Comfort
- indoor climate systems

Lindab®


Lindab

Lindab - all over the world

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Contents

We make a difference in the indoor climate

A good indoor climate is far from a natural part of daily life - although it should be. Now, however indoor climate has been put on the agenda of the public debate. This makes demands on you, and Lindab can help you meet them.

Lindab puts indoor climate on the agenda.

Not all your customers think about the underlying factors for a good indoor climate. Lindab does. Our many years of experience has given us an in-depth knowledge of how to create the best conditions for a good indoor climate - and an understanding of what it means for both health and well-being. We put that knowledge and experience at your disposal, when you choose Lindab as your business partner.

We help to secure a good indoor climate for everyone

We don't just make a difference with regards to the indoor climate - but also in the co-operation with our customers. It is not by coincidence that our products are integral parts of the majority of the world's ventilation-systems. Right from the design through production to the final delivery, your needs are front and centre. It is by working together that we can achieve success. How? That is just what we will give you an insight to on the following pages.

Good indoor climate doesn't just happen. You being able to offer your customers the best possible indoor climate is built on four key abilities: knowledge, logistics, design and dialogue. We have these abilities, and that is exactly why Lindab makes a difference.

Knowledge

Knowledge is about being in possession of the necessary competence and insight, which makes it possible to develop the right solutions and systems. It is also about having the necessery understanding for the customers and the co-workers, who are able to offer technical advice and support, as well as develop and design these solutions.

We can document our solutions.
When you implement a solution, you must be able to trust its quality. That is why documentation and new technology plays an important role for us in our work to find the most intelligent solutions and functional products. These are continually tested in our own laboratories to insure the highest quality. Our product-programme is carefully described and documented - in catalogues and the programme CADvent, which is a part of Lindab's extensive softwarepackage, Lindab ITline.

Lindab laboratories insure a high quality
Quality is the key in choosing us as your business partner. Consequently, all our products are tested in our own air- and acoustic laboratories, where we combine the customers' ideas and views with our abilities and experience - before production begins. The laboratories enable us to conduct full-scale testing offering you a direct advantage.

Logistics

Your time is valuable, and therefore it is crucial that we always deliver components on time. Never too late - and not too soon.

Delivery from hour to hour

To deliver on time - often from hour to hour- is a priority with Lindab. The key to our effective logistics system is our fully integrated online sales- and production system, which connects Lindabs divisions throughout the nation. That means, that your local Lindab division for all purposes will function as your main warehouse, and that you can order or pick up any components you may need from your local division.

Design

With a selection of more than 25,000 standard components and the possiblity of specialized solutions which can meet any need, Lindab helps secure a good indoor climate for everyone.

Good indoor climate is also design

If we want to make sure thousands of people have a good indoor climate, insuring their well-being every day of the year, it is not only a matter of delivering a product, which is efficient and economical. It is as much a matter of design.

We co-operate with architects and designers

Lindab knows that is it not enough that our solutions are efficient, they have to be beautiful and in harmony with the surroundings in which they are placed. Consequently, we have thoughout many years had a dialogue with our customers. Through a close co-operation with a number of renowned architects and designers, we have shaped diffusers and other visible and important details. One architect and industrial designer is Knud Holscher, who has won the Industrial Design award for his design of our diffusers.

We offer our clients special treatment
We are always up to the task. Besides our standard programme, we can design and produce components and solutions to suit your every need. We have divisions, who specialize in bespoke solutions. Tell us which component you need, and we will produce it. That is the only way we can achieve the perfect solution - every time - together.

Dialogue

Dialogue is the heart of our corporation. It is the dialogue with our customers and our suppliers - and that between co-workers - which is the central axis of all, that we do.

Dialogue is an important part of everyday life

It is the daily contact, which makes us better at: servicing our customers, co-operation, and developing new innovative products. Lindab is not just a supplier - we also function as the technical advisor, with regards to our product's function and we have to be able to fulfill the very different needs and wants of our customers.

We develop through close dialogue

It is only through the close contact with our customers that we are continuously able to develop better solutions. It takes two parties to keep a dialogue going, and Lindab never just sits waiting by the phone. In active co-operation, we follow up on your expectations. How else would we be able to meet them?

We know your needs

Lindab is a modern and innovative corporation with great experience and expertise within its field. With us you will be well equipped to meet the challenges and demands of the future.

Lindab - an international success

Lindab was founded in Sweden in 1959 and is divided into two business areas: Ventilation and Profile. Ventilation and Profile develop, produce and market ventilation- and building components in thin plated steel. Worldwide the corporatin has more than 4,100 employees distributed throughout 125 branches in 26 countries. In Denmark alone, 500 employees are working within the area of Ventilation, and 150 employees are working within the area of Profile. Our management system has been certified by ISO 14001 and ISO 9001 standards.

The success of our clients is our future

Today Lindab is one of the worlds leading suppliers to the ventilation business, and we want to continue to be so. We will continuously develop and strengthen the abilities we possess today: knowledge, logistics, design and dialogue - and in doing so, we will make the difference to ensure our customers continued success.

Simple.

Areas of Production

Air duct systems

This area of production includes our complete programme of circular and rectangular ducts and fittings. Furthermore the production programme includes a large programme of roof hoods, dampers, silencers etc.

Read more in the catalogue: “Air duct systems”

Comfort Indoor Climate systems

The product area Comfort includes air- and waterborne indoor climate systems as well as silencers. The airborne systems, which you can read more about in this catalogue, includes among other things diffusers, VAV-systems and dampers.

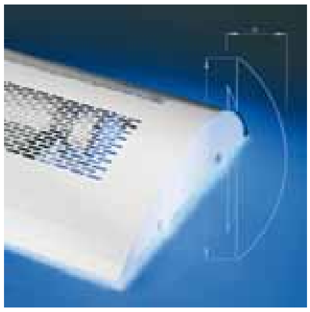
The waterborne systems include active and passive chilled beams, facade systems, cooling panels, heating panels, regulators, protection against condensation etc.

Read more in the catalogue “Comfort - waterborne indoor clinate systems”.

Accessories and aids

By using our network of service centres throughout the country, you will be able to supply yourself with everything you may need to install a ventilation system - fans, filters, automatics, brackets etc.
We are close by.

Read more in the catalogue “Accessories”.



IT-solutions

We offer a unique pallette of programmes for construction, calculations, and dimensioning of ventilation- and indoor climate systems. This saves time and money for all parties in the project, and offers a more reliable, safe and efficient ventilation system.

Read more about IT-solutions on the next page.

IT-Solutions

Time is an important factor when working with construction and dimensioning of a ventilation system. The faster and the more freely you are able to move between the different work-processes and programmes, the faster you will be able to finish the job at hand.

With Lindab we know how precious your time is. We offer several different intelligent and rational tools to make your daily life easier. In short, it will offer you the possibility to work out optimal and dependable solutions for ventilation in the shortest amount of time.

CADvent

CADvent is the complete tool for drawing, dimensioning, calculation, quantifying and presentation of complete ventilation systems.

- Fast and simple to use in 2D and 3D.
- The design functions include dimensioning and calculation and contain the most inclusive and advanced tools on the market.
- Makes it possible for the engineer to carry out radical design changes of a ventilation system with automatic updates of the information' - fast and simple.
- Print Bills of Materials - total or by levels.
- Impressive and correct presentation of cut and plan-drawings.
- Database of the most used products on the market, which follows the danish standard for exchange of information.
- With the 4D-coupling to our project planningsystem we can incorporate the fourth dimension into the project. This offers the possibility for planning for delivery, scheduling and optimized planning management.
- With CADvent you can send your drawing directly to your local Lindab sales office.

DIMcomfort

Product choice and dimensioning programme for Lindab's air-borne indoor climate solutions. From userdefined requirements the programme suggests suitable product alternatives.

- Can be used as a separate product-choice guideline and can be linked to CADvent.
- Enables a quick choice of diffusers and grills.
- Offers correct dimensioning and positioning of the products.
- Access to calculations for sound and temperatures in addition to simulation of airflow from the fittings.
- It is possible to make prints of the chosen products
- Adjustment of supply air and exhaust air diffusers to optimize the comfort for the users of the room.
- It is possible to download from www.lindab.dk

DIMsilencer

Product choice and dimensioning programme for Lindab Silencers, which is able to give detailed support for effective silencing of air-duct systems. From userdefined requirements the programme suggests suitable product alternatives.

- Can be used as a separate product choice programme and can be linked to CADvent.
- Quick choice of silencers which will meet the predefined requirements.
- Complete system calculation from fan to room.
- Fast and simple to change requirements and predispositions to find alternative solutions.
- It is possible to make prints of the chosen silencers.
- It is possible to download from www. lindab.com

DIMsilencer is very user-friendly, continuously updated with the newest measurements - measured by the going standard, and has a built-in room module, which makes it possible to conduct sound-calculations which accurately match the predispositions of the room.

TEKNOsim

Our programme for simulation of indoor climate is very easy to use and can be used in all phases of the building process. The complete constructions for the walls, windows, ceiling and floor in addition to other functions, are chosen by using the dialogue-boxes in a database.

The programme is not tied to a specific manufacturer'. This means that you are able to choose if the programme should dimension our products or someone else's. By calculating the cooling temperature necessary, you can choose between aircooling (100% convection flow) or some of Lindab's products (a mix of radiation and convection flow).
Besides calculating the power need or the resulting temperatures (air and operative) the TEKNOsim also calculates the PPD-index. The result is shown in both diagramme and text-form. All results are easily transferred to other Windows-based programmes like Word or Excel.

Education and support

Lindab offers education and support on all our own programmes.

- Basic introduction course
- Support by installation and start
- Continued education

You can find more information at www.lindab.com.

Our IT-solutions are created for the purpose of easing and making your job more efficient. From project to the final construction - fast, simple and reliable.

References

At www.lindabcomfort.com you will always find the newest references and latest product news.

Syddansk University, Odense.

Hotel Marriott, Copenhagen.

Aluminium-grilles, Metro stations, Copenhagen.

Billund Airport, Billund.

Langelinieparken, Aarhus.

Operaen, Copenhagen.

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

References

At www.lindabcomfort.com you will always find the newest references and latest product news.

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Marienlyst Casino, Elsinore.

Ejendal arena, Leksand.

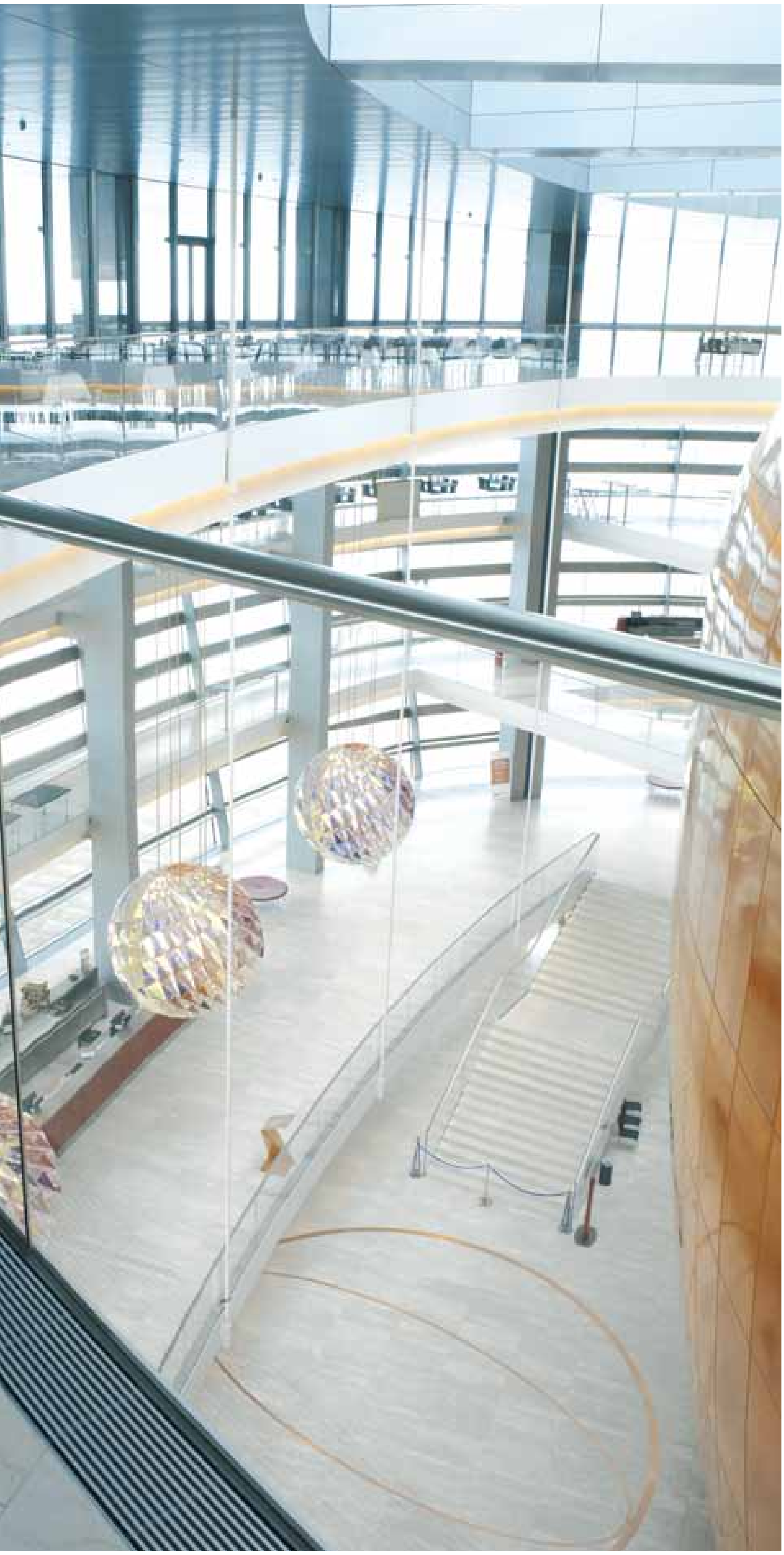
Henning Larsen architechs, Copenhagen.

The royal theatre, Copenhagen.

Hospital, Copenhagen.

Telia, Copenhagen.

Comfort and design



Comfort and Design

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When the climate is perfect, there is room for big thoughts

Man was not built to be indoors. It is in our nature to prefer fresh air. It gives comfort - and we all know how important that is for efficiency.

Not everyone can work outdoors.

Lindab has for years developed indoor climate solutions, and we always keep our goal in mind - to maintain an optimum indoor climate. The world over, our know-how has made it more comfortable to work indoors. Our indoor climate solutions are today an intricate part of planning, when talking about standard components - but also very much so in the case of architectural special solutions.

Products for every type of indoor climate solution

Lindab offers a selection of indoor climate solutions, which besides the airborne indoor climate solutions also include a very large programme in waterborne indoor climate solutions and silencers.

Combined as well as separate, the two programmes create the best conditions for an indoor climate solution adapted to the specific requirements and desires for comfort. That is exactly why we have gathered these different types of indoor climate solutions under one hat with the appropriate name: *Comfort.*

Denmark's compentence centre for indoor climate

The demands for comfort increase at the same rate as the technology develops. As a market leader Lindab is very aware of our responsibility to influence the development rather than just to respond to market demands. We consider it our natural mission to continuously strengthen our products with research and product-development in order to benefit your solutions.

The visible evidence can be seen in the company's compentence centre for indoor climate solutions in Farum, and in the client support centre in Viby by Aarhus. In the compentence centre, the work within the areas of development- and construction is very focused on producing the best solutions. This development takes place in close co-operation with the competence centres sound- and airlaboratories, who simultaneously test the constructions and offer input for optimizing the solutions, before they are launched on the market.

The joy of development drives us, the customer satisfaction and appreciation is the reward we get for a perfectly constructed solution.

Because we are people too.

Comfort and Design

In safe hands from start to finish.

With Lindab as your business partner in your work with indoor climate solutions, you are in safe hands. From the moment you contact us with your project to the time you deliver the complete indoor climate solution to the building owner. Our priority is strengthening your solution from start to finish so you can feel absolutely secure.

A good start....

A good start on a project is the deciding factor for the continued progress, where later adjustments typically cost much more than the adjustments made at the beginning of the project. Lindab can in more ways than one be of assistance.

All over the world the Lindab organisation is ready to help you - our technicians and engineers have the newest knowledge of indoor climate, are standing by to advise you on the best solutions available.

It is of great importance to us, that you experience Lindab as an attentive business partner during the entire project process. We are consequently very happy to see, by way of our customer satisfaction survey, that *96% of our customers express their satisfaction with the advise and service we deliver as a natural part of a Lindab Solution.

The correct solution, when and where you need it

We understand the importance of fast and accurate delivery directly to the building site. A good teamwork requires trust in each other and the agreements you enter into. We are very proud of our delivery guarantee, and we are always working to further strengthen our logistics.

Strengthening your solution

It is our goal to always strengthen our customers solutions. This is the case when our engineers develop productlines, and research in the indoor climate solutions of the future, as well as when we develop IT-solutions to ease your daily life. When we advise you rearding planning and the completion of actual projects, in addition to when we deliver the solutions directly to the building site.

Lindab is with you all the way.

* Customer satisfaction survey , December 2005

Comfort and Design

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One thing is theory - another is practice

Today bigger and bigger demands are made on security in documentation of both standard and specially designed components in ventilation constructions.

The technical ventilation calculations are not always adequate in insuring a correct calculation foundation for an indoor climate, which corresponds to the owner of the buildings demands.

Relationships between buildings and loads can be one of the reasons for full-scale testing. Consequently Lindab can offer a realistic test of theory in the largest and most advanced air- and sound technical laboratory in Northern Europe. Here we can find the perfect solution for most ventilation problems. Having seen the solution in full-scale before the project is begun gives a great sense of security.

Full-scale testing

Air patterns are visualised in smoke so that you are able to form an accurate impression of the exact solution you have chosen. This is needed in order to determine if the chosen solution indeed is the right one for the specific purpose.

Advanced measuring equipment

Advanced technique and measuring equipment registers data. The measuring programme and the data is then collected in specially designed software. This is done from the control centre. A detailed report is compiled and sent to you as our customer, to be used for the continued planning process or perhaps as documentation for the building owner.

Lindab's sound laboratory is built in accordance to the DS/EN ISO 7235 standard. In this setting measurements of the damping ability of absorption silencers, flow noise and total pressure loss are taken.

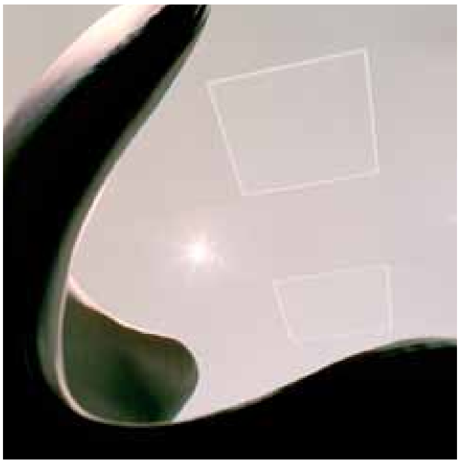
Comfort and Design

We make specialities - standard

Our initial starting point is that no assignment is impossible. Several years of working with customer-adapted solutions has given us a solid know-how, which benefits you greatly.

Adaptation of diffusers to suit the environment in which they will be placed, while at the same time focusing on the most optimum function, are key when producing special products. Lindab offers consultation from the initial idea-phase to the time the product has been mounted and tested.

Our ability to counsel on, and to manufacture, special solutions of a high quality is one of the reasons, why a Lindab solution is present in many prestige projects all over the country.



Complete solutions

Lindab has for many years been specialists within the area of ceiling adaption where aesthetics and functionality coexist to obtain the best solution possible. The large selection of diffusers can be adapted to fit most ceilings. Futher details are discussed under the section “Ceiling diffusers”.

Lindab has also entered into several new partnerships with ceiling suppliers. FUSION is a new and different dynamic ceiling concept, in which a number of suppliers deliver components designed and integrated in the design of the ceiling itself. Lindab contributes with airborne as well as waterborne solutions.

The following pages will give you an overview of the different designs, which are reproduced in our combination overviews in the catalogue.

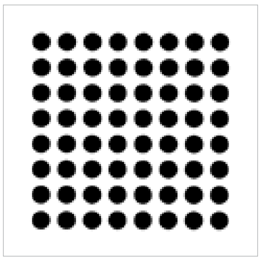
Comfort and Design

Design possibilities

Square and rectangular diffusers

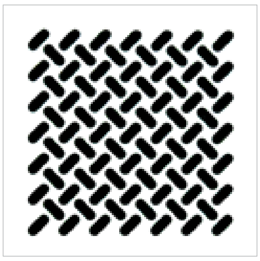
The different designs of perforations offers you as a customer the possibility to integrate the visible details with the surroundings. The possibility to combine the perforated diffuser with the hidden rotation pattern satisfies both function and aesthetics.

Design 1 and 8



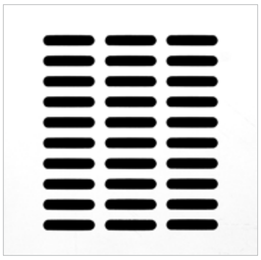
Ø7 mm
Square division
10 mm
free area 38%

Design 2 and 9



5 x 8 mm
free area 50%

Design 3 and 10



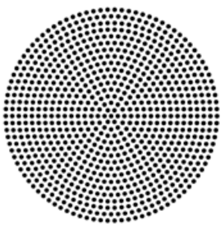
OB 4x20 mm
even division 8x24 mm
free area 40%

Design 4 and 11

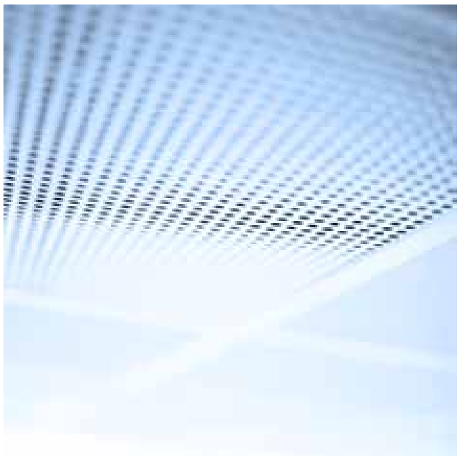
8x8 mm
even division 12,5 mm
free area 41%

Circular diffusers

Design 6 and 7

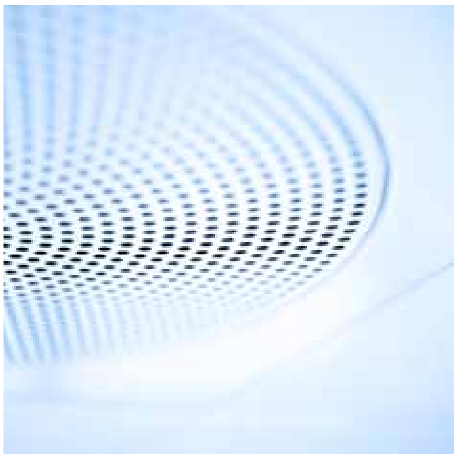


Ø7 mm
free area 38%



Design 1

Design 3, where the perforation in the front plate matches the perforation in the ceiling system.



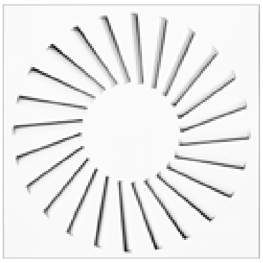
Design 6

Comfort and Design

Design possibilities

Rotation - square and circular diffusers with set guiding vanes.

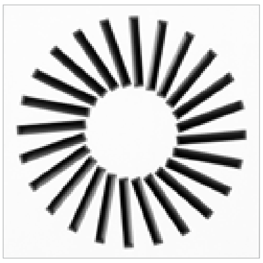
Design 14



Design 14

Rotation adjustable guiding vanes in matt black plastic.

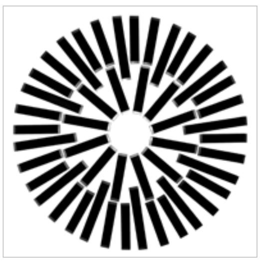
Design 15



Design 15

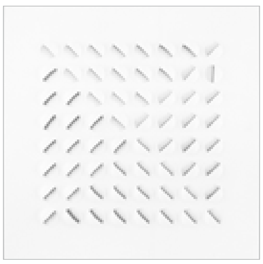
The guiding vanes can be delivered in other colours matching the front plate or in a contrast colour.

Design 16



The guiding vanes can be delivered in other colours matching the front plate or in a contrast colour.

Design 19



Design 19

Nozzles for individual air pattern change in white plastic. Plastic nozzles can be delivered in other colours matching the front plate or in a contrast colour.

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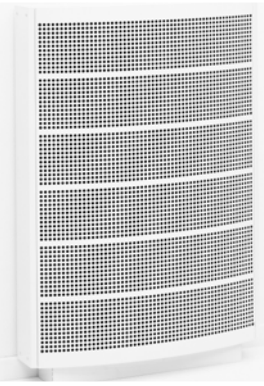
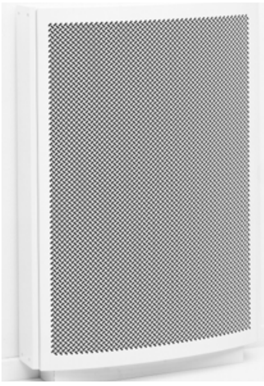
Design possibilities

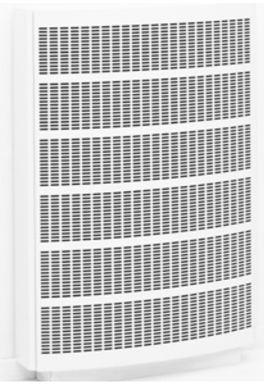
Displacement units



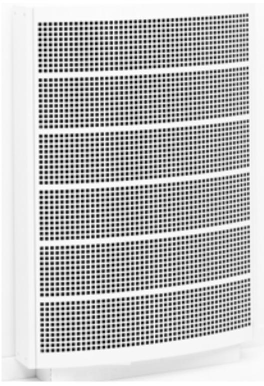
**Ø7 division
square division 10 mm
field perforated
free area 38%**



**5 x 8 mm
field perforated
free area 50%**



**4x20 mm (OB)
equal division 8x24 mm
field perforated
free area 40%**



**8x8 mm
equal division 12,5 mm
field perforated
free area 41%**

We develop through close dialogue

Lindab’s displacement units can be delivered in many specially adjusted designs. As a free standing variety, the unit may be made a part of the buildings architecture, or be made a part of the decor. The displacement unit may also be mounted around constructional columns in order to hide them. At the same time they will function as supply air units. All possibilities are open - design your own solution - and contact Lindab to make the solution come to life.

Lindab®

Comfort and Design

Colours and Materials

Colours

Lindab has the most modern production technology at its disposal. This is also the case when it comes to our coating system.

We control several powder coating systems, which ensures you fast delivery of diffusers in the desired colour and in a very high quality.

Lindab offers coating in all RAL and NCS colours, and co-operates with among others, laboratories in Germany for the purpose of analyzing and producing powder for very specific and special colours.

Product overview / symbols

Product overview

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

Lindab Formo

Aesthetic design

Function
Mixed ventilation, horizontal and vertical jet-patterns, 1-2-3 way jet-patterns, exhaust air.
Use
Offices, restaurants, show rooms, schools, stores, supermarkets, institutions.
Installation
Cut directly into the ceiling or mounted on suspended ceilings by use of adapted ceiling tiles.
Size and Capacity
ø125-400, 0-80 W/m²
Important features
Awardwinning, ceiling adaption, simple and economical.

Lindab Integra

Integrated design

Function
Mixed ventilation and low impulse,
horizontal and vertical jet-patterns, exhaust air.
Use
Offices, restaurants, show rooms, schools, stores, supermarkets, institutions.
Installation
Cut directly into the ceiling or mounted on suspended ceilings by use of adapted ceiling tiles.
Size and Capacity
ø125-315, 0-80 W/m²
Important features
Flush diffuser, ceiling adaption and flexible possibilities.

Lindab Versio

Countless possibilities

Function
Mixed ventilation and low impulse, horizontal and vertical jet-patterns, 1-2-3 way jet-patterns, exhaust air.
Use
Offices, restaurant, show rooms, schools, stores, supermarkets, institutions.
Installation
Available adapted to suspended ceilings
Size and Capacity
ø125-315, 0-80 W/m²
Important features
Countless configuration-possibilities, unique suspension-system for front plates, simple mounting integrated in the ceiling system, flush to the ceiling.

Lindab Lineo

Clean lines

Function
Mixed ventilation, horizontal and vertical jet-pattern, exhaust air.
Use
Offices, restaurants, hotels, show rooms, stores.
Installation
Cut directly into the ceiling or wall/skirt.
Size and Capacity
ø125-200, 0-50 W/m²
Important features
Simple and clean lines, possibility for unbroken bands throughout the length of the room.

Ceiling diffusers - visible

Function
Mixed ventilation, horizontal jet-patterns, exhaust air.
Use
Offices, restaurants, show rooms, schools, stores, supermarkets, institutions.
Installation
Against the ceiling or free-hanging. The box is equiped with threadnuts in the top for mounting.
Size and Capacity
ø100-315, 0-80 W/m²
Important features
Diffusers are not dependent on a straight duct in front of plenum box.

Product overview

Industrial diffusers

Function
Mixed ventilation, horizontal and vertical jet-patterns.
Use
Show rooms, conference rooms, stores, supermarkets, industrial rooms.
Installation
Free hanging or mounted on walls or columns.
Size and Capacity
ø125-630, 0-100 W/m^2
Important features
Several varieties of electrical motors and thermal actuator for change of jet-pattern.

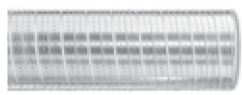
Nozzles

Function
Mixed ventilation, directed jet-patterns.
Use
Swimming halls, sport halls, stores, supermarkets, industrial rooms.
Installation
Directly in the air duct, fitting or duct-side/skirt.
Size and Capacity
ø57-400, 0-60 W/m^2
Important features
Adjustable nozzles.

Plenum boxes

Function
Ensures a stable air flow to the diffuser, sound attenuation and individual adjustment.
Use
All building types.
Installation
Hidden or free hanging. Several types of mounting integrated in the construction.
Size and Capacity
ø80-315
Important features
Low building heights, graduated adjustment wires. K-factors printed on the adjustment wire. K-factor independent of diffuser.

Ventiduct



Function
Mixed ventilation, horizontal and vertical jet-patterns, 1-2-3 way jet-patterns.
Use
Industry, exercise rooms, schools.
Installation
Free hanging.
Size and Capacity
ø200-500, 0-100 W/m^2
Important features
High capacity, large area of dynamics and simple mounting.

Wall diffusers

Function
Mixed ventilation, horizontal and adjustable jet-patterns, exhaust air.
Use
Offices, restaurants, show rooms, schools, stores, supermarkets, institutions.
Installation
Mounted in the wall or skirt.
Size and Capacity
ø80-200, 0-50 W/m^2
Important features
Compact plenum box type WB has a maximum width of 500 mm, which makes it possible to mount in an ordinary wall construction with a centre distance of 600 mm.

Grilles

Function
Mixed ventilation, horizontal, vertical and adjustable jet-patterns, exhaust air.
Use
Offices, restaurants, show rooms, schools, stores, supermarkets, institutions.
Installation
Wall/floor mounting or directly in the air duct.
Size and Capacity
Available in standard sizes and adapted to 3000x3000 mm 0-60 W/m^2
Important features
The broadest programme on the market, aluminium grilles, and steel grilles.

Product overview

Displacement units

Function
Principle of displacement, adjustable jet-patterns.
Use
Canteens, restaurants, show rooms, schools, stores, supermarkets, institutions, industrial rooms.
Installation
Mounted on the wall, against the floor or free-hanging.
Size and Capacity
ø125-630, 0-80 W/m^2
Important features
Adjustable nozzles, able to change the near zones geometry. Good adaption possibilities.

Air flow regulators

Function
Sustaining constant or variable air flow in the air duct system with a mechanical regulator.
Use
In circular duct systems in all types of buildings.
Installation
In circular air ducts.
Size and Capacity
ø80-315, up to 12 m/s
Important features
Mechanical function, available in motorized form.

Fresh air valves /overflow unit

Function
Brings about air change and pressure levelling between rooms.
Use
Offices, homes.
Installation
In the outerwall or separating wall between rooms.
Size and Capacity
Circular and rectangular varieties.
Important features
Telescopic function which simplifies mounting.

Air valves

Function
Mixed ventilation, horizontal jet patterns, exhaust air.
Use
All types of buildings.
Installation
Directly into circular air ducts or fittings.
Size and Capacity
ø100-200
Important features
Simple and easy mounting directly in air duct with bayonet-socket.

VAV

Function
Mixed ventilation and low-impulse. Horizontal jet patterns, built-in damper function in the diffuser.
Use
Offices, restaurants, exhibits, schools, stores, supermarkets, institutions.
Installation
Cut directly into the ceiling or adapted to system ceilings. Air flow regulators directly in the air duct system.
Size and Capacity
Diffusers ø160-315, 0-80 W/m^2
Dampers ø125-630, up to 10 m/s
Important features
Diffusers with damper motors built-in, makes it possible to vary the air volume from 0% to 100%. Room regulator Regula Combi with many functions in the same unit.

Cleanroom diffusers

Function
Mixed ventilation, horizontal jet patterns, exhaust air.
Use
Clean rooms, pharmaceutical and bio-technological industry.
Installation
Ceiling or wall mounting.
Size and Capacity
ø125-400, and rectangular connections 0-80 W/m^2
Important features
Hinged frontplate assures an easy access to filter and internal components.

Combination overview

Possibilities

Symbols

Combination overviews, available on most larger series gives an easy and fast overview of the product series.
In the combination overview the individual products are shown with possible combinations, different types of accessories and ceiling adaptions. The symbols below shows the possible combinations.

- ● 1. Product and tech. data depicted in catalogue.
- ○ 2. Combination possible. Tech. data depicted in catalogue.
- ● 3. Combination possible. Tech. data not in catalogue.
- 4. If space is empty, combination is not possible.

Product choice:

Several products are based on a configuration, where the final product is configurated to.

Choices Versio:

PS	Perforated	Square
RS	Rotation	Square
NS	Nozzles	Square
GS	Grilles	Square

Choices Integra:

PC	Perforated	Circular
RC	Rotation	Circular
NC	Nozzles	Circular

Choices wall diffusers:

PR	Perforated	Rectangular
NR	Nozzles	Rectangular
DR	Adjustable blades	Rectangular

Design:

The configurated series create the possibility of more differnt designs in perforations and rotation patterns etc. The design is numbered, and more closely described in the chapter ”Comfort and Design”.

Grille boxes / plenum boxes:

Specifically for the Versio series, the overpart and plenum box are a part of the configuration. Here the choice is betwen a circular or rectangular connection and a vertical or horizontal connection. At the same time the type of regulation needed to supply the diffuser has to be decided upon.

Choices - connection:

V	Vertical circular connection. Square grille box.
H	Horizontal circular connection. Square plenum box.
R	Horizontal rectangular connection. Square plenum box.

Choices - dampers:

0	Without damper and measuring device (always grille box type V)
1	With damper without measuring device
2	With damper and measuring device

Function:

The configurated series can be used for several types of supply air principle as well as exhaust air. In order to achieve the desired function, it is necessary to determine how the diffuser will be used.

Choices:

S	Supply air
E	Exhaust air
L	Low impulse

Connection size:

Size of the diffusers connection-dimension is chosen

Ceiling system:

In order to adapt the diffuser for the right ceiling type, the ceiling system is chosen. The ceiling systems are numbered and more detailed described in the chapter “ceiling adaption”.

Order codes:

The configurated series are ordered from the desired configuration. Order codes are noted on the product pages.

Accessories:

In the combination overviews, the types of accessories the product can be combined with is noted. The accessories are ordered separately, more details on the individual product pages.

Symbols

Symbols create an overview

We use symbols in order to view the opportunities you as a customer have by choosing the individual product.

The symbols below are used:

Mixed ventilation
The diffuser works by the principle of mixed ventilation

Principle of displacement
The diffuser works by the principle of displacement

Low impulse principle
The diffuser works by the principle of low-impulse

Supply air

Exhaust air

Horizontal supply air

Vertical supply air

Inward swirl

Outward swirl

Supply air 1 way

Supply air 2 way

Supply air 2 way corner

Supply air 3 way

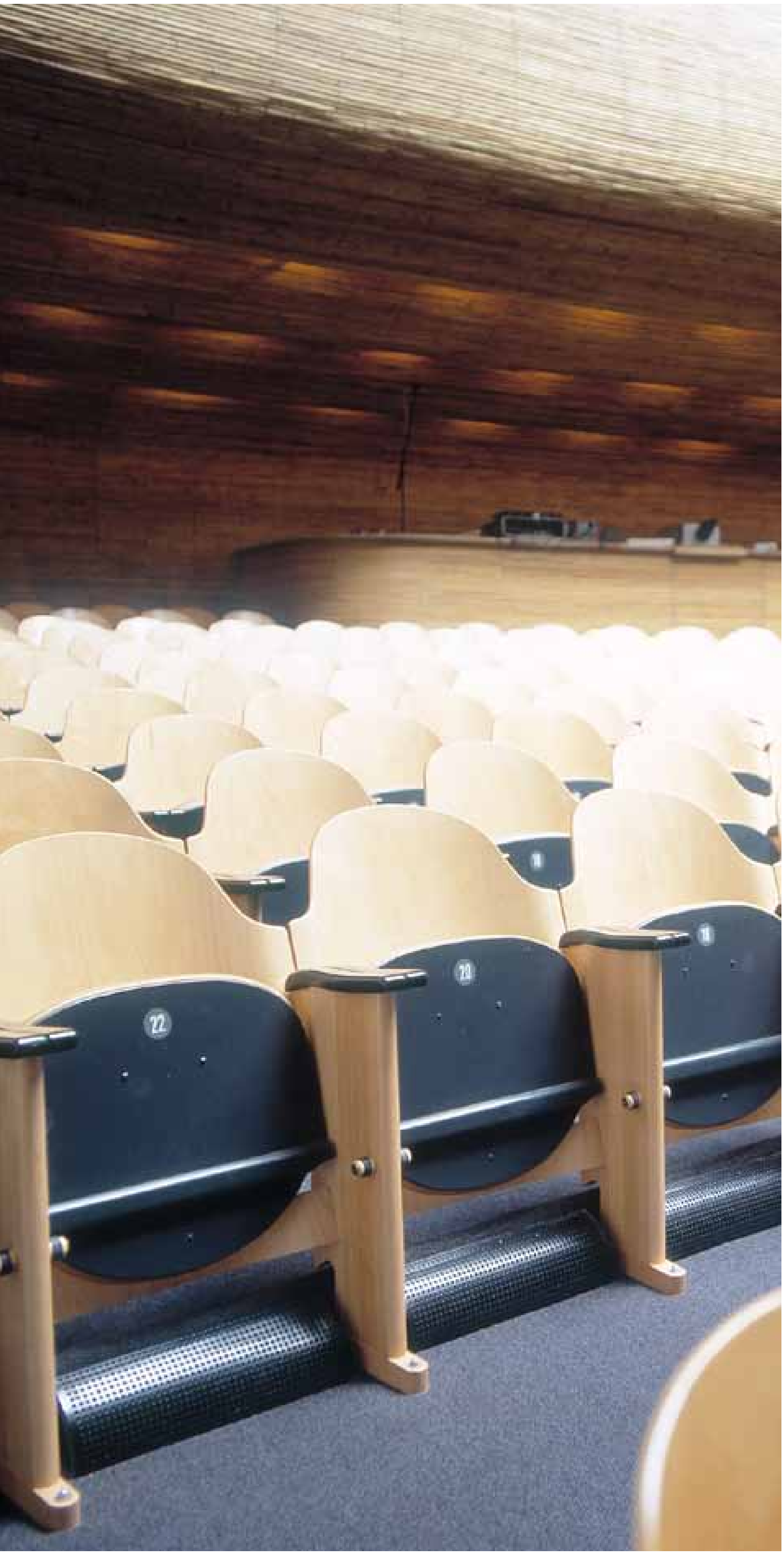
Nozzle supply air

Closed damper

Open damper

Without damper

Theory



Theory

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Contents

Air distribution systems

Mixed ventilation

In mixed ventilation the air is supplied with a relatively high velocity outside the occupied zone, usually from the ceiling or the wall. The high velocity of the supplied air means, that a considerable amount of room-air is circulated as well. The velocity of the supplied air should be kept at a level which ensures that the mixing is effective, but at the same time ensures that the air velocity has fallen to the required level by the time it reaches the occupied zone. This makes demands on the efficiency of the units used as regards to velocity and mixing capacity.

An increase in the supplied air velocity will cause an increase in the sound level. Requirements for a low sound level consequently means a limit on the diffusers efficiency. The temperature and the contamination concentration is roughly the same throughout the room, for both isothermal and cold air.
Mixed ventilation is mostly unaffected by outside influences and can be used for both heating and cooling needs.

Supply of heated air

Since heated air is lighter than the room-air, it takes a considerable energy to force the air into the occupied zone. This means that the requirements for the downward supply air velocity rises with the increase of ceiling height and rising temperatures. When the ceiling height is high, it is usually necessary to blow the air vertically down wards.

Supply of cold air

The heavier cold air, supplied from the ceiling, may lead to excessive air velocity in the occupied zone if the thermal loads are large. The air jets from diffusers (normally horizontal) and the convection streams from the heating sources (people, lighting, machines) result in a velocity in the occupied zone, which in addition to the supplied air velocity from the diffuser, depends on the removed effect per square meter (W/m^2), the distribution on the individual diffusers and the diffusers jet pattern.

The supply of both heated and cold air in the same diffuser, from the ceiling cannot normally fulfil requirements for temperature gradient, ventilation efficiency and velocity in the occupied zone at the same time.

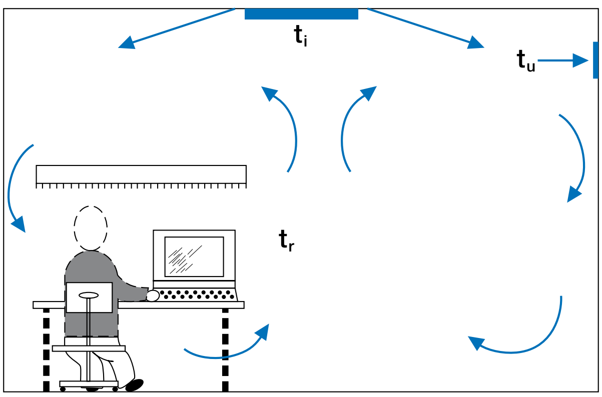


Fig. 1, Illustration of mixed ventilation.

The solution to this problem may be motorized diffusers, which can change the jet patterns. Another option is to dimension the diffusers to suit the cooling situation in question, and then add vertical nozzles for supply of heated air.

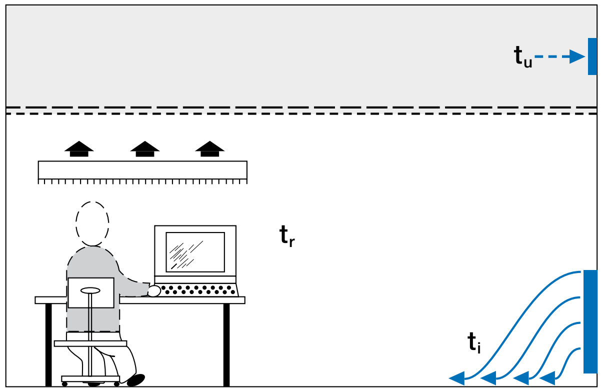


Fig. 2, Illustration of displacement ventilation.

Displacement ventilation

When using displacement ventilation, it is the thermal forces from the heating sources in the room, that control the air distribution. The air is supplied directly into the occupied zone at floor level - at low velocity and a cooling temperature. The air spreads across the floor, and displaces the hot, contaminated air, which is forced to the ceiling by the convection flow from the heating sources. Exhaust units should be placed in the ceiling, where a hot "contaminated" layer is formed.

The ventilation efficiency of displacement ventilation is larger than the mixed ventilation owing to this stratification of the air. The difference is increased with the ceiling height.
The increased temperature efficiency means, that cooling power can be saved, or that the cooling effect of the outside air can be used better, since the exhaust air is warmer and consequently will transport more effect from the room.
In normal circumstances displacement ventilation is not suitable for heating purposes.

The near-zone of the units depends primarily on the amount of supplied air, the cooling temperature and the placement of the unit. Within the recommended air flow area, the units size has no practical influence on the near-zone. The near-zone geometry can however be altered to suit the individual needs just by adjusting the nozzles.

Air distribution systems

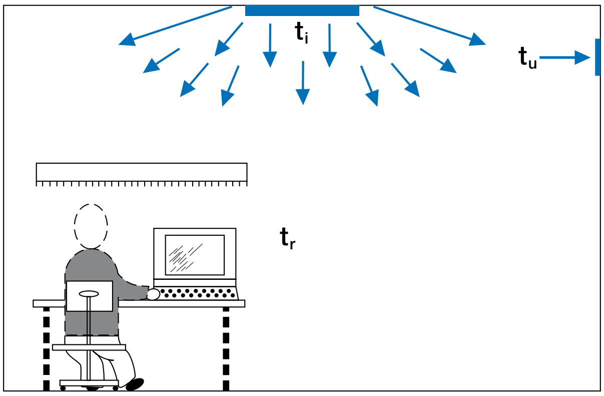


Fig. 3, Illustration of low impulse supply air.

Low-impulse supply air

By using low-impulse supply air, cold air from the ceiling is supplied at a low velocity. The clean air displaces the contaminated air.

The best result is obtained by distributing the supplied air flow in small portions spread out over the entire ceiling.

The system cannot be used for heating.

Choice of air distribution system

The different systems have their advantages and disadvantages. These should be considered carefully before choosing a system solution.
All the system solutions have one thing in common: the more units used, and the better the distribution of units in the room the better the thermal and atmospheric comfort achieved. The advantages and disadvantages are outlined below.

Mixed ventilation

+ Can be used for cooling and heating
+ Large induction allows supply air with a larger cooling temperature.
+ Largely the same temperature and air-quality through out the room, ie. a small temperature gradient and a small concentration gradient.
+ Stable flow pattern.
+ Flexibility with regards to placement of the diffusers.
+ No reduction of useful area (near-zone).
- Risk of short-circuits/low ventilation efficiency (particularly for heating).
- More power required for cooling.
- Risk of draft when large cooling effect.

Displacement ventilation

+ High ventilation - and temperature efficiency.
+ High air quality in the occupied zone.
+ Low velocity in the occupied zone, although not in the near-zone.
+ Suitable for cooling of rooms with high ceiling height.
- Less freedom with regard to furniture positioning, and the room space is reduced due to the diffusers near-zone.
- Low induction.
- Large vertical temperature gradient.
- Heating is not possible.

Low impulse

+ No reduction of useful area.
+ Suitable for large air replacement with limited cooling temperature.
+ High local efficiency.
- Low induction.
- Heating is not possible.
- Risk of short-circuit when the exhaust is in the ceiling.

Air distribution systems

Choice of air distribution system

		Mixed								Displacement			Low-impulse
		Nozzles	Grilles	wall diffusers	Ceiling diff. w. one slot	Perf. diffusers	Cone diffusers	Swirl diffusers	Slot diffusers	Wall diffusers	Floor diffusers	Under seat supply	
Office	Heat + cold				••	••	••	•••					
	0-30 W/m²			••	•••	•••	•••	•••	•	•••			
	30-60 W/m²				••	•••	••	•••					
	>60 W/m²					••	••	••		••	•••		
Audience	Conference rooms				•	••	••	••		•••	•••		
	Cinema					•	•	•		••	••	•••	
	Auditoria					•	•	•		••	••	•••	
	Restaurants				•	••	••	••		•••	••		
	Educational estab.			••	••	•••	•••	•••		•••			
	Exhibition halls		•	••	•••	•••	•••	•••	•	•••	•••		
Stores	Shops	•	•	••	••	•••	•••	•••	•				
	Supermarkets	•	•		•••	•••	•••	•••					
	Sportshalls	•••	••				••			•			
	Swimming baths	•••	••			•	••	••					
	Industrial kitchens				•	••	••	••		••			•••
	Laboratories				•	••	••	••		••			•••
	"Clean room"				•	••	••	•••					
	Homes		••	••	•••	•••			••				
	Institutions		••	••	•••	•••				••			

• Usable •• Good ••• Best

Choice of air distribution system in industrial environments

Ventilation need	Heating need	Cooling need	Mixed ventilation	Displacement ventilation	Low-impulse
❄	❄	❄	X		
❄	❆	❄	X		
❄	❆	❆	X		
❄	❄	❆		X	X
❆	❄	❄	X		X
❆	❆	❄	X		
❆	❆	❆	X		
❆	❄	❆		X	X

❄ Little need ❆ Large need

Mixed ventilation

Mixed ventilation

An air distribution unit must supply a certain amount of air, in order to provide adequate ventilation. At the same time requirements for sound pressure, air velocity and temperature gradient in the occupied zone must be respected. In order to fulfil these requirements, certain planning guidelines are necessary. The most important ones are specified below. When choosing a diffuser, values such as pressure loss, sound level and air throw have to be taken into account. This data is specified for each individual product separately.
The selection and performance data contained in the Lindab catalogue are the result of measurements conducted in Lindabs laboratory using modern precision instruments. The conditions are rarely as ideal in practice as in a laboratory, since constructional choices, furnishing, placement of air distribution units etc. have a great influence on the distribution of the air in the room. Lindab offers to test the conditions in practice by conducting full-scale testing, which is very useful when large and complicated projects are being planned.

Descriptions

A	Total room absorption	[m²]
b_h	Maximum horizontal spread to final velocity 0,2 m/s	[m]
b_v	Maximum vertical spread to final velocity 0,2 m/s	[m]
F	Free cross-section (q/v_0, where v_0 is measured)	[m²]
K_{ok}	Octave correction value for sound power level	[dB]
$l_{0,2}$	Air throw to terminal velocity 0,2 m/s	[m]
$l_{0,0}$	Turning point at vertical supply air	[m]
l_b	Distance from the unit to point of maximum spread	[m]
L_A	A-balanced sound pressure level	[dB(A)]
L_{WA}	A-balanced sound power level	[dB(A)]
L_{Wok}	Sound power level in octave-bands	[dB]
L_p	Sound pressure level	[dB]
L_W	Sound power level	[dB]
ΔL	Sound attenuation	[dB]
D	Room attenuation	[dB]
Δp_t	Total pressure loss	[Pa]
q	Air flow	[m³/h], [l/s]
Δt	Temperature difference between supply air temperature and room air temperature	[K]
v_0	Supply velocity	[m/s]
v_x	Jet velocity at distance 'x' from centre of diffuser	[m/s]
v_{term}	Thermal maximum velocity in the occupied zone	[m/s]

Pressure loss

The diagram shows the total pressure loss for the diffuser (at ρ = 1,2 kg/m³), meaning the sum of static and dynamic pressure (incl. a possible plenum box) connected to a straight air duct with a length of 1 m and the same dimensions as the diffuser.

Sound level

The diagrams show the A-balanced sound power level L_{WA} for diffuser and possible plenum box connected with a straight air duct with a length of 1 m and the same dimensions as the diffuser.
Sound pressure level is a measurement for the power of the sound, ie. the pressure vibrations we perceive, while the sound power level is a parameter to characterize the source of the sound. Both are normally noted in the unit dB (decibels), which can cause some confusion.

Sound pressure (Lp)
Is a measure of the intensity of the sound, characterized by pressure vibrations, perceived by the ear or measured with a microphone on a noise meter. Sound pressure is measured in Pascal (Pa) and is usually noted as sound pressure level in decibels (dB) or dB(A).

Sound power (Lw)
The power, a sound source (eg. a machine) sends out in the shape of a sound. The sound effect is measured in Watt (W) and is usually noted as sound effect level in decibels (dB) or dB(A).

In the catalogue, sound properties of the diffusers are specified as sound power level.

Sound power level $L_W = 10 \times \log \frac{N}{N_{re}}$ [dB]

N is the actual sound power [W], which is sent out in the shape of pressure vibrations and $N_{re} = 10^{-12}$ W which is the reference sound power.

Sound pressure level: $L_P = 20 \times \log \frac{P}{P_{re}}$ [dB]

P is the actual sound pressure [N/m²] and $p_{re} = 2 \times 10^{-5}$ N/m² is the reference sound pressure.
Room attenuation D [dB] is the difference between sound power level and the sound pressure level

$L_P = L_W - D$

The A-balanced sound power level, L_{WA} is calculated to sound power level in the individual octave-bands by

$L_{Wok} = L_{WA} + K_{ok}$

K_{ok} is a correctional value. K_{ok} is noted in tabular form for each unit.

Sound attenuation

Is noted for each unit, and refers to the reduction in sound power level between duct and room (incl. end-reflection).

Isothermal supply air

All technical data refer to isothermal conditions.

Air throw

The air throw $l_{0,2}$ is defined as the largest distance between the centre of the unit and the terminal velocity 0,2 m/s.
The values specified for air throw $l_{0,2}$ correspond to diffusers mounted in the ceiling. *(Fig. 4)*

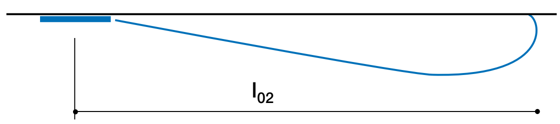


Fig. 4, Air throw $l_{0,2}$ for diffusers mounted in ceiling.

Lindab®

Mixed ventilation

Suspended mounting, ie. diffusers mounted more than 300 mm from the ceiling *(Figure 5)*, reduces the air throw by 20 %, so that $l_{0,2}$ suspended = 0,8 × $l_{0,2}$.

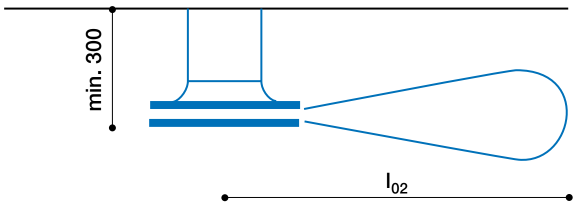


Fig.5, Suspended diffuser.

For grilles $l_{0,2}$ applies for mounting more than 800 mm from the ceiling. *(Figure 6)*.

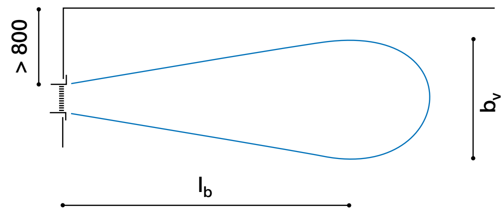


Fig. 6, Air throw for grilles mounted more than 800 mm from ceiling.

Should a grille be mounted less than 300 mm from the ceiling *(Figure 7)* the air throw $l_{0,2}$ is extended by 40 %, so that $l_{0,2}$ grilles by ceiling = 1,4 x $l_{0,2}$.

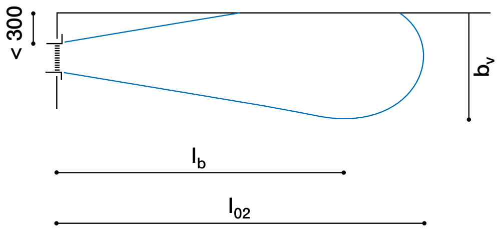


Fig.7, Air throw for grille mounted less than 300 mm from ceiling.

Spread

The maximum vertical spread b_v specifies the largest vertical distance between the ceiling and the terminal velocity 0,2 m/s *(Figure 8)*.

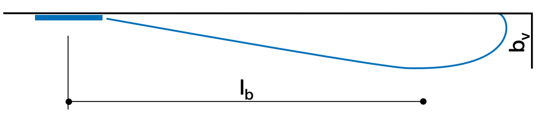


Fig.8, Vertical spread.

The horizontal spread is noted as b_h and specifies the maximum horizontal spread of the air jet for the terminal velocity 0,2 m/s *(Figure 9)*. The distance between the unit and the point of largest jet width is noted as l_b. b_v, b_h and l_b are specified for each unit as a function of the air throw $l_{0,2}$.

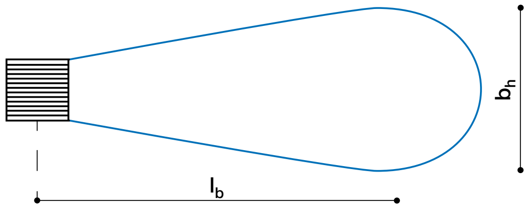


Fig. 9, Horizontal spread.

Coanda effect

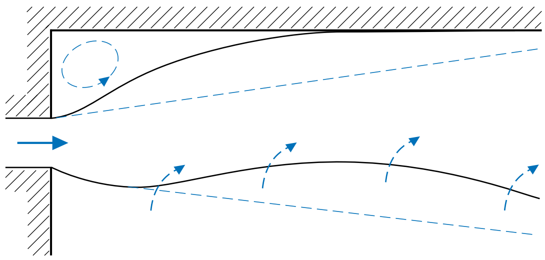


Fig. 10, Air flow with Coanda effect.

When the air is supplied parallel to a surface (eg. a ceiling) negative pressure occurs between the air jet and the ceiling, causing the jet to “stick” to the ceiling (this is known as the Coanda effect). *(Figure 10)*. This effect is of great importance, particularly when supplying cooling air.
To achieve the greatest possible Coanda effect, the air should be supplied in small quantities to each unit, with the widest possible spread on the ceiling and the greatest possible velocity.
This means that the best method is always to supply the air from the diffuser in a full 360°-pattern without side covers. In particular, linear diffusers (MTL) are divided into active and inactive sections to avoid drop.

Velocity in the jet

The air velocity of the core jet can be calculated within a limited area, using the following formula:

$$v_x = \frac{l_{0,2} \times 0,2}{x} \iff x = \frac{l_{0,2} \times 0,2}{v_x}$$

Where x is the distance in metres between the unit and the point in the core jet where the air velocity is v_x m/s.

<u>Example</u>
A diffuser has an air throw of $l_{0,2}$ = 3 m. The distance to the point where the jet velocity is 0,3 m/s is calculated as follows:

$$X = \frac{3 \text{ m} \times 0,2 \text{ m/s}}{0,3 \text{ m/s}} = 2 \text{ m}$$

Mixed ventilation

Thermal supply air

The catalogue values for air throws are valid in the case of isothermal supply air.
When using cold or heated supply air the thermal forces work by forcing the jet downwards (cooling) or giving the jet a lift (heating). A description of the jet flow would require a determination of the ratio of temperature difference and supplied air velocity (in the jet-theory expressed by Archimedes number). If a more detailed calculation of supply air velocities is needed - where this is factored in - in addition to a visual of the jet flow from the diffusers, we refer you to the software programme DIMcomfort.

The general rule below for horizontal and vertical supply air with cold- or heated air, can however be used for correction of the air throw in a more simple calculation.

Horizontal supply air at the ceiling

1. When air is supplied horizontally with cold air, the air throws are reduced by 1,5 % per degree *(Figure 11)*, while the vertical spread b_V is increased.

2. When air is supplied horizontally with heated air, the air throws are increased with 2 % per degree *(Figure 11)*.

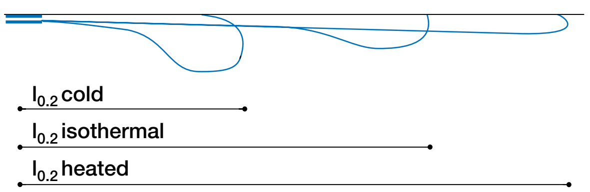


Fig. 11, Air throw $l_{0,2}$ for diffusers mounted in ceiling.

Vertical supply air at the ceiling

The throw lengths for vertical supply air is are valid for isothermal conditions.

1. When air is supplied at a cooling temperature the throw length is increased. The throw length is doubled at Δt = -10 ˚C.

2. When air is supplied with heated air, the throw length is reduced. The throw length is halved at Δt = 10 ˚C.

For products, which can be set for vertical supply air, there are also other separate turning point diagrams for heated air (Δt = +5K, +10K and possibly +15K) for turning point $l_{0,0}$ in addition to the other product data.

Dimensioning mixed ventilation

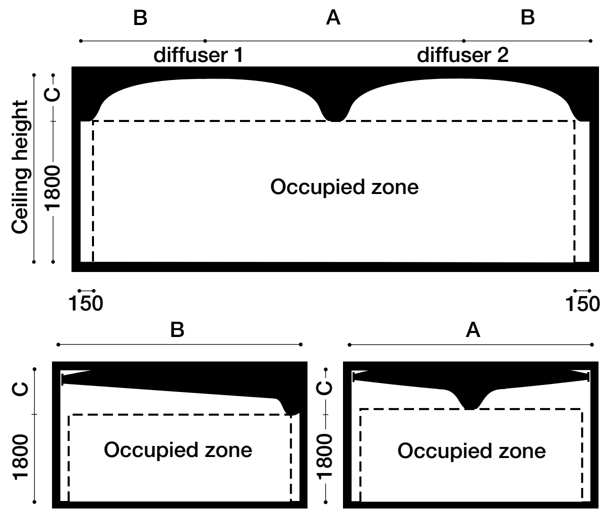


Fig. 12, Planning af mixed ventilation.

In order to avoid velocities more than 0,2 m/s in the occupied zone, the diffusers must be dimensioned so that the air throw $l_{0,2}$ has the right ratio to the distance A, B and C *(Figure 12)*. If there are two opposing diffusers the following formula must be observed.

$$0{,}75 \times \left(\frac{A}{2} + C\right) \leq l_{0,2} \leq \left(\frac{A}{2}\right) + C$$

In the case of a diffuser blowing towards a wall the following formula must be observed
$0{,}75 \times (B + C) \leq l_{0,2} \leq B + C$

If two or more diffusers with a parallel delivery of supply air (1-way or 2-way) are placed with a spacing A between them, which is less than b_h, the air throw increases in accordance with the following formula $l_{0,2}$ (corrected) = K × $l_{0,2}$ where K is the correctional factor to be read from *Figure 13*.

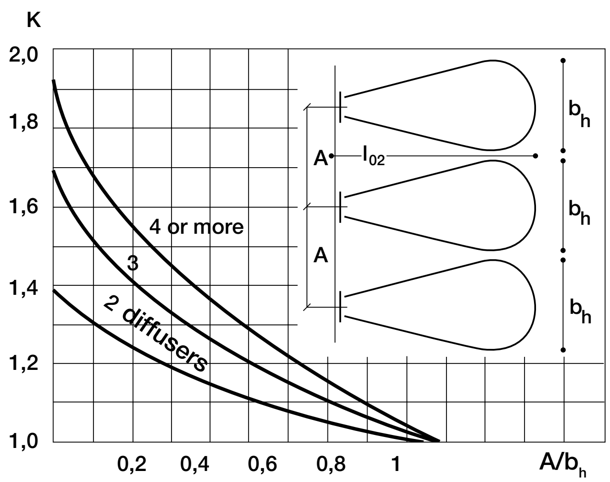


Fig. 13, Planning mixed ventilation.

Lindab

Mixed ventilation

For nozzles and suspended diffusers with 1-way supply of air, the lift or drop of the jet as a consequence of heating or cooling supplied air can be read in *Figure 14*.

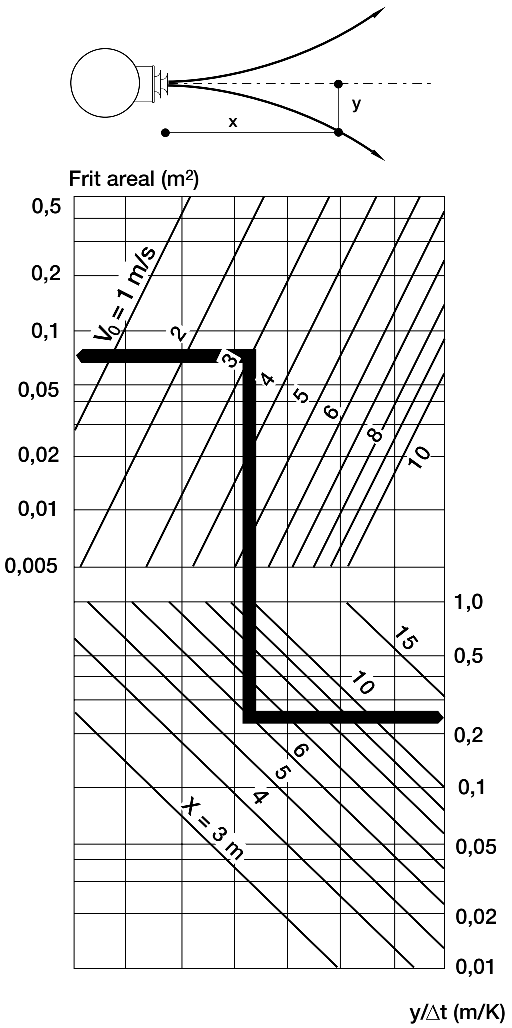


Fig. 14, Planning mixed ventilation.

<u>Example</u>
A nozzle has a free area of 0,075 m².
With an air volume of 756 m³/h a supplied air velocity of v_0 = 3 m/s ($v_0 = q / A_0$) is achieved.
Figure 14 has a thick horizontal line between A_0 = 0,075 m² and v_0 = 3 m/s. By following the thick line straight down to x = 6 m and then horizontal to the right, the ratio between y (lift/drop) and Δt (temperature difference between supplied air and room air) can be read to be 0,24.
With a temperature difference of 10 K a lift/drop at y = 0,24 m/K × 10 K = 2,4 m at a distance of x = 6 m from the nozzle is achieved.

To avoid the jet being deflected by possible obstacles, the minimum distances in *Figure 15* must be observed.

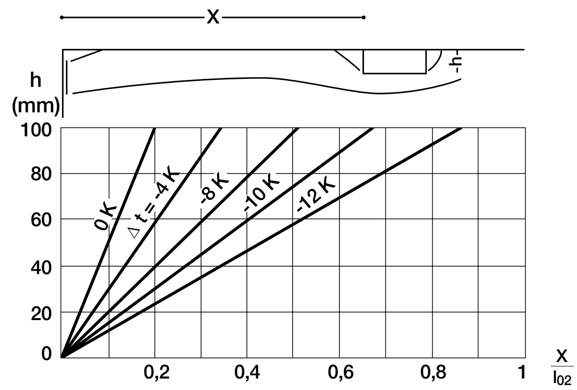


Fig. 15, Air throw $l_{0,2}$ for diffusers.

Mixed ventilation

Heat loads in the room create upward convection flows, and in the same manner downward cold convection flows are created from the supplied air.

The calculated maximum velocity v_{term} in the occupied zone, which occurs due to thermal flows is shown in *Figure 16*. These flows depend on the heat load in the room (W/m²) in addition to the distribution of the supplied air (number of diffusers and jet pattern), but not of the impulse of the supplied air. Furthermore the velocity depends on the ceiling height.

The determination of the maximum velocity in the occupied zone is made by the help of an empirical model from the heat load (W/m²), number of diffusers (W/diffuser) and air pattern (1-, 2-, 3-, 4-way) at a ceiling height of 2,5 m.
If there is any doubt regarding a project, or special conditions need investigating, Lindab offers to test the conditions by conducting a full-scale test, which will often hold great value in the case of bigger and more complex constructional tasks.

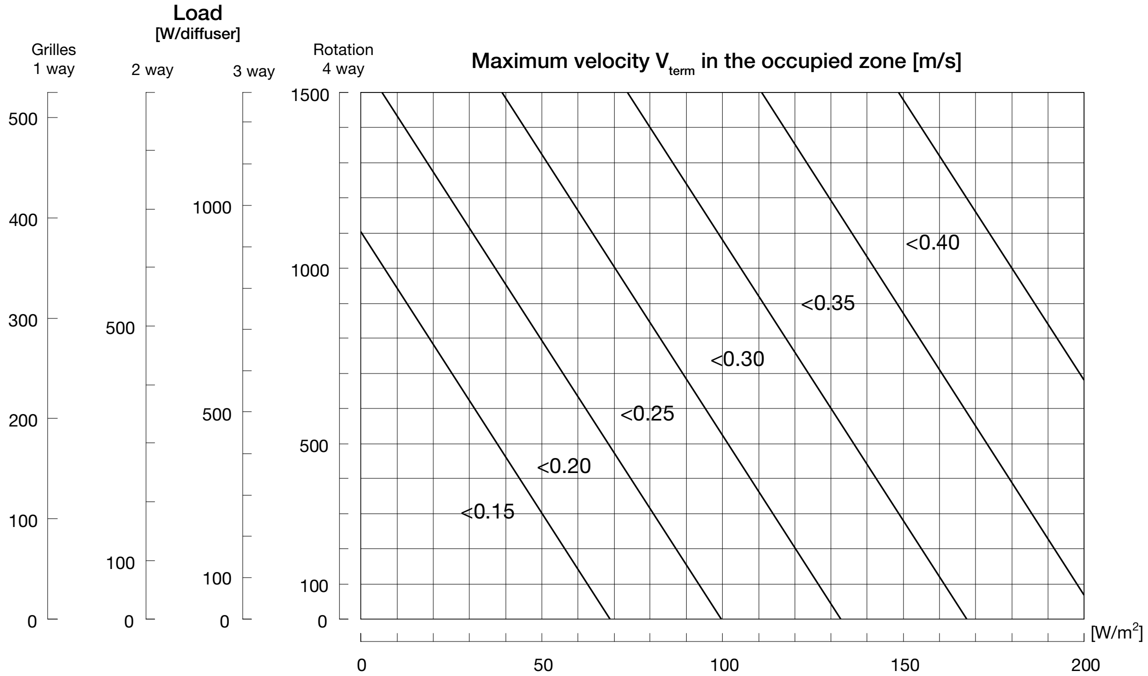


Fig. 16 a, Thermal maximum velocity in the occupied zone. The diagram is advisory and valid for ceiling heights of 2,5 m.

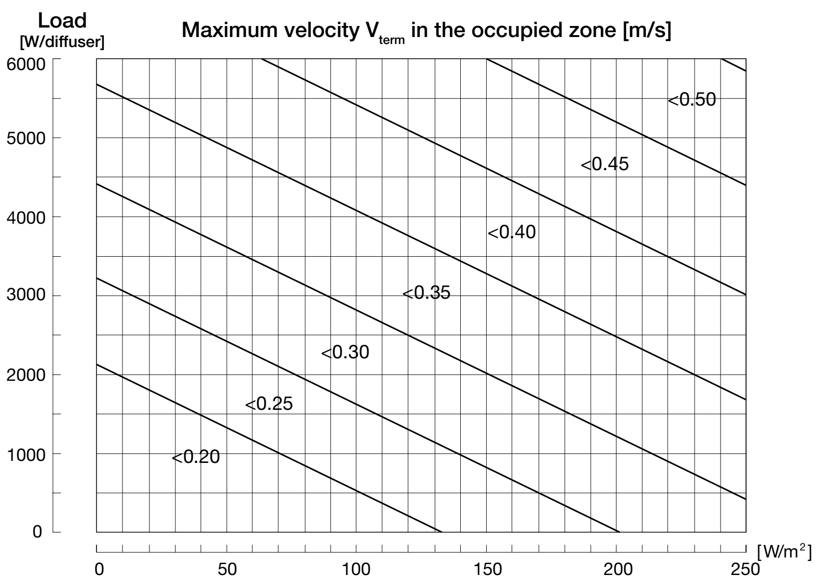


Fig. 16 b, Thermal maximum velocity in the occupied zone. The diagram is advisory and valid for ceiling heights > 4 m.

Mixed ventilation

Calculation example

Room: L × B × H = 10 m × 6 m × 4 m

Thermal load:

10 pers., sitting activity (10 × 130 W)	= 1300W (22 W/m^2)
10 table lamps of 60 W (10 × 60 W)	= 600 W (10 W/m^2)
10 machines of 100 W (10 × 100 W)	= 1000 W (17 W/m^2)
Total	= 2900 W (48 W/m^2)

In order to achieve a satisfactory air quality in the room, the typical calculations determine that the ventilation should have a supply air of 4-10 l/s per person in addition to 0,4 l/s per m^2 floor area. If 10 l/s is used, the following necessary air volume can be calculated.

q_{min} = 10 persons × 10 l/s per person + 60 m^2 × 0,4 l/s per. m^2 = 124 l/s

If the ventilation at the same time has to remove the collective heat load in the room, it is necessary to have a temperature difference Δt between the supply air and the room/ exhaust air. Δt can be determined to be

$$\Delta t = \frac{2900\ \text{W}}{\frac{124\ \text{l/s}}{1000\ \text{l/m}^3} \times 1{,}2\ \text{kg/m}^3 \times 1007\ \text{J/kg/K}} = 19{,}4\ \text{K}$$

Since Δt of almost 20 K is very likely to cause thermal discomfort, eg. due to drop from a ceiling diffuser, it is recommended to increase the air volume and use less Δt between supply and room temperature. If Δt = 6 K is chosen the air volume can be determined to be.

$$q = \frac{2900\ \text{W}}{6\ \text{K} \times 1{,}2\ \text{kg/m}^3 \times 1007\ \text{J/kg/K}} \times 1000\ \text{l/m}^3 = 400\ \text{l/s}$$

Displacement ventilation

Displacement ventilation

A displacement unit should add a certain amount of air to properly ventilate the room, and at the same time meeting the requirements for sound level, air velocity and temperature gradient in the occupied zone. In order to meet these requirements, planning guidelines are needed, and the most important ones are stated hereafter. When choosing a unit, the demands on pressure loss, sound level and air throw should be made clear. These data can be found for each individual product. The selection- and performance data shown in Lindabs catalogue is the result of measurements carried out in Lindabs laboratory and are all conducted with modern and accurate measuring devices. In practice the conditions are rarely as ideal as in a laboratory, since the constructional environments, furnishing, placement of the air distribution units etc. has a great influence on the jet pattern spread in the room. Lindab attempts to test the conditions in practice by carrying out full-scale testing, which is often very valuable in the case of bigger and complicated tasks.

Descriptions

$a_{0,2}$	Width of near-zone	[m]
$b_{0,2}$	Length of near-zone	[m]
ε_t	Temperature efficiency	[-]
K_{ok}	Octave Correction value for sound power level	[dB]
L_A	A-balanced sound pressure level	[dB(A)]
L_{WA}	A-balanced sound power level	[dB(A)]
L_{Wok}	Sound power level in octave bands	[dB]
L_p	Sound pressure level	[dB]
L_w	Sound power level	[dB]
ΔL	Sound attenuation	[dB]
D	Room attenuation	[dB]
Δp_t	Total pressure	[Pa]
q	Air flow	[m³/h], [l/s]
t_i	Supply air temperature	[°C]
t_r	Room temperature (1,1 m over the floor)	[°C]
t_u	Exhaust air temperature	[°C]
Δt	Temperature difference between room air and supply air	[K]
v_x	Velocity at distance x from the centre of the unit	[m/s]

Vertical temperature distribution

Due to the stratified flow, displacement ventilation causes a big difference in temperature throughout the room. In comfort ventilation, where the heating sources are placed in the bottom part of the room, the temperature gradient, meaning the temperature rise per m (K/m) will be bigger in the lower part of the room, and smaller in the upper part.

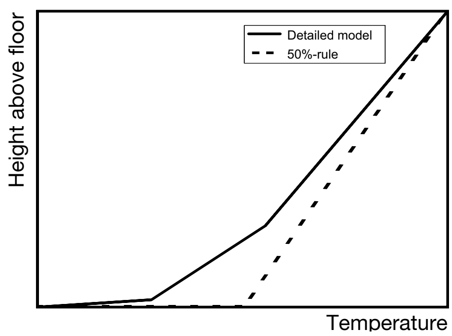


Fig. 17, Comparison of models for description of the vertical temperature distribution

The simplest models for description of the vertical temperature distribution are the so-called "%-rules".
The most used one is the 50%-rule, in which it is assumed, that half of the temperature rise from supply air to exhaust air occurs at the floor, and the other half occurs up throughout the room *(see Figure 17)*. The model is a good one, as a first evaluation of the most typical rooms and units, but because of the simplicity it does not precise determine the temperature gradient in the occupied zone.
Lindab recommends the use of a more detailed model instead. One that describes the variation of the temperature gradient up through the room. A close assumption is that the temperature gradient in the occupied zone is half of the temperature difference between the room air and the supply air. The model is based on a number of full scale tests, and factors in the temperature efficiency and the fact that the temperature gradient is larger in the lower part of the room than in the upper part.

Temperature efficiency

The efficiency in displacement ventilation is due to the stratification. The difference is increased at larger ceiling heights. The effect taken from the room is proportional to the temperature difference between supply air and exhaust air (t_u-t_i).
Since the exhaust temperature (t_u) is higher than the room temperature (t_r) in displacement ventilation, the same effect can be taken from the room at a higher supply air temperature (t_i) than with mixed ventilation, where $t_u \leq t_r$. This means that cooling effect can be spared, or that it is possible to use the cooling effect of the outer air more efficiently.
Displacement ventilation is furthermore partly self-regulating at varying thermal loads, because a rising load first and foremost will give a higher temperature gradient and consequently a higher temperature at the ceiling.
The temperature efficiency is given at:

$$\varepsilon_t = \frac{t_u - t_i}{t_r - t_i} \times 100\%$$

With displacement ventilation it is the case that ε_t > 100 % ($t_u \geq t_r$),
while $\varepsilon_t \leq$ 100 % at mixed ventilation ($t_u \leq t_r$).
By ideal mixing ε_t = 100 % ($t_u = t_r$).

Pressure loss

The diagrams show the total pressure loss for the unit (at ρ = 1,2 kg/m³), meaning the sum of static and dynamic pressure, connected to a straight air duct with a length of 1 m and the same dimension as the diffuser.

Sound level

The diagrams show the A-balanced sound power level L_{WA} for a diffuser connected with a straight air duct with a length of 1 m and the same dimensions as the diffuser.
Sound pressure level is a measurement of the result of the sound, ie. the pressure vibrations we perceive, while the sound power level is a parameter to characterize the source of the sound. Both are normally noted in the unit dB (decibels), which can cause some confusion.

Displacement ventilation

<u>*Sound pressure (Lp)*</u>
Is a measure of the intensity of the sound, characterized by pressure vibrations, perceived by the ear or measured with a microphone on a noise meter. Sound pressure is measured in Pascal (Pa) and is usually noted as sound pressure level in decibels (dB) or dB(A).

<u>*Sound power (Lw)*</u>
The power, a sound source (eg. a machine) sends out in the form of a sound. The sound effect is measured in Watt (W) and is usually noted as sound effect level in decibels (dB) or dB(A).

In Lindabs catalogue sound properties of the units are named sound power level.

Sound power level: $L_W = 10 \times \log \frac{N}{N_{re}}$ [dB]

where N is the actual sound power [W], which is sent out in the shape of pressure vibrations and $N_{re} = 10^{-12}$ W is the reference sound power.

Sound pressure level: $L_P = 20 \times \log \frac{P}{P_{re}}$ [dB]

where p is the actual sound pressure [N/m^2] and $p_{re} = 2 \times 10^{-5}$ N/m^2 which is the reference sound pressure.
Room attenuation D [dB] is the difference between sound power level and sound pressure level
$L_{wok} = L_W - D$

The A-balanced sound power level, L_{WA} is calculated to sound power level in the individual octave bands by $L_P = L_{WA} + K_{ok}$, K_{ok} being a correctional value. K_{ok} is specified in tabular form for each individual unit.

Sound attenuation

Specified for each individual diffuser, the reduction of sound power level from air duct to room (including end reflection).

Near-zone

The area around the unit, where the air velocity is above 0,2 m/s, is referred to as the near-zone.
The size of the near-zone is specified for each unit at a cooling temperature of $\Delta t = t_r - t_i = 3K$. The near-zone length ($a_0$) and – width ($b_0$) is valid for evenly distributed thermal loads.

Dimensioning displacement ventilation

To plan a ventilation system by displacement principle, which "works" on the basis of thermal powers, and where the supply air is added directly to the occupied zone, makes special demands on dimensioning and placement of the air distribution units. They should, as such, never be placed directly by a powerful heating source, like a radiator. Powerful sunlight can also disturb the system, and in some cases make it function as a mixed ventilation system. Large, cold walls - or window surfaces in the room can also cause a back-flow of contaminated air to the occupied zone.

The system is not suitable for heating purposes, and consequently requires heating and ventilation to be separate. Exhaust should always take place as high up in the room as possible.
If in any doubt about a project, or if there are any points to be analysed, Lindab offers to test the conditions in practice by conducting full-scale tests, which is often of great value, at bigger and complicated tasks.

Convection flow

The supplied air flow should at least be the same as the total convection flow in the room *(Figure 18)*. If the supplied air flow is less than this the convection flow will draw contaminated air from above down into the occupied zone *(Figure 19)*.
The following factors affect the convection flow:

- The shape and surface of the heat source
- The surface temperature of the heat source
- Convective proportion of the heating output emitted
- Mean temperature of the room
- The level of the contaminated zone in relation to the level of the heat sources in the room

The convection flow from people, lighting, and machinery can be determined from the output and the placement of the heat sources in the room *(see Table 1 and Table 2)*.

Table 1, Convection flows for people based on experiences

Activity	met	Heat outputW	airflow l/s 1.2 above floor	1.8 above floor
Sitting, relaxing	1,0	100	8-10	-
Sitting activity	1,2	130	10-12	-
Light act., standing	1,6	170	-	25-30
Medium act.,standing	2,0	200	-	30-35
High act. standing	3,0	300	-	35-40

Met: metabolism, 1 met = 58 W/m^2 body surface.

Table 2, Convection flows for various heat sources.

Heating source	Airflow 1.2 above floor	l/s pr. W 1.8 above floor
Table lamps	0,10	0,20
Ceiling lights	-	-
Machines	0,10	0,20
Sunlight	0,11	0,22

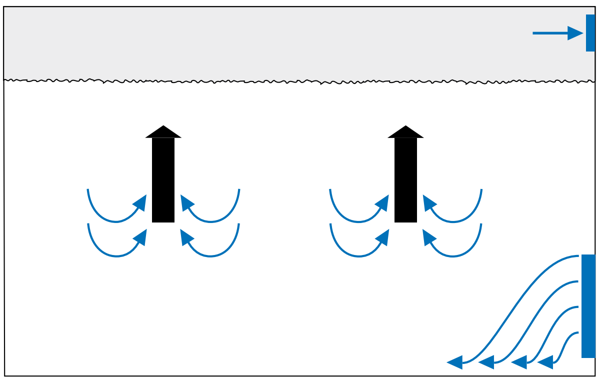


Fig. 18, Displacement ventilation with sufficient air flow.

Displacement ventilation

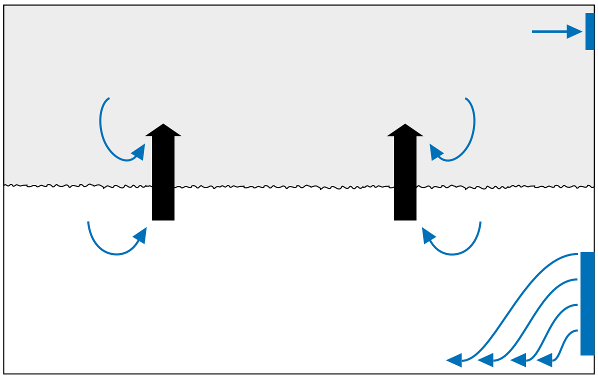


Fig. 19, Displacement ventilation with insufficient air flow.

Temperature gradient

The demands made on thermal comfort in the occupied zone places a limit on the size of the temperature gradient. *Table 3* show the maximum gradient recommended by Lindab Comfort at various levels of activity. Further more the corresponding maximum cooling temperature (t_r-t_i) is mentioned when using Lindabs COMDIF-units. The temperature gradient in the occupied zone (K/m) can with a small margin be set at half of the cooling temperature t_r-t_i (K).

Table 3, Recommended temperature gradients and cooling temperatures

Activity	Max. temperature gradient (K/m)	Max. undertemperature t_r-t_i (K)
Sitting, relaxing	1,5	3,0
Sitting activity	2,0	4,0
Light act., standing	2,5	5,0
Medium activity	3,0	6,0
High activity	3,5	7,0

Near-zone

The size of the near-zone is specified for each unit in the catalogue. If several units are placed close to one another, the near-zone will increase *(Figure 20)*.

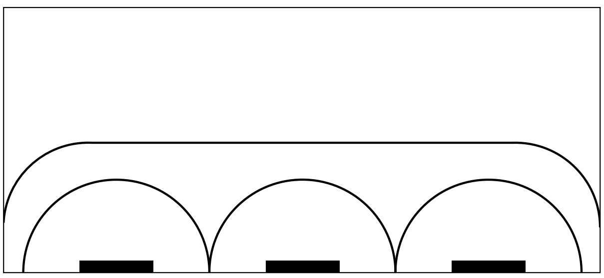


Fig. 20, Diffusers placed too close, limiting the individual diffusers induction.

A big air flow from one unit can result in a too big near-zone *(Figure 21)*. If the air is instead distributed on two units, smaller near-zones are the result. *(Figure 22)*.
To achieve the smallest possible near-zones, and thus the best possible use of the room, the air flow should be distributed evenly in the room with as many units as possible.

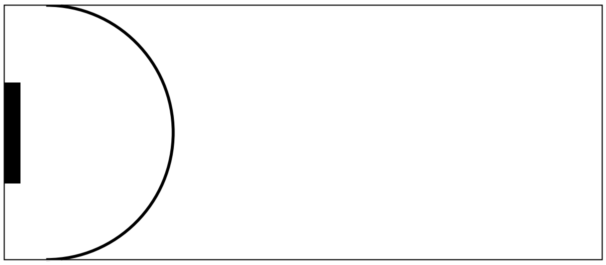


Fig. 21, Too great air flow on one diffuser results in a too big near zone.

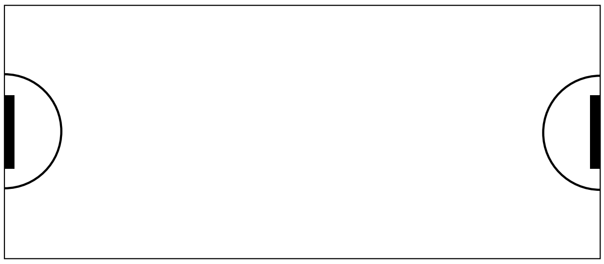


Fig. 22, Less air flow per diffuser and smaller near zones.

More units

When several units are placed too close to one another by the same wall, the near-zone is increased as shown in *Figure 20*, since jet streams can form between the units. In a certain distance from the units however, a continuous jet flow will be formed with a near constant velocity. This end-velocity is dependent on the total airflow per m wall and the cooling temperature. In *Figure 23* this end-velocity can be read. It will often be an advantage to distribute the air on units placed on adjacent walls at a 90 degree angle. In this case, the units should also be placed evenly along the walls, since of course jets also form between too closely placed units around the corner of a wall.

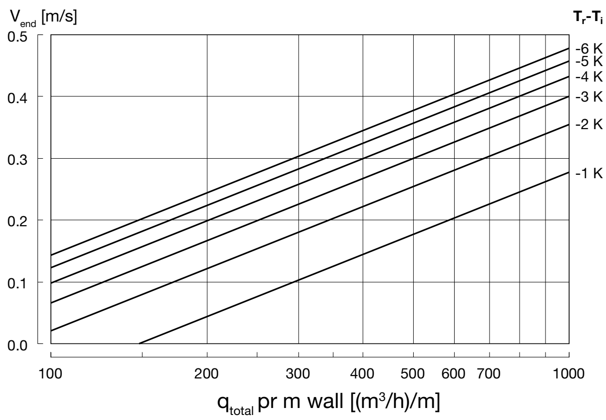


Fig. 23, End velocity at continuous jet flow.

Displacement ventilation

Output

In order to calculate the output which can be removed from the room by a displacement system, the temperature difference t_u-t_i, has to be known (depends on the thermal load, ceiling height and cooling temperature (t_r-t_i)).

By calculating the temperature efficiency and the necessary difference in temperature t_u-t_i the heating sources close to the ceiling (eg. lighting) are accounted for by 50% of the output.

From *Figure 24* the temperature efficiency $\boldsymbol{\varepsilon}_t$ can be read at different combinations of ceiling height and heat loads.

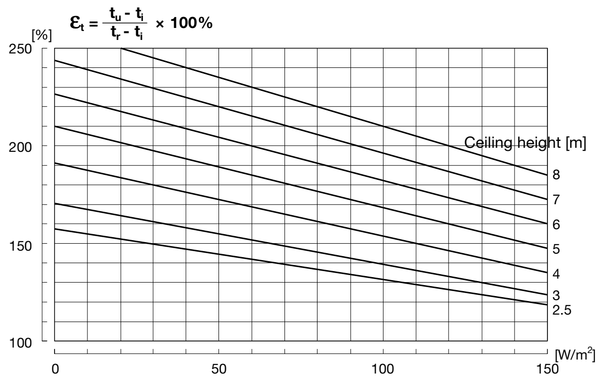


Fig. 24, Temperature efficiency is dependent on ceiling height and heat load.

Calculation example

Room: L × B × H = 10 m × 6 m × 4 m

Thermal load:

10 pers., sitting activity (10 × 130 W)	= 1300W (22 W/m²)
10 table lamps of 60 W (10 × 60 W)	= 600 W (10 W/m²)
10 machines of 100 W (10 × 100 W)	= 1000 W (17 W/m²)
Total	= 2900 W (48 W/m²)

Minimum air flow *(from Table 1 and Table 2)*:
q_{min} = 10 pers. × 11 l/s/pers. + 10 table lamps × 60 W/table lamps × 0,1 l/s/W + 10 machines × 100 W/machines × 0,1 l/s/W = 270 l/s
Required temperature difference (t_u-t_i):

$$t_u - t_i = \frac{2900\ W}{\frac{270\ l/s}{1000\ l/m^3} \times 1{,}2\ kg/m^3 \times 1007\ J/kg/K} = 8{,}9\ K$$

From *Figure 24* the temperature efficiency can be read at $\boldsymbol{\varepsilon}_t$ = 178 % by a ceiling height of 4 m and a heat load of 48 W/m². Consequently the temperature difference t_r-t_i can be determined by using the formula:

$$\varepsilon_t = \frac{t_u - t_i}{t_r - t_i} \iff t_r - t_i = \frac{t_u - t_i}{\varepsilon_t} = \frac{8{,}9\ K}{1{,}78} = 5\ K$$

which gives a temperature gradient in the occupied zone of 2,5 K/m (since the temperature gradient in the occupied zone can be set to the half of the cooling temperature t_r-t_i).

Lindab recommends a temperature gradient of <2 K/m and therefore the air flow should be increased.

A temperature gradient of 2 K/m gives t_r-t_i = 4 K and with unchanged temperature efficiency of 178 % the acceptable temperature difference is t_u-t_i = 7,1 K.

To remove the thermal load of 2900 W the air flow must be changed to:

$$q = \frac{2900\ W}{7{,}1\ K \times 1{,}2\ kg/m^3 \times 1007\ J/kg/K} \times 1000\ l/m^3 = 337\ l/s$$

Planning of sound level

Planning sound level

The diagrams in the catalogue specify the A-weighted sound effect level L_{WA} for diffusers connected to a straight air duct with a length of 1 m and the same dimension as the diffuser.
The actual sound pressure level that we hear is determined as shown below.

Key

A	Total room absorption	[m²]
K_{ok}	Octave correction value for sound power level	[dB]
L_A	A-balanced sound pressure level	[dB(A)]
L_{WA}	A-balanced sound power level	[dB(A)]
L_{Wok}	Sound power level in octave bands	[dB]
L_p	Sound pressure level	[dB]
D	Room attenuation	[dB]
L_w	Sound power level	[dB]
V	Room volume	[m²]
T_s	Reverberation time	[-]
D	Room attenuation	[dB]
Q	Direction factor	[-]
Δ	Increase in sound power level at a given number of identical units	[dB]
r	Distance to closest unit	[m]
α	Absorption factor	[-]
n	Number of units	[-]

Sound pressure level

The collective sound effect L_W from a number of similar diffusers is found through a logarithmic multiplication of the number of diffusers with the sound power level from an individual diffuser
$L_W = L_{W1} \otimes n$
where L_{w1} is the sound power level from an individual diffuser [dB] and n is the number of diffusers.
The collective sound power can, by help of *Figure 25* be calculated as $L_W = L_{W1} + \Delta$ where Δ is the increase of sound power level for a given number of identical diffusers.

n	1	2	3	4	5	6	7	8	9	10	15
Δ	0	3.0	4.8	6.0	7.0	7.8	8.5	9.0	9.0	10.0	11.8

Fig. 25, Increase of sound power level (logarithmic multiplication) by a number of identical sound sources

With the knowledge of the sound sources and the absorption area of the room, the attenuation of the room is determined by *Figure 26*, *Figure 27 and Figure 28* at one or several identical sound sources in the room.
The actual sound pressure level is the difference between the sound power level and the room attenuation where L_p is the sound pressure level [dB], L_W is the sound power level [dB] and D is the room attenuation [dB].
In the case of different sound sources in the same room, the sound pressure level is found at a given point by a logarithmic addition of the sound pressure levels for the individual sound sources (Figure 29).

A can also be calculated from reverberation time by using the formula:

$$A = 0.16 \times \frac{V}{T_s}$$

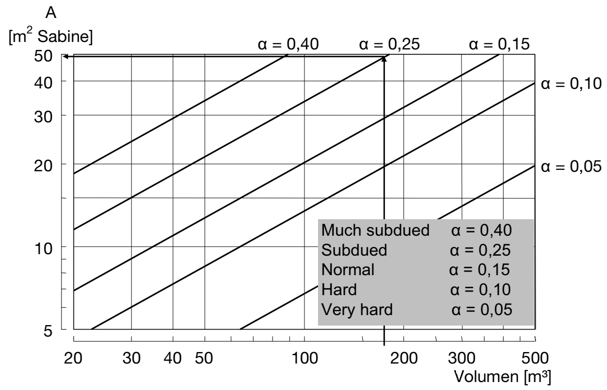


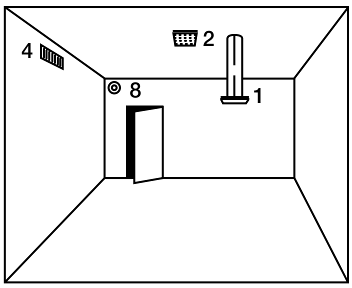
Fig. 26, Direction factor for different placements of sound sources and the relationship between the room volume and equivalent sound-absorption area

Calculation example

In a room with the dimensions L × B × H = 10 m x 7 m x 2,5 m four diffusers are mounted in the ceiling. Each diffuser gives off a sound power level of 29 dB(A). The room is attenuated, which gives an absorption area of A ~ 50 m² Sabine *(Figure 26)*. The sound pressure level needs to calculated 1,5 m above the floor.
Sound power from the four diffusers: $L_W = 29 \otimes 4 = 29 + 6 = 35$ dB(A) *(Figure 25)*
For diffusers mounted in the ceiling the direction factor Q = 2 and consequently becomes *(Figure 27)*.

√n / √Q = 1,4

At the height of 1,5 m over the floor the distance to the closest diffuser is r = 1 m, and therefore the room attenuation can be determined to be D = 9 dB via. *Figure 28*.
The sound pressure level in the room: L_A = 35 dB(A) - 9 dB = 26 dB(A).



n	1	2	3	4	5	6	7	8	9	10	15
Q	√n / √Q										
1	1.0	1.4	1.7	2.0	2.2	2.4	2.6	2.8	3.0	3.2	3.9
2	0.7	1.0	1.2	1.4	1.6	1.7	1.9	2.0	2.1	2.2	2.7
4	0.5	0.7	0.9	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.9
8	0.4	0.5	0.6	0.7	0.8	0.9	0.9	1.0	1.1	1.1	1.4

Fig. 27, Direction factor for different placements of sound sources and the ratio between √n / √Q as a function of number of sound sources and direction factor (picture).

Planning sound levels

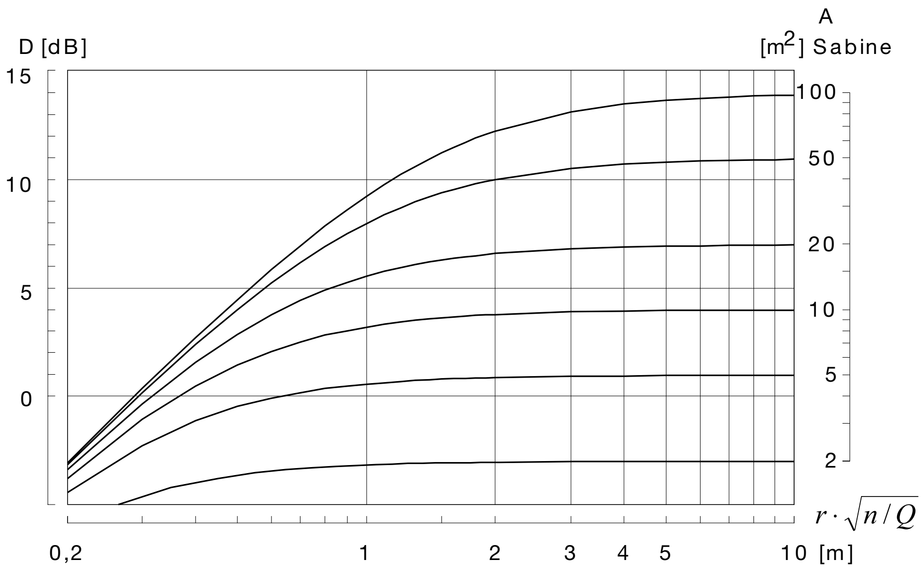


Fig. 28, Room dampening as a function of area of absorption and number of sound sources.

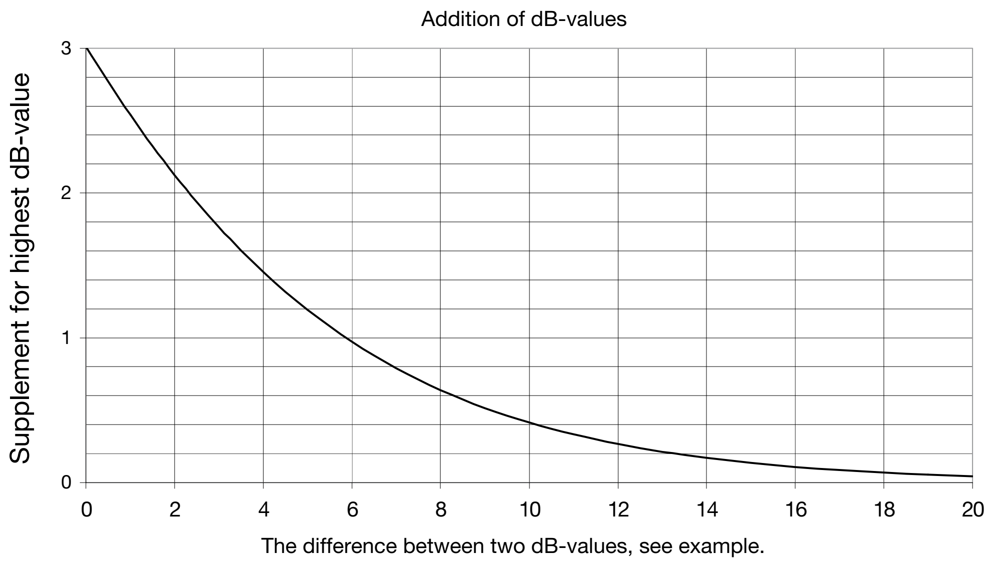


Fig. 29, Addition of sound levels (logarithmic addition of sound effect level or sound pressure level).

E.g. two sources at 41 dB and 47 dB;
difference is 47 - 41 = 6 ;
from graph: 6 on X-axis = 1 on Y-axis;
47 + 1 = 48 dB resultant level.

Ceiling diffusers

Ceiling diffusers

Formo
Aesthetic design

Integra
Integrated design

Versio
Countless opportunities

Lineo
Clean lines

Extraction above ceiling

Lindab Formo a series of architectuallly designed diffusers

PCA, Terminal 3 - Copenhagen Airport

Lindab Formo

Mixed ventilation is the most used principle of ventilation there is. Mixed ventilation is typically used in offices and similar rooms, where you wish to maintain low velocities in the occupied zone as well as low temperature gradients from floor to ceiling. The best results with mixed ventilation is obtained by spreading the air over the entire ceiling area, so that the velocity can subside as much as possible before reaching the occupied zone. There is a large selection of ceiling diffusers in different designs and with different functions, which can be the used depending on the room's dimensions.

Functionality

Formo mixed ventilation diffusers are known by the diffusers being suspended from the ceiling with a single slot around the diffusers. The diffusers are offered in circular, or square designs with perforated or plain front plates. The diffusers have a very high capacity and are available with several different types of accessories. The circular diffusers are normally cut directly into the ceiling when mounted, but can by using tileplates be adapted for the most common 600x600 mm ceiling systems. On the next few pages, is illustrated a combinatic overview which will pro vide for a good insigh to the series.

PCA, ceiling diffuser

Lindab Formo

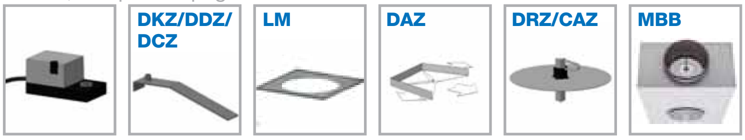
a series of architectural designed diffusers

Design

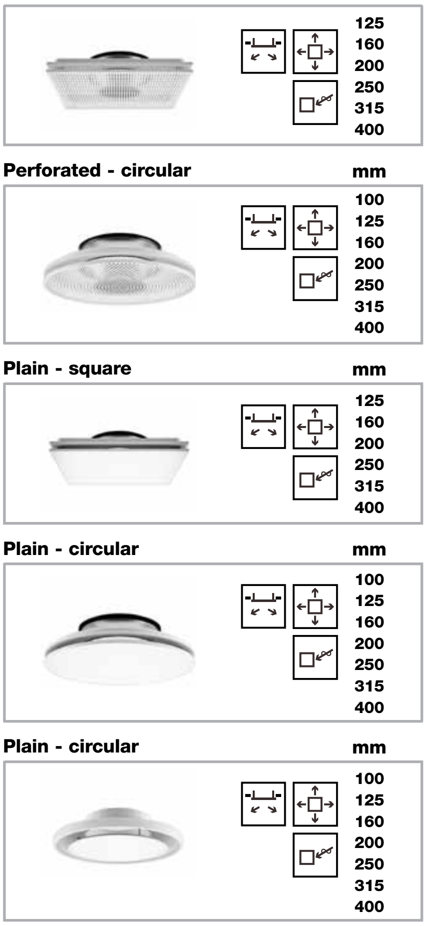
See Comfort and design

Accessories

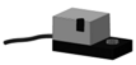
Details, see productpages



Product | Ventilations - principle | Supp./Exhau. | Size



Product	Design	Size mm	El. - motor	Bracket	Module pl.	1, 2, 3 way	Damper	MBB box
PKA	**Perforated - square**	125		●	●	●	●	●
		160	●	●	●	●	●	●
		200	●	●	●	●	●	●
		250	●	●	●	●	●	●
		315	●	●		●	●	●
		400		●		●	●	●
PCA	**Perforated - circular**	100		●	●	●	●	●
		125		●	●	●	●	●
		160	●	●	●	●	●	●
		200	●	●	●	●	●	●
		250	●	●	●	●	●	●
		315	●	●	●	●	●	●
		400		●	●	●	●	●
LKA	**Plain - square**	125		●	●	●	●	●
		160	●	●	●	●	●	●
		200	●	●	●	●	●	●
		250	●	●	●	●	●	●
		315	●	●		●	●	●
		400		●		●	●	●
LCA	**Plain - circular**	100		●	●	●	●	●
		125		●	●	●	●	●
		160	●	●	●	●	●	●
		200	●	●	●	●	●	●
		250	●	●	●	●	●	●
		315	●	●	●	●	●	●
		400		●	●	●	●	●
CRL	**Plain - circular**	100		●			●	●
		125		●			●	●
		160		●			●	●
		200		●			●	●
		250		●			●	●
		315		●			●	●
		400						●

Electrical motor: 
See VAV chapter for further documentation.

● 1. Product and tech. data depicted in catalogue.
○ 2. Combination possible. Tech. data depicted in catalogue.
● 3. Combination possible. Tech. data not in catalogue.
4. If space is empty, combination is not possible.

Example of order Diffuser + MBB box

PCA	160	+	MBB	125	160	S

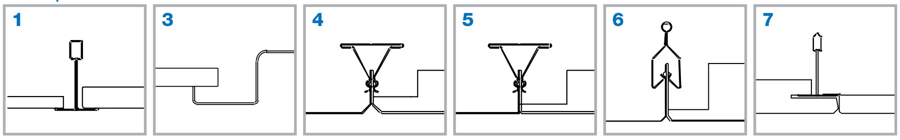
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

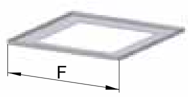
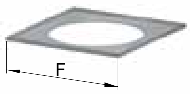
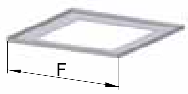
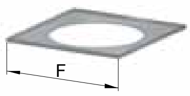
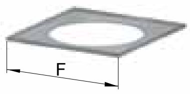
Lindab Formo

a series of architectual designed diffusers

Ceiling tile adaption

Details, see Chapter ceiling tile adaption



Product	Size	1	3	4	5	6	7
Ceiling types		Danotile T24/T15 Ecophon T24 Rockfon A24.	Permanent ceiling	Dampa Clip-In bevelled edge	Dampa Clip-In square edge	Luxalon SQ Clip-In	Danotile Contur Ecophon D Rockfon D-XL
Perforated - square	**mm**	F: 595 mm	A x A mm	F: 600 mm	F: 600 mm	F: 600 mm	F: 599 mm
PKA 	125	●	Standard	●	●	●	●
	160	●	Standard	●	●	●	●
	200	●	Standard	●	●	●	●
	250	●	Standard	●	●	●	●
	315	Standard *					
	400	Standard *					
Perforated - circular	**mm**	F: 595 mm	ØD mm	F: 600 mm	F: 600 mm	F: 600 mm	F: 599 mm
PCA 	100	●	Standard	●	●	●	●
	125	●	Standard	●	●	●	●
	160	●	Standard	●	●	●	●
	200	●	Standard	●	●	●	●
	250	●	Standard	●	●	●	●
	315	●	Standard	●	●	●	●
	400	●	Standard	●	●	●	●
Plain - square	**mm**	F: 595 mm	A x A mm	F: 600 mm	F: 600 mm	F: 600 mm	F: 599 mm
LKA 	125	●	Standard	●	●	●	●
	160	●	Standard	●	●	●	●
	200	●	Standard	●	●	●	●
	250	●	Standard	●	●	●	●
	315	Standard *					
	400	Standard *					
Plain - circular	**mm**	F: 595 mm	ØD mm	F: 600 mm	F: 600 mm	F: 600 mm	F: 599 mm
LCA 	100	●	Standard	●	●	●	●
	125	●	Standard	●	●	●	●
	160	●	Standard	●	●	●	●
	200	●	Standard	●	●	●	●
	250	●	Standard	●	●	●	●
	315	●	Standard	●	●	●	●
	400	●	Standard	●	●	●	●
Plain - circular	**mm**	F: 595 mm	ØA mm	F: 600 mm	F: 600 mm	F: 600 mm	F: 599 mm
CRL 	100		Standard				
	125		Standard				
	160		Standard				
	200		Standard				
	250		Standard				
	315		Standard				
	400		Standard				

* In other ceiling systems the overpart of the diffuser is adapted to the ceiling. No seperate Modulplatte.

● 1. Product and tech. data depicted in catalogue.
○ 2. Combination possible. Tech. data depicted in catalogue.
● 3. Combination possible. Tech. data not in catalogue.
4. If space is empty, combination is not possible.

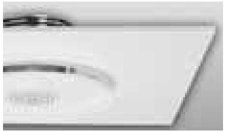
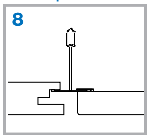
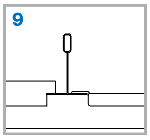
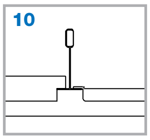
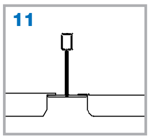
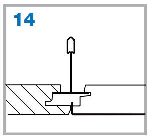
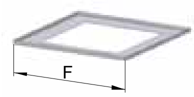
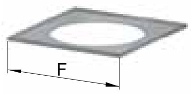
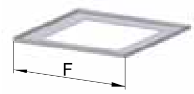
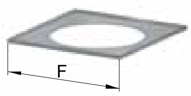
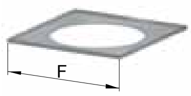
Example of order Moduleplate

LM	1	PCA	160

Lindab Formo
a series of architectual designed diffusers

Ceiling tile adaption

Details, see Chapter ceiling tile adaption

Product		Size	8	9	10	11	14	
								
	Ceiling types		Ecophon Focus DG	Rockfon E10 24 Ecophon -E / T24	Rockfon E10 15 Ecophon - E / T15	Danotile Markant	Ecophon Focus edge DS	
	Perforated - square	**mm**	F: 592mm	F: 575mm	F: 584 mm	F: 575 mm	F: 599 mm	
PKA		**125**	●	●	●	●	●	
		160	●	●	●	●	●	
		200	●	●	●	●	●	
		250	●	●	●	●	●	
		315						
		400						
	Perforated - circular	**mm**	F: 592mm	F: 575mm	F: 584 mm	F: 575 mm	F: 599 mm	
PCA		**100**	●	●	●	●	●	
		125	●	●	●	●	●	
		160	●	●	●	●	●	
		200	●	●	●	●	●	
		250	●	●	●	●	●	
		315	●	●	●	●	●	
		400	●	●	●	●	●	
	Plain - square	**mm**	F: 592mm	F: 575mm	F: 584 mm	F: 575 mm	F: 599 mm	
LKA		**125**	●	●	●	●	●	
		160	●	●	●	●	●	
		200	●	●	●	●	●	
		250	●	●	●	●	●	
		315						
		400						
	Plain - circular	**mm**	F: 592mm	F: 575mm	F: 584 mm	F: 575 mm	F: 599 mm	
LCA		**100**	●	●	●	●	●	
		125	●	●	●	●	●	
		160	●	●	●	●	●	
		200	●	●	●	●	●	
		250	●	●	●	●	●	
		315	●	●	●	●	●	
		400	●	●	●	●	●	
	Plain - circular	**mm**	F: 592mm	F: 575mm	F: 584 mm	F: 575 mm	F: 599 mm	
CRL		**100**						
		125						
		160						
		200						
		250						
		315						
		400						

● 1. Product and tech. data depicted in catalogue.
○ 2. Combination possible. Tech. data depicted in catalogue.
● 3. Combination possible. Tech. data not in catalogue.
4. If space is empty, combination is not possible.

Perforated diffuser PKA

Description

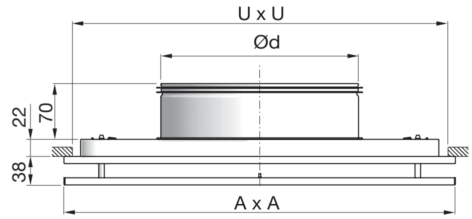
PKA is a square diffuser with perforated face plate. PKA can be used for both supply and exhaust air. PKA is suitable for horizontal supply of cooled air and can be equipped with accessories of various types in order to achieve optimal function. Installing a PKA diffuser in a plenum box type MBB can help to achieve a stable airflow to the diffuser as well as realise the potential for individual ajustment.

- Suitable for both supply and exhaust air
- Suitable for horizontal supply of cooled air
- Option of 1, 2 and 3-way supply air

Maintenance

The face plate can be removed to enable cleaning of internal parts or to gain access to the duct or box. The visible parts of the diffuser can be wiped with a damp cloth.

Dimensions



PKA Ød mm	A mm	U * mm	Free area A m^2	Weight kg
125	235	200	0,018	1,10
160	295	260	0,023	1,80
200	395	360	0,03	2,80
250	495	460	0,043	4,20
315	595	560	0,057	5,70
400	595	560	0,075	5,70

U x U = ceiling grid opening

Order code

Product	**PKA - aaa**
Type	
PKA	
Connection dim. Ød	
Ød 125-400	

Example: PKA-200

Materials and finish

Material:	Galvanised steel
Standard finish:	Powder-coated
Standard colour:	White RAL 9010, gloss 30

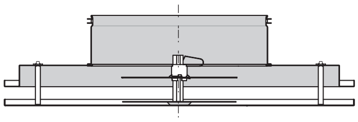
The diffuser is available in other colours. Please contact Lindab's sales department for further information.

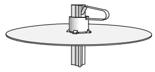
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

Perforated diffuser PKA

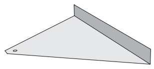
Accessories

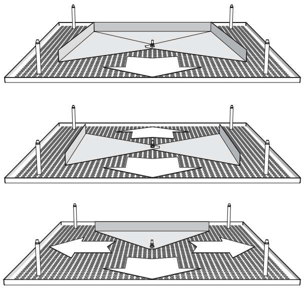
DRZ - Balancing damper



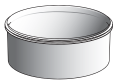


DAZ - Blending profiles (set)

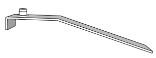


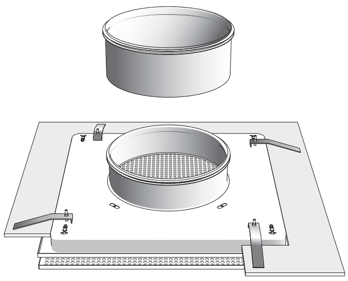


MBZ - Extension piece



DKZ - Mounting brackets (set)



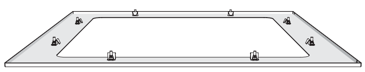


Order code - accessories

Product	aaa	bbb
Type	✓	
Size		✓

Example: DRZ-200

LM - Module plate



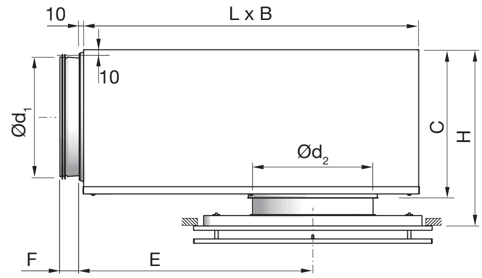
Order code - module plate

Product	LM	a	PKA	ccc
Type	✓			
Ceiling system		✓		
Diffuser			✓	
Size				✓

Example: LM-1-PKA-200
Ceiling system - see introductory summary.

MBB - Plenum box

PKA + MBB



PKA + MBB							
Duct Ød$_1$ mm	PKA Ød$_2$ mm	B mm	C mm	E mm	F mm	H* mm	L mm
100	125	260	159	216	50	200 - 240	310
100	160	260	159	216	50	200 - 240	310
125	125	310	184	262	50	225 - 265	376
125	160	310	184	262	50	225 - 265	376
125	200	310	184	262	50	225 - 265	376
160	160	380	220	323	50	259 - 299	459
160	200	380	220	323	50	259 - 299	459
160	250	380	220	323	50	259 - 299	459
200	200	460	259	396	70	300 - 340	565
200	250	460	259	396	70	300 - 340	565
200	315	460	259	396	70	300 - 340	565
250	250	540	309	486	70	350 - 390	698
250	315	540	309	486	70	350 - 390	698
250	400	540	309	486	70	350 - 390	698
315	315	540	373	646	70	415 - 455	858
315	400	540	373	646	70	415 - 455	858

* Using accessory MBZ the H dimension will increase:
Ød$_2$ = 125 - 200 mm => H +40 mm
Ød$_2$ = 250 - 315 mm => H +60 mm
Ød$_2$ = 400 mm => H +80 mm

Order code

Product	MBB	- aaa	- bbb	- c
Type MBB	✓			
Duct connection Ød$_1$ Ø100-315		✓		
Diffuser dimension Ød$_2$ Ø125-400			✓	
Function S = Supply air E = Exhaust				✓

Example: PKA-200+MBB-160-200-S

Perforated diffuser PKA

Technical data

Capacity

Air flow q_v [l/s] and [m^3/h], total pressure Δp_t [Pa], throw $l_{0.2}$ [m] and sound power level L_{WA} [dB(A)] can be seen in the diagrams.

Frequency-related sound effect level

The sound effect level in the frequency band is defined as $L_{WA}+K_{ok}$. K_{ok} values are specified in charts beneath the diagrams on the following pages. K_{ok} values for PKA without a box are available on request.

Quick selection, supply air

PKA + MBB Duct $Ød_1$	PKA $Ød_2$	Max. airflow 30dB(A) l/s	Max. airflow 30dB(A) m^3/h	Max. airflow 35dB(A) l/s	Max. airflow 35dB(A) m^3/h
100	125	33	119	39	140
100	160	39	140	47	169
125	125	40	144	48	173
125	160	51	184	61	220
125	200	58	209	70	252
160	160	59	212	70	252
160	200	67	241	84	302
160	250	77	277	99	356
200	200	83	299	100	360
200	250	96	346	118	425
200	315	112	403	139	500
250	250	118	425	139	500
250	315	133	479	163	587
250	400	128	461	174	626
315	315	145	522	173	623
315	400	173	623	209	752

Sound attenuation

Sound attenuation of the diffuser ΔL from duct to room, including end reflection, see table below.

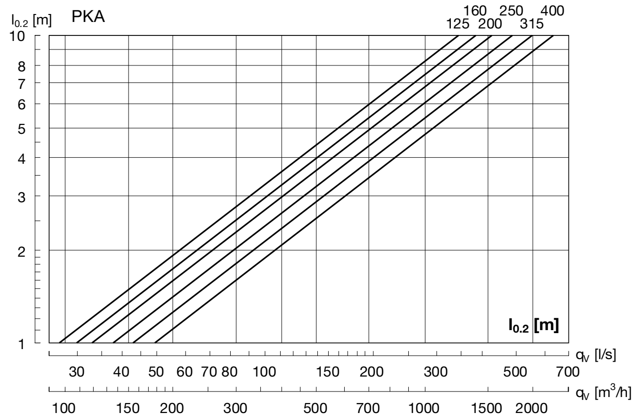
PKA + MBB Duct $Ød_1$	PKA $Ød_2$	63	125	250	500	1K	2K	4K	8K
		Centre frequency Hz							
100	125	19	16	7	19	18	18	18	21
100	160	21	16	5	15	17	18	16	19
125	125	18	13	9	20	13	19	18	19
125	160	12	13	8	19	13	16	17	19
125	200	16	11	5	16	13	15	15	17
160	160	17	17	11	19	18	17	20	20
160	200	14	14	7	21	15	16	18	19
160	250	15	15	5	17	13	15	16	18
200	200	15	10	6	16	17	15	19	18
200	250	12	9	5	14	17	15	17	17
200	315	12	7	4	11	15	14	16	15
250	250	14	8	8	14	16	17	17	18
250	315	12	6	6	15	15	15	16	17
250	400	13	5	4	13	14	14	15	15
315	315	7	9	8	14	17	16	17	21
315	400	7	8	8	12	16	16	16	18

Balancing

Balancing data is contained in a separate brochure.

Throw $l_{0.2}$

The throw is specified at a terminal velocity of 0.2 m/s.



Correction throw $l_{0.2}$

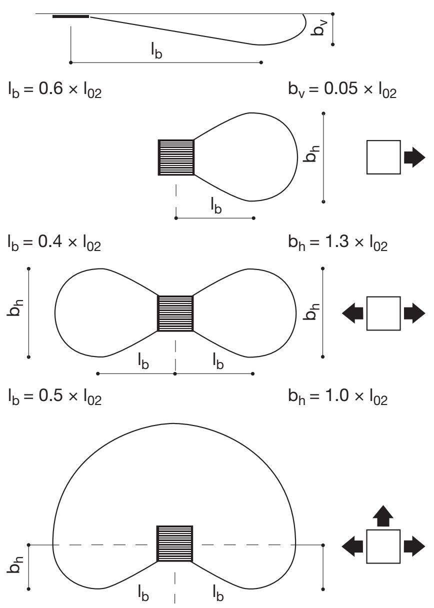
PKA Ød	1-way	2-way	3 - way
125	2.6	1.8	1.4
160	2.5	1.7	1.3
200	2.4	1.7	1.3
250	2.3	1.7	1.3
315	2.2	1.7	1.2
400	2.3	1.7	1.2

Air jet distribution

l_b = Distance from the diffuser to the point where there is maximum dispersal.

b_v = Depth of the air jet on a vertical plane.

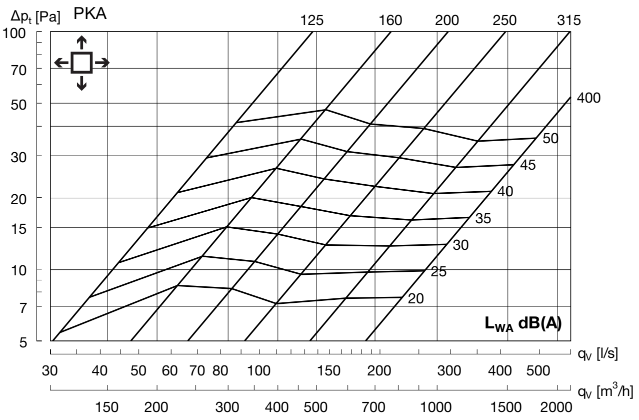
b_h = Width of the air jet on a horizontal plane.



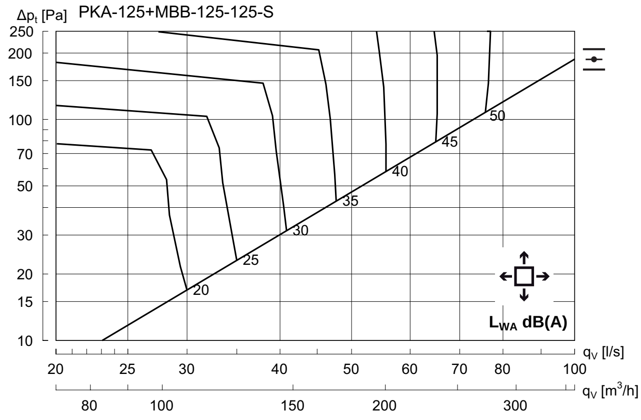
Perforated diffuser PKA

Technical data

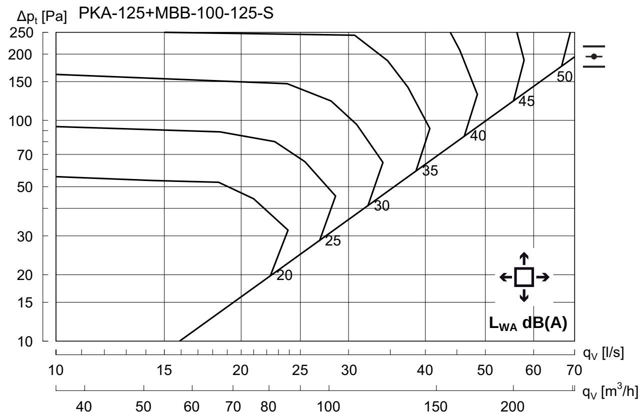
PKA without box - Supply air



PKA 125 + MBB - Supply air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	9	5	-1	-4	-3	-11	-20	-26

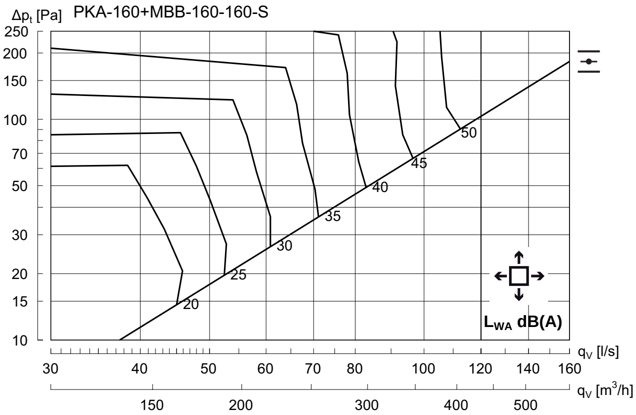


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	11	7	3	-5	-5	-11	-18	-25

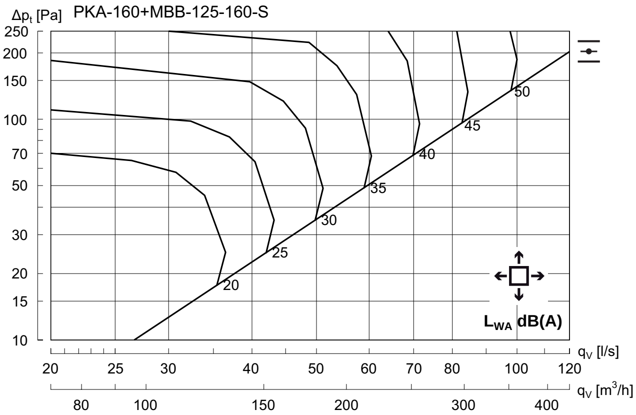
Perforated diffuser PKA

Technical data

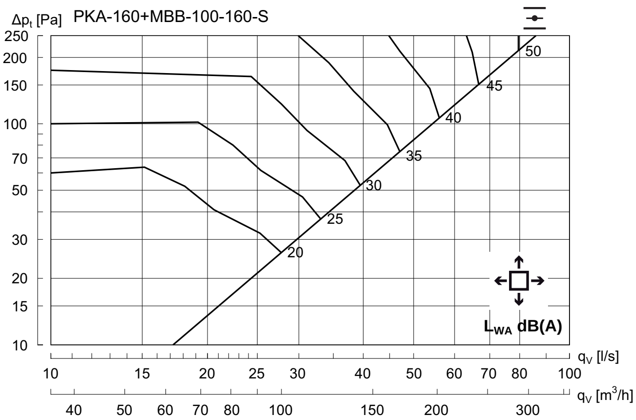
PKA 160 + MBB - Supply air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	8	5	-2	-4	-3	-11	-21	-29

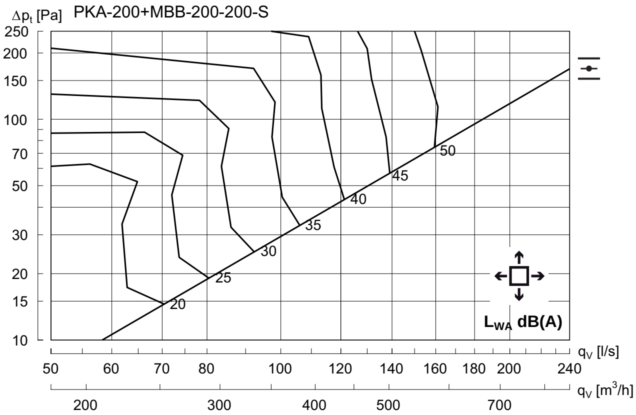


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	9	5	1	-4	-4	-10	-17	-25

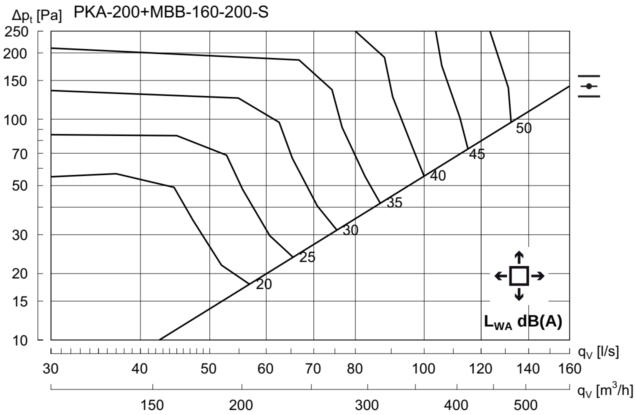


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	9	4	1	-3	-5	-10	-15	-19

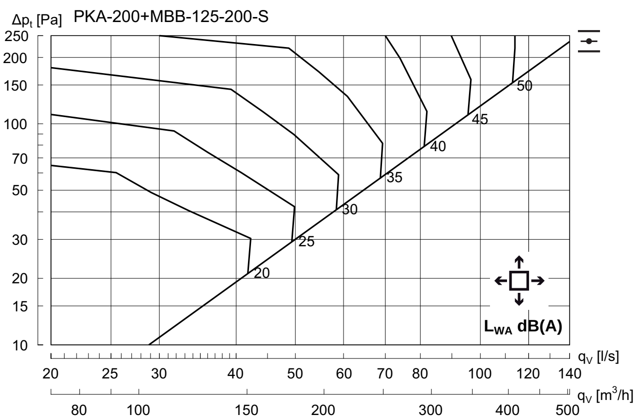
PKA 200 + MBB - Supply air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	11	5	-3	-3	-3	-11	-22	-29



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	10	5	-2	-4	-3	-10	-20	-26

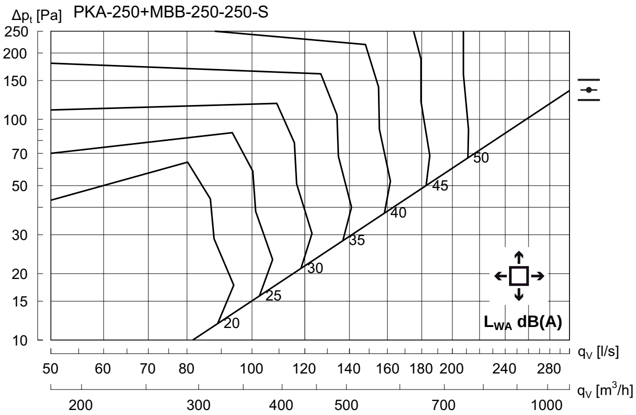


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	10	5	1	-4	-5	-10	-15	-22

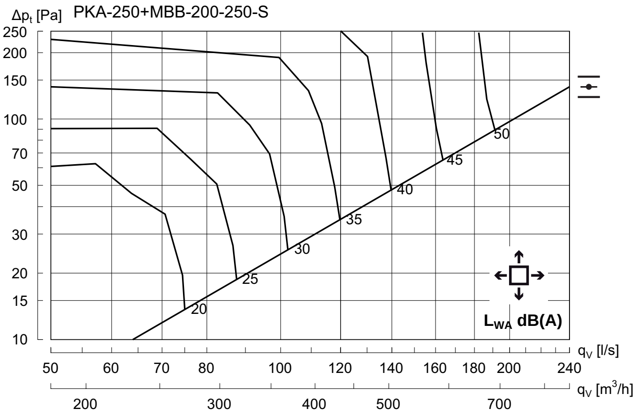
Perforated diffuser PKA

Technical data

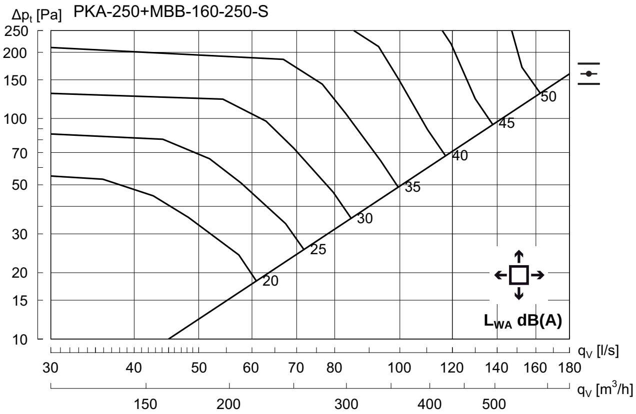
PKA 250 + MBB - Supply air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	11	3	-4	-3	-3	-12	-22	-30

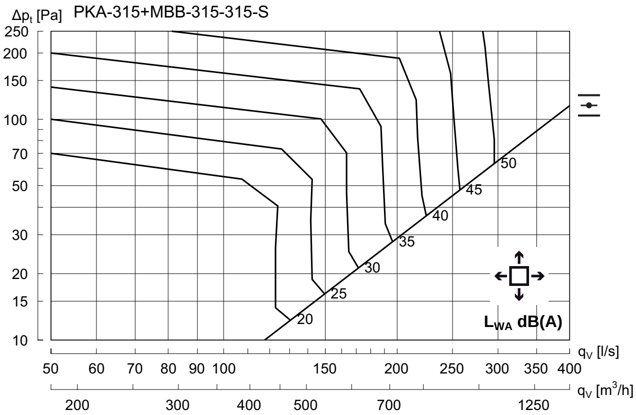


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	10	5	-2	-3	-3	-11	-20	-28

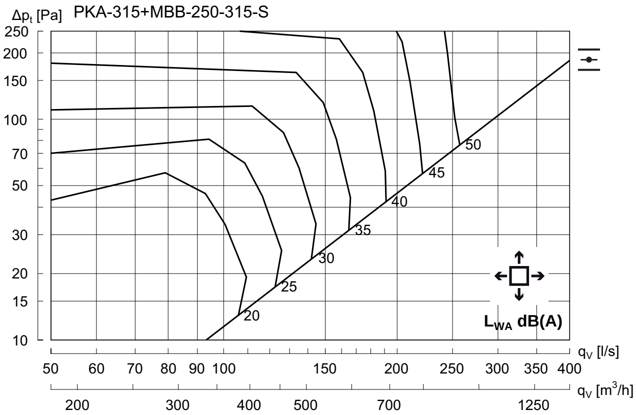


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	8	5	0	-4	-4	-10	-17	-23

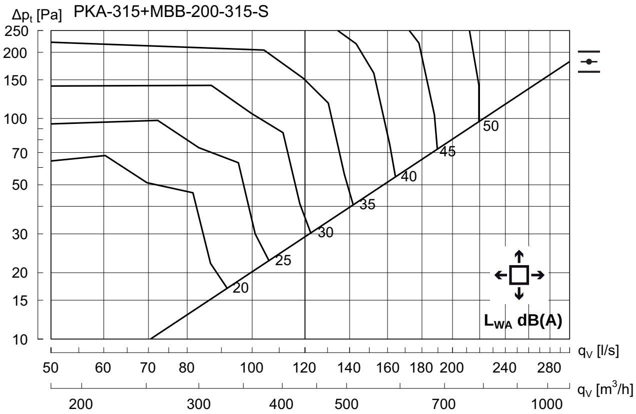
PKA 315 + MBB - Supply air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	12	2	-3	-2	-3	-13	-23	-33



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	11	3	-2	-3	-4	-11	-18	-27

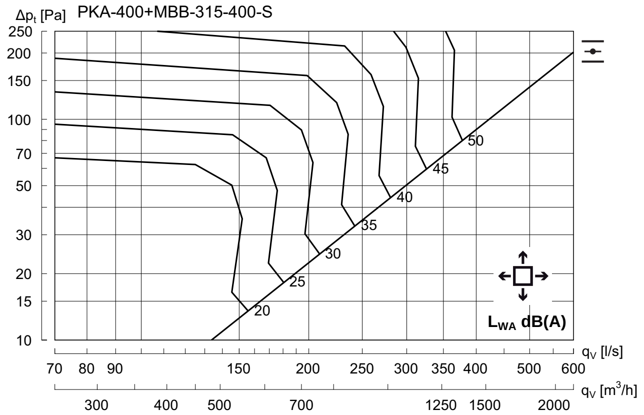


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	10	5	-1	-3	-4	-11	-19	-25

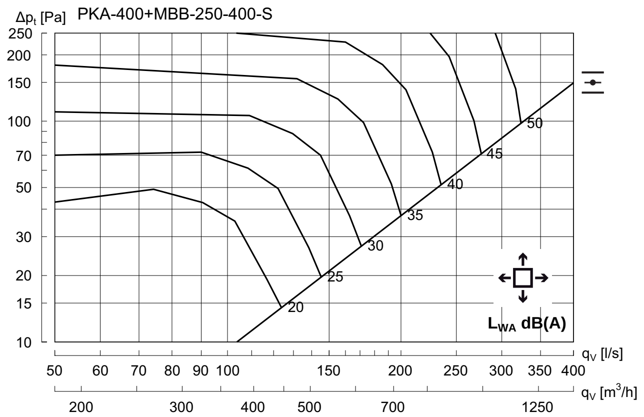
Perforated diffuser PKA

Technical data

PKA 400 + MBB - Supply air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	14	2	0	-2	-5	-13	-17	-26



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	10	4	0	-2	-4	-11	-17	-24

PKA + MBB - Supply air

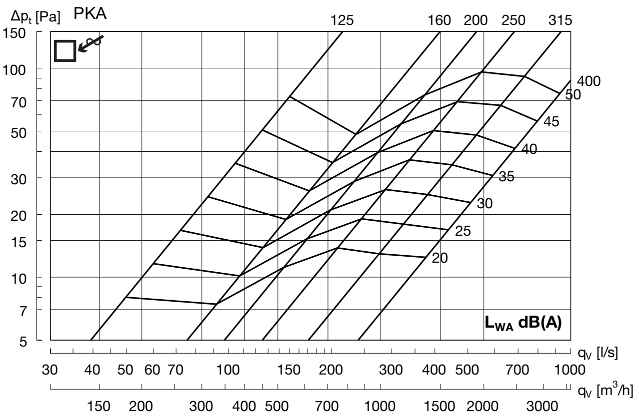
Correction sound power level (L_{WA}) and pressure loss (Δp_t)

PKA + MBB		1-way		2-way		3 - way	
Duct $Ød_1$	PKA $Ød_2$	L_{WA}	Δp_t	L_{WA}	Δp_t	L_{WA}	Δp_t
100	125	+ 10	x 1.3	+ 4	x 1.1	+ 2	x 1.05
100	160	+ 5	x 1.1	+ 2	x 1.05	+ 1	x 1
125	125	+ 10	x 1,35	+ 6	x 1,1	+ 4	x 1,05
125	160	+ 10	x 1.4	+ 4	x 1.1	+ 1	x 1
125	200	+ 4	x 1.2	+ 2	x 1.05	+ 1	x 1
160	160	+ 13	x 1.8	+ 6	x 1.3	+ 2	x 1.1
160	200	+ 16	x 1.7	+ 10	x 1.2	+ 4	x 1.05
160	250	+ 10	x 1.3	+ 6	x 1,1	+ 3	x 1
200	200	+ 17	x 2.3	+ 11	x 1.4	+ 7	x 1.1
200	250	+ 13	x 1.8	+ 6	x 1.2	+ 4	x 1.1
200	315	+ 9	x 1.5	+ 4	x 1.1	+ 0	x 1.05
250	250	+ 21	x 2.1	+ 11	x 1.4	+ 7	x 1.2
250	315	+ 19	x 1.8	+ 7	x 1.2	+ 3	x 1.1
250	400	+ 10	x 1.5	+ 6	x 1.2	+ 0	x 1
315	315	+ 21	x 2.1	+ 10	x 1.3	+ 4	x 1.1
315	400	+ 21	x 1.8	+ 8	x 1.5	+ 3	x 1.2

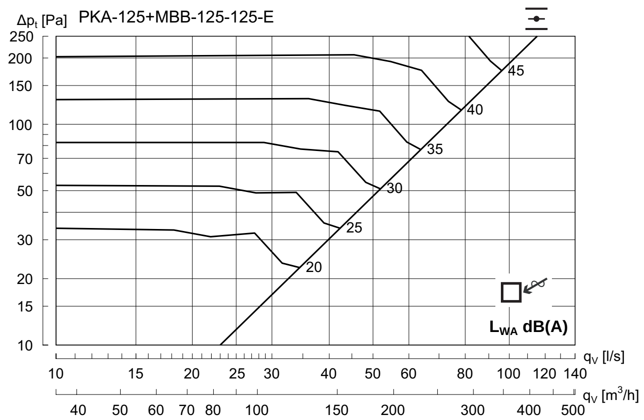
Perforated diffuser PKA

Technical data

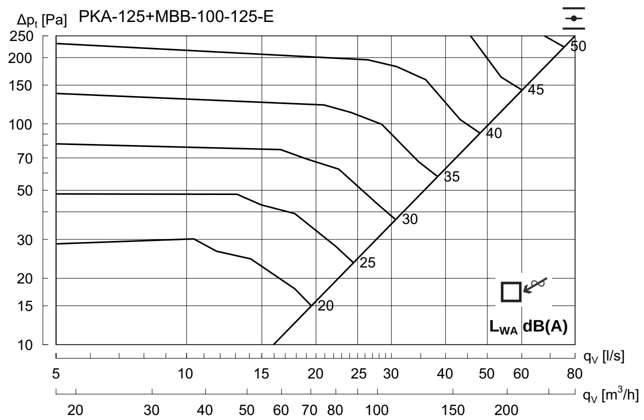
PKA without box - Exhaust air



PKA 125 + MBB - Exhaust air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	13	5	-1	-4	-4	-11	-15	-20

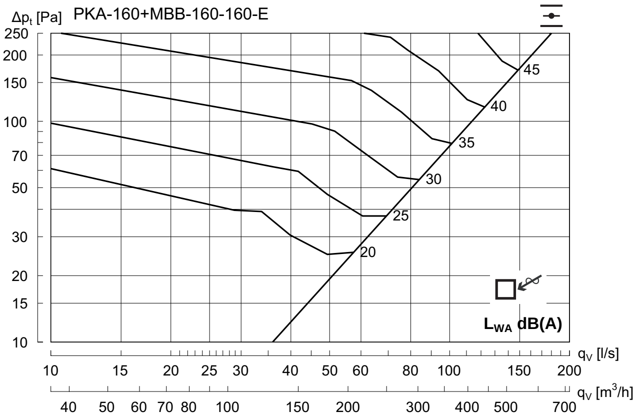


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	13	-1	3	-3	-6	-10	-16	-19

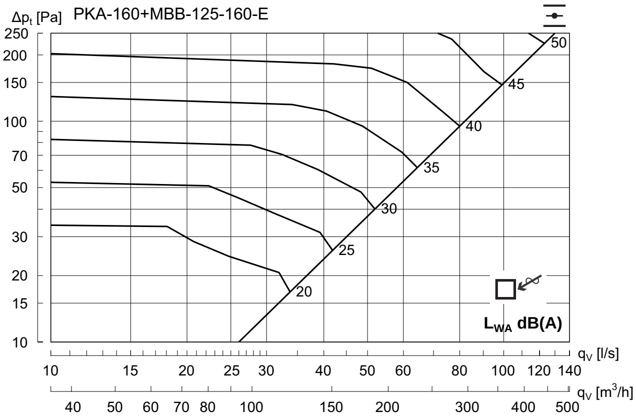
Perforated diffuser PKA

Technical data

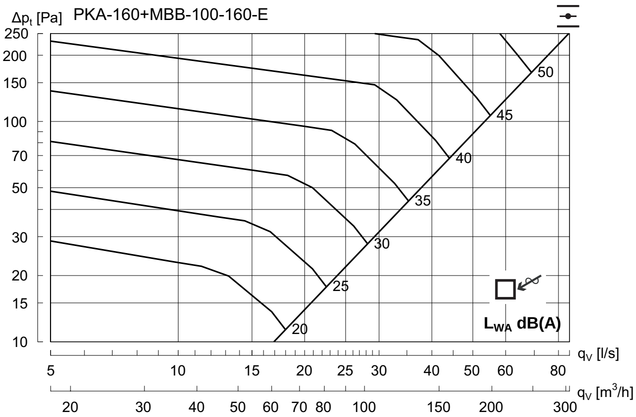
PKA 160 + MBB - Exhaust air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	16	6	-1	-5	-4	-10	-15	-19

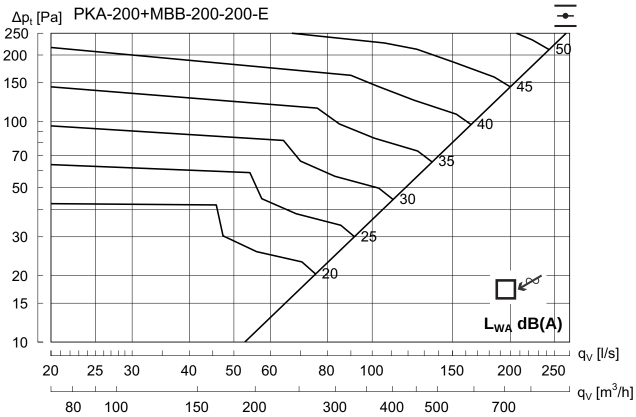


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	13	5	0	-3	-5	-11	-15	-22

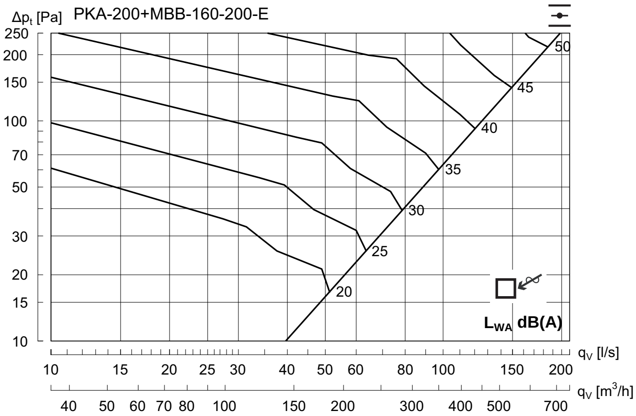


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	10	-1	5	-3	-8	-11	-18	-25

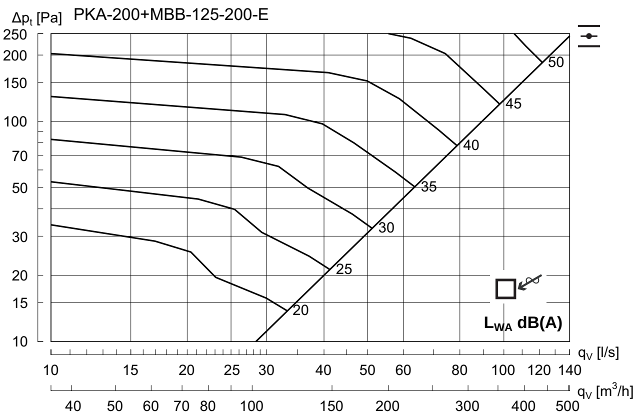
PKA 200 + MBB - Exhaust air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	15	4	-1	-4	-5	-9	-16	-25



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	15	6	-1	-5	-5	-9	-14	-20



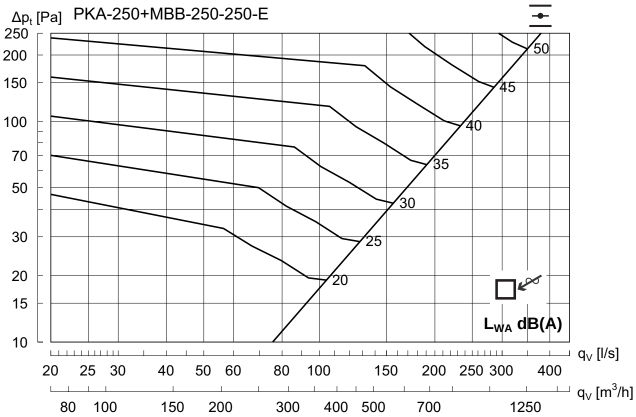
Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	9	3	1	-4	-5	-10	-14	-21

Perforated diffuser PKA

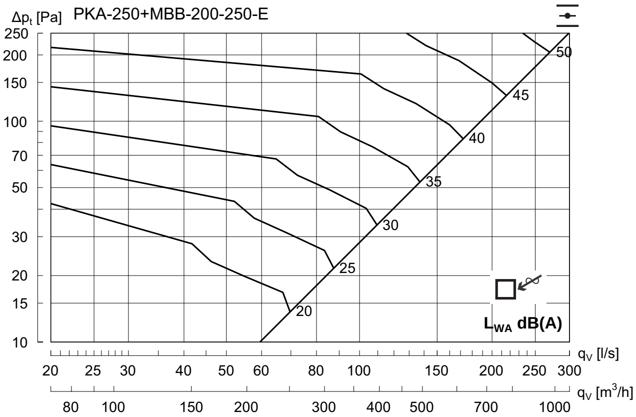
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

Technical data

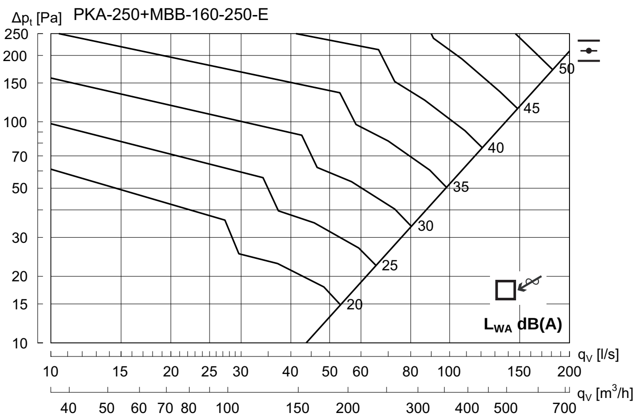
PKA 250 + MBB - Exhaust air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	10	5	2	-3	-5	-11	-16	-25

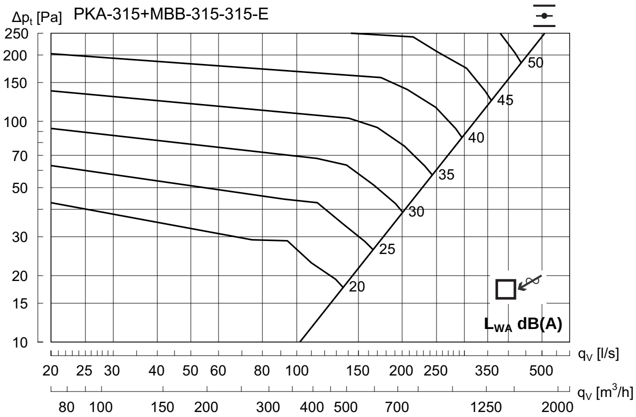


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	12	5	0	-3	-5	-10	-14	-23

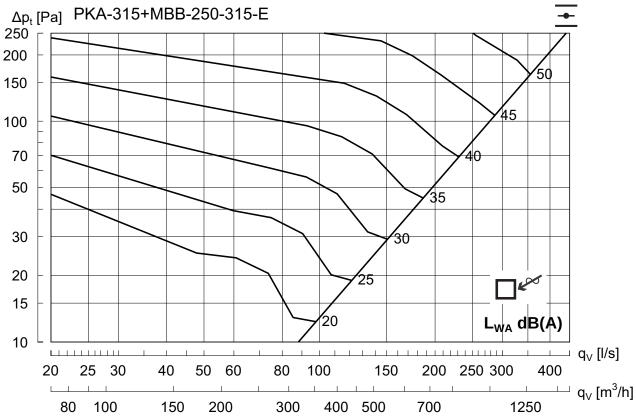


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	16	6	0	-5	-5	-9	-15	-21

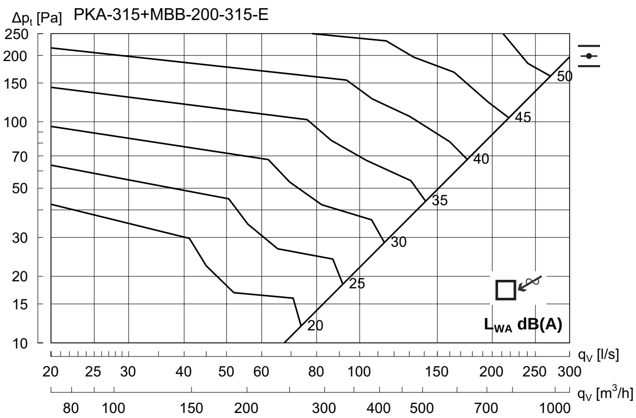
PKA 315 + MBB - Exhaust air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	13	5	3	-4	-6	-10	-16	-26



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	7	5	2	-3	-6	-10	-16	-24

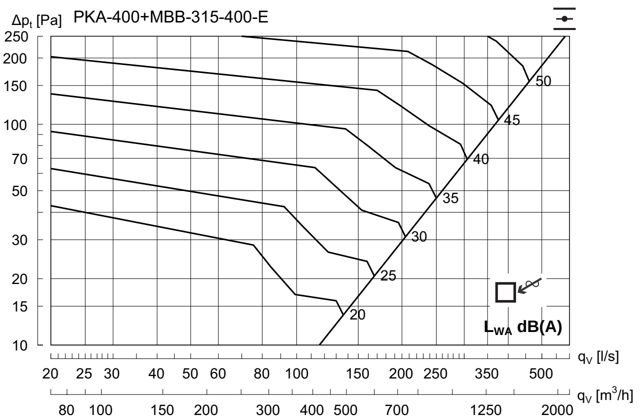


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	13	5	0	-3	-5	-9	-15	-23

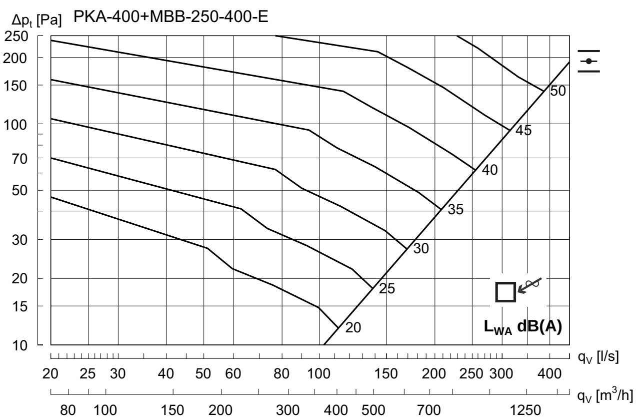
Perforated diffuser PKA

Technical data

PKA 400 + MBB - Exhaust air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	10	4	2	-3	-6	-9	-14	-25



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	10	5	2	-4	-5	-10	-15	-23

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

Perforated diffuser PCA

Description

PCA is a circular diffuser with perforated face plate. PCA can be used for both supply and exhaust air. PCA is suitable for horizontal supply of cooled air and can be equipped with accessories of various types in order to achieve optimal function. Installing a PCA diffuser in a plenum box type MBB can help to achieve a stable airflow to the diffuser as well as realise the potential for individual ajustment.

- Suitable for both supply and exhaust air
- Suitable for horizontal supply of cooled air
- Option of 1, 2 and 3-way supply air

Maintenance

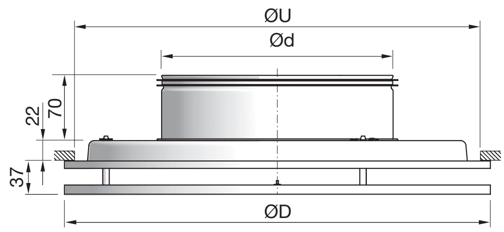
The face plate can be removed to enable cleaning of internal parts or to gain access to the duct or box. The visible parts of the diffuser can be wiped with a damp cloth.

Order code

Product	PCA - aaa
Type	
PCA	
Connection dim. Ød	
Ød 100-400	

Example: PCA-200

Dimensions



PCA Ød mm	ØD mm	ØU* mm	Free area A m^2	Weight kg
100	240	200	0.016	1,00
125	240	200	0.018	1,00
160	300	260	0.023	1,50
200	360	320	0.03	2,30
250	460	420	0.042	3,40
315	540	500	0.058	4,60
400	540	500	0.066	4,60

ØU = ceiling grid opening

Materials and finish

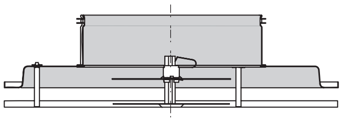
Material:	Galvanised steel
Standard finish:	Powder-coated
Standard colour:	White RAL 9010, gloss 30

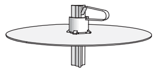
The diffuser is available in other colours. Please contact Lindab's sales department for further information.

Perforated diffuser PCA

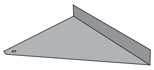
Accessories

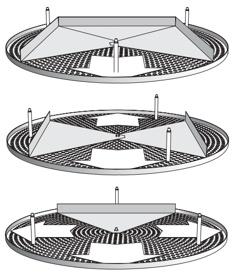
DRZ - Balancing damper



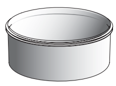


DAZ - Blending profiles (set)

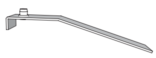


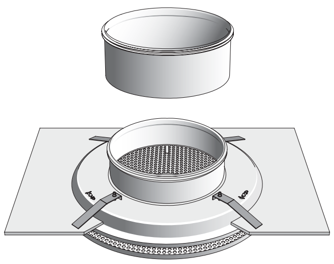


MBZ - Extension piece



DDZ - Mounting brackets (set)



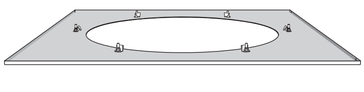


Order code - accessories

Product	aaa	bbb
Type	✓	
Size		✓

Example: DRZ-200

LM - Module plate



Order code - module plate

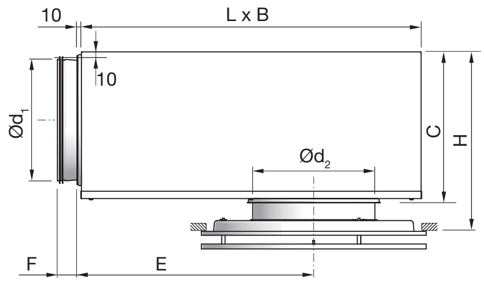
Product	LM	a	PCA	ccc
Type	✓			
Ceiling system		✓		
Diffuser			✓	
Size				✓

Example: LM-1-PCA-200

Ceiling system - see introductory summary.

MBB - Plenum box

PCA + MBB



PCA + MBB							
Duct Ød$_1$ mm	PCA Ød$_2$ mm	B mm	C mm	E mm	F mm	H* mm	L mm
100	100	260	159	216	50	200 - 240	310
100	125	260	159	216	50	200 - 240	310
100	160	260	159	216	50	200 - 240	310
125	125	310	184	262	50	225 - 265	376
125	160	310	184	262	50	225 - 265	376
125	200	310	184	262	50	225 - 265	376
160	160	380	220	323	50	259 - 299	459
160	200	380	220	323	50	259 - 299	459
160	250	380	220	323	50	259 - 299	459
200	200	460	259	396	70	300 - 340	565
200	250	460	259	396	70	300 - 340	565
200	315	460	259	396	70	300 - 340	565
250	250	540	309	486	70	350 - 390	698
250	315	540	309	486	70	350 - 390	698
250	400	540	309	486	70	350 - 390	698
315	315	540	373	646	70	415 - 455	858
315	400	540	373	646	70	415 - 455	858

* Using accessory MBZ the H dimension will increase:
Ød$_2$ = 100 - 200 mm => H +40 mm
Ød$_2$ = 250 - 315 mm => H +60 mm
Ød$_2$ = 400 mm => H +80 mm

Order code

Product	MBB	aaa	bbb	c
Type: MBB	✓			
Duct connection Ød$_1$: Ø100-315		✓		
Diffuser dimension Ød$_2$: Ø100-400			✓	
Function: S = Supply air, E = Exhaust				✓

Example: PCA-200+MBB-160-200-S

Perforated diffuser PCA

Technical data

Capacity

Air flow q_v [l/s] and [m^3/h], total pressure Δp_t [Pa], throw $l_{0.2}$ [m] and sound power level L_{WA} [dB(A)] can be seen in the diagrams

Frequency-related sound effect level

The sound effect level in the frequency band is defined as $L_{WA}+K_{ok}$. K_{ok} values are specified in charts beneath the diagrams on the following pages. K_{ok} values for PCA without a box are avaliable on request.

Quick selection, supply air

PCA + MBB		Max. airflow		Max. airflow	
Duct	PCA	30dB(A)		35dB(A)	
Ød$_1$	Ød$_2$	l/s	m^3/h	l/s	m^3/h
100	100	26	94	31	112
100	125	33	119	39	140
100	160	39	140	47	169
125	125	40	144	48	173
125	160	51	184	61	220
125	200	58	209	70	252
160	160	57	207	71	255
160	200	67	241	84	302
160	250	77	277	99	356
200	200	83	299	100	360
200	250	96	346	118	425
200	315	112	403	139	500
250	250	118	425	139	500
250	315	133	479	163	587
250	400	146	526	193	695
315	315	145	522	173	623
315	400	187	673	225	810

Sound attenuation

Sound attenuation of the diffuser ΔL from duct to room, including end reflection, see table below.

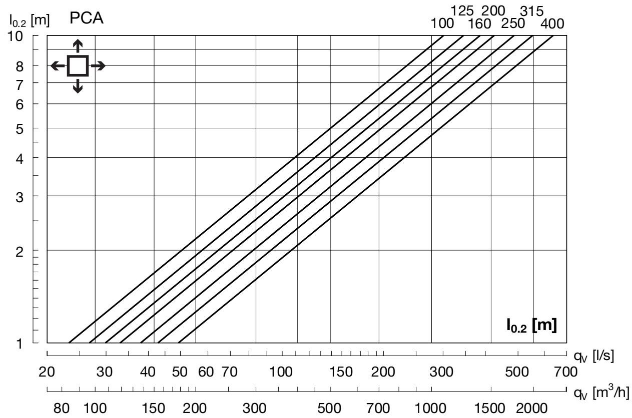
PCA + MBB		Centre frequency Hz							
Duct Ød$_1$	PCA Ød$_2$	63	125	250	500	1K	2K	4K	8K
100	100	18	17	8	20	19	20	19	23
100	125	19	16	7	19	18	18	18	21
100	160	21	16	5	15	17	18	16	19
125	125	18	13	9	20	13	19	18	19
125	160	12	13	8	19	13	16	17	19
125	200	16	11	5	16	13	15	15	17
160	160	17	17	11	19	18	17	20	20
160	200	14	14	7	21	15	16	18	19
160	250	15	15	5	17	13	15	16	18
200	200	15	10	6	16	17	15	19	18
200	250	12	9	5	14	17	15	17	17
200	315	12	7	4	11	15	14	16	15
250	250	14	8	8	14	16	17	17	18
250	315	12	6	6	15	15	15	16	17
250	400	13	5	4	13	14	14	15	15
315	315	7	9	8	14	17	16	17	21
315	400	7	8	8	12	16	16	16	18

Balancing

Balancing data is contained in a separate brochure.

Throw $l_{0.2}$

The throw is specified at a terminal velocity of 0.2 m/s.



Correction throw $L_{0.2}$

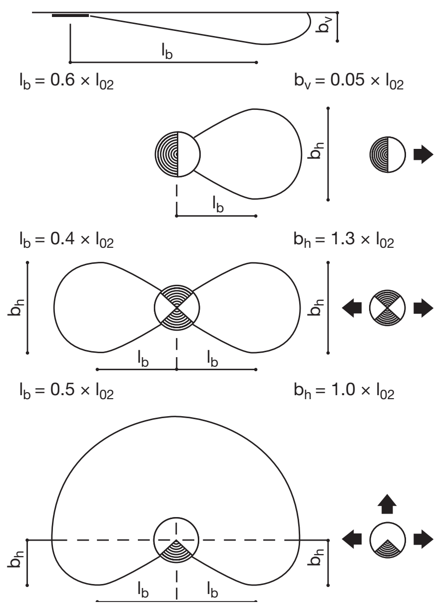
PCA Ød	1-way	2-way	3 - way
100	2.3	1.7	1.3
125	2.6	1.8	1.4
160	2.5	1.7	1.3
200	2.4	1.7	1.3
250	2.3	1.7	1.3
315	2.2	1.7	1.2
400	2.3	1.7	1.2

Air jet distribution

l_b = Distance from the diffuser to the point where there is maximum dispersal.

b_v = Depth of the air jet on a vertical plane.

b_h = Width of the air jet on a horizontal plane.



Perforated diffuser PCA

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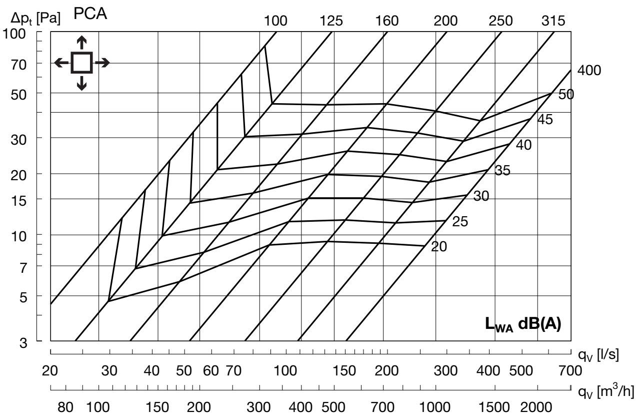
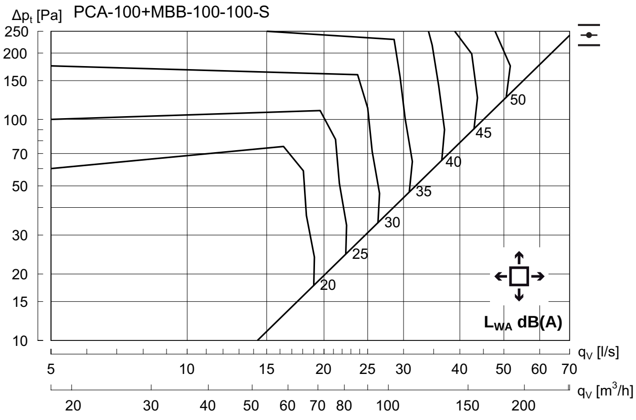
18

Technical data

PCA without box - Supply air



PCA 100 + MBB - Supply air

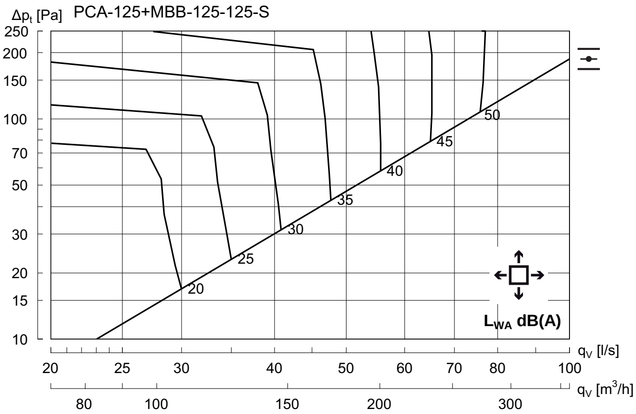


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	12	5	2	-5	-4	-11	-20	-26

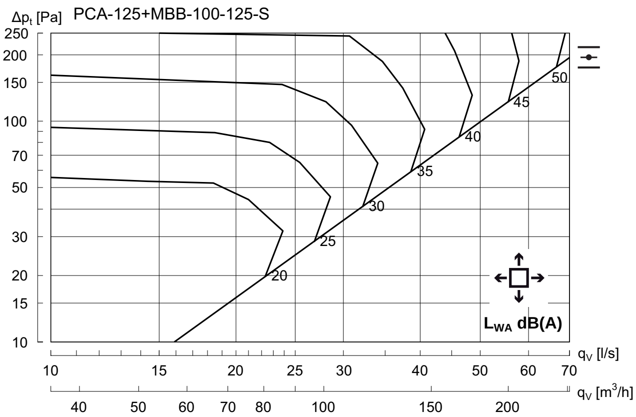
Perforated diffuser PCA

Technical data

PCA 125 + MBB - Supply air

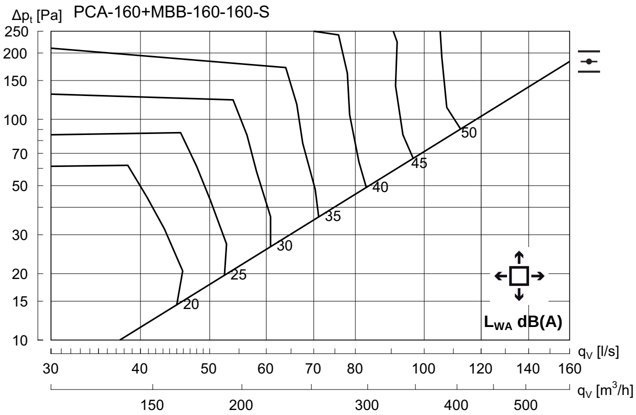


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	9	5	-1	-4	-3	-11	-20	-26

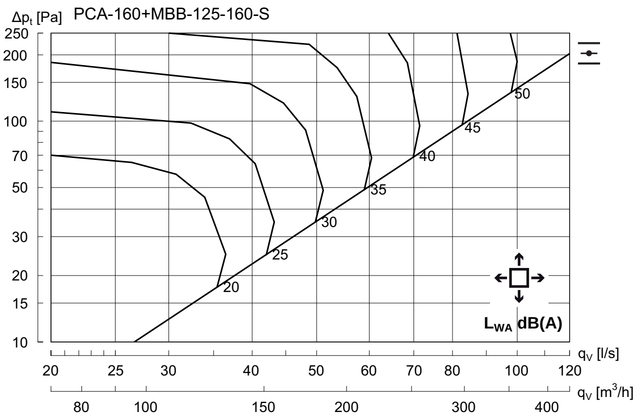


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	11	7	3	-5	-5	-11	-18	-25

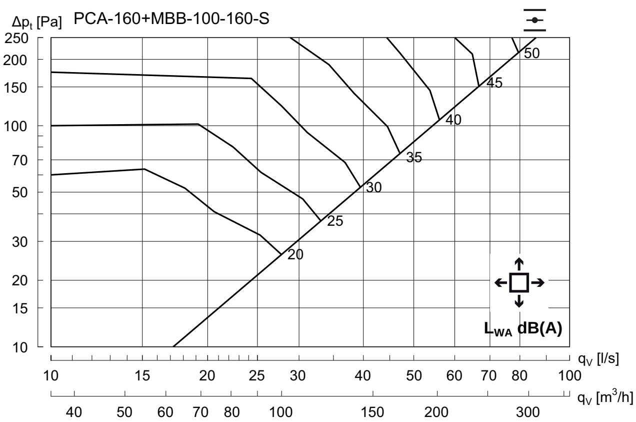
PCA 160 + MBB - Supply air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	8	5	-2	-4	-3	-11	-21	-29



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	9	5	1	-4	-4	-10	-17	-25

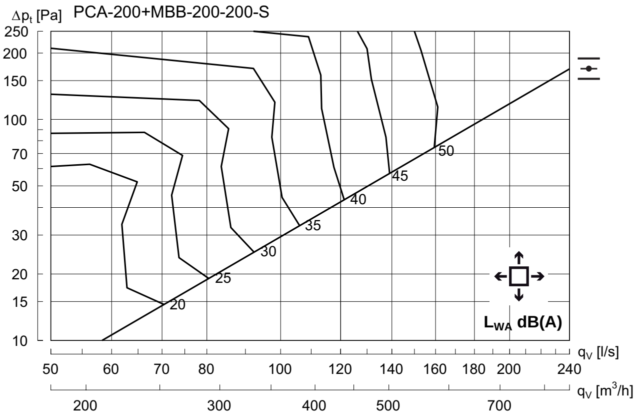


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	9	4	1	-3	-5	-10	-15	-19

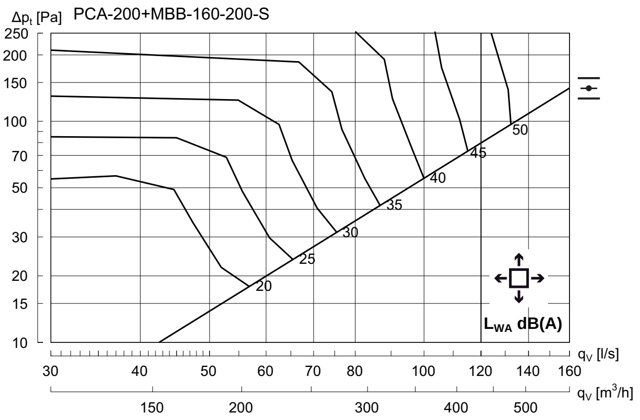
Perforated diffuser PCA

Technical data

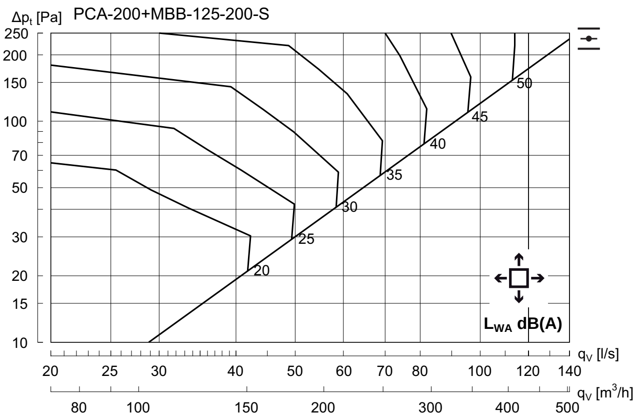
PCA 200 + MBB - Supply air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	11	5	-3	-3	-3	-11	-22	-29

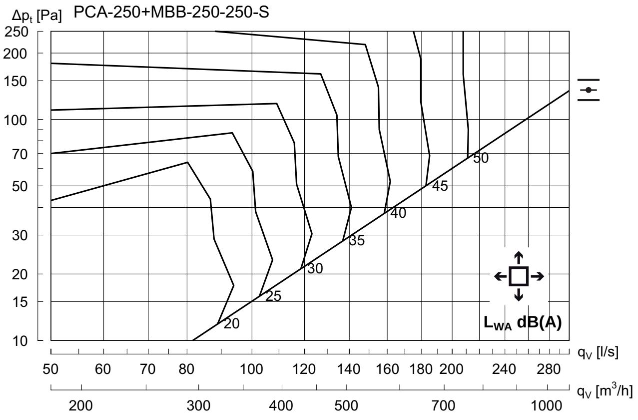


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	10	5	-2	-4	-3	-10	-20	-26

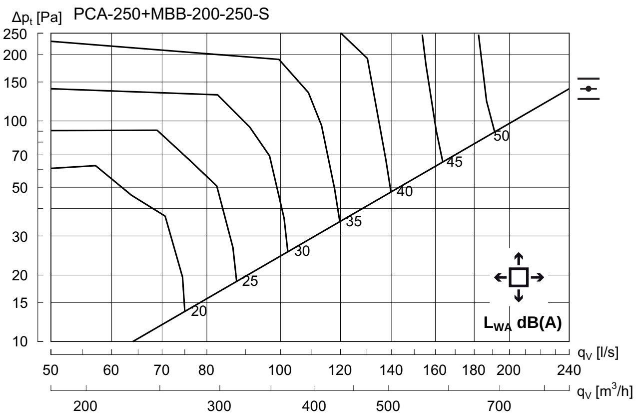


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	10	5	1	-4	-5	-10	-15	-22

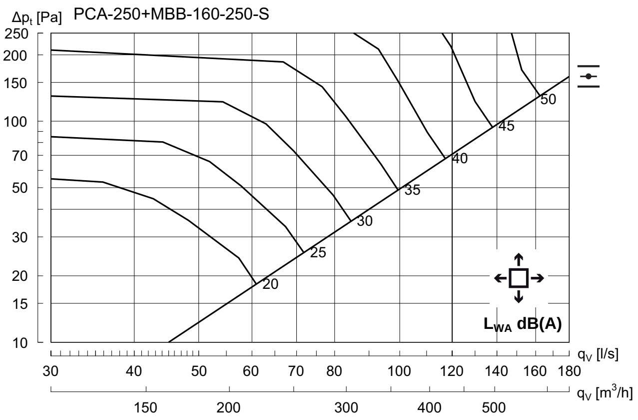
PCA 250 + MBB - Supply air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	11	3	-4	-3	-3	-12	-22	-30



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	10	5	-2	-3	-3	-11	-20	-28

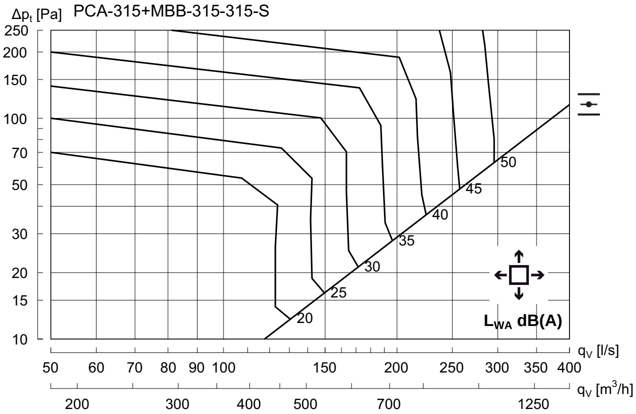


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	8	5	0	-4	-4	-10	-17	-23

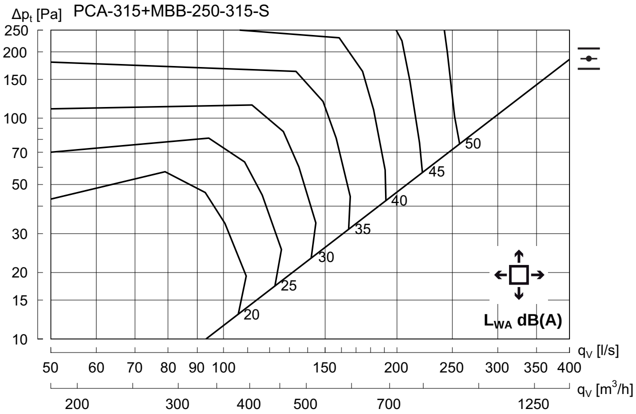
Perforated diffuser PCA

Technical data

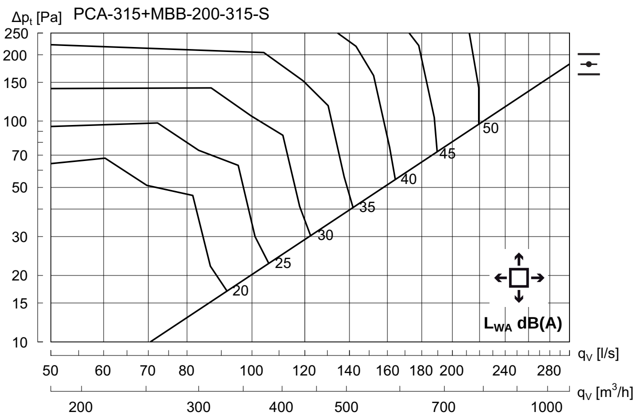
PCA 315 + MBB - Supply air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	12	2	-3	-2	-3	-13	-23	-33

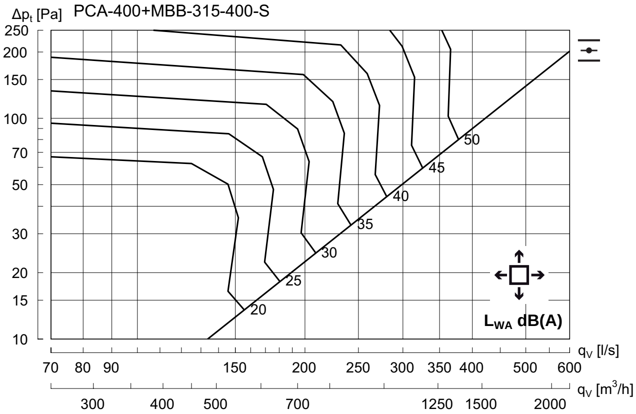


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	11	3	-2	-3	-4	-11	-18	-27

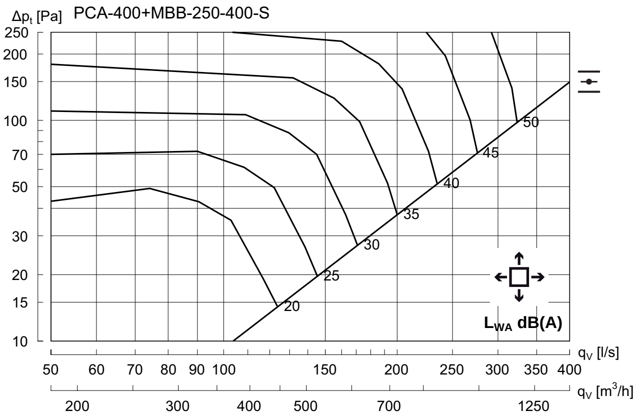


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	10	5	-1	-3	-4	-11	-19	-25

PCA 400 + MBB - Supply air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	14	2	0	-2	-5	-13	-17	-26



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	10	4	0	-2	-4	-11	-17	-24

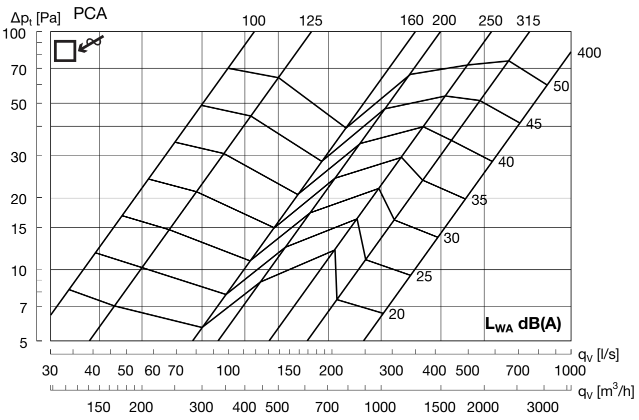
Correction sound power level (L_{WA}) and pressure loss (ΔP_t)

PCA + MBB							
Duct	PCA	1-way		2-way		3 - way	
$Ød_1$	$Ød_2$	L_{WA}	Δp_t	L_{WA}	Δp_t	L_{WA}	Δp_t
100	100	+ 10	x 1,35	+ 6	x 1,1	+ 4	x 1,05
100	125	+ 10	x 1.3	+ 4	x 1.1	+ 2	x 1.05
100	160	+ 5	x 1.1	+ 2	x 1.05	+ 1	x 1
125	125	+ 10	x 1,35	+ 6	x 1,1	+ 4	x 1,05
125	160	+ 10	x 1,4	+ 4	x 1,1	+ 1	x 1
125	200	+ 4	x 1,2	+ 2	x 1,05	+ 1	x 1
160	160	+ 13	x 1,8	+ 6	x 1,3	+ 2	x 1,1
160	200	+ 16	x 1,7	+ 10	x 1,2	+ 4	x 1,05
160	250	+ 10	x 1,3	+ 6	x 1,1	+ 3	x 1
200	200	+ 17	x 2,3	+ 11	x 1,4	+ 7	x 1,1
200	250	+ 13	x 1,8	+ 6	x 1,2	+ 4	x 1,1
200	315	+ 9	x 1,5	+ 4	x 1,1	+ 0	x 1,05
250	250	+ 21	x 2,1	+ 11	x 1,4	+ 7	x 1,2
250	315	+ 19	x 1,8	+ 7	x 1,2	+ 3	x 1,1
250	400	+ 10	x 1,5	+ 6	x 1,2	+ 0	x 1
315	315	+ 21	x 2,1	+ 10	x 1,3	+ 4	x 1,1
315	400	+ 21	x 1,8	+ 8	x 1,5	+ 3	x 1,2

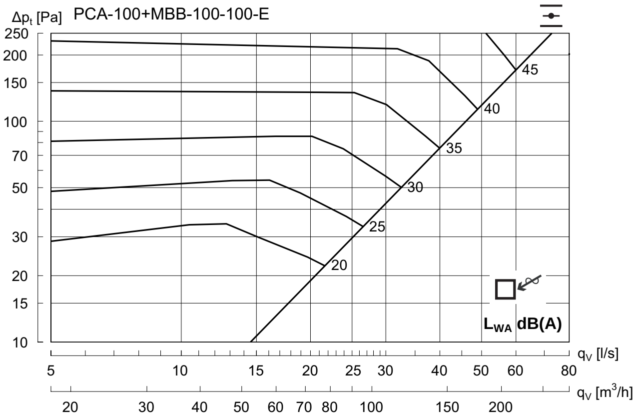
Perforated diffuser PCA

Technical data

PCA without box - Exhaust air



PCA 100 + MBB - Exhaust air

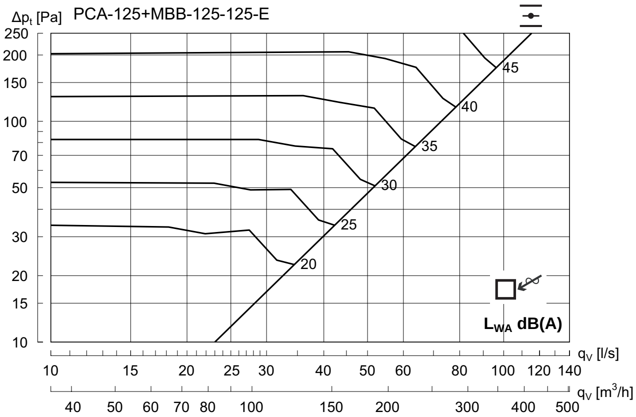


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	11	0	3	-3	-6	-10	-15	-22

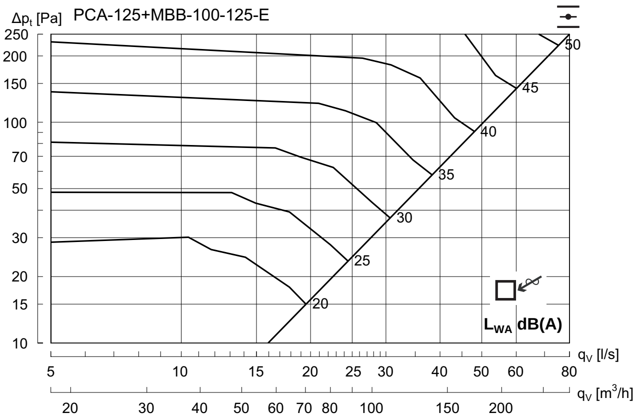
Perforated diffuser PCA

Technical data

PCA 125 + MBB - Exhaust air

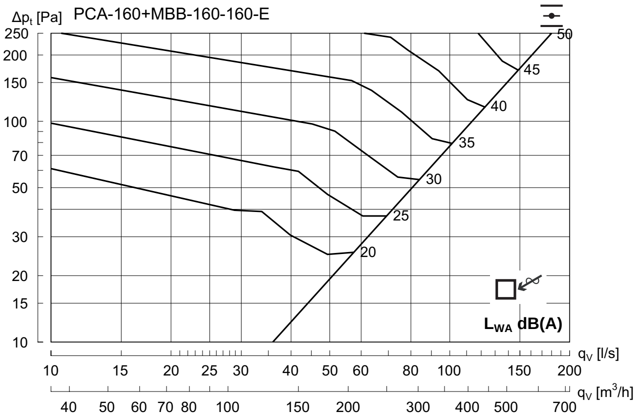


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	13	5	-1	-4	-4	-11	-15	-20

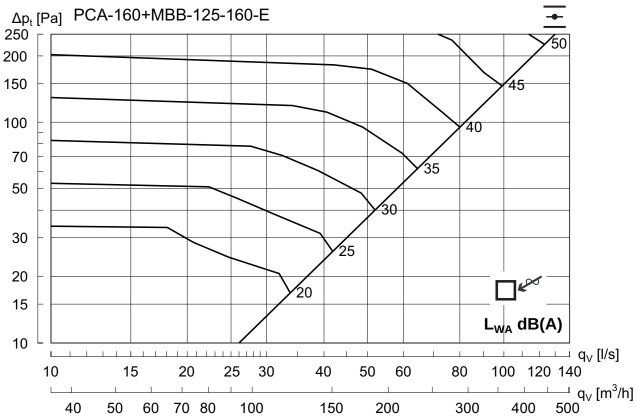


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	13	-1	3	-3	-6	-10	-16	-19

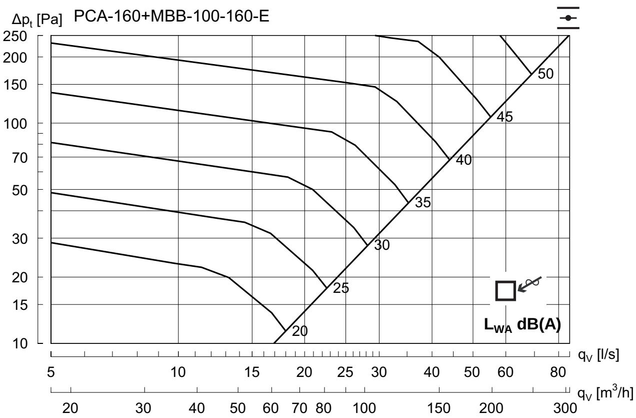
PCA 160 + MBB - Exhaust air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	16	6	-1	-5	-4	-10	-15	-19



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	13	5	0	-3	-5	-11	-15	-22

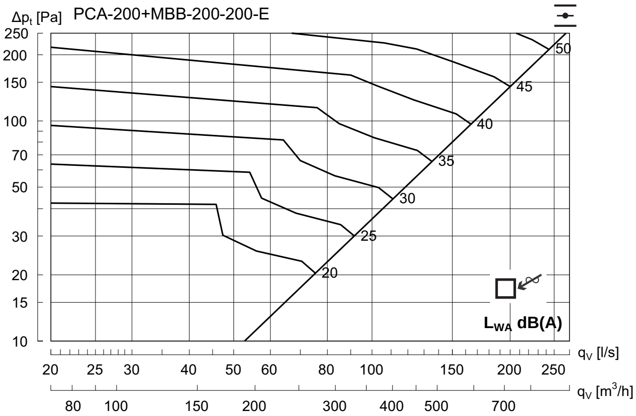


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	10	-1	5	-3	-8	-11	-18	-25

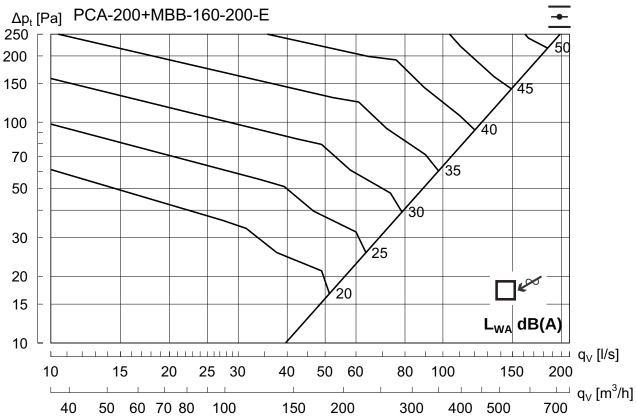
Perforated diffuser PCA

Technical data

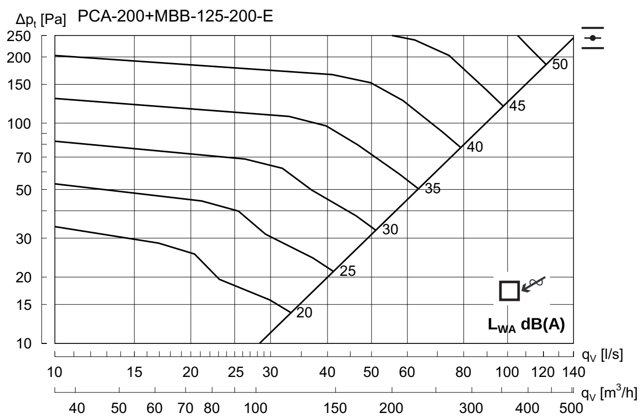
PCA 200 + MBB - Exhaust air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	15	4	-1	-4	-5	-9	-16	-25

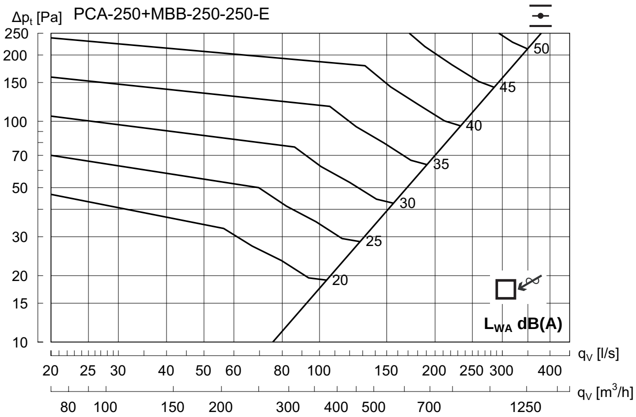


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	15	6	-1	-5	-5	-9	-14	-20

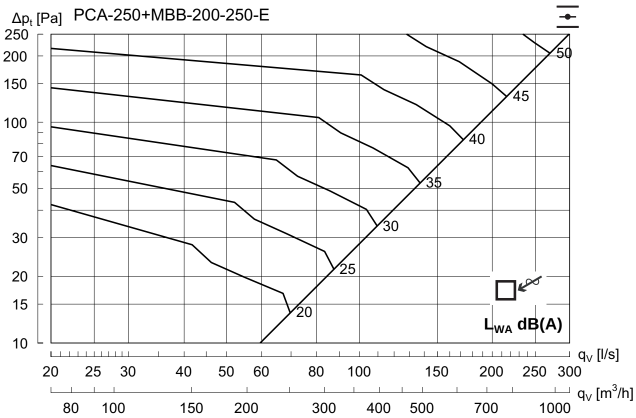


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	9	3	1	-4	-5	-10	-14	-21

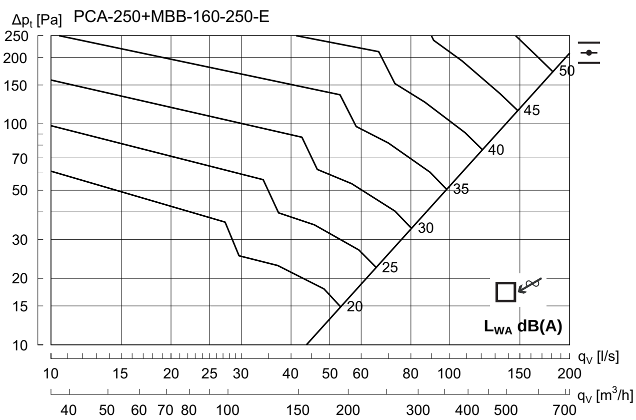
PCA 250 + MBB - Exhaust air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	10	5	2	-3	-5	-11	-16	-25



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	12	5	0	-3	-5	-10	-14	-23



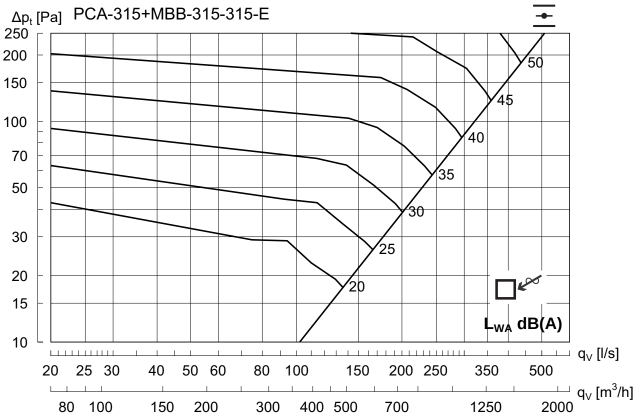
Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	16	6	0	-5	-5	-9	-15	-21

Perforated diffuser

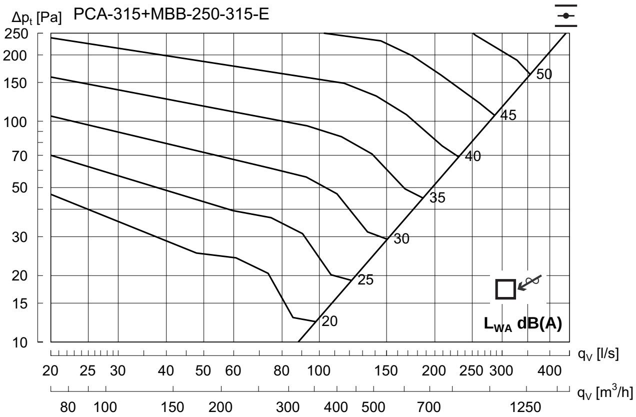
PCA

Technical data

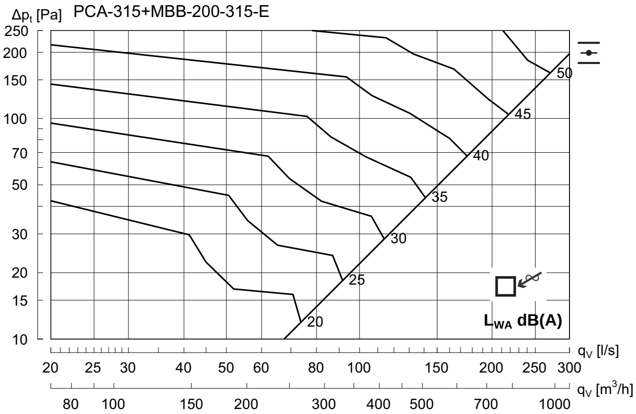
PCA 315 + MBB - Exhaust air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	13	5	3	-4	-6	-10	-16	-26

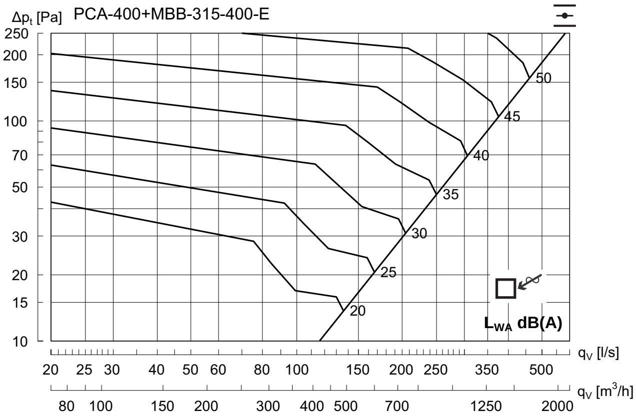


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	7	5	2	-3	-6	-10	-16	-24

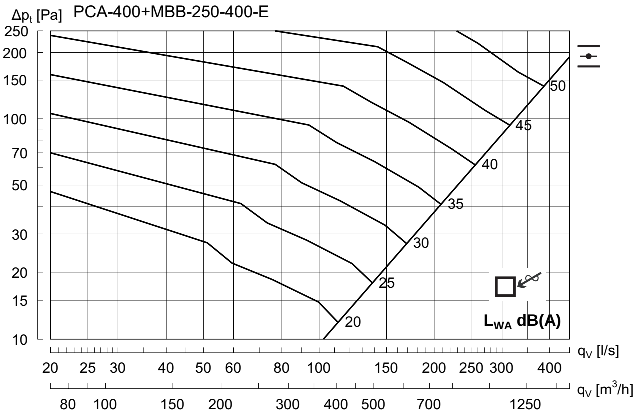


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	13	5	0	-3	-5	-9	-15	-23

PCA 400 + MBB - Exhaust air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	10	4	2	-3	-6	-9	-14	-25



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	10	5	2	-4	-5	-10	-15	-23

Plain diffuser LKA

Description

LKA is a square diffuser with an unperforated face plate that can be used for both supply and exhaust air. LKA is suitable for the horizontal supply of cooled air where a high impulse is required. It can be equipped with accessories of various types. Installing an LKA diffuser in a plenum box type MBB can help to achieve a stable airflow to the diffuser as well as realise the potential for individual adjustment.

- Suitable for both supply and exhaust air
- Suitable for the horizontal supply of cooled air
- High impulse
- Option of 1, 2 and 3-way supply air

Maintenance

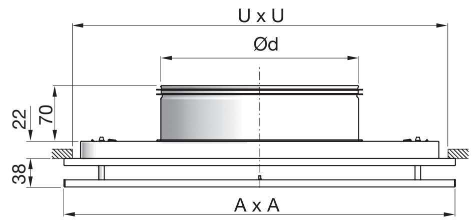
The face plate can be removed to enable cleaning of internal parts or to gain access to the duct or box. The visible parts of the diffuser can be wiped with a damp cloth.

Order code

Product	LKA - aaa
Type	
LKA	
Connection dim. Ød	
Ød 125-400	

Example: LKA-200

Dimensions



LKA Ød mm	A mm	U* mm	Free area A m^2	Weight kg
125	235	200	0,011	1,10
160	295	260	0,016	1,80
200	395	360	0,022	2,80
250	495	460	0,033	4,20
315	595	560	0,041	5,70
400	595	560	0,042	5,70

U x U = ceiling grid opening

Materials and finish:

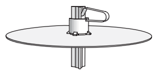
Material: Galvanised steel
Standard finish: Powder-coated
Standard colour: White RAL 9010, gloss 30

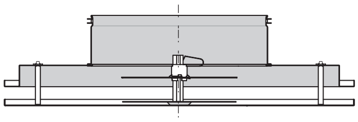
The diffuser is available in other colours. Please contact Lindab's sales department for further information.

Plain diffuser LKA

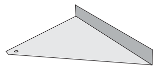
Accessories

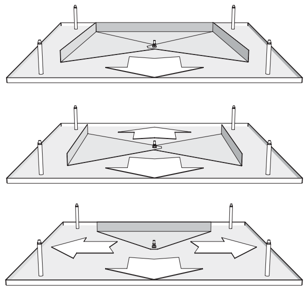
DRZ - Balancing damper



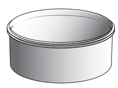


DAZ - Blending profiles (set)

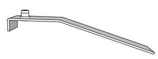


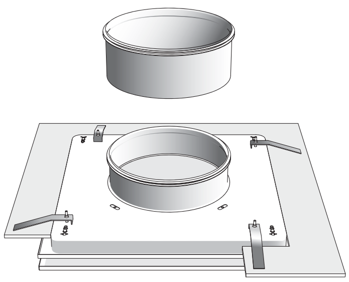


MBZ - Extension piece



DKZ - Mounting brackets (set)



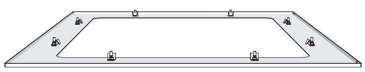


Order code - accessories

Product	aaa	bbb
Type		
Size		

Example: DRZ-200

LM - Module plate



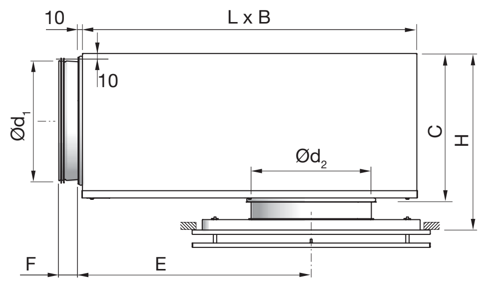
Order code - module plate

Product	LM	a	LKA	ccc
Type				
Ceiling system				
Diffuser				
Size				

Example: LM-1-LKA-200
Ceiling system - see introductory summary.

MBB - Plenum box

LKA + MBB



LKA + MBB Duct Ød₁ mm	LKA Ød₂ mm	B mm	C mm	E mm	F mm	H* mm	L mm
100	125	260	159	216	50	200 - 240	310
100	160	260	159	216	50	200 - 240	310
125	125	310	184	262	50	225 - 265	376
125	160	310	184	262	50	225 - 265	376
125	200	310	184	262	50	225 - 265	376
160	160	380	220	323	50	259 - 299	459
160	200	380	220	323	50	259 - 299	459
160	250	380	220	323	50	259 - 299	459
200	200	460	259	396	70	300 - 340	565
200	250	460	259	396	70	300 - 340	565
200	315	460	259	396	70	300 - 340	565
250	250	540	309	486	70	350 - 390	698
250	315	540	309	486	70	350 - 390	698
250	400	540	309	486	70	350 - 390	698
315	315	540	373	646	70	415 - 455	858
315	400	540	373	646	70	415 - 455	858

* Using accessory MBZ the H dimension will increase:
$Ød_2$ = 125 - 200 mm => H +40 mm
$Ød_2$ = 250 - 315 mm => H +60 mm
$Ød_2$ = 400 mm => H +80 mm

Order code

Product	MBB	- aaa	- bbb	- c
Type MBB				
Duct connection $Ød_1$ Ø100-315				
Diffuser dimension $Ød_2$ Ø125-400				
Function S = Supply air E = Exhaust				

Example: LKA-200+MBB-160-200-S

Lindab

Plain diffuser LKA

Technical data

Capacity
Air flow q_v [l/s] and [m³/h], total pressure Δp_t [Pa], throw $l_{0.2}$ [m] and sound power level L_{WA} [dB(A)] can be seen in the diagrams.

Frequency-related sound effect level
The sound effect level in the frequency band is defined as $L_{WA}+K_{ok}$. K_{ok} values are specified in chart beneath the diagrams on the following pages. K_{ok} values for LKA without a box are available on request.

Quick selection, supply air

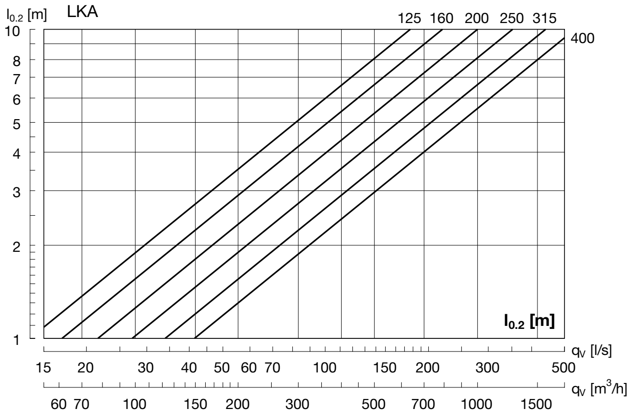
LKA + MBB		Max. airflow 30dB(A)		Max. airflow 35dB(A)	
Duct Ød1	LKA Ød2	l/s	m³/h	l/s	m³/h
100	125	31	112	38	137
100	160	40	144	49	176
125	125	42	151	50	180
125	160	53	191	64	230
125	200	63	227	75	270
160	160	60	216	73	263
160	200	70	252	88	317
160	250	94	338	115	414
200	200	98	353	118	425
200	250	106	382	129	464
200	315	133	479	159	572
250	250	116	418	141	508
250	315	136	490	167	601
250	400	139	500	182	655
315	315	153	551	183	659
315	400	169	608	200	720

Sound attenuation
Sound attenuation of the diffuser ΔL from duct to room, including end reflection, see table below

LKA + MBB		Centre frequency Hz							
Duct Ød1	LKA Ød2	63	125	250	500	1K	2K	4K	8K
100	125	20	17	6	16	19	20	18	22
100	160	21	17	5	12	19	20	18	21
125	125	17	14	9	19	15	21	18	20
125	160	13	13	9	18	18	18	18	20
125	200	14	12	7	15	16	18	17	19
160	160	18	17	11	16	21	19	20	21
160	200	15	14	9	20	21	20	20	20
160	250	16	16	7	17	13	18	19	20
200	200	14	11	8	15	21	18	20	18
200	250	13	10	8	16	20	17	19	17
200	315	15	9	6	14	17	17	18	17
250	250	16	9	9	17	20	19	19	19
250	315	15	8	9	16	18	16	18	18
250	400	13	6	6	14	16	17	17	17
315	315	8	10	10	16	20	19	18	23
315	400	8	10	10	13	19	19	17	21

Balancing
Balancing data is contained in a separate brochure.

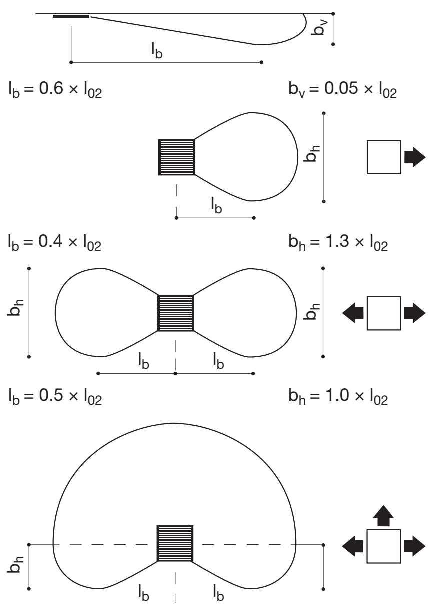
Throw $l_{0.2}$
The throw is specified at a terminal velocity of 0.2 m/s.



Correction throw $L_{0.2}$

LKA Ød	1-way	2-way	3 - way
125	2.3	1.8	1.3
160	2.3	1.8	1.3
200	2.3	1.9	1.3
250	2.3	2	1.3
315	2.3	2	1.3
400	2.2	2.1	1.3

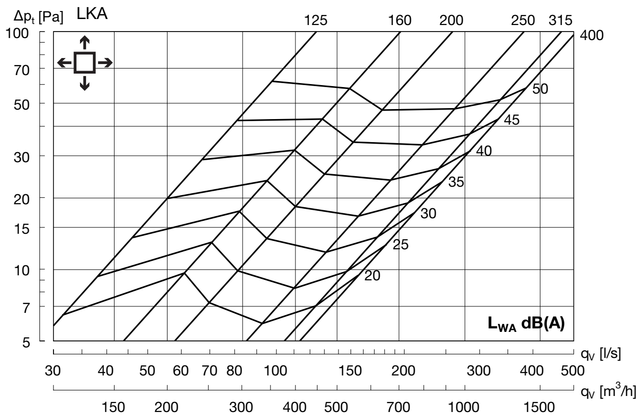
Air jet distribution
l_b = Distance from the diffuser to the point where there is maximum dispersal.
b_v = Depth of the air jet on a vertical plane.
b_h = Width of the air jet on a horizontal plane.



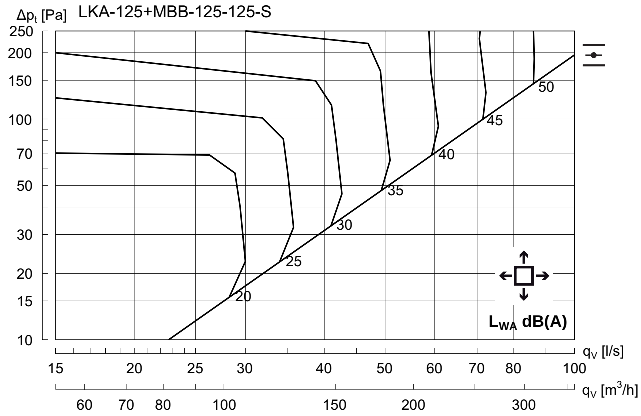
Plain diffuser LKA

Technical data

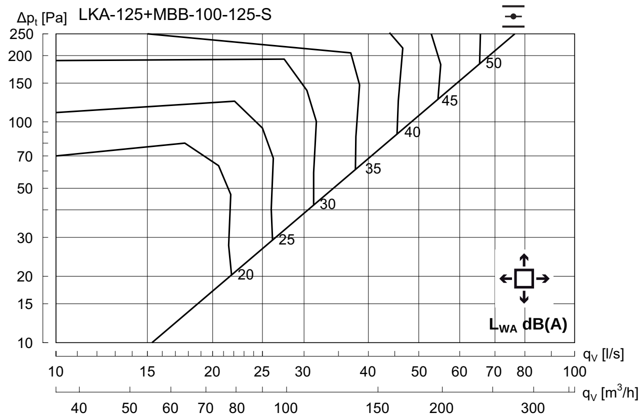
LKA without box - Supply air



LKA 125 + MBB - Supply air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	12	6	1	-4	-4	-13	-20	-28



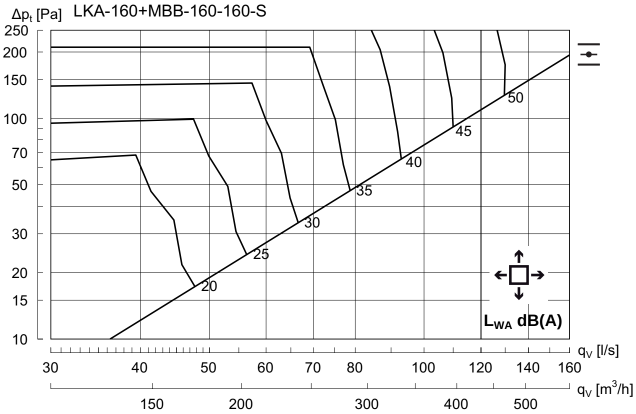
Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	11	7	3	-4	-5	-14	-18	-24

Plain diffuser LKA

Technical data

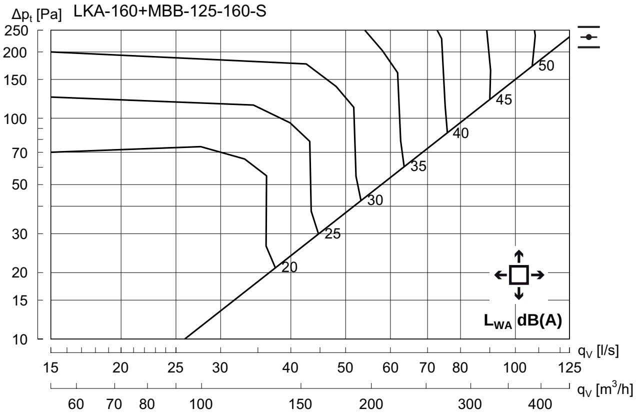
LKA 160 + MBB - Supply air

Δp$_t$ [Pa] LKA-160+MBB-160-160-S



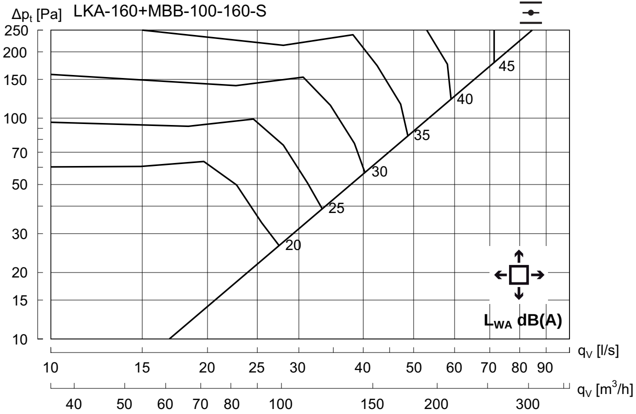
Hz	63	125	250	500	1K	2K	4K	8K
K$_{ok}$	11	11	0	-2	-7	-15	-22	-28

Δp$_t$ [Pa] LKA-160+MBB-125-160-S



Hz	63	125	250	500	1K	2K	4K	8K
K$_{ok}$	13	8	1	-3	-6	-12	-17	-25

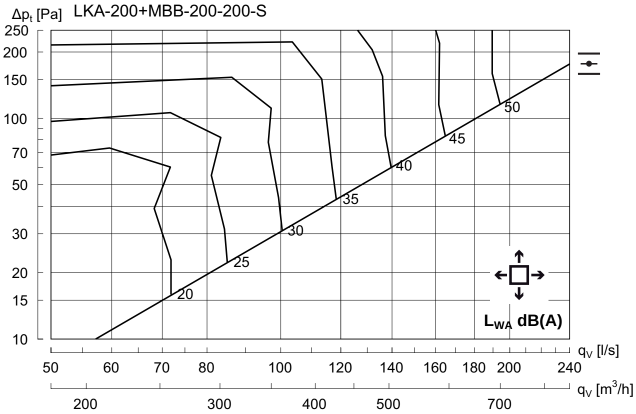
Δp$_t$ [Pa] LKA-160+MBB-100-160-S



Hz	63	125	250	500	1K	2K	4K	8K
K$_{ok}$	12	5	1	-2	-6	-10	-14	-20

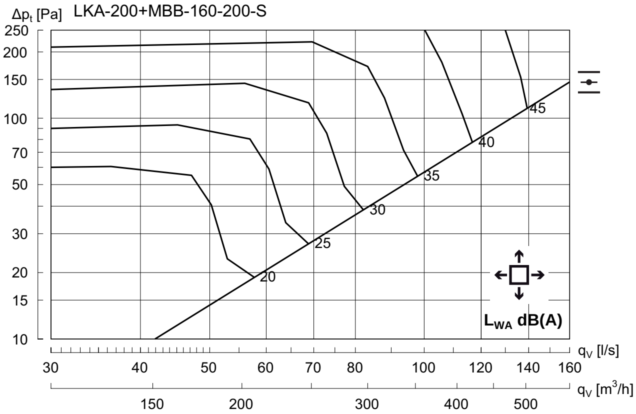
LKA 200 + MBB - Supply air

Δp$_t$ [Pa] LKA-200+MBB-200-200-S



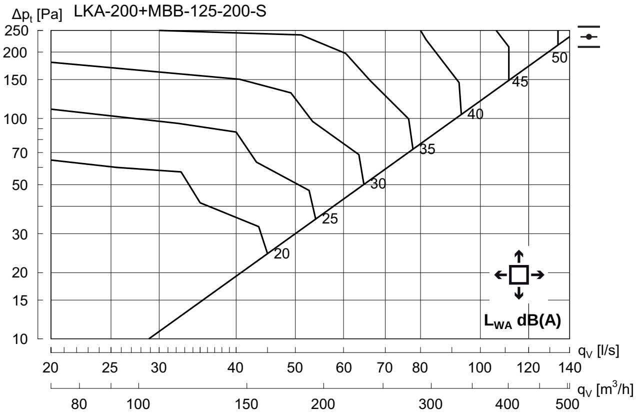
Hz	63	125	250	500	1K	2K	4K	8K
K$_{ok}$	12	6	-1	-1	-5	-15	-21	-26

Δp$_t$ [Pa] LKA-200+MBB-160-200-S



Hz	63	125	250	500	1K	2K	4K	8K
K$_{ok}$	12	9	0	-2	-6	-12	-19	-24

Δp$_t$ [Pa] LKA-200+MBB-125-200-S



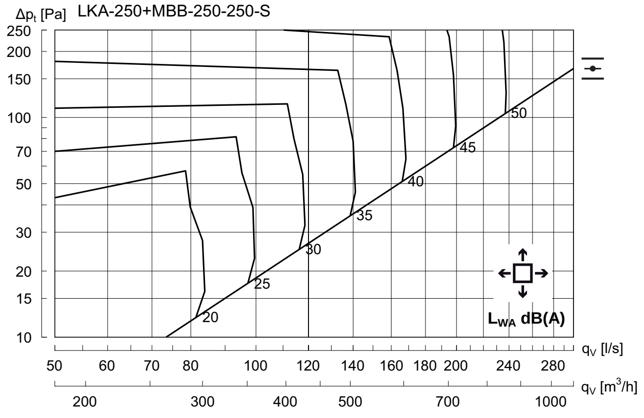
Hz	63	125	250	500	1K	2K	4K	8K
K$_{ok}$	12	7	1	-3	-6	-11	-15	-21

Plain diffuser LKA

Technical data

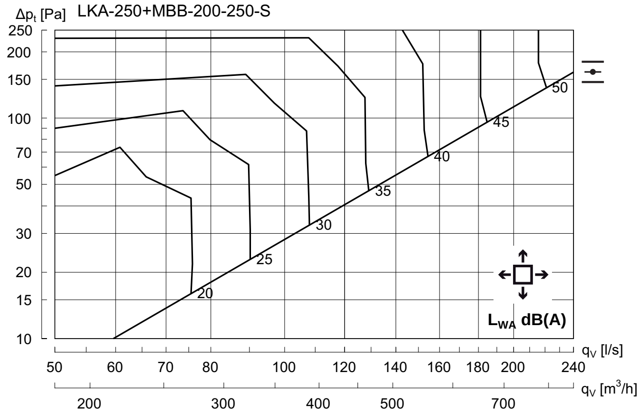
LKA 250 + MBB - Supply air

Δpt [Pa] LKA-250+MBB-250-250-S



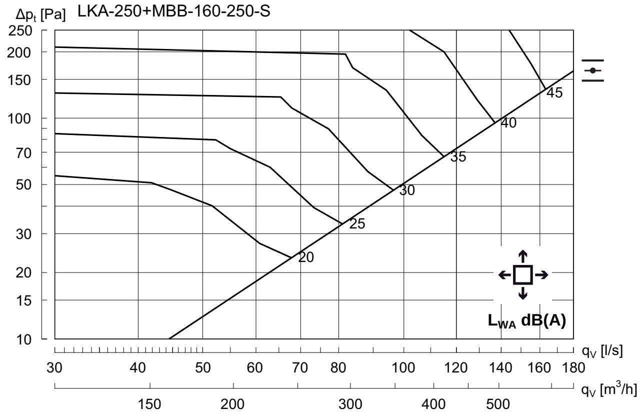
Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	12	3	-4	0	-4	-17	-24	-31

Δpt [Pa] LKA-250+MBB-200-250-S



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	12	6	-2	-1	-5	-14	-19	-23

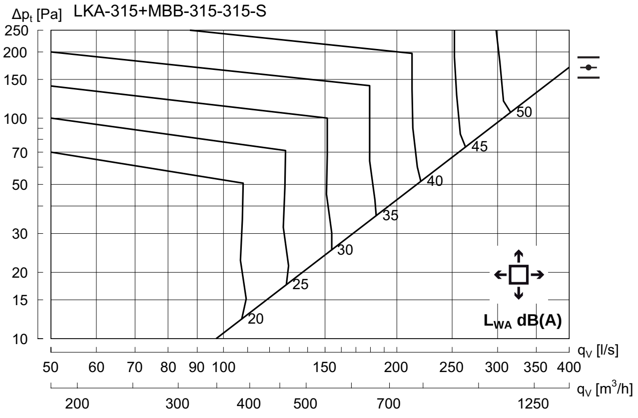
Δpt [Pa] LKA-250+MBB-160-250-S



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	9	7	-2	-3	-5	-10	-15	-21

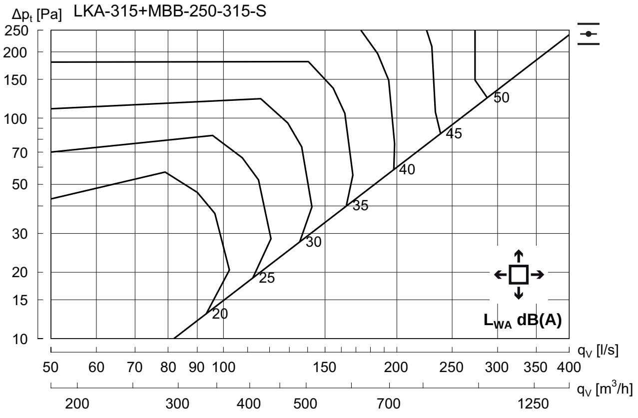
LKA 315 + MBB - Supply air

Δpt [Pa] LKA-315+MBB-315-315-S



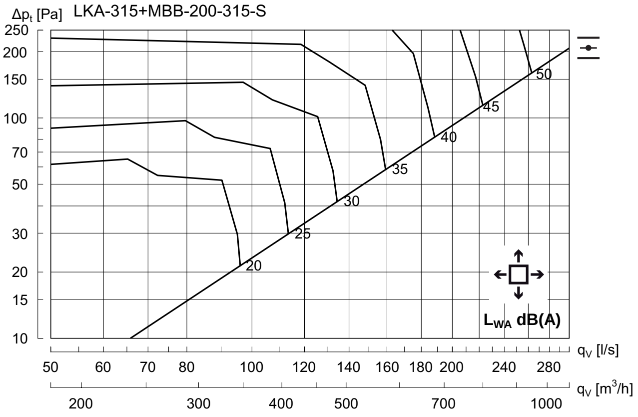
Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	13	5	-2	-1	-4	-17	-25	-36

Δpt [Pa] LKA-315+MBB-250-315-S



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	14	5	-2	-2	-4	-13	-19	-26

Δpt [Pa] LKA-315+MBB-200-315-S



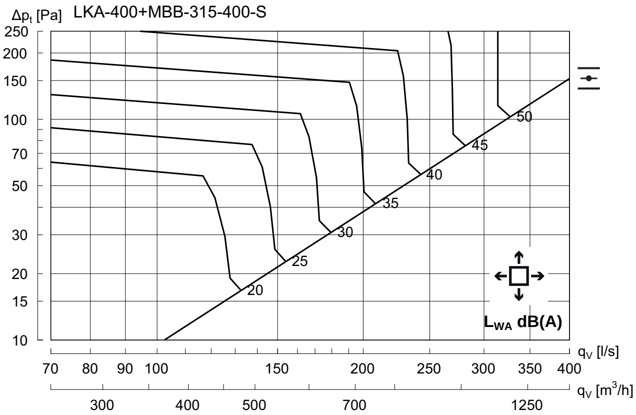
Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	13	6	-2	-3	-4	-11	-17	-22

We reserve the right to make changes without prior notice

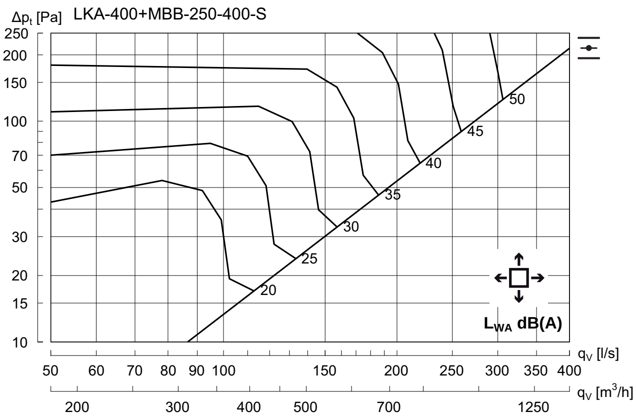
Plain diffuser LKA

Technical data

LKA 400 + MBB - Supply air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	14	6	1	-1	-6	-16	-21	-27



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	12	7	0	-2	-6	-12	-19	-26

LKA + MBB - Supply air

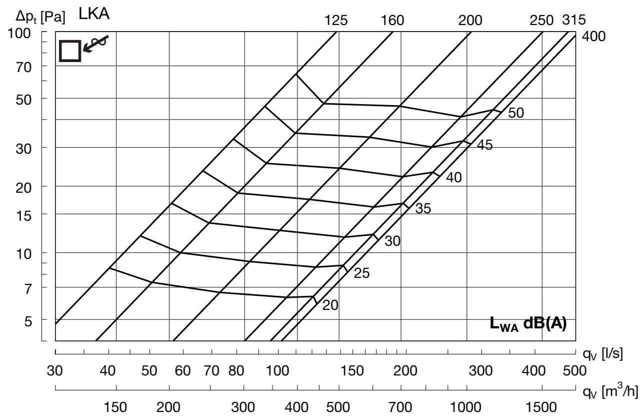
Correction sound power level (L_{WA}) and pressure loss (Δp_t)

LKA + MBB		1-way		2-way		3 - way	
Duct	PKA						
$Ød_1$	$Ød_2$	L_{WA}	Δp_t	L_{WA}	Δp_t	L_{WA}	Δp_t
100	125	+ 10	x 1.3	+ 4	x 1.1	+ 2	x 1,05
100	160	+ 5	x 1.1	+ 2	x 1.05	+ 1	x 1
125	125	+ 10	x 1,35	+ 6	x 1,1	+ 4	x 1,05
125	160	+ 10	x 1,4	+ 4	x 1,1	+ 1	x 1
125	200	+ 4	x 1,2	+ 2	x 1,05	+ 1	x 1
160	160	+ 16	x 1,8	+ 9	x 1,3	+ 4	x 1,1
160	200	+ 16	x 1,7	+ 10	x 1,2	+ 4	x 1,05
160	250	+ 10	x 1,3	+ 6	x 1,1	+ 3	x 1
200	200	+ 17	x 2,3	+ 11	x 1,4	+ 7	x 1,1
200	250	+ 13	x 1,8	+ 6	x 1,2	+ 4	x 1,1
200	315	+ 9	x 1,5	+ 4	x 1,1	+ 0	x 1,05
250	250	+ 21	x 2,1	+ 11	x 1,4	+ 7	x 1,2
250	315	+ 19	x 1,8	+ 7	x 1,2	+ 3	x 1,1
250	400	+ 10	x 1,5	+ 6	x 1,2	+ 0	x 1
315	315	+ 21	x 2,1	+ 10	x 1,3	+ 4	x 1,1
315	400	+ 21	x 1,8	+ 8	x 1,5	+ 3	x 1,2

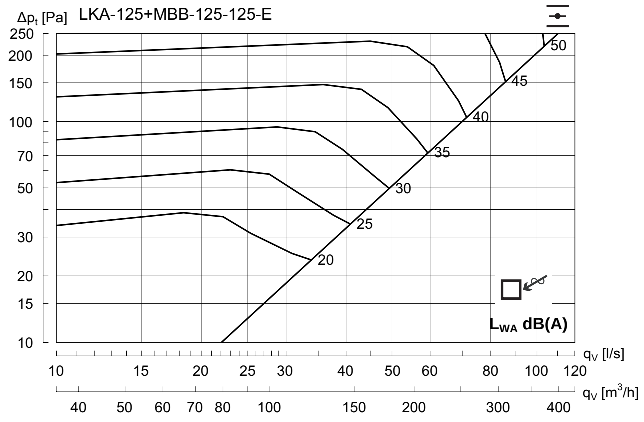
Plain diffuser LKA

Technical data

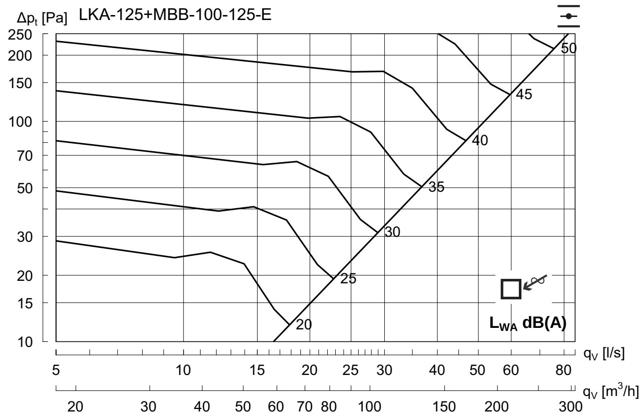
LKA without box - Exhaust air



LKA 125 + MBB - Exhaust air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	13	4	1	-2	-5	-12	-15	-22



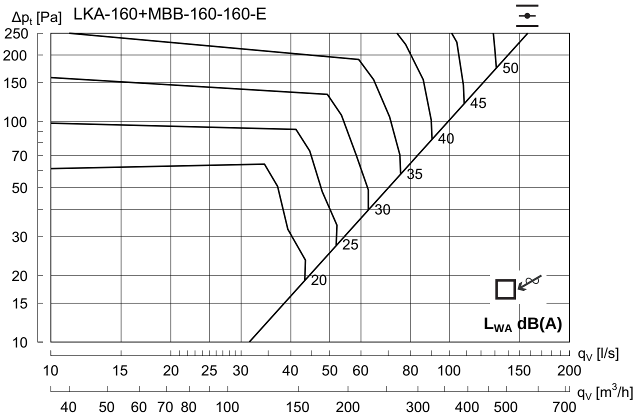
Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	13	0	4	-2	-8	-11	-16	-22

Plain diffuser

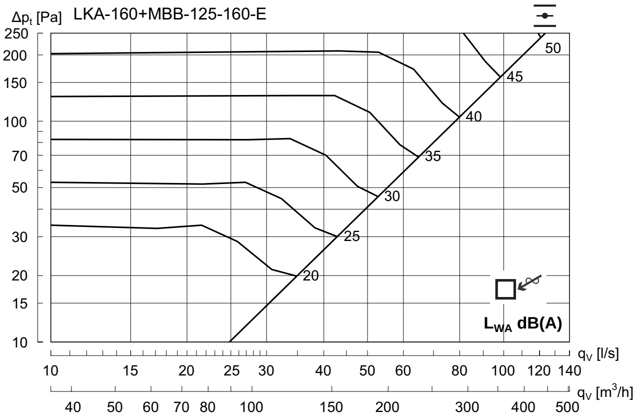
LKA

Technical data

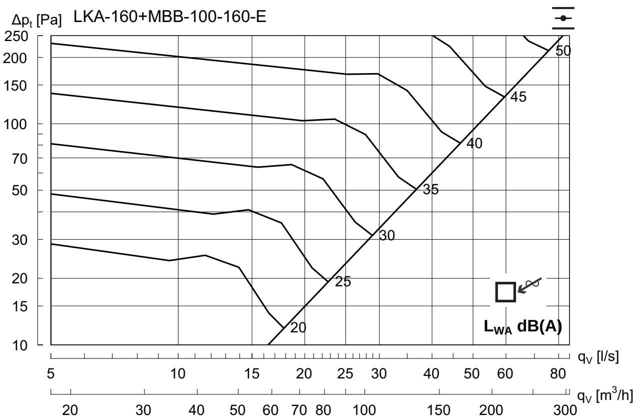
LKA 160 + MBB - Exhaust air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	16	6	1	-4	-5	-11	-17	-24

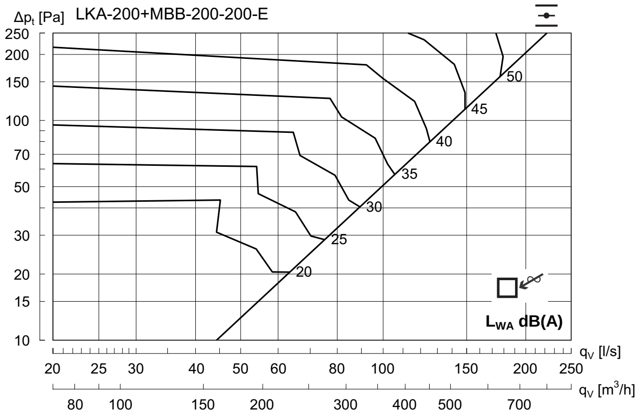


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	12	6	2	-2	-7	-12	-14	-19

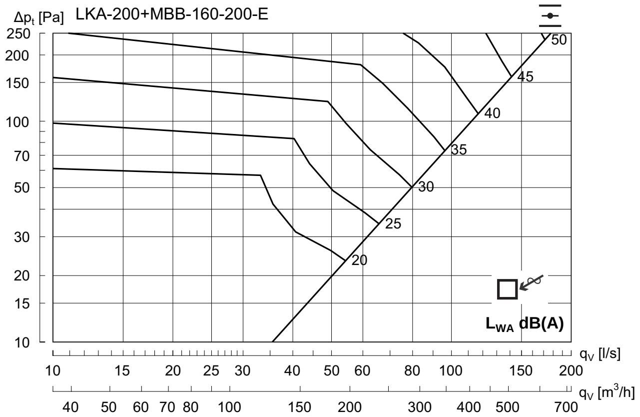


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	11	-1	5	-2	-9	-13	-18	-24

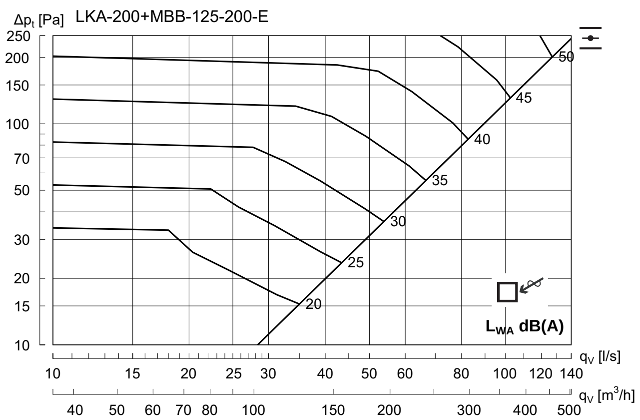
LKA 200 + MBB - Exhaust air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	14	6	0	-3	-5	-10	-19	-27



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	16	7	-1	-4	-6	-10	-14	-20

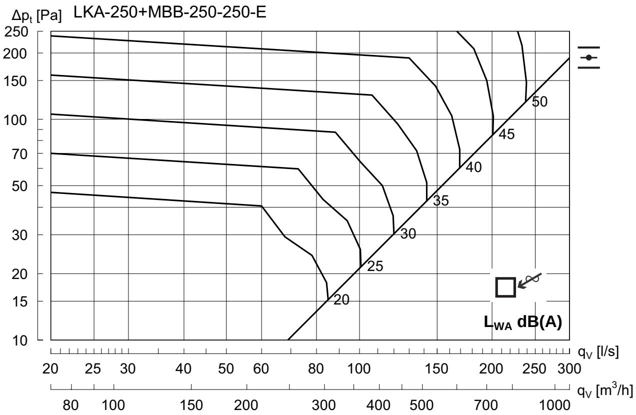


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	11	3	0	-2	-5	-11	-14	-21

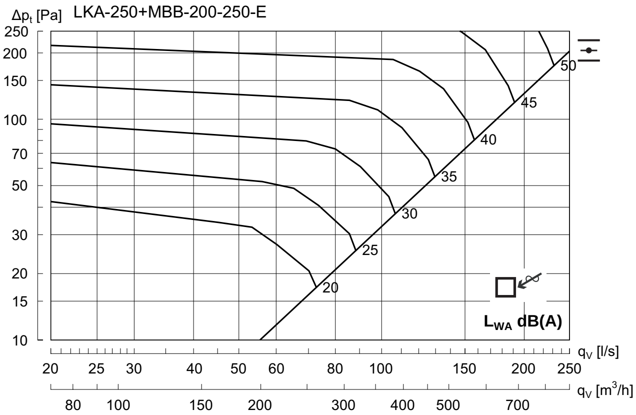
Plain diffuser LKA

Technical data

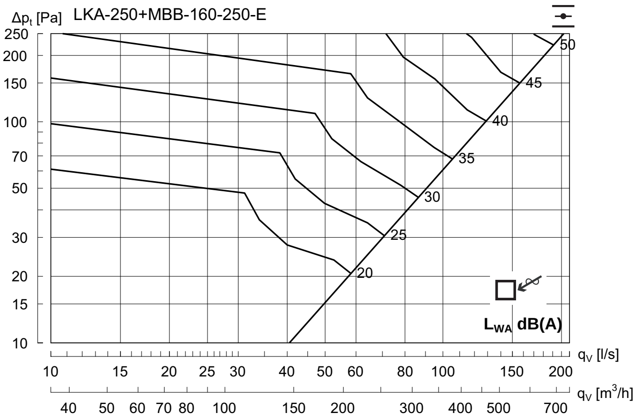
LKA 250 + MBB - Exhaust air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	12	4	-1	-3	-3	-12	-19	-30

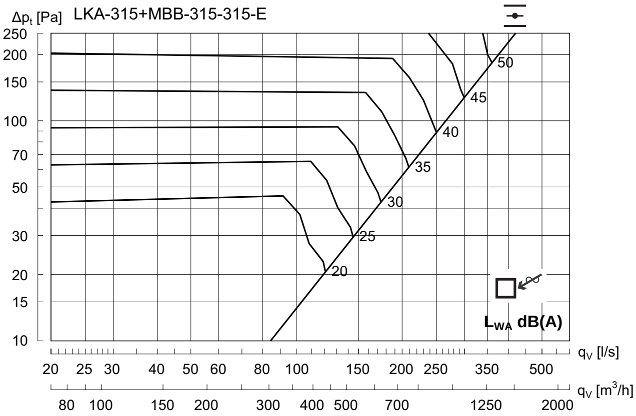


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	13	3	-1	-3	-4	-11	-15	-24

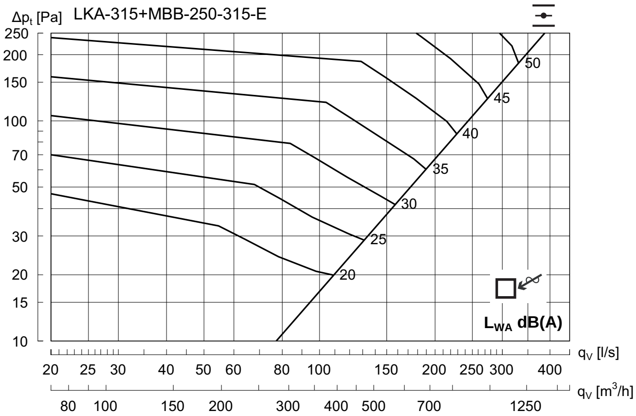


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	14	6	0	-3	-5	-11	-15	-19

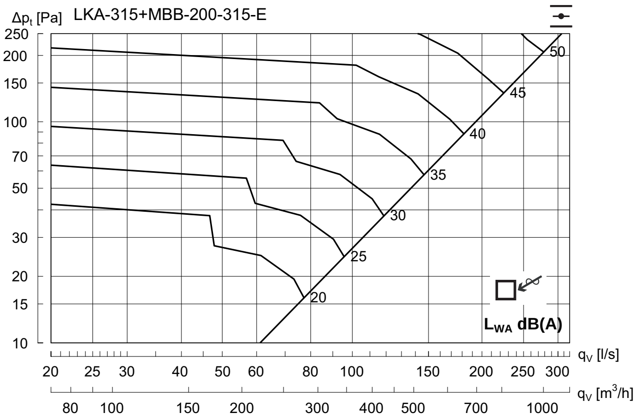
LKA 315 + MBB - Exhaust air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	13	5	2	-2	-6	-12	-17	-27



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	10	5	1	-2	-6	-10	-16	-24



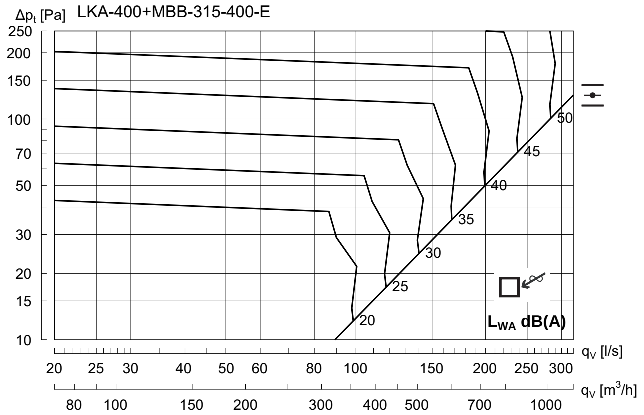
Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	14	5	0	-2	-6	-12	-14	-22

Plain diffuser

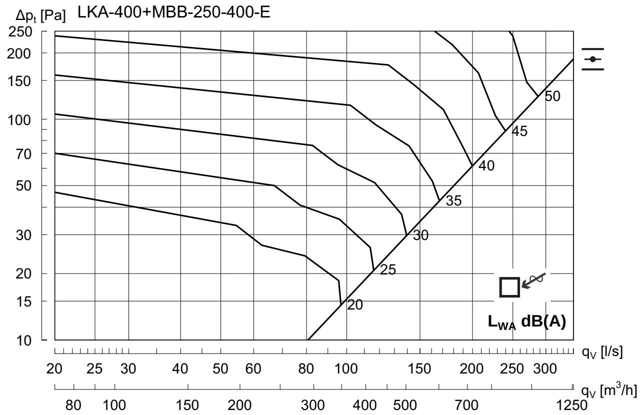
LKA

Technical data

LKA 400 + MBB - Exhaust air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	10	5	0	0	-6	-15	-20	-27



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	12	5	1	-1	-7	-12	-16	-24

Plain diffuser LCA

Description

LCA is a circular diffuser with an unperforated face plate that can be used for both supply and exhaust air. LCA is suitable for the horizontal supply of cooled air where a high impulse is required. It can be equipped with accessories of various types in order to achieve optimum function. Installing an LCA diffuser in a plenum box type MBB can help to achieve a stable airflow to the diffuser as well as realise the potential for individual adjustment.

- Suitable for both supply and exhaust air
- Suitable for the horizontal supply of cooled air
- High impulse
- Option of 1, 2 and 3-way supply air
- Discrete design

Maintenance

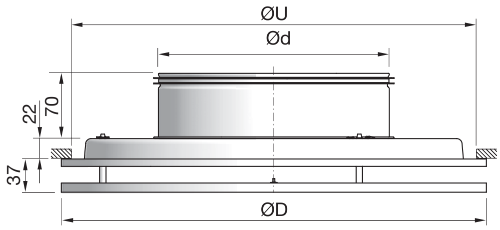
The face plate can be removed to enable cleaning of internal parts or to gain access to the duct or box. The visible parts of the diffuser can be wiped with a damp cloth.

Order code

Product	LCA - aaa
Type	
LCA	
Connection dim. Ød	
Ød 100-400	

Example: LCA-200

Dimensions



LCA Ød mm	ØD mm	ØU* mm	Free area A m^2	Weight kg
100	240	200	0,010	1,00
125	240	200	0.011	1,00
160	300	260	0.0165	1.50
200	360	320	0.023	2.30
250	460	420	0.03	3.40
315	540	500	0.037	4.60
400	540	500	0.037	4.60

ØU = ceiling grid opening

Materials and finish

Material: Galvanised steel
Standard finish: Powder-coated
Standard colour: White RAL 9010, gloss 30

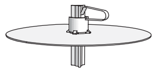
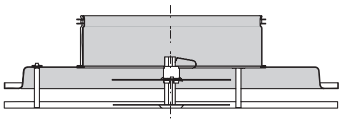
The diffuser is available in other colours. Please contact Lindab's sales department for further information.

Plain diffuser LCA

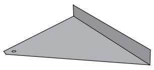
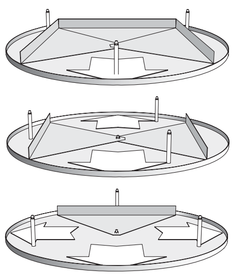
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

Accessories

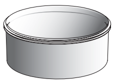
DRZ - Balancing damper

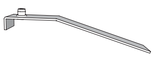
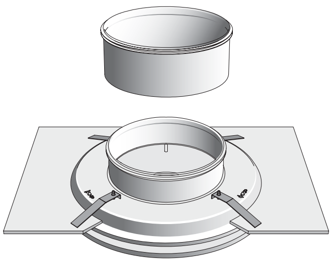
DAZ - Blending profiles (set)

MBZ - Extension piece



DDZ - Mounting brackets (set)

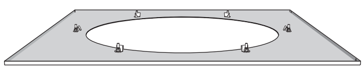



Order code - accessories

Product	aaa	bbb
Type	●	
Size		●

Example: DRZ-200

LM - Module plate



Order code - module plate

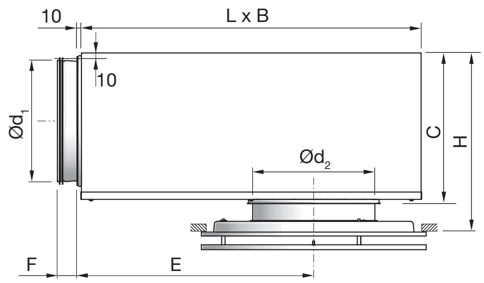
Product	LM	a	LCA	ccc
Type	●			
Ceiling system		●		
Diffuser			●	
Size				●

Example: LM-1-LCA-200

Ceiling system - see introductory summary

MBB - Plenum box

LCA + MBB



LCA + MBB							
Duct Ød1 mm	LCA Ød2 mm	B mm	C mm	E mm	F mm	H* mm	L mm
100	100	260	159	216	50	200 - 240	310
100	125	260	159	216	50	200 - 240	310
100	160	260	159	216	50	200 - 240	310
125	125	310	184	262	50	225 - 265	376
125	160	310	184	262	50	225 - 265	376
125	200	310	184	262	50	225 - 265	376
160	160	380	220	323	50	259 - 299	459
160	200	380	220	323	50	259 - 299	459
160	250	380	220	323	50	259 - 299	459
200	200	460	259	396	70	300 - 340	565
200	250	460	259	396	70	300 - 340	565
200	315	460	259	396	70	300 - 340	565
250	250	540	309	486	70	350 - 390	698
250	315	540	309	486	70	350 - 390	698
250	400	540	309	486	70	350 - 390	698
315	315	540	373	646	70	415 - 455	858
315	400	540	373	646	70	415 - 455	858

* Using accessory MBZ the H dimension will increase:
$Ød_2$ = 100 - 200 mm => H +40 mm
$Ød_2$ = 250 - 315 mm => H +60 mm
$Ød_2$ = 400 mm => H +80 mm

Order code

Product	MBB	- aaa	- bbb	- c
Type MBB	●			
Duct connection $Ød_1$ Ø100-315		●		
Diffuser dimension $Ød_2$ Ø100-400			●	
Function S = Supply air E = Exhaust				●

Example: LCA-200+MBB-200-200-S

Lindab

Plain diffuser

LCA

Technical data

Capacity

Air flow q_v [l/s] and [m^3/h], total pressure Δp_t [Pa], throw $l_{0.2}$ [m] and sound power level L_{WA} [dB(A)] can be seen in the diagrams.

Frequency-related sound effect level

The sound effect level in the frequency band is defined as $L_{WA}+K_{ok}$. K_{ok} values are specified in charts beneath the diagrams on the following pages. K_{ok} values for LCA without a box are available on request.

Quick selection, supply air

LCA + MBB		Max. airflow		Max. airflow	
Duct	LCA	30dB(A)		35dB(A)	
$Ød_1$	$Ød_2$	l/s	m^3/h	l/s	m^3/h
100	100	27	97	33	119
100	125	31	112	38	137
100	160	40	144	49	176
125	125	42	151	50	180
125	160	53	191	64	230
125	200	59	212	70	252
160	160	60	216	73	263
160	200	70	252	88	317
160	250	94	338	115	414
200	200	98	353	118	425
200	250	106	382	129	464
200	315	133	479	159	572
250	250	116	418	141	508
250	315	136	490	167	601
250	400	139	500	182	655
315	315	153	551	183	659
315	400	169	608	200	720

Sound attenuation

Sound attenuation of the diffuser ΔL from duct to room, including end reflection, see table below

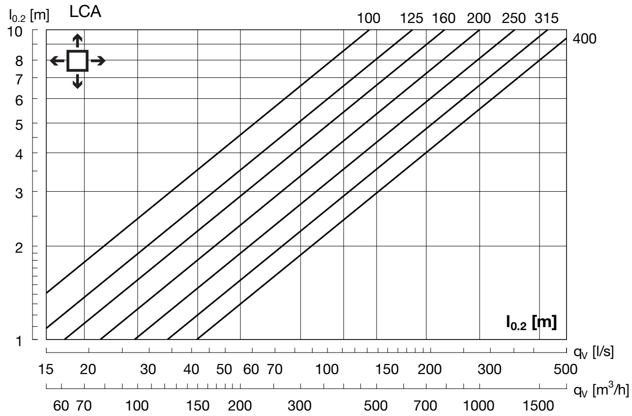
LCA + MBB		Centre frequency Hz							
Duct $Ød_1$	LCA $Ød_2$	63	125	250	500	1K	2K	4K	8K
100	100	18	17	9	19	20	23	22	23
100	125	20	17	6	16	19	20	18	22
100	160	21	17	5	12	19	20	18	21
125	125	17	14	9	19	15	21	18	20
125	160	13	13	9	18	18	18	18	20
125	200	14	12	7	15	16	18	17	19
160	160	18	17	11	16	21	19	20	21
160	200	15	14	9	20	21	20	20	20
160	250	16	16	7	17	13	18	19	20
200	200	14	11	8	15	21	18	20	18
200	250	13	10	8	16	20	17	19	17
200	315	15	9	6	14	17	17	18	17
250	250	16	9	9	17	20	19	19	19
250	315	15	8	9	16	18	16	18	18
250	400	13	6	6	14	16	17	17	17
315	315	8	10	10	16	20	19	18	23
315	400	8	10	10	13	19	19	17	21

Balancing

Balancing data is contained in a seperate brochure.

Throw $l_{0.2}$

The throw is specified at a terminal velocity of 0.2 m/s .

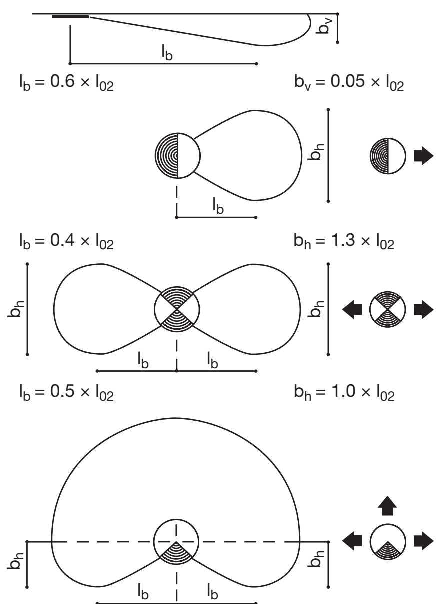


Correction throw $l_{0.2}$

LCA Ød	1-way	2-way	3 - way
100	2.4	1.8	1.4
125	2.3	1.8	1.3
160	2.3	1.8	1.3
200	2.3	1.9	1.3
250	2.3	2	1.3
315	2.3	2	1.3
400	2.2	2.1	1.3

Air jet distribution

l_b = Distance from the diffuser to the point where there is maximum dispersal.
b_v = Depth of the air jet on a vertical plane.
b_h = Width of the air jet on a horizontal plane.

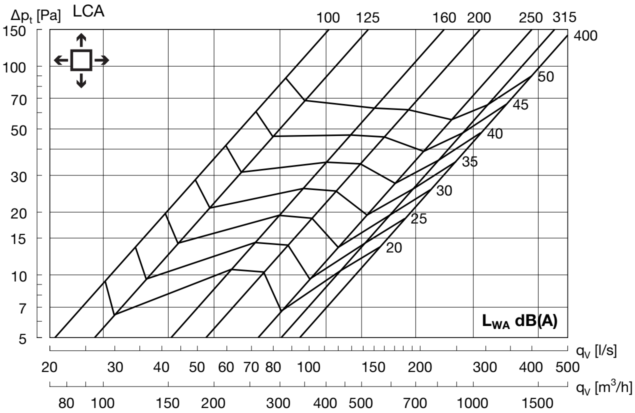


Plain diffuser LCA

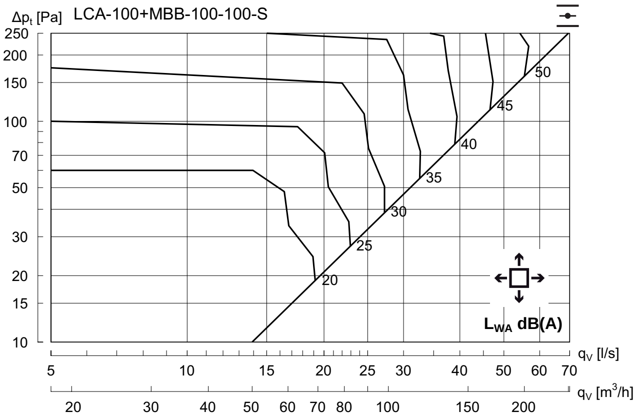
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

Technical data

LCA without box - Supply air



LCA 100 + MBB - Supply air

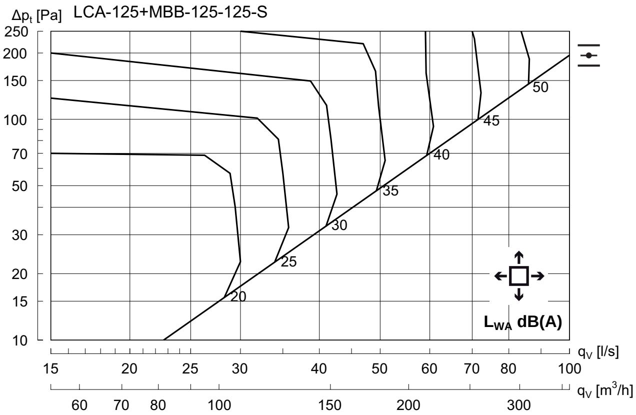


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	9	7	3	-5	-5	-12	-16	-23

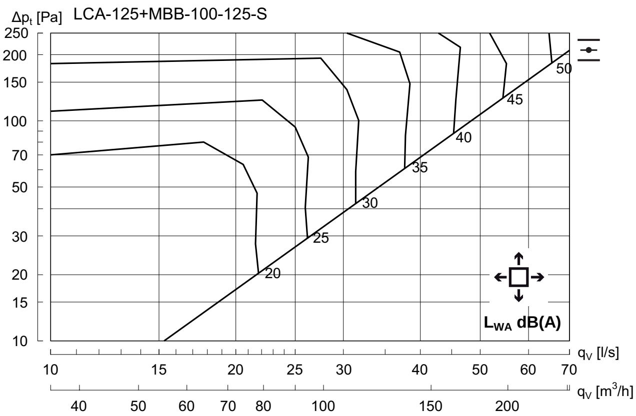
Plain diffuser LCA

Technical data

LCA 125 + MBB - Supply air

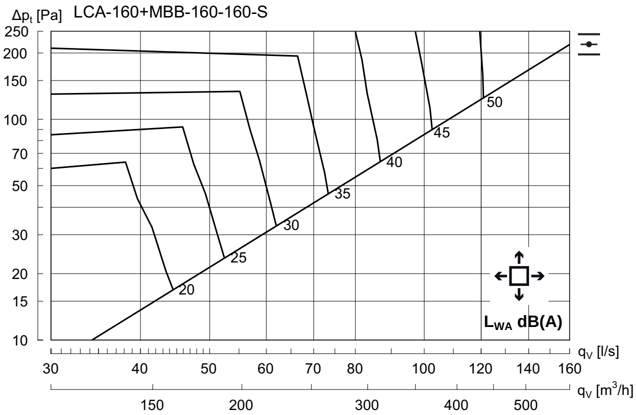


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	12	6	1	-4	-4	-13	-20	-28

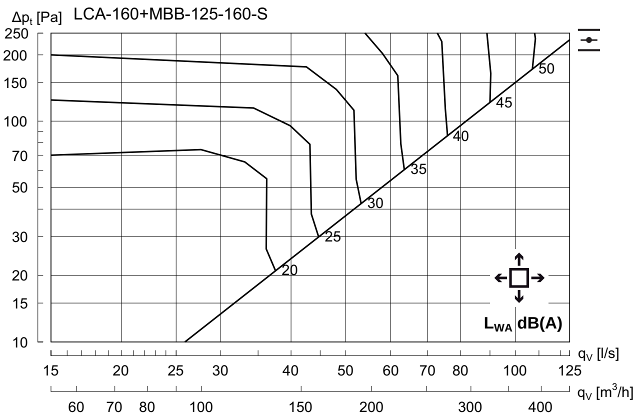


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	11	7	3	-4	-5	-14	-18	-24

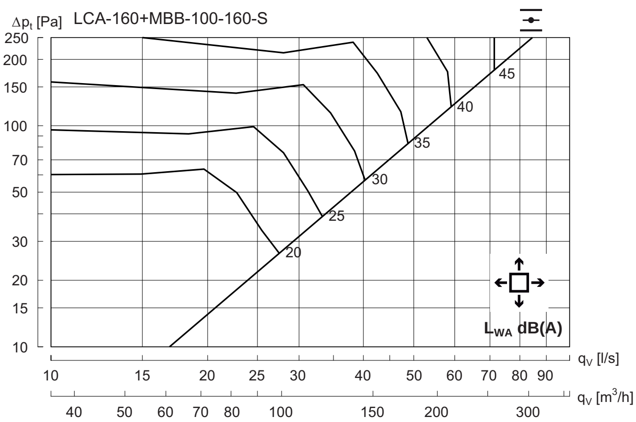
LCA 160 + MBB - Supply air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	11	11	0	-2	-7	-15	-22	-28



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	13	8	1	-3	-6	-12	-17	-25



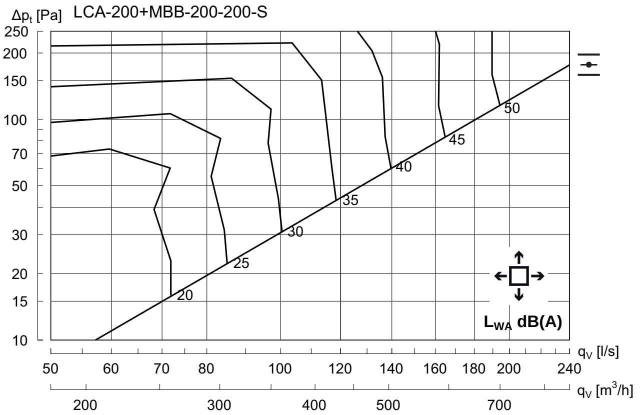
Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	12	5	1	-2	-6	-10	-14	-20

Plain diffuser

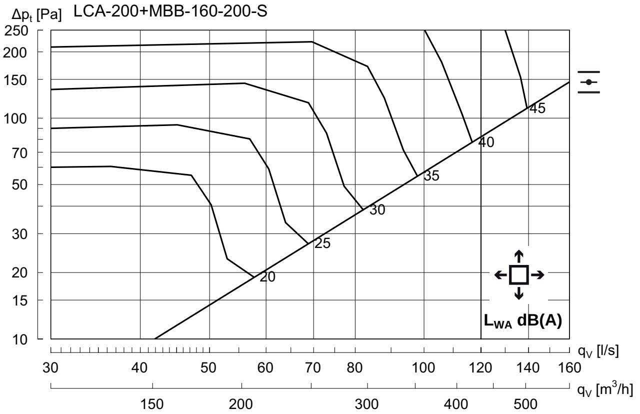
LCA

Technical data

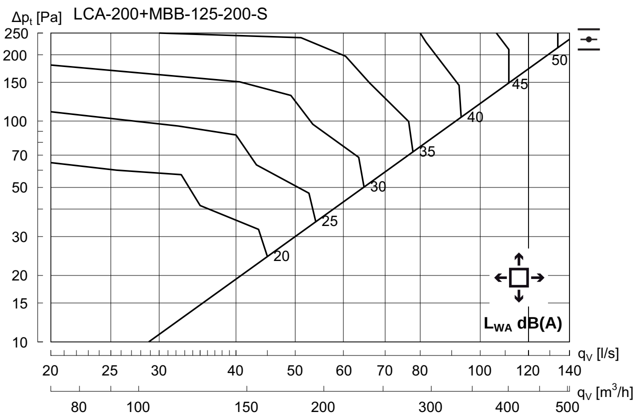
LCA 200 + MBB - Supply air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	12	6	-1	-1	-5	-15	-21	-26

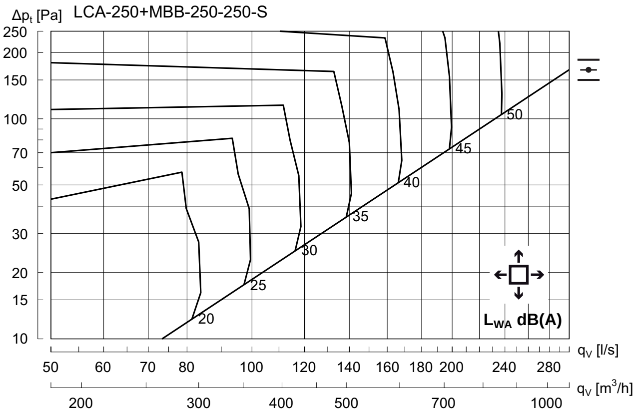


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	12	9	0	-2	-6	-12	-19	-24

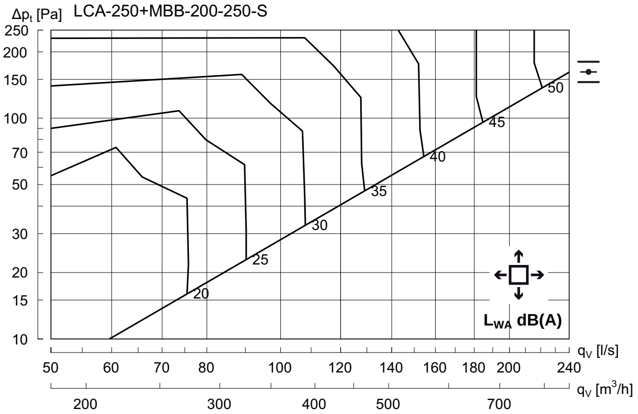


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	12	7	1	-3	-6	-11	-15	-21

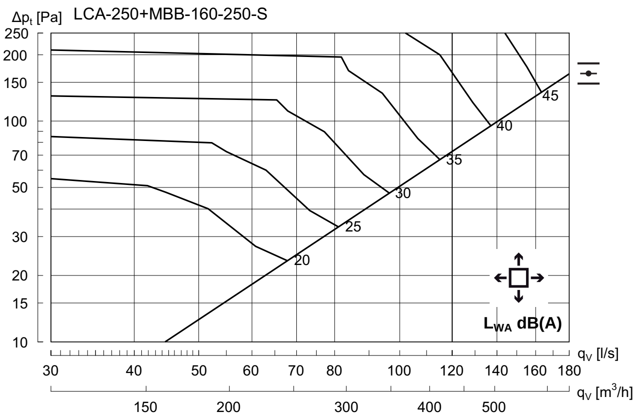
LCA 250 + MBB - Supply air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	12	3	-4	0	-4	-17	-24	-31



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	12	6	-2	-1	-5	-14	-19	-23



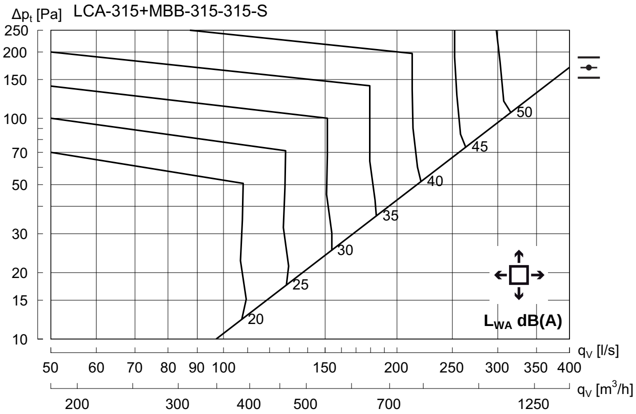
Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	9	7	-2	-3	-5	-10	-15	-21

Plain diffuser LCA

Technical data

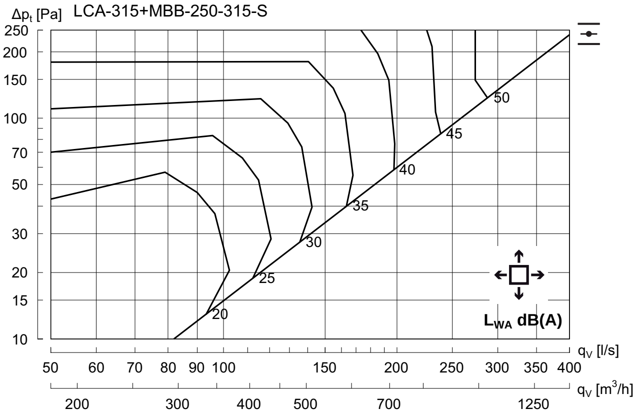
LCA 315 + MBB - Supply air

LCA-315+MBB-315-315-S



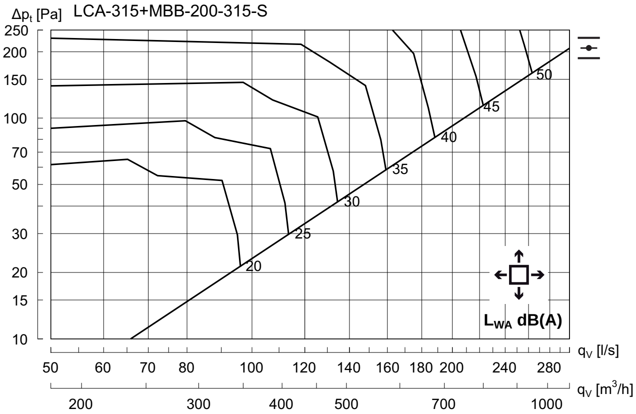
Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	13	5	-2	-1	-4	-17	-25	-36

LCA-315+MBB-250-315-S



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	14	5	-2	-2	-4	-13	-19	-26

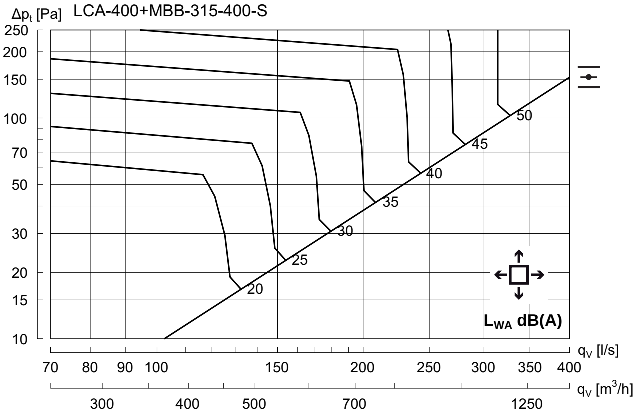
LCA-315+MBB-200-315-S



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	13	6	-2	-3	-4	-11	-17	-22

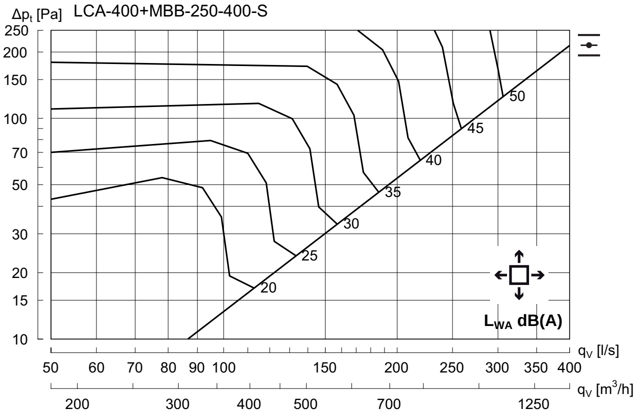
LCA 400 + MBB - Supply air

LCA-400+MBB-315-400-S



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	14	6	1	-1	-6	-16	-21	-27

LCA-400+MBB-250-400-S



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	12	7	0	-2	-6	-12	-19	-26

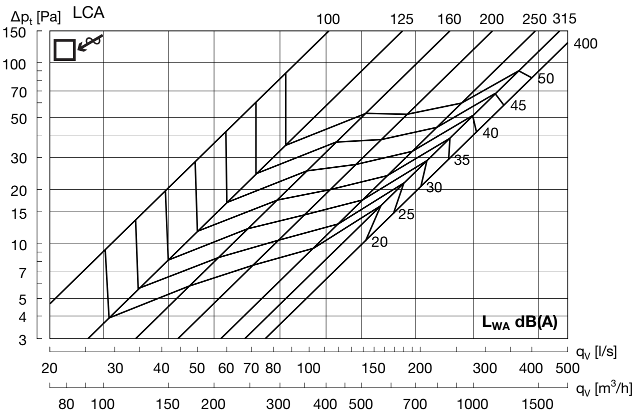
Correction sound power level (L_{WA}) and pressure loss (Δp_t)

LCA + MBB		1-way		2-way		3 - way	
Duct $Ød_1$	LCA $Ød_2$	L_{WA}	Δp_t	L_{WA}	Δp_t	L_{WA}	Δp_t
100	100	+ 12	x 1,5	+ 8	x 1,2	+ 4	x 1,1
100	125	+ 10	x 1.3	+ 4	x 1.1	+ 2	x 1,05
100	160	+ 9	x 1.3	+ 2	x 1.1	+ 1	x 1
125	125	+ 12	x 1,5	+ 8	x 1,2	+ 4	x 1,1
125	160	+ 14	x 1,5	+ 7	x 1,2	+ 2	x 1,1
125	200	+ 9	x 1,4	+ 6	x 1,2	+ 3	x 1,1
160	160	+ 16	x 1,8	+ 9	x 1,3	+ 4	x 1,1
160	200	+ 21	x 1,9	+ 10	x 1,3	+ 4	x 1,1
160	250	+ 12	x 1,4	+ 6	x 1,1	+ 2	x 1,05
200	200	+ 24	x 2,5	+ 10	x 1,5	+ 5	x 1,2
200	250	+ 18	x 1,9	+ 7	x 1,2	+ 2	x 1,05
200	315	+ 17	x 1,6	+ 9	x 1,2	+ 3	x 1,1
250	250	+ 21	x 2,3	+ 10	x 1,4	+ 5	x 1,1
250	315	+ 20	x 1,9	+ 11	x 1,2	+ 5	x 1,2
250	400	+ 10	x 1,5	+ 6	x 1,2	+ 0	x 1
315	315	+ 21	x 2,4	+ 12	x 1,6	+ 6	x 1,2
315	400	+ 21	x 1,8	+ 8	x 1,5	+ 3	x 1,2

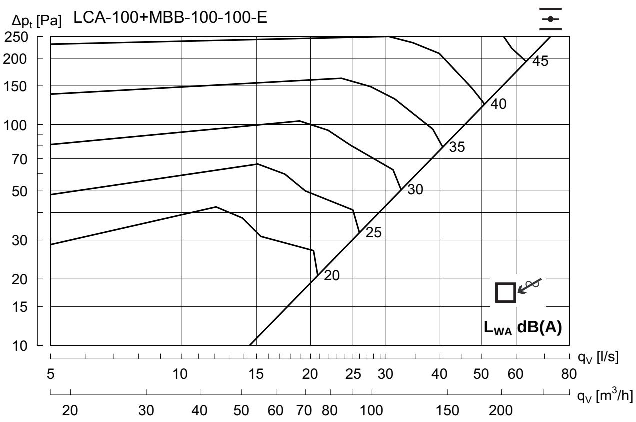
Plain diffuser LCA

Technical data

LCA without box - supply air



LCA 100 + MBB - Exhaust air

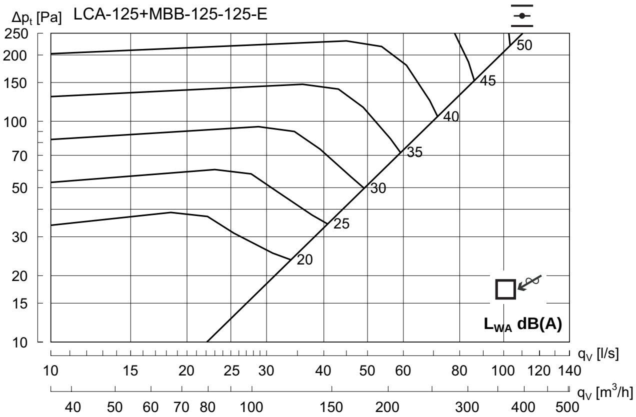


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	13	1	3	-2	-7	-10	-15	-22

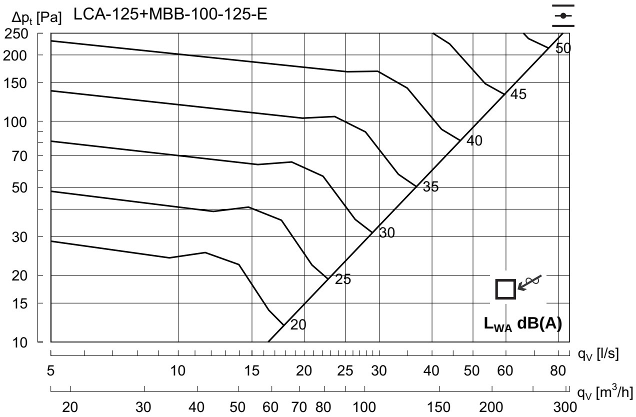
Plain diffuser LCA

Technical data

LCA 125 + MBB - Exhaust air

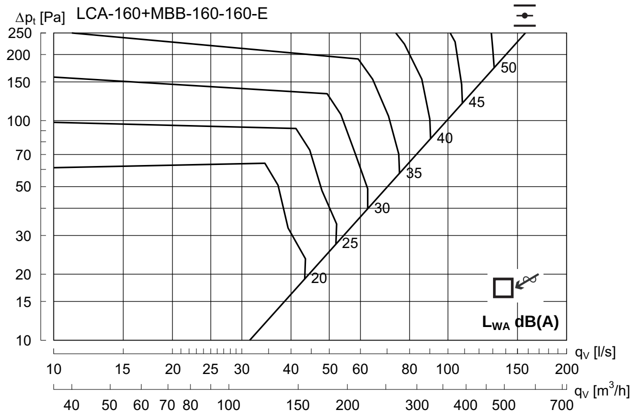


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	13	4	1	-2	-5	-12	-15	-22

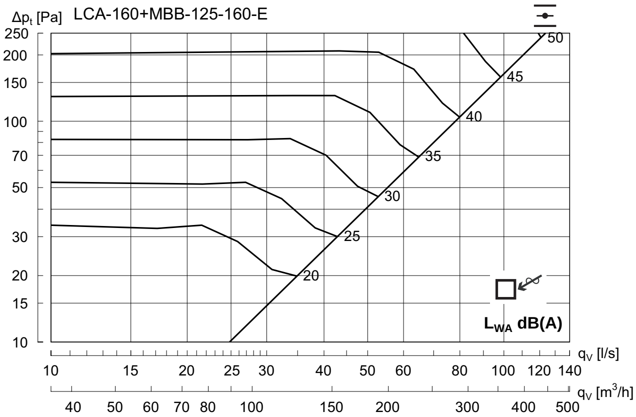


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	13	0	4	-2	-8	-11	-16	-22

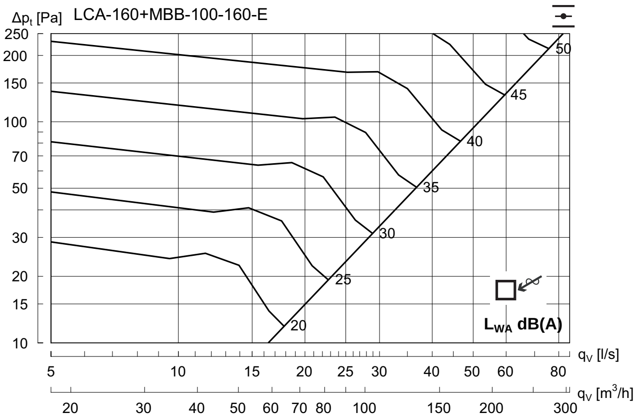
LCA 160 + MBB - Exhaust air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	16	6	1	-4	-5	-11	-17	-24



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	12	6	2	-2	-7	-12	-14	-19



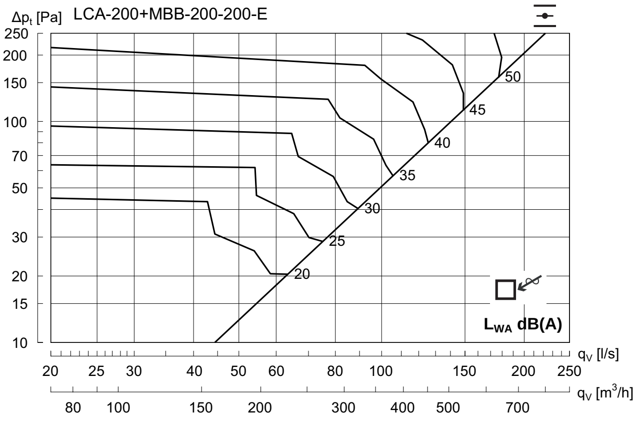
Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	11	-1	5	-2	-9	-13	-18	-24

Plain diffuser LCA

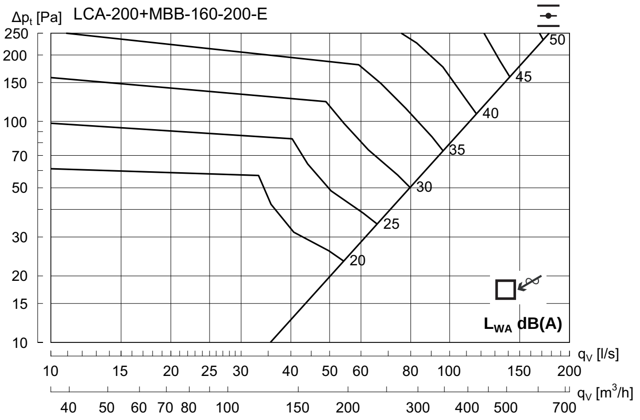
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

Technical data

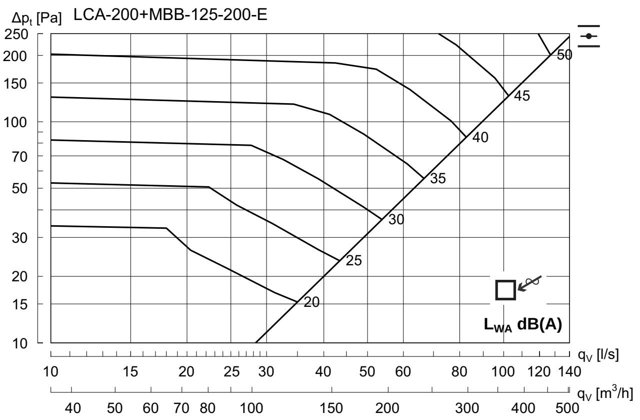
LCA 200 + MBB - Exhaust air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	14	6	0	-3	-5	-10	-19	-27

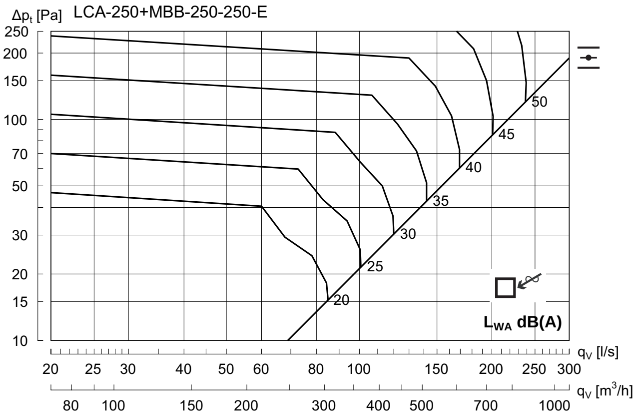


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	16	7	-1	-4	-6	-10	-14	-20

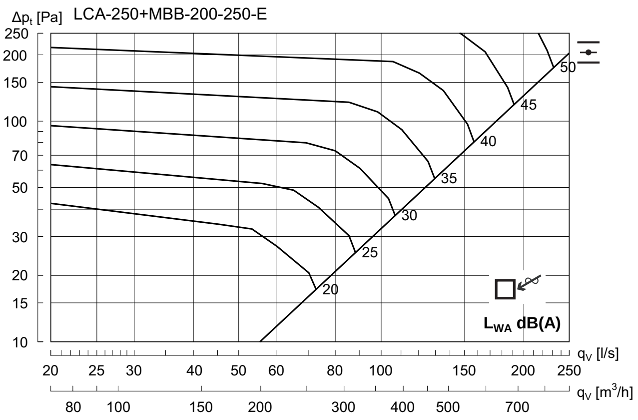


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	11	3	0	-2	-5	-11	-14	-21

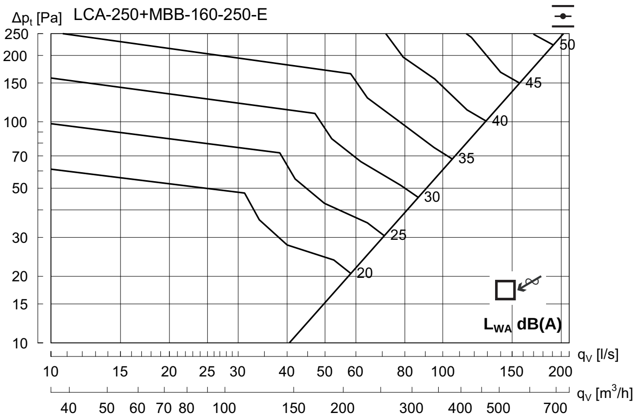
LCA 250 + MBB - Exhaust air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	12	4	-1	-3	-3	-12	-19	-30



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	13	3	-1	-3	-4	-11	-15	-24

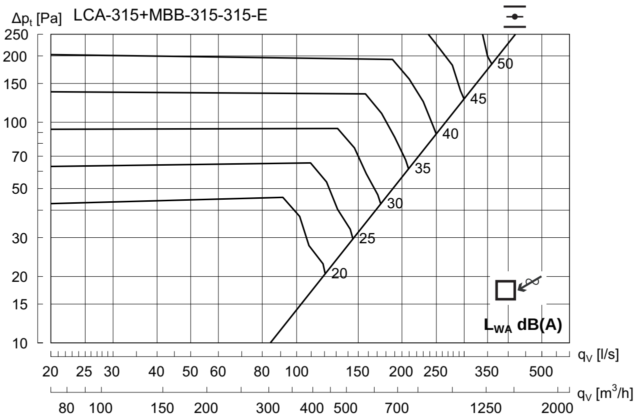


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	14	6	0	-3	-5	-11	-15	-19

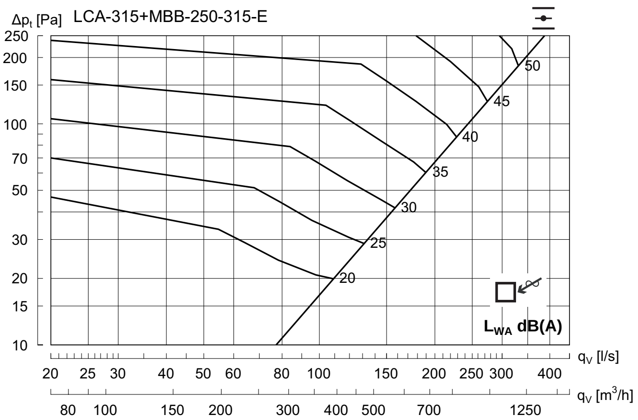
Plain diffuser LCA

Technical data

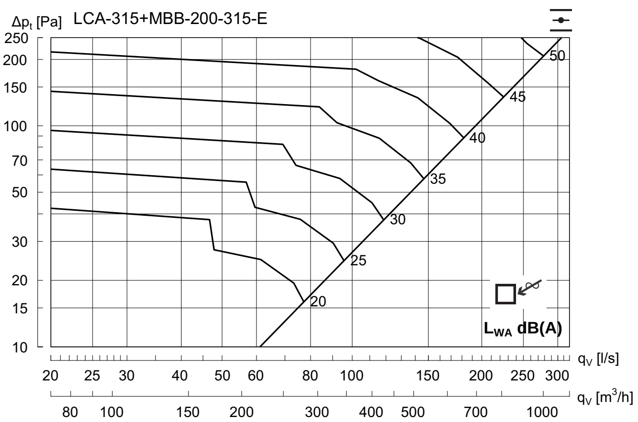
LCA 315 + MBB - Exhaust air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	13	5	2	-2	-6	-12	-17	-27

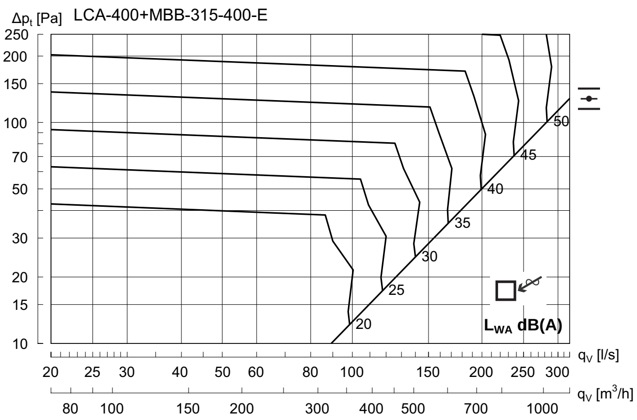


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	10	5	1	-2	-6	-10	-16	-24

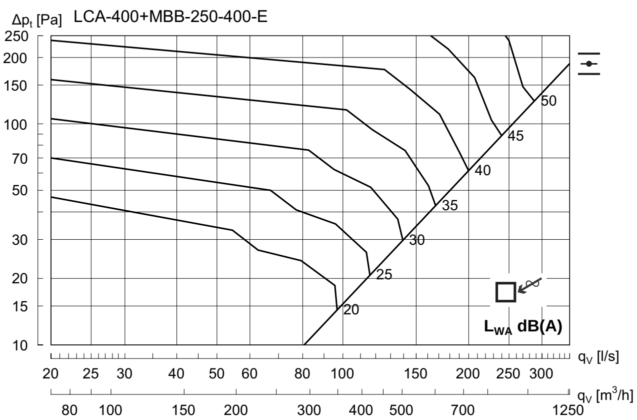


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	14	5	0	-2	-6	-12	-14	-22

LCA 400 + MBB - Exhaust air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	10	5	0	0	-6	-15	-20	-27



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	12	5	1	-1	-7	-12	-16	-24

Plain diffuser CRL

Description

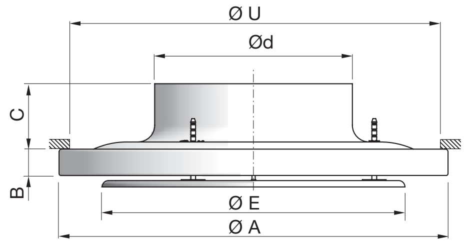
CRL is a circular diffuser with an unperforated adjustable face plate. CRL can be used both for supply and exhaust air. The diffuser can be switched between horizontal and vertical supply air, and is therefore suitable for the horizontal supply of cooled air or vertical supply of heated air. Installing a CRL diffuser in a plenum box type MBB can help to achieve a stable airflow to the diffuser as well as realise the potential for individual adjustment. It is also possible to install a damper directly in the diffuser to enable adjustment without a box.

- Suitable for both supply and exhaust air
- Suitable for horizontal or vertical supply air patterns
- A damper can be installed on the diffuser to achieve adjustment

Maintenance

The face plate can be removed to enable cleaning of internal parts or to gain access to the duct or plenum box. The visible parts off the diffuser can be wiped with a damp cloth.

Dimensions

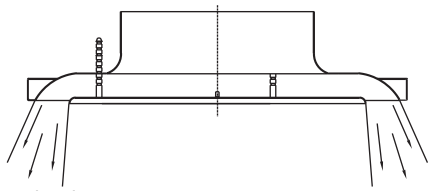


CRL Ød mm	ØA mm	B mm	C mm	ØE mm	ØU* mm	Weight kg
100	188	15	60	146	170	0.30
125	238	20	65	180	210	0.50
160	288	25	65	220	255	0.60
200	388	28	72	300	355	1.10
250	488	33	82	380	390	1.60
315	588	33	97	490	465	2.50
400	720	40	100	590	670	3.80

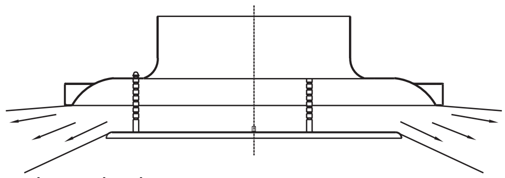
ØU = Ceiling grid opening

Dispersal patterns

CRL is supplied with vertical supply air as standard.
The dispersal pattern can be changed to horizontal supply air by moving the face plate.



Vertical supply air.



Horizontal supply air.

Order code

Product	CRL - aaa
Type	
CRL	
Connection dim. Ød	
Ød 100-400	

Example: CRL-200

Materials and finish:

Grille box: Aluminium
Face plate: Galvanised steel
Standard finish: Powder-coated
Standard colour: White RAL 9010, gloss 30

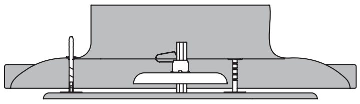
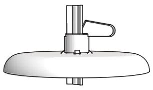
The diffuser is available in other colours. Please contact Lindab's sales department for further information.

Plain diffuser CRL

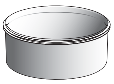
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

Accessories

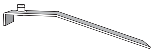
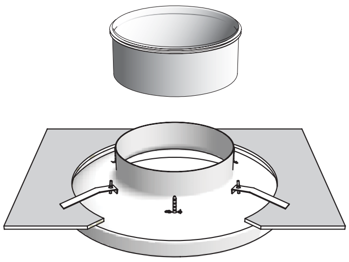
CAZ - Balancing damper

MBZ - Extension piece



DCZ - Mounting brackets (set)

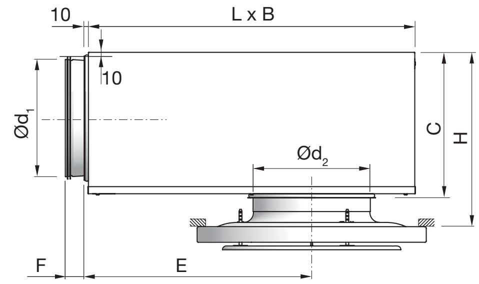
Order code - accessories

Product	aaa	bbb
Type		
Size		

Example: CAZ-125

MBB - Plenum box

CRL + MBB



CRL + MBB							
Duct	CRL	B	C	E	F	H*	L
$Ød_1$ mm	$Ød_2$ mm	mm	mm	mm	mm	mm	mm
100	100	260	159	216	50	175 - 210	310
100	125	260	159	216	50	175 - 205	310
100	160	260	159	216	50	175 - 205	310
125	125	310	184	262	50	200 - 230	376
125	160	310	184	262	50	200 - 230	376
125	200	310	184	262	50	210 - 245	376
160	160	380	220	323	50	235 - 265	459
160	200	380	220	323	50	245 - 280	459
160	250	380	220	323	50	250 - 290	459
200	200	460	259	396	70	285 - 320	565
200	250	460	259	396	70	290 - 332	565
200	315	460	259	396	70	290 - 345	565
250	250	540	309	486	70	340 - 380	698
250	315	540	309	486	70	340 - 395	698
250	400	540	309	486	70	370 - 400	698
315	315	540	373	646	70	405 - 460	858
315	400	540	373	646	70	435 - 465	858

USING CRL + MBB => ALWAYS USE MBZ

* Using accessory MBZ the H dimension will increase:

$Ød_2$ = 100 - 200 mm => H +40 mm
$Ød_2$ = 250 - 315 mm => H +60 mm
$Ød_2$ = 400 mm => H +80 mm

Order code

Product	MBB	-	aaa	-	bbb	-	c
Type							
MBB							
Duct connection $Ød_1$							
Ø100-315							
Diffuser dimension $Ød_2$							
Ø100-400							
Function							
S = Supply air							
E = Exhaust							

Example: CRL-200+MBB-160-200-S

We reserve the right to make changes without prior notice

Lindab

Plain diffuser

CRL

Technical data

Capacity

Air flow q_v [l/s] and [m³/h], total pressure Δp_t [Pa], throw $l_{0.2}$ [m] and sound power level L_{WA} [dB(A)] can be seen in the diagrams.

Frequency-related sound effect level

The sound effect level in the frequency band is defined as L_{WA}+K_{ok}. K_{ok} values are specified in charts beneath the diagrams on the following pages. K_{ok} values for CRL without a box are available on request.

Quick selection, supply air

CRL + MBB		Max. airflow		Max. airflow	
Duct	CRL	30dB(A)		35dB(A)	
Ød1	Ød2	l/s	m³/h	l/s	m³/h
100	100	26	94	31	112
100	125	35	126	42	151
100	160	42	151	50	180
125	125	46	166	54	194
125	160	58	209	68	245
125	200	62	223	75	270
160	160	67	241	81	292
160	200	86	310	105	378
160	250	96	346	121	436
200	200	107	385	127	457
200	250	135	486	160	576
200	315	146	526	177	637
250	250	151	544	183	659
250	315	161	580	215	774
250	400	185	666	252	907
315	315	206	742	263	947
315	400	227	817	309	1112

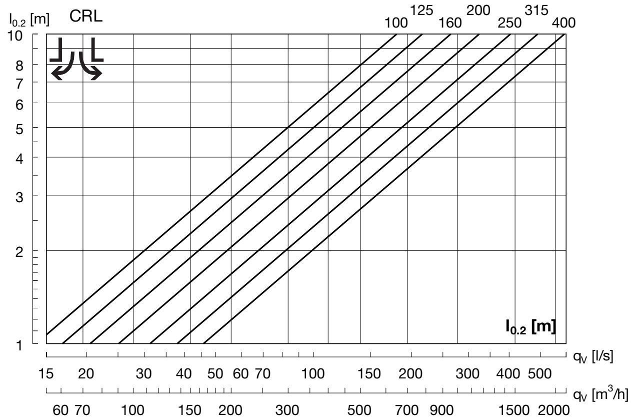
Sound attenuation

Sound attenuation of the diffuser ΔL from duct to room, including end reflection, see table below.

CRL + MBB									
Duct	CRL	Centre frequency Hz							
Ød1	Ød2	63	125	250	500	1K	2K	4K	8K
100	100	20	17	7	20	19	20	20	22
100	125	21	16	6	18	19	18	19	21
100	160	21	16	5	15	17	18	18	18
125	125	18	13	7	20	12	19	19	20
125	160	15	14	8	19	12	17	17	19
125	200	14	12	6	16	14	16	17	16
160	160	18	17	10	18	16	18	21	20
160	200	15	14	7	19	17	18	19	19
160	250	15	15	4	15	13	14	16	18
200	200	14	10	7	14	19	16	20	17
200	250	15	9	5	14	19	16	17	16
200	315	13	8	4	11	16	15	16	15
250	250	16	8	7	16	18	18	18	17
250	315	11	7	6	16	17	17	16	16
250	400	15	6	5	10	14	16	15	15
315	315	8	10	9	14	18	18	17	21
315	400	8	8	8	11	16	17	16	19

Throw $l_{0.2}$

The throw is specified at a terminal velocity of 0.2 m/s. Diagram below shows throw $l_{0.2}$ for horizontal supply air.



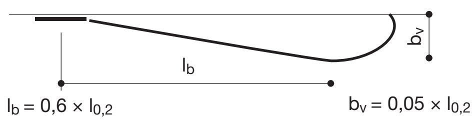
Correction throw $l_{0.2}$ for vertical supply air

CRL Ød	Correction factor
100	3,1
125	2,7
160	2,7
200	2,7
250	2,6
315	2,4
400	2,3

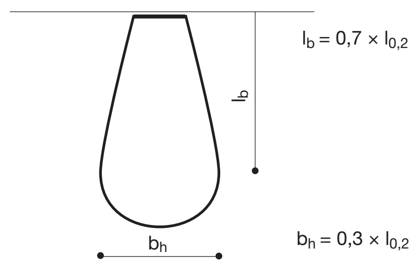
Air jet distribution

l_b = Distance from the diffuser to the point where there is maximum dispersal.
b_v = Depth of the air jet on a vertical plane.
b_h = Width of the air jet on a horizontal plane

Horizontal supply air pattern



Vertical supply air pattern

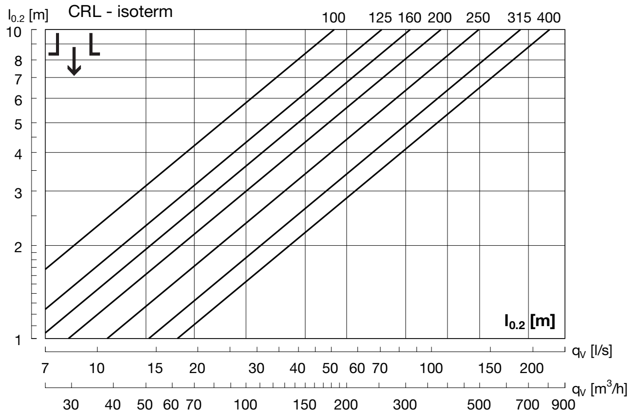


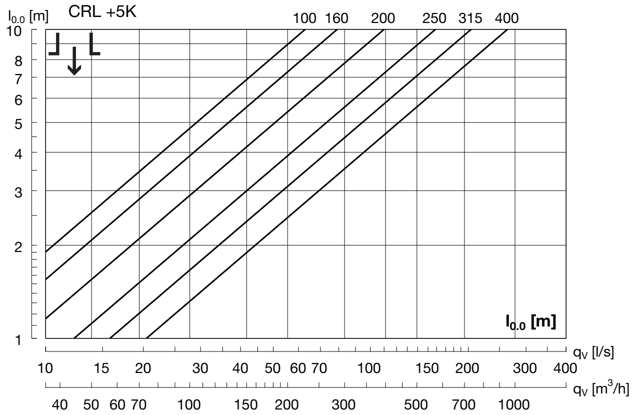
Plain diffuser CRL

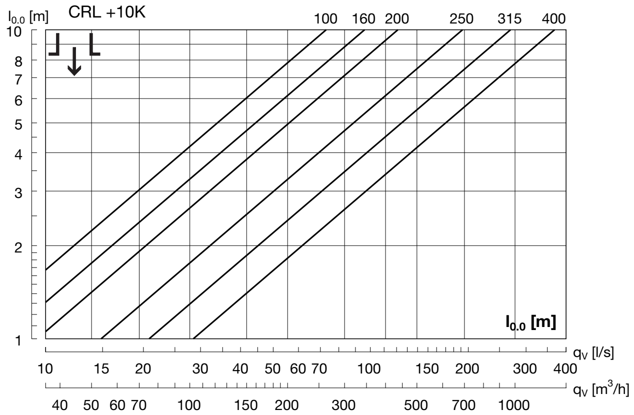
Technical data

Throw $l_{0.2}$ / turning point $l_{0.0}$

Throw $l_{0.2}$ [m] is specified at a speed of 0.2 m/s. Turning point $l_{0.0}$ [m] is specified for +5 K, +10 K respectively.

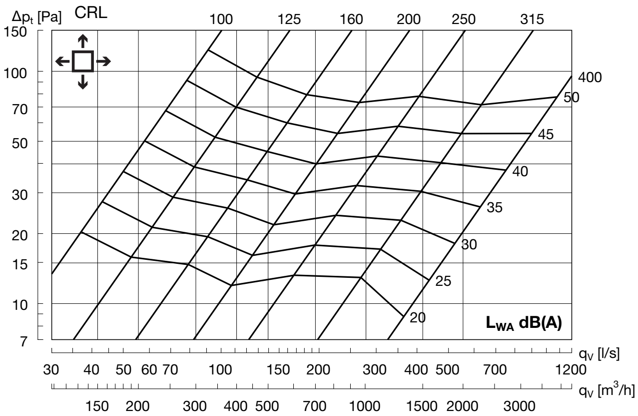




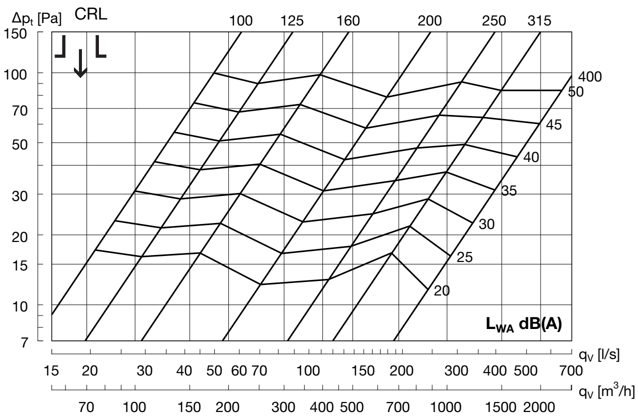


CRL without box - Supply air

Supply air - horizontal



Supply air - vertical

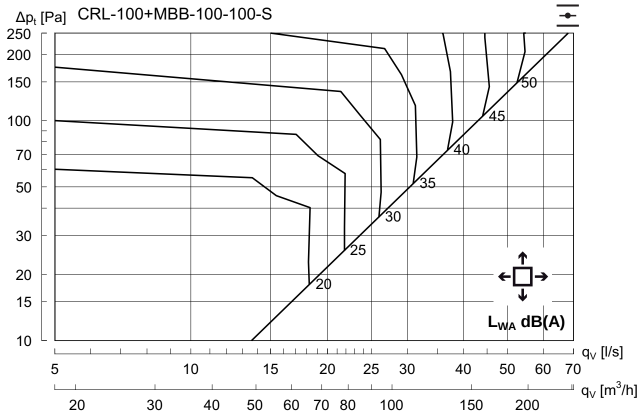


Plain diffuser

CRL

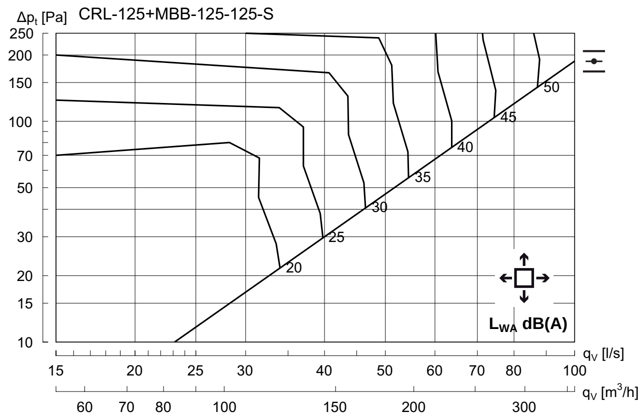
Technical data

CRL 100 + MBB - Supply air

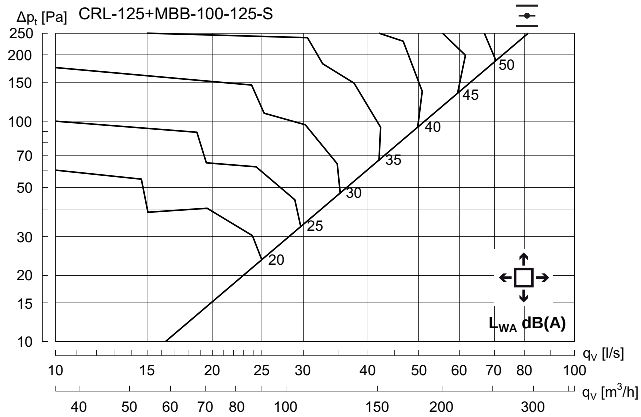


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	12	8	5	-7	-8	-14	-17	-22

CRL 125 + MBB - Supply air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	11	9	3	-5	-6	-14	-20	-24

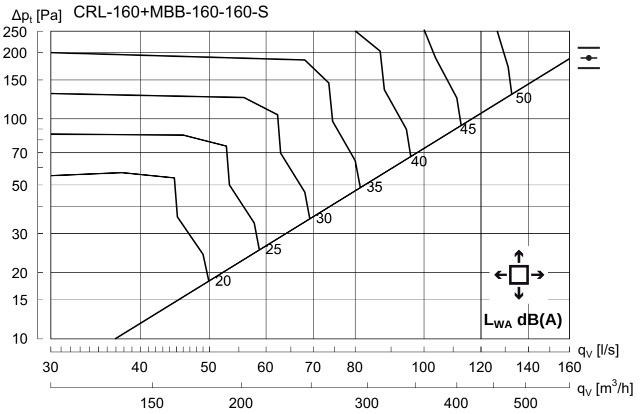


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	13	8	3	-5	-7	-11	-15	-19

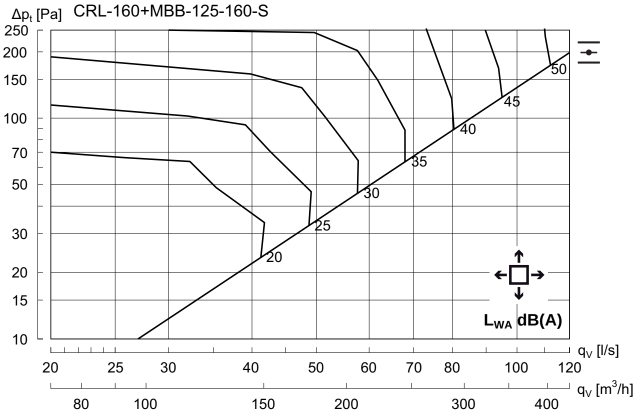
Plain diffuser CRL

Technical data

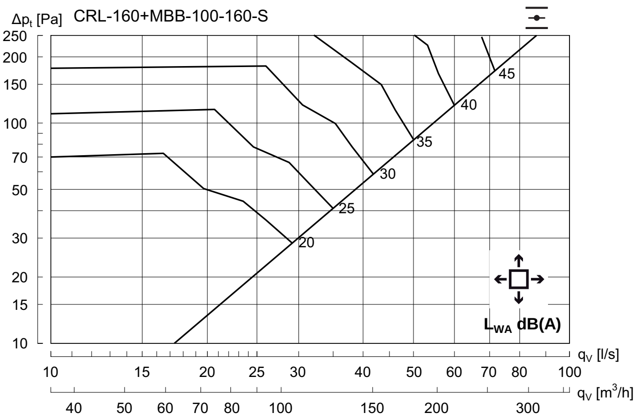
CRL 160 + MBB - Supply air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	11	12	3	-7	-7	-15	-20	-23

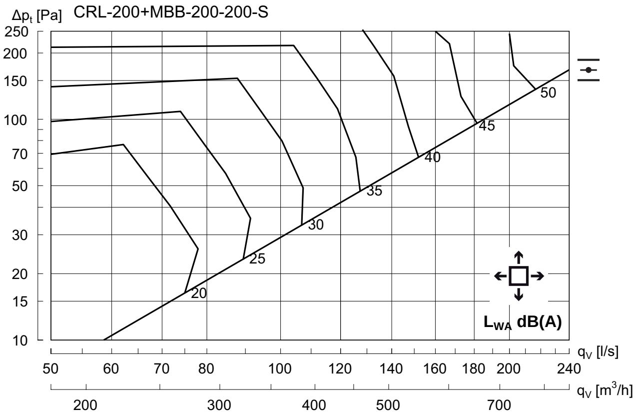


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	12	8	3	-5	-6	-11	-17	-22

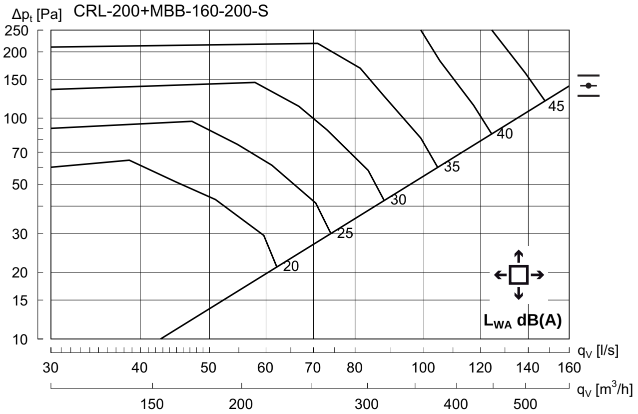


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	9	3	1	-3	-5	-9	-15	-19

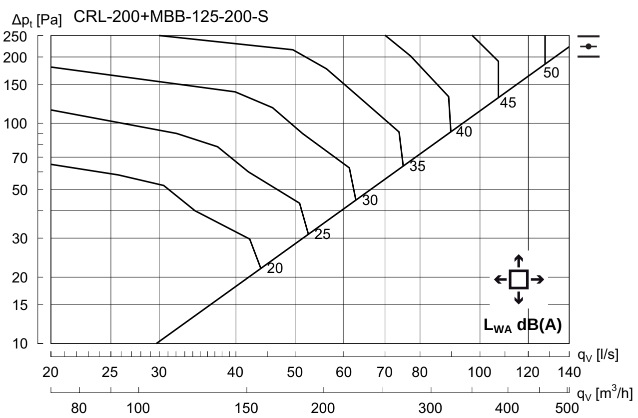
CRL 200 + MBB - Supply air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	12	11	1	-3	-7	-15	-20	-24



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	12	8	1	-4	-5	-10	-18	-22

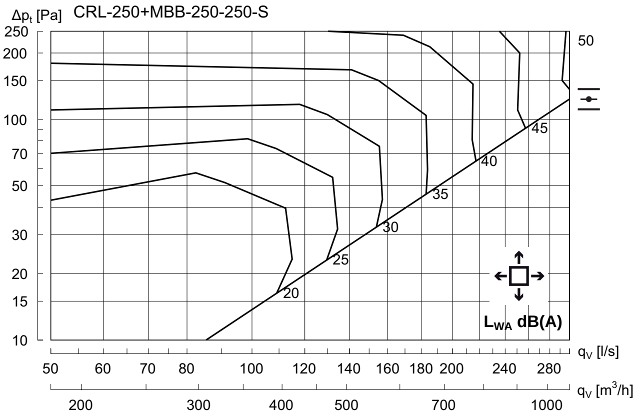


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	10	5	1	-4	-5	-10	-16	-20

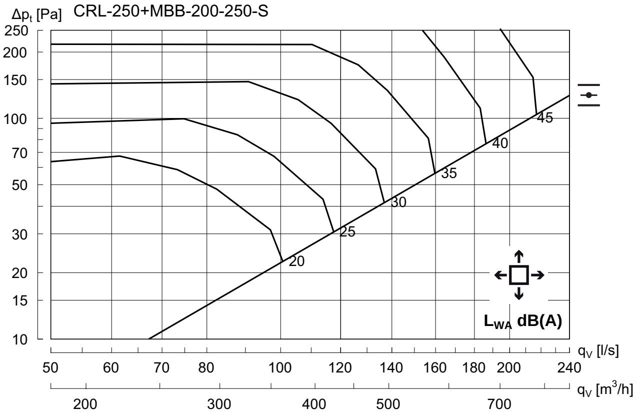
Plain diffuser CRL

Technical data

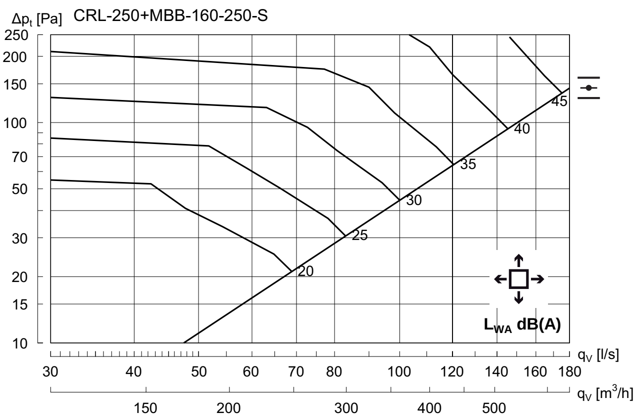
CRL 250+ MBB - Supply air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	15	7	0	-2	-6	-12	-16	-21

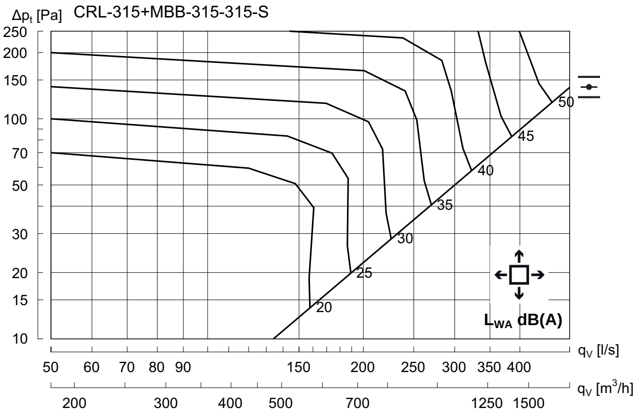


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	11	7	-1	-2	-5	-12	-17	-22

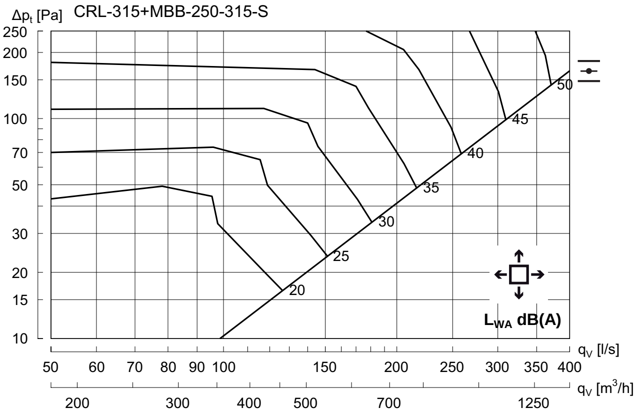


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	11	6	1	-3	-5	-10	-15	-21

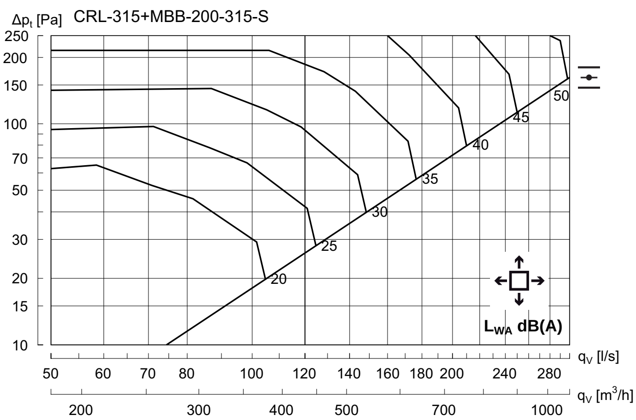
CRL 315 + MBB - Supply air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	15	4	1	-2	-6	-13	-17	-16



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	13	6	-1	-2	-5	-12	-17	-23

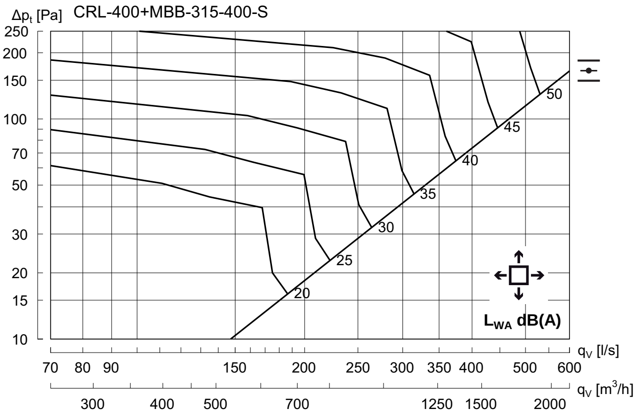


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	11	7	0	-3	-6	-10	-16	-21

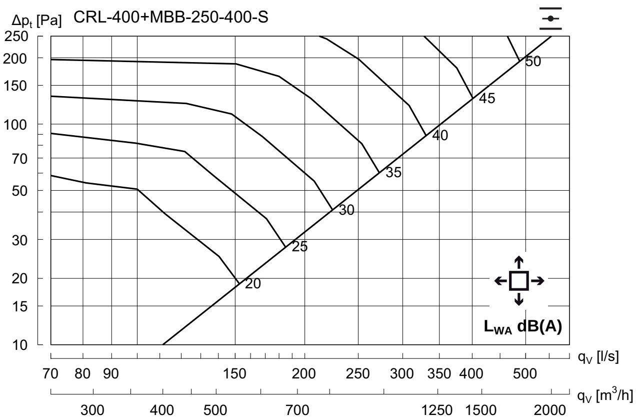
Plain diffuser CRL

Technical data

CRL 400+ MBB - Supply air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	11	3	0	-3	-5	-10	-14	-23



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	8	4	-1	-3	-4	-10	-14	-20

CRL + MBB - Supply air

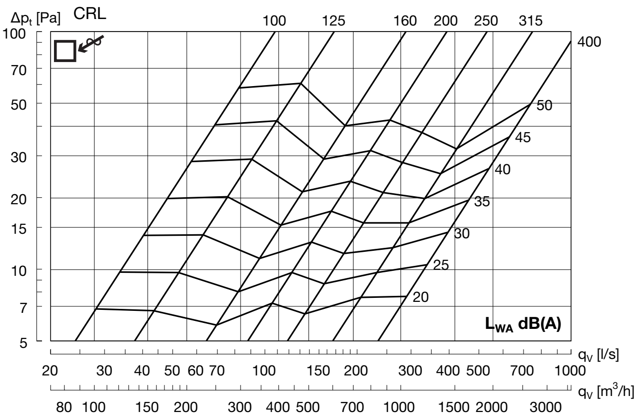
Correction vertical supply air, sound power level (L_{WA}) and pressure loss (Δp_t)

CRL + MBB		Correction factor	
Duct $Ød_1$	CRL $Ød_2$	L_{WA}	Δp_t
100	100	+ 6	x 1,3
100	125	+ 8	x 1,3
100	160	+ 3	x 1,1
125	125	+ 1	x 1
125	160	+ 8	x 1,2
125	200	+ 1	x 1
160	160	+ 10	x 1,5
160	200	+ 3	x 1,1
160	250	+ 0	x 1
200	200	+ 7	x 1,3
200	250	+ 0	x 1
200	315	+ 1	x 1
250	250	+ -2	x 1
250	315	+ 0	x 1
250	400	+ 0	x 1,1
315	315	+ -2	x 1,1
315	400	+ 3	x 1,2

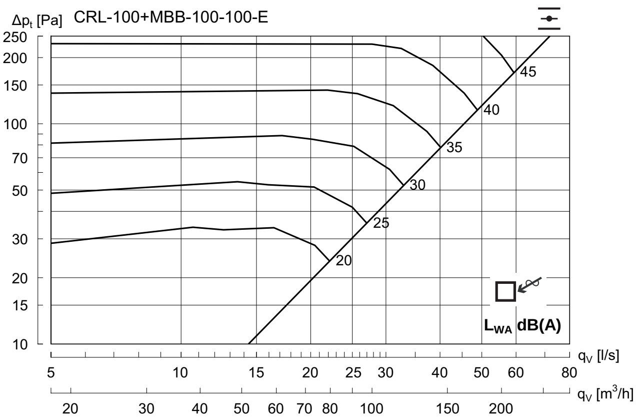
Plain diffuser CRL

Technical data

CRL without box - Exhaust air



CRL 100 + MBB - Exhaust air

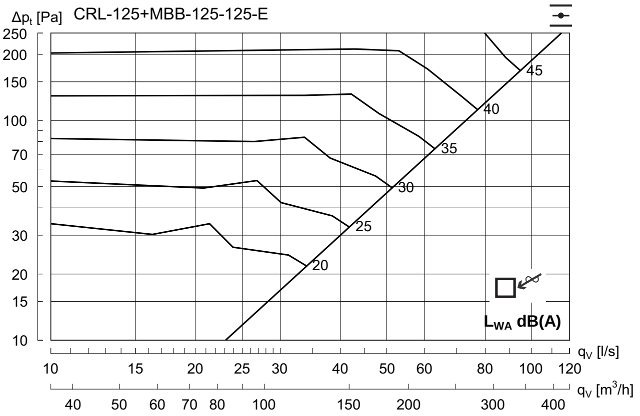


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	11	0	2	-2	-6	-11	-15	-22

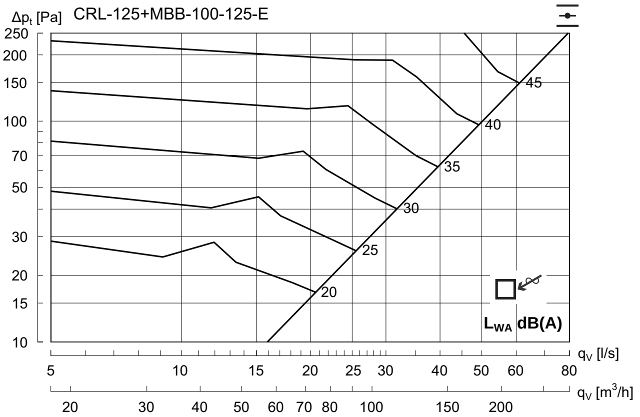
Plain diffuser CRL

Technical data

CRL 125 + MBB - Exhaust air

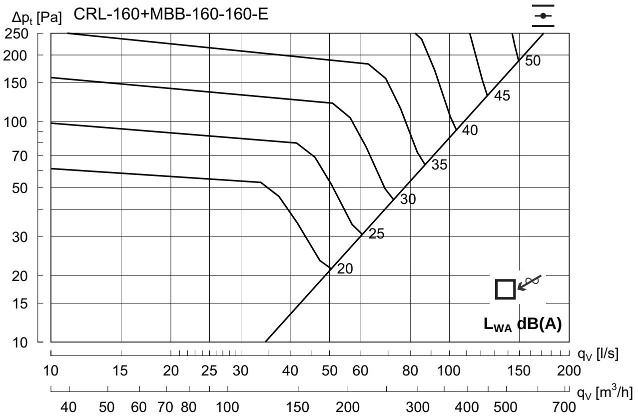


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	14	5	-1	-3	-4	-12	-15	-21

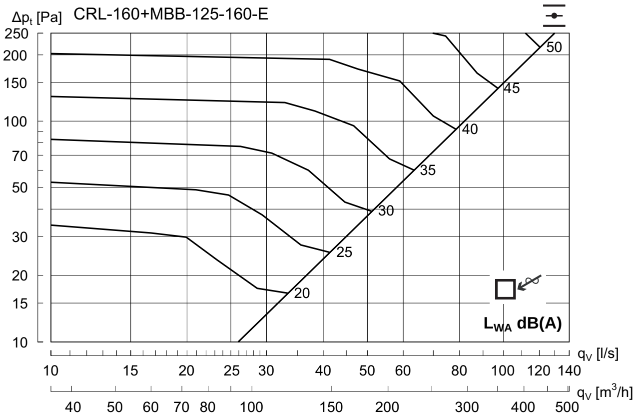


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	13	0	4	-3	-8	-11	-17	-22

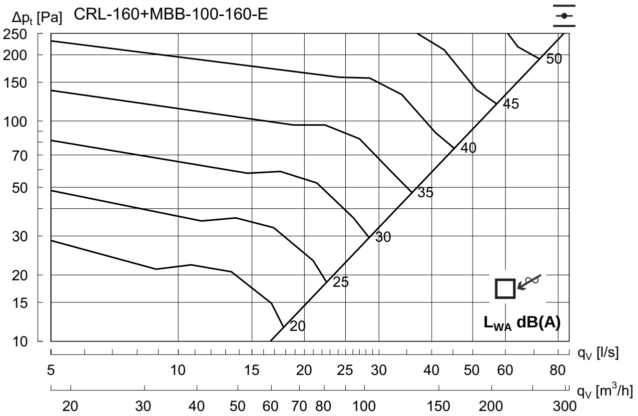
CRL 160 + MBB - Exhaust air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	14	4	-1	-4	-4	-10	-16	-24



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	13	6	1	-3	-5	-12	-15	-21

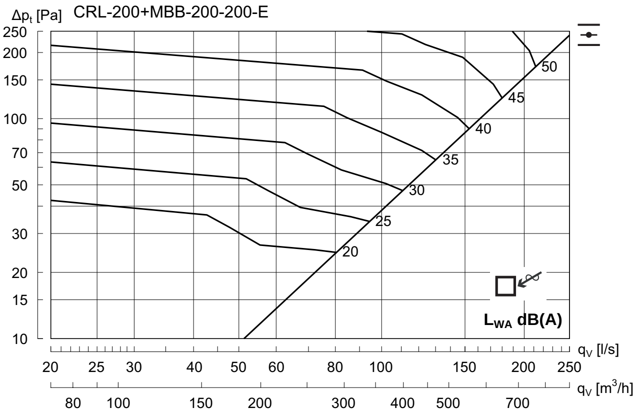


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	13	0	5	-3	-9	-12	-19	-23

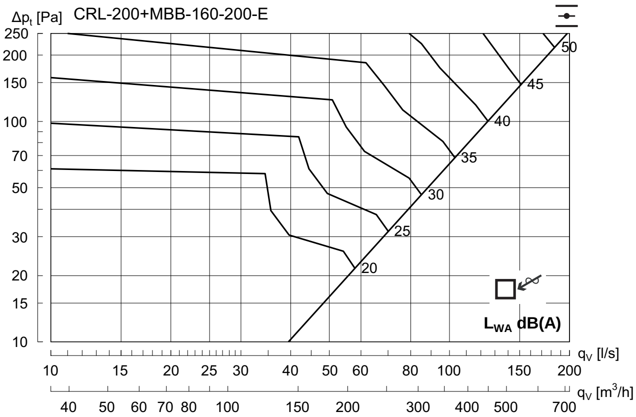
Plain diffuser CRL

Technical data

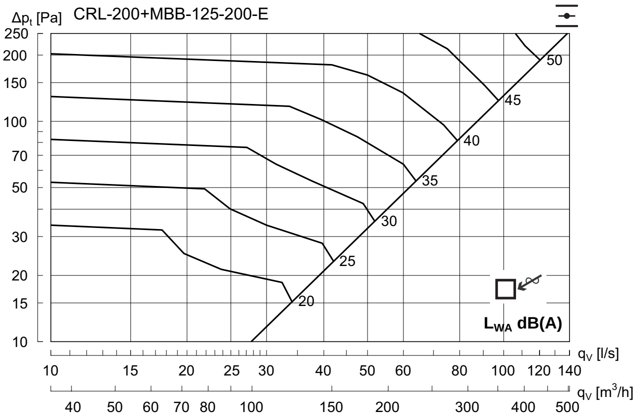
CRL 200 + MBB - Exhaust air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	15	5	-1	-3	-6	-9	-16	-25

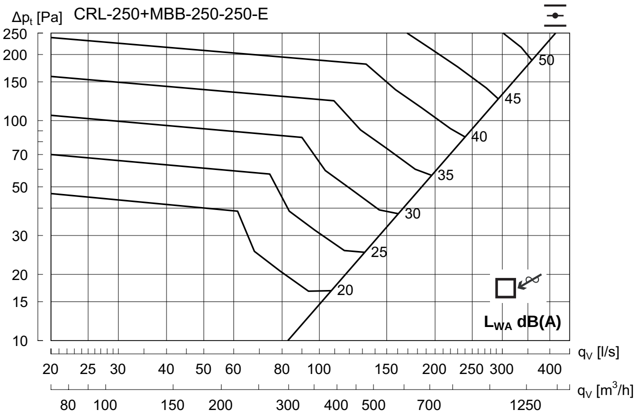


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	14	5	0	-3	-5	-9	-15	-20

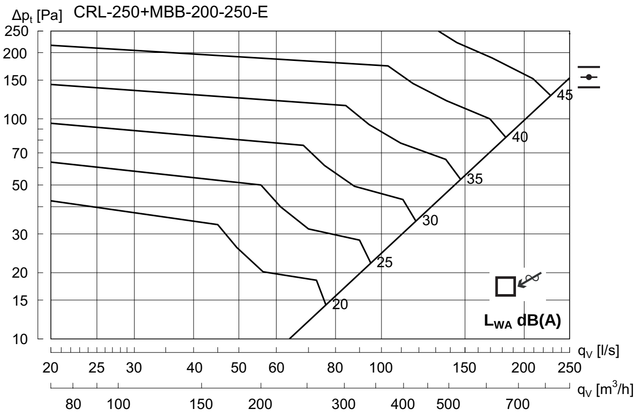


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	9	2	1	-2	-5	-9	-14	-19

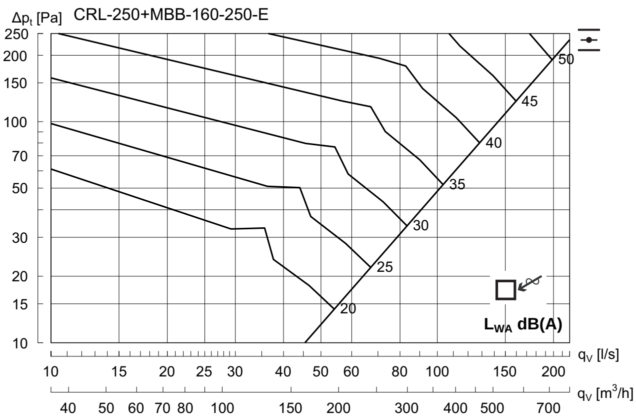
CRL 250 + MBB - Exhaust air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	11	6	2	-2	-7	-11	-15	-24



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	13	5	1	-3	-6	-10	-13	-22

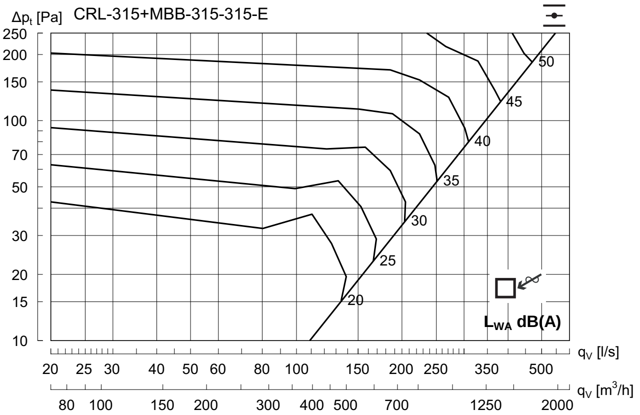


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	13	5	1	-3	-5	-11	-14	-20

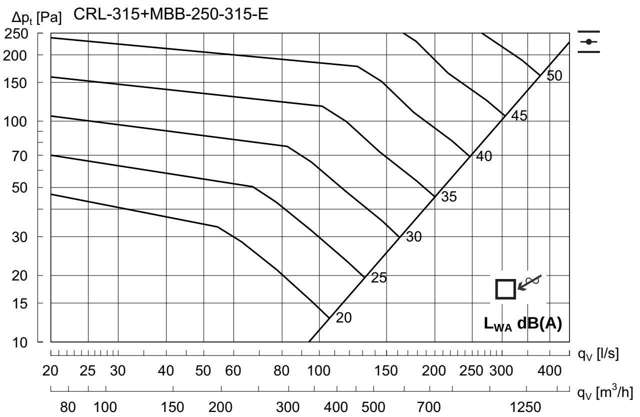
Plain diffuser CRL

Technical data

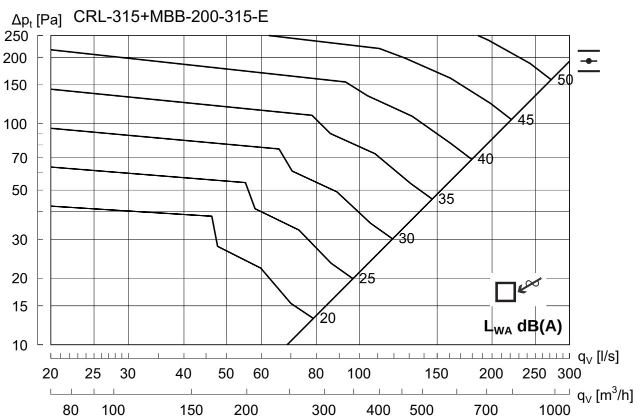
CRL 315 + MBB - Exhaust air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	13	5	2	-3	-6	-10	-15	-25

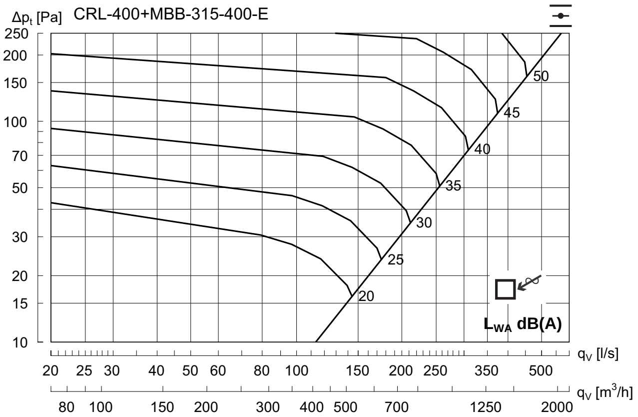


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	9	5	2	-3	-6	-10	-16	-22

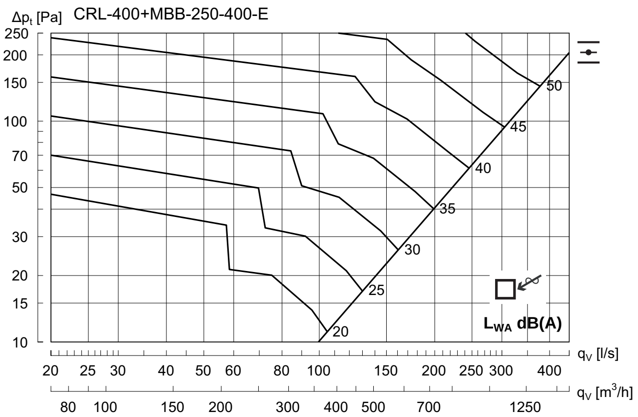


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	13	5	0	-3	-5	-10	-15	-22

CRL 400 + MBB - Exhaust air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	11	5	2	-2	-7	-11	-15	-25



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	9	6	2	-2	-6	-12	-16	-24

Lindab Integra

PC7,Integrated in Luxalon Clip-In ceiling with adapted module plate type LM.

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

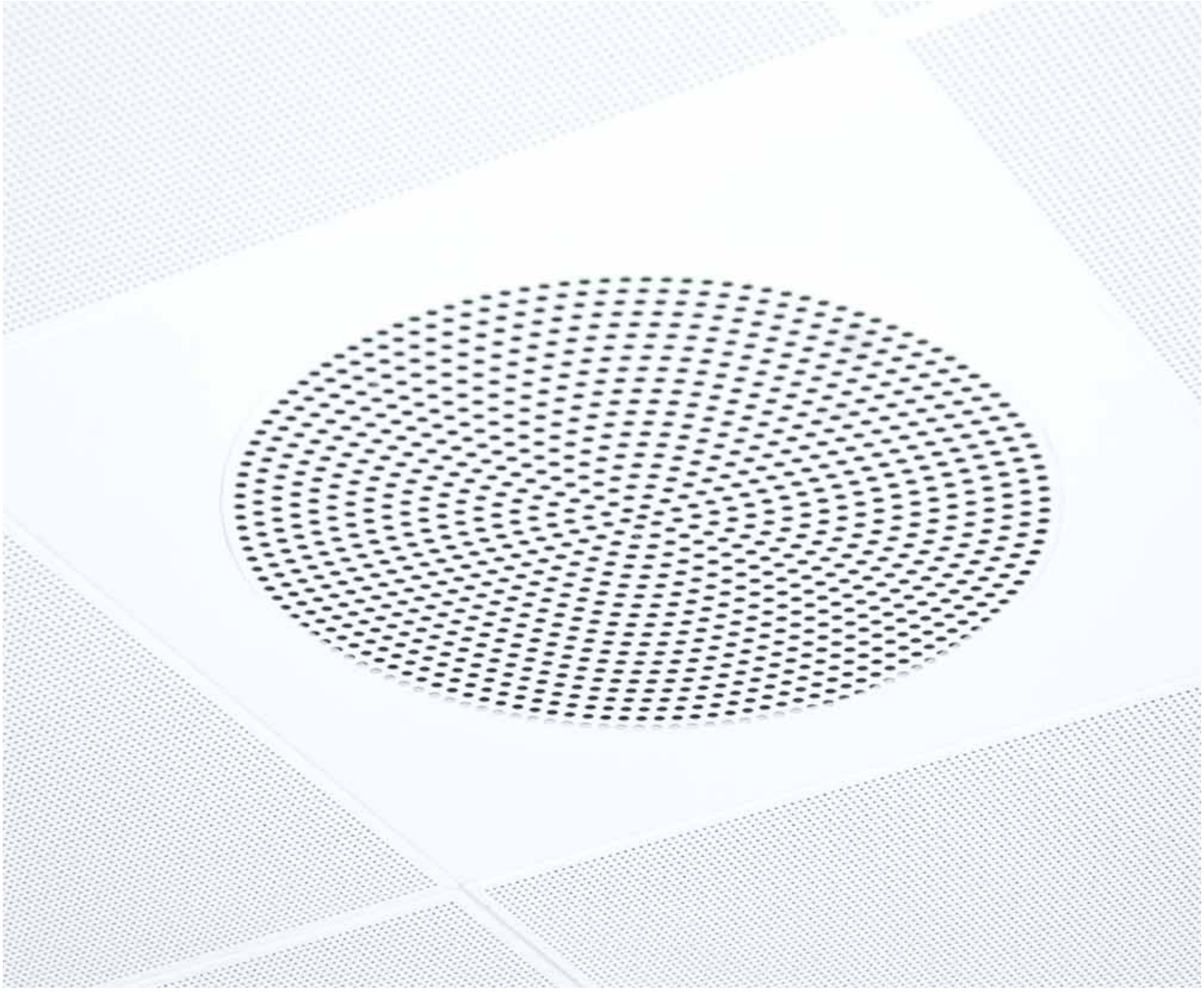
Lindab Integra a series of flush diffusers

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

Mixed ventilation diffusers

	Product	Functions	Page
	**PC6**		**125**
	**PC7**		**135**
	**RC14**		**141**
	**RC15**		**151**
	**NC19**		**161**
	**RCG**		**169**
	**LCP**		**177**
	**LKP**		**177**

Lindab Integra a series of flush diffusers



PC7, Integrated in Luxalon Clip-In ceiling with adapted module plate, type LM.

Lindab Integra

Integra is a series of flush mounted ceiling diffusers for mixed ventilation. The diffusers are primarily offered in circular, but are also available in square forms with a large selection of face plates in different designs, which satisfy requirements as well as function. The circular diffusers are normally cut directly into the ceiling when mounted, but can by using module plates be adapted for the most common 600x600 ceiling systems. The square diffusers in this series are adapted to the system-ceiling. The diffusers can be mounted in a plenum box type MBB with great advantage, in order to obtain a stable air flow to the diffuser and the possibility for individual adjustments.

Functionality

Integra has a unique magnetic mounting system of the face plates on all circular diffusers with exception of RCG. This ensures an incredibly easy access to all the internal components, which can be detached without the use of tools, and gives free access to the air duct system for cleaning.

PC6, ceiling diffusers

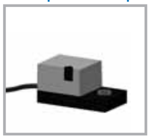
Lindab Integra a series of flush diffusers

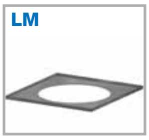
Design

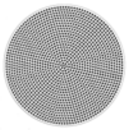
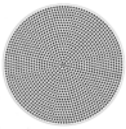
See Comfort and design

Accessories

See product pages



Product	Design	Size (mm)	El. - motor	Bracket	Module pl.	MBB box
PC6	Perforated 	125		●	●	●
		160		●	●	●
		200		●	●	●
		250		●	●	●
		315		●	●	●
PC7	Perforated swirl 	160		●	●	●
		200		●	●	●
		250		●	●	●
		315		●		●
RC14	Swirl 	160		●	●	●
		200		●	●	●
		250		●	●	●
		315		●	●	●
RC15	Swirl 	160		●	●	●
		200		●	●	●
		250		●	●	●
		315		●	●	●
NC19	Nozzle 	125		●	●	●
		160		●	●	●
		200		●	●	●
		250		●	●	●
		315		●	●	●
RCG	Swirl 	125		●	●	●
		160		●	●	●
		200		●	●	●
		250		●	●	●
		315		●	●	●
		400		●	●	●
LCP	Plain	125	●			●
		160	●			●
		200	●			●
		250	●			●
		315	●			●
LKP	Plain	125	●			●
		160	●			●
		200	●			●
		250	●			●
		315	●			●

Electric motor: 

See VAV chapter for futher documentation

● 1. Product and tech. data depicted in catalogue.

○ 2. Combination possible. Tech. data depicted in catalogue.

● 3. Combination possible. Tech. data not in catalogue.

4. If space is empty, combination is not possible.

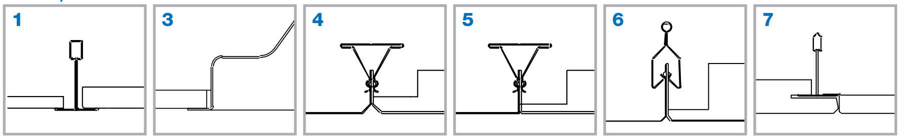
Examaple of order Diffuser + MBB box

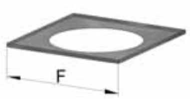
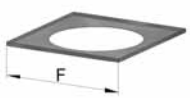
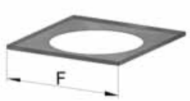
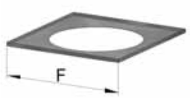
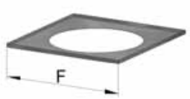
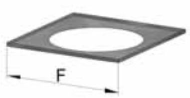
PC6 – S – 160 + MBB – 125 – 160 – S

Lindab Integra a series of flush diffusers

Ceiling tile adaption

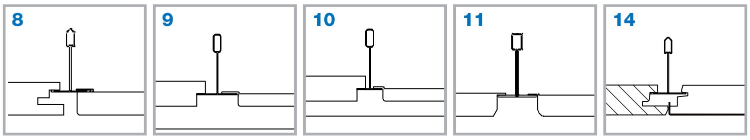
Details, see Chapter Ceiling tile adaption



Product		Size	1	3	4	5	6	7
	Ceiling types		Danotile T24/T15 Ecophon T24 Rockfon A24.	Plasterboard ceiling	Dampa Clip-In bevelled edge	Dampa Clip-In square edge	Luxalon SQ Clip-In	Danotile Contur Ecophon D Rockfon D-XL
	Perforated	**mm**	F: 595 mm	ØA mm	F: 600 mm	F: 600 mm	F: 600 mm	F: 599 mm
PC6		**125**	●	Standard	●	●	●	●
		160	●	Standard	●	●	●	●
		200	●	Standard	●	●	●	●
		250	●	Standard	●	●	●	●
		315	●	Standard	●	●	●	●
	Perforated swirl	**mm**	F: 595 mm	ØA mm	F: 600 mm	F: 600 mm	F: 600 mm	F: 599 mm
PC7		**160**	●	Standard	●	●	●	●
		200	●	Standard	●	●	●	●
		250	●	Standard	●	●	●	●
		315	●	Standard	●	●	●	●
	Swirl	**mm**	F: 595 mm	ØA mm	F: 600 mm	F: 600 mm	F: 600 mm	F: 599 mm
RC14		**160**	●	Standard	●	●	●	●
		200	●	Standard	●	●	●	●
		250	●	Standard	●	●	●	●
		315	●	Standard	●	●	●	●
	Swirl	**mm**	F: 595 mm	ØA mm	F: 600 mm	F: 600 mm	F: 600 mm	F: 599 mm
RC15		**160**	●	Standard	●	●	●	●
		200	●	Standard	●	●	●	●
		250	●	Standard	●	●	●	●
		315	●	Standard	●	●	●	●
	Nozzles	**mm**	F: 595 mm	ØA mm	F: 600 mm	F: 600 mm	F: 600 mm	F: 599 mm
NC19		**125**	●	Standard	●	●	●	●
		160	●	Standard	●	●	●	●
		200	●	Standard	●	●	●	●
		250	●	Standard	●	●	●	●
		315	●	Standard	●	●	●	●
	Swirl	**mm**	F: 595 mm	ØD mm	F: 600 mm	F: 600 mm	F: 600 mm	F: 599 mm
RCG		**125**	●	Standard	●	●	●	●
		160	●	Standard	●	●	●	●
		200	●	Standard	●	●	●	●
		250	●	Standard	●	●	●	●
		315	●	Standard	●	●	●	●
		400	●	Standard	●	●	●	●
	Plain	**mm**	F: 595 mm	595 x 595 mm	F: 600 mm	F: 600 mm	F: 600 mm	F: 599 mm
LCP	No seperate module plate (Integrated in design)	**125**	Standard*	●		●	●	●
		160	Standard*	●		●	●	●
		200	Standard*	●		●	●	●
		250	Standard*	●		●	●	●
		315	Standard*	●		●	●	●
	Plain	**mm**	F: 595 mm	595 x 595 mm	F: 600 mm	F: 600 mm	F: 600 mm	F: 599 mm
LKP	No seperate module plate (Integrated in design)	**125**	Standard*	●		●	●	●
		160	Standard*	●		●	●	●
		200	Standard*	●		●	●	●
		250	Standard*	●		●	●	●
		315	Standard*	●		●	●	●

* In other ceiling systems the grille box is adapted to the ceiling

Lindab Integra a series of flush diffusers



Product	Size	8	9	10	11	14	
Ceiling types		Ecophon Focus DG	Rockfon E10 24 Ecophon - E / T24	Rockfon E10 15 Ecophon - E / T15	Danotile Markant	Ecophon Focus edge DS	
PC6 – **Perforated**	**mm**	F: 592 mm	F: 575 mm	F: 584 mm	F: 575 mm	F: 599 mm	
	125	●	●	●	●	●	
	160	●	●	●	●	●	
	200	●	●	●	●	●	
	250	●	●	●	●	●	
	315	●	●	●	●	●	
PC7 – **Perforated swirl**	**mm**	F: 592 mm	F: 575 mm	F: 584 mm	F: 575 mm	F: 599 mm	
	160	●	●	●	●	●	
	200	●	●	●	●	●	
	250	●	●	●	●	●	
	315	●	●	●	●	●	
RC14 – **Swirl**	**mm**	F: 592 mm	F: 575 mm	F: 584 mm	F: 575 mm	F: 599 mm	
	160	●	●	●	●	●	
	200	●	●	●	●	●	
	250	●	●	●	●	●	
	315	●	●	●	●	●	
RC15 – **Swirl**	**mm**	F: 592 mm	F: 575 mm	F: 584 mm	F: 575 mm	F: 599 mm	
	160	●	●	●	●	●	
	200	●	●	●	●	●	
	250	●	●	●	●	●	
	315	●	●	●	●	●	
NC19 – **Nozzles**	**mm**	F: 592 mm	F: 575 mm	F: 584 mm	F: 575 mm	F: 599 mm	
	125	●	●	●	●	●	
	160	●	●	●	●	●	
	200	●	●	●	●	●	
	250	●	●	●	●	●	
	315	●	●	●	●	●	
RCG – **Swirl**	**mm**	F: 592 mm	F: 575 mm	F: 584 mm	F: 575 mm	F: 599 mm	
	125	●	●	●	●	●	
	160	●	●	●	●	●	
	200	●	●	●	●	●	
	250	●	●	●	●	●	
	315	●	●	●	●	●	
	400	●	●	●	●	●	
LCP – **Plain** (No seperate module plate (Integrated in design))	**mm**	F: 592 mm	F: 575 mm	F: 584 mm	F: 575 mm	F: 599 mm	
	125	●	●	●	●	●	
	160	●	●	●	●	●	
	200	●	●	●	●	●	
	250	●	●	●	●	●	
	315	●	●	●	●	●	
LKP – **Plain** (No seperate module plate (Integrated in design))	**mm**	F: 592 mm	F: 575 mm	F: 584 mm	F: 575 mm	F: 599 mm	
	125	●	●	●	●	●	
	160	●	●	●	●	●	
	200	●	●	●	●	●	
	250	●	●	●	●	●	
	315	●	●	●	●	●	

Perforated diffuser PC6

Description

PC6 is a circular perforated diffuser that can be used for both supply air and exhaust. The diffuser is suitable for the horizontal supply of cooled air. The diffuser can also be used for low impulse and is therefore useful for the supply of replacement air in environments with high rates of air exchange. Installing this diffuser in a plenum box type MBB can help to achieve a stable flow of air to the diffuser as well as realise the potential for individual adjustment.

- Suitable for both supply and exhaust air
- Discrete design
- Can be used for low impulse supply air

Maintenance

The face plate can be removed to enable cleaning of internal parts or to gain access to the duct or box. The visible parts of the diffuser can be wiped with a damp cloth.

Order code

Product PC6 - a - bbb

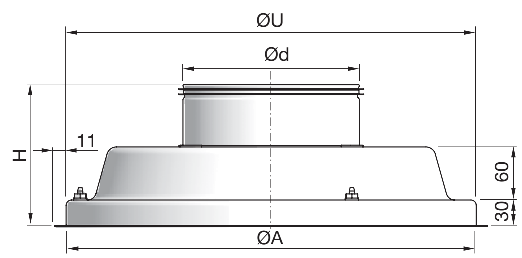
Type
PC6

Functional use
S = Supply air
E = Exhaust
L = Low-impulse

Connection dim.
Ød 125-315

Example: PC6-S-200

Dimensions



PC6 Ød mm	ØA mm	H mm	ØU* mm	Weight kg
125	360	160	370	3.90
160	460	160	470	5.30
200	460	160	470	5.40
250	540	160	550	7.40
315	540	160	550	8.10

* ØU = ceiling grid opening

Ød 315, No mounting holes for MBB !

Materials and finish

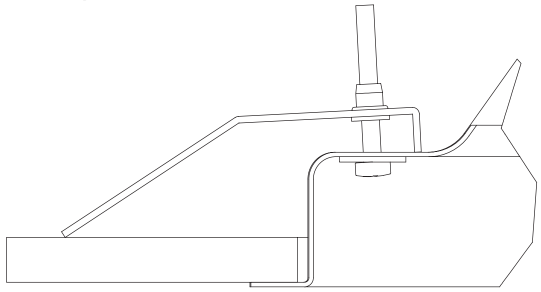
Material: Galvanised steel
Standard finish: Powder-coated
Standard colour: RAL 9010 Gloss 30

The diffuser is available in other colours. Please contact Lindab's sales department for further information.

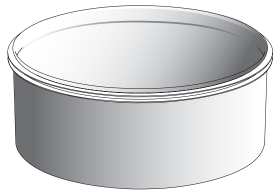
Perforated diffuser PC6

Accessories

Mounting brackets DCZ



Extension piece MBZ

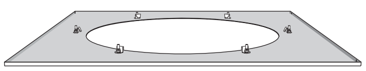


Order code - accessories

Product	aaa	bbb
Type		
Size		

Example: MBZ-200

Module plate LM



Order code - module plate

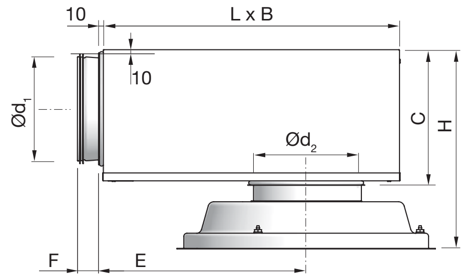
Product	LM	a	PC6	ccc
Type				
Ceiling system				
Diffuser				
Size				

Example: LM-1-PC6-200

Ceiling system - see introductory summary

Plenum box MBB

PC6 + MBB



PC6 + MBB							
Duct $Ød_1$ mm	PC6 $Ød_2$ mm	B mm	C mm	E mm	F mm	H* mm	L mm
100	125	260	159	216	50	270 - 310	310
100	160	260	159	216	50	270 - 310	310
125	125	310	184	262	50	295 - 335	376
125	160	310	184	262	50	295 - 335	376
125	200	310	184	262	50	295 - 335	376
160	160	380	220	323	50	329 - 369	459
160	200	380	220	323	50	329 - 369	459
160	250	380	220	323	50	329 - 369	459
200	200	460	259	396	70	370 - 410	565
200	250	460	259	396	70	370 - 410	565
200	315	460	259	396	70	370 - 410	565
250	250	540	309	486	70	420 - 460	698
250	315	540	309	486	70	420 - 460	698
315	315	540	373	646	70	485 - 525	858

* Using accessory MBZ the H dimension will increase:
$Ød_2$ = 100 - 200 mm => H +40 mm
$Ød_2$ = 250 - 315 mm => H +60 mm

Order code

Product	MBB	aaa	bbb	c
Type MBB				
Duct connection $Ød_1$ Ø100-315				
Diffuser dimension $Ød_2$ Ø125-315				
Functional use S = Supply air E = Exhaust				

Example: PC6-S-200-MBB-160-200-S

Perforated diffuser PC6

Technical data

Capacity

Air flow q_v [l/s] and [m^3/h], total pressure Δp_t [Pa], throw $l_{0.2}$ [m] and sound power level L_{WA} [dB(A)] can be seen in the diagrams.

Frequency-related sound effect level

The sound effect level in the frequency band is defined as $L_{WA}+K_{ok}$.
K_{ok} values are specified in charts beneath the diagrams on the following pages. K_{ok} values for PC6 without a box are avaliable on request.

Quick selection, supply air

PC6 + MBB		Max. airflow 30dB(A)		Max. airflow 35dB(A)	
Duct $Ød_1$	PC6 $Ød_2$	l/s	m³/h	l/s	m³/h
100	125	32	115	38	137
100	160	39	140	46	166
125	125	39	140	46	166
125	160	48	173	62	223
125	200	56	202	66	238
160	160	53	191	62	223
160	200	66	238	78	281
160	250	74	266	95	342
200	200	71	256	85	306
200	250	92	331	112	403
200	315	113	407	138	497
250	250	110	396	130	468
250	315	122	439	152	547
315	315	156	562	188	677

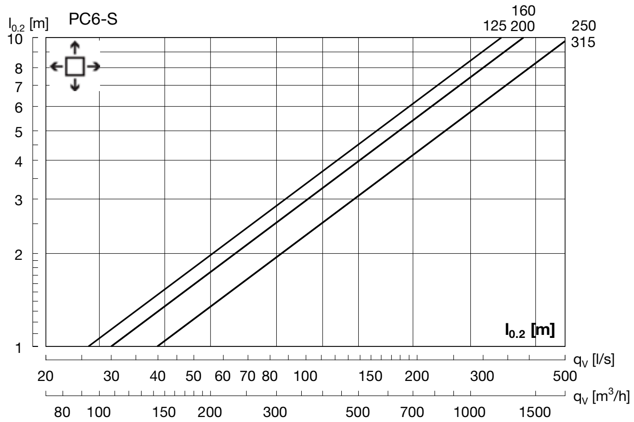
Low-impulse
Correction sound power level (L_{WA}) and pressure loss (p_t)

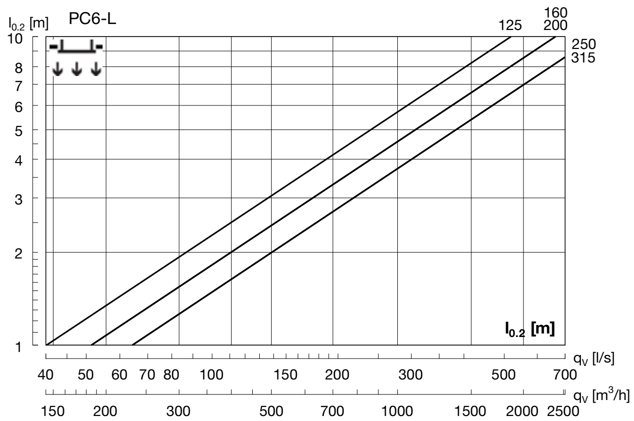
On the following pages you can find diagrams for all sizes PC6+MBB supply air. When low-impulse values are wanted use the correction factors in the table below.

PC6-L + MBB		Low-impulse Correction factor	
Duct $Ød_1$	PC6-L $Ød_2$	L_{WA}	Δp_t
100	125	-1	x 1
100	160	1	x 1
125	125	-4	x 1
125	160	-1	x 1
125	200	-2	x 1
160	160	-5	x 0,9
160	200	-3	x 1
160	250	-2	x 1
200	200	0	x 1
200	250	0	x 1
200	315	-1	x 1
250	250	-5	x 0,9
250	315	-2	x 1
315	315	0	x 1

Throw $l_{0.2}$

Throw $l_{0.2}$ [m] is specified at a terminal velocity of 0.2 m/s.





Sound attenuation

Sound attenuation of the diffusers ΔL from duct to room, including end reflection, see table below.

PC6 + MBB		Centre frequency Hz							
Duct $Ød_1$	PC6 $Ød_2$	63	125	250	500	1K	2K	4K	8K
100	125	19	16	7	15	19	18	19	21
100	160	17	15	4	14	17	17	17	18
125	125	17	15	9	19	17	19	18	20
125	160	15	14	8	18	15	16	17	19
125	200	13	11	4	14	13	15	16	17
160	160	15	15	10	21	17	18	19	20
160	200	18	15	8	21	17	17	18	19
160	250	16	14	5	17	13	15	17	18
200	200	13	11	8	16	18	16	19	17
200	250	13	9	5	14	16	15	18	16
200	315	13	8	3	10	16	14	16	16
250	250	14	8	7	15	17	17	18	17
250	315	13	7	6	14	16	15	16	17
315	315	8	9	8	14	17	16	17	21

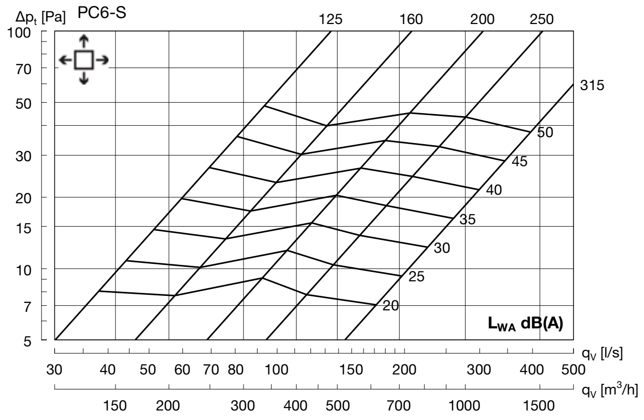
Balancing

Balancing data is contained in a separate brochure.

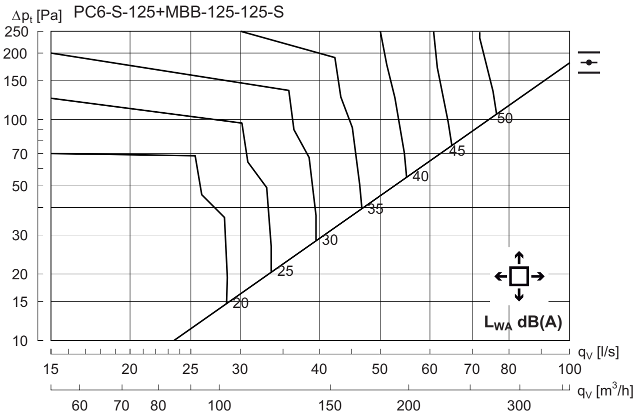
Perforated diffuser PC6

Technical data

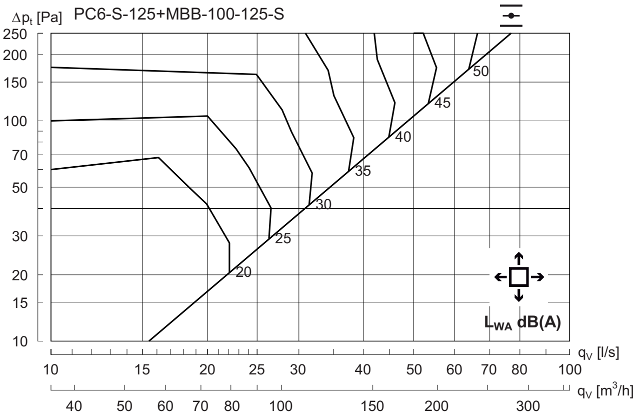
PC6 without box - Supply air



PC6 125 + MBB - Supply air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	7	2	-4	0	-4	-14	-23	-32

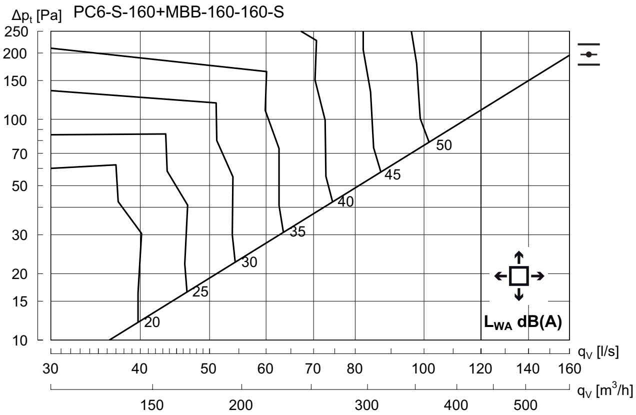


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	10	6	1	-2	-5	-12	-18	-25

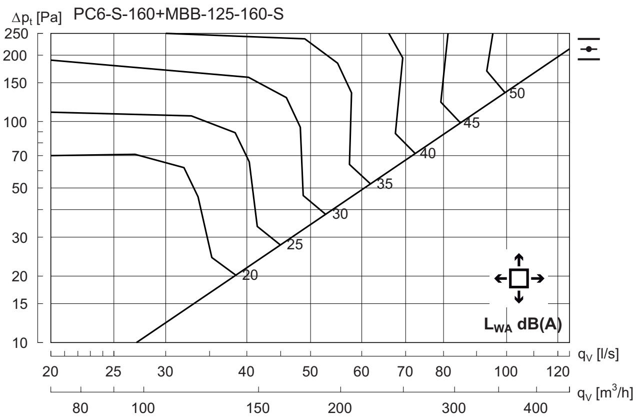
Perforated diffuser PC6

Technical data

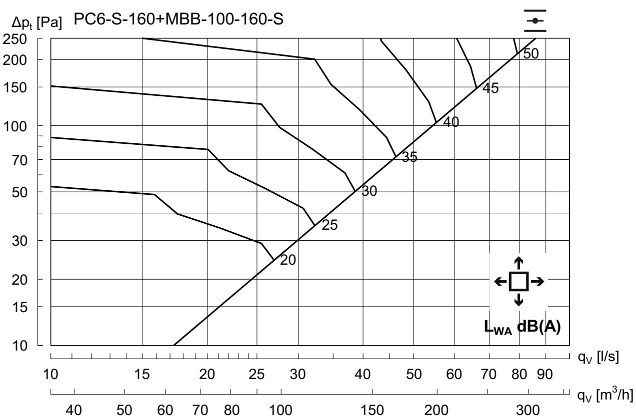
PC6 160 + MBB - Supply air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	10	3	-5	-1	-3	-15	-23	-29

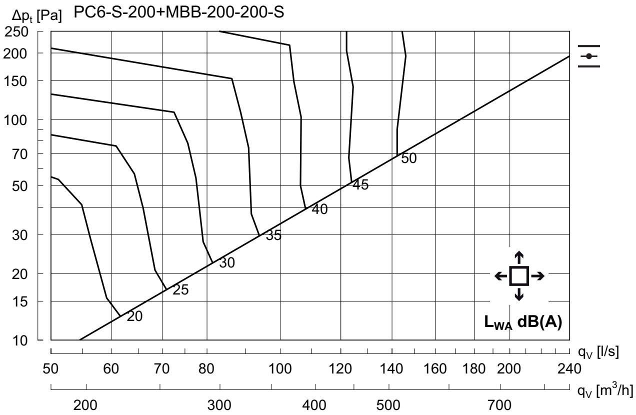


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	9	5	0	-2	-5	-12	-17	-25

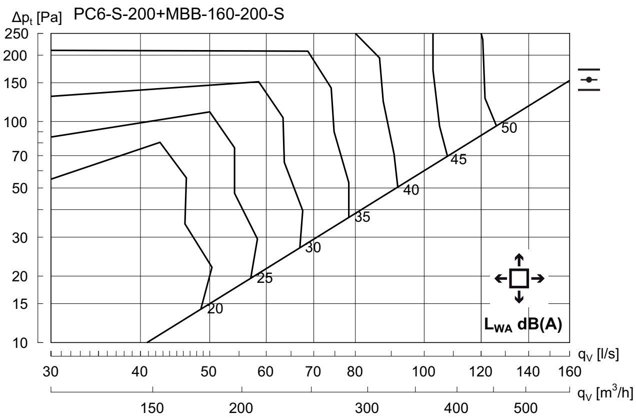


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	7	4	0	-1	-5	-11	-16	-22

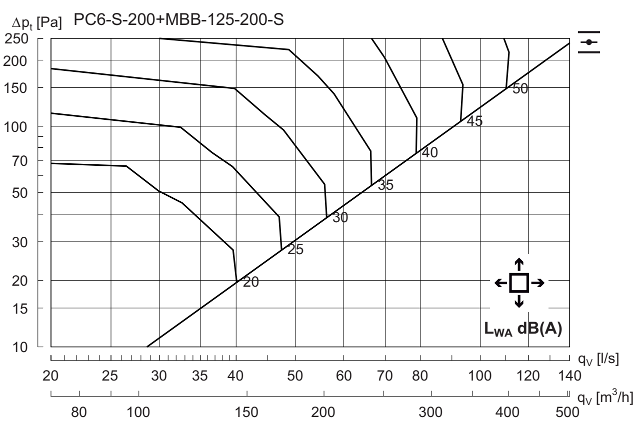
PC6 200 + MBB - Supply air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	11	2	-5	-1	-4	-15	-22	-27



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	11	4	-2	-2	-3	-12	-20	-27



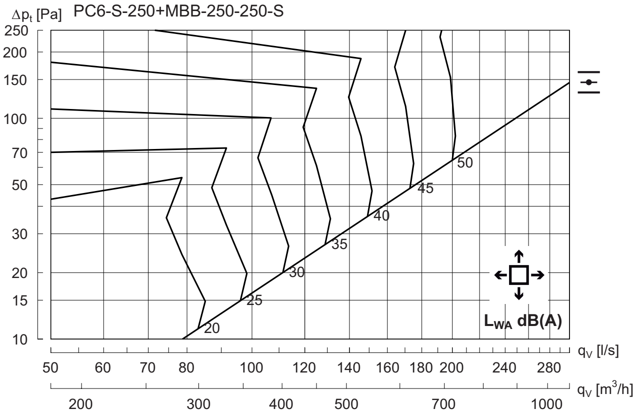
Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	6	5	0	-2	-5	-10	-16	-22

Perforated diffuser PC6

Technical data

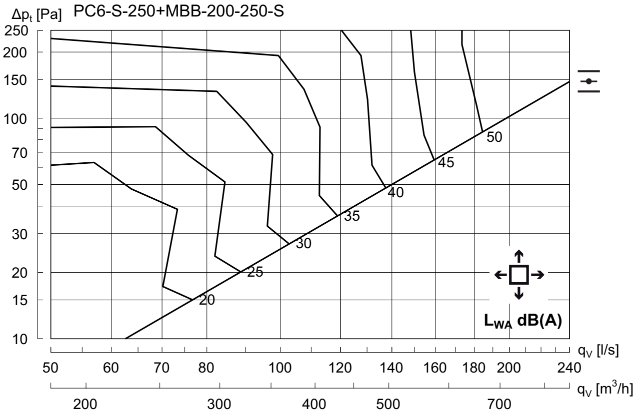
PC6 250 + MBB - Supply air

Δpt [Pa] PC6-S-250+MBB-250-250-S



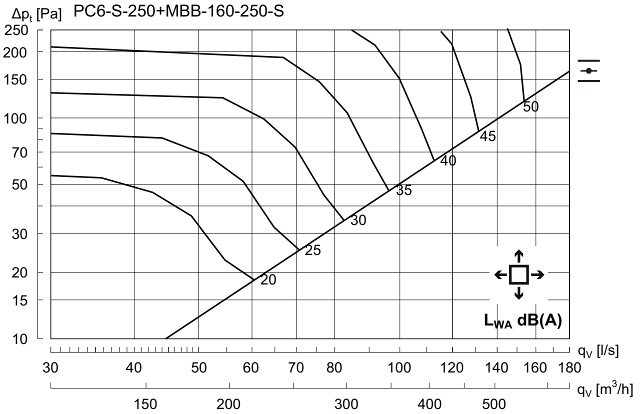
Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	9	-1	-6	0	-4	-16	-25	-30

Δpt [Pa] PC6-S-250+MBB-200-250-S



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	11	3	-3	-2	-3	-14	-22	-29

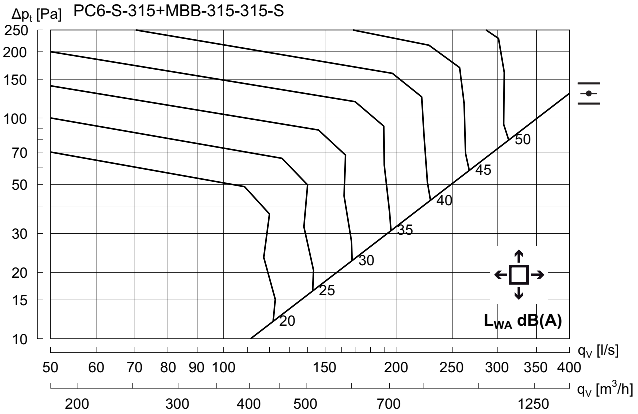
Δpt [Pa] PC6-S-250+MBB-160-250-S



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	12	3	-1	-4	-4	-10	-18	-24

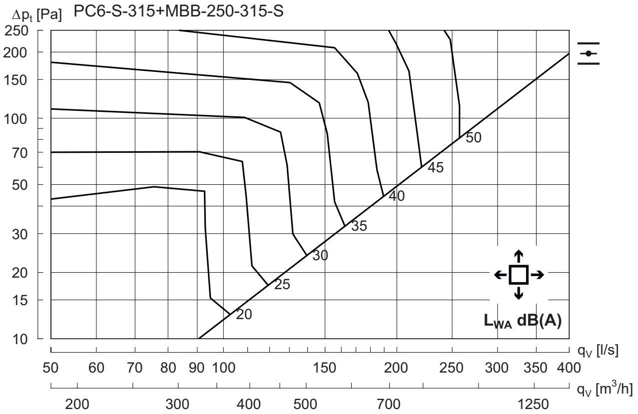
PC6 315 + MBB - Supply air

Δpt [Pa] PC6-S-315+MBB-315-315-S



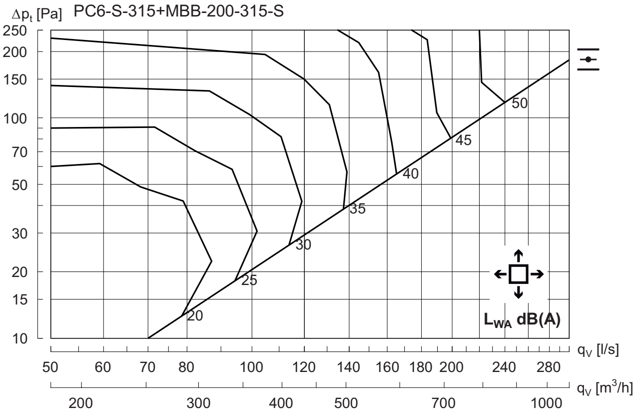
Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	13	1	-2	-2	-4	-13	-23	-29

Δpt [Pa] PC6-S-315+MBB-250-315-S



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	11	2	-3	-2	-3	-13	-19	-26

Δpt [Pa] PC6-S-315+MBB-200-315-S

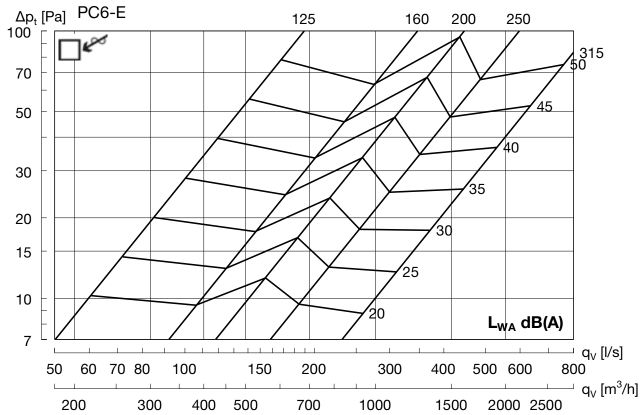


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	10	6	-1	-2	-4	-12	-20	-26

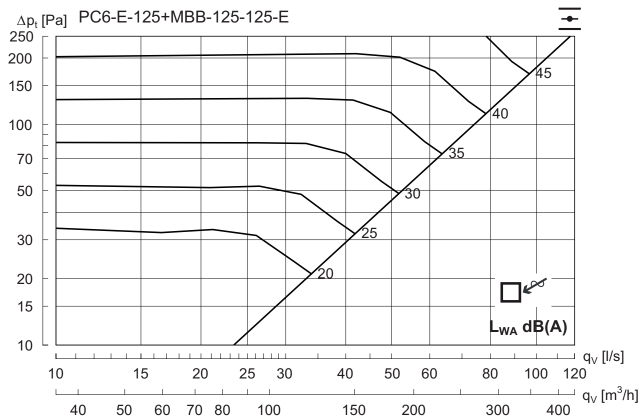
Perforated diffuser PC6

Technical data

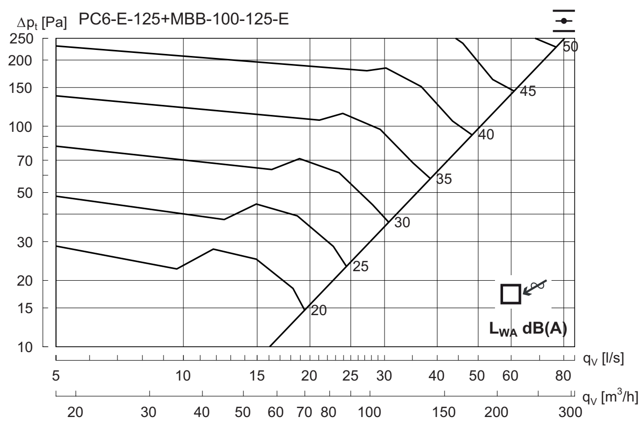
PC6 without box - Exhaust air



PC6 125 + MBB - Exhaust air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	12	5	0	-2	-5	-11	-14	-21



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	11	-1	4	-2	-8	-11	-16	-23

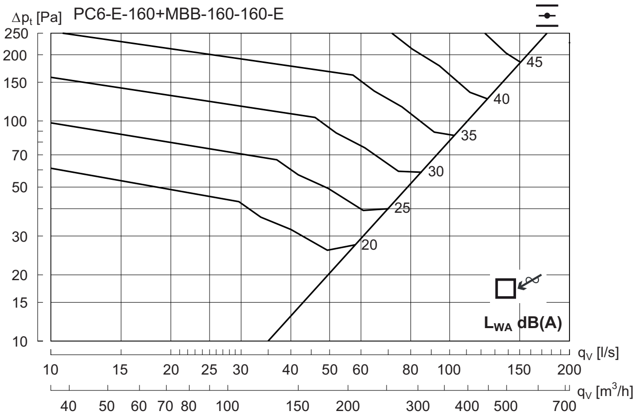
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

Perforated diffuser PC6

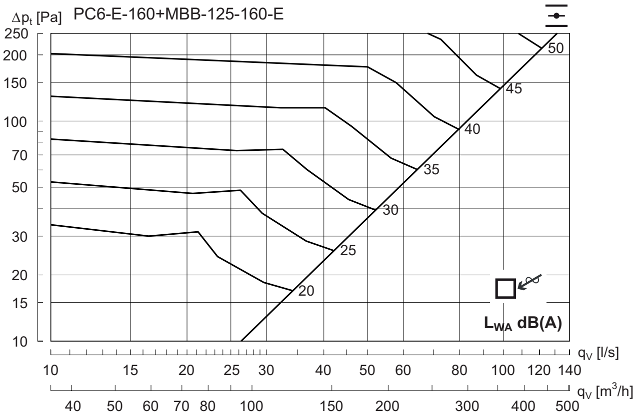
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

Technical data

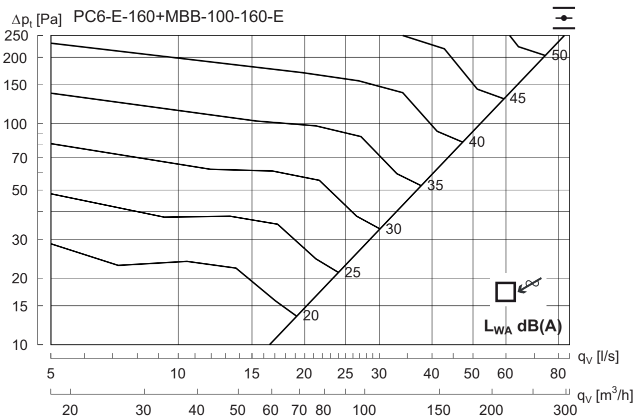
PC6 160 + MBB - Exhaust air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	20	8	-1	-4	-6	-12	-18	-21

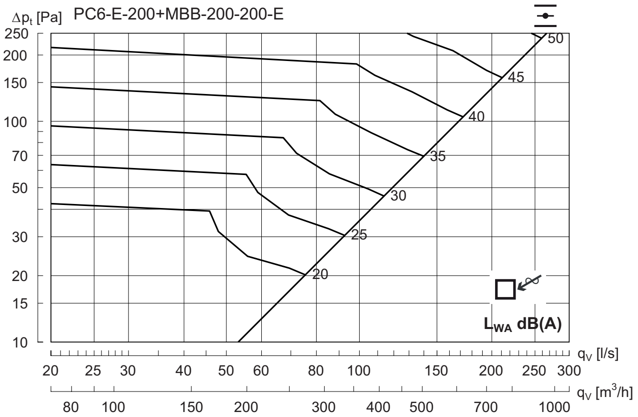


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	12	6	1	-2	-6	-11	-14	-21

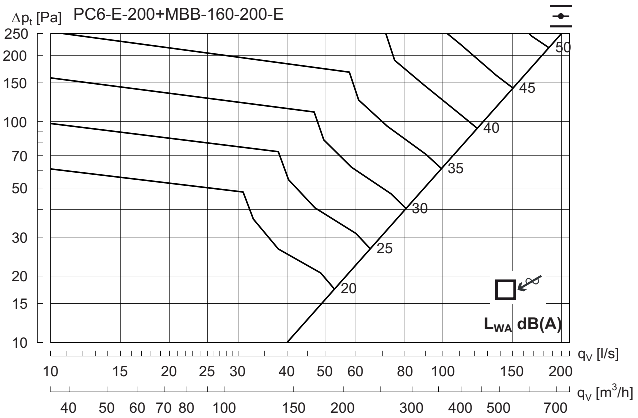


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	9	3	3	-1	-8	-11	-16	-22

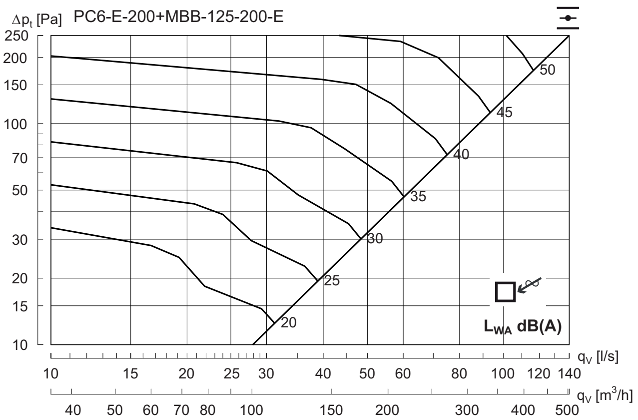
PC6 200+ MBB - Exhaust air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	14	4	0	-3	-5	-9	-15	-23



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	15	6	-1	-3	-5	-9	-15	-21

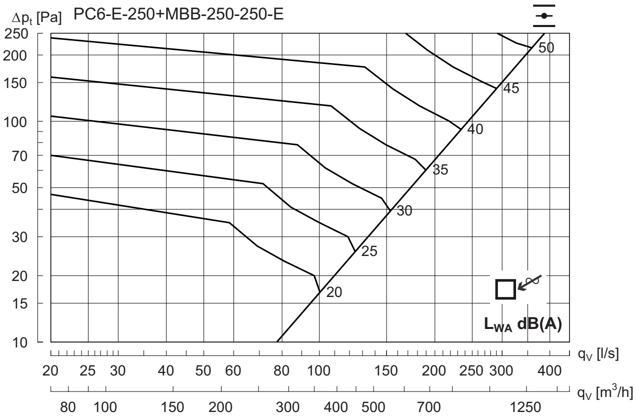


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	10	3	1	-2	-5	-10	-16	-22

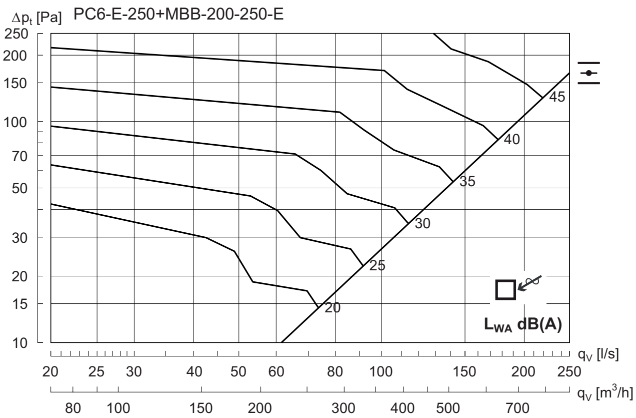
Perforated diffuser PC6

Technical data

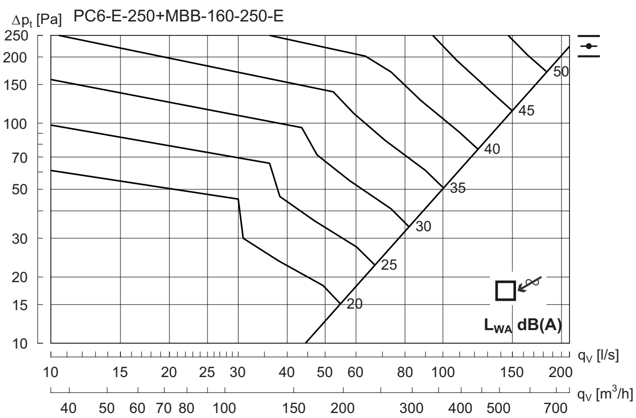
PC6 250+ MBB - Exhaust air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	10	5	2	-3	-5	-11	-17	-24

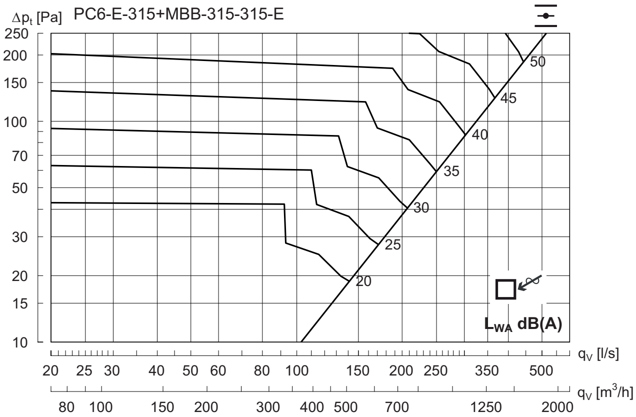


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	13	4	0	-3	-5	-10	-14	-21

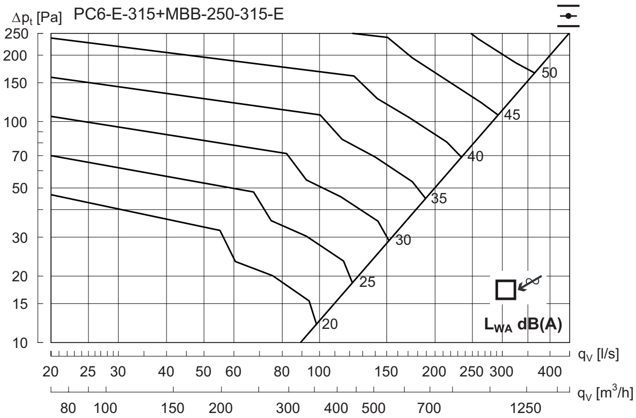


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	14	6	0	-4	-6	-9	-14	-19

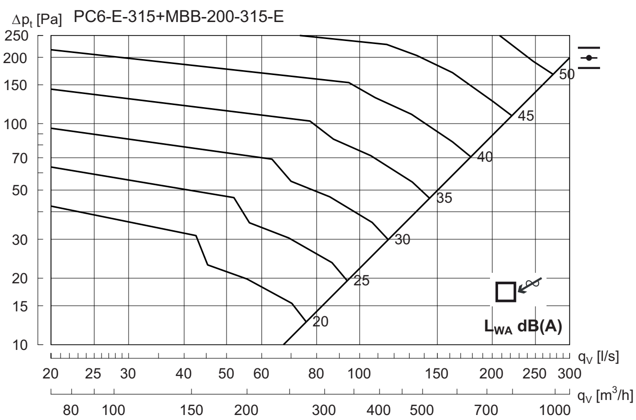
PC6 315+ MBB - Exhaust air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	13	5	3	-3	-6	-10	-16	-27



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	8	5	2	-3	-5	-11	-17	-25



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	13	5	1	-3	-5	-9	-14	-22

Perforated diffuser PC7

Description

PC7 is a circular diffuser with perforated face plate and integrated swirl insert. The diffuser is suitable for the horizontal supply of very cold air. The integrated swirl insert ensures optimum distribution and high induction. Installing this diffuser in a plenum box type MBB can help to achieve a stable flow of air to the diffuser as well as realise the potential for individual adjustment.

- High induction
- Discrete design
- Suitable for cooling at very low temperatures

Maintenance

The face plate and swirl insert can be removed to enable cleaning of internal parts or to gain access to the duct or box. The visible parts of the diffuser can be wiped with a damp cloth.

Order code

Product **PC7 - S - aaa**

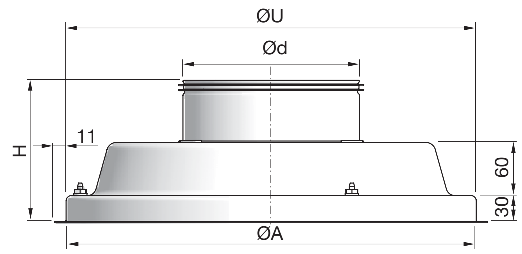
Type
PC7

Functional use
S = Supply air

Connection dim.
Ød 160-315

Example: PC7-S-200

Dimensions



PC7 Ød mm	ØA mm	H mm	ØU* mm	Weight kg
160	460	160	470	5.30
200	460	160	470	5.40
250	540	160	550	7.40
315	540	160	550	8.10

* ØU = ceiling grid opening

Ød 315, No mounting holes for MBB !

Materials and finish

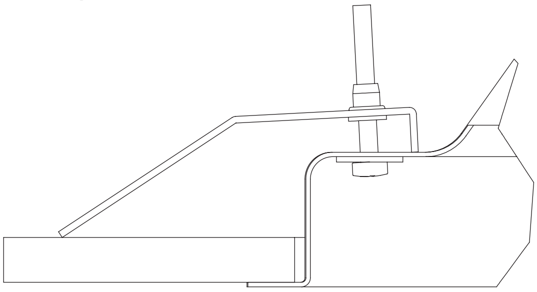
Material: Galvanised steel
Standard finish: Powder-coated
Standard colour: RAL 9010 Gloss 30

The diffuser is available in other colours. Please contact Lindab's sales department for further information.

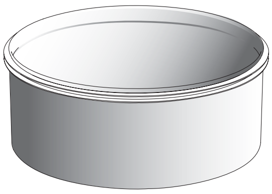
Perforated diffuser PC7

Accessories

Mounting brackets DCZ



Extension piece MBZ

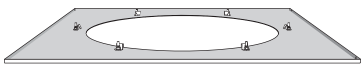


Order code - accessories

Product	aaa	bbb
Type	aaa	
Size		bbb

Example: DCZ-200

Module plate LM



Order code - module plate

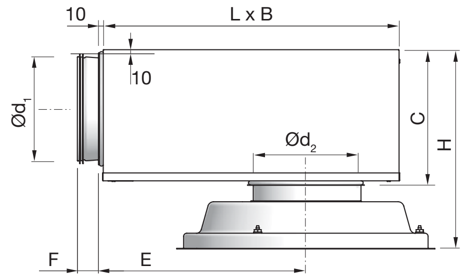
Product	LM	a	PC7	ccc
Type	LM			
Ceiling system		a		
Diffuser			PC7	
Size				ccc

Example: LM-1-PC7-200

Ceiling system - see introductory summary.

Plenum box MBB

PC7 + MBB



PC7 + MBB							
Duct $Ød_1$ mm	PC7 $Ød_2$ mm	B mm	C mm	E mm	F mm	H* mm	L mm
100	160	260	159	216	50	270 - 310	310
125	160	310	184	262	50	295 - 335	376
125	200	310	184	262	50	295 - 335	376
160	160	380	220	323	50	329 - 369	459
160	200	380	220	323	50	329 - 369	459
160	250	380	220	323	50	329 - 369	459
200	200	460	259	396	70	370 - 410	565
200	250	460	259	396	70	370 - 410	565
200	315	460	259	396	70	370 - 410	565
250	250	540	309	486	70	420 - 460	698
250	315	540	309	486	70	420 - 460	698
315	315	540	373	646	70	485 - 525	858

* Using accessory MBZ the H dimension will increase:
$Ød_2$ = 160 - 200 mm => H + 40 mm
$Ød_2$ = 250 - 315 mm => H + 60 mm

Order code

Product	MBB	aaa	bbb	S
Type MBB	MBB			
Duct connection $Ød_1$ Ø100-315		aaa		
Diffuser dimension $Ød_2$ Ø160-315			bbb	
Functional use S = Supply air				S

Example: PC7-S-200-MBB-160-200-S

Perforated diffuser PC7

Technical data

Capacity

Air flow q_v [l/s] and [m^3/h], total pressure Δp_t [Pa], throw $l_{0.2}$ [m] and sound power level L_{WA} [dB(A)] can be seen in the diagrams.

Frequency-related sound effect level

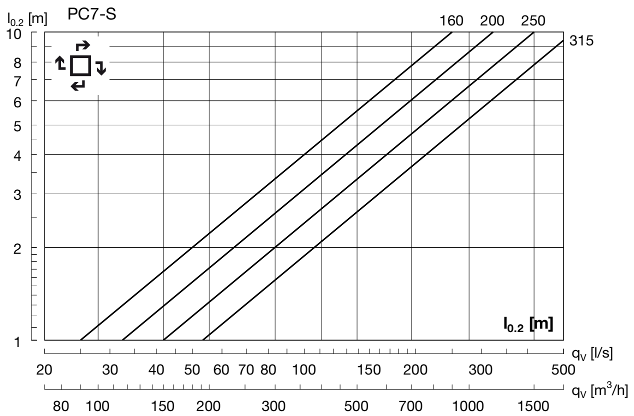
The sound effect level in the frequency band is defined as $L_{WA}+K_{ok}$.
K_{ok} values are specified in charts beneath the diagrams on the following pages. K_{ok} values for PC7 without a box are avaliabe on request.

Quick selection, supply air

PC7 + MBB		Max. airflow 30dB(A)		Max. airflow 35dB(A)	
Duct Ød$_1$	PC7 Ød$_2$	l/s	m³/h	l/s	m³/h
100	160	36	130	43	155
125	160	44	158	55	198
125	200	50	180	60	216
160	160	47	169	55	198
160	200	55	198	66	238
160	250	71	256	88	317
200	200	60	216	72	259
200	250	84	302	99	356
200	315	93	335	113	407
250	250	88	317	103	371
250	315	96	346	114	410
315	315	107	385	127	457

Throw $l_{0.2}$

Throw $l_{0.2}$ [m] is specified at a terminal velocity of 0.2 m/s.



Sound attenuation

Sound attenuation of the diffusers ΔL from duct to room, including end reflection - see table below.

PC7 + MBB		Centre frequency Hz							
Duct Ød$_1$	PC7 Ød$_2$	63	125	250	500	1K	2K	4K	8K
100	160	17	15	5	12	18	17	17	19
125	160	15	14	7	18	16	17	18	20
125	200	12	11	4	14	14	16	16	18
160	160	17	15	10	21	18	19	20	20
160	200	18	15	8	21	17	17	19	20
160	250	17	14	4	16	14	16	18	19
200	200	14	10	8	16	19	16	20	18
200	250	12	10	6	14	17	15	18	17
200	315	12	8	4	10	16	14	17	16
250	250	13	9	8	15	17	17	18	18
250	315	13	7	6	14	16	16	17	17
315	315	9	9	9	14	17	16	17	22

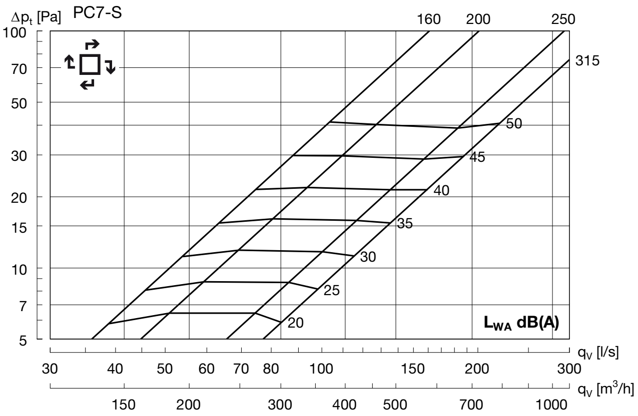
Balancing

Balancing data is contained in a separate brochure.

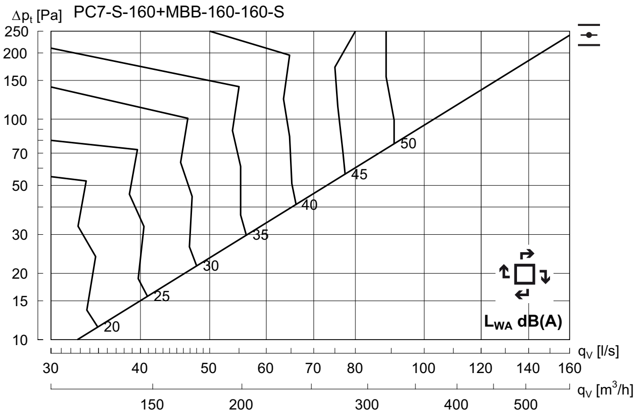
Perforated diffuser PC7

Technical data

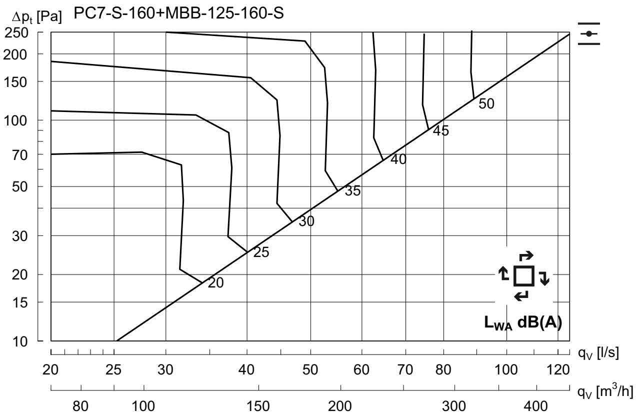
PC7 without box - Supply air



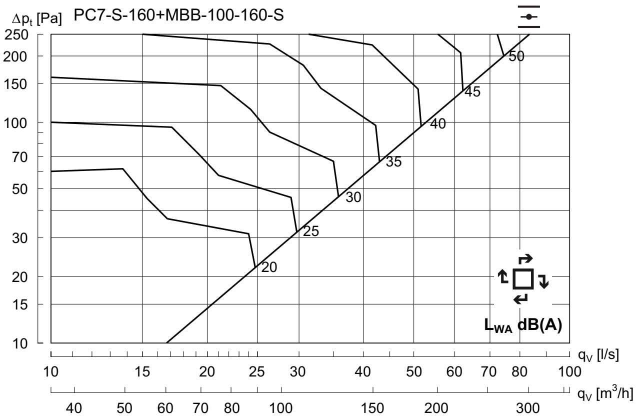
PC7 160 + MBB - Supply air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	10	1	-4	-1	-3	-18	-26	-32



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	10	4	-1	-1	-5	-14	-19	-25

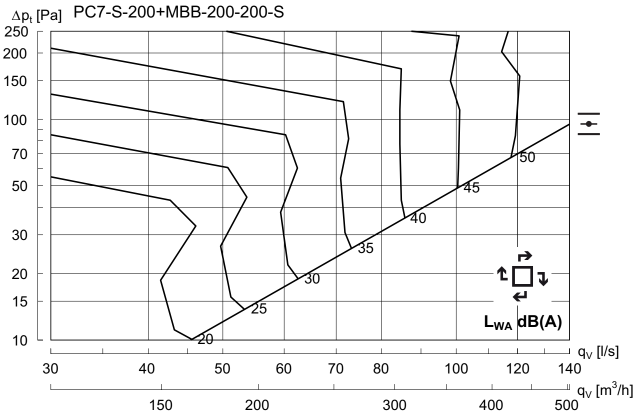


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	11	3	0	-1	-6	-10	-14	-20

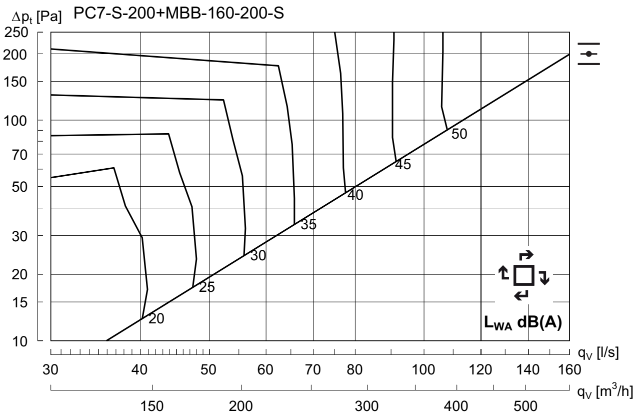
Perforated diffuser PC7

Technical data

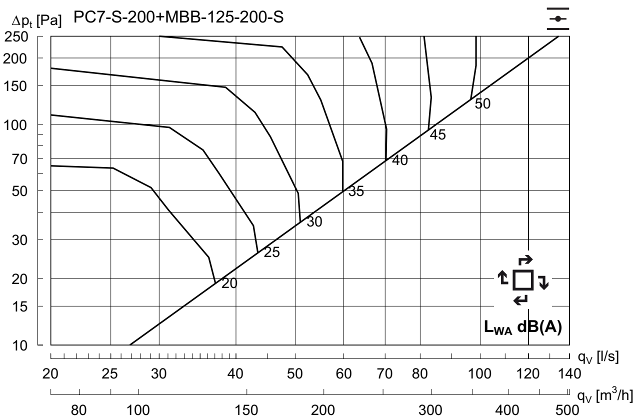
PC7 200 + MBB - Supply air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	11	-1	-4	0	-4	-19	-26	-31

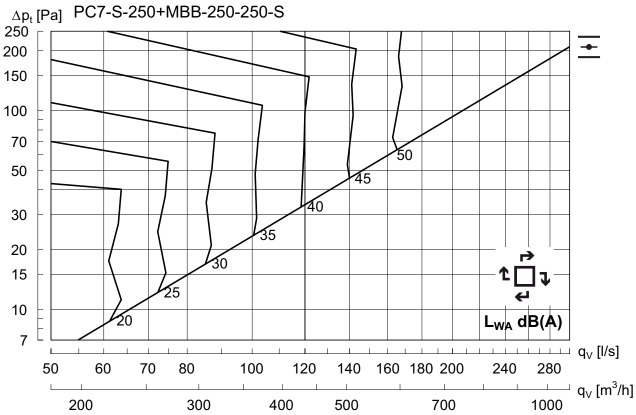


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	11	2	-2	-1	-4	-16	-24	-29

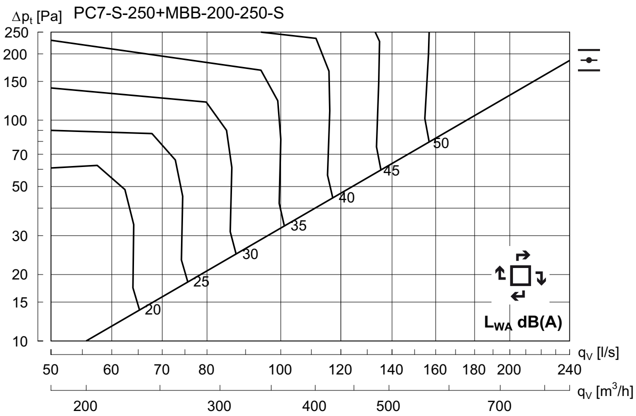


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	6	5	1	-1	-5	-13	-19	-24

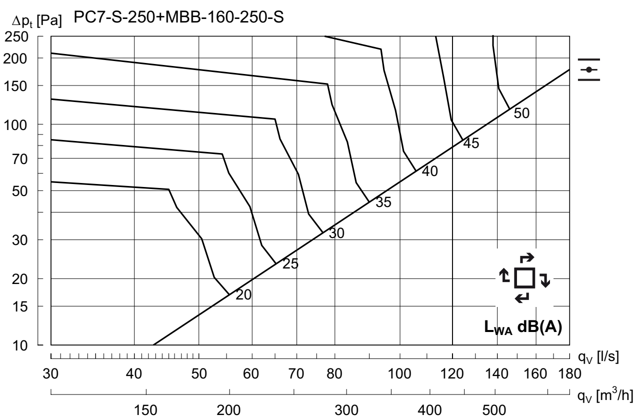
PC7 250 + MBB - Supply air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	12	-1	-5	0	-4	-18	-28	-36



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	13	2	-3	-1	-4	-16	-24	-29

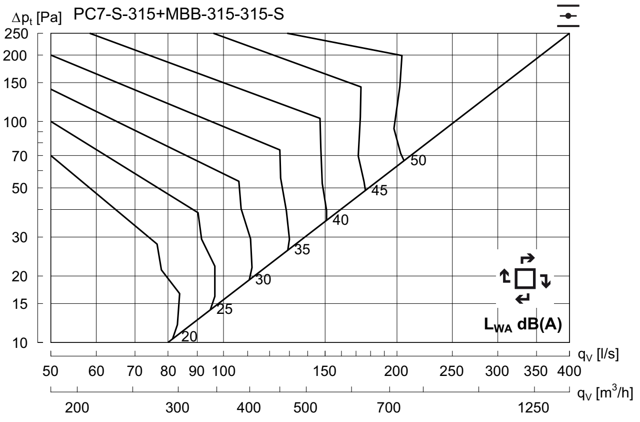


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	12	4	1	-2	-4	-13	-20	-26

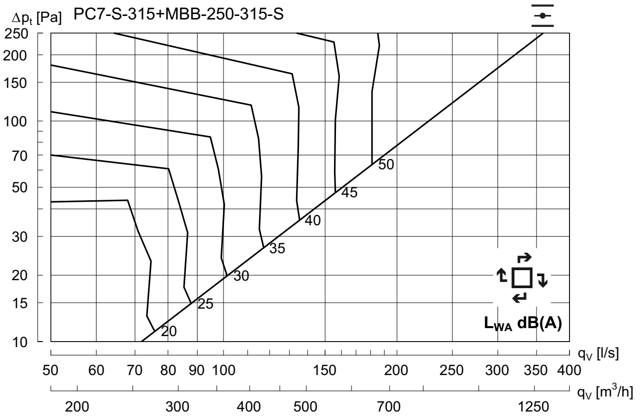
Perforated diffuser PC7

Technical data

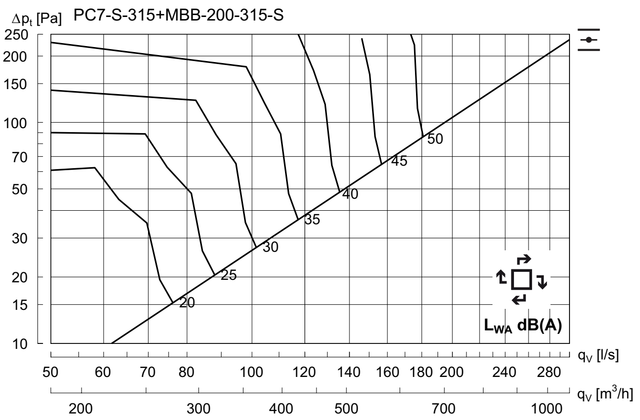
PC7 315 + MBB - Supply air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	12	1	-2	0	-5	-18	-23	-32



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	9	0	-2	0	-4	-16	-25	-34



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	12	4	-1	-1	-4	-14	-21	-27

Swirl diffuser RC14

Description

RC14 is a circular swirl diffuser with fixed bars. The diffuser can be used for both supply air and exhaust. The swirl pattern ensures high induction and a large dynamic range, and is therefore ideal for the horizontal supply of very cold air. Installing this diffuser in a plenum box type MBB can help to achieve a stable flow of air to the diffuser as well as realise the potential for individual adjustment.

- Large dynamic range
- High induction
- Suitable for cooling at very low temperatures
- Can be used for both supply and exhaust air.

Maintenance

The face plate and swirl insert can be removed to enable cleaning of internal parts or to gain access to the duct or box. The visible parts of the diffuser can be wiped with a damp cloth.

Order code

Product **RC14 - a - bbb**

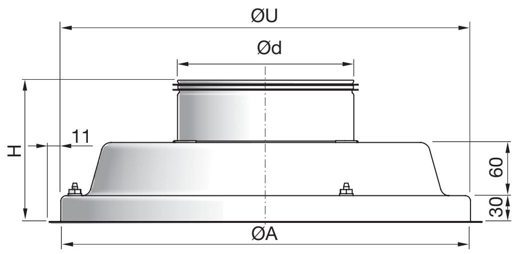
Type
RC14

Functional use
S = Supply air
E = Exhaust

Connection dim.
Ød 160-315

Example: RC14-S-250

Dimensions



RC14 Ød mm	ØA mm	H mm	ØU* mm	Weight kg
160	360	160	370	5.30
200	360	160	370	5.40
250	460	160	470	7.40
315	540	160	550	8.10

* ØU = ceiling grid opening

Ød 315, No mounting holes for MBB !

Materials and finish

Material: Galvanised steel
Standard finish: Powder-coated
Standard colour: RAL 9010 Gloss 30

The diffuser is available in other colours. Please contact Lindab's sales department for further information.

Swirl diffuser RC14

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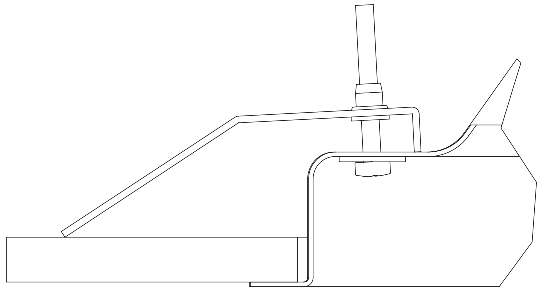
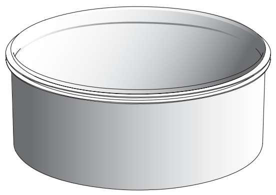
Accessories

Mounting brackets DCZ



Extension piece MBZ

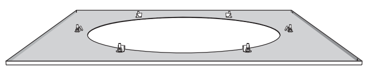


Order code - accessories

Product	aaa	bbb
Type		
Size		

Example: DCZ-250

Module plate LM



Order code - module plate

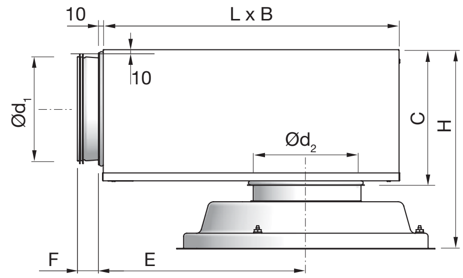
Product	LM	a	RC14	ccc
Type				
Ceiling system				
Diffuser				
Size				

Example: LM-1-RC14-250
Ceiling system - see introductory summary.

Dimensions

Plenum box MBB

RC14 + MBB



RC14 + MBB							
Duct Ød1 mm	RC14 Ød2 mm	B mm	C mm	E mm	F mm	H* mm	L mm
100	160	260	159	216	50	270 - 310	310
125	160	310	184	262	50	295 - 335	376
125	200	310	184	262	50	295 - 335	376
160	160	380	220	323	50	329 - 369	459
160	200	380	220	323	50	329 - 369	459
160	250	380	220	323	50	329 - 369	459
200	200	460	259	396	70	370 - 410	565
200	250	460	259	396	70	370 - 410	565
200	315	460	259	396	70	370 - 410	565
250	250	540	309	486	70	420 - 460	698
250	315	540	309	486	70	420 - 460	698
315	315	540	373	646	70	485 - 525	858

* Using accessory MBZ the H dimension will increase:
$Ød_2$ = 160 - 200 mm => H +40 mm
$Ød_2$ = 250 - 315 mm => H +60 mm

Order code

Product	MBB	aaa	bbb	c
Type MBB				
Duct connection $Ød_1$ Ø100-315				
Diffuser dimension $Ød_2$ Ø160-315				
Functional use S = Supply air E = Exhaust				

Example: RC14-S-250-MBB-200-250-S

Swirl diffuser RC14

Technical data

Capacity

Air flow q_v [l/s] and [m^3/h], total pressure Δp_t [Pa], throw $l_{0.2}$ [m] and sound power level L_{WA} [dB(A)] can be seen in the diagrams.

Frequency-related sound effect level

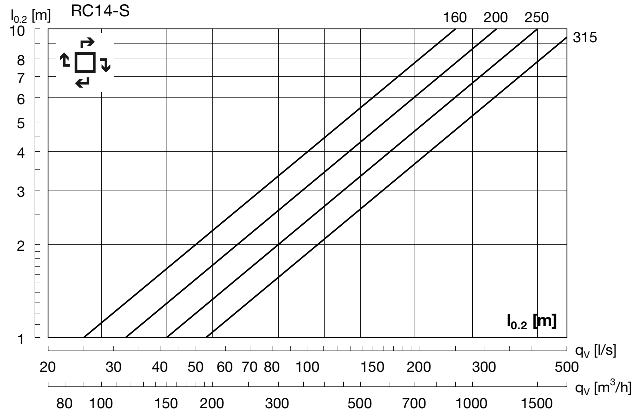
The sound effect level in the frequency band is defined as $L_{WA}+K_{ok}$.
K_{ok} values are specified in charts beneath the diagrams on the following pages. K_{ok} values for RC14 without a box are avaliable on request.

Quick selection, supply air

RC14 + MBB		Max. airflow		Max. airflow	
Duct	RC14	30dB(A)		35dB(A)	
$Ød_1$	$Ød_2$	l/s	m^3/h	l/s	m^3/h
100	160	37	133	44	158
125	160	44	158	54	194
125	200	50	180	62	223
160	160	48	173	57	205
160	200	56	202	67	241
160	250	67	241	84	302
200	200	62	223	74	266
200	250	82	295	96	346
200	315	102	367	126	454
250	250	92	331	106	382
250	315	117	421	139	500
315	315	141	508	166	598

Throw $l_{0.2}$

Throw $l_{0.2}$ [m] is specified at a terminal velocity of 0.2 m/s.



Sound attenuation

Sound attenuation of the diffusers ΔL from duct to room, including end reflection - see table below.

RC14 + MBB		Centre frequency Hz							
Duct	RC14								
$Ød_1$	$Ød_2$	63	125	250	500	1K	2K	4K	8K
100	160	18	15	5	11	18	19	18	19
125	160	15	13	8	17	17	17	18	20
125	200	13	11	6	13	14	17	17	19
160	160	16	15	11	21	18	20	21	20
160	200	17	15	9	21	18	19	20	20
160	250	17	14	4	18	14	16	18	19
200	200	14	11	8	15	19	17	20	18
200	250	14	10	5	14	18	14	18	17
200	315	14	8	3	10	16	15	17	16
250	250	14	9	7	15	18	17	19	18
250	315	12	7	6	14	16	15	17	17
315	315	8	9	9	13	17	16	18	22

Balancing

Balancing data is contained in a separate brochure.

Swirl diffuser RC14

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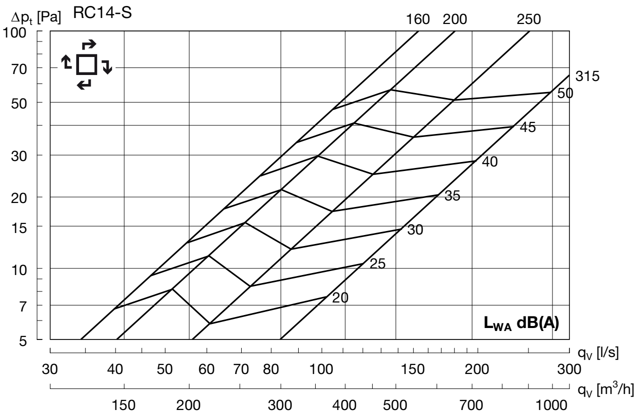
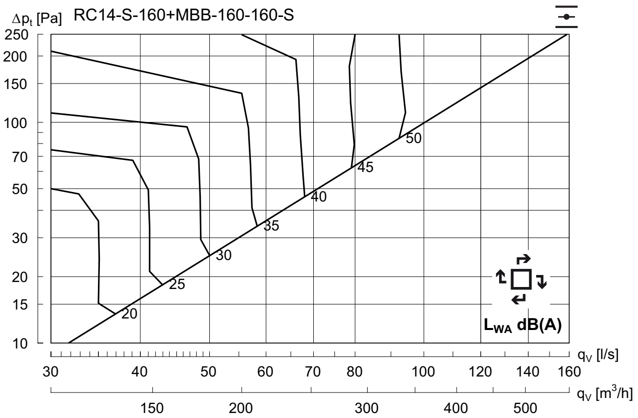
Technical data

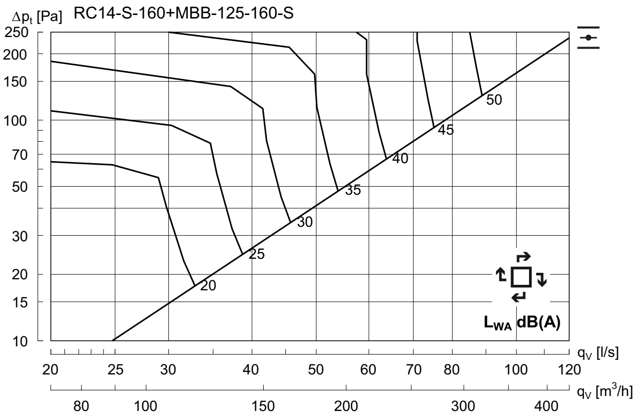
RC14 without box – supply air



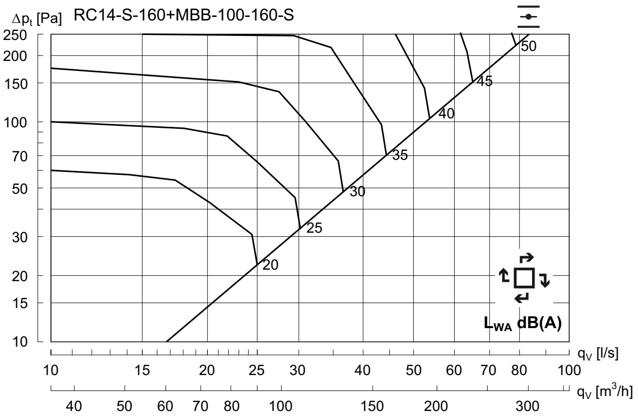
RC14 - 160 + MBB - Supply air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	6	2	-3	0	-4	-15	-26	-32



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	9	5	0	-1	-5	-13	-19	-25

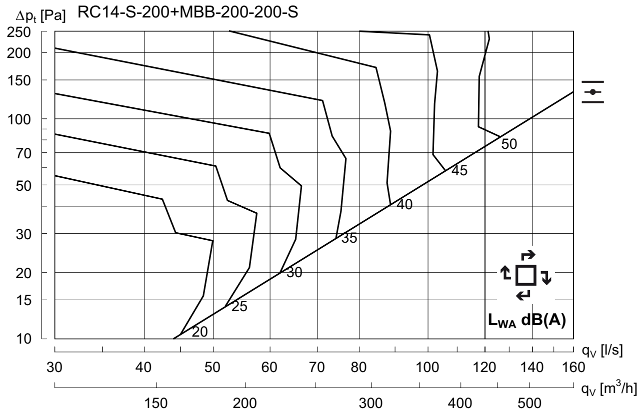


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	9	4	0	0	-6	-12	-16	-20

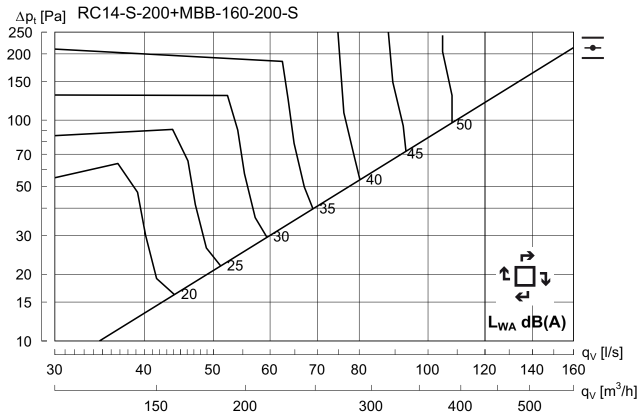
Swirl diffuser RC14

Technical data

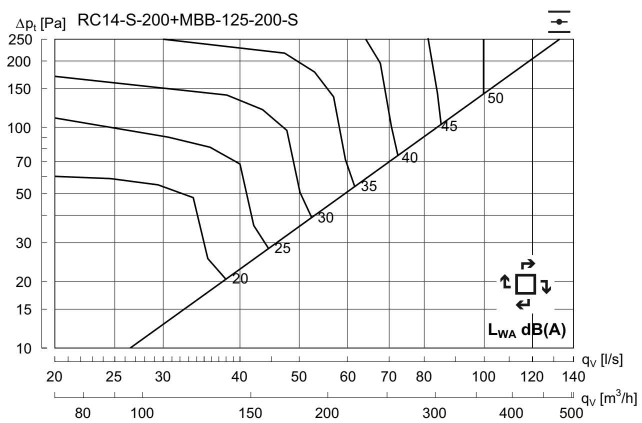
RC14 - 200 + MBB - Supply air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	11	3	-3	-1	-5	-12	-24	-33

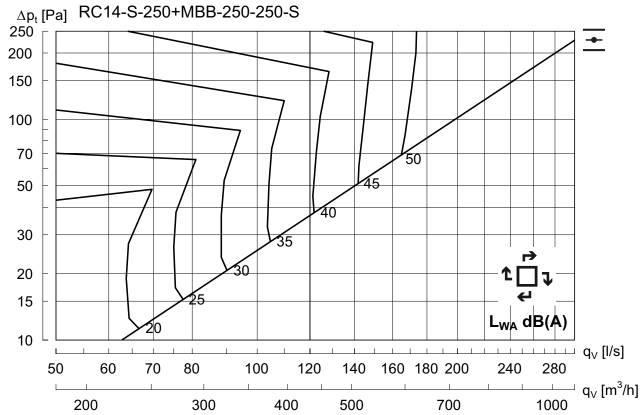


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	14	4	-2	-2	-4	-12	-22	-30

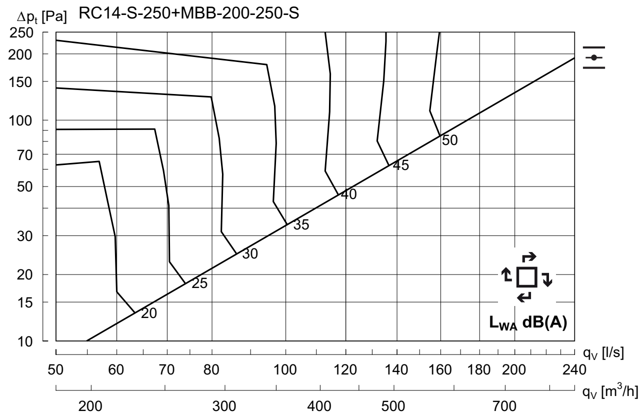


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	8	6	1	-2	-6	-12	-17	-23

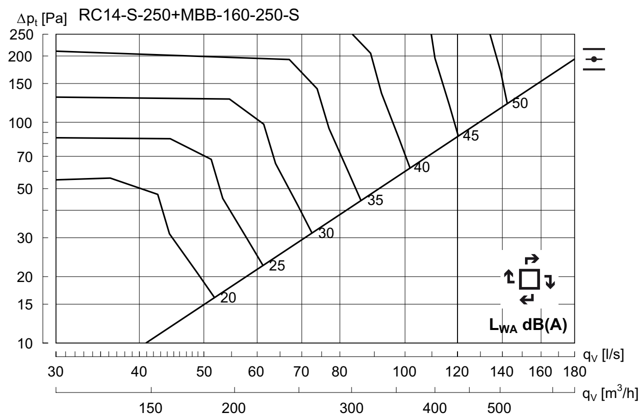
RC14 - 250 + MBB - Supply air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	10	1	-4	-1	-4	-14	-26	-37



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	9	5	-3	-2	-3	-12	-24	-32

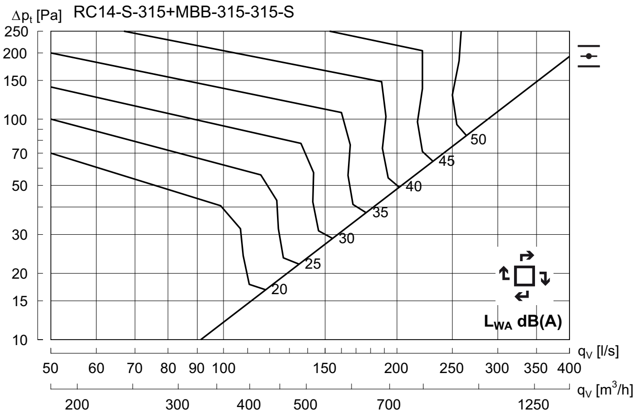


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	13	4	-1	-3	-4	-13	-21	-26

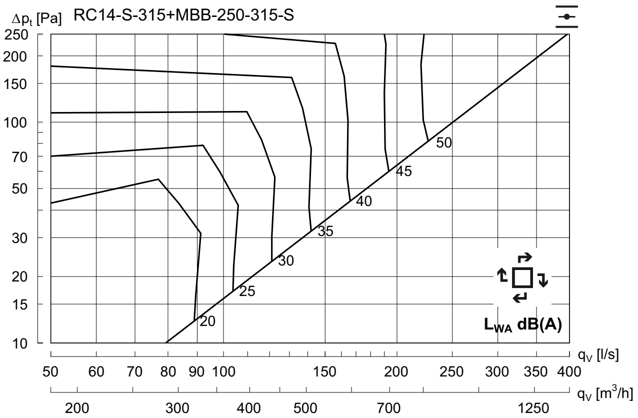
Swirl diffuser RC14

Technical data

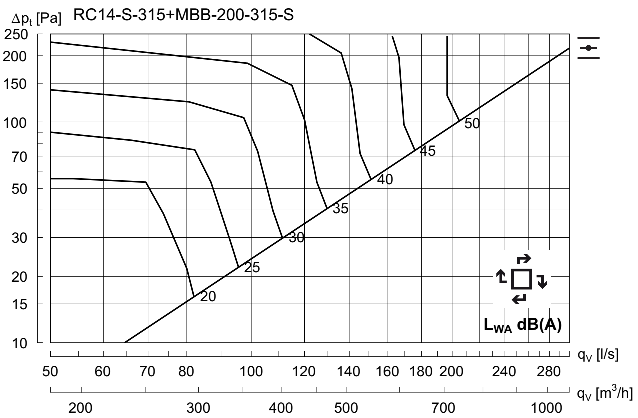
RC14 - 315 + MBB - Supply air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	14	3	-1	-1	-4	-13	-24	-33



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	11	3	-2	-2	-4	-11	-21	-30

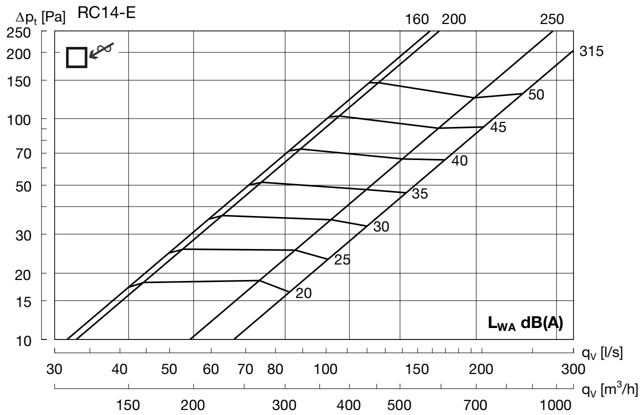


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	10	7	-1	-2	-4	-13	-21	-27

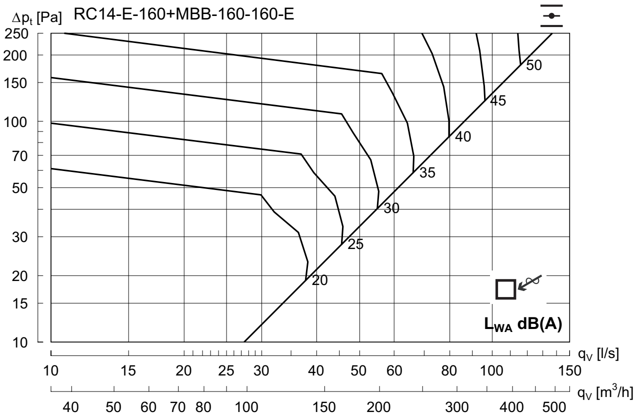
Swirl diffuser RC14

Technical data

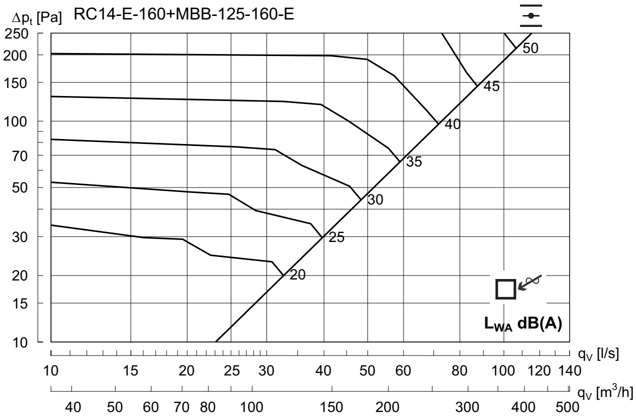
RC14 without box – Exhaust air



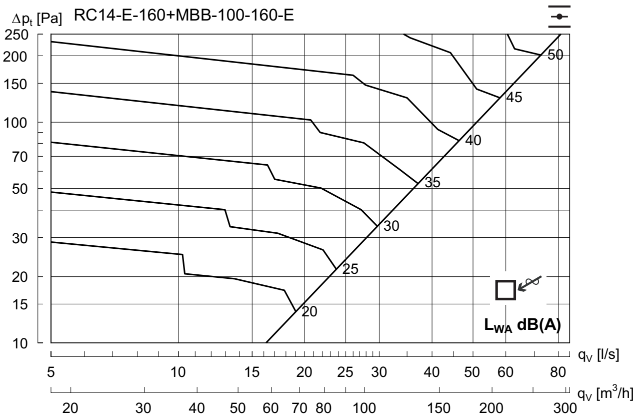
RC14 - 160 + MBB - Exhaust air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	14	4	-2	-2	-4	-13	-20	-26



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	13	6	1	-1	-6	-13	-16	-22

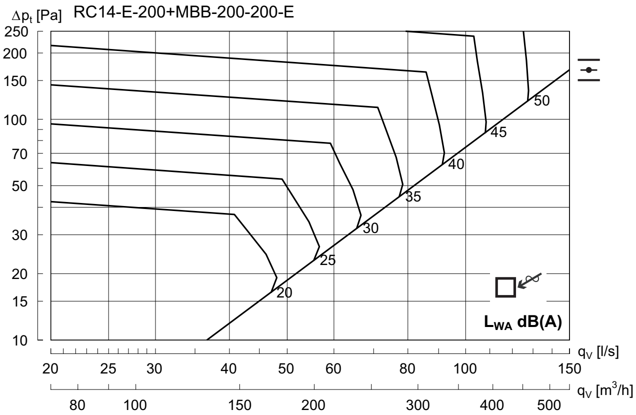


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	9	0	4	-1	-10	-12	-18	-24

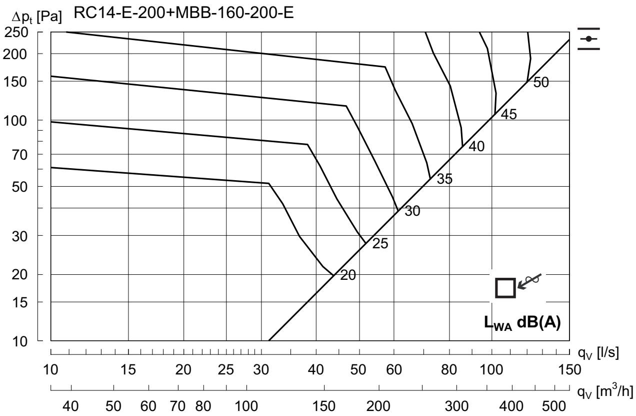
Swirl diffuser RC14

Technical data

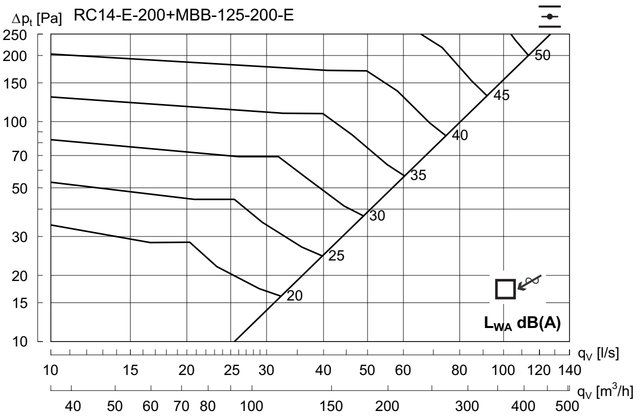
RC14 - 200 + MBB - Exhaust air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	13	2	-4	-2	-3	-13	-22	-31

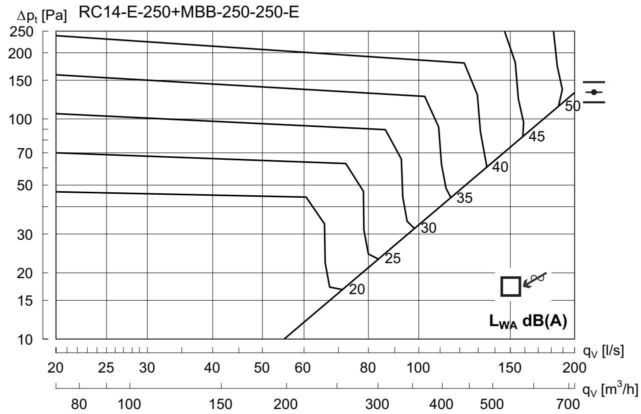


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	16	5	-2	-3	-4	-12	-21	-26

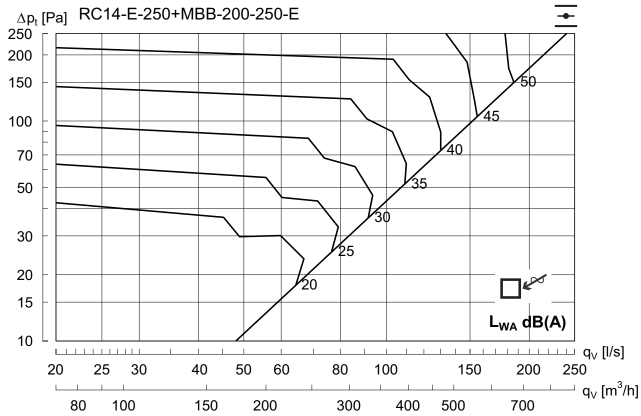


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	12	3	1	-1	-6	-12	-17	-23

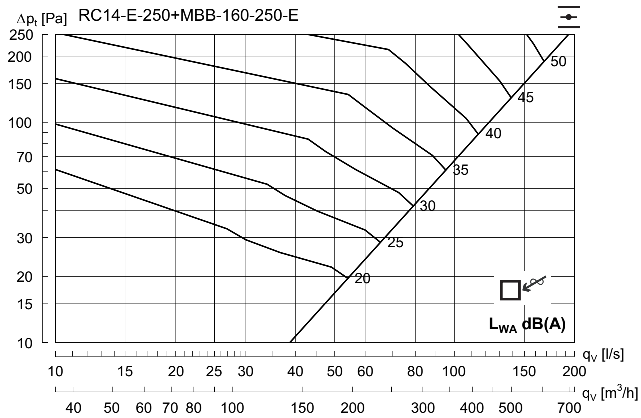
RC14 - 250 + MBB - Exhaust air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	13	4	0	-2	-4	-12	-22	-31



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	12	4	0	-2	-4	-11	-19	-27



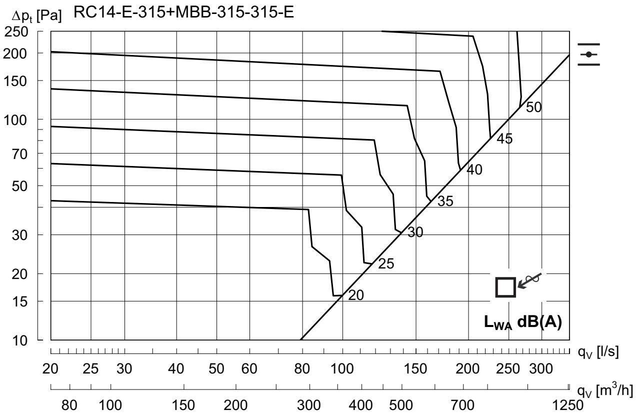
Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	15	6	0	-2	-6	-11	-16	-22

Swirl diffuser

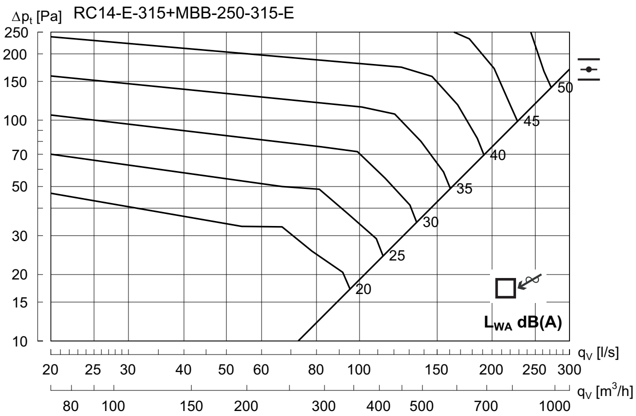
RC14

Technical data

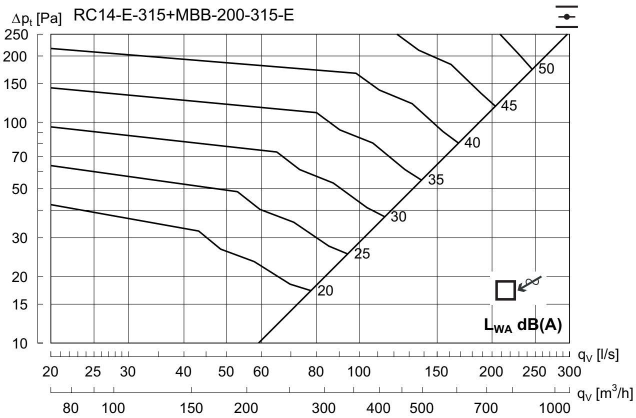
RC14 - 315 + MBB - Exhaust air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	10	3	1	-2	-4	-16	-24	-34



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	9	5	1	-2	-5	-13	-18	-26



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	14	6	1	-2	-6	-11	-16	-24

Swirl diffuser RC15

Description

RC15 is a circular swirl diffuser with adjustable bars. The diffuser can be used for both supply and exhaust air. The swirl pattern ensures high induction and a large dynamic range, and is therefore ideal for the horizontal supply of very cold air. The diffuser can also be set to a vertical supply air pattern, enabling supply of heated air. Installing this diffuser in a plenum box type MBB can help to achieve a stable flow of air to the diffuser as well as realise the potential for individual adjustment.

- Large dynamic range
- High induction
- Suitable for cooling at very low temperatures
- Horizontal or vertical supply air pattern
- Can be used for both supply air and exhaust

Maintenance

The face plate and swirl insert can be removed to enable cleaning of internal parts or to gain access to the duct or box. The visible parts of the diffuser can be wiped with a damp cloth.

Order code

Product **RC15 - a - bbb**

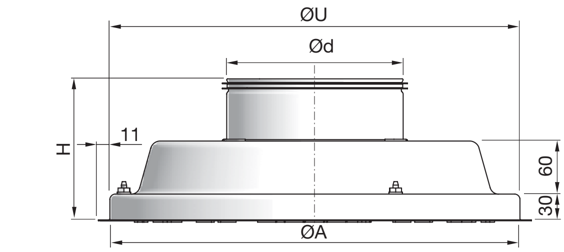
Type
RC15

Functional use
S = Supply air
E = Exhaust

Connection dim.
Ød 160-315

Example: RC15-S-160

Dimensions

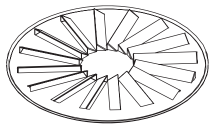


RC15 Ød mm	ØA mm	H mm	ØU* mm	Weight kg
160	360	160	370	5.30
200	360	160	370	5.40
250	460	160	470	7.40
315	540	160	550	8.10

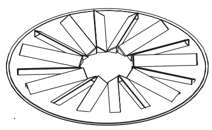
* ØU = ceiling grid opening

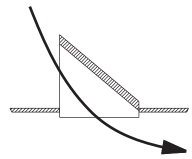
Ød 315, No mounting holes for MBB !

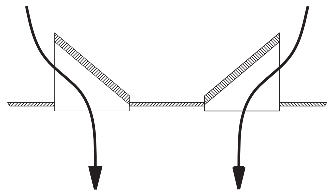
Bar setting - horizontal



Bar setting - vertical







Materials and finish

Material:	Galvanised steel
Standard finish:	Powder-coated
Standard colour:	RAL 9010 Gloss 30
Bars (Only RC15-S):	Black ABS plastic

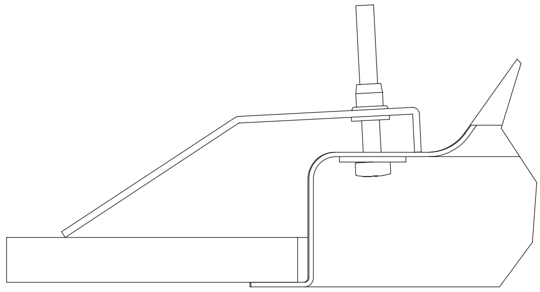
The diffuser is available in other colours. Please contact Lindab's sales department for further information.

Swirl diffuser RC15

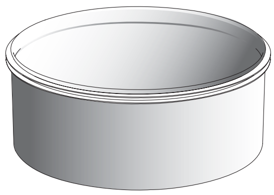
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

Accessories

Mounting brackets DCZ



Extension piece MBZ

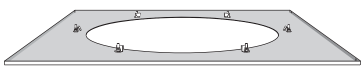


Order code - accessories

Product	aaa	bbb
Type		
Size		

Example: DCZ-160

Module plate LM



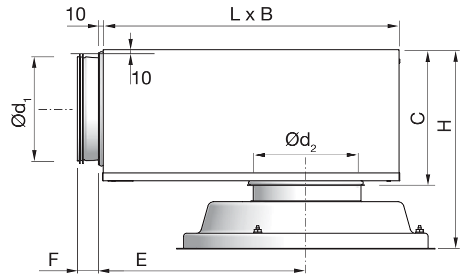
Order code - module plate

Product	LM	a	RC15	ccc
Type				
Ceiling system				
Diffuser				
Size				

Example: LM-1-RC15-160
Ceiling system - see introductory summary

Plenum box MBB

RC15 + MBB



RC15 + MBB							
Duct Ød1 mm	RC15 Ød2 mm	B mm	C mm	E mm	F mm	H* mm	L mm
100	160	260	159	216	50	270 - 310	310
125	160	310	184	262	50	295 - 335	376
125	200	310	184	262	50	295 - 335	376
160	160	380	220	323	50	329 - 369	459
160	200	380	220	323	50	329 - 369	459
160	250	380	220	323	50	329 - 369	459
200	200	460	259	396	70	370 - 410	565
200	250	460	259	396	70	370 - 410	565
200	315	460	259	396	70	370 - 410	565
250	250	540	309	486	70	420 - 460	698
250	315	540	309	486	70	420 - 460	698
315	315	540	373	646	70	485 - 525	858

* Using accessory MBZ the H dimension will increase:
$Ød_2$ = 160 - 200 mm => H +40 mm
$Ød_2$ = 250 - 315 mm => H +60 mm

Order code

Product	MBB	aaa	bbb	c
Type MBB				
Duct connection $Ød_1$ Ø100-315				
Diffuser dimension $Ød_2$ Ø160-315				
Functional use S = Supply air E = Exhaust				

Example: RC15-S-160-MBB-125-160-S

Lindab

Swirl diffuser RC15

Technical data

Capacity

Air flow q_v [l/s] and [m³/h], total pressure Δp_t [Pa], throw $l_{0.2}$ [m] and sound power level L_{WA} [dB(A)] can be seen in the diagrams.

Frequency-related sound effect level

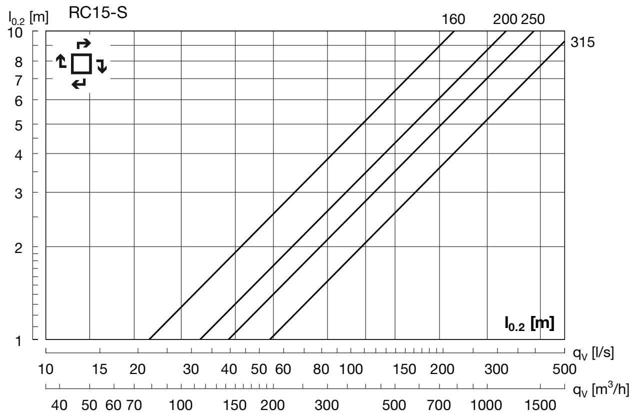
The sound effect level in the frequency band is defined as $L_{WA}+K_{ok}$.
K_{ok} values are specified in charts beneath the diagrams on the following pages. K_{ok} values for RC15 without a box are avaliable on request.

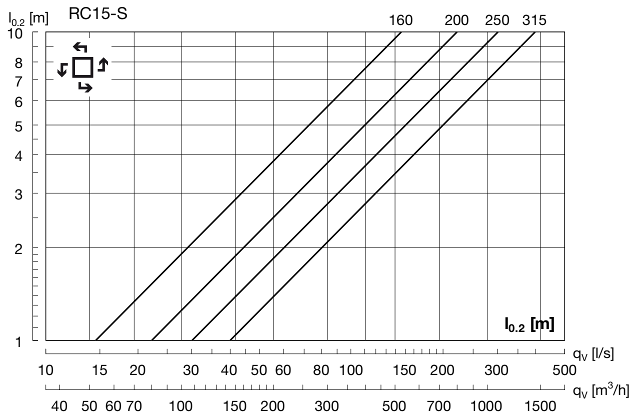
Quick selection, supply air

RC15 + MBB		Max. airflow		Max. airflow	
Duct	RC15	30dB(A)		35dB(A)	
Ød1	Ød2	l/s	m³/h	l/s	m³/h
100	160	36	130	44	158
125	160	44	158	54	194
125	200	49	176	59	212
160	160	47	169	56	202
160	200	54	194	64	230
160	250	69	248	90	324
200	200	56	202	66	238
200	250	82	295	99	356
200	315	101	364	125	450
250	250	90	324	106	382
250	315	113	407	137	493
315	315	138	497	163	587

Throw $l_{0.2}$

Throw $l_{0.2}$ [m] is specified at a terminal velocity of 0.2 m/s.





Sound attenuation

Sound attenuation of the diffusers ΔL from duct to room, including end reflection - see table below.

RC15 + MBB		Centre frequency Hz							
Duct	RC15								
Ød1	Ød2	63	125	250	500	1K	2K	4K	8K
100	160	17	15	5	12	19	20	20	21
125	160	16	14	8	18	18	20	20	21
125	200	11	12	6	14	14	19	18	19
160	160	16	15	11	22	20	22	21	21
160	200	16	15	9	22	19	21	20	21
160	250	18	14	4	17	14	16	18	19
200	200	13	12	8	17	20	19	21	18
200	250	12	9	6	14	19	16	18	17
200	315	11	8	4	10	17	16	19	17
250	250	13	8	7	15	19	19	18	18
250	315	12	8	6	14	17	17	18	18
315	315	8	9	9	14	18	18	18	23

Balancing

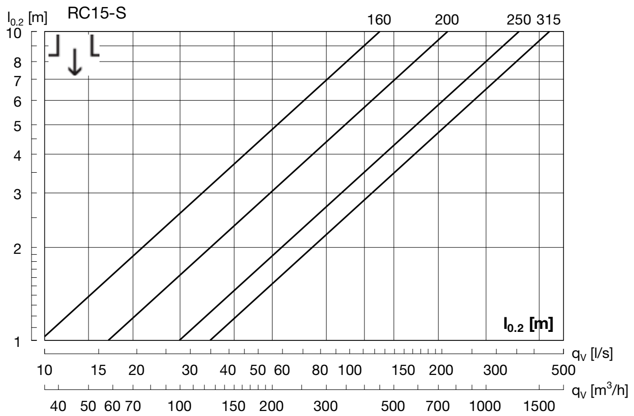
Balancing data is contained in a separate brochure.

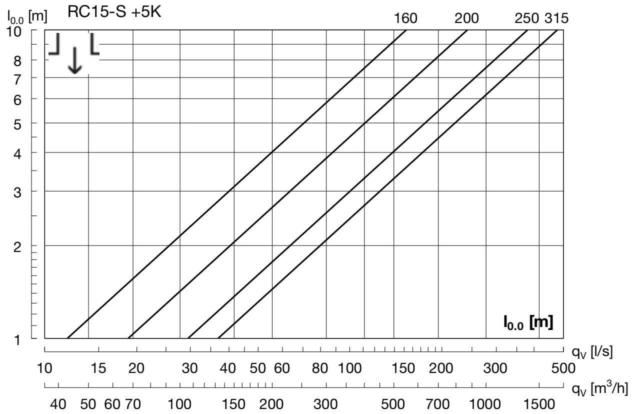
Swirl diffuser RC15

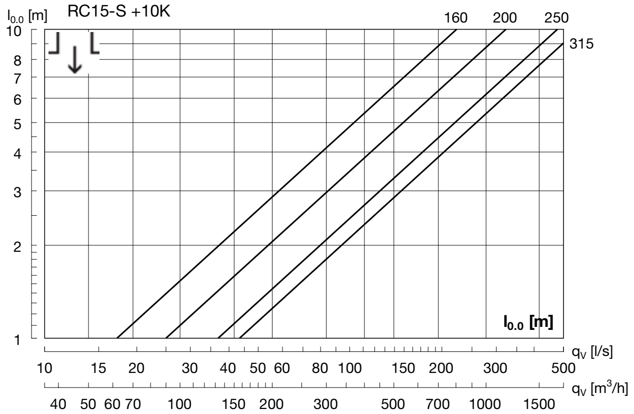
Technical data

Throws/Turning points

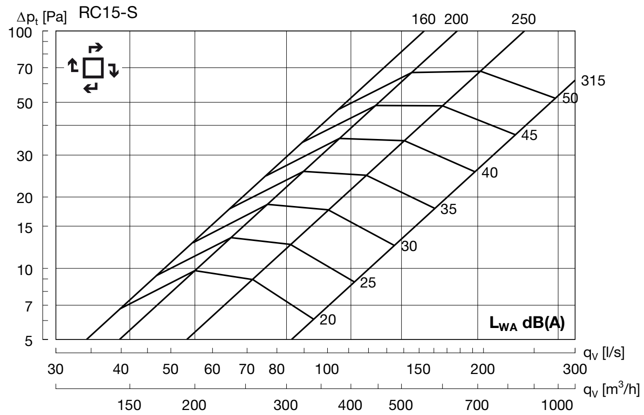
Throw $l_{0.2}$ [m] is specified at a terminal velocity of 0.2 m/s. Turning point $l_{0.0}$ [m] is specified for +5 K and +10 K respectively.







RC15 without box – supply air



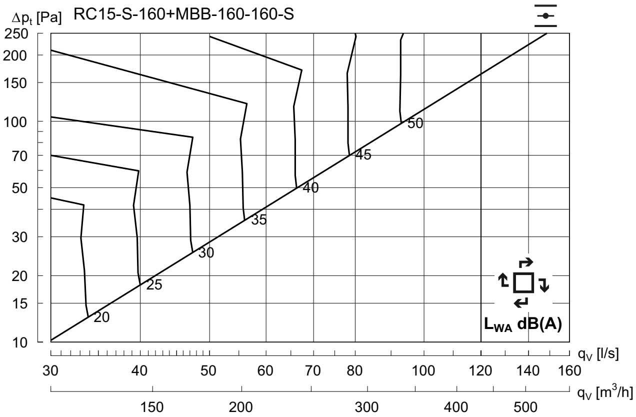
We reserve the right to make changes without prior notice

Lindab

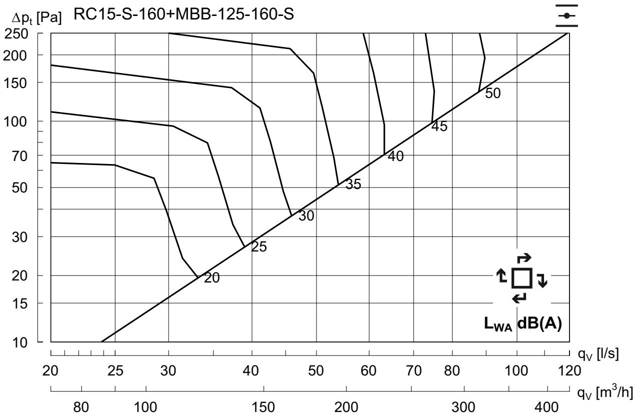
Swirl diffuser RC15

Technical data

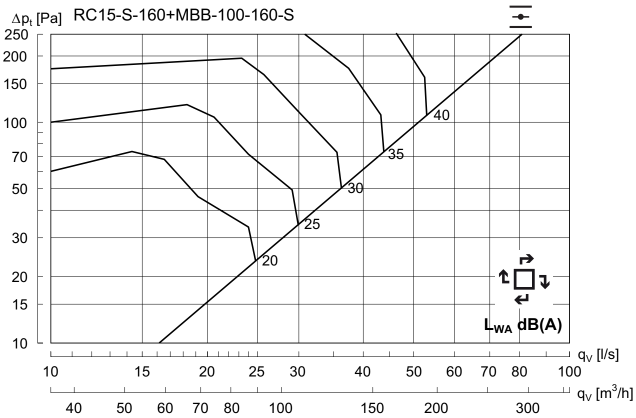
RC15 160 + MBB - Supply air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	10	2	-4	0	-5	-17	-23	-31

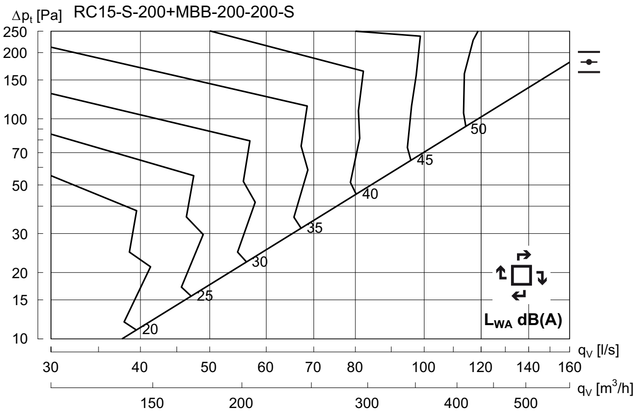


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	10	4	-1	0	-6	-13	-18	-24

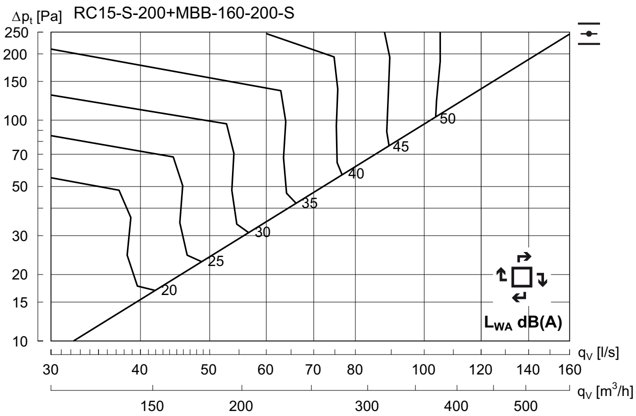


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	12	4	2	-1	-8	-12	-16	-19

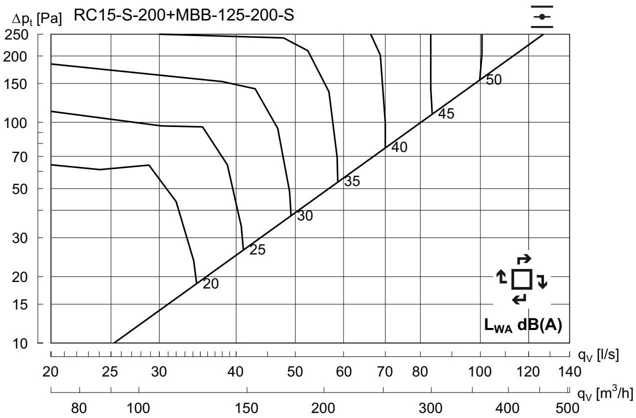
RC15 - 200 + MBB - Supply air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	8	3	-4	-1	-4	-15	-22	-31



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	9	3	-1	-2	-4	-14	-21	-29

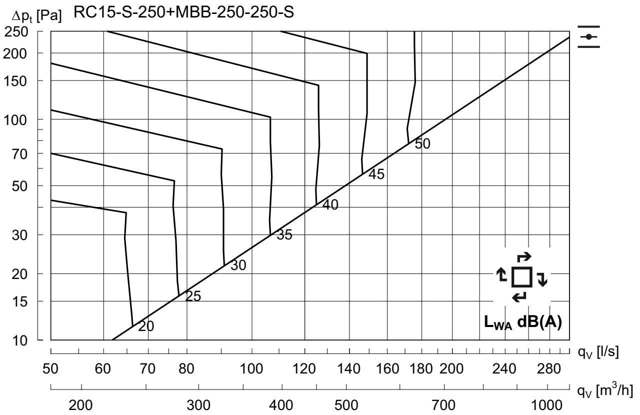


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	7	5	0	-1	-5	-13	-17	-24

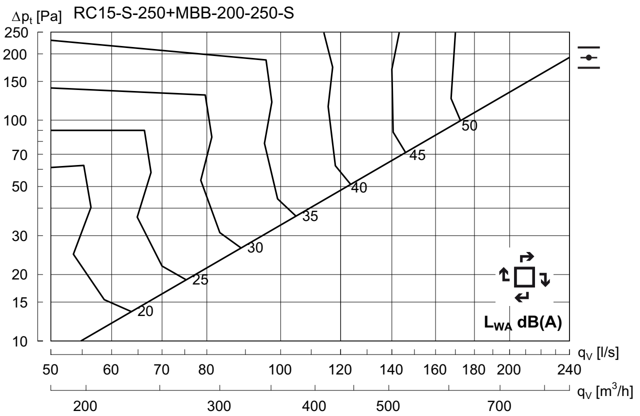
Swirl diffuser RC15

Technical data

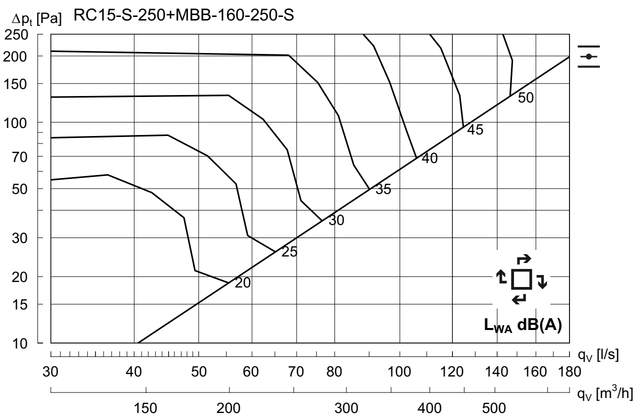
RC15 - 250 + MBB - Supply air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	12	1	-4	0	-4	-16	-24	-20

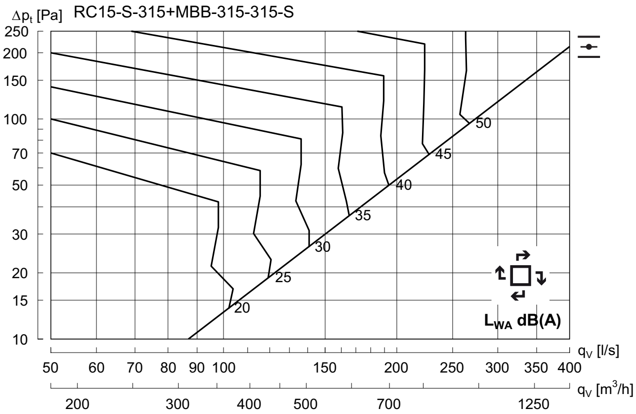


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	10	4	-3	-2	-3	-15	-21	-29

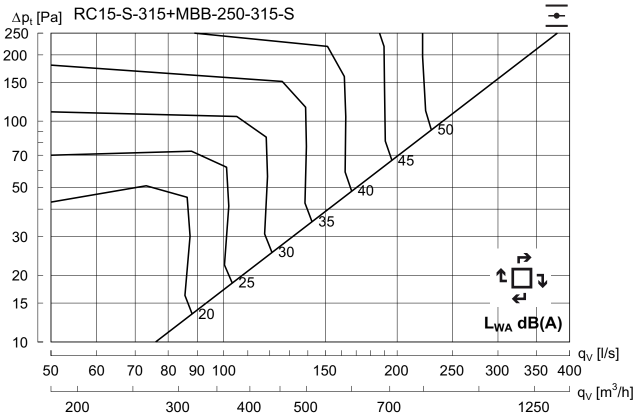


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	15	5	0	-3	-4	-13	-19	-25

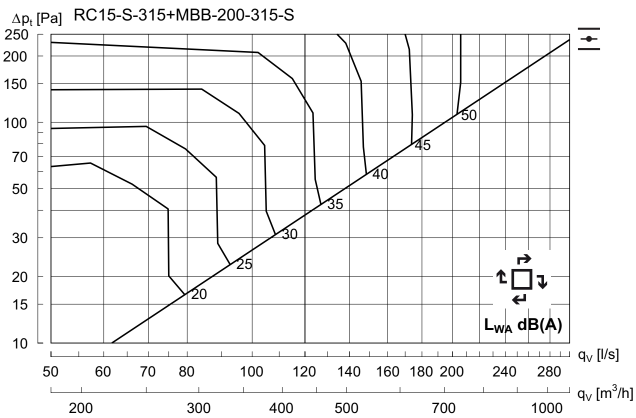
RC15 - 315 + MBB - Supply air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	14	3	-2	-2	-4	-13	-22	-31



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	11	3	-2	-1	-4	-13	-19	-28

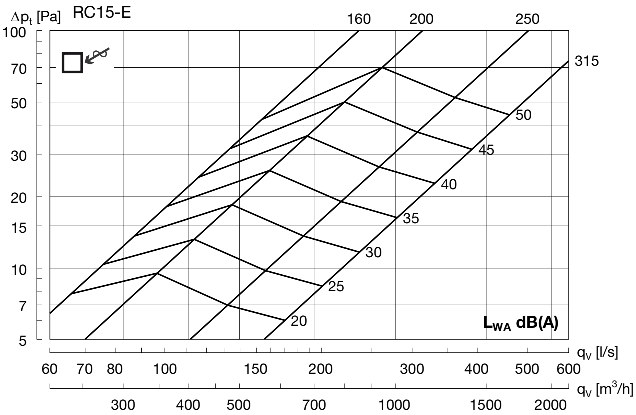


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	9	7	-1	-2	-5	-13	-19	-26

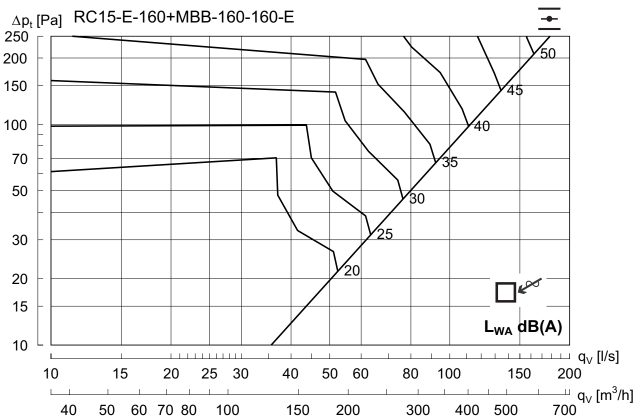
Swirl diffuser RC15

Technical data

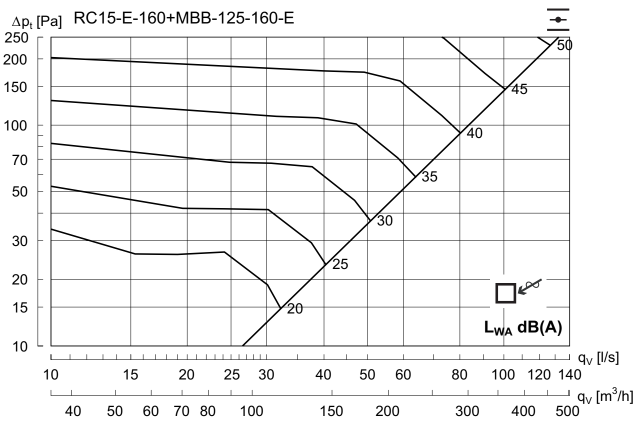
RC15 without box – Exhaust air



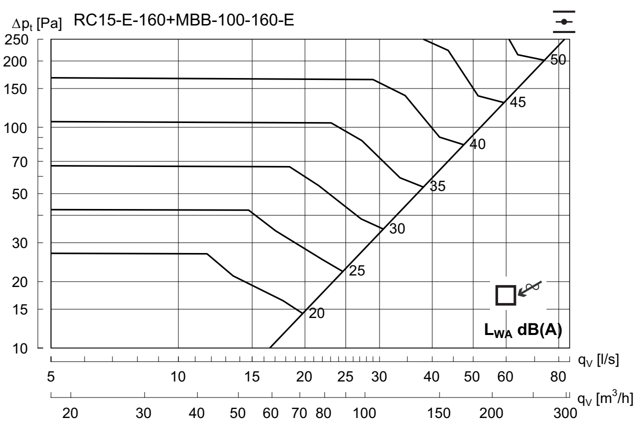
RC15 160 + MBB - Exhaust air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	16	6	0	-3	-6	-11	-16	-21



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	13	6	1	-2	-7	-12	-14	-22



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	11	4	3	0	-9	-13	-17	-23

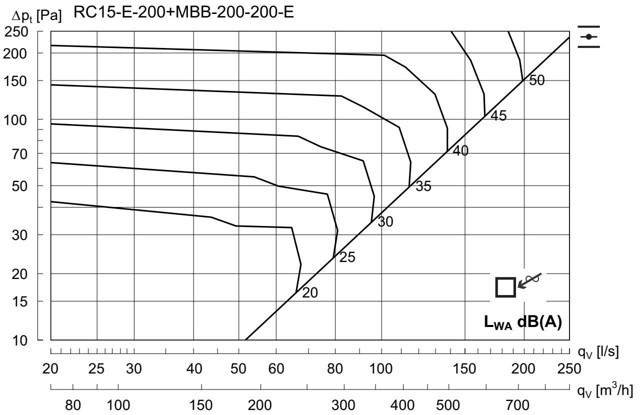
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

Swirl diffuser RC15

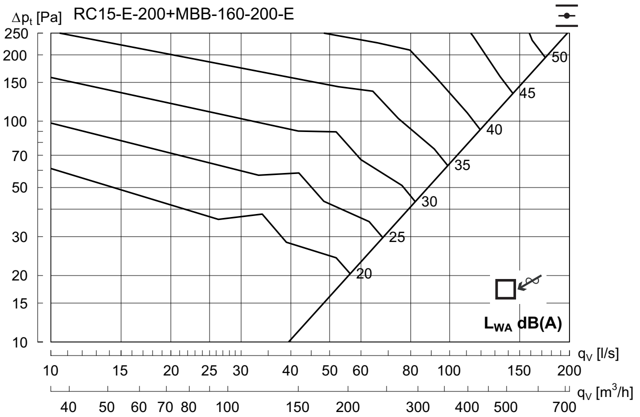
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

Technical data

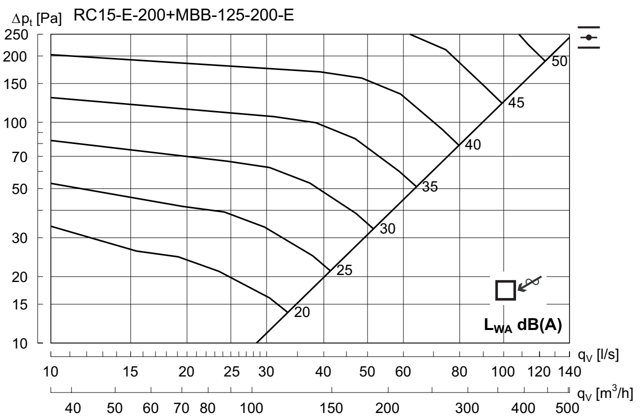
RC15 200 + MBB - Exhaust air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	14	5	0	-2	-5	-11	-16	-24



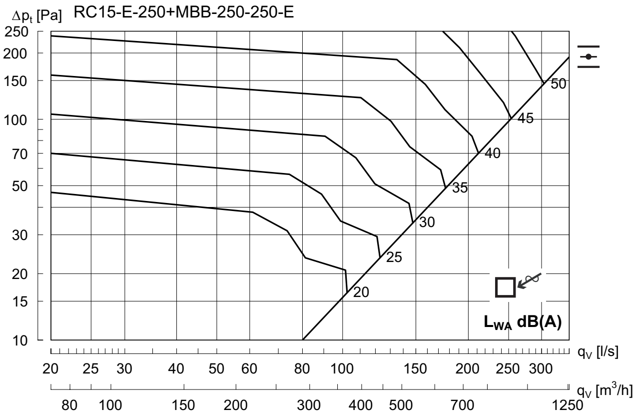
Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	17	6	-1	-3	-6	-10	-14	-19



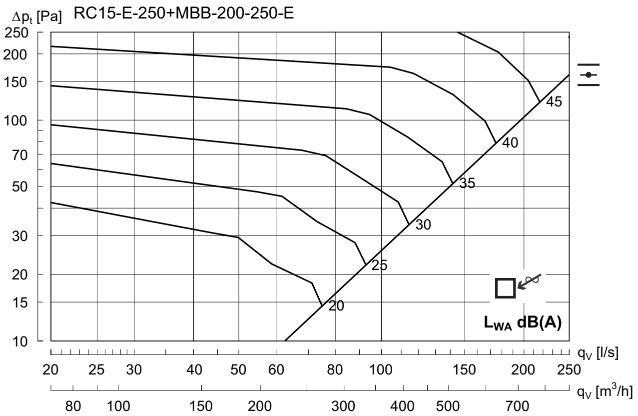
Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	14	3	1	-1	-6	-12	-15	-22

Technical data

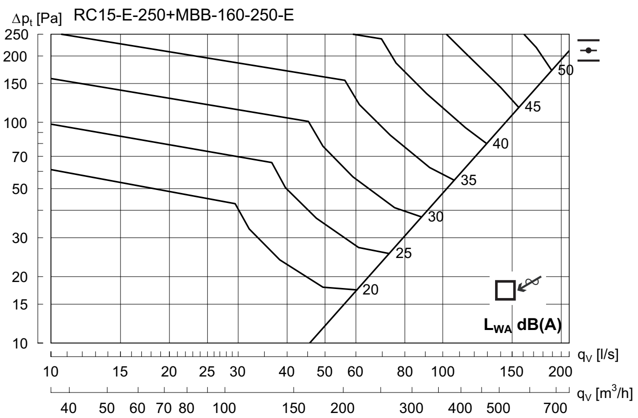
RC15 - 250 + MBB - Exhaust air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	12	6	2	-3	-6	-12	-17	-24



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	13	5	0	-3	-6	-10	-14	-23

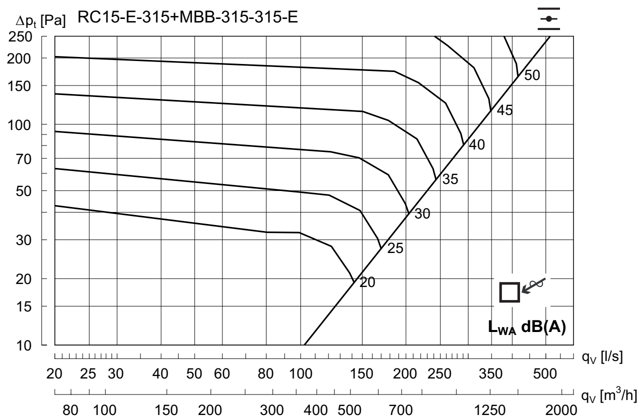


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	13	7	0	-3	-6	-10	-15	-19

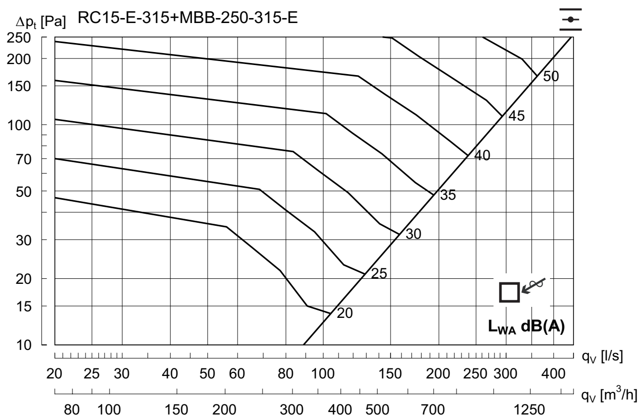
Swirl diffuser RC15

Technical data

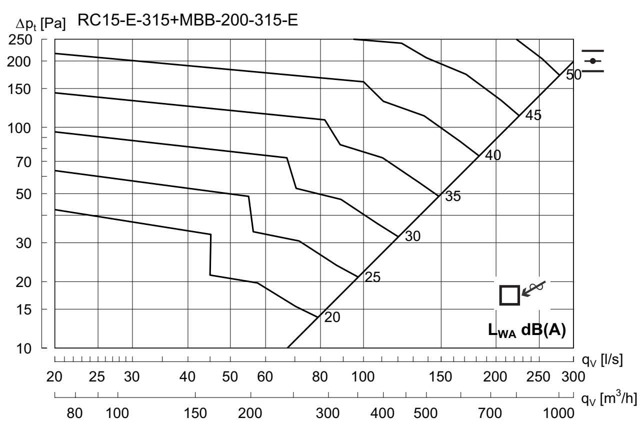
RC15 - 315 + MBB - Exhaust air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	12	5	3	-3	-6	-11	-16	-25



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	9	5	2	-3	-5	-11	-17	-25



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	15	5	1	-3	-5	-10	-15	-23

Nozzle diffuser

NC19

Description

NC19 is a circular diffuser with individually adjustable nozzles. The diffuser is suitable for the horizontal supply of cooled air, where great flexibility in the dispersal pattern is required. The diffuser can also be set to a vertical supply air pattern, enabling supply of heated air. Installing this diffuser in a plenum box type MBB can help to achieve a stable flow of air to the diffuser as well as realise the potential for individual adjustment.

- Adjustable dispersal patterns
- No pressure change for different dispersal patterns
- Suitable for horizontal or vertical supply air patterns

Maintenance

The face plate can be removed to enable cleaning of internal parts or to gain access to the duct or box. The visible parts of the diffuser can be wiped with a damp cloth.

Order code

Product **NC19 - S - aaa**

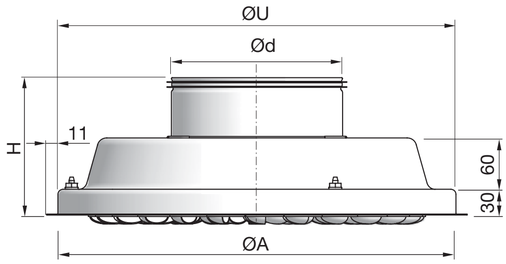
Type
NC19

Functional use
S = Supply air

Connection dim.
Ød 125-315

Example: NC19-S-200

Dimensions



NC19 Ød mm	ØA mm	H mm	ØU* mm	Weight kg
125	360	160	370	3.90
160	460	160	470	5.30
200	460	160	470	5.40
250	540	160	550	7.40
315	540	160	550	8.10

* ØU = ceiling grid opening

Ød 315, No mounting holes for MBB !

Materials and finish

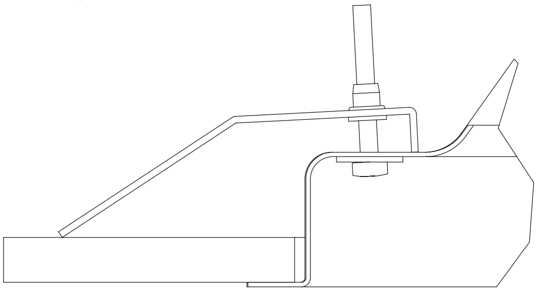
Material: Galvanised steel
Standard finish: Powder-coated
Standard colour: RAL 9010, Gloss 30
Nozzles: White ABS plastic

The diffuser is available in other colours. Please contact Lindab's sales department for further information.

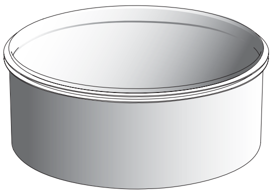
Nozzle diffuser NC19

Accessories

Mounting brackets DCZ



Extension piece MBZ

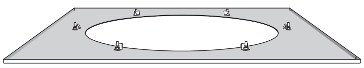


Order code - accessories

Product	aaa	bbb
Type		
Size		

Example: DCZ-200

Module plate LM



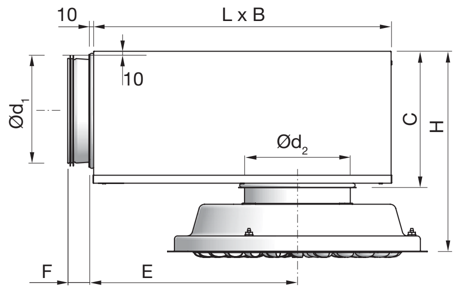
Order code - module plate

Product	LM	a	NC19	ccc
Type				
Ceiling system				
Diffuser				
Size				

Example: LM-1-NC19-200
Ceiling system - see introductory summary

Plenum box MBB

NC19 + MBB



NC19 + MBB							
Duct Ød$_1$ mm	NC19 Ød$_2$ mm	B mm	C mm	E mm	F mm	H* mm	L mm
100	125	260	159	216	50	270 - 310	310
100	160	260	159	216	50	295 - 335	310
125	125	310	184	262	50	270 - 310	376
125	160	310	184	262	50	295 - 335	376
125	200	310	184	262	50	329 - 369	376
160	160	380	220	323	50	295 - 335	459
160	200	380	220	323	50	329 - 369	459
160	250	380	220	323	50	370 - 410	459
200	200	460	259	396	70	329 - 369	565
200	250	460	259	396	70	370 - 410	565
200	315	460	259	396	70	420 - 460	565
250	250	540	309	486	70	370 - 410	698
250	315	540	309	486	70	420 - 460	698
315	315	540	373	646	70	485 - 525	858

* Using accessory MBZ the H dimension will increase:
Ød$_2$ = 125 - 200 mm => H +40 mm
Ød$_2$ = 250 - 315 mm => H +60 mm

Order code

Product	MBB	- aaa	- bbb	- S
Type				
MBB				
Duct connection Ød$_1$				
Ø100-315				
Diffuser dimension Ød$_2$				
Ø125-315				
Functional use				
S = Supply air				

Example: NC19-S-200-MBB-200-200-S

Nozzle diffuser NC19

Technical data

Capacity

Air flow q_v [l/s] and [m³/h], total pressure Δp_t [Pa], throw $l_{0.2}$ [m] and sound power level L_{WA} [dB(A)] can be seen in the diagrams.

Frequency-related sound effect level

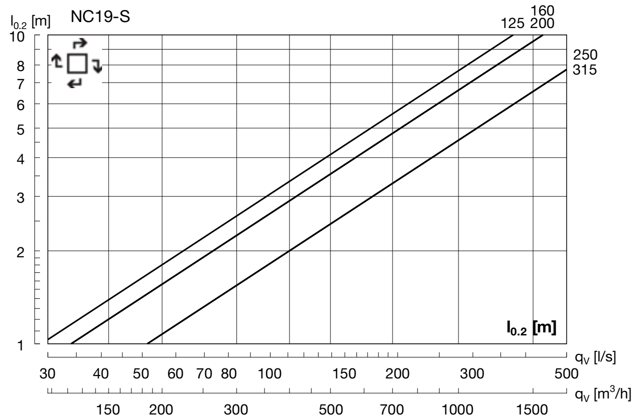
The sound effect level in the frequency band is defined as $L_{WA}+K_{ok}$.
K_{ok} values are specified in chart beneath the diagrams on the following pages. K_{ok} values for NC19 without a box are avaliable on request.

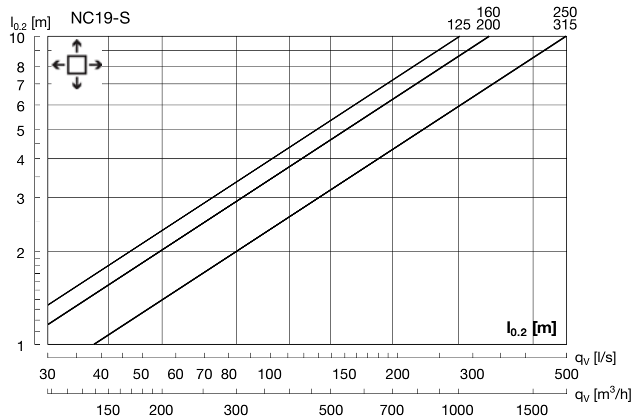
Quick selection, supply air

NC19 + MBB		Max. airflow		Max. airflow	
Duct	NC19	30dB(A)		35dB(A)	
$Ød_1$	$Ød_2$	l/s	m³/h	l/s	m³/h
100	125	25	90	33	119
100	160	39	140	47	169
125	125	35	126	41	148
125	160	48	173	59	212
125	200	54	194	64	230
160	160	52	187	63	227
160	200	59	212	72	259
160	250	76	274	96	346
200	200	66	238	80	288
200	250	92	331	112	403
200	315	97	349	120	432
250	250	100	360	119	428
250	315	109	392	131	472
315	315	121	436	143	515

Throw $l_{0.2}$

Throw $l_{0.2}$ [m] is specified at a terminal velocity of 0.2 m/s.





Sound attenuation

Sound attenuation of the diffusers ΔL from duct to room, including end reflection, see table below

NC19 + MBB		Centre frequency Hz							
Duct	NC19								
$Ød_1$	$Ød_2$	63	125	250	500	1K	2K	4K	8K
100	125	20	16	6	15	20	20	19	23
100	160	16	16	4	13	18	19	17	21
125	125	17	15	10	19	20	20	19	22
125	160	15	14	7	18	18	18	18	21
125	200	13	12	5	15	15	16	17	19
160	160	16	15	11	22	20	20	20	20
160	200	16	15	8	21	19	19	19	21
160	250	16	14	5	17	14	16	18	19
200	200	15	10	8	16	20	18	20	18
200	250	13	9	5	13	17	15	19	17
200	315	13	9	4	11	16	15	17	17
250	250	14	8	8	16	18	18	18	19
250	315	14	8	6	14	17	16	17	18
315	315	8	10	9	14	17	17	18	24

Balancing

Balancing data is contained in a separate brochure.

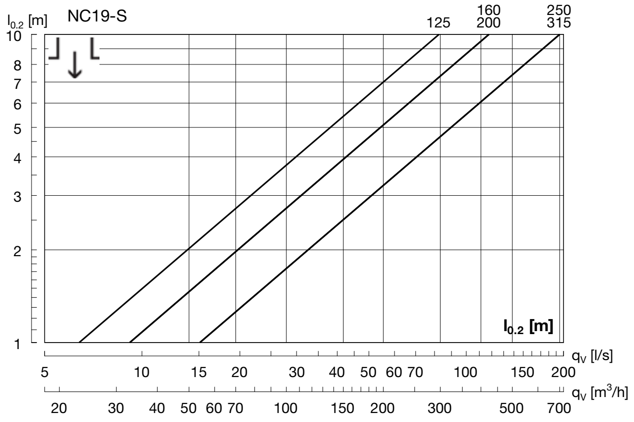
Nozzle diffuser

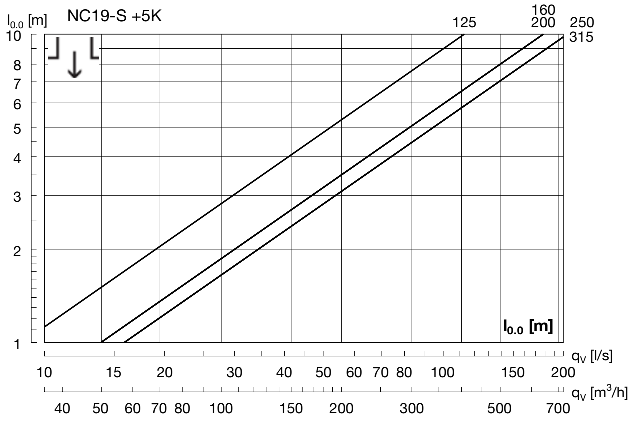
NC19

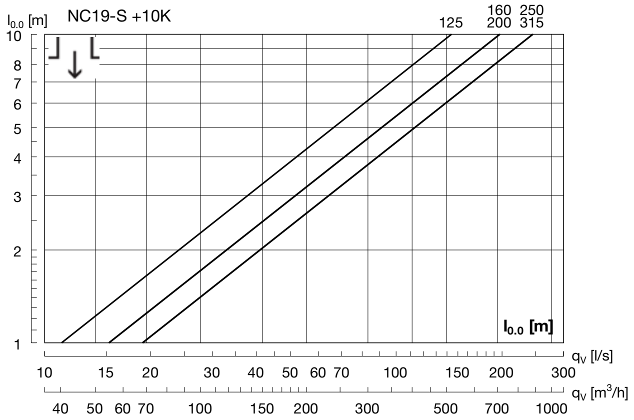
Technical data

Throws/Turning points

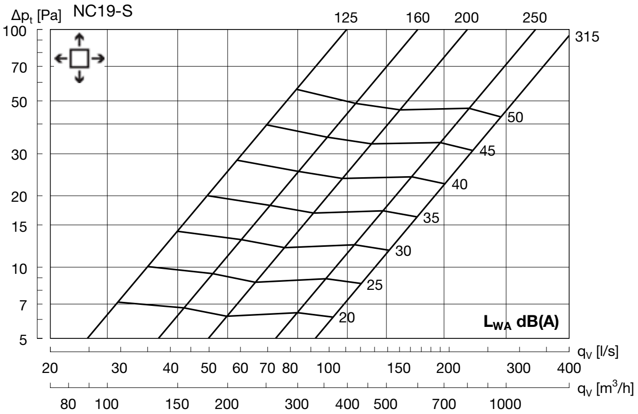
Throw $l_{0.2}$ [m] is specified at a terminal velocity of 0.2 m/s. Turning point $l_{0.0}$ [m] is specified for +5 K and +10 K respectively.







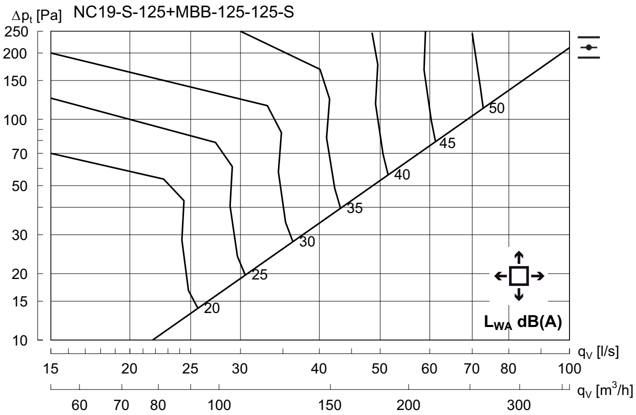
NC19 without box – Supply air



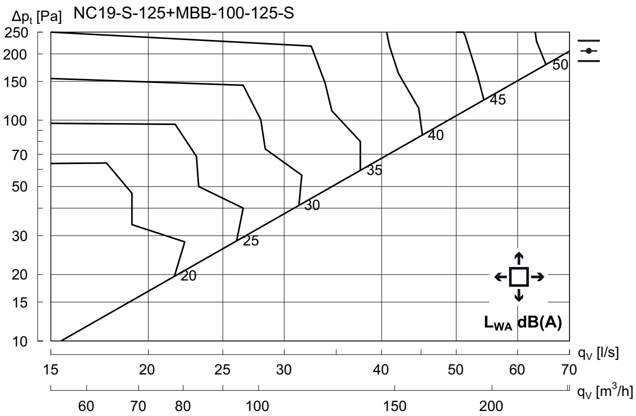
Nozzle diffuser NC19

Technical data

NC19 - 125 + MBB - Supply air

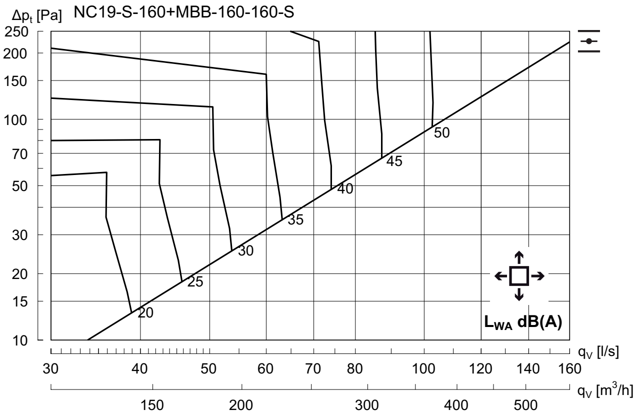


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	11	1	-4	0	-5	-15	-23	-35

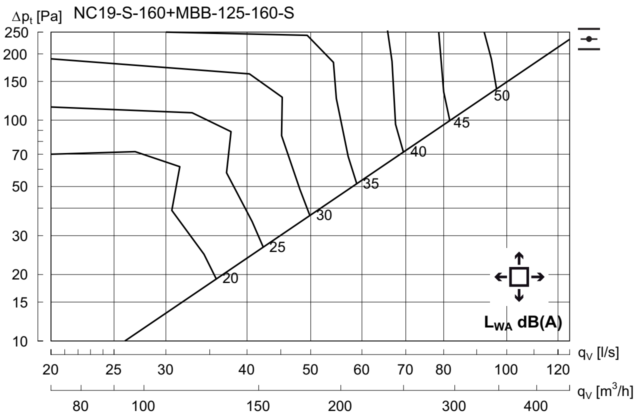


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	10	3	2	0	-7	-15	-22	-27

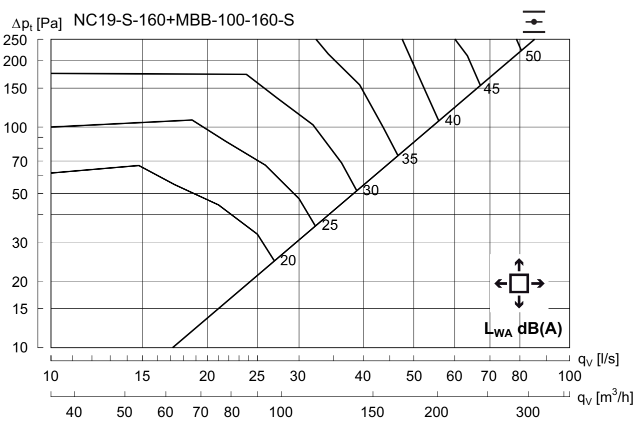
NC19 - 160 + MBB - Supply air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	6	5	-3	-1	-4	-14	-21	-32



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	8	5	-1	-1	-6	-13	-17	-25



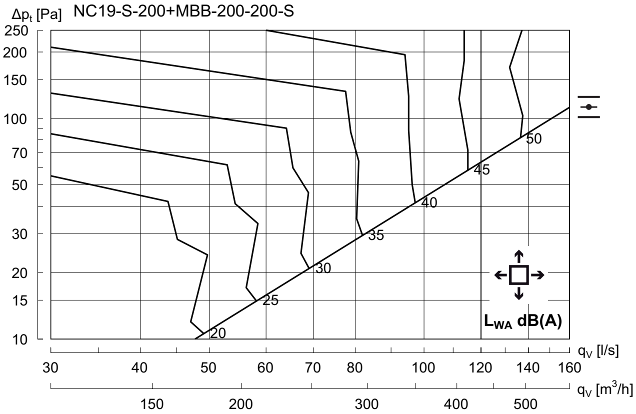
Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	10	4	1	0	-8	-12	-16	-21

Nozzle diffuser NC19

Technical data

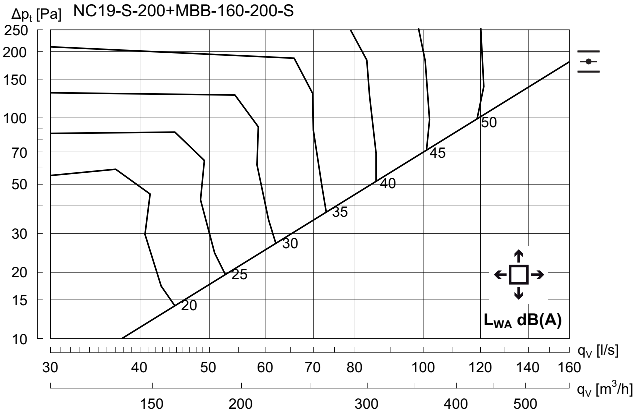
NC19 - 200 + MBB - Supply air

Δp_t [Pa] NC19-S-200+MBB-200-200-S



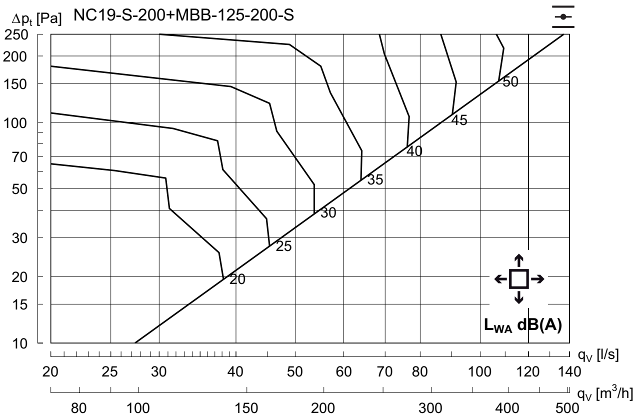
Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	11	2	-5	0	-4	-16	-23	-33

Δp_t [Pa] NC19-S-200+MBB-160-200-S



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	9	4	-2	-1	-5	-14	-20	-28

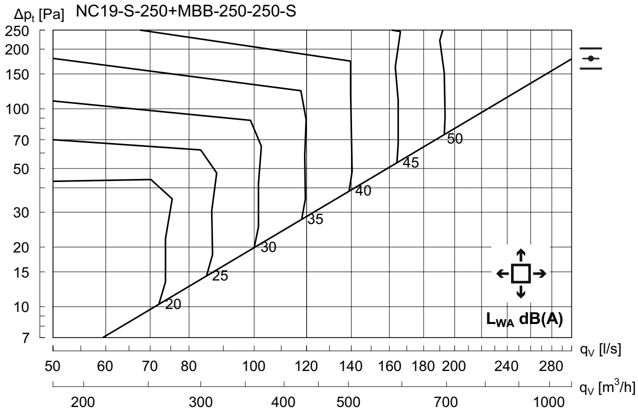
Δp_t [Pa] NC19-S-200+MBB-125-200-S



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	6	5	0	0	-6	-12	-17	-25

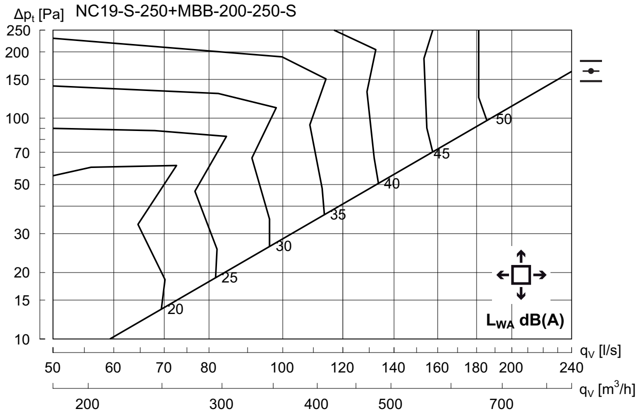
NC19 - 250 + MBB - Supply air

Δp_t [Pa] NC19-S-250+MBB-250-250-S



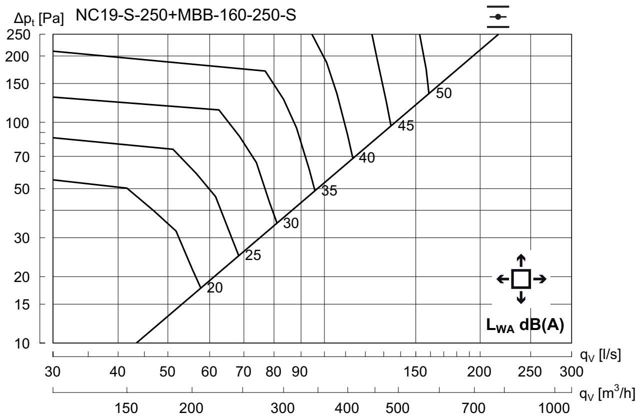
Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	10	3	-4	-1	-4	-15	-23	-34

Δp_t [Pa] NC19-S-250+MBB-200-250-S



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	6	7	-2	-1	-4	-14	-20	-29

Δp_t [Pa] NC19-S-250+MBB-160-250-S



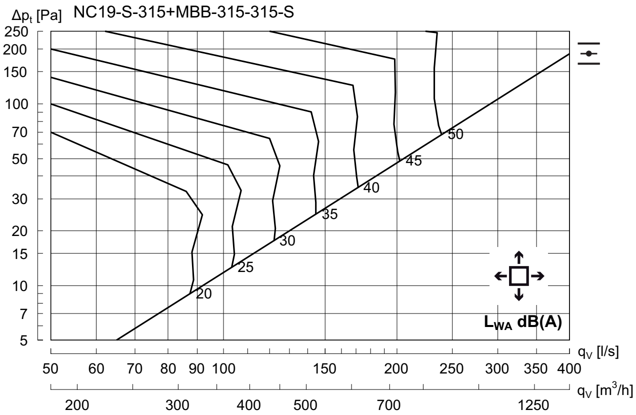
Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	11	6	1	-2	-5	-12	-18	-26

Nozzle diffuser

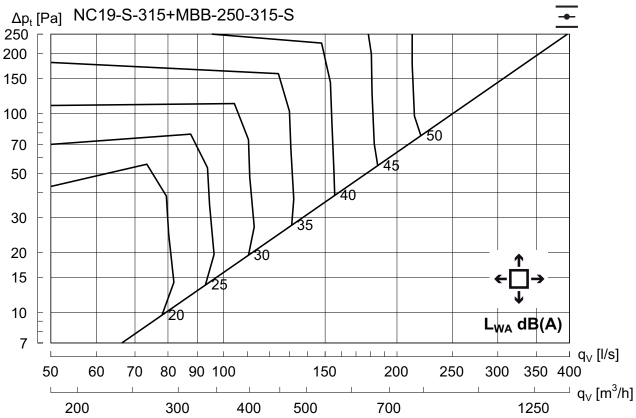
NC19

Technical data

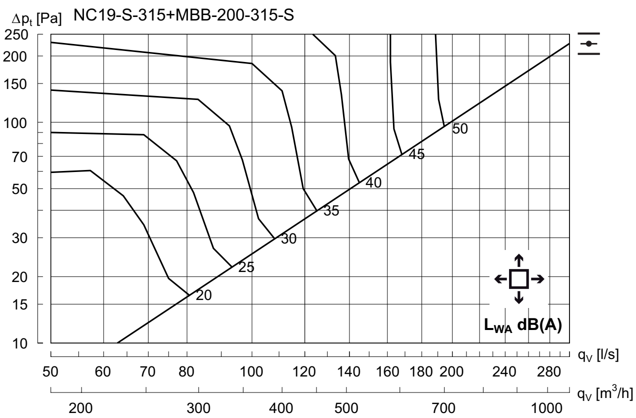
NC19 - 315 + MBB - Supply air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	9	1	-4	-1	-3	-17	-26	-40



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	9	4	-2	-1	-4	-15	-23	-30



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	8	7	0	-2	-5	-14	-20	-30

Swirl diffuser RCG

Description

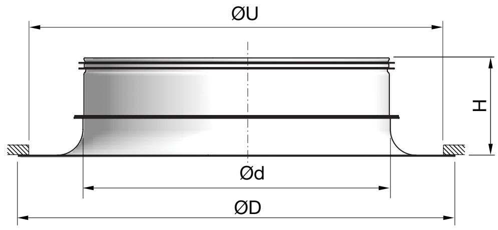
RCG is a circular swirl diffuser with fixed bars. RCG is suitable for the horizontal supply of very cold air. The swirl pattern ensures optimum distribution and high induction, as well as a large dynamic range. Installing a RCG diffuser in a plenum box type MBB can help to achieve a stable flow of air to the diffuser as well as realise the potential for individual adjustment. RCG can also be installed directly in the duct using the traverse bracket GRZ1, which is available as an accessory.

- Large dynamic range
- High induction
- Suitable for cooling at very low temperatures

Maintenance

Diffusers are removed to enable cleaning of the plenum box or duct system. The visible parts of the diffuser can be wiped with a damp cloth.

Dimensions



RCG Ød mm	ØD mm	H mm	ØU mm	Free area A m^2	Weight kg
125	200	70	150	0,0031	0,40
160	250	70	200	0,0072	0,50
200	300	70	250	0,0106	0,60
250	350	90	300	0,0189	0,80
315	450	100	400	0,027	1,00
400	570	150	500	0.039	1,50

* ØU = Cutting dimension

Order code

Product	RCG	aaa
Type		
RCG		
Connection dim.		
Ød 125-400		

Example: RCG-315

Materials and finish

Material: Steel
Standard finish: Powder-coated
Standard colour: RAL 9010 Gloss 30

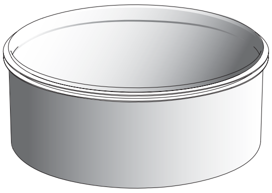
The diffuser is available in other colours. Please contact Lindab's sales department for further information.

Swirl diffuser RCG

Accessories

Traverse bracket GRZ1

Extension piece MBZ

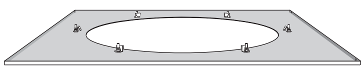


Order code - accessories

Product	aaa	bbb
Type		
Size		

Example: GRZ1-315

Module plate LM



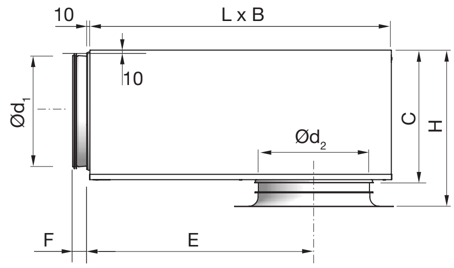
Order code - module plate

Product	LM	a	RCG	ccc
Type				
Ceiling system				
Diffuser				
Size				

Example: LM-1-RCG-315
Ceiling system - see introductory summary

Plenum box MBB

RCG + MBB



RCG + MBB							
Duct Ød1 mm	RCG Ød2 mm	B mm	C mm	E mm	F mm	H* mm	L mm
100	125	260	159	216	50	185 - 215	310
100	160	260	159	216	50	185 - 215	310
125	125	310	184	262	50	210 - 240	376
125	160	310	184	262	50	210 - 240	376
125	200	310	184	262	50	210 - 240	376
160	160	380	220	323	50	244 - 274	459
160	200	380	220	323	50	244 - 274	459
160	250	380	220	323	50	264 - 304	459
200	200	460	259	396	70	305 - 345	565
200	250	460	259	396	70	325 - 365	565
200	315	460	259	396	70	325 - 365	565
250	250	540	309	486	70	360 - 400	698
250	315	540	309	486	70	360 - 400	698
250	400	540	309	486	70	410 - 450	698
315	315	540	373	646	70	425 - 465	858
315	400	540	373	646	70	475 - 515	858

* Using accessory MBZ the H dimension will increase:
Ød_2 = 125 - 200 mm => H +40 mm
Ød_2 = 250 - 315 mm => H +60 mm
Ød_2 = 400 mm => H +80 mm

Order code

Product	MBB	aaa	bbb	S
Type MBB				
Duct connection Ød_1 Ø100-315				
Diffuser dimension Ød_2 Ø125-400				
Functional use S = Supply air				

Example: RCG-315-MBB-315-315-S

Swirl diffuser RCG

Technical data

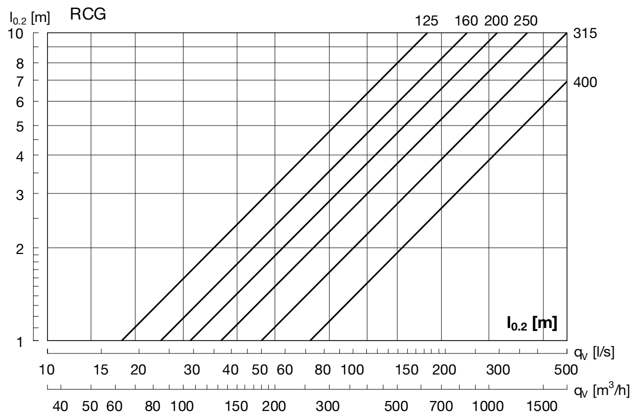
Capacity
Air flow q_v [l/s] and [m^3/h], total pressure Δp_t[Pa], throw $l_{0.2}$ [m] and sound power level L_{WA} [dB(A)] can be seen in the diagrams.

Frequency-related sound effect level
The sound effect level in the frequency band is defined as L_{WA}+K_{ok}. K_{ok} values are specified in charts beneath the diagrams on the following pages.

Quick selection, supply air

RCG + MBB		Max. airflow 30dB(A)		Max. airflow 35dB(A)	
Duct Ød$_1$	RCG Ød$_2$	l/s	m^3/h	l/s	m^3/h
100	125	17	61	20	72
100	160	28	101	33	119
125	125	20	72	24	86
125	160	32	115	39	140
125	200	42	151	52	187
160	160	34	122	41	148
160	200	48	173	59	212
160	250	60	216	76	274
200	200	50	180	63	227
200	250	67	241	84	302
200	315	90	324	111	400
250	250	76	274	93	335
250	315	99	356	122	439
250	400	109	392	143	515
315	315	119	428	142	511
315	400	142	511	177	637

Throw $l_{0.2}$
Throw $l_{0.2}$ [m] is specified at a terminal velocity of 0.2 m/s.



Sound attenuation
Sound attenuation of the diffusers ΔL from duct to room, including end reflection - see table below.

RCG + MBB		Centre frequency Hz							
Duct Ød$_1$	RCG Ød$_2$	63	125	250	500	1K	2K	4K	8K
100	125	20	16	7	18	19	18	17	21
100	160	19	16	5	17	17	16	16	19
125	125	17	15	9	21	17	19	18	20
125	160	13	14	8	20	14	16	16	20
125	200	13	12	5	17	13	14	15	18
160	160	18	15	9	22	18	17	19	20
160	200	17	15	8	21	17	16	18	19
160	250	16	15	4	17	14	14	16	18
200	200	14	9	8	18	18	15	18	17
200	250	13	10	5	15	17	14	17	16
200	315	11	8	3	13	15	13	16	16
250	250	15	8	8	15	17	16	17	18
250	315	15	7	6	13	15	14	16	17
250	400	14	5	4	12	13	13	14	16
315	315	7	10	9	13	16	15	17	21
315	400	7	8	9	12	15	15	16	19

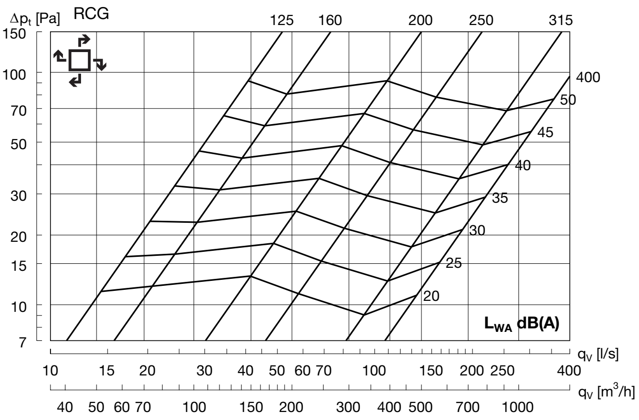
Balancing
Balancing data is contained in a separate brochure.

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

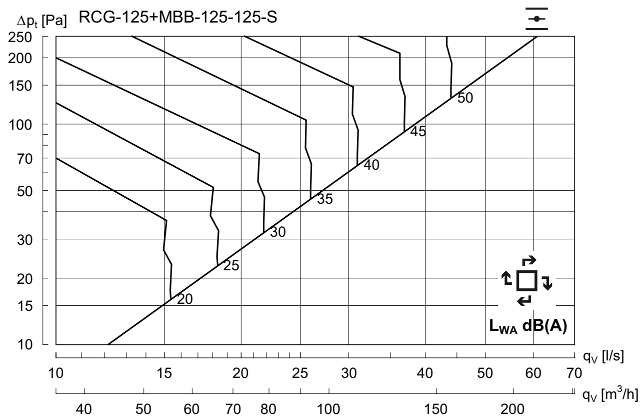
Swirl diffuser RCG

Technical data

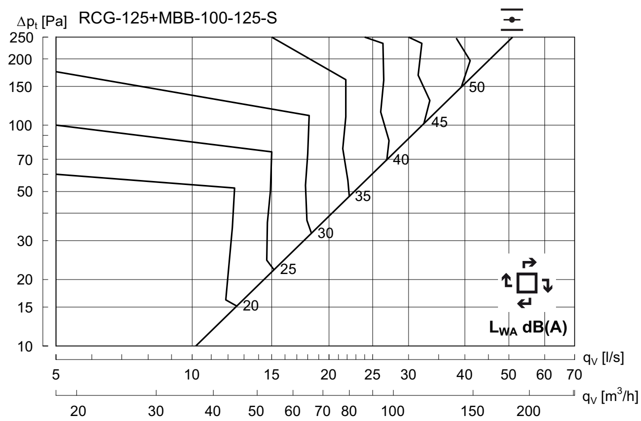
RCG without box – supply air



RCG 125 + MBB - Supply air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	14	5	2	-3	-7	-10	-20	-31



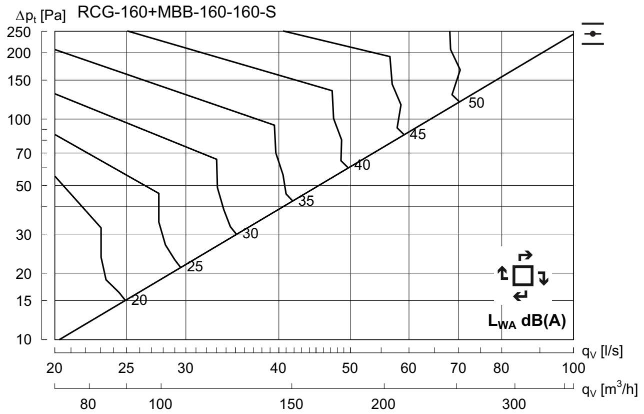
Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	9	4	4	-3	-7	-11	-22	-33

We reserve the right to make changes without prior notice

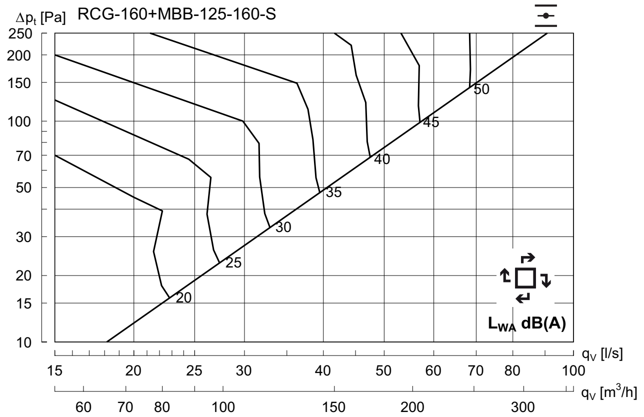
Swirl diffuser RCG

Technical data

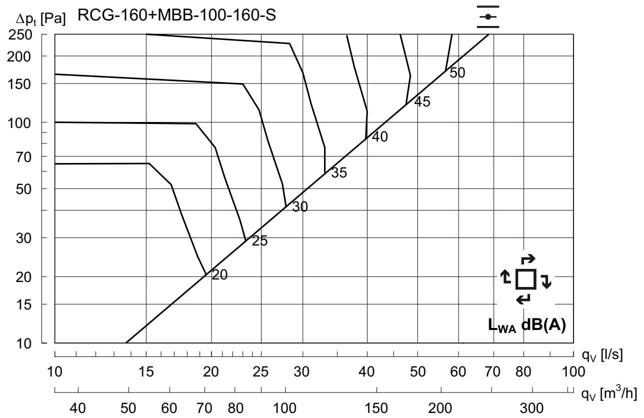
RCG 160 + MBB - Supply air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	5	7	3	-2	-7	-11	-22	-34

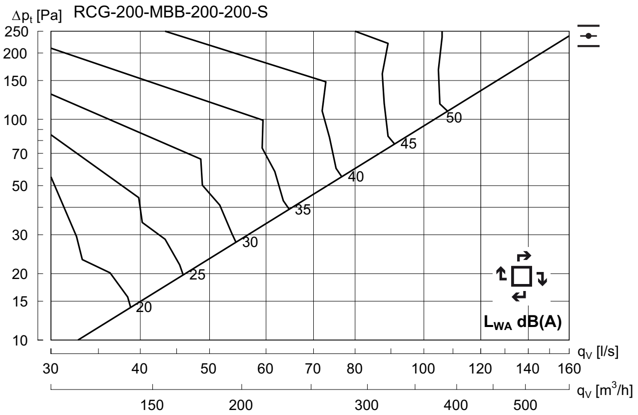


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	8	5	4	-3	-7	-12	-22	-34

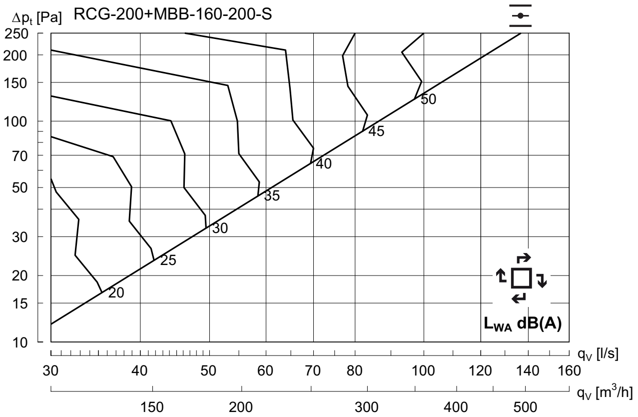


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	12	4	4	-3	-7	-12	-20	-27

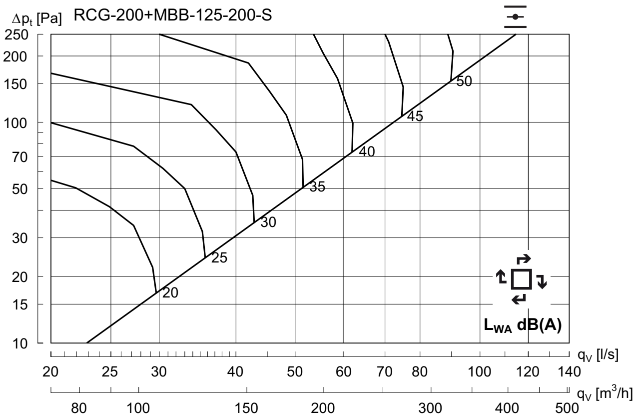
RCG 200 + MBB - Supply air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	14	7	2	-2	-6	-13	-24	-35



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	11	7	3	-3	-7	-12	-22	-34

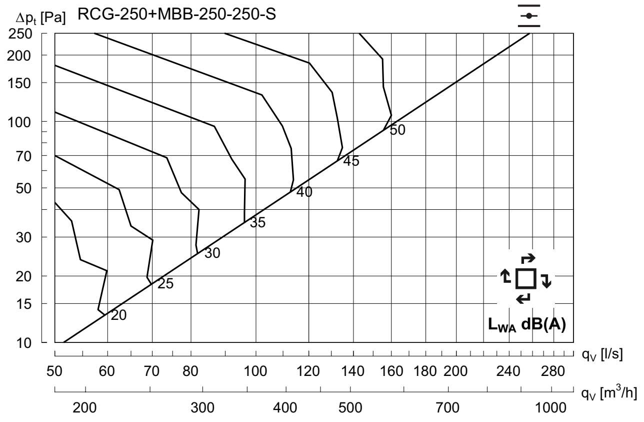


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	10	5	5	-4	-8	-12	-18	-27

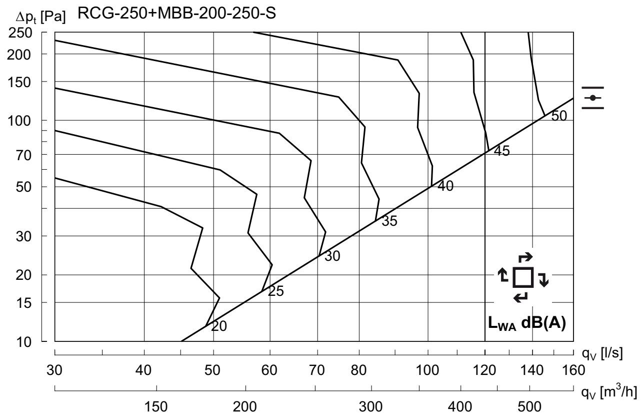
Swirl diffuser RCG

Technical data

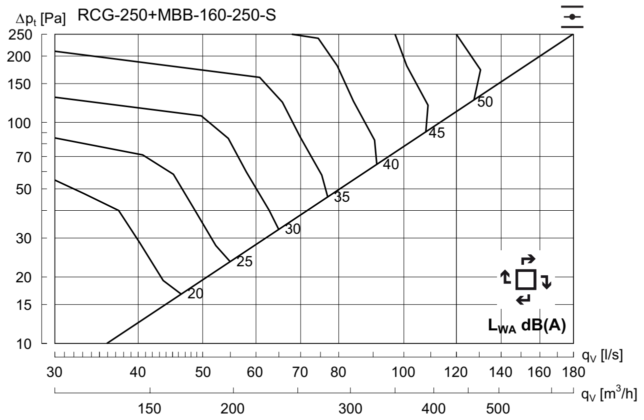
RCG 250 + MBB - Supply air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	10	6	2	-3	-5	-12	-21	-29

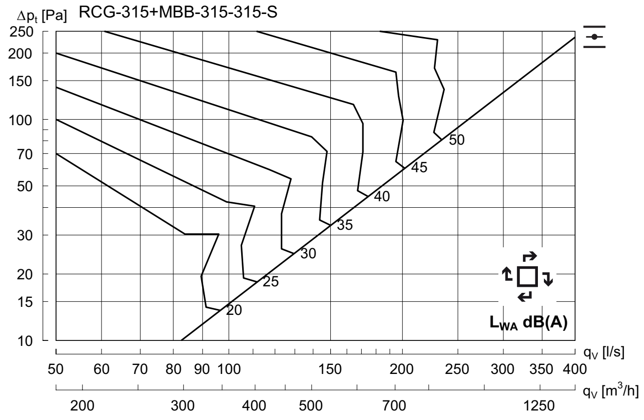


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	8	7	3	-2	-6	-12	-22	-34

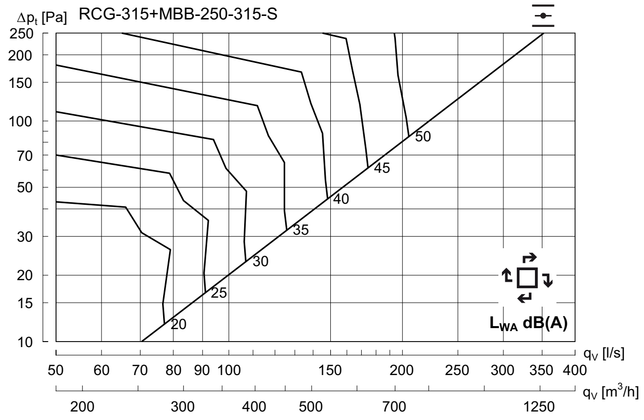


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	12	6	3	-3	-7	-12	-20	-29

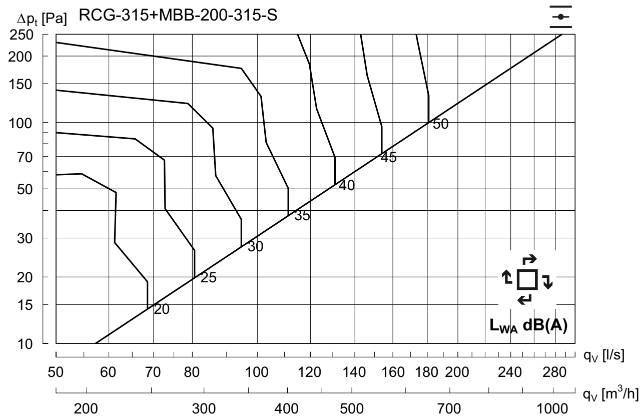
RCG 315 + MBB - Supply air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	12	4	2	-3	-4	-14	-22	-32



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	10	7	3	-3	-6	-14	-22	-32



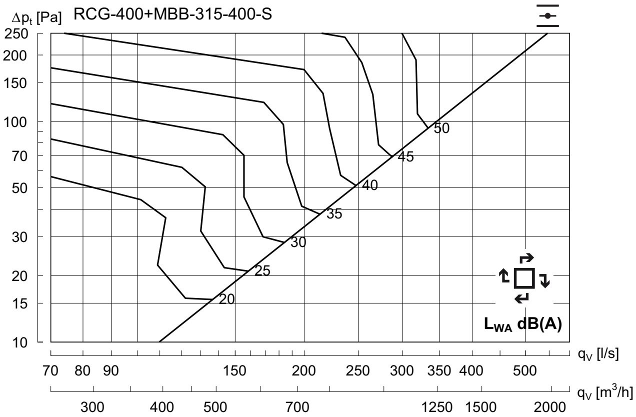
Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	9	7	3	-2	-6	-13	-22	-31

Swirl diffuser

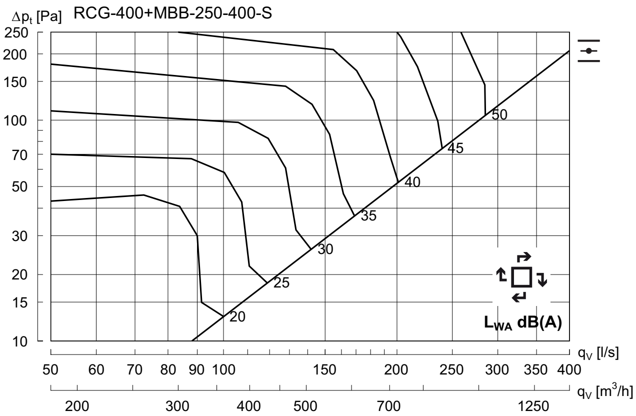
RCG

Technical data

RCG 400 + MBB - Supply air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	10	5	2	-4	-5	-11	-20	-28



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	9	6	2	-3	-5	-11	-19	-28

Plain diffuser LKP/LCP

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

LKP

LCP

Description

LCP is a flush-mounted square diffuser with a circular unperforated face plate for installation in ceiling systems. LCP can be used for both supply and exhaust air. LCP is suitable for the horizontal supply of cooled air and has a large dynamic range. Installing an LCP diffuser in a plenum box type MBB can help to achieve a stable airflow to the diffuser as well as realise the potential for individual adjustment.

LKP has a square face plate and the same properties as LCP.

- Simple and stylish appearance
- Large dynamic range
- Can be used for both supply and exhaust air
- Can be adapted to most ceiling systems

Maintenance

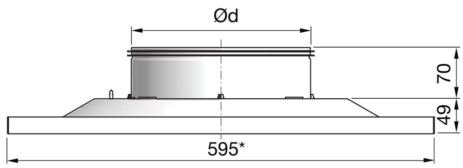
The face plate can be removed to enable cleaning of internal parts or to gain access to the duct or box. The visible parts of the diffuser can be wiped with a damp cloth.

Order code

Product	LCP/LKP	-	aaa	-	b
Type LCP/LKP					
Connection dim. Ød 125-315					
Ceiling system 1 - 14					

Example: LCP-160-1

Dimensions



* ceiling system 1, other ceiling systems see Integra chapter page 122-123.

LCP
Ød 315, No mounting holes for MBB !

LKP/LCP Ød mm	Weight kg
125	5.30
160	5.30
200	5.30
250	5.30
315	5.30

Materials and finish

Grille box:	Galvanised steel
Face plate LKP:	Galvanised steel
Face plate LCP:	Aluminium
Face plate finish:	Powder-coated
Standard colour:	RAL 9010 Gloss 30

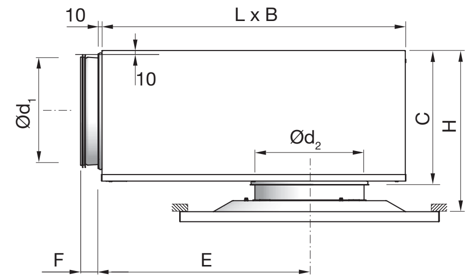
The diffuser is available in other colours. Please contact Lindab's sales department for further information.

Plain diffuser LKP/LCP

Accessories

Plenum box MBB

LKP/LCP + MBB



LKP/LCP + MBB							
Duct $Ød_1$ mm	LKP/LCP $Ød_2$ mm	B mm	C mm	E mm	F mm	H* mm	L mm
100	125	260	159	216	50	230 - 270	310
100	160	260	159	216	50	230 - 270	310
125	125	310	184	262	50	255 - 295	376
125	160	310	184	262	50	255 - 295	376
125	200	310	184	262	50	255 - 295	376
160	160	380	220	323	50	289 - 329	459
160	200	380	220	323	50	289 - 329	459
160	250	380	220	323	50	289 - 329	459
200	200	460	259	396	70	330 - 370	565
200	250	460	259	396	70	330 - 370	565
200	315	460	259	396	70	330 - 370	565
250	250	540	309	486	70	380 - 420	698
250	315	540	309	486	70	380 - 420	698
315	315	540	373	646	70	445 - 485	858

* Using accessory MBZ the H dimension will increase:
$Ød_2$ = 125 - 200 mm => H +40 mm
$Ød_2$ = 250 - 315 mm => H +60 mm

Order code

Product **MBB - aaa - bbb - c**

Type
MBB

Duct connection $Ød_1$
Ø100-315

Diffuser dimension $Ød_2$
Ø125-315

Functional use
S = Supply air
E = Exhaust

Example: LCP-160-1+MBB-160-160-S

Plain diffuser LKP/LCP

Technical data

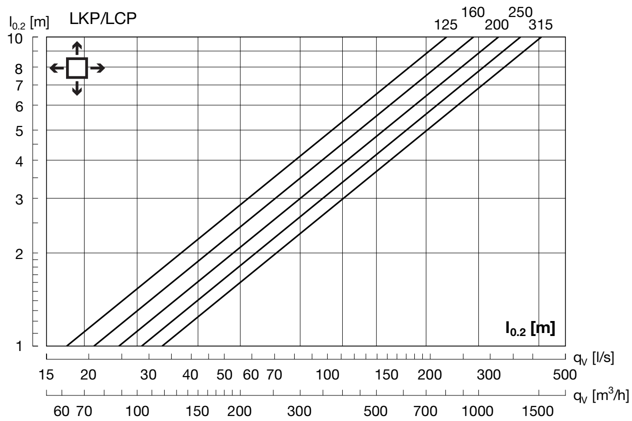
Capacity
Air flow q_v [l/s] and [m^3/h], total pressure Δp_t [Pa], throw $l_{0.2}$ [m] and sound power level L_{WA} [dB(A)] can be seen in the diagrams.

Frequency-related sound effect level
The sound effect level in the frequency band is defined as $L_{WA}+K_{ok}$.
K_{ok} values are specified in charts beneath the diagrams on the following pages. K_{ok} values for LKP/LCP without a box are avaliable on request.

Quick selection, supply air

LKP/LCP + MBB		Max. airflow 30dB(A)		Max. airflow 35dB(A)	
Duct $Ød_1$	LKP/LCP $Ød_2$	l/s	m^3/h	l/s	m^3/h
100	125	37	133	44	158
100	160	39	140	48	173
125	125	48	173	56	202
125	160	56	202	66	238
125	200	61	220	73	263
160	160	67	241	85	306
160	200	79	284	99	356
160	250	95	342	113	407
200	200	92	331	117	421
200	250	105	378	122	439
200	315	118	425	145	522
250	250	112	403	132	475
250	315	131	472	168	605
315	315	144	518	169	608

Throw $l_{0.2}$
Throw $l_{0.2}$ [m] can be seen in the diagram for isothermal air, at a terminal velocity of 0.2 m/s.



Sound attenuation
Sound attenuation of the diffusers ΔL from duct to room, including end reflection, see table below.

LKP/LCP + MBB		Centre frequency Hz							
Duct $Ød_1$	LKP/LCP $Ød_2$	63	125	250	500	1K	2K	4K	8K
100	125	17	15	10	17	15	18	19	21
100	160	17	16	6	10	18	18	18	21
125	125	17	15	10	17	15	18	19	21
125	160	15	14	10	17	16	17	18	21
125	200	13	12	7	13	13	16	17	18
160	160	17	15	12	21	19	19	21	21
160	200	17	16	10	20	17	17	19	20
160	250	16	14	7	17	15	16	19	20
200	200	13	11	10	17	18	15	19	18
200	250	14	11	8	15	19	15	18	17
200	315	14	9	7	13	18	14	17	17
250	250	15	10	9	17	18	18	19	19
250	315	15	8	9	16	18	16	18	18
315	315	8	10	10	17	18	17	18	24

Balancing
Balancing data is contained in a separate brochure.

Plain diffuser LKP/LCP

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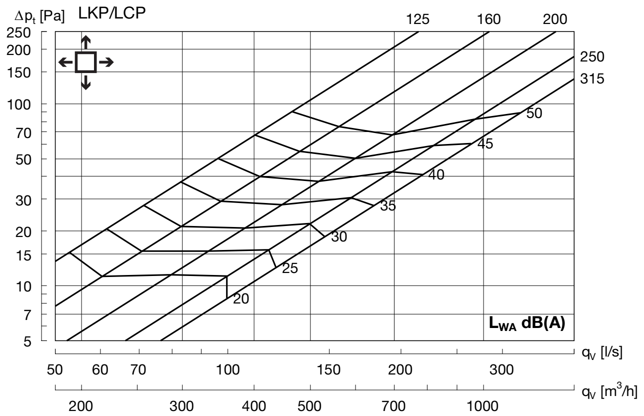
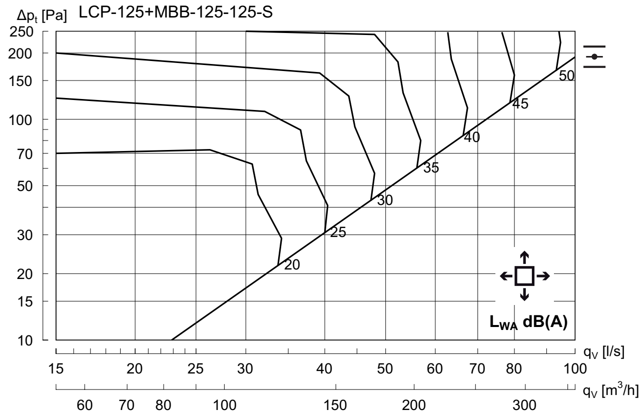
Technical data

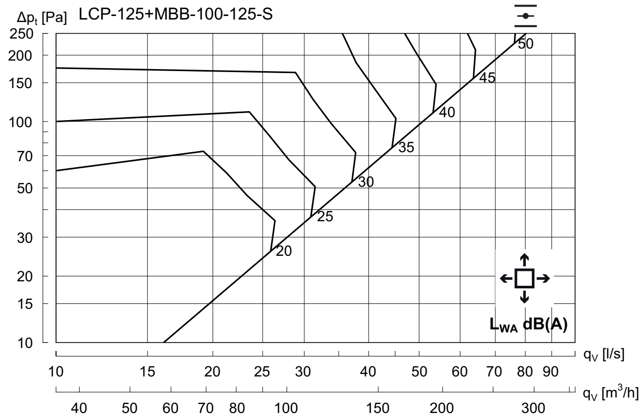
LKP/LCP without box – supply air



LKP/LCP 125 + MBB - Supply air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	13	7	1	-2	-6	-14	-20	-25

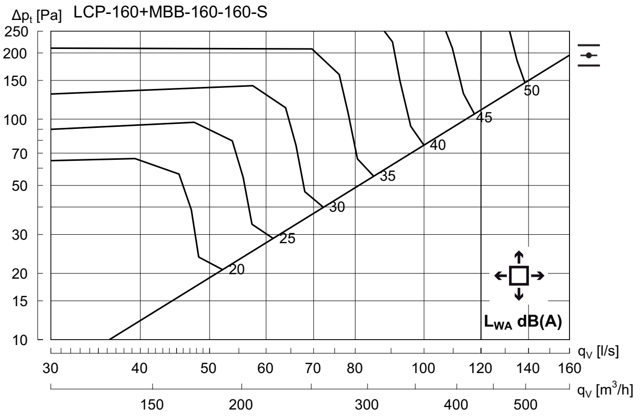


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	10	4	2	-2	-6	-10	-17	-23

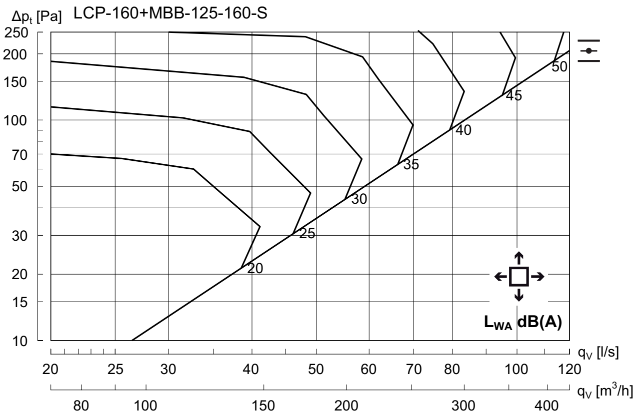
Plain diffuser LKP/LCP

Technical data

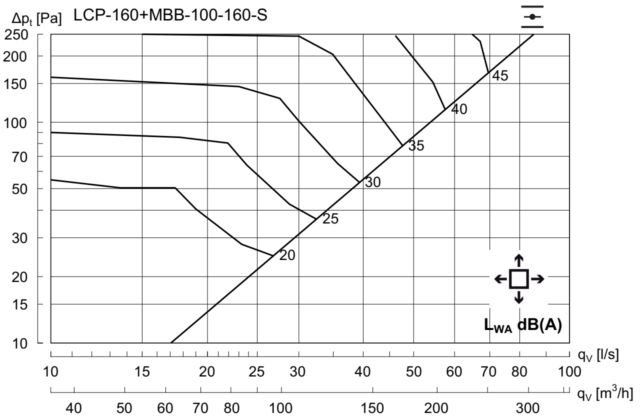
LKP/LCP 160 + MBB - Supply air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	13	8	0	-3	-6	-10	-19	-25

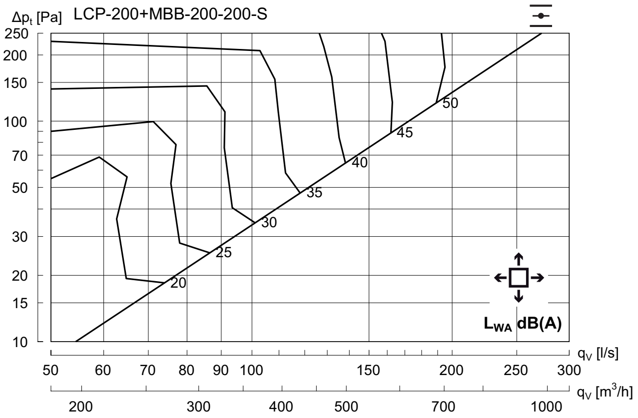


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	9	8	1	-3	-6	-11	-16	-22

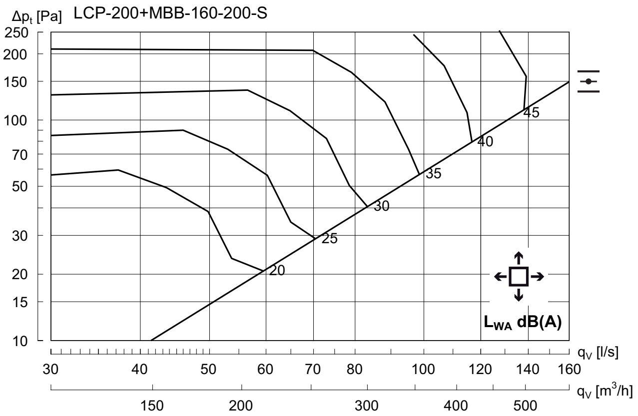


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	9	5	0	-1	-7	-10	-16	-21

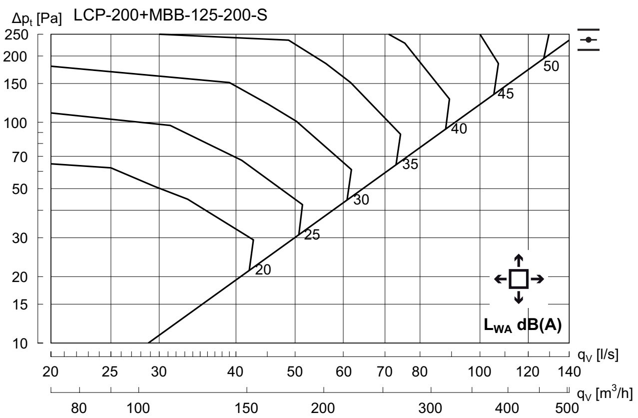
LKP/LCP 200 + MBB - Supply air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	12	8	0	-3	-5	-14	-21	-24



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	12	7	-1	-3	-5	-10	-15	-21

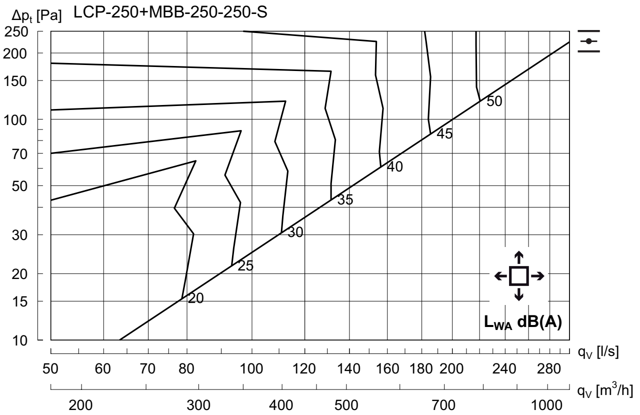


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	6	6	0	-3	-5	-9	-16	-21

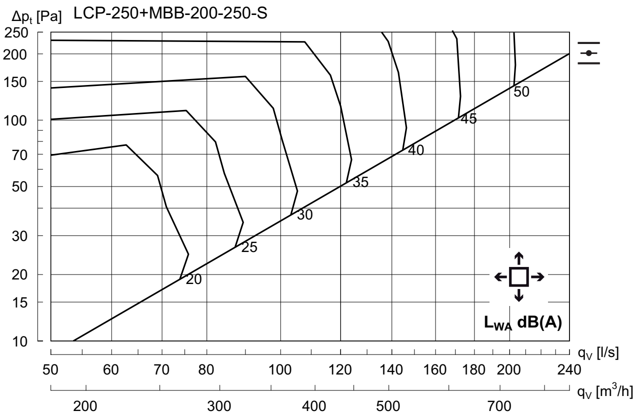
Plain diffuser LKP/LCP

Technical data

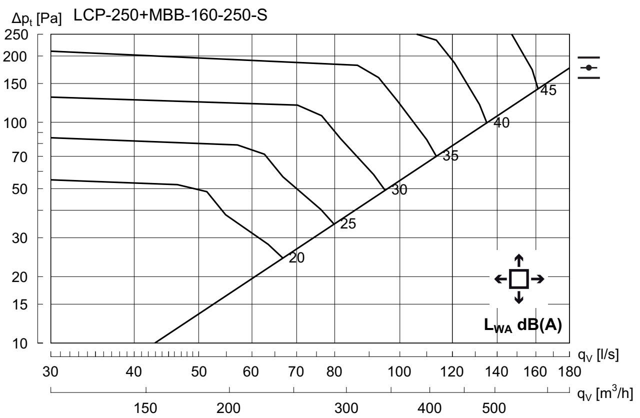
LKP/LCP 250 + MBB - Supply air



Hz	63	125	250	500	1K	2K	4K	8K
Kok	15	6	-1	-1	-5	-15	-23	-29

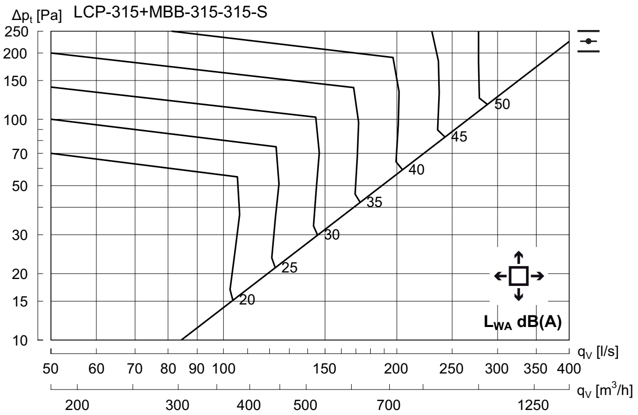


Hz	63	125	250	500	1K	2K	4K	8K
Kok	13	8	-1	-2	-5	-13	-20	-26

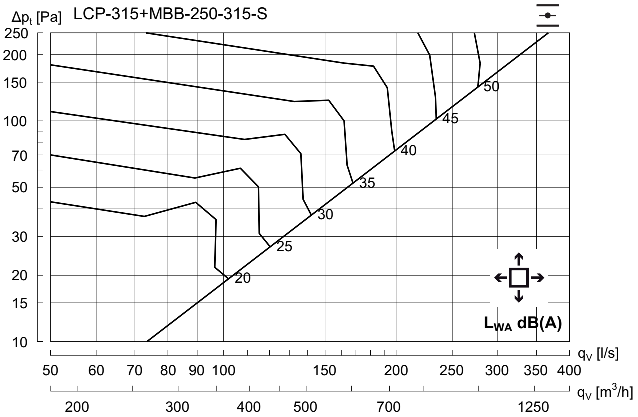


Hz	63	125	250	500	1K	2K	4K	8K
Kok	13	7	0	-4	-5	-11	-16	-22

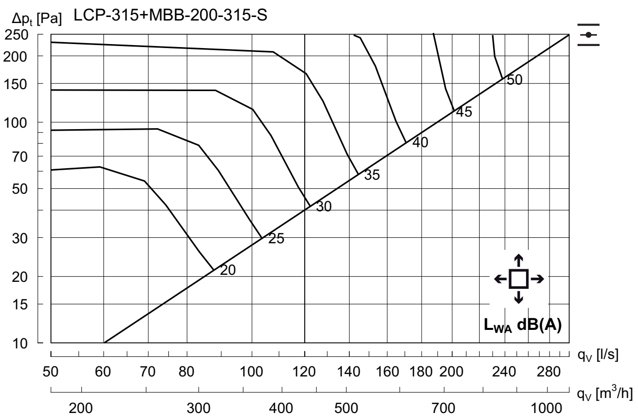
LKP/LCP 315 + MBB - Supply air



Hz	63	125	250	500	1K	2K	4K	8K
Kok	12	4	0	-2	-4	-14	-19	-27



Hz	63	125	250	500	1K	2K	4K	8K
Kok	13	7	0	-2	-6	-10	-17	-23



Hz	63	125	250	500	1K	2K	4K	8K
Kok	12	10	0	-3	-6	-12	-19	-24

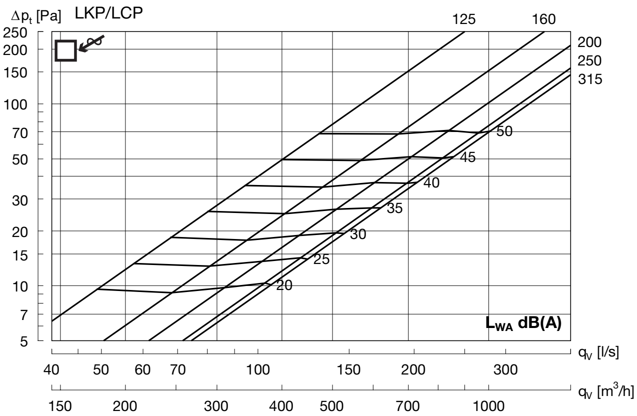
We reserve the right to make changes without prior notice

Lindab

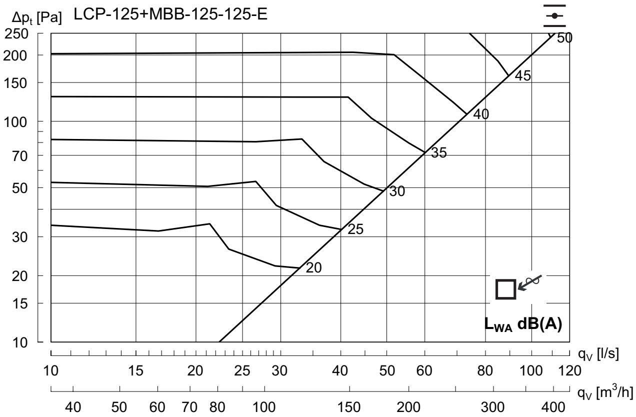
Plain diffuser LKP/LCP

Technical data

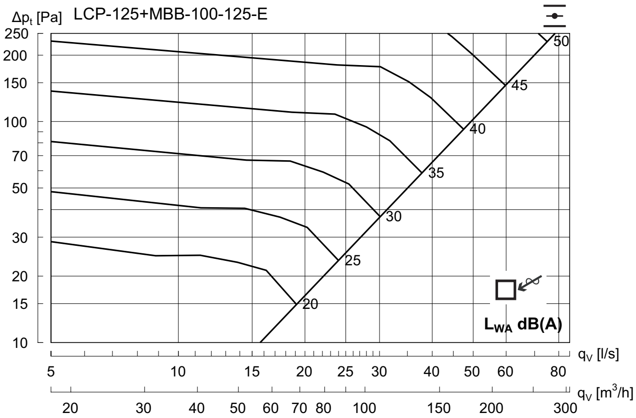
LKP/LCP without box – Exhaust



LKP/LCP 125 + MBB - Exhaust air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	12	4	-1	-1	-6	-12	-16	-22



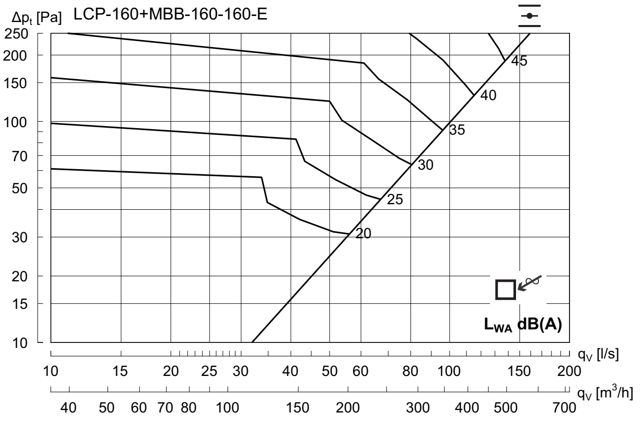
Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	13	-1	3	-1	-9	-11	-17	-23

Plain diffuser

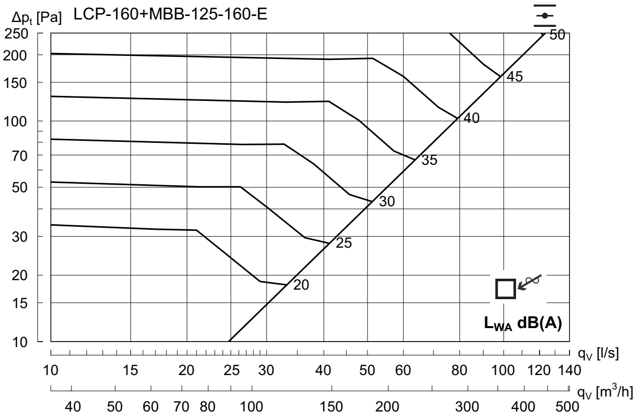
LKP/LCP

Technical data

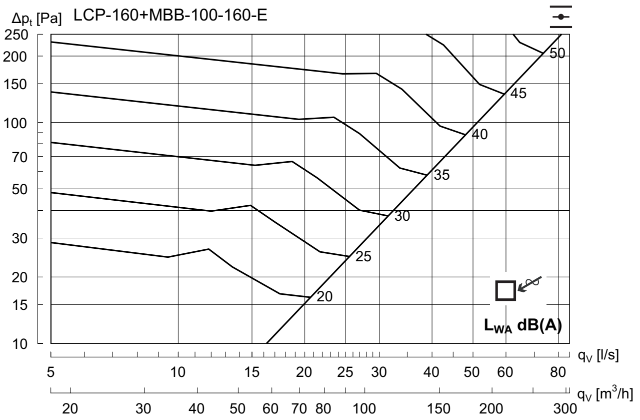
LKP/LCP 160 + MBB - Exhaust air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	16	4	-1	-2	-5	-10	-16	-21

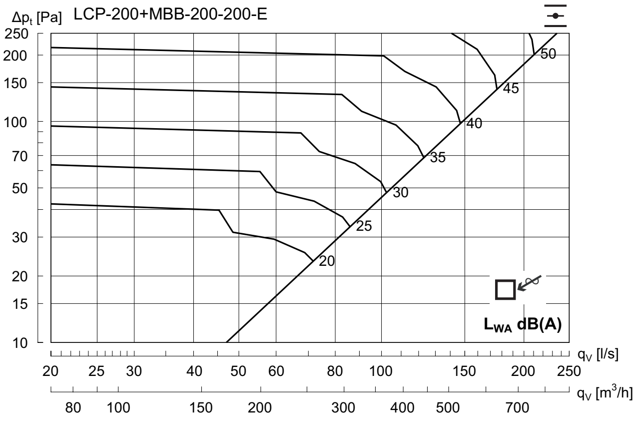


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	14	5	0	-1	-6	-11	-15	-21

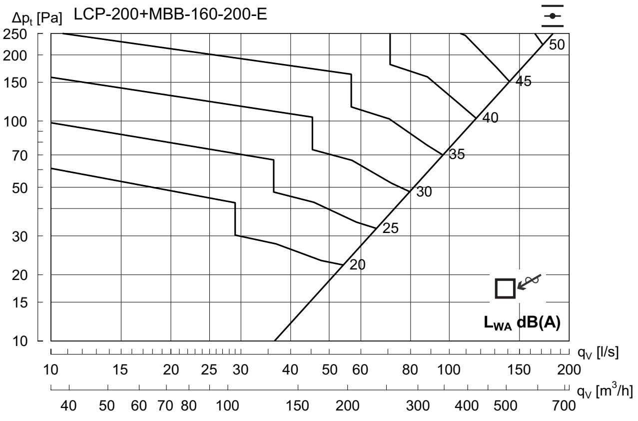


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	11	3	2	0	-8	-13	-17	-23

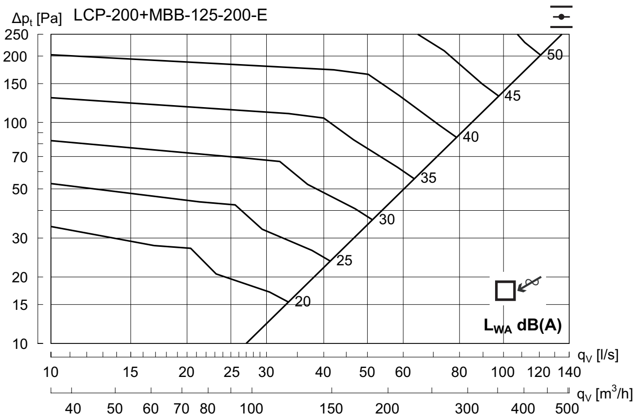
LKP/LCP 200 + MBB - Exhaust air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	15	5	0	-2	-6	-10	-15	-23



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	16	5	-1	-3	-5	-10	-15	-21



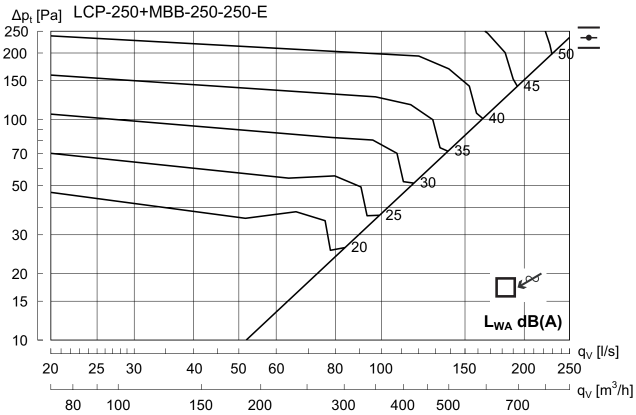
Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	11	3	-1	-2	-5	-10	-16	-22

Plain diffuser

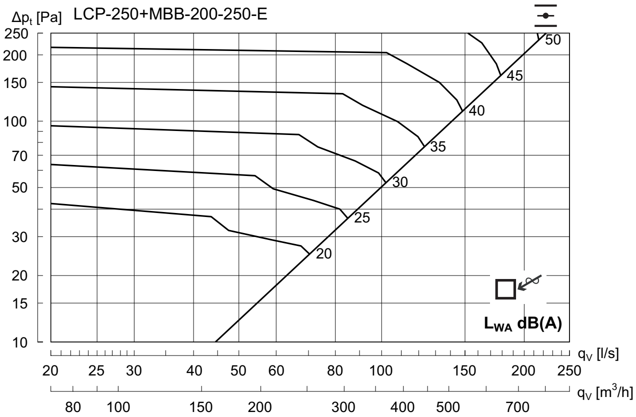
LKP/LCP

Technical data

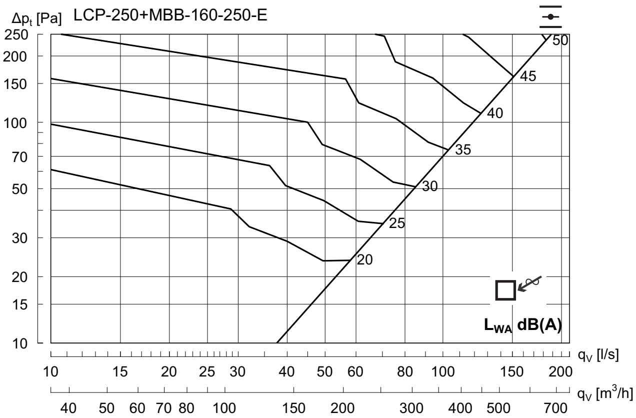
LKP/LCP 250 + MBB - Exhaust air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	11	4	1	-2	-5	-11	-17	-25

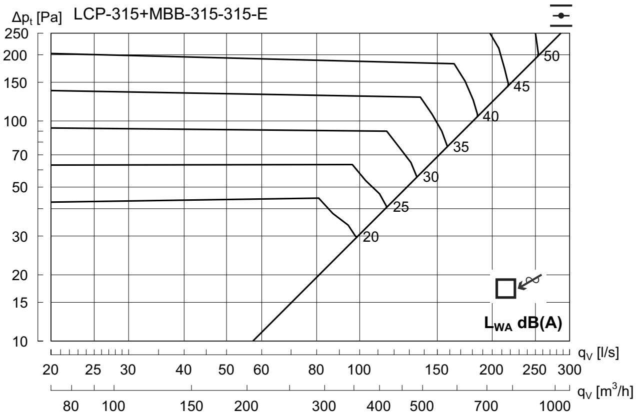


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	14	4	0	-2	-6	-11	-16	-25

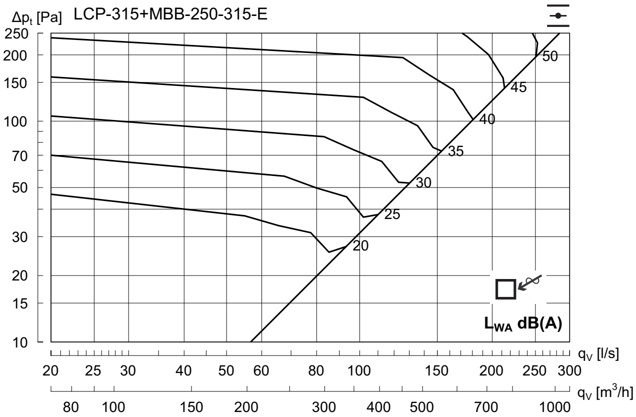


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	19	6	-1	-4	-5	-12	-18	-26

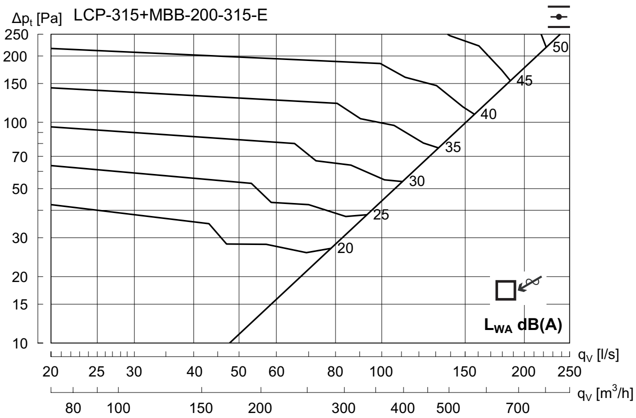
LKP/LCP 315 + MBB - Exhaust air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	12	4	2	-3	-6	-9	-18	-27



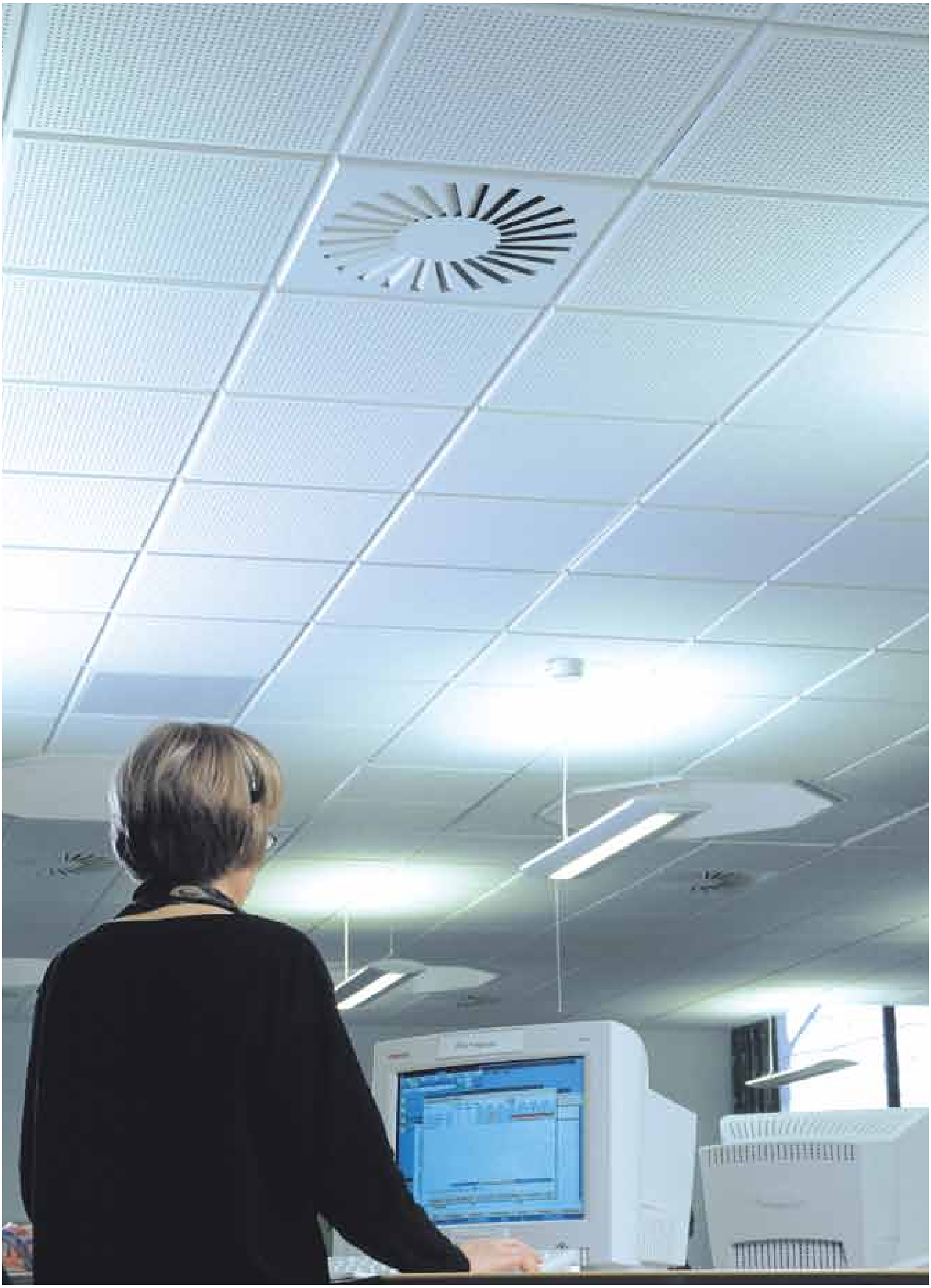
Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	12	5	2	-3	-6	-10	-17	-24



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	14	5	0	-3	-5	-10	-16	-25

Lindab Versio

a series of ceiling adapted diffusers

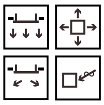
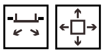
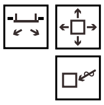
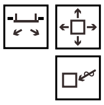
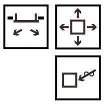
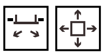


RS14, adjusted ceiling type Markant.

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

Lindab Versio a series of ceiling adapted diffusers

Diffusers for mixed ventilation

Diffusers	Product	Functions	Page
	**PS1**		**195**
	**PS8**		**205**
	**RS14**		**213**
	**RS15**		**227**
	**RS16**		**239**
	**NS19**		**247**
	**GS23**		**255**

Lindab Versio a series of ceiling adapted diffusers

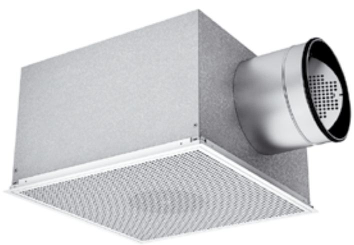
CMC Biopharmaceuticals A/S, Søborg.

Lindab Versio

Lindab Versio is a series of square ceiling diffusers for supply and exhaust air adapted for false ceilings.
Versio is, as the name implies, a variety of possibilities to construct the diffuser to suit the specific need. A large selection of face plates with different designs meet requirements for both design and function. Different types of plenum boxes ensure the possibility to connect the diffuser to the duct system, and at the same time regulate the diffusers individually.
Versio can be adapted to most ceiling systems, so the diffuser will blend in naturally with the ceiling environment, and ensure a simple mounting, which will make the job easier when mounting the diffuser directly at the construction site.

Unique flexibility

Versio gives a unique freedom of selection and flexibility. The final configurated diffuser is simple to mount and is delivered finished and adapted to the individual ceiling system.
A unique magnetic suspension-system of the face plates secure an easy access to the internal components , which can be demounted without the use of tools and gives free access to all internal parts including the air-duct system in connection with inspection and cleaning.



PS1 with plenum box type H.

Lindab Versio a series of ceiling adapted diffusers

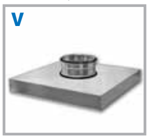
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

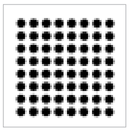
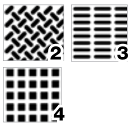
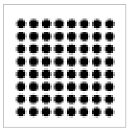
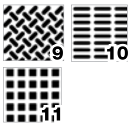
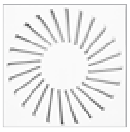
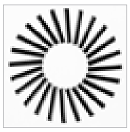
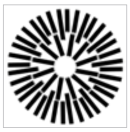
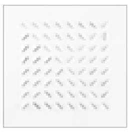
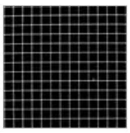
Design

See Comfort and Design

Plenum boxes

Details, see chapter Plenum boxes

V  H  R 

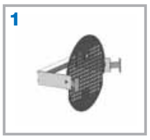
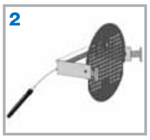
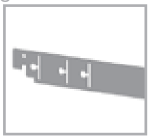
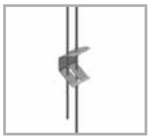
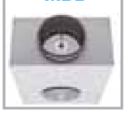
Product	Design	Ventilation principle	Size (mm)	Dimension A x B (Only R box) (mm)	V: H = 95 mm	H: H = Ød + 90 mm	R: H = 170 mm
PS	**Perforated**						
	No.: 1 		125				
			160	200 x 100		●	•
			200	300 x 100	●	●	•
			250	400 x 100	●	●	•
			315	500 x 100	●	●	•
	No.: 2, No.: 3, No.: 4 		125				
			160	200 x 100		○	•
			200	300 x 100	○	○	•
			250	400 x 100	○	○	•
			315	500 x 100	○	○	•
	Perforated rotation						
	No.: 8 		125			●	
			160	200 x 100	●	●	•
			200	300 x 100	●	●	•
			250	400 x 100	●	●	•
			315	500 x 100	●	●	•
	No.: 9, No.: 10, No.: 11 		125			●	
			160	200 x 100	○	●	•
			200	300 x 100	○	●	•
			250	400 x 100	○	●	•
			315	500 x 100	○	●	•
RS	**Swirl**						
	No.: 14 		125			●	
			160	200 x 100	●	●	○
			200	300 x 100	●	●	○
			250	400 x 100	●	●	○
			315	500 x 100	●	●	○
	No.: 15 		125				
			160	200 x 100		●	
			200	300 x 100	●	●	○
			250	400 x 100	●	●	○
			315	500 x 100	●	●	○
	No.: 16 		125				
			160	200 x 100			
			200	300 x 100			
			250	400 x 100		●	
			315	500 x 100	●	●	○
NS	**Nozzles**						
	No.: 19 		125			●	
			160	200 x 100	●	●	•
			200	300 x 100	●	●	•
			250	400 x 100	●	●	•
			315	500 x 100	●	●	•
GS	**Grid**						
	No.: 23 		125			●	
			160	200 x 100	•	●	•
			200	300 x 100	•	●	•
			250	400 x 100	•	●	•
			315	500 x 100	•	●	•

Lindab®

Lindab Versio a series of ceiling adapted diffusers

Regulation Accessories

See product pages

Type		Size	Patterns	1 	2 				MBB 
Grille box		**mm**		Damper	Damper/mea.dev.	MDR	PBB	MHS	MBB
V		**160**	**300**				●	●	●
		200	**400**			●	●	●	●
		250	**500**			●	●	●	●
		315	**600**			●	●	●	●
Plenum box		**mm**		Damper	Damper/mea.dev..		PBB	MHS	MBB
H		**125**	**300**	●	●		●	●	
		160	**400**	●	●	●	●	●	
		200	**500**	●	●	●	●	●	
		250	**600**	●	●	●	●	●	
		315	**600**	●	●	●	●	●	
Rectangular connection		**mm**		Damper	Damper/mea.dev.	.	PBB	MHS	MBB
R		**200**	**300**	○	○	◍	●	●	
		300	**400**	○	○	◍	●	●	
		400	**500**	○	○	◍	●	●	
		500	**600**	○	○	◍	●	●	

● 1. Product and tech. data depicted in catalogue.
○ 2. Combination possible. Tech. data depicted in catalogue.
◍ 3. Combination possible. Tech. data not in catalogue.
4. If space is empty, combination is not possible.

Guide to diffuser selection

1. Lindab Versio starts with a product- and design choice based on function and design. Ex. : PS1 or RS14. The design is numbered, and specifically described in the chapter ”Comfort and Design”. Then a choice must be made of a grille box / plenum box depending on the type of connection, circular or rectangular, vertical or horizontal.

2. To obtain the desired function, one has to decide how the diffuser should be used: Supply (S), Exhaust (E), or Low-impulse(L). If the plenum box type H or R is chosen, it is necessary to know which type of regulation is required: without damper and measuring device (0), with damper without measuring device (1) or with damper and measuring device (2).

3. The connection dimension for the diffuser/plenum box is set, and finally the ceiling system is stated. The ceiling systems are numbered, and more specifically described in “Ceiling adaption”.

4. Lindab Versio is ready to order after making the specific choices. The final configurated product is named in the order. Ordering codes are also found on the product pages as well as in the rest of the product programme.

Example of ordering Versio + grille box/plenum box

In this example the order is for:
Square diffuser with non-adjustable swirl pattern. Integrated side-connected plenum box with connection dimension ø200. The diffuser should be supplied with damper and measuring device for individual regulation of the unit. The diffuser should be adapted to T24 600x600 system ceiling in a cleanable design.

RS14 – **H** – **S** – **2** – **200** – **1**

Diffuser being ordered in the example

Lindab Versio

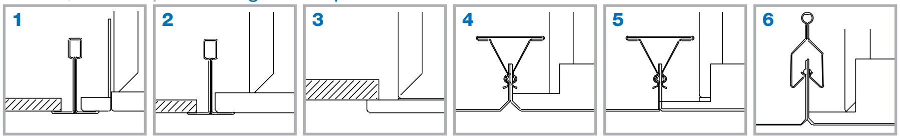
a series of ceiling adapted diffusers

Design

See Comfort and Design

Ceiling tile adaption

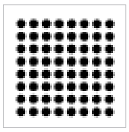
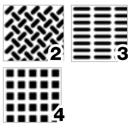
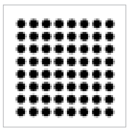
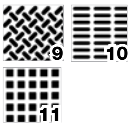
Details, see chapter Ceiling tile adaption



Product | Size

1: Danotile T24/T15, Ecophon T24, Rockfon A24.
2: Danotile T24/T15, Ecophon T24, Rockfon A24
3: Permanent ceiling
4: Dampa Clip-In Bevelled edge
5: Dampa Clip-In Square edge
6: Luxalon Clip-In

Grille box/plenum boxes

Product	Design	mm	1 V	1 H	1 R	2 V	2 H	2 R	3 V	3 H	3 R	4 V	4 H	4 R	5 V	5 H	5 R	6 V	6 H	6 R
PS	**Perforated**																			
	No.: 1 	**125**																		
		160		●	●		●	●		●	●		●	●		●	●		●	●
		200	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
		250	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
		315	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	No.: 2, No.: 3, No.: 4 	**125**																		
		160		●	●		●	●		●	●		●	●		●	●		●	●
		200	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
		250	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
		315	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	Perforated rotation																			
	No.: 8 	**125**		●			●			●			●			●			●	
		160	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
		200	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
		250	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
		315	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	No.: 9, No.: 10, No.: 11 	**125**		●			●			●			●			●			●	
		160	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
		200	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
		250	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
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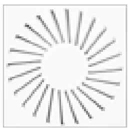
RS	**Swirl**																			
	No.: 14 	**125**		●			●			●			●			●			●	
		160	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
		200	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
		250	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
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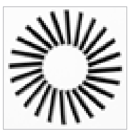
	No.: 15 	**125**																		
		160		●			●			●			●			●			●	
		200	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
		250	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
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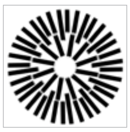
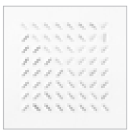
	No.: 16 	**125**																		
		160																		
		200																		
		250		●			●			●			●			●			●	
		315	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
NS	**Nozzles**																			
	No.: 19 	**125**		●			●			●			●			●			●	
		160	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
		200	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
		250	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
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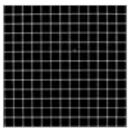
GS	**Grid**																			
	No.: 23 	**125**		●			●			●			●			●			●	
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		200	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
		250	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
		315	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●

Lindab Versio

a series of ceiling adapted diffusers

Design

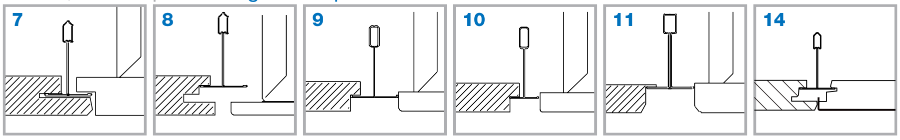
See Comfort and Design

Ceiling tile adaption

Details, see chapter Ceiling tile adaption

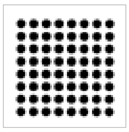
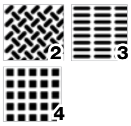
Product

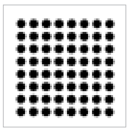
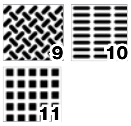
Size

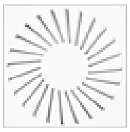
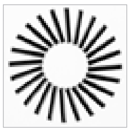
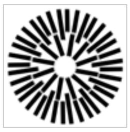
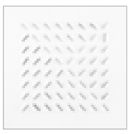
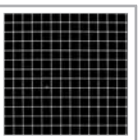


7	8	9	10	11	14
Danotile Contur Ecophon D Rockfon D-XL	Ecophon Focus DG	Rockfon E10 24 Ecophon - E / T24	Rockfon E10 15 Ecophon - E / T15	Danotile Markant	Ecophone Focus edge DS

Grille box/plenum boxes

Product	Design	No.	mm	7 V	7 H	7 R	8 V	8 H	8 R	9 V	9 H	9 R	10 V	10 H	10 R	11 V	11 H	11 R	14 V	14 H	14 R
PS	Perforated	No.: 1	125																		
			160		●	●		●	●		●	●		●	●		●	●		●	●
			200	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
			250	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
			315	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
		No.: 3 No.: 4	125																		
			160		●	●		●	●		●	●		●	●		●	●		●	●
			200	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
			250	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
			315	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	Perforated rotation	No.: 8	125		●			●			●			●			●			●	
			160	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
			200	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
			250	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
			315	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
		No.: 9 No.: 10 No.: 11	125		●			●			●			●			●			●	
			160	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
			200	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
			250	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
			315	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
RS	Swirl	No.: 14	125		●			●			●			●			●			●	
			160	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
			200	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
			250	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
			315	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
		No.: 15	125																		
			160		●			●			●			●			●			●	
			200	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
			250	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
			315	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
		No.: 16	125																		
			160																		
			200																		
			250		●			●			●			●			●			●	
			315	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
NS	Nozzles	No.: 19	125		●			●			●			●			●			●	
			160	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
			200	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
			250	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
			315	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
GS	Grid	No.: 23	125		●			●			●			●			●			●	
			160	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
			200	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
			250	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
			315	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●

Versio

PS1

PS1 with grille box type V

Description

PS1 is a square perforated diffuser. PS1 can be used for both supply and exhaust air. PS1 is suitable for the horizontal supply of cooled air. PS1 can also be used for low impulse and is therefore useful for the supply of replacement air in environments with high rates of air exchange.

- Suitable for both supply and exhaust air
- The possibility of 1-2-3-way dispersal
- Can be used for low impulse
- Unique magnetic suspension of face plate

Order code

Product PS a b c d eee f

Type
PS

Design
1 - 2 - 3- 4

Box type
V - H - R

Functional use
S = Supply air
E = Exhaust (Box type R, only exhaust)
L = Low-impulse

Damper
0 = No damper (Box type : H, V)
1 = Damper (Box type : H, R)
2 = Damper / Meas.outlets (Box type : H)

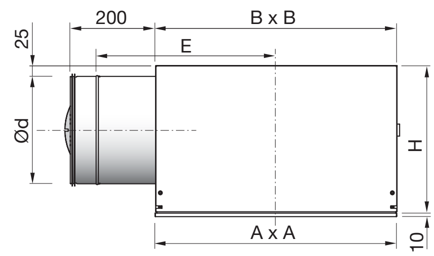
Connection dim.
Ø200-315 (Box type : V)
Ø160-315 (Box type : H)
(200x100 -500x100) (Box type : R)

Ceiling system
1 - 14 (Go to chapter Ceiling tile adaption)

Example: PS-1-V-S-0-200-1

PS1 with plenum box type H

Dimensions



PS1-H		A	B	H	E	Weight
Ød	**Pattern**	**mm**	**mm**	**mm**	**mm**	**kg**
160	400	*-	380	250	350	5,9
200	500	*-	460	290	390	8.50
250	600	*-	560	340	420	12.3
315	600	*-	560	405	420	13.1

* Face plate dimension A x A depends on ceiling system. See "**Ceiling adjustment**" for detailed dimensions. For further details on plenum box - see **"Plenum boxes"**.

Maintenance

The face plate can be removed to enable cleaning of internal parts or to gain access to the duct or box. The visible parts of the diffuser can be wiped with a damp cloth.

Materials and finish

Grille box/plenum box:
Material: Galvanised steel

Face plate:
Material: Galvanised steel
Standard finish: Powder-coated
Standard colour: RAL 9010, gloss 30

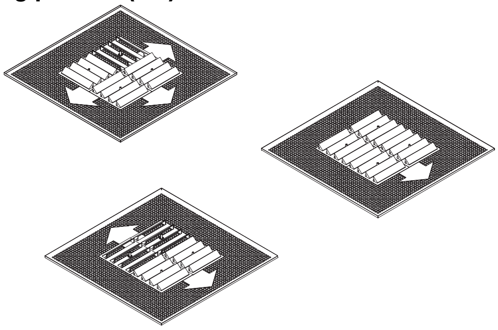
The diffuser is available in other colours. Please contact Lindab's sales department for further information.

Versio

PS1

Accessories

Blending profiles (set) — MDR

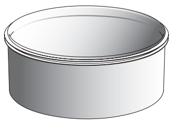


Order code

Product	MDR	aaa
Type		
Pattern		

Example: MDR-200

Extension piece — MBZ



Order code

Product	MBZ	aaa
Type		
Size		

Example: MBZ-200

Mounting bracket — PBB

Suspension — MHS

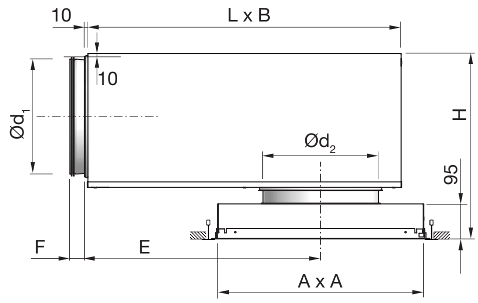
Order code

Product	aaa
Type	

Example: MHS

Plenum box MBB

PS1-V + MBB



PS1-V + MBB							
Duct	PS1-V		B	E	F	H*	L
$Ød_1$ mm	$Ød_2$ mm	Pattern	mm	mm	mm	mm	mm
125	200	400	310	262	50	300 - 340	376
160	200	400	380	323	50	334 - 374	459
160	250	500	380	323	50	334 - 374	459
200	200	400	460	396	70	375 - 415	565
200	250	500	460	396	70	375 - 415	565
200	315	600	460	396	70	375 - 415	565
250	250	500	540	486	70	425 - 465	698
250	315	600	540	486	70	425 - 465	698
315	315	600	540	646	70	490 - 530	858

* Using accessory MBZ the H dimension will increase:
$Ød_2$ = 200 mm => H +40 mm
$Ød_2$ = 250 - 315 mm => H +60 mm

Order code

Product	MBB	aaa	bbb	c
Type MBB				
Duct connection $Ød_1$ Ø125-315				
Diffuser dimension $Ød_2$ Ø200-315				
Functional use S = Supply air E = Exhaust				

Example: PS-1-V-S-0-200-1+MBB-200-200-S

Versio

PS1

Technical data

Capacity

Air flow q_v [l/s] and [m^3/h], total pressure Δp_t [Pa], throw $l_{0.2}$ [m] and sound power level L_{WA} [dB(A)] can be seen in the diagrams.

Frequency-related sound effect level

The sound effect level in the frequency band is defined as $L_{WA}+K_{ok}$. K_{ok} values are specified in charts beneath the diagrams on the following pages. K_{ok} values for PS1 without a box are avaliable on request.

Quick selection, supply air

PS1-V + MBB

PS1-V + MBB		Max. airflow		Max. airflow	
Duct	PS1-V	30dB(A)		35dB(A)	
$Ød_1$	$Ød_2$	l/s	m^3/h	l/s	m^3/h
125	200	58	209	70	252
160	200	63	227	77	277
160	250	71	256	90	324
200	200	82	295	97	349
200	250	88	317	108	389
200	315	108	389	139	500
250	250	106	382	124	446
250	315	124	446	150	540
315	315	152	547	183	659

PS1 + H

PS1 + H	Minimum		Max. airflow		Max. airflow	
Size Ød			30dB(A)		35dB(A)	
mm	l/s	m^3/h	l/s	m^3/h	l/s	m^3/h
160	30	108	51	184	57	205
200	49	176	69	248	83	299
250	49	176	93	335	114	410
315	82	295	140	504	164	590

Sound attenuation

Sound attenuation of the diffusers ΔL from duct to room, including end reflection - see table below.

PS1-V + MBB

PS1-V + MBB		Centre frequency Hz							
Duct	PS1-V								
$Ød_1$	$Ød_2$	63	125	250	500	1K	2K	4K	8K
125	200	14	11	4	15	15	15	16	17
160	200	14	14	7	22	18	17	19	20
160	250	14	14	4	17	15	15	16	19
200	200	13	10	7	16	19	17	19	18
200	250	11	9	6	15	17	15	18	16
200	315	13	8	3	12	16	14	16	15
250	250	14	8	8	16	18	17	17	18
250	315	14	7	5	14	16	15	16	17
315	315	8	9	9	15	17	16	17	21

PS1 + H

PS1 + H	Centre frequency Hz							
Size Ød								
mm	63	125	250	500	1K	2K	4K	8K
160	18	15	5	13	11	11	9	10
200	16	10	6	15	11	11	12	14
250	14	9	7	13	8	9	12	14
315	12	8	8	14	10	9	11	14

Mounting -and balancing instruction

For futher information go to www.lindQST.com and Mounting -and balancing instruction.

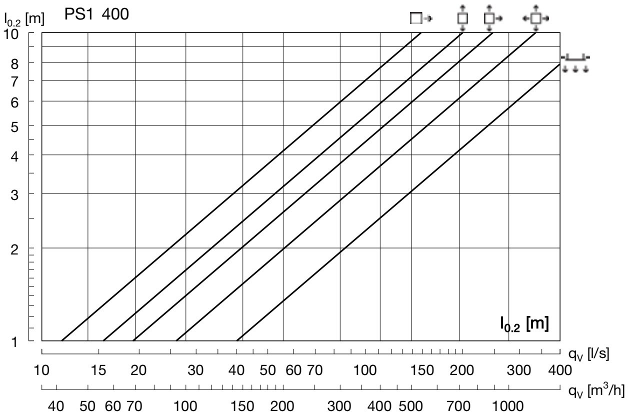
Versio PS1

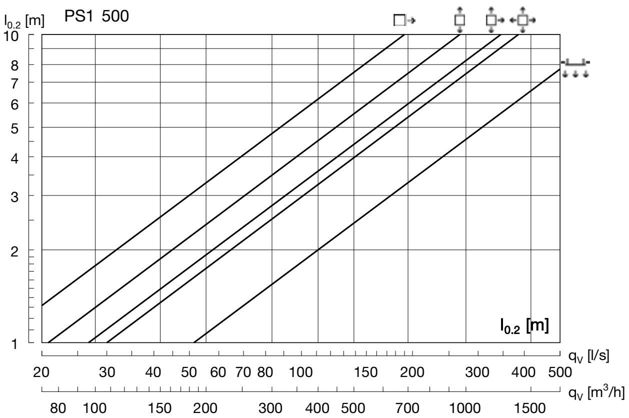
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

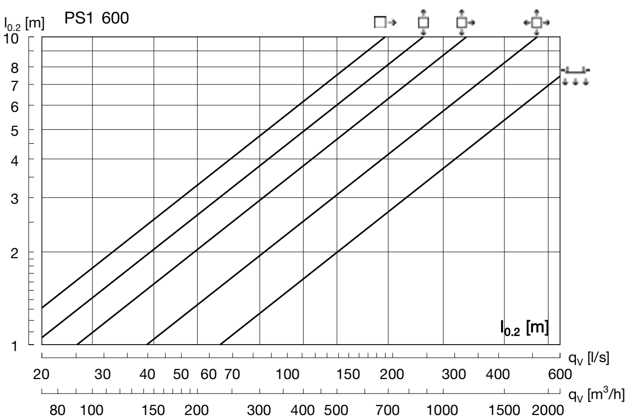
Technical data

Throw $l_{0.2}$

Throw $l_{0.2}$ [m] is specified at a terminal velocity of 0.2 m/s.

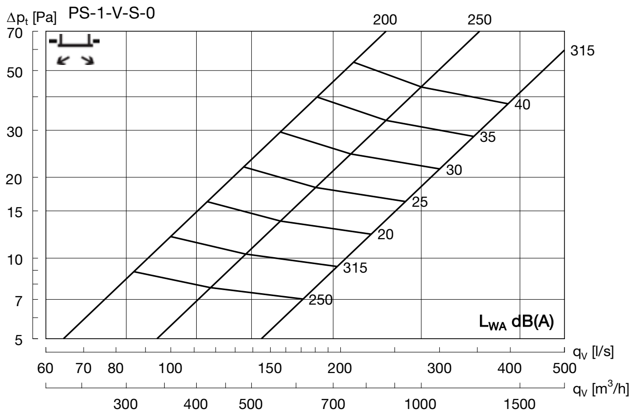




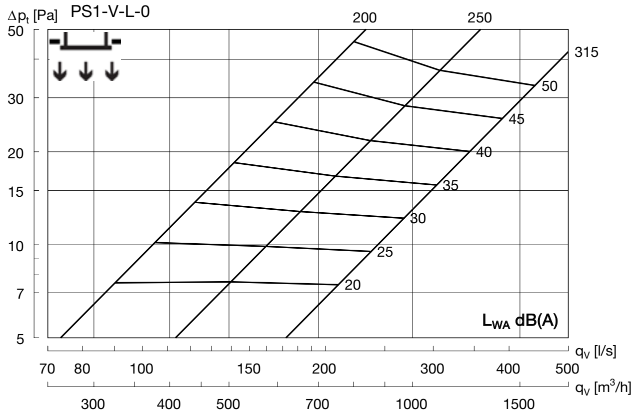


PS1-V without MBB

Supply air



Low-impulse

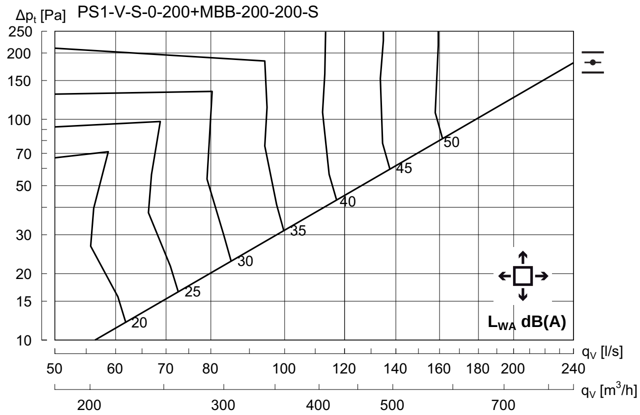


Concerning low impulse, go to planning guide in chapter 12 "Low impulse"

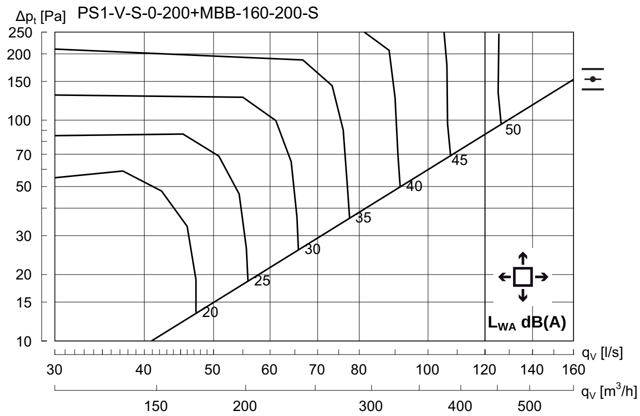
Versio PS1

Technical data

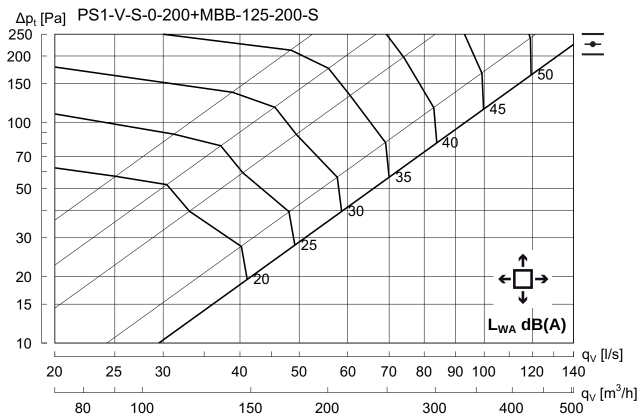
PS1-V 200 + MBB - Supply air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	13	0	-6	0	-4	-17	-25	-32

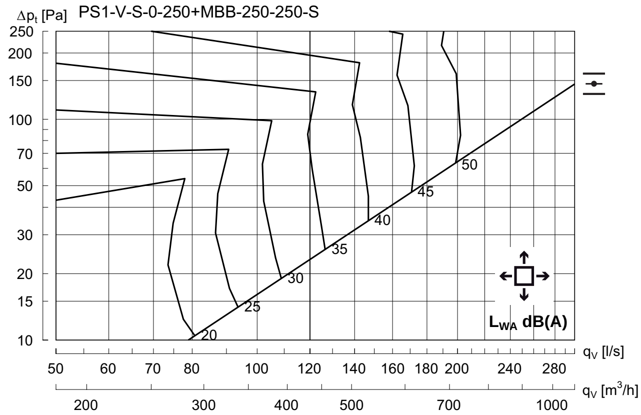


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	8	3	-3	-1	-4	-14	-21	-27

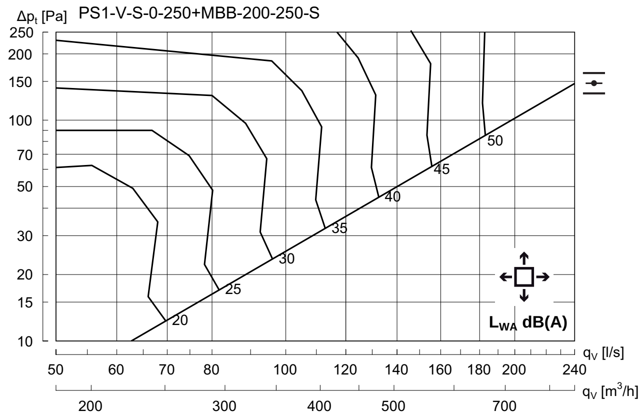


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	9	5	1	-2	-6	-10	-15	-22

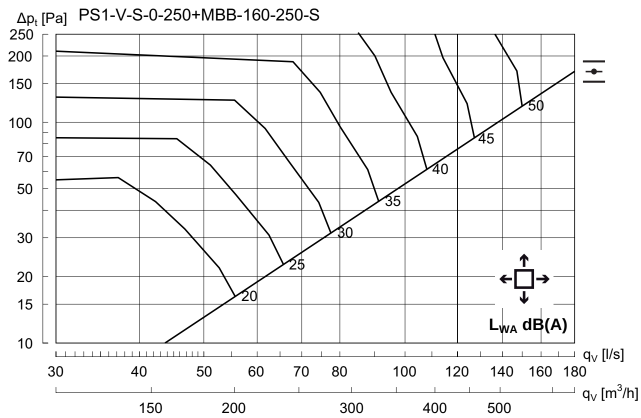
PS1-V 250 + MBB - Supply air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	10	-1	-6	0	-4	-18	-25	-33



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	9	4	-4	-1	-4	-15	-22	-28

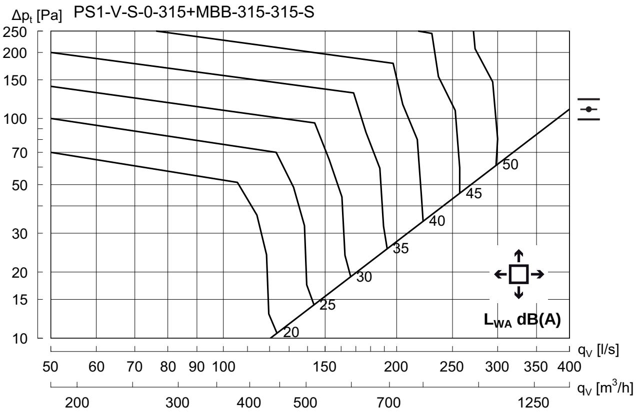


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	15	3	-1	-3	-4	-12	-19	-24

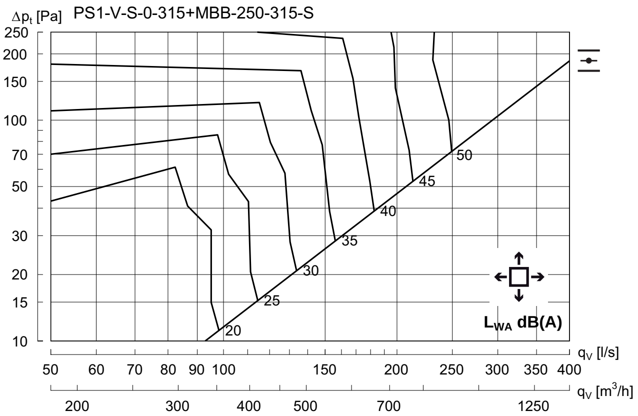
Versio PS1

Technical data

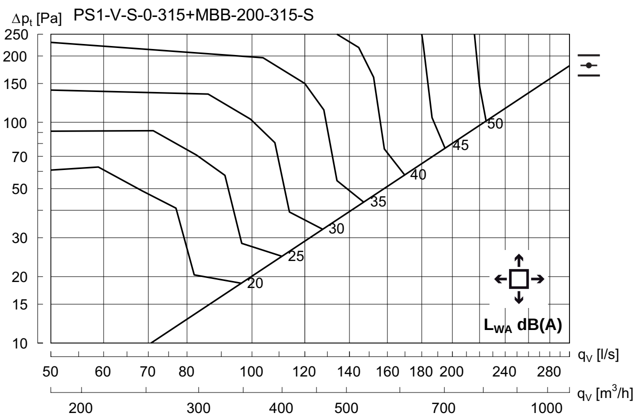
PS1-V 315 + MBB - Supply air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	12	0	-3	-1	-4	-16	-22	-28



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	9	4	-3	-1	-4	-15	-22	-28



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	10	5	-1	-2	-4	-12	-19	-25

Low-impulse correction, sound power level (L_{WA}) and pressure loss (Δp_t)

On the previous pages you can find diagrams for all sizes PS1-V+MBB supply air. When low-impulse values are wanted, use the correction factors in the table below.

PS1-V + MBB

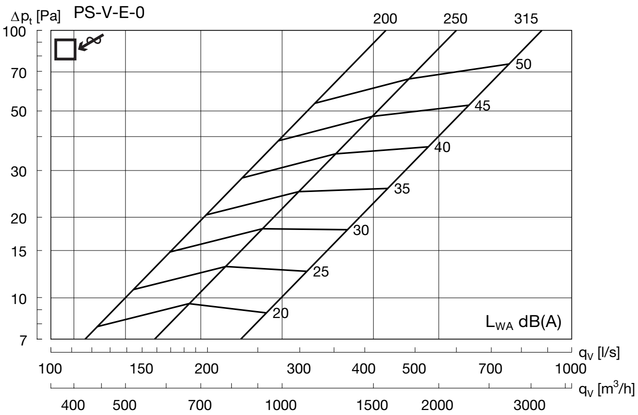
PS1-V + MBB		Low-impulse Correction factor	
Duct $Ød_1$	PS1-V $Ød_2$	L_{WA}	Δp_t
125	200	-1	x 1
160	200	-2	x 0,9
160	250	0	x 1
200	200	-3	x0,9
200	250	0	x 1
200	315	0	x 1
250	250	0	x 1
250	315	0	x 1
315	315	0	x 1

Concerning low impulse, go to planning guide in chapter 12 "Low impulse"

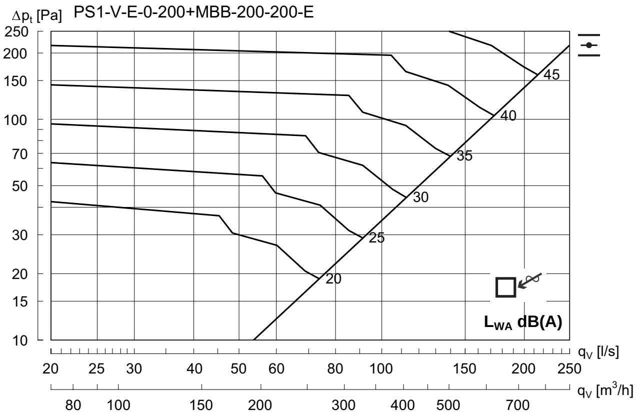
Versio PS1

Technical data

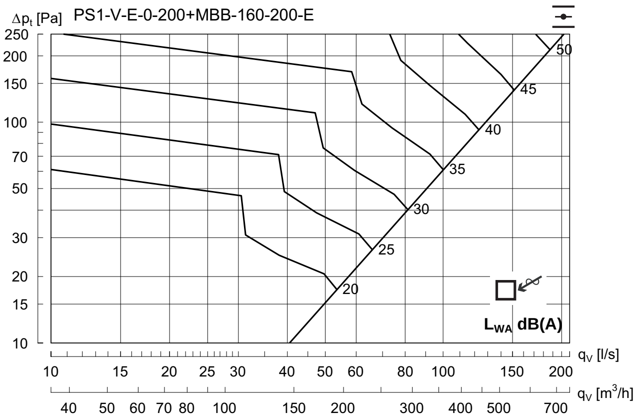
PS1-V without MBB - Exhaust air



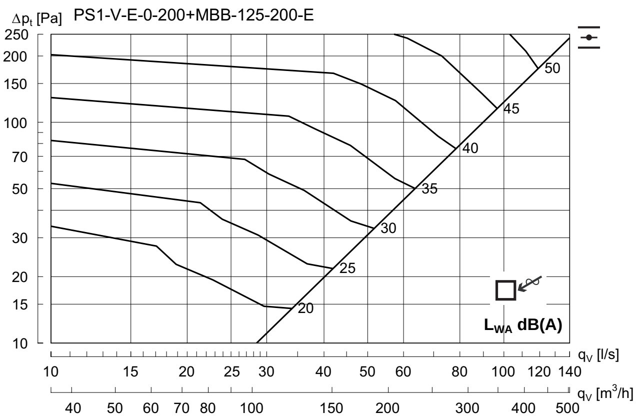
PS1-V 200 + MBB - Exhaust air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	15	5	1	-3	-6	-10	-14	-23



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	16	6	0	-3	-7	-9	-15	-21



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	10	4	2	-2	-6	-10	-15	-22

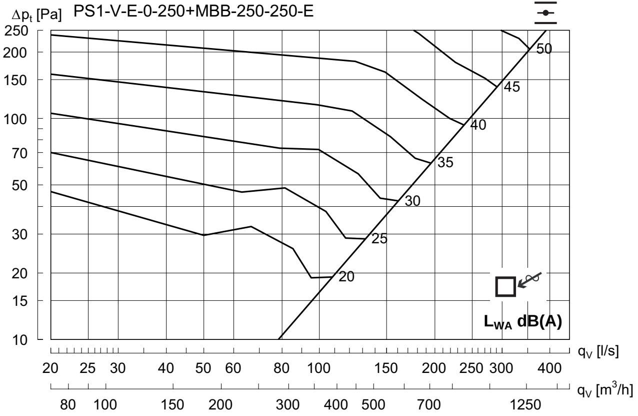
Versio

PS1

Technical data

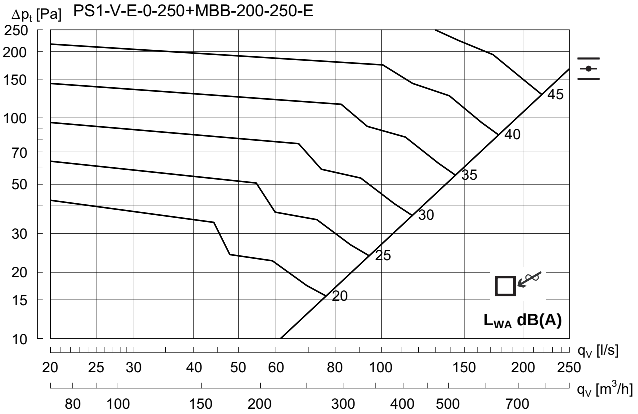
PS1-V 250 + MBB - Exhaust air

PS1-V-E-0-250+MBB-250-250-E



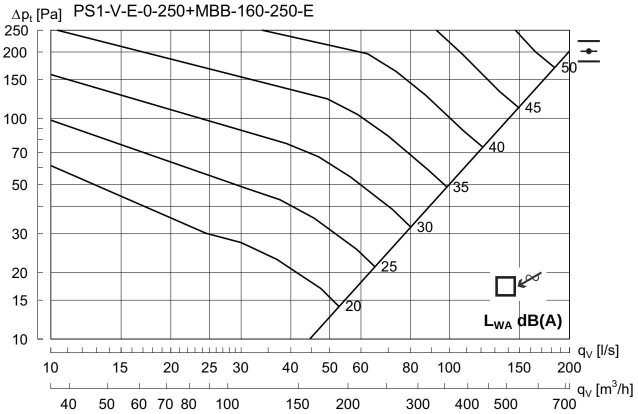
Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	10	6	2	-3	-6	-10	-15	-23

PS1-V-E-0-250+MBB-200-250-E



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	14	5	1	-3	-5	-10	-15	-22

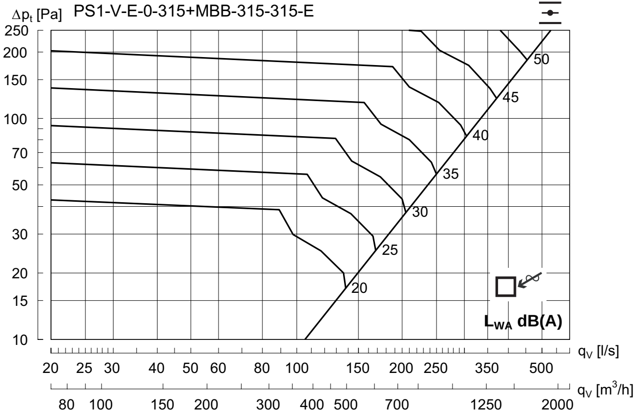
PS1-V-E-0-250+MBB-160-250-E



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	15	6	0	-3	-6	-9	-14	-21

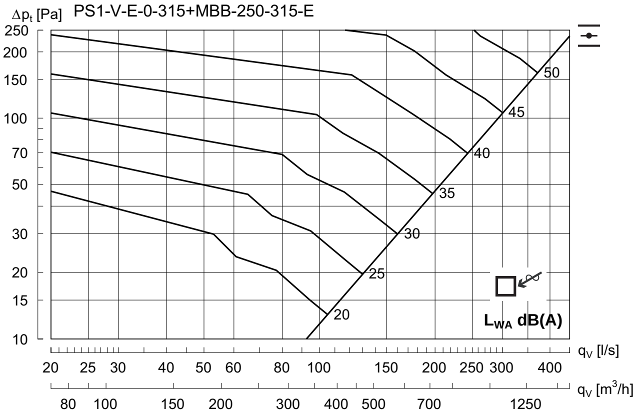
PS1-V 315 + MBB - Exhaust air

PS1-V-E-0-315+MBB-315-315-E



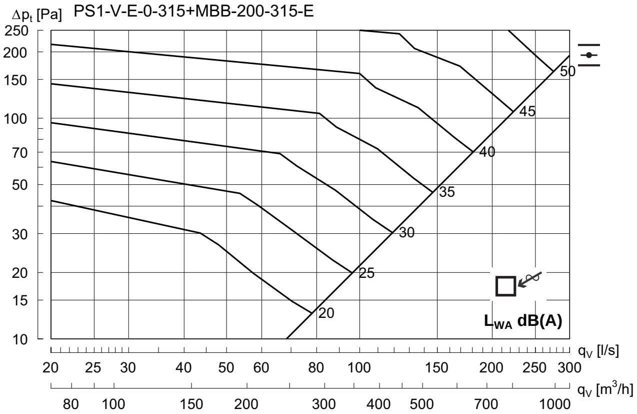
Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	11	5	3	-3	-7	-10	-15	-26

PS1-V-E-0-315+MBB-250-315-E



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	11	5	2	-3	-6	-11	-16	-23

PS1-V-E-0-315+MBB-200-315-E



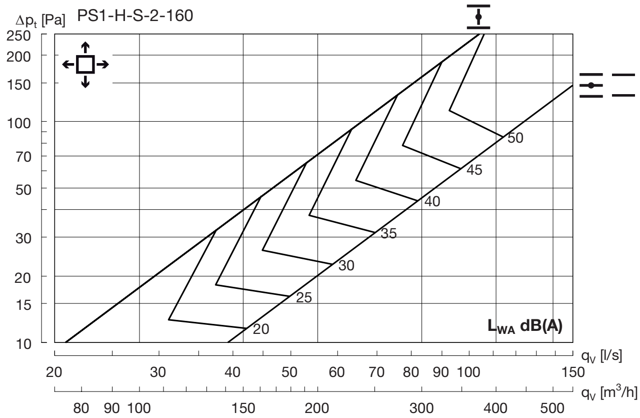
Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	13	5	1	-3	-6	-10	-14	-22

Versio

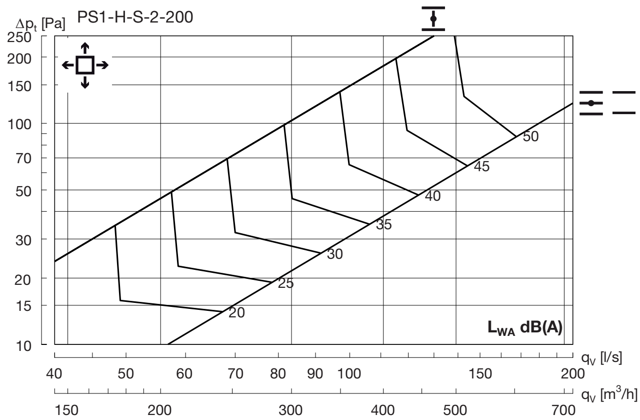
PS1

Technical data

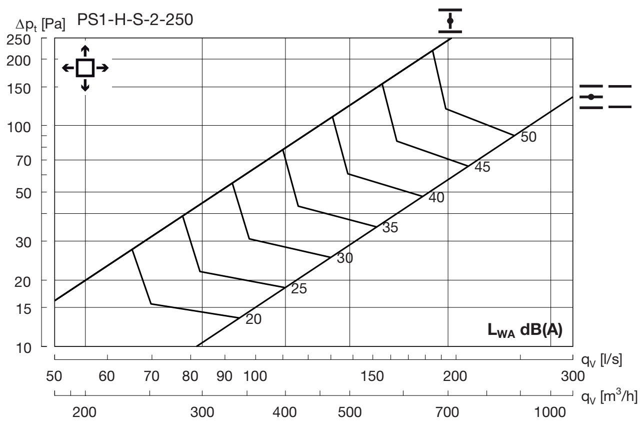
PS1+H - Supply air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	8	4	3	-3	-6	-11	-15	-14

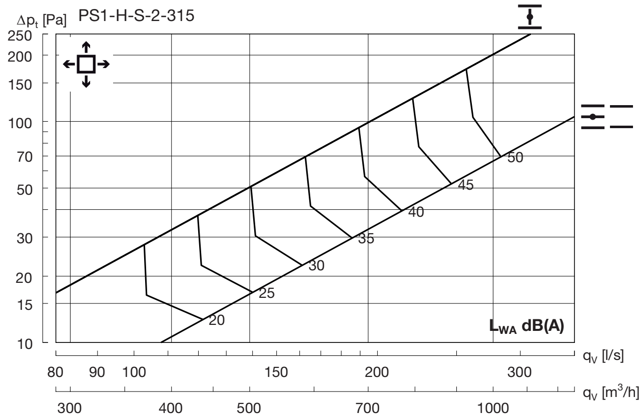


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	5	5	1	-1	-7	-12	-12	-18



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	9	5	2	-1	-7	-14	-18	-19

PS1+H - Supply air

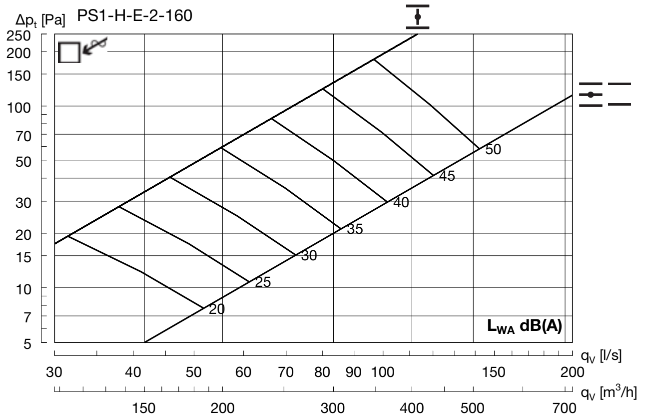


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	13	4	0	-1	-6	-13	-17	-27

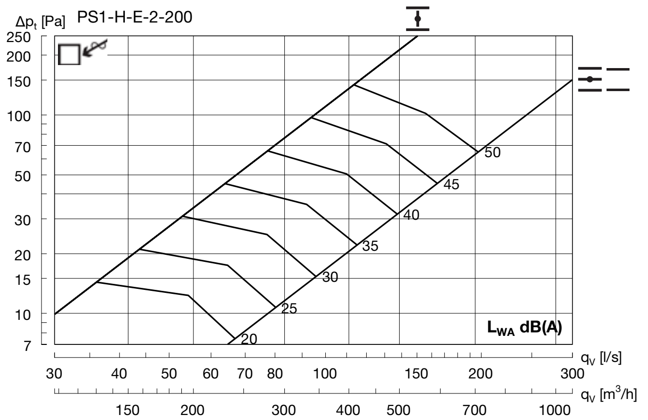
Versio PS1

Technical data

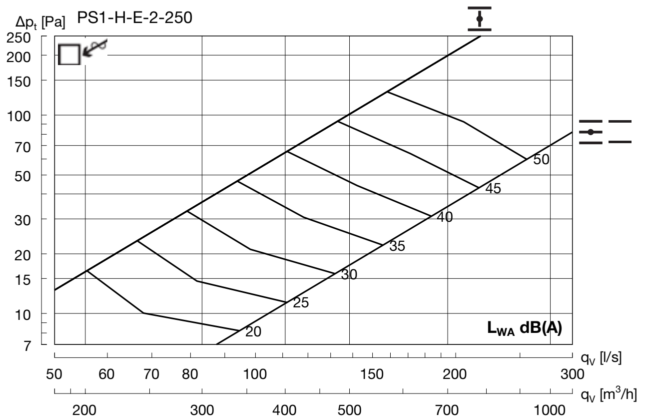
PS1+H - Exhaust air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	10	4	6	-3	-11	-12	-19	-25

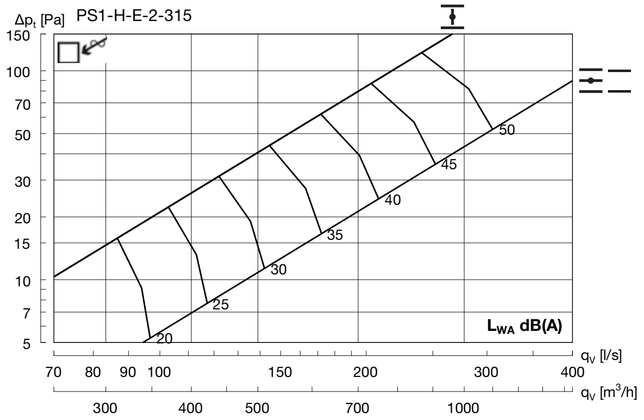


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	10	4	5	-2	-9	-13	-21	-29



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	11	5	2	-2	-6	-12	-22	-32

PS1+H - Exhaust air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	11	3	1	1	-8	-16	-26	-37

Versio PS8

PS8 with grille box type V

PS8 with plenum box type H

Description

PS8 is a square perforated diffuser with swirl insert. PS8 fits naturally into the ceiling and maintains the excellent technical properties of swirl diffusers. The swirl pattern ensures high induction and a large dynamic range, and is therefore ideal for the horizontal supply of very cold air.

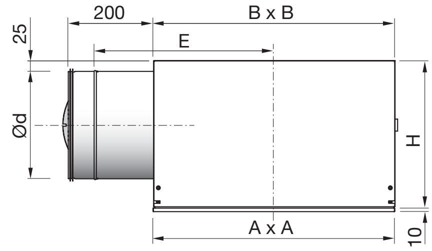
- Discrete appearance
- Large dynamic range
- High induction
- Ideal for the supply of very cold air

Order code

Product			PS	a	b	S	d	eee	f
Type									
PS									
Design									
8 - 9 - 10 - 11									
Box type									
V - H - R									
Functional use									
S = Supply air									
Damper									
0 = No damper	(Box type	: H, V)							
1 = Damper	(Box type	: H, R)							
2 = Damper / Meas.outlets	(Box type	: H)							
Connection dim.									
Ø160-315	(Box type	: V)							
Ø125-315	(Box type	: H)							
(200x100 -500x100)	(Box type	: R)							
Ceiling system									
1 - 14	(Go to chapter Ceiling tile adaption)								

Example: PS-8-V-S-0-200-1

Dimensions



PS8-H Ød	Pattern	A mm	B mm	H mm	E mm	Weight kg
125	300	*-	380	215	350	5.9
160	400	*-	380	250	350	5.9
200	500	*-	460	290	390	8.5
250	600	*-	560	340	420	12.3
315	600	*-	560	405	420	13.1

* Face plate dimension depends on ceiling system. See **"Ceiling adjustment"** for detailed dimensions. For further details on plenum box - see **"Plenum boxes"**.

Maintenance

The face plate can be removed to enable cleaning of internal parts or to gain access to the duct or box. The visible parts of the diffuser can be wiped with a damp cloth.

Materials and finish

Grille box/plenum box:
Material: Galvanised steel

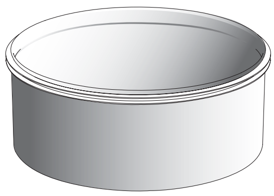
Face plate:
Material: Galvanised steel
Standard finish: Powder-coated
Standard colour: RAL 9010, gloss 30

The diffuser is available in other colours. Please contact Lindab's sales department for further information.

Versio PS8

Accessories

Extension piece MBZ



Order code

Product	MBZ	aaa
Type	MBZ	
Size		aaa

Example: MBZ-200

Mounting bracket PBB

Suspension MHS

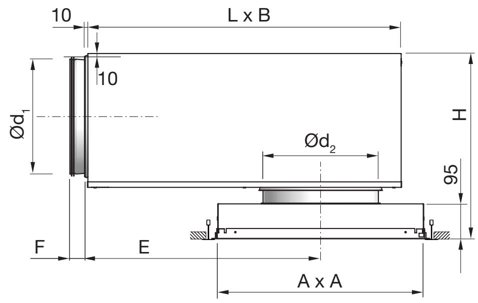
Order code

Product	aaa
Type	aaa

Example: MHS

Plenum box MBB

PS8-V + MBB



PS8-V + MBB							
Duct Ød							

Duct $Ød_1$ mm	PS8-V $Ød_2$ mm	Pattern	B mm	E mm	F mm	H* mm	L mm
100	160	300	260	216	50	275 - 315	310
125	160	300	310	262	50	300 - 340	376
125	200	400	310	262	50	300 - 340	376
160	160	300	380	323	50	334 - 374	459
160	200	400	380	323	50	334 - 374	459
160	250	500	380	323	50	334 - 374	459
200	200	400	460	396	70	375 - 415	565
200	250	500	460	396	70	375 - 415	565
200	315	600	460	396	70	375 - 415	565
250	250	500	540	486	70	425 - 465	698
250	315	600	540	486	70	425 - 465	698
315	315	600	540	646	70	490 - 530	858

* Using accessory MBZ the H dimension will increase:
$Ød_2$ = 160 - 200 mm => H +40 mm
$Ød_2$ = 250 - 315 mm => H +60 mm

Order code

Product	MBB	aaa	bbb	c
Type MBB	MBB			
Duct connection $Ød_1$ Ø100-315		aaa		
Diffuser dimension $Ød_2$ Ø160-315			bbb	
Functional use S = Supply air, E = Exhaust				c

Example: PS-8-V-S-0-200-1+MBB-200-200-S

Versio

PS8

Technical data

Capacity

Air flow q_v [l/s] and [m^3/h], total pressure Δp_t [Pa], throw $l_{0.2}$ [m] and sound power level L_{WA} [dB(A)] can be seen in the diagrams.

Frequency-related sound effect level

The sound effect level in the frequency band is defined as $L_{WA}+K_{ok}$. K_{ok} values are specified in charts beneath the diagrams on the following pages. K_{ok} values for PS8 without a box are avaliable on request.

Quick selection, supply air

PS8-V + MBB

PS8-V + MBB Duct $Ød_1$	PS8-V $Ød_2$	Max. airflow 30dB(A) l/s	m³/h	Max. airflow 35dB(A) l/s	m³/h
100	160	31	112	38	137
125	160	36	130	43	155
125	200	48	173	60	216
160	160	37	133	44	158
160	200	52	187	62	223
160	250	67	241	84	302
200	200	59	212	70	252
200	250	82	295	98	353
200	315	72	259	88	317
250	250	83	299	97	349
250	315	81	292	96	346
315	315	-	-	102	367

PS8 + H

PS8 + H Size Ød mm	Minimum l/s	m³/h	Max. airflow 30dB(A) l/s	m³/h	Max. airflow 35dB(A) l/s	m³/h
125	26	93	23	83	29	104
160	33	118	46	166	54	194
200	57	204	61	220	74	266
250	71	254	-	-	106	382
315	95	342	-	-	-	-

Sound attenuation

Sound attenuation of the diffusers ΔL from duct to room, including end reflection - see table below.

PS8-V + MBB

PS8-V + MBB Duct $Ød_1$	PS8-V $Ød_2$	Centre frequency Hz 63	125	250	500	1K	2K	4K	8K
100	160	18	16	5	17	20	19	17	21
125	160	16	13	9	19	18	18	18	20
125	200	14	11	5	15	16	17	17	19
160	160	15	16	11	23	20	20	21	21
160	200	15	15	8	22	20	18	20	20
160	250	16	13	5	18	16	16	17	20
200	200	14	11	7	17	21	17	20	18
200	250	14	9	5	14	18	15	18	17
200	315	13	9	3	13	17	15	17	16
250	250	13	8	7	17	18	18	18	18
250	315	16	7	5	16	16	17	17	18
315	315	9	9	9	16	17	17	18	23

PS8 + H

PS8 + H Size Ød mm	Centre frequency Hz 63	125	250	500	1K	2K	4K	8K
125	18	13	8	19	14	11	12	15
160	18	12	3	14	13	7	7	8
200	14	9	3	14	9	7	8	11
250	14	8	7	10	8	7	9	12
315	12	6	8	13	8	7	10	12

Mounting -and balancing instruction

For futher information go to www.lindQST.com and Mounting -and balancing instruction.

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

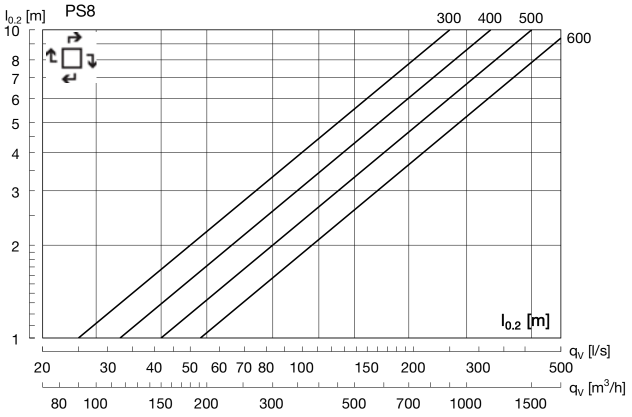
Versio

PS8

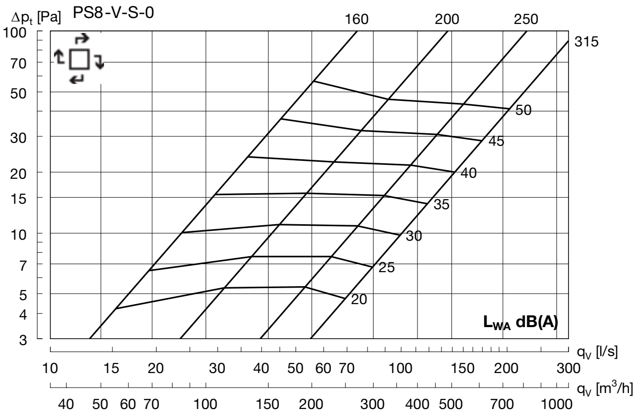
Technical data

Throw $l_{0.2}$

Throw $l_{0.2}$ [m] is specified at a terminal velocity of 0.2 m/s. The designation by the lines specifies the pattern on the face plate.



PS8-V without plenum box – Supply air

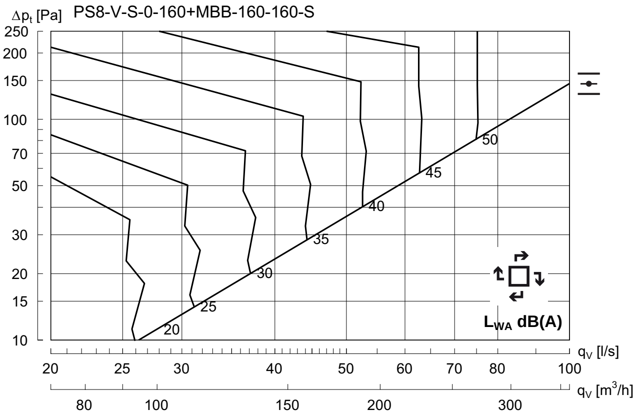


Versio

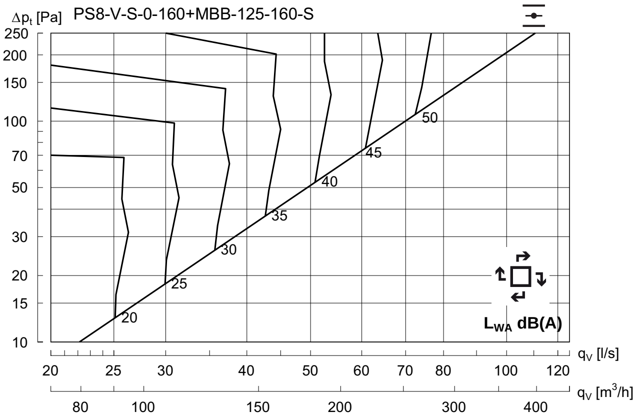
PS8

Technical data

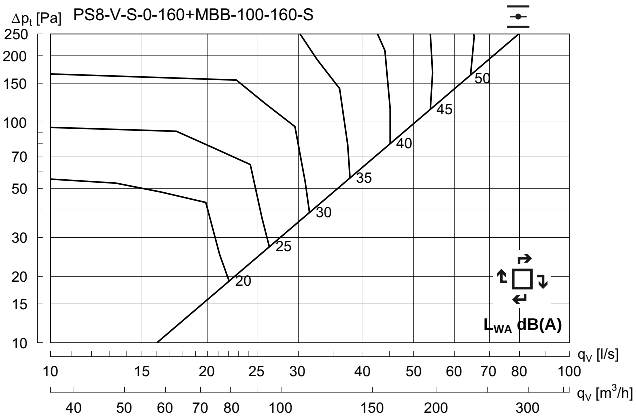
PS8-V 160 + MBB - Supply air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	9	0	-2	1	-7	-17	-28	-38

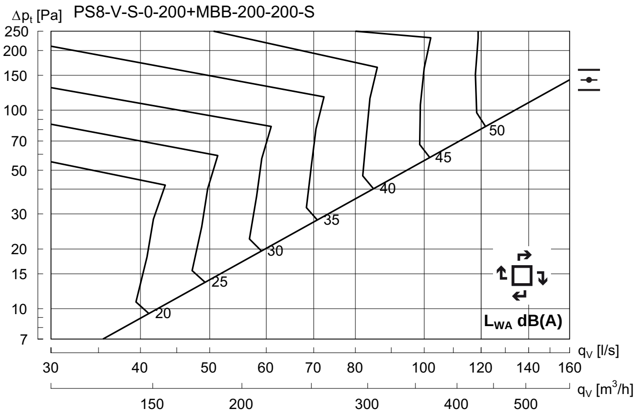


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	8	3	-1	1	-7	-16	-24	-31

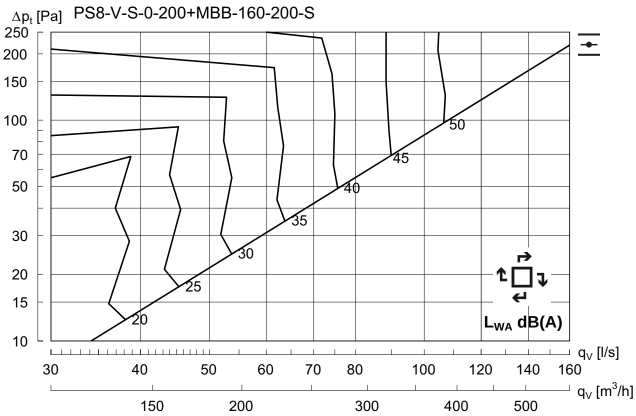


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	10	3	3	-1	-8	-14	-18	-23

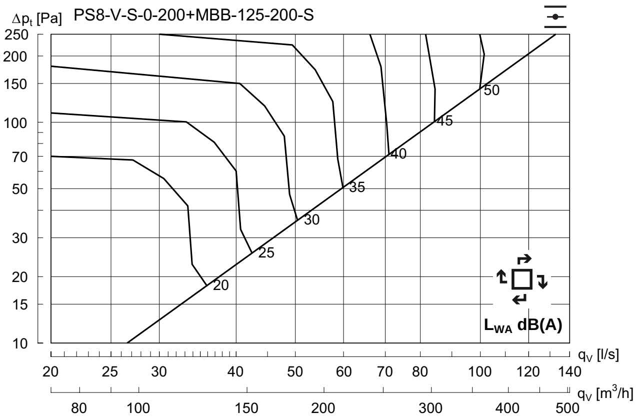
PS8-V 200 + MBB - Supply air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	13	0	-5	1	-6	-20	-29	-40



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	6	3	-2	1	-6	-16	-22	-30

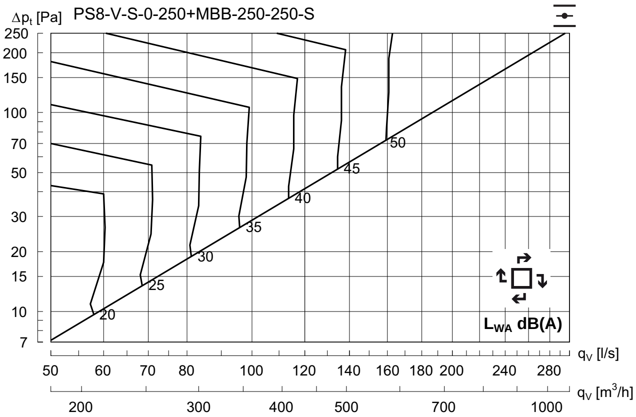


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	6	5	2	-1	-6	-13	-19	-25

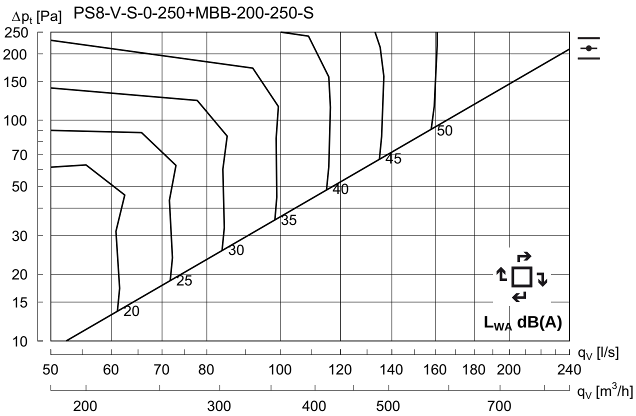
Versio PS8

Technical data

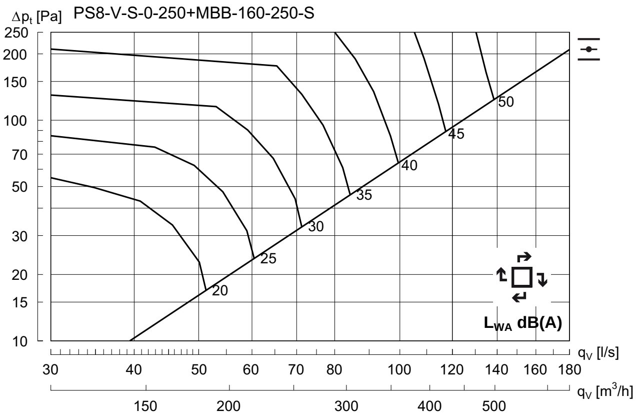
PS8-V 250 + MBB - Supply air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	8	0	-5	1	-6	-19	-28	-40

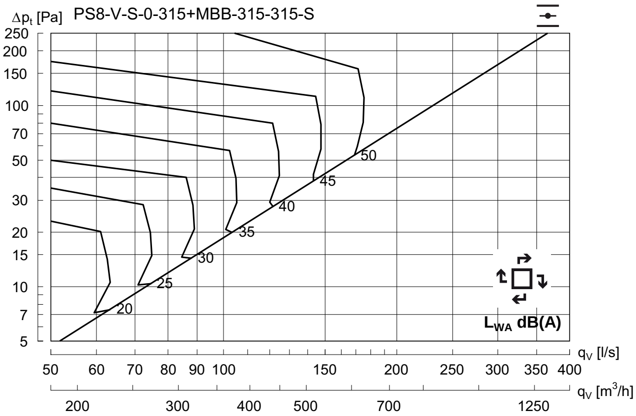


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	12	4	-2	0	-6	-16	-20	-26

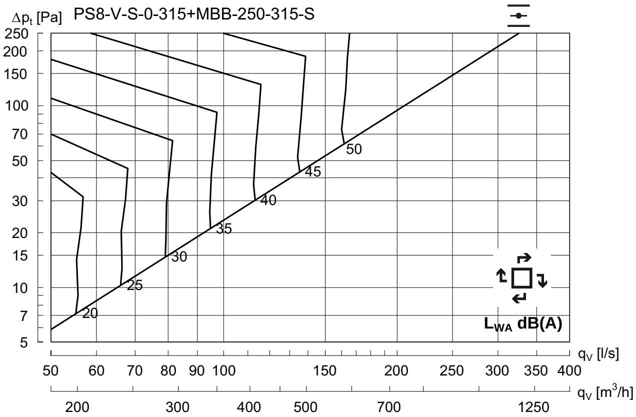


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	15	5	1	-2	-5	-13	-20	-26

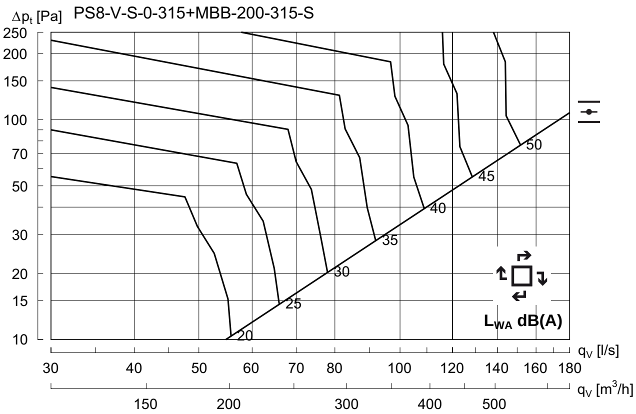
PS8-V 315 + MBB - Supply air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	11	-4	-2	1	-7	-21	-26	-35



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	8	0	-3	2	-8	-21	-29	-39

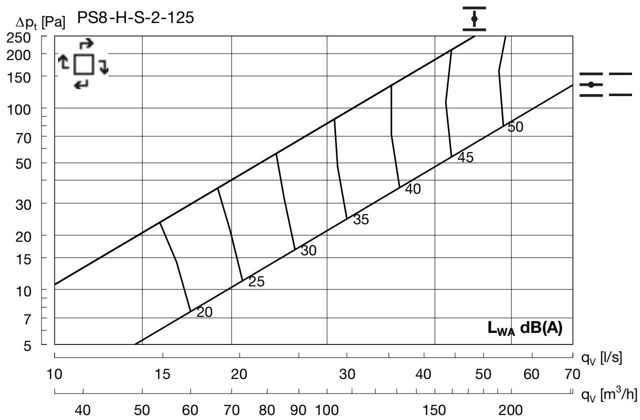


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	10	2	-1	1	-7	-18	-23	-29

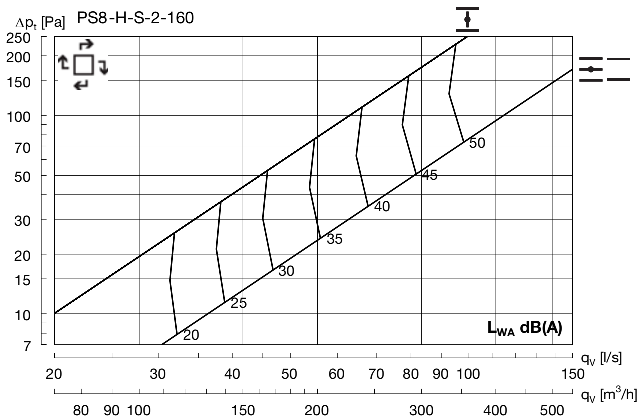
Versio PS8

Technical data

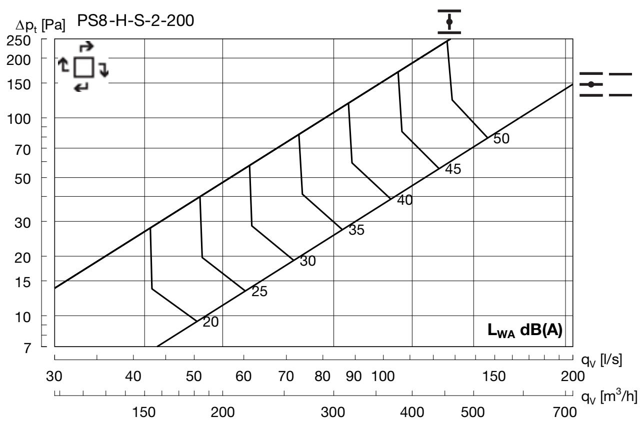
PS8 + H - Supply air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	3	4	4	0	-10	-18	-25	-31

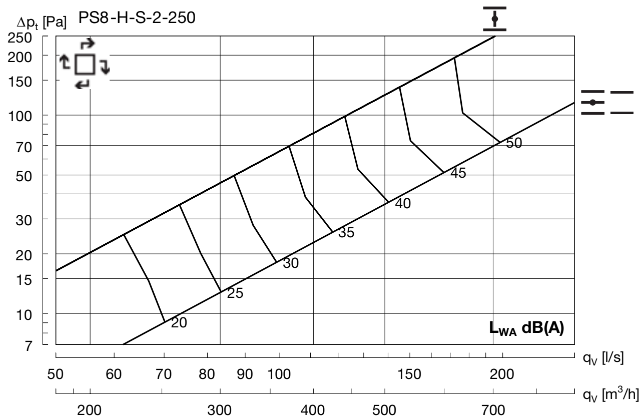


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	1	3	5	-2	-9	-19	-25	-32

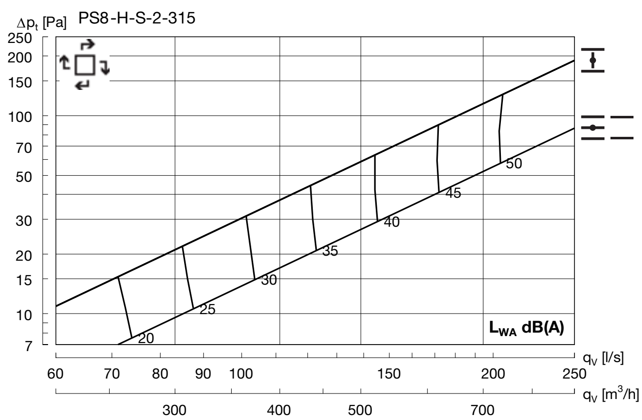


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	7	7	3	-1	-7	-16	-23	-29

PS8 + H - Supply air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	5	6	4	-1	-8	-18	-26	-33



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	7	5	3	0	-9	-21	-31	-41

Versio

RS14

RS14 with grille box type V

RS14 with plenum box type H

Description

RS14 is a square swirl diffuser with fixed bars. RS14 can be used for both supply and exhaust air. The swirl pattern ensures high induction and a large dynamic range. It is therefore ideal for the horizontal supply of very cold air.

- Large dynamic range
- High induction
- Suitable for cooling at very low temperatures
- Can be used for both supply air and exhaust
- Unique magnetic suspension of face plate

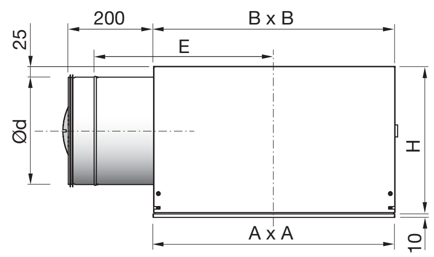
Order code

Product RS 14 b c d eee f

Type		
RS		
Design		
14		
Box type		
V - H - R		
Functional use		
S = Supply air		
E = Exhaust		
Damper		
0 = No damper	(Box type	: H, V)
1 = Damper	(Box type	: H, R)
2 = Damper / Meas.outlets	(Box type	: H)
Connection dim.		
Ø160-315	(Box type	: V)
Ø125-315	(Box type	: H)
(200x100 -500x100)	(Box type	: R)
Ceiling system		
1 - 14	(Go to chapter Ceiling tile adaption)	

Example: RS-14-V-S-0-200-1

Dimensions



RS14-H Ød	Pattern	A mm	B mm	H mm	E mm	Weight kg
125	300	*-	380	215	350	5.9
160	400	*-	380	250	350	5.9
200	500	*-	460	290	390	8.5
250	600	*-	560	340	420	12.3
315	600	*-	560	405	420	13.1

* Face plate dimension A x A depends on ceiling system. See **"Ceiling adjustment"** for detailed dimensions. For further details on plenum box - see **"Plenum boxes"**.

Maintenance

The face plate can be removed to enable cleaning of internal parts or to gain access to the duct or box. The visible parts of the diffuser can be wiped with a damp cloth.

Materials and finish

Grille box/plenum box:
Material: Galvanised steel

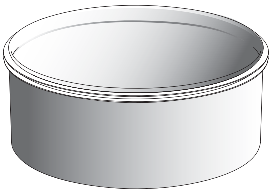
Face plate:
Material: Galvanised steel
Standard finish: Powder-coated
Standard colour: RAL 9010, gloss 30

The diffuser is available in other colours. Please contact Lindab's sales department for further information.

Versio RS14

Accessories

Extension piece MBZ



Order code

Product	MBZ	aaa
Type		
Size		

Example: MBZ-200

Mounting bracket PBB

Suspension MHS

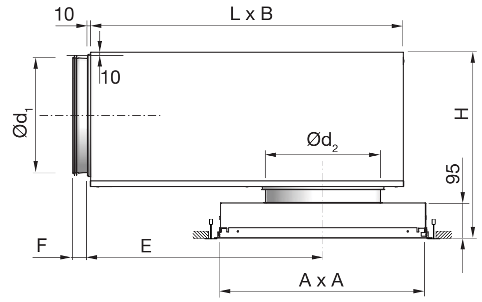
Order code

Product	aaa
Type	

Example: MHS

Plenum box MBB

RS14-V + MBB



RS14-V + MBB							
Duct Ød$_1$ mm	**RS14-V Ød$_2$ mm**	**Pattern**	**B mm**	**E mm**	**F mm**	**H* mm**	**L mm**
100	160	300	260	216	50	275 - 315	310
125	160	300	310	262	50	300 - 340	376
125	200	400	310	262	50	300 - 340	376
160	160	300	380	323	50	334 - 374	459
160	200	400	380	323	50	334 - 374	459
160	250	500	380	323	50	334 - 374	459
200	200	400	460	396	70	375 - 415	565
200	250	500	460	396	70	375 - 415	565
200	315	600	460	396	70	375 - 415	565
250	250	500	540	486	70	425 - 465	698
250	315	600	540	486	70	425 - 465	698
315	315	600	540	646	70	490 - 530	858

* Using accessory MBZ the H dimension will increase:
Ød$_2$ = 160 - 200 mm => H +40 mm
Ød$_2$ = 250 - 315 mm => H +60 mm

Order code

Product	**MBB**	**aaa**	**bbb**	**c**
Type MBB				
Duct connection Ød$_1$ Ø100-315				
Diffuser dimension Ød$_2$ Ø160-315				
Functional use S = Supply air, E = Exhaust				

Example: RS-14-V-S-0-200-1+MBB-200-200-S

Versio

RS14

Technical data

Capacity

Air flow q_v [l/s] and [m^3/h], total pressure Δp_t [Pa], throw $l_{0.2}$ [m] and sound power level L_{WA} [dB(A)] can be seen in the diagrams.

Frequency-related sound effect level

The sound effect level in the frequency band is defined as $L_{WA}+K_{ok}$. K_{ok} values are specified in charts beneath the diagrams on the following pages. K_{ok} values for RS14 without a box are avaliable on request.

Quick selection, supply air

RS14-V + MBB

RS14-V + MBB		Max. airflow 30dB(A)		Max. airflow 35dB(A)	
Duct $Ød_1$	RS14-V $Ød_2$	l/s	m³/h	l/s	m³/h
100	160	33	119	41	148
125	160	44	158	52	187
125	200	49	176	59	212
160	160	38	137	46	166
160	200	51	184	62	223
160	250	67	241	85	306
200	200	65	234	77	277
200	250	77	277	95	342
200	315	100	360	124	446
250	250	89	320	104	374
250	315	110	396	132	475
315	315	129	464	151	544

RS14 + H

RS14 + H Size Ød mm	Minimum		Max. airflow 30dB(A)		Max. airflow 35dB(A)	
	l/s	m³/h	l/s	m³/h	l/s	m³/h
125	26	93	28	101	34	122
160	33	118	53	191	63	227
200	57	204	65	234	80	288
250	71	254	89	320	107	385
315	95	342	-	-	148	533

Sound attenuation

Sound attenuation of the diffusers ΔL from duct to room, including end reflection - see tables below.

RS14-V + MBB

RS14-V + MBB		Centre frequency Hz							
Duct $Ød_1$	RS14-V $Ød_2$	63	125	250	500	1K	2K	4K	8K
100	160	20	16	5	19	20	19	18	21
125	160	16	13	9	20	18	18	19	20
125	200	14	12	6	17	16	16	18	19
160	160	17	16	10	24	20	20	21	21
160	200	15	15	7	22	21	19	20	21
160	250	15	14	5	20	16	16	17	19
200	200	14	11	7	18	21	17	20	18
200	250	13	9	5	17	18	16	18	17
200	315	13	8	3	15	17	15	17	16
250	250	15	8	7	18	18	18	18	19
250	315	15	7	6	16	16	17	17	18
315	315	8	11	8	16	18	17	17	22

RS14 + H

RS14 + H Size Ød mm	Centre frequency Hz							
	63	125	250	500	1K	2K	4K	8K
125	18	13	8	18	14	11	12	14
160	17	13	3	14	13	7	7	8
200	15	10	3	13	9	6	8	10
250	12	9	6	11	8	7	10	12
315	12	7	7	13	8	7	10	12

RS14 + R

RS14 + R Size mm	Mean frequency Hz							
	63	125	250	500	1K	2K	4K	8K
200x100	19	14	9	6	5	3	3	4
300x100	16	11	5	5	6	5	3	4
400x100	13	8	2	3	4	5	4	5
500x100	12	7	2	4	2	5	5	5

Mounting -and balancing instruction

For futher information go to www.lindQST.com and Mounting -and balancing instruction.

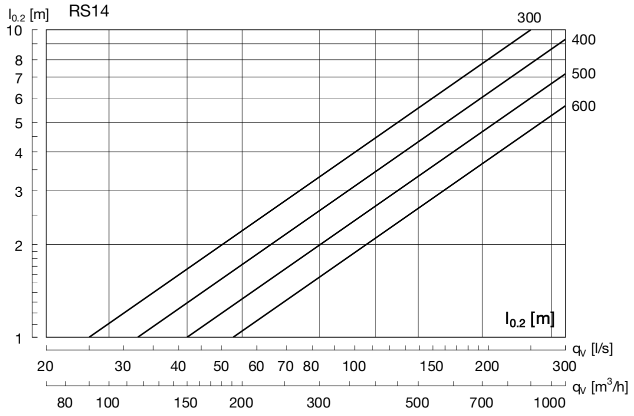
Versio

RS14

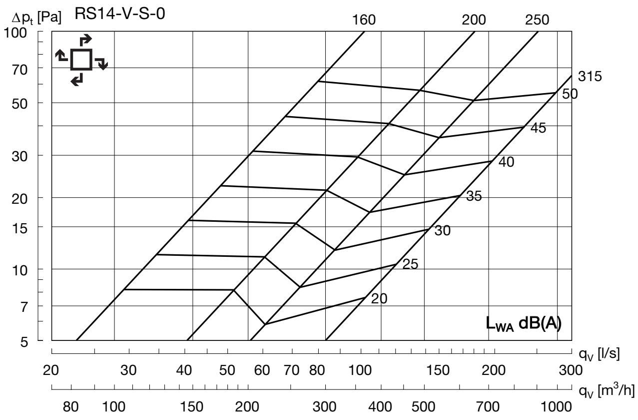
Technical data

Throw $l_{0.2}$

Throw $l_{0.2}$ [m] is specified at a terminal velocity of 0.2 m/s. The designation by the lines specifies the pattern of dispersal.



RS14-V without plenum box – Supply air

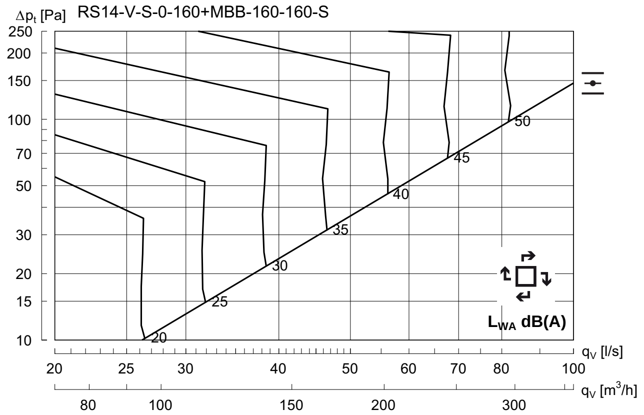


Versio

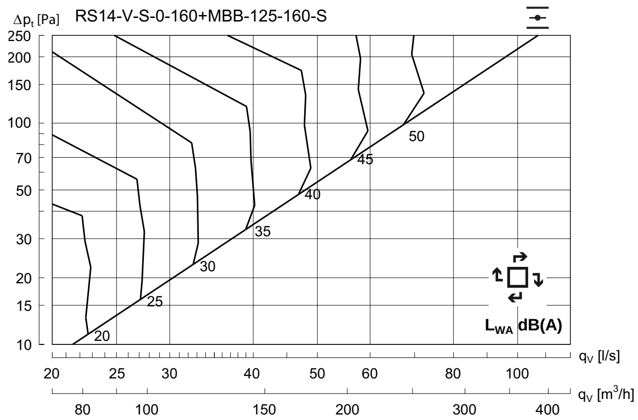
RS14

Technical data

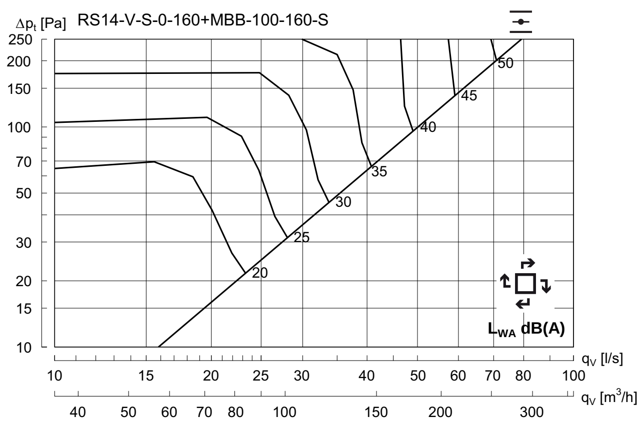
RS14-V 160 + MBB - Supply air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	8	2	-1	1	-7	-17	-26	-36

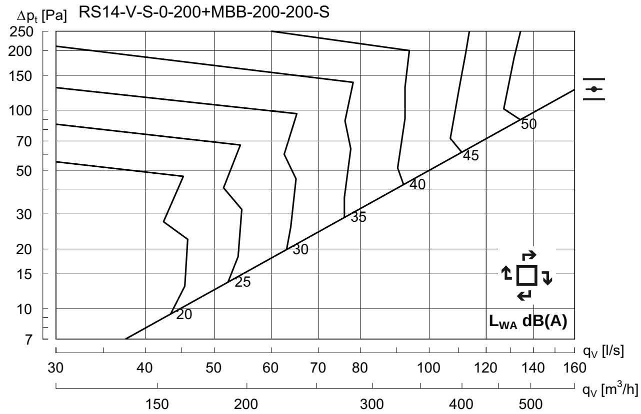


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	10	4	-1	1	-7	-17	-24	-29

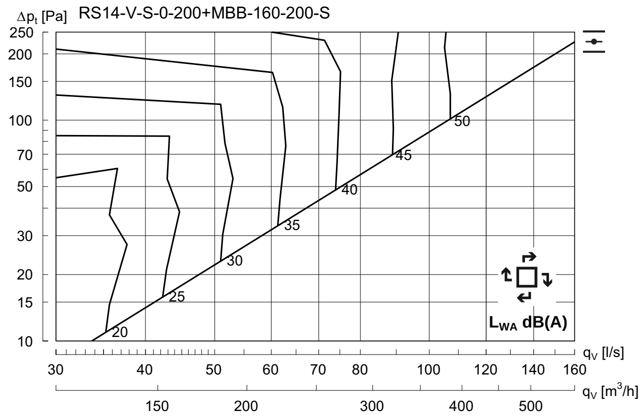


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	10	4	2	-1	-7	-13	-18	-22

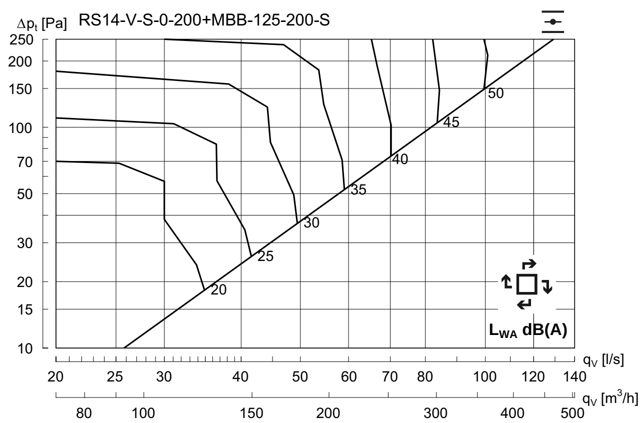
RS14-V 200 + MBB - Supply air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	11	0	-5	0	-4	-15	-26	-36



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	11	2	-1	0	-6	-15	-24	-33



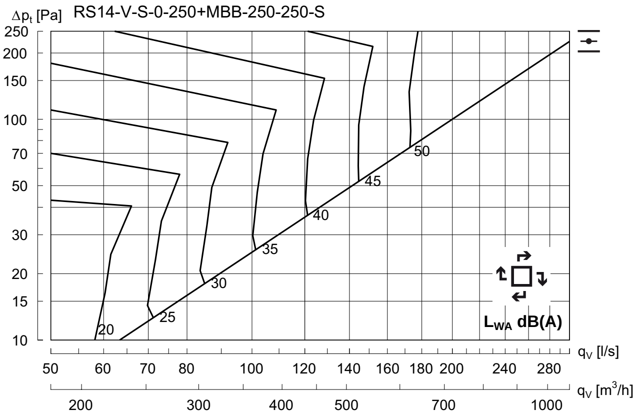
Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	10	4	2	-1	-7	-13	-18	-22

Versio

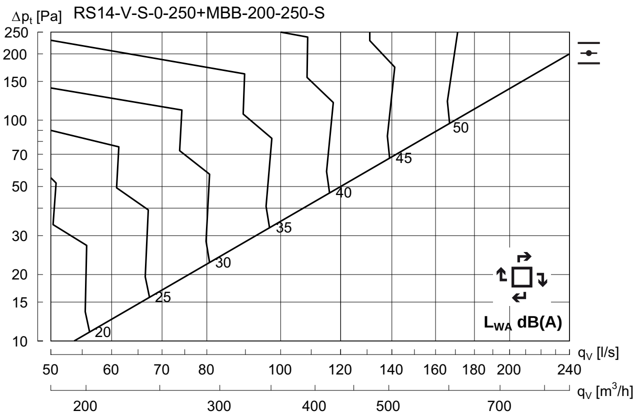
RS14

Technical data

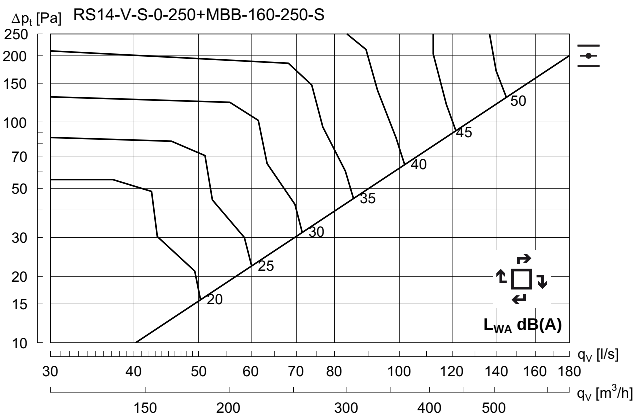
RS14-V 250 + MBB - Supply air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	8	-1	-6	1	-5	-18	-29	-40

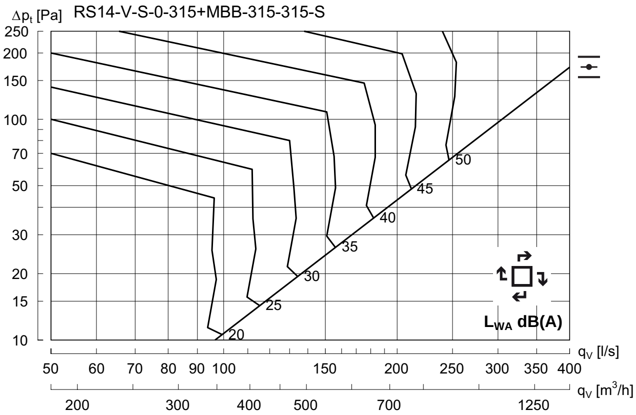


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	9	2	-3	0	-5	-17	-26	-29

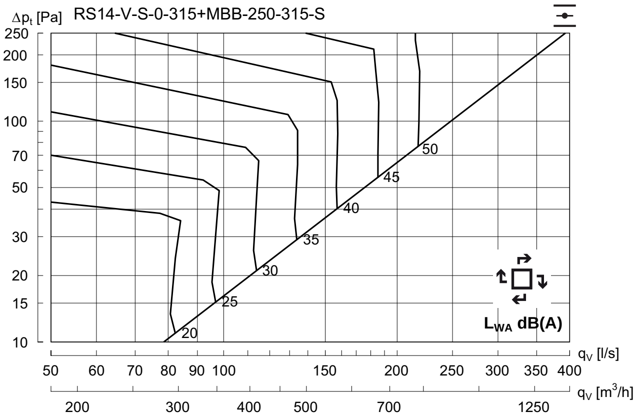


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	13	5	-1	-1	-5	-14	-20	-26

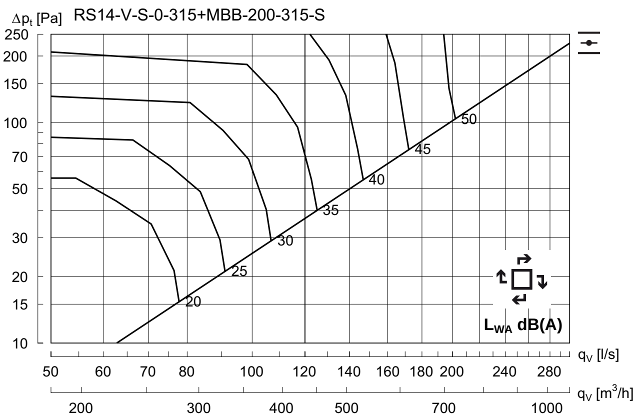
RS14-V 315 + MBB - Supply air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	11	-1	-3	0	-5	-17	-25	-28



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	12	2	-3	0	-5	-15	-22	-30

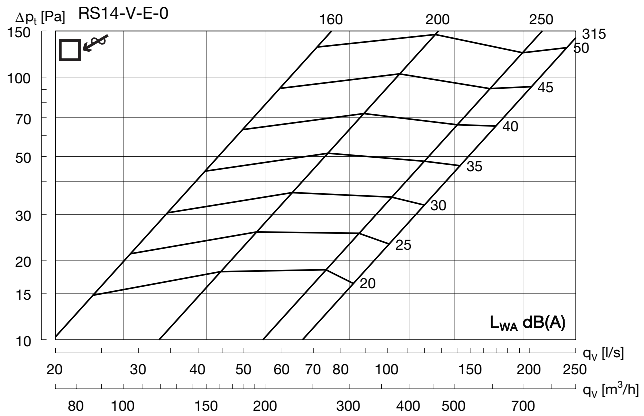


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	13	4	-1	-1	-6	-14	-19	-25

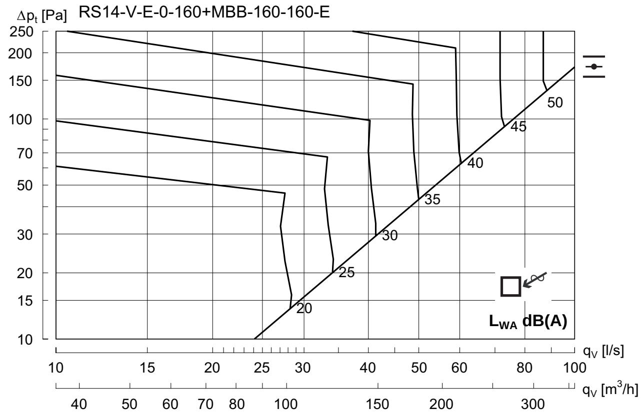
Versio RS14

Technical data

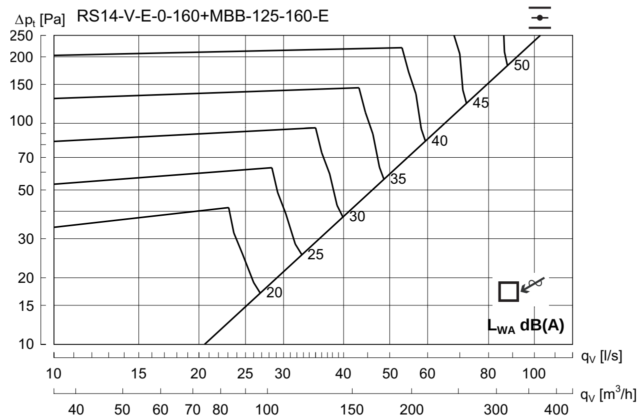
RS14-V without plenum box – Exhaust air



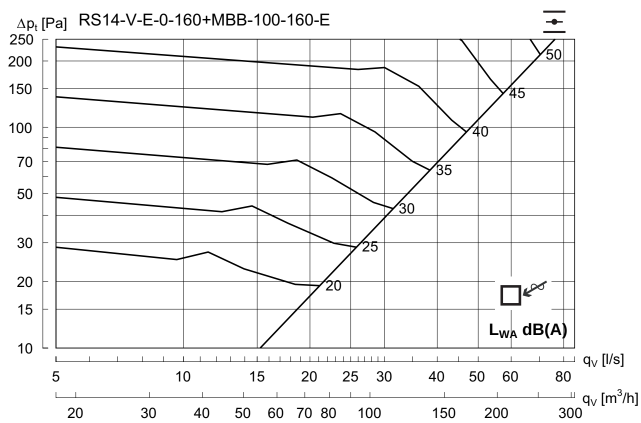
RS14-V 160 + MBB - Exhaust air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	12	2	-1	-1	-5	-13	-22	-31



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	11	4	-1	-1	-5	-13	-19	-27



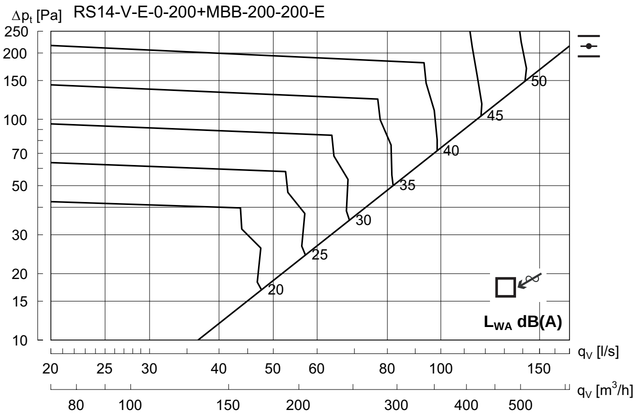
Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	11	4	4	-2	-9	-13	-17	-23

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

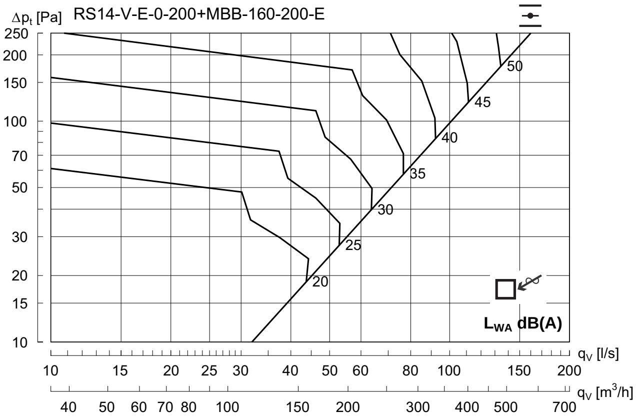
Versio RS14

Technical data

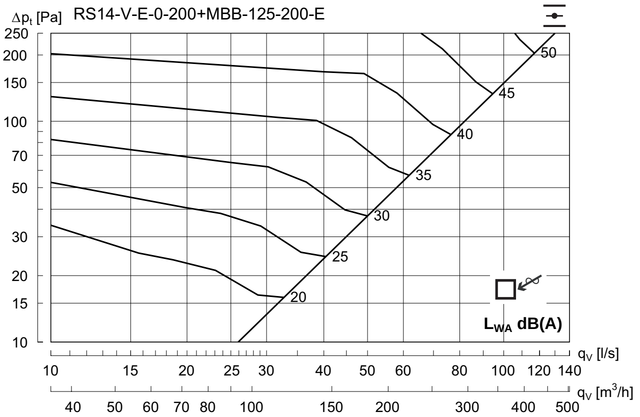
RS14-V 200 + MBB - Exhaust air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	13	4	-1	-1	-5	-12	-20	-28

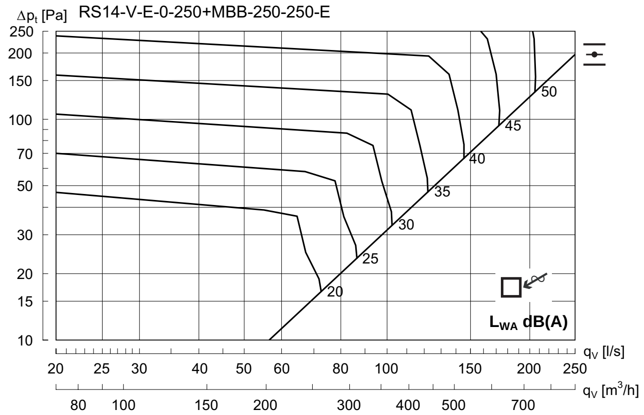


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	16	6	0	-2	-6	-12	-18	-25

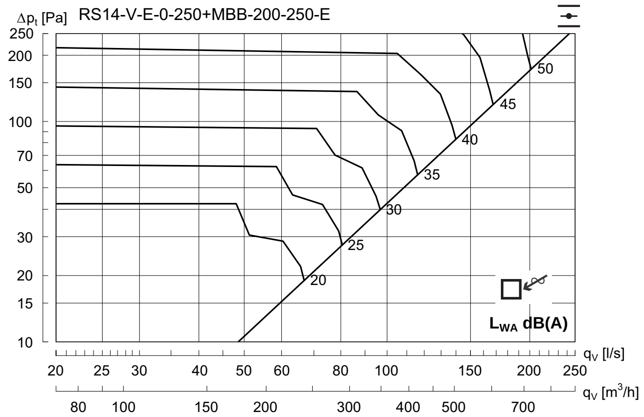


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	11	4	2	-1	-7	-12	-16	-23

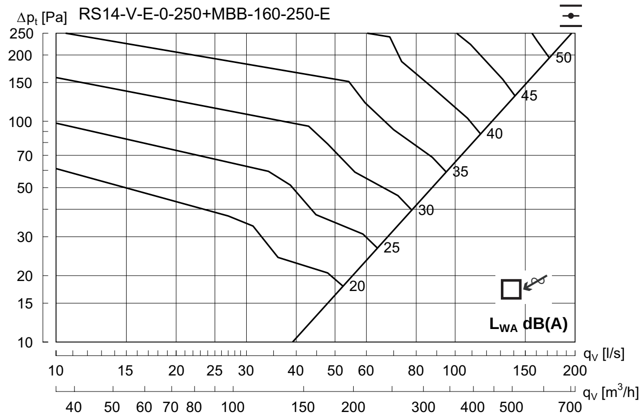
RS14-V 250 + MBB - Exhaust air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	8	5	0	-1	-5	-11	-20	-28



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	14	5	1	-2	-5	-11	-19	-26



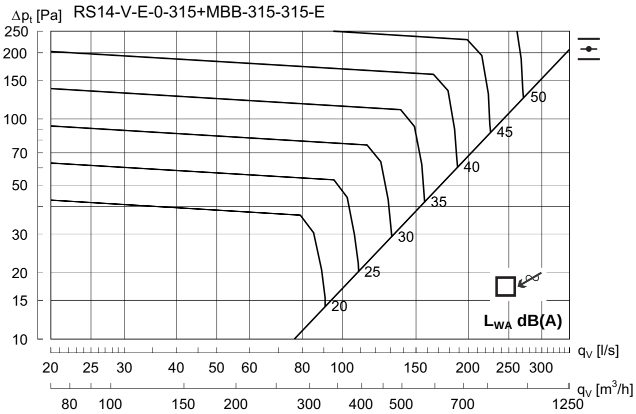
Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	15	7	1	-2	-7	-11	-17	-22

Versio

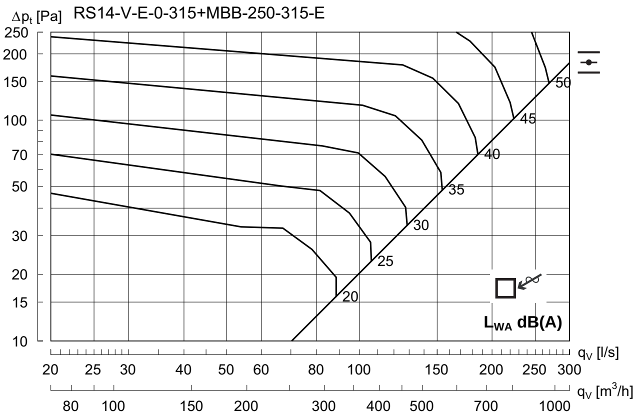
RS14

Technical data

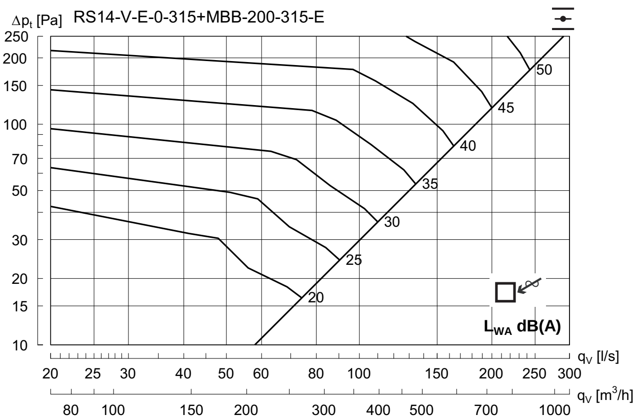
RS14-V 315 + MBB - Exhaust air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	11	4	1	-2	-5	-13	-22	-32



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	10	6	2	-2	-5	-12	-19	-27



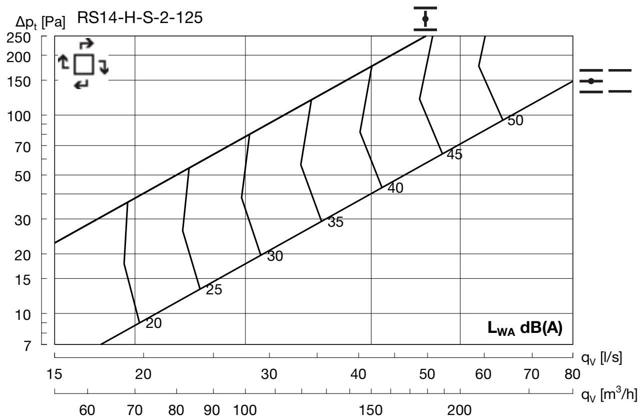
Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	14	5	2	-2	-6	-11	-16	-24

Versio

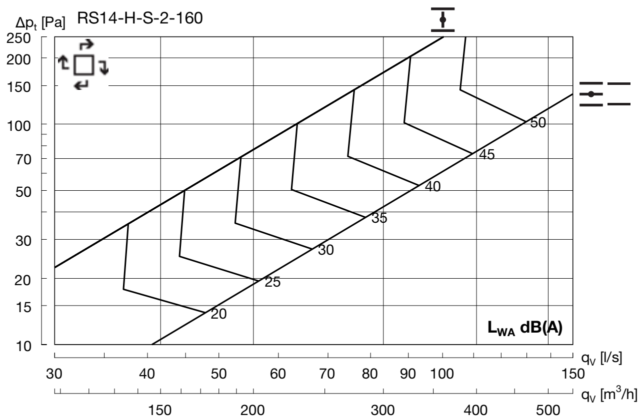
RS14

Technical data

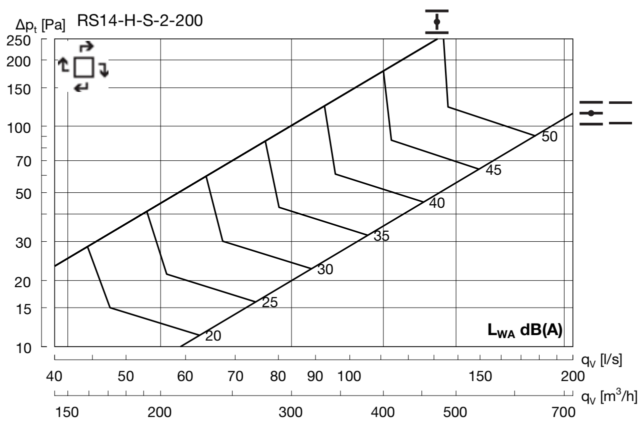
RS14 + H - Supply air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	14	8	5	-3	-10	-17	-23	-28

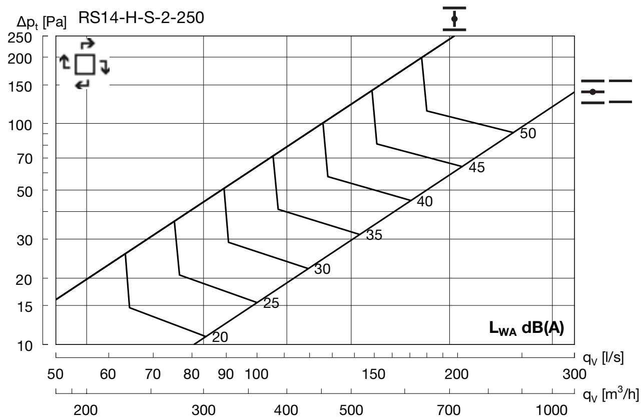


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	2	5	5	-3	-7	-14	-20	-26

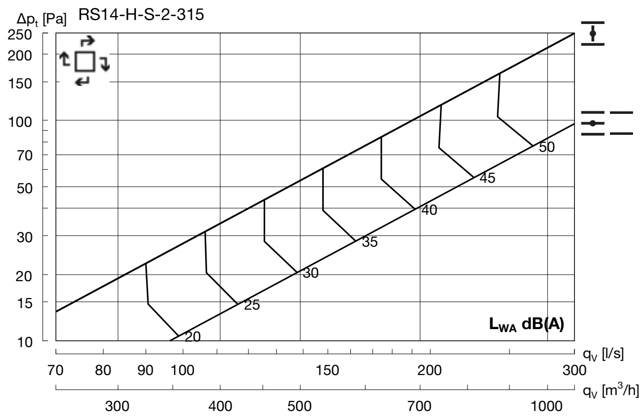


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	10	7	2	-2	-6	-14	-21	-29

RS14 + H - Supply air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	5	7	3	-1	-7	-16	-23	-31



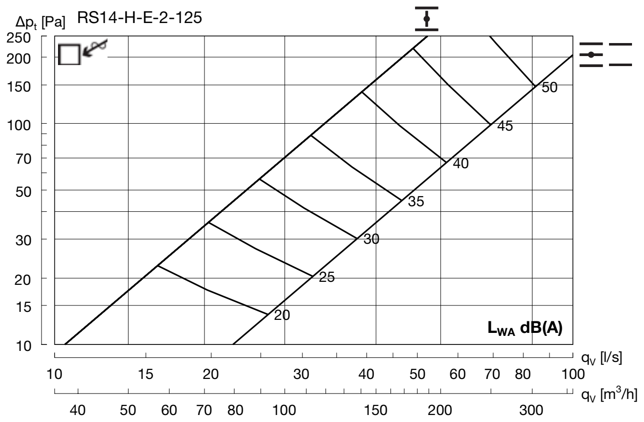
Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	7	7	2	-1	-7	-16	-25	-35

Versio

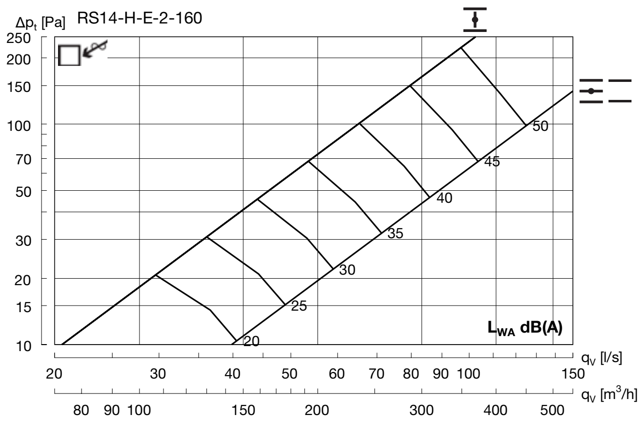
RS14

Technical data

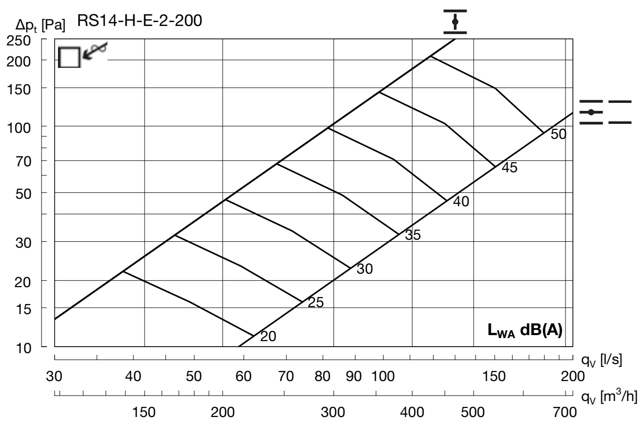
RS14 + H - Exhaust air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	3	7	3	-1	-8	-14	-19	-26

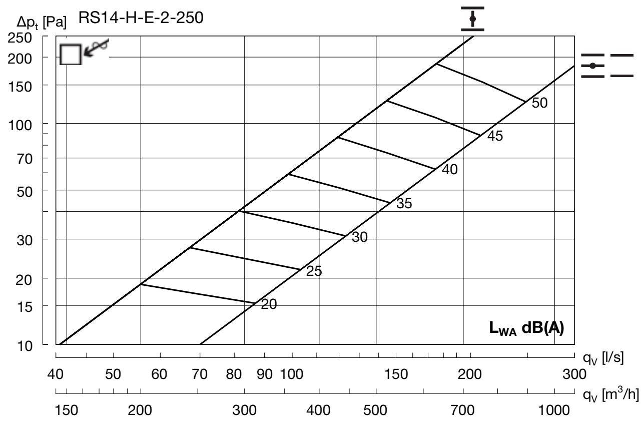


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	2	6	5	-3	-8	-14	-22	-31

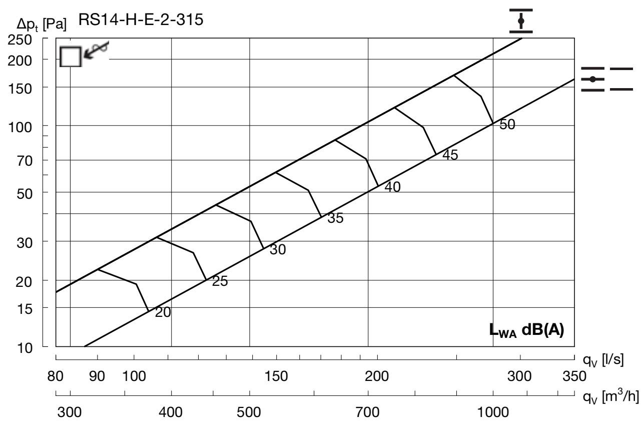


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	7	7	4	-3	-7	-13	-20	-25

RS14 + H - Exhaust air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	5	7	3	-2	-7	-13	-21	-31



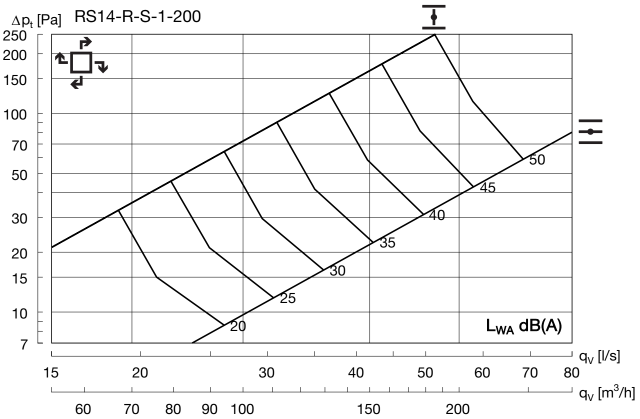
Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	7	7	2	-2	-6	-14	-24	-35

Versio

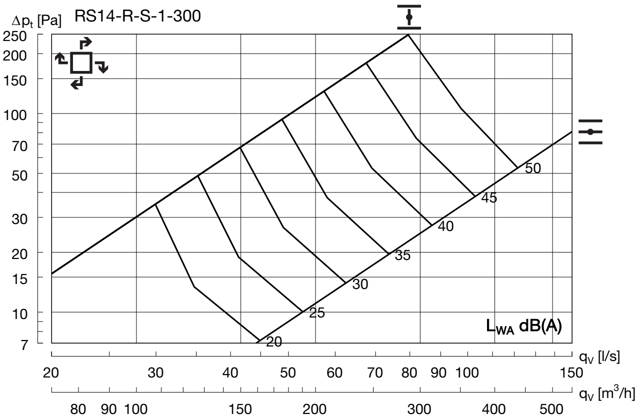
RS14

Technical data

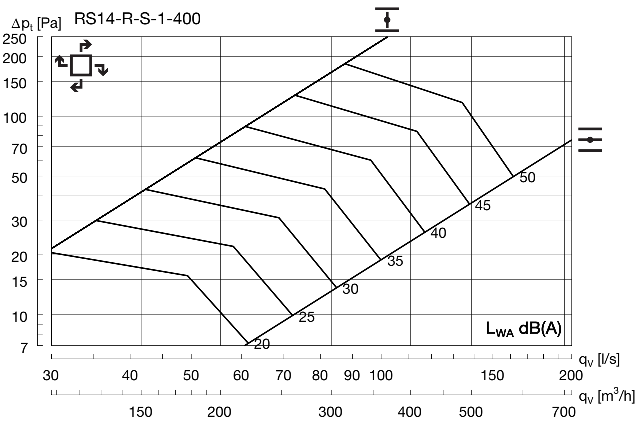
RS14 + R - Supply air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	6	-1	3	-1	-7	-12	-25	-33

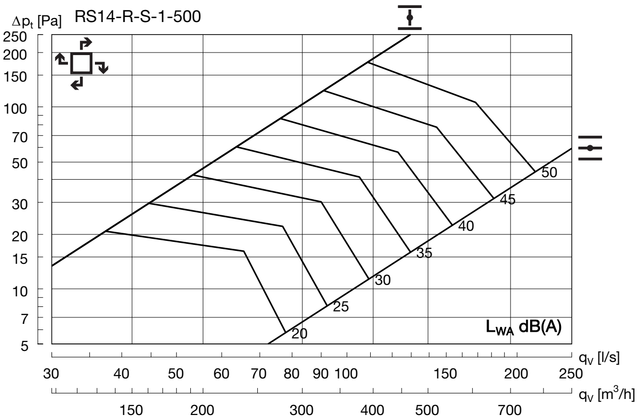


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	7	-1	4	-1	-8	-14	-22	-31



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	-2	-1	3	-1	-6	-11	-20	-32

RS14 + R - Supply air



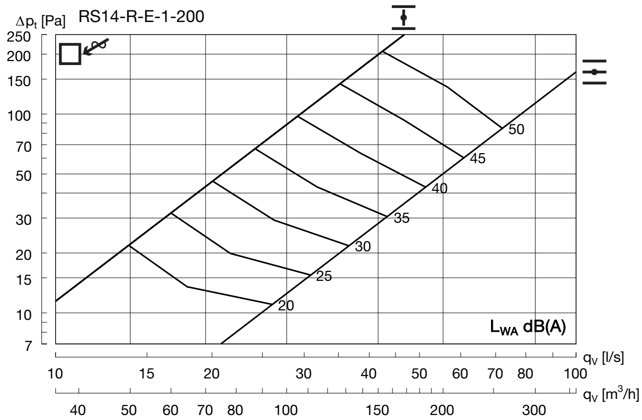
Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	3	-1	3	-1	-7	-11	-19	-31

Versio

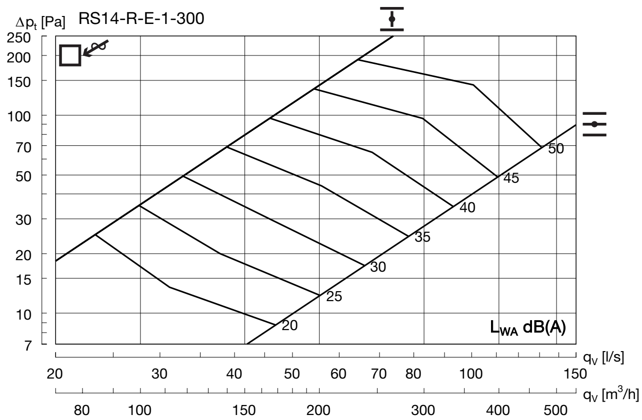
RS14

Technical data

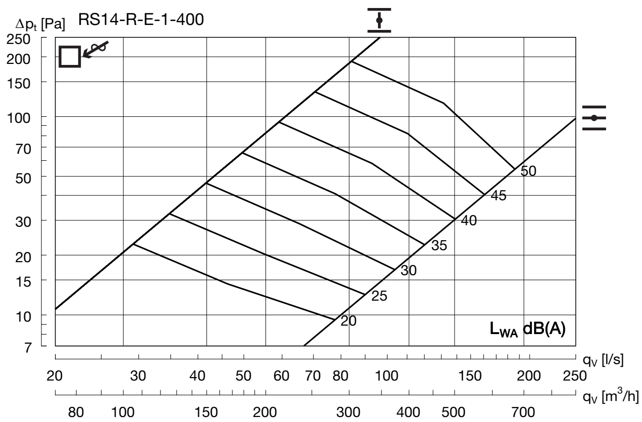
RS14 + R - Exhaust air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	7	-1	4	-2	-8	-10	-18	-25

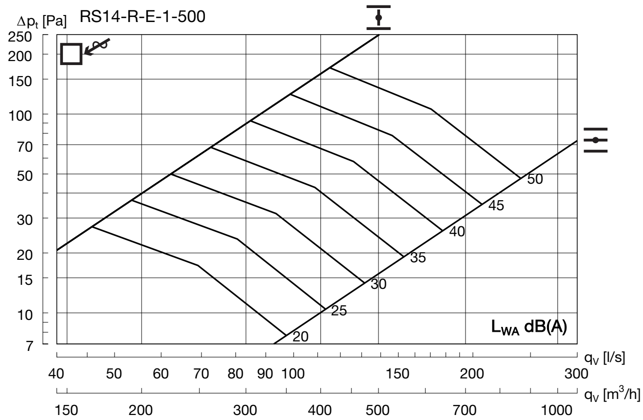


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	6	1	4	-2	-7	-10	-17	-25



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	2	0	2	-2	-5	-10	-16	-24

RS14 + R - Exhaust air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	1	1	1	-2	-6	-9	-16	-25

Versio RS15

RS15 with grille box type V

RS15 with plenum box type H

Description

RS15 is a square swirl diffuser with adjustable bars that can be used for both supply and exhaust air. The swirl pattern ensures high induction and a large dynamic range. It is therefore ideal for the horizontal supply of very cold air. The diffuser can also be set to a vertical supply air pattern, enabling supply of heated air. The diffuser is supplied as standard with inward swirl. For exhaust, the diffuser is supplied as standard without bars

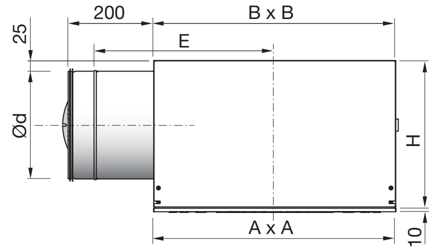
- Large dynamic range
- High induction
- Ideal for the supply of very cold air
- Adjustable for horizontal or vertical supply air pattern
- Can be used for both supply air and exhaust

Order code

Product			RS	15	b	c	d	eee	f
Type									
RS									
Design									
15									
Box type									
V - H - R									
Functional use									
S = Supply air									
E = Exhaust									
Damper									
0 = No damper	(Box type	: H, V)							
1 = Damper	(Box type	: H, R)							
2 = Damper / Meas.outlets	(Box type	: H)							
Connection dim.									
Ø200-315	(Box type	: V)							
Ø160-315	(Box type	: H)							
(300x100 -500x100)	(Box type	: R)							
Ceiling system									
1 - 14	(Go to chapter Ceiling tile adaption)								

Example: RS-15-V-S-0-200-1

Dimensions



RS15-H Ød	Pattern	A mm	B mm	H mm	E mm	Weight kg
160	400	*-	380	250	350	5.9
200	500	*-	460	290	390	8.5
250	600	*-	560	340	420	12.3
315	600	*-	560	405	420	13.1

* Face plate dimension A x A depends on ceiling system. See **"Ceiling adjustment"** for detailed dimensions. For further details on plenum box - see **"Plenum boxes"**.

Maintenance

The face plate can be removed to enable cleaning of internal parts or to gain access to the duct or box. The visible parts of the diffuser can be wiped with a damp cloth.

Materials and finish

Grille box/plenum box:

Material: Galvanised steel

Face plate:

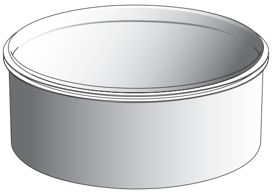
Material: Galvanised steel
Bars: Black ABS-plastic
Standard finish: Powder-coated
Standard colour: RAL 9010, gloss 30

The diffuser is available in other colours. Please contact Lindab's sales department for further information.

Versio RS15

Accessories

Extension piece MBZ



Order code

Product	MBZ	aaa
Type		
Size		

MBZ-200

Mounting bracket PBB

Suspension MHS

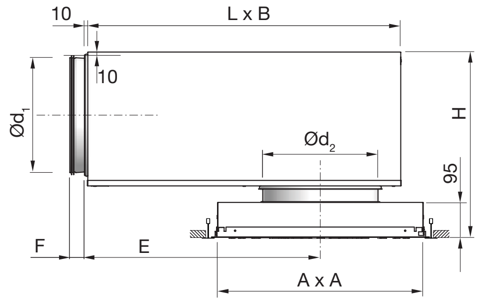
Order code

Product	aaa
Type	

Example: MHS

Plenum box MBB

RS15-V + MBB



RS15-V + MBB							
Duct	**RS15-V**		**B**	**E**	**F**	**H***	**L**
$Ød_1$ mm	**$Ød_2$ mm**	**Pattern**	**mm**	**mm**	**mm**	**mm**	**mm**
125	200	400	310	262	50	300 - 340	376
160	200	400	380	323	50	334 - 374	459
160	250	500	380	323	50	334 - 374	459
200	200	400	460	396	70	375 - 415	565
200	250	500	460	396	70	375 - 415	565
200	315	600	460	396	70	375 - 415	565
250	250	500	540	486	70	425 - 465	698
250	315	600	540	486	70	425 - 465	698
315	315	600	540	646	70	490 - 530	858

* Using accessory MBZ the H dimension will increase:
$Ød_2$ = 200 mm => H +40 mm
$Ød_2$ = 250 - 315 mm => H +60 mm

Order code

Product	MBB	aaa	bbb	c
Type				
MBB				
Duct connection $Ød_1$				
Ø125-315				
Diffuser dimension $Ød_2$				
Ø200-315				
Functional use				
S = Supply air				
E = Exhaust				

Example: RS-15-V-S-200-1+MBB-200-200-S

Lindab

Versio

RS15

Technical data

Capacity

Air flow q_v [l/s] and [m^3/h], total pressure Δp_t [Pa], throw $l_{0.2}$ [m] and sound power level L_{WA} [dB(A)] can be seen in the diagrams.

Frequency-related sound effect level

The sound effect level in the frequency band is defined as $L_{WA}+K_{ok}$. K_{ok} values are specified in charts beneath the diagrams on the following pages. K_{ok} values for RS15 without a box are avaliable on request.

Quick selection, supply air

RS15-V + MBB

RS15-V + MBB		Max. airflow 30dB(A)		Max. airflow 35dB(A)	
Duct $Ød_1$	RS15-V $Ød_2$	l/s	m^3/h	l/s	m^3/h
125	200	53	191	63	227
160	200	56	202	67	241
160	250	72	259	91	328
200	200	60	216	73	263
200	250	84	302	102	367
200	315	94	338	119	428
250	250	94	338	112	403
250	315	107	385	128	461
315	315	123	443	144	518

RS15 + H

RS15 + H Size Ød	Minimum		Max. airflow 30dB(A)		Max. airflow 35dB(A)	
mm	l/s	m^3/h	l/s	m^3/h	l/s	m^3/h
160	33	118	53	191	63	227
200	57	204	65	234	80	288
250	71	254	89	320	107	385
315	95	342	-	-	148	533

Sound attenuation

Sound attenuation of the diffusers ΔL from duct to room, including end reflection - see table below.

RS15-V + MBB

RS15-V + MBB		Centre frequency Hz							
Duct $Ød_1$	RS15-V $Ød_2$	63	125	250	500	1K	2K	4K	8K
125	200	14	13	6	16	18	17	18	19
160	200	15	15	8	22	21	20	20	20
160	250	15	14	4	20	17	18	18	20
200	200	14	11	8	17	21	18	21	18
200	250	14	9	5	17	18	16	18	17
200	315	12	9	4	16	17	16	17	16
250	250	15	9	8	19	19	18	18	18
250	315	16	7	5	15	16	17	17	18
315	315	10	10	8	16	18	17	17	23

RS15 + H

RS15 + H Size Ød	Centre frequency Hz							
mm	63	125	250	500	1K	2K	4K	8K
160	17	12	5	15	14	10	9	9
200	14	8	4	13	10	7	8	11
250	12	8	6	9	7	7	8	10
315	12	6	7	12	6	6	8	10

RS15 + R

RS15 + R Size	Mean frequency Hz							
mm	63	125	250	500	1K	2K	4K	8K
300x100	16	11	5	5	6	5	3	4
400x100	13	8	2	3	4	5	4	5
500x100	12	7	2	4	2	5	5	5

Mounting -and balancing instruction

For futher information go to www.lindQST.com and Mounting -and balancing instruction.

Versio RS15

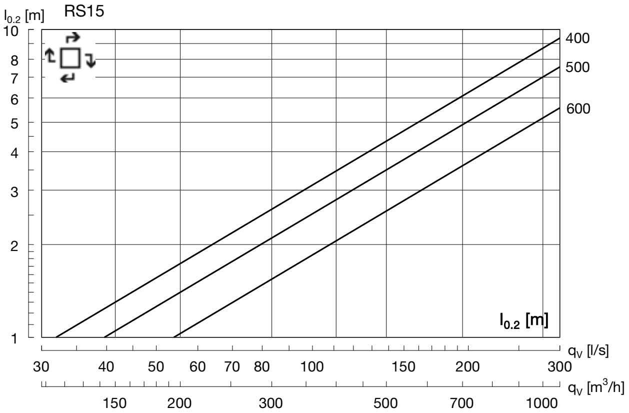
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

Technical data

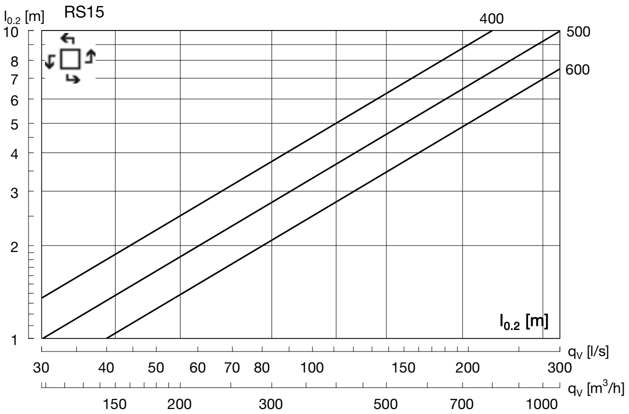
Throw $l_{0.2}$

Throw $l_{0.2}$ [m] is specified at a terminal velocity of 0.2 m/s. The designation by the lines specifies the pattern of dispersal.

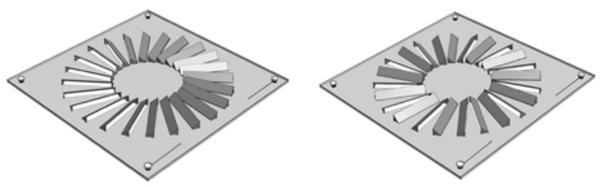
Inward swirl

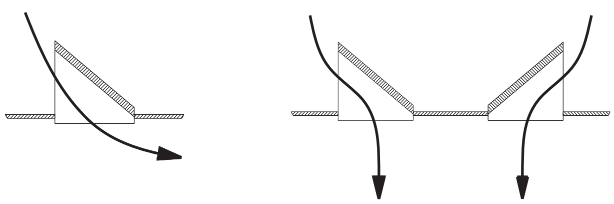


Outward swirl



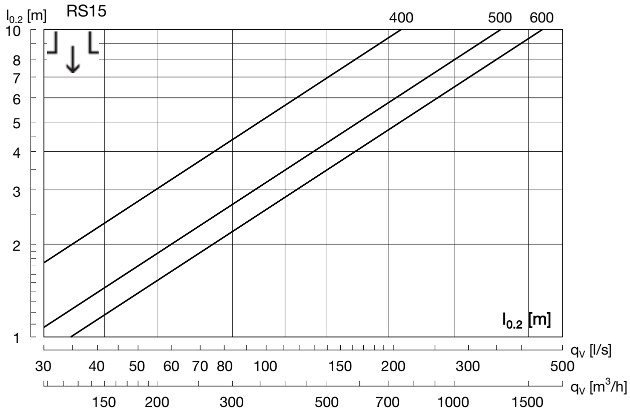
Horizontal and vertical bars

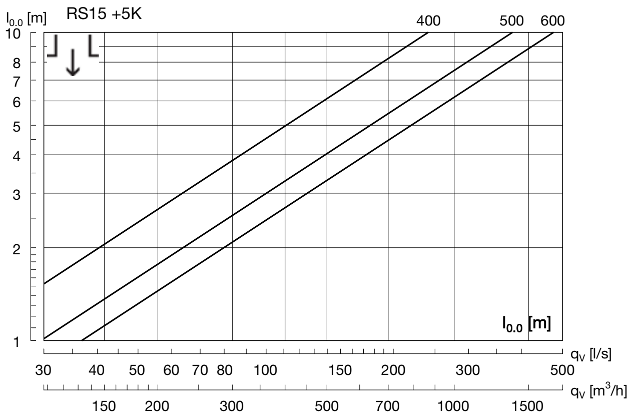


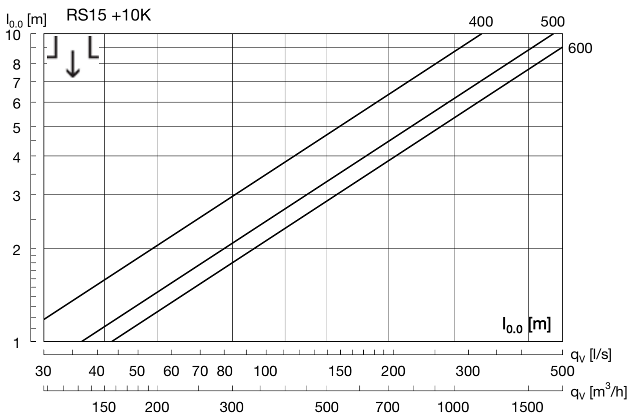


Throws/turning points

Throw $l_{0.2}$ [m] can be seen in the diagram. The throw applies for isothermal air at a terminal velocity of 0.2 m/s. Turning point $l_{0.0}$ (m) can be seen in the diagram for heated air, +5 K and +10 K respectively.
The designation by the lines specifies the pattern of dispersal.



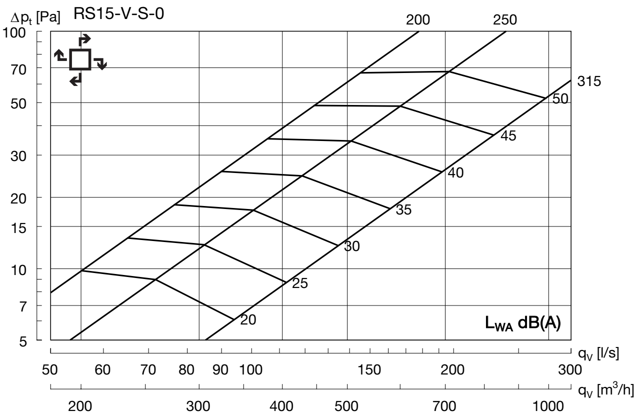




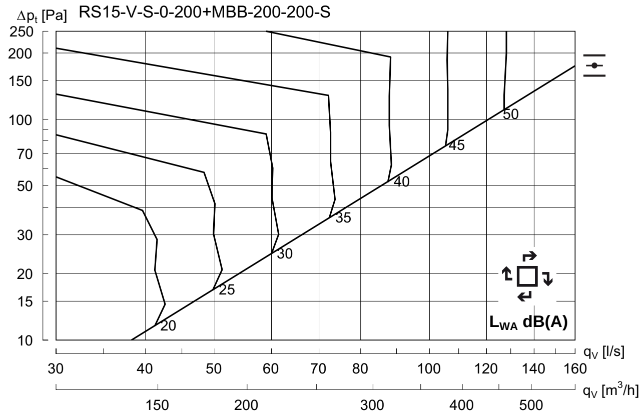
Versio RS15

Technical data

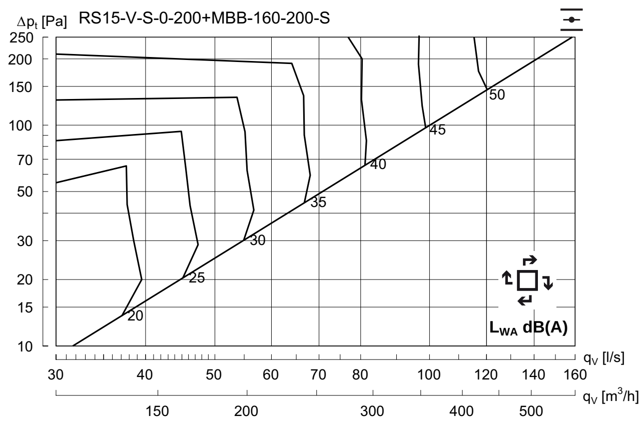
RS15-V without plenum box - Supply air



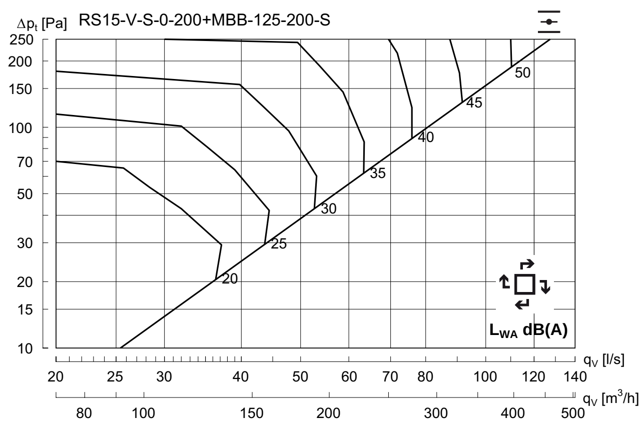
RS15-V 200 + MBB - Supply air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	13	2	-4	0	-5	-14	-21	-29



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	11	4	-2	-1	-5	-13	-19	-27



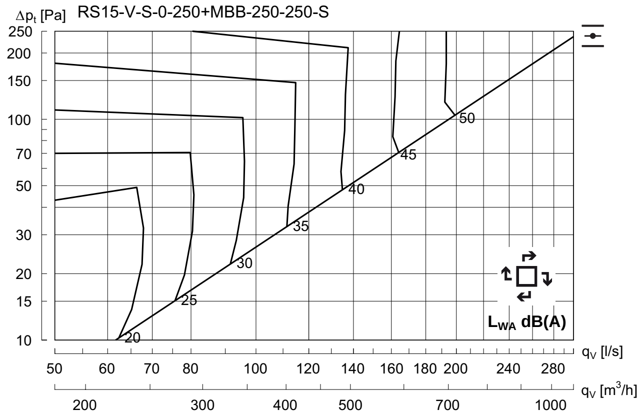
Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	12	5	1	-1	-6	-11	-16	-22

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

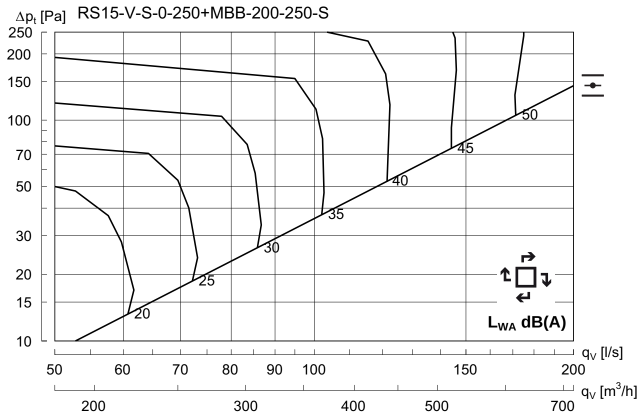
Versio RS15

Technical data

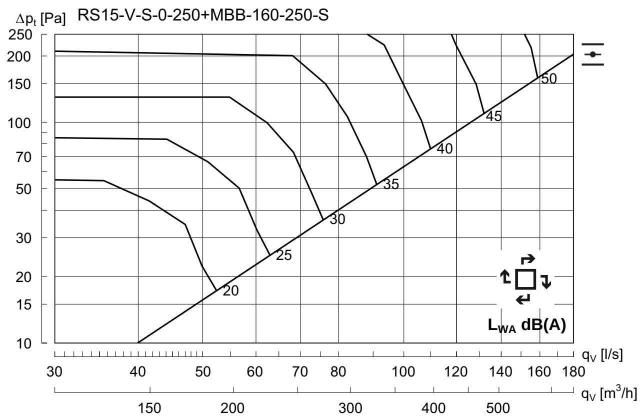
RS15-V 250 + MBB - Supply air



Hz	63	125	250	500	1K	2K	4K	8K
Kok	10	2	-3	0	-5	-14	-20	-30

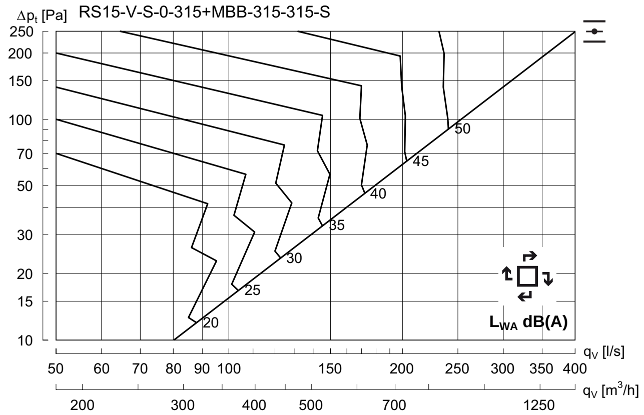


Hz	63	125	250	500	1K	2K	4K	8K
Kok	11	4	-1	0	-7	-14	-22	-30

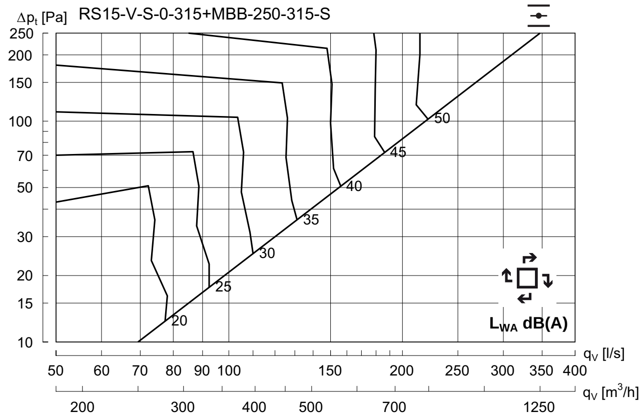


Hz	63	125	250	500	1K	2K	4K	8K
Kok	12	4	0	-2	-5	-11	-18	-24

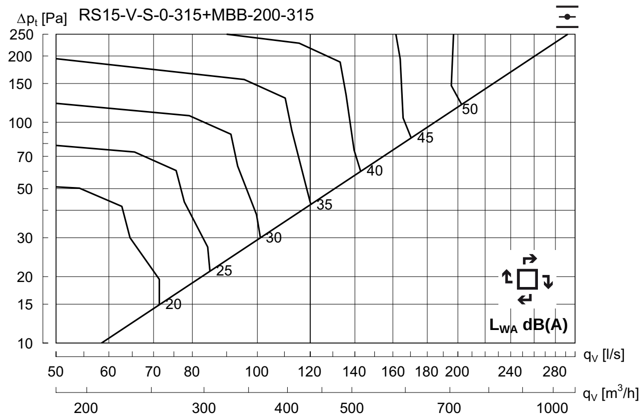
RS15-V 315 + MBB - Supply air



Hz	63	125	250	500	1K	2K	4K	8K
Kok	9	3	0	0	-6	-13	-20	-30



Hz	63	125	250	500	1K	2K	4K	8K
Kok	10	4	-1	-1	-5	-13	-19	-28



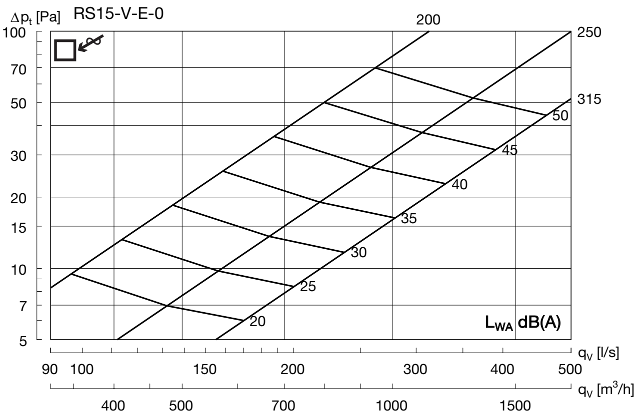
Hz	63	125	250	500	1K	2K	4K	8K
Kok	10	6	0	-1	-6	-12	-18	-27

Versio

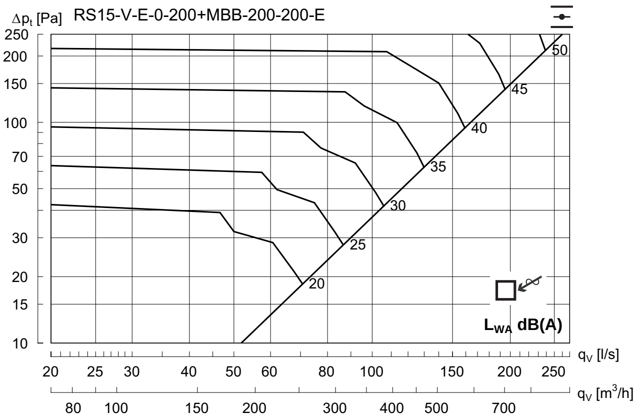
RS15

Technical data

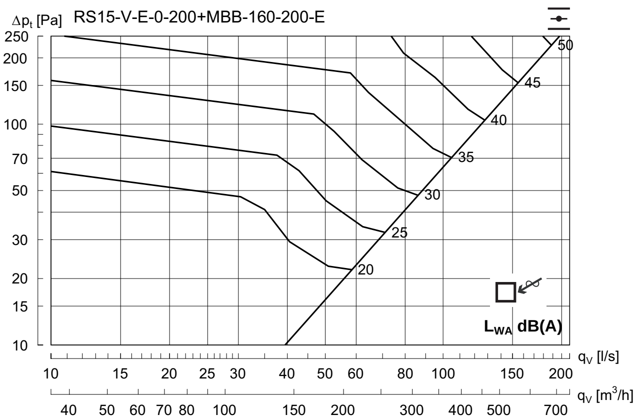
RS15-V without plenum box - Exhaust air



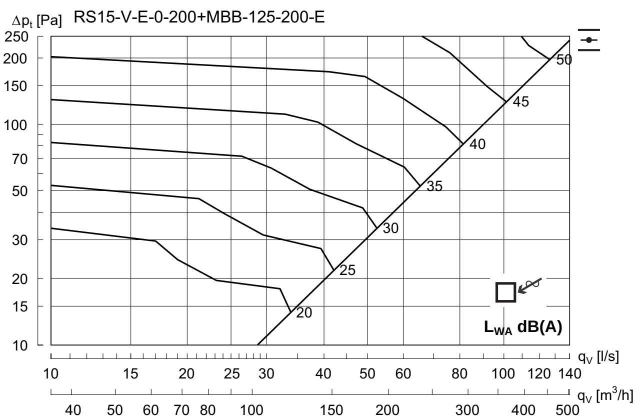
RS15-V 200 + MBB - Exhaust air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	14	5	1	-3	-6	-10	-15	-23



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	14	6	0	-2	-7	-9	-15	-19

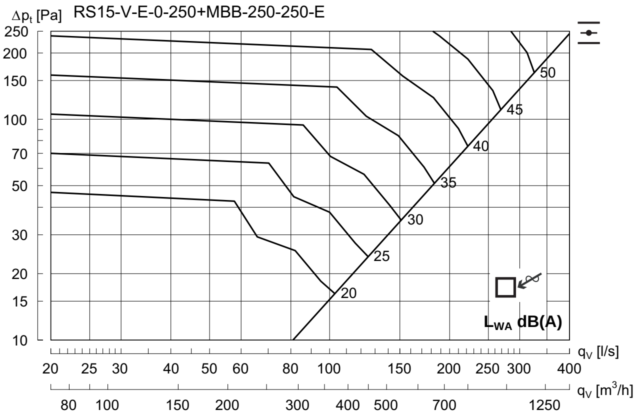


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	13	4	1	-1	-7	-11	-15	-22

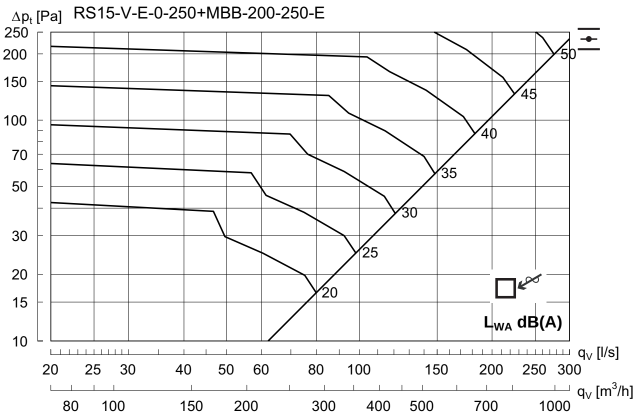
Versio RS15

Technical data

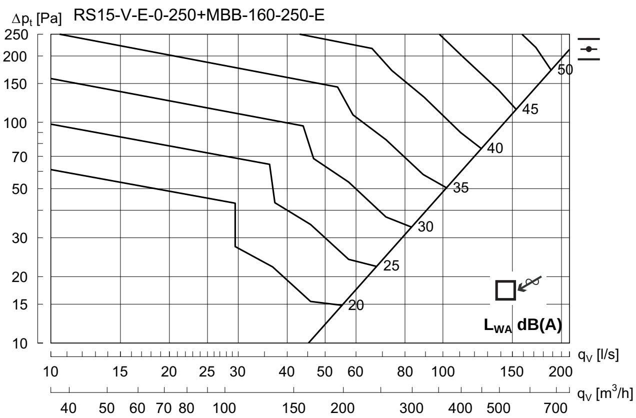
RS15-V 250 + MBB - Exhaust air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	10	6	3	-4	-6	-10	-16	-24

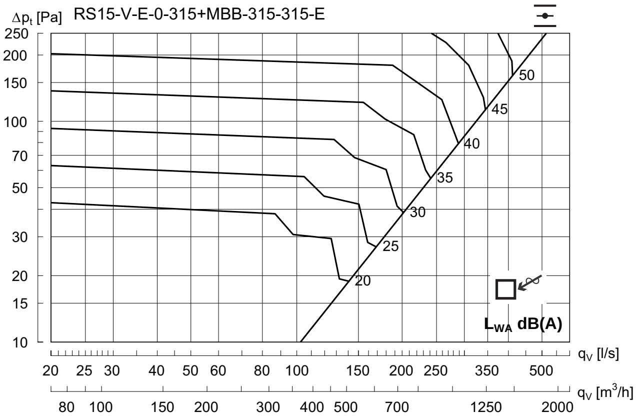


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	14	5	1	-3	-6	-10	-13	-21

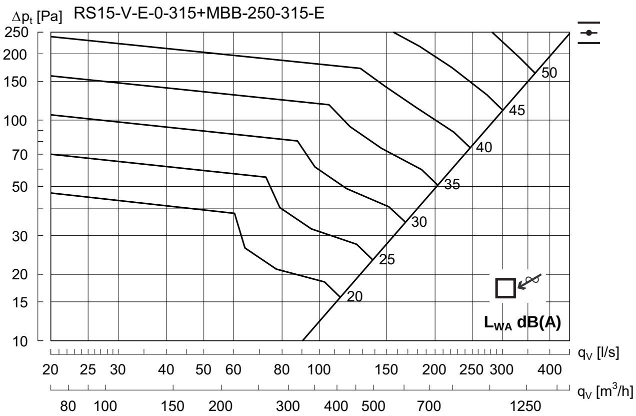


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	15	7	1	-3	-6	-10	-16	-19

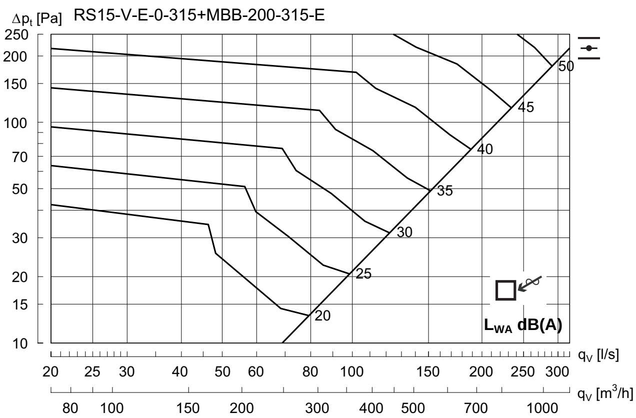
RS15-V 315 + MBB - Exhaust air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	12	6	3	-3	-6	-11	-16	-26



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	11	6	2	-4	-6	-10	-16	-23



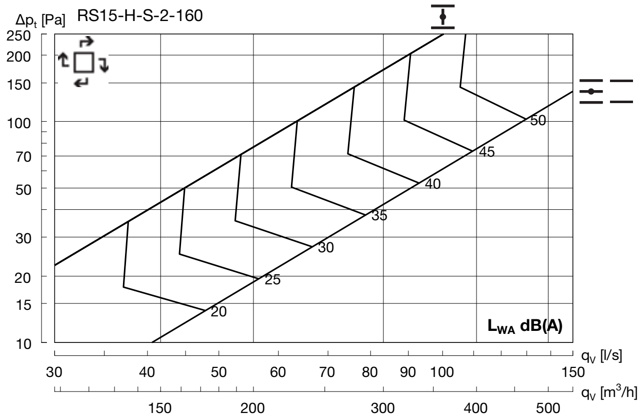
Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	14	5	1	-3	-6	-10	-14	-22

Versio

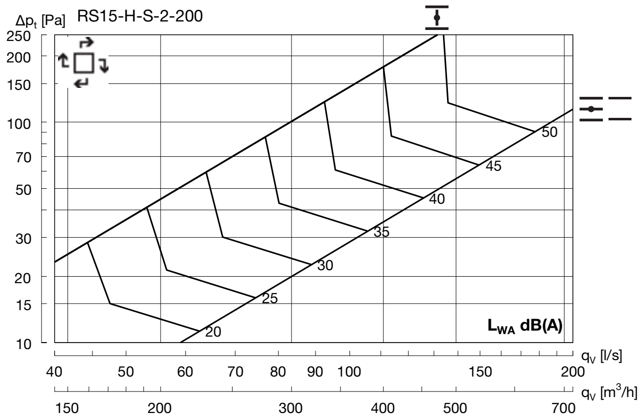
RS15

Technical data

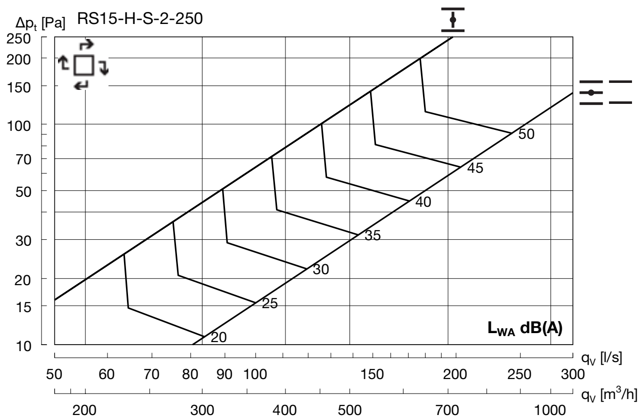
RS15 + H - Supply air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	2	5	5	-3	-7	-14	-20	-26

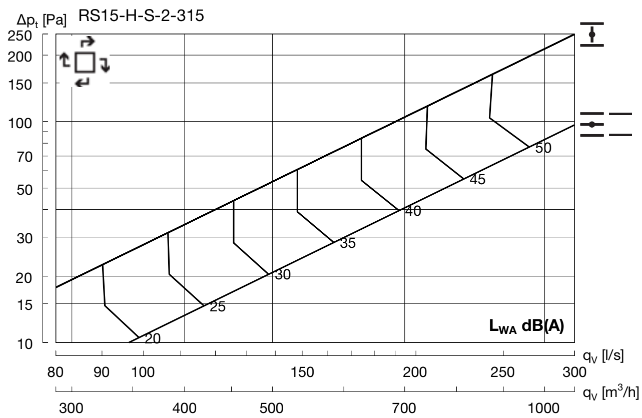


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	10	7	2	-2	-6	-14	-21	-29



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	5	7	3	-1	-7	-16	-23	-31

RS15 + H - Supply air



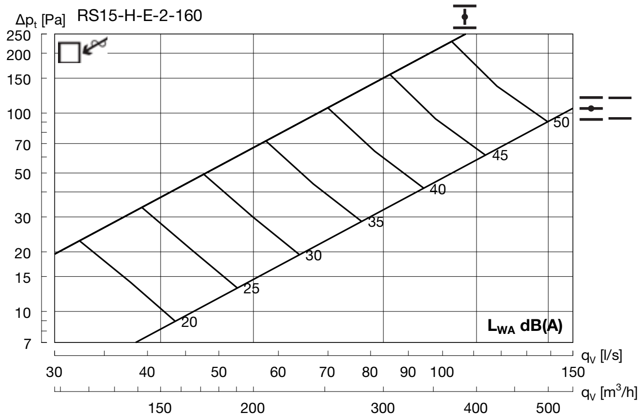
Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	7	7	2	-1	-7	-16	-25	-35

Versio

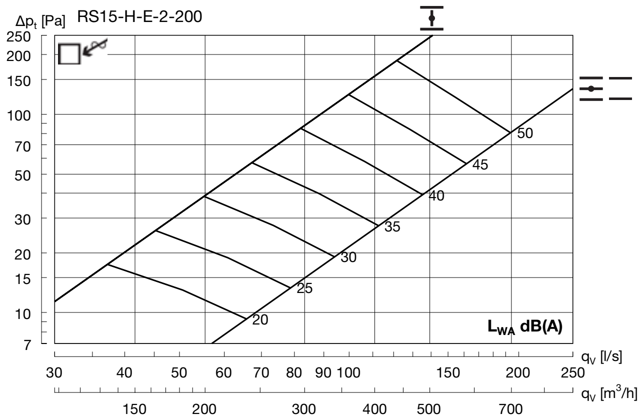
RS15

Technical data

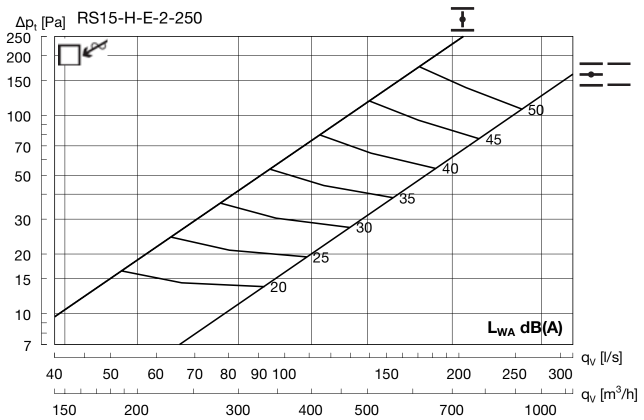
RS15 + H - Exhaust air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	9	7	6	-4	-10	-13	-22	-31

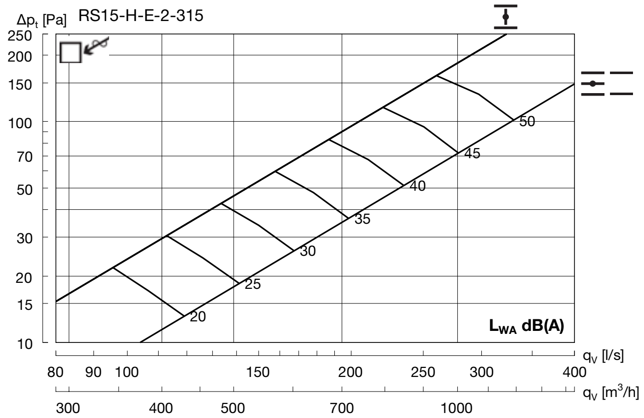


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	6	9	4	-4	-8	-12	-19	-29



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	6	7	2	-2	-6	-13	-22	-31

RS15 + H - Exhaust air



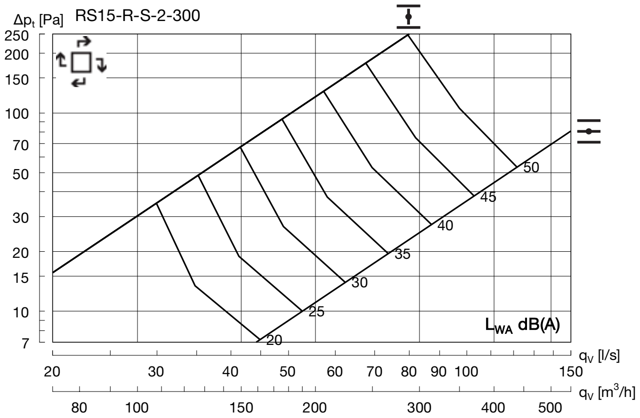
Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	7	6	2	-2	-5	-12	-24	-33

Versio

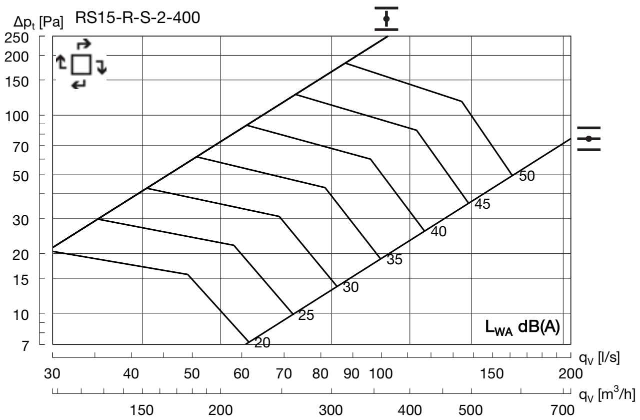
RS15

Technical data

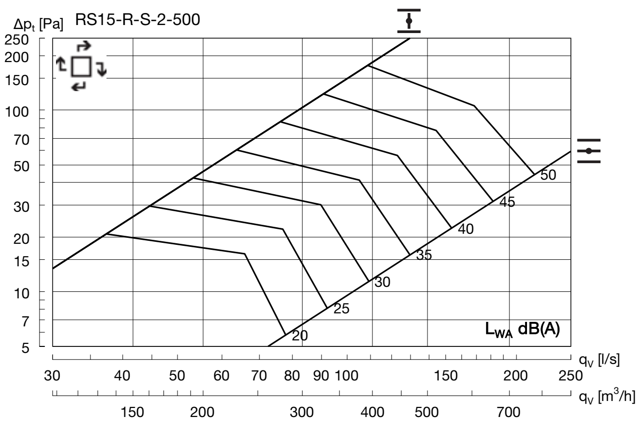
RS15 + R - Supply air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	7	-1	4	-1	-8	-14	-22	-31

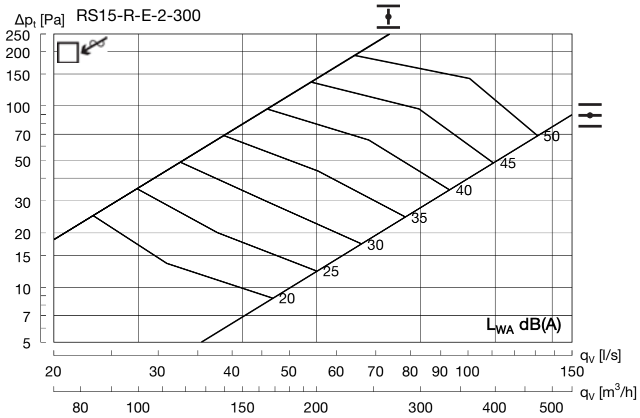


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	-2	-1	3	-1	-6	-11	-20	-32

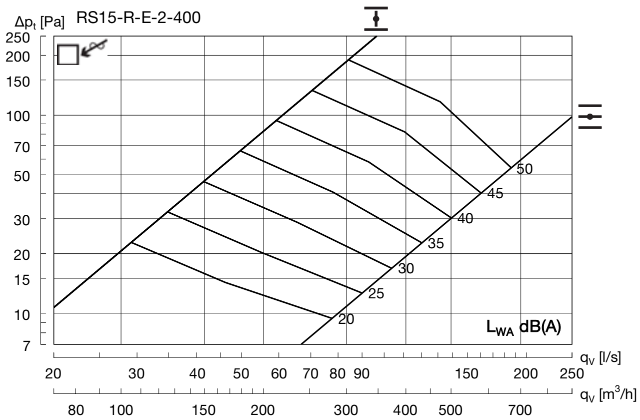


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	3	-1	3	-1	-7	-11	-19	-31

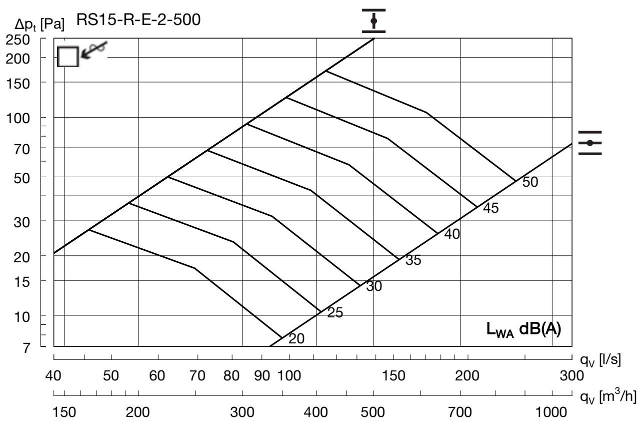
RS15 + R - Exhaust air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	6	1	4	-2	-7	-10	-17	-25



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	2	0	2	-2	-5	-10	-16	-24



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	1	1	1	-2	-6	-9	-16	-25

Versio RS16

RS16 with upper section type V

RS16 with plenum box type H

Description

RS16 is a square swirl diffuser with adjustable bars that can be used for both supply air and exhaust. The swirl pattern ensures high induction and a large dynamic range, and is therefore ideal for the horizontal supply of very cold air. For exhaust, the diffuser is supplied as standard without bars.

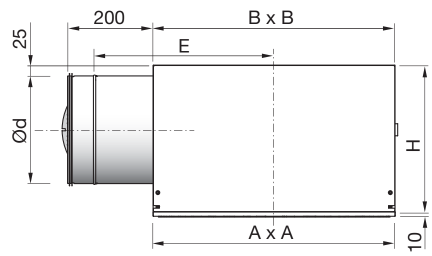
- High capacity
- Large dynamic range
- High induction
- Ideal for the supply of very cold air
- Can be used for both supply air and exhaust

Order code

Product			RS	16	b	c	d	eee	f
Type									
RS									
Design									
16									
Box type									
V - H - R									
Functional use									
S = Supply air									
E = Exhaust									
Damper									
0 = No damper	(Box type	: H, V)							
1 = Damper	(Box type	: H, R)							
2 = Damper / Meas.outlets	(Box type	: H)							
Connection dim.									
Ø315	(Box type	: V)							
Ø250-315	(Box type	: H)							
(500x100)	(Box type	: R)							
Ceiling system									
1 - 14	(Go to chapter Ceiling tile adaption)								

Example: RS-16-V-S-0-315-1

Dimensions



RS16-H Ød	Pattern	A mm	B mm	H mm	E mm	Weight kg
250	600	*-	560	340	420	12.3
315	600	*-	560	405	420	13.1

* Face plate dimension A x A depends on ceiling system. See **"Ceiling adjustment"** for detailed dimensions. For further details on plenum box - see **"Plenum boxes"**.

Maintenance

The face plate can be removed to enable cleaning of internal parts or to gain access to the duct or box. The visible parts of the diffuser can be wiped with a damp cloth.

Materials and finish

Grille box/plenum box:
Material: Galvanised steel

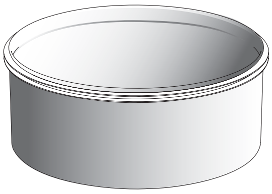
Face plate:
Material: Galvanised steel
Bars: Black ABS-plastic
Standard finish: Powder-coated
Standard colour: RAL 9010, gloss 30

The diffuser is available in other colours. Please contact Lindab's sales department for further information.

Versio RS16

Accessories

Extension piece MBZ



Order code

Product	MBZ	aaa
Type		
Size		

Example: MBZ-315

Mounting bracket PBB

Suspension MHS

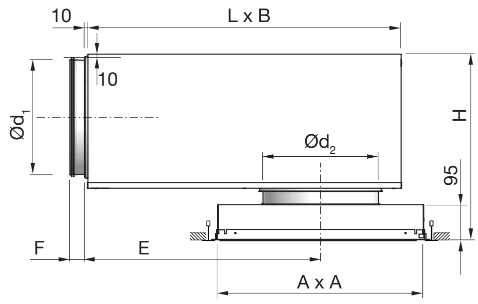
Order code

Product	aaa
Type	

Example: MHS

Plenum box MBB

RS16-V + MBB



RS16-V + MBB							
Duct	RS16-V		B	E	F	H*	L
$Ød_1$ mm	$Ød_2$ mm	Pattern	mm	mm	mm	mm	mm
200	315	600	460	396	70	375 - 415	565
250	315	600	540	486	70	425 - 465	698
315	315	600	540	646	70	490 - 530	858

* Using accessory MBZ the H dimension will increase:
$Ød_2$ = 315 mm=> H + 60 mm

Order code

Product	MBB	aaa	315	c
Type MBB				
Duct connection $Ød_1$ Ø200-315				
Diffuser dimension $Ød_2$ Ø315				
Functional use S = Supply air E = Exhaust				

Example: RS-16-V-S-0-315-1+MBB-315-315-S

Versio

RS16

Technical data

Capacity

Air flow q_v [l/s] and [m³/h], total pressure Δp_t [Pa], throw $l_{0.2}$ [m] and sound power level L_{WA} [dB(A)] can be seen in the diagrams.

Frequency-related sound effect level

The sound effect level in the frequency band is defined as $L_{WA}+K_{ok}$. K_{ok} values are specified in charts beneath the diagrams on the following pages. K_{ok} values for RS16 without a box are avaliable on request.

Quick selection, supply air

RS16-V + MBB

RS16-V + MBB		Max. airflow 30dB(A)		Max. airflow 35dB(A)	
Duct $Ød_1$	RS16-V $Ød_2$	l/s	m³/h	l/s	m³/h
200	315	99	356	131	472
250	315	126	454	160	576
315	315	155	558	185	666

RS16 + H

RS16 + H Size Ød mm	Minimum		Max. airflow 30dB(A)		Max. airflow 35dB(A)	
	l/s	m³/h	l/s	m³/h	l/s	m³/h
250	71	254	-	-	112	403
315	95	342	-	-	174	626

Sound attenuation

Sound attenuation of the diffusers ΔL from duct to room, including end reflection - see table below.

RS16-V + MBB

RS16-V + MBB		Centre frequency Hz							
Duct $Ød_1$	RS16-V $Ød_2$	63	125	250	500	1K	2K	4K	8K
200	315	13	9	3	16	16	15	17	16
250	315	12	7	5	17	16	17	17	18
315	315	8	10	8	17	18	17	18	23

RS16 + H

RS16 + H Size Ød mm	Centre frequency Hz							
	63	125	250	500	1K	2K	4K	8K
250	13	8	4	8	5	5	7	9
315	12	7	5	11	5	5	6	8

RS16 + R

RS16 + R Size mm	Mean frequency Hz							
	63	125	250	500	1K	2K	4K	8K
500x100	12	7	2	4	2	5	5	5

Mounting -and balancing instruction

For futher information go to www.lindQST.com and Mounting -and balancing instruction.

Versio

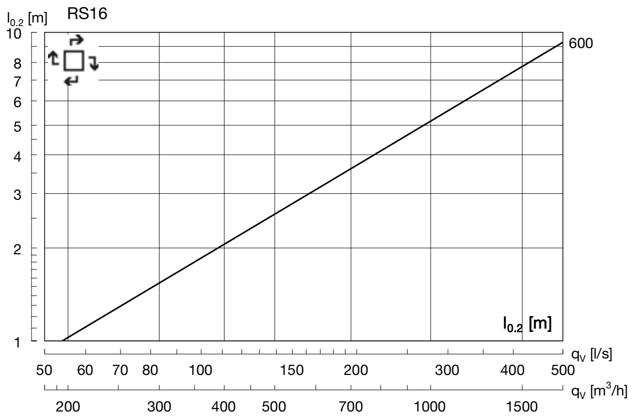
RS16

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18

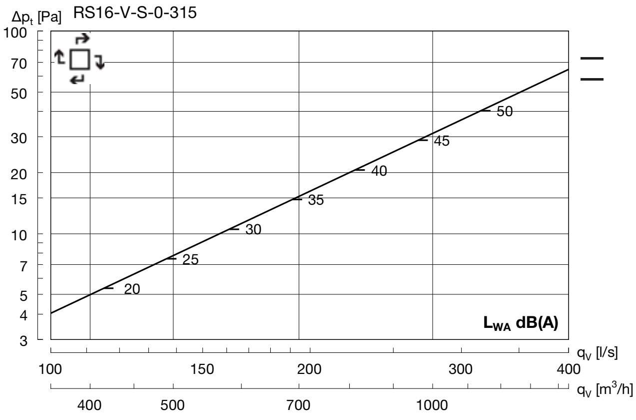
Technical data

Throw $l_{0.2}$

Throw $l_{0.2}$ [m] is specified at a terminal velocity of 0.2 m/s. The designation by the line specifies the pattern of dispersal.



RS16-V without plenum box – Supply air

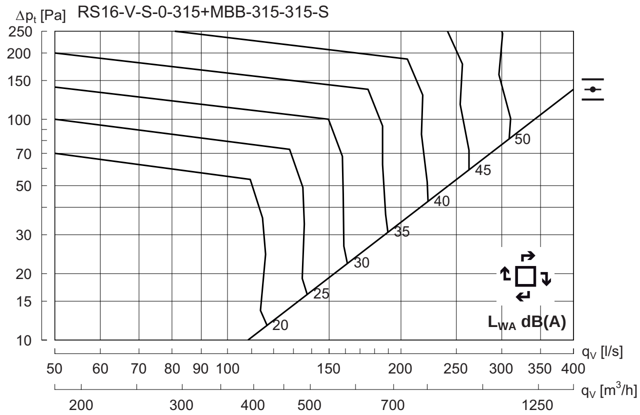


Versio

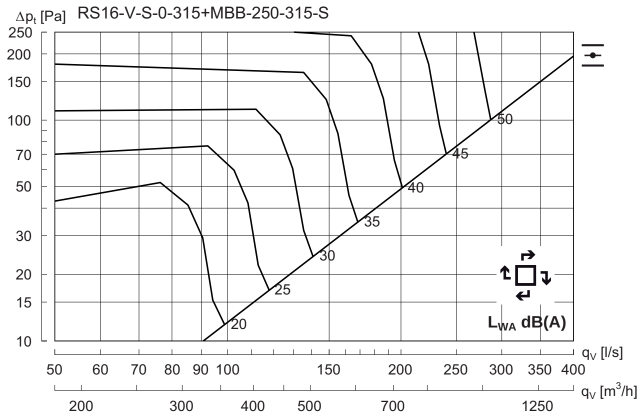
RS16

Technical data

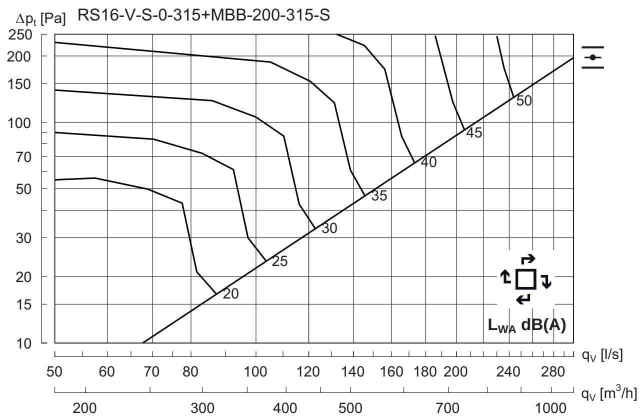
RS16-V 315 + MBB - Supply air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	8	1	-1	0	-6	-14	-21	-30



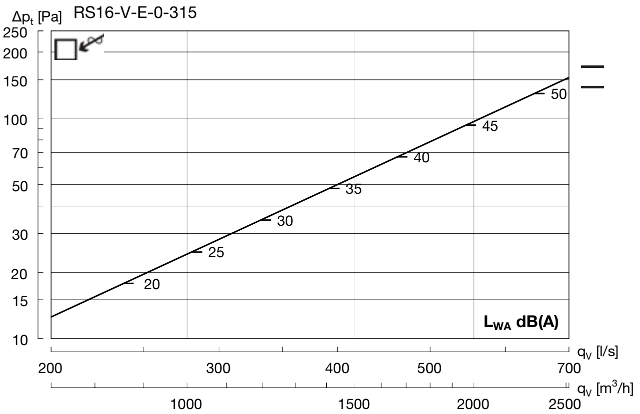
Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	10	4	-1	-1	-5	-12	-19	-26



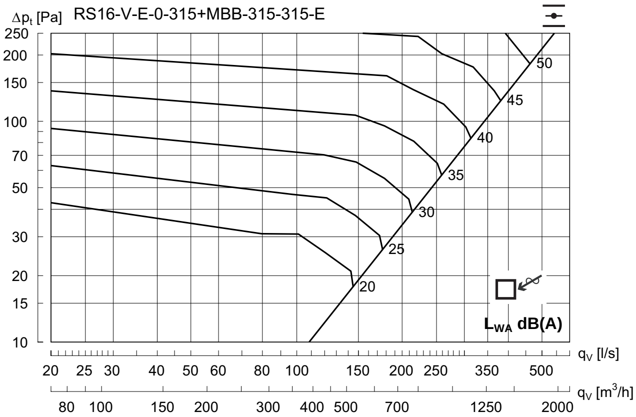
Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	12	7	-1	-2	-5	-12	-18	-24

Technical data

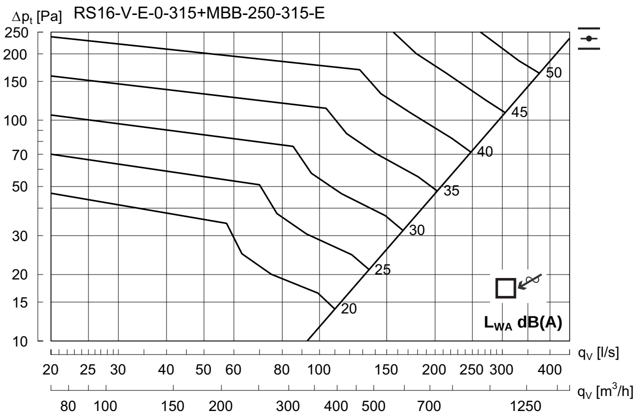
RS16-V without plenum box – Exhaust air



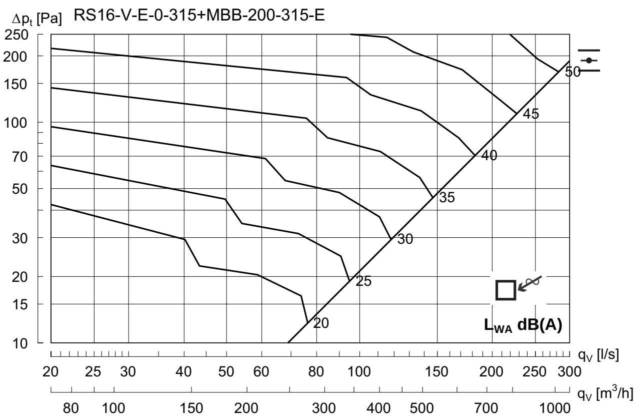
RS16-V 315 + MBB - Exhaust air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	11	5	3	-4	-6	-9	-15	-26



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	11	6	3	-4	-6	-11	-16	-24



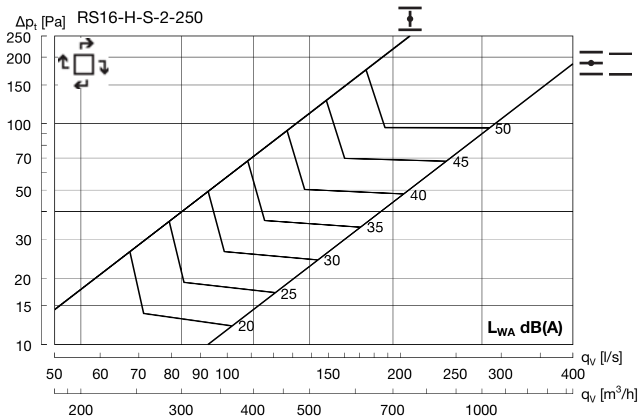
Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	14	5	1	-3	-6	-9	-13	-21

Versio

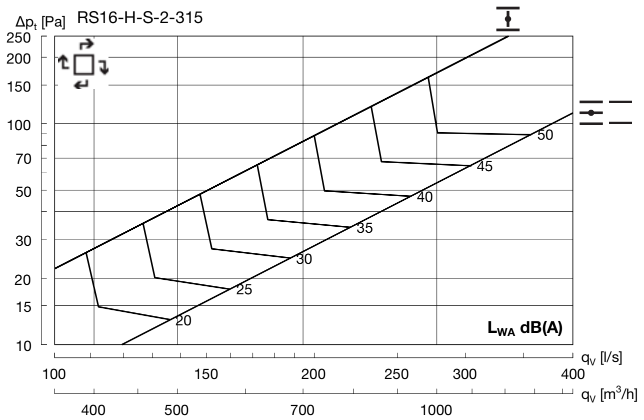
RS16

Technical data

RS16 + H - Supply air

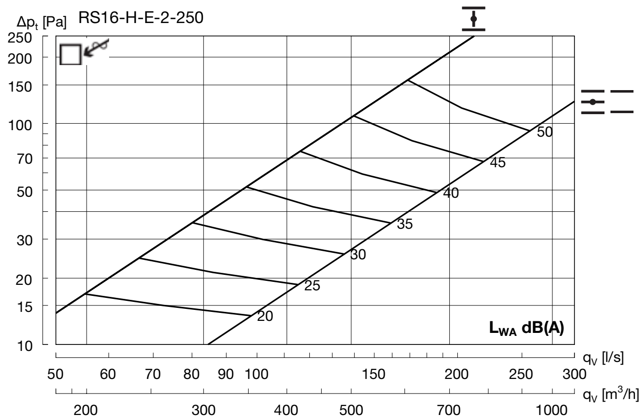


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	5	5	2	-1	-6	-13	-19	-27

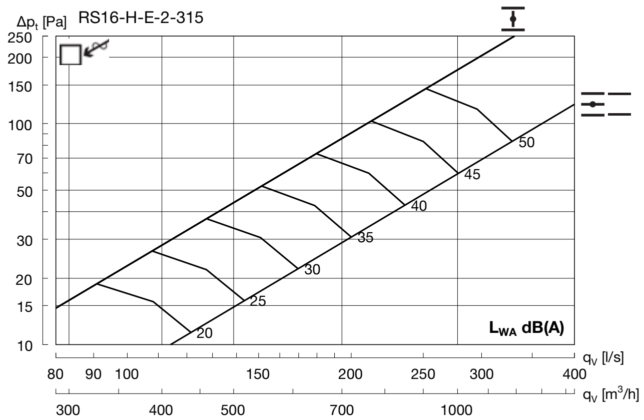


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	8	5	1	-1	-5	-13	-21	-31

RS16 + H - Exhaust air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	2	6	3	-2	-7	-12	-21	-30

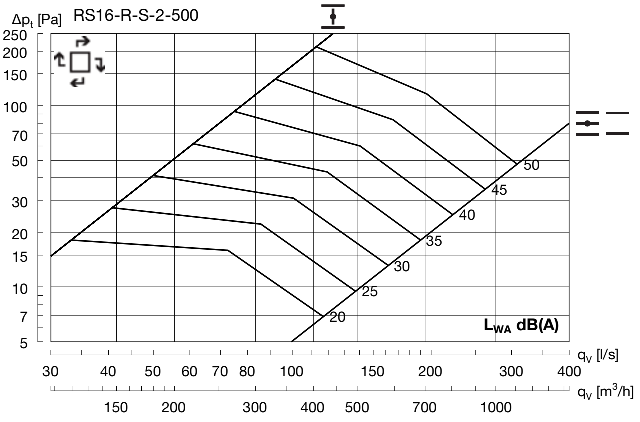


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	8	5	2	-2	-5	-12	-21	-32

Versio RS16

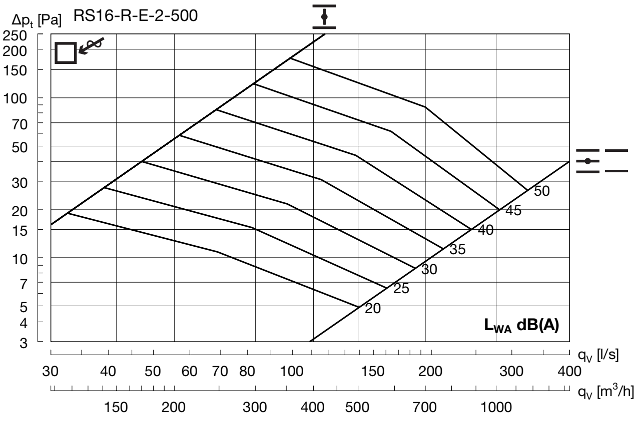
Technical data

RS16 + R - Supply air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	9	2	3	-1	-8	-12	-21	-28

RS16 + R - Exhaust air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	8	0	0	-3	-5	-8	-18	-26

Versio NS19

NS19 with grille box type V

NS19 with plenum box type H

Description

NS19 is a square diffuser with individually adjustable nozzles. The diffuser is suitable for the horizontal supply of cooled air, where great flexibility in the dispersal pattern is required. The diffuser can also be set to a vertical supply air pattern, enabling supply of heated air. The diffuser is supplied as standard with nozzles set for swirl.

- Adjustable dispersal patterns
- No pressure change for different dispersal patterns
- Suitable for horizontal or vertical supply air

Order code

Product	NS	19	b	S	d	eee	f

Type
NS

Design
19

Box type
V - H - R

Functional use
S = Supply air

Damper

0 = No damper	(Box type	: H, V)
1 = Damper	(Box type	: H, R)
2 = Damper / Meas.outlets	(Box type	: H)

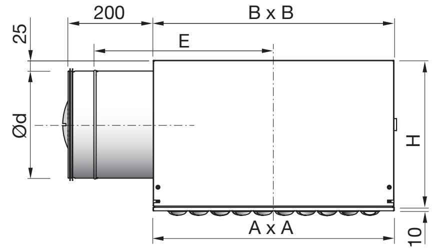
Connection dim.

Ø160-315	(Box type	: V)
Ø125-315	(Box type	: H)
(200x100 -500x100)	(Box type	: R)

Ceiling system
1 - 14 (Go to chapter Ceiling tile adaption)

Example: NS-19-V-S-0-200-1

Dimensions



NS19-H Ød	Pattern	A mm	B mm	H mm	E mm	Weight kg
125	300	*-	380	215	350	3.30
160	400	*-	380	250	350	4.60
200	500	*-	460	290	390	6.50
250	600	*-	560	340	420	9.30
315	600	*-	560	405	420	10.1

* Face plate dimension A x A depends on ceiling system. See **"Ceiling systems"** for detailed dimensions. For further details on plenum box, see **"Plenum boxes"**.

Maintenance

The face plate can be removed to enable cleaning of internal parts or to gain access to the duct or box. The visible parts of the diffuser can be wiped with a damp cloth.

Materials and finish

Grille box/plenum box:
Material: Galvanised steel

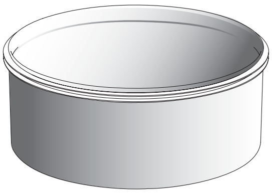
Face plate:
Material: Galvanised steel
Nozzles: White, ABS.plastic
Standard finish: Powder-coated
Standard colour: RAL 9010, gloss 30

The diffuser is available in other colours. Please contact Lindab's sales department for further information.

Versio NS19

Accessories

Extension piece MBZ



Order code

Product	MBZ	aaa
Type		
Size		

Example: MBZ-200

Mounting bracket PBB

Suspension MHS

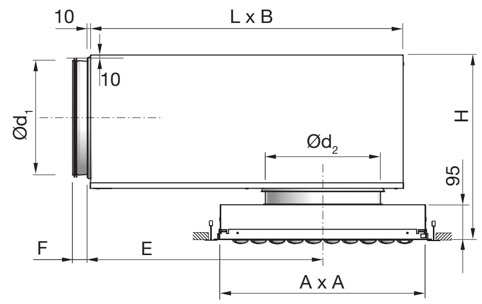
Order code

Product	aaa
Type	

Example: MHS

Plenum box MBB

NS19-V + MBB



NS19-V + MBB							
Duct Ød1 mm	NS19-V Ød2 mm	Pattern	B mm	E mm	F mm	H* mm	L mm
100	160	300	260	216	50	275 - 315	310
125	160	300	310	262	50	300 - 340	376
125	200	400	310	262	50	300 - 340	376
160	160	300	380	323	50	334 - 374	459
160	200	400	380	323	50	334 - 374	459
160	250	500	380	323	50	334 - 374	459
200	200	400	460	396	70	375 - 415	565
200	250	500	460	396	70	375 - 415	565
200	315	600	460	396	70	375 - 415	565
250	250	500	540	486	70	425 - 465	698
250	315	600	540	486	70	425 - 465	698
315	315	600	540	646	70	490 - 530	858

* Using accessory MBZ the H dimension will increase:
$Ød_2$ = 160 - 200 mm => H +40 mm
$Ød_2$ = 250 - 315 mm => H +60 mm

Order code

Product	MBB	aaa	bbb	S
Type MBB				
Duct connection Ød1 Ø100-315				
Diffuser dimension Ød2 Ø160-315				
Functional use S = Supply air				

Example: NS-19-V-S-0-200-1+MBB-200-200-S

Versio

NS19

Technical data

Capacity

Air flow q_v [l/s] and [m^3/h], total pressure Δp_t [Pa], throw $l_{0.2}$ [m] and sound power level L_{WA} [dB(A)] can be seen in the diagrams.

Frequency-related sound effect level

The sound effect level in the frequency band is defined as $L_{WA}+K_{ok}$. K_{ok} values are specified in charts beneath the diagrams on the following pages. K_{ok} values for NS19 without a box are availble on request.

NS19-V + MBB

NS19-V + MBB		Max. airflow		Max. airflow	
Duct	NS19-V	30dB(A)		35dB(A)	
Ød$_1$	Ød$_2$	l/s	m^3/h	l/s	m^3/h
100	160	37	133	44	158
125	160	45	162	56	202
125	200	52	187	63	227
160	160	48	173	58	209
160	200	60	216	74	266
160	250	70	252	88	317
200	200	68	245	82	295
200	250	80	288	97	349
200	315	89	320	114	410
250	250	89	320	105	378
250	315	104	374	128	461
315	315	129	464	152	547

Supply air

NS19 + H

NS19 + H			Max. airflow		Max. airflow	
Size Ød	Minimum		30dB(A)		35dB(A)	
mm	l/s	m^3/h	l/s	m^3/h	l/s	m^3/h
125	26	93	31	112	40	144
160	33	118	50	180	60	216
200	57	204	60	216	77	277
250	71	254	95	342	113	407
315	95	342	-	-	147	529

Sound attenuation

Sound attenuation of the diffusers ΔL from duct to room, including end reflection - see table below.

NS19-V + MBB

NS19-V + MBB		Centre frequency Hz							
Duct	NS19-V								
Ød$_1$	Ød$_2$	63	125	250	500	1K	2K	4K	8K
100	160	18	16	5	17	20	19	18	21
125	160	17	13	8	20	18	18	18	21
125	200	13	11	5	16	17	16	17	19
160	160	17	16	11	23	21	20	21	21
160	200	13	14	8	22	21	19	20	21
160	250	14	14	5	19	17	17	18	20
200	200	13	10	7	17	20	17	19	18
200	250	12	9	6	16	18	17	19	17
200	315	12	8	3	14	17	15	17	17
250	250	14	9	7	18	19	19	19	19
250	315	14	7	5	16	17	18	18	18
315	315	8	9	8	16	18	17	18	24

NS19 + H

NS19 + H	Centre frequency Hz							
Size Ød								
mm	63	125	250	500	1K	2K	4K	8K
125	17	15	5	12	12	7	8	12
160	17	13	4	13	14	7	7	10
200	15	9	3	14	10	8	8	14
250	12	8	5	10	7	7	8	13
315	12	6	5	12	6	6	8	13

Mounting -and balancing instruction

For futher information go to www.lindQST.com and Mounting -and balancing instruction.

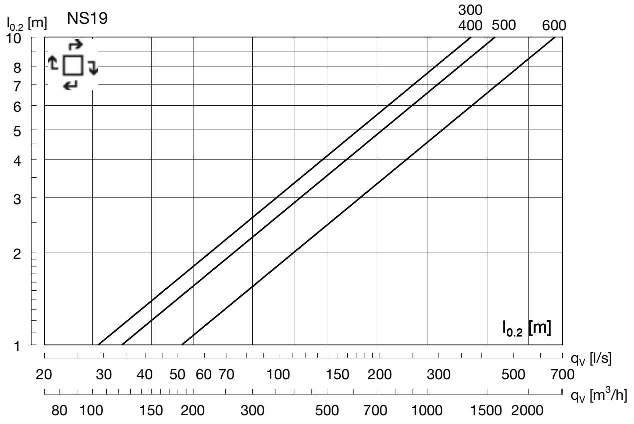
Versio

NS19

Technical data

Throw $l_{0.2}$

Throw $l_{0.2}$ [m] is specified at a terminal velocity of 0.2 m/s. The designation by the lines specifies the pattern of dispersal.

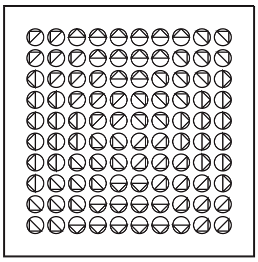


Correction throw

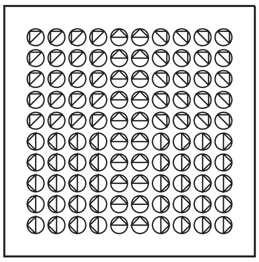
4-way	3-way	2-way	1-way
1,3	2	2,5	4,6

Air patterns

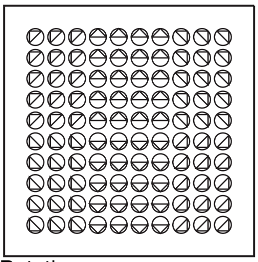
4 - way



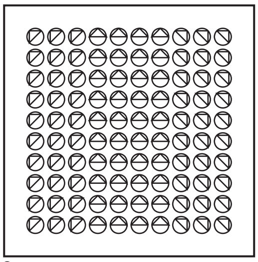
3 - way



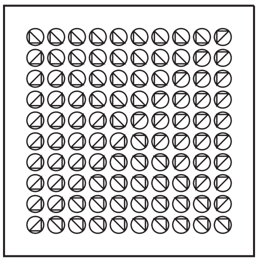
2-way



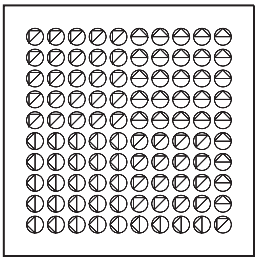
1-way



Rotation



2-way corner



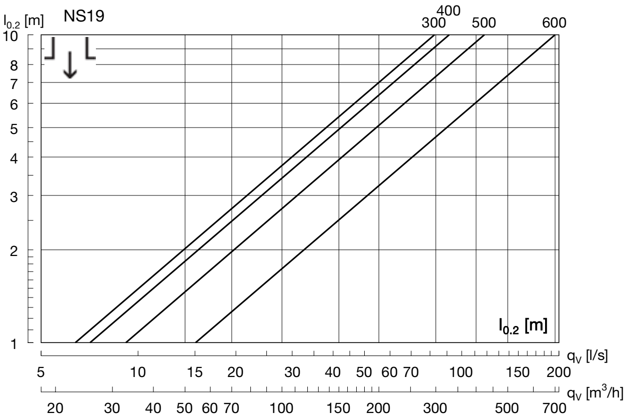
Versio

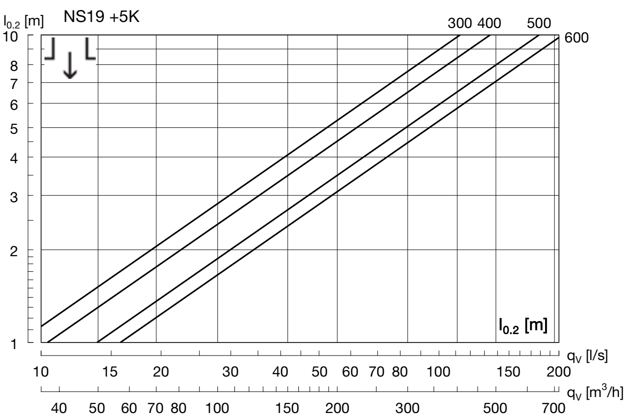
NS19

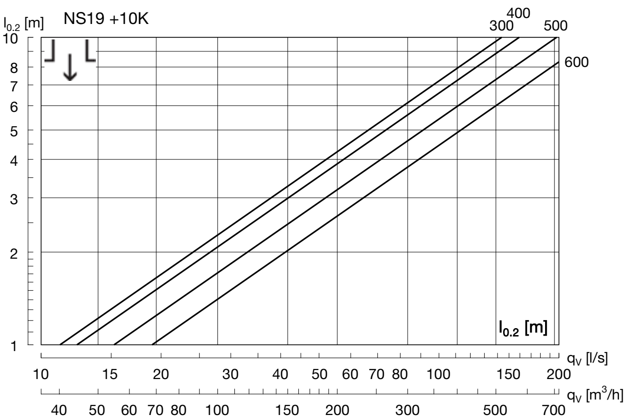
Technical data

Throws/turning points

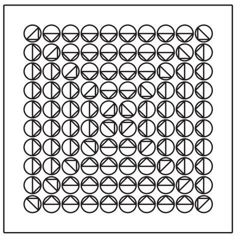
Throw $l_{0.2}$ [m] can be seen in the diagram. The throw applies for isothermal air at a terminal velocity of 0.2 m/s. Turning point $l_{0.0}$ (m) can be seen in the diagram for heated air, +5 K and +10 K respectively.
The designation by the lines specifies the pattern of dispersal.



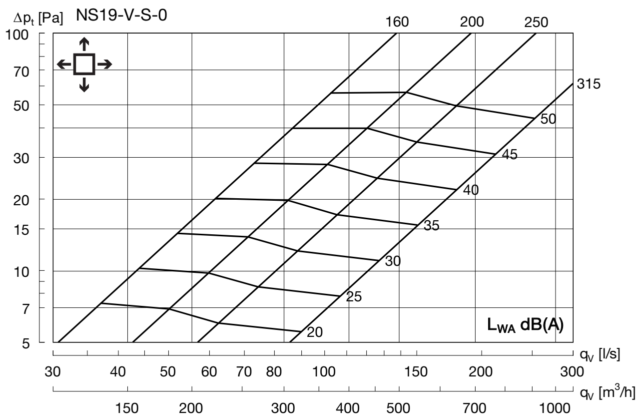




Nozzle setting - vertical



NS19-V without plenum box



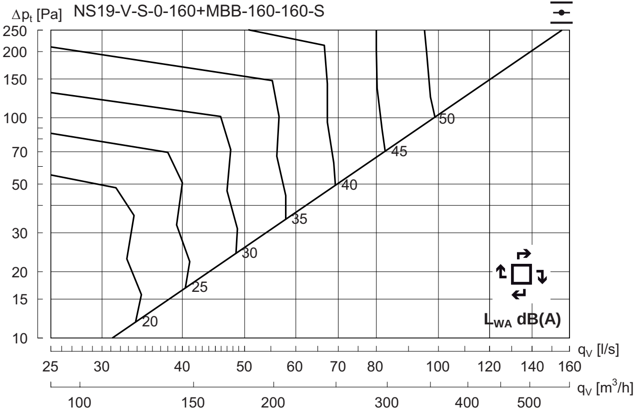
Versio

NS19

Technical data

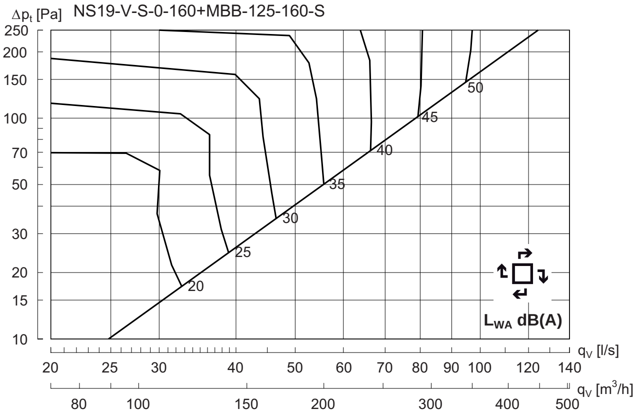
NS19-V 160 + MBB - Supply air

NS19-V-S-0-160+MBB-160-160-S



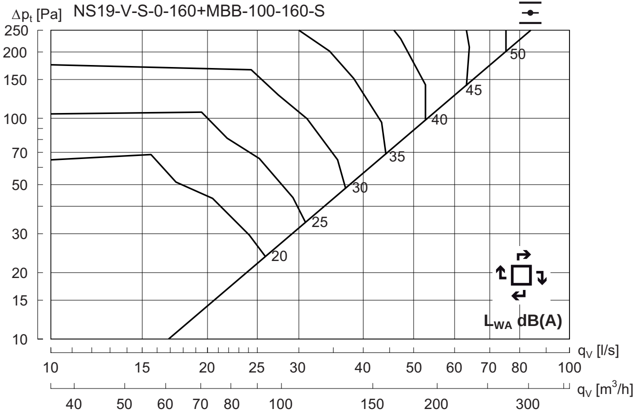
Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	10	4	-2	1	-6	-15	-22	-33

NS19-V-S-0-160+MBB-125-160-S



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	8	5	-1	0	-6	-13	-18	-28

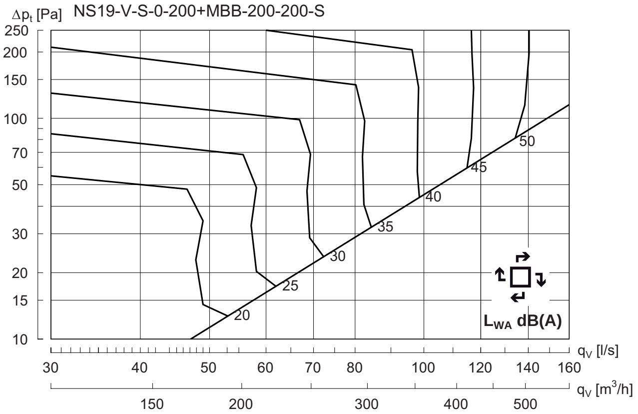
NS19-V-S-0-160+MBB-100-160-S



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	11	4	2	-1	-8	-12	-16	-22

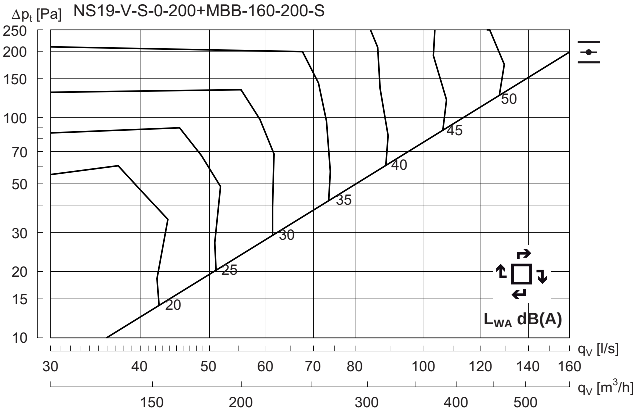
NS19-V 200 + MBB - Supply air

NS19-V-S-0-200+MBB-200-200-S



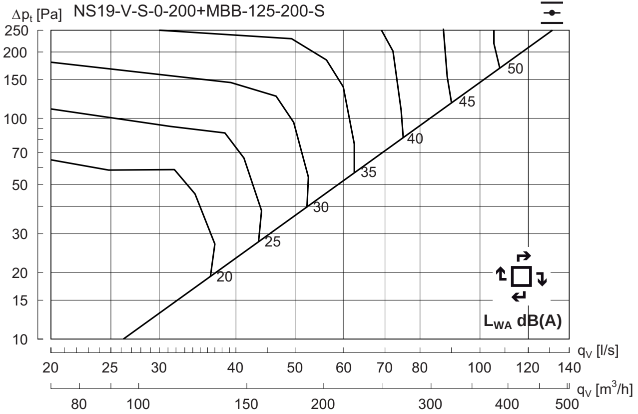
Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	11	4	-3	0	-5	-16	-23	-33

NS19-V-S-0-200+MBB-160-200-S



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	12	5	-1	-1	-5	-13	-19	-26

NS19-V-S-0-200+MBB-125-200-S



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	8	6	2	-1	-7	-13	-18	-26

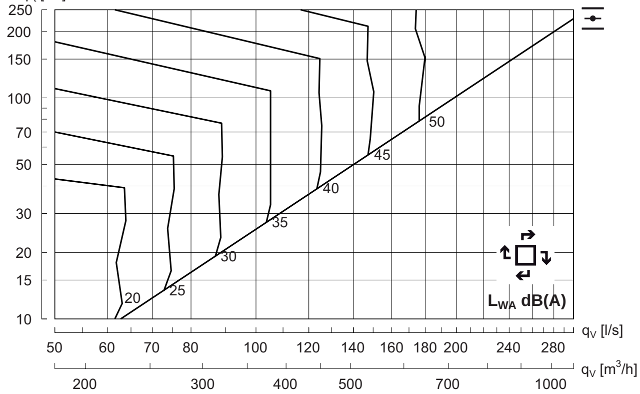
Versio

NS19

Technical data

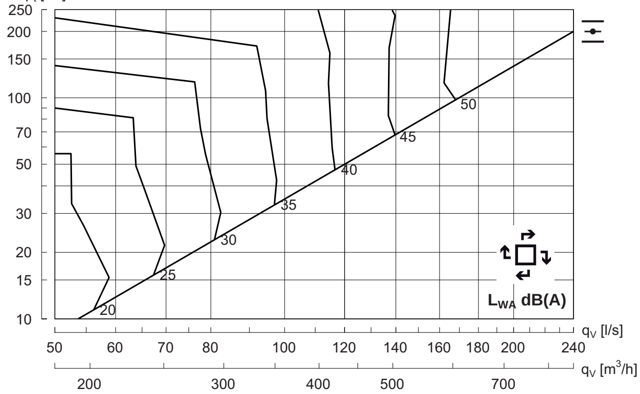
NS19-V 250 + MBB - Supply air

Δp_t [Pa] NS19-V-S-0-250+MBB-250-250-S



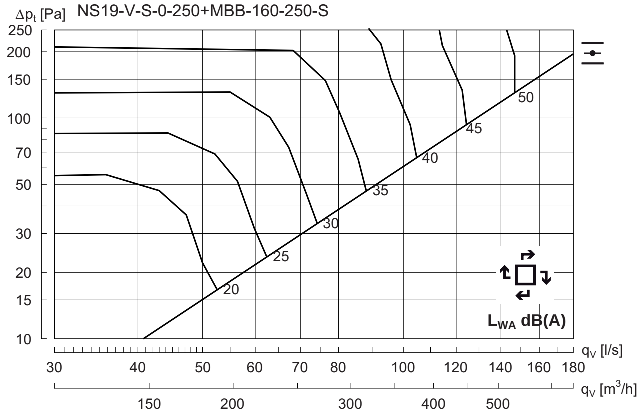
Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	8	4	-4	0	-5	-16	-24	-37

Δp_t [Pa] NS19-V-S-0-250+MBB-200-250-S



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	9	6	-2	0	-5	-15	-22	-33

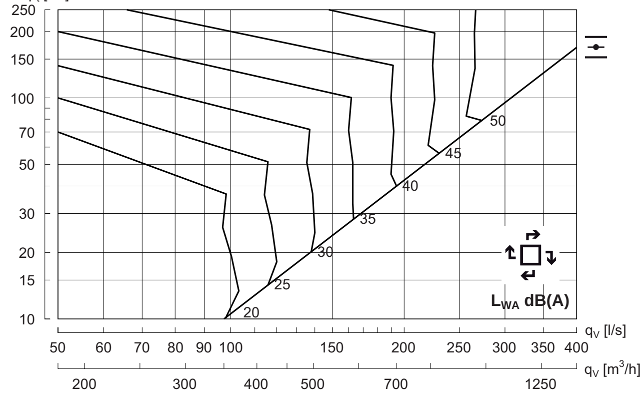
Δp_t [Pa] NS19-V-S-0-250+MBB-160-250-S



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	13	6	0	-1	-5	-12	-18	-26

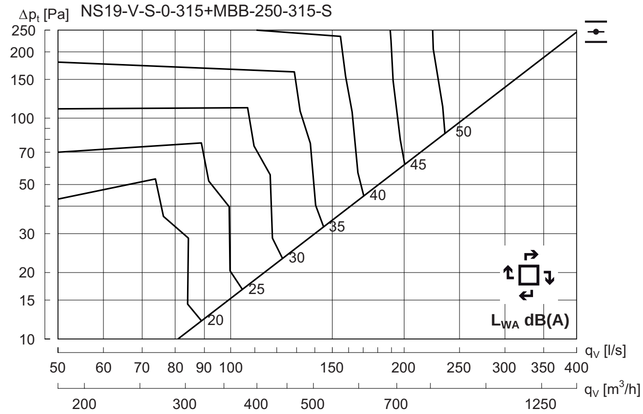
NS19-V 315 + MBB - Supply air

Δp_t [Pa] NS19-V-S-0-315+MBB-315-315-S



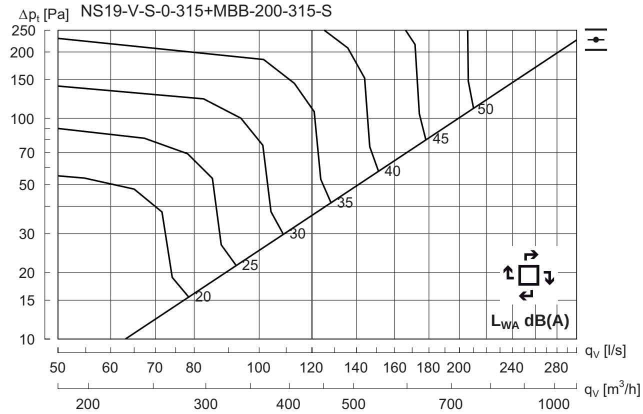
Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	10	1	-2	0	-5	-16	-23	-34

Δp_t [Pa] NS19-V-S-0-315+MBB-250-315-S



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	10	3	-2	0	-5	-15	-21	-28

Δp_t [Pa] NS19-V-S-0-315+MBB-200-315-S



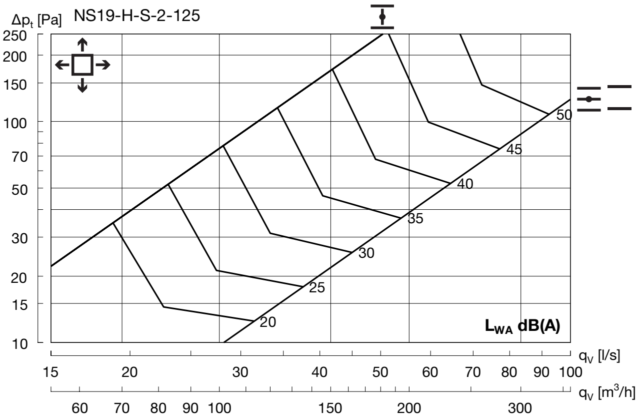
Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	9	6	-1	-1	-5	-13	-20	-28

Versio

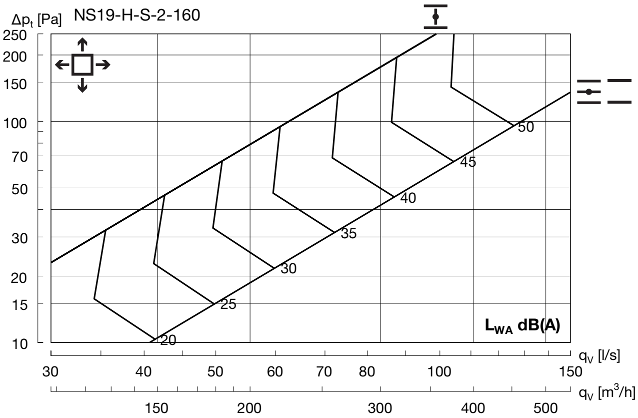
NS19

Technical data

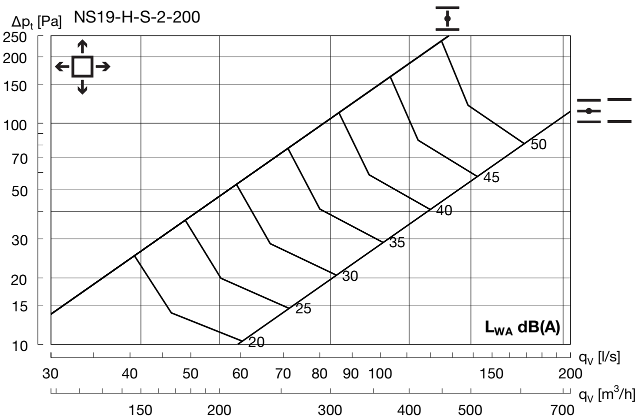
NS19 + H - Supply air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	9	7	6	-4	-9	-15	-21	-28

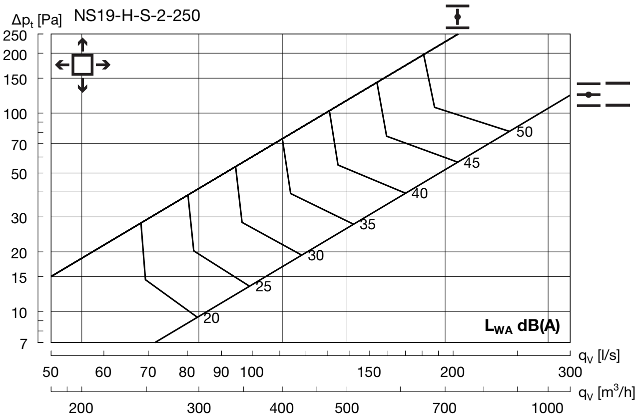


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	9	7	6	-4	-9	-15	-21	-28

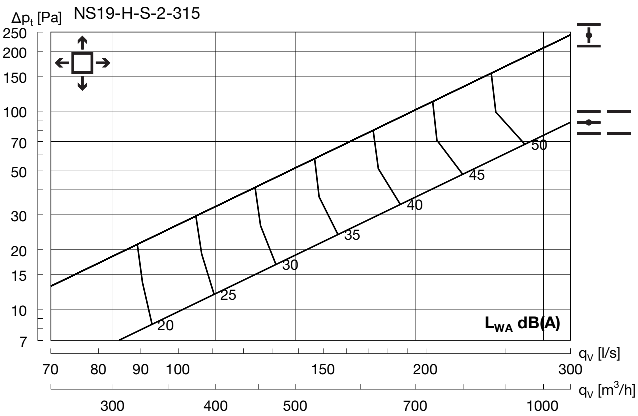


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	11	6	3	-1	-7	-16	-22	-30

NS19 + H - Supply air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	6	7	3	-1	-7	-16	-22	-31



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	6	7	3	-1	-8	-17	-25	-36

Versio

GS23

GS23 with grille box type V

GS23 with plenum box type H

Description

GS23 is a square diffuser with an aluminium grid. GS23 is used for exhaust.

- High capacity

Maintenance

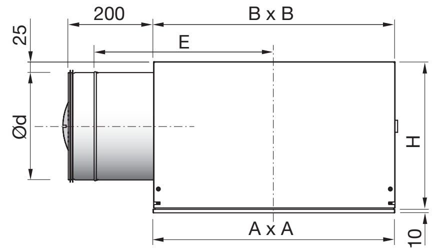
The face plate can be removed to enable cleaning of internal parts or to gain access to the duct or box. The visible parts of the diffuser can be wiped with a damp cloth.

Order code

Product			GS 23 b E d eee f
Type			
GS			
Design			
23			
Box type			
V - H - R			
Functional use			
E = Exhaust			
Damper			
0 = No damper	(Box type	: H, V)	
1 = Damper	(Box type	: H, R)	
2 = Damper / Meas.outlets	(Box type	: H)	
Connection dim.			
Ø160-315	(Box type	: V)	
Ø125-315	(Box type	: H)	
(200x100 -500x100)	(Box type	: R)	
Ceiling system			
1 - 14	(Go to chapter Ceiling tile adaption)		

Example: GS-23-V-E-0-200-1

Dimensions



GS23-H Ød	Pattern	A mm	B mm	H mm	E mm	Weight kg
125	300	*-	380	215	350	5.9
160	400	*-	380	250	350	5.9
200	500	*-	460	290	390	8.5
250	600	*-	560	340	420	12.3
315	600	*-	560	405	420	13.1

* Face plate dimension A x A depends on ceiling system. See **"Ceiling adjustment"** for detailed dimensions. For further details on plenum box, see **"Plenum boxes"**.

Materials and finish

Grille box/plenum box:
Material: Galvanised steel

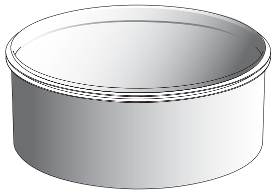
Face plate:
Material: Galvanised steel
Grid: Aluminium
Standard finish: Powder-coated
Standard colour: RAL 9010, gloss 30

The diffuser is available in other colours. Please contact Lindab's sales department for further information.

Versio GS23

Accessories

Extension piece MBZ



Order code

Product	MBZ	aaa
Type		
Size		

Example: MBZ-200

Mounting bracket PBB

Suspension MHS

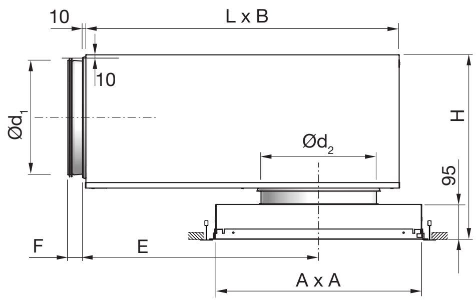
Order code

Product	aaa
Type	

Example: MHS

Plenum box MBB

GS23-V + MBB



GS23-V + MBB							
Duct Ød$_1$ mm	GS23-V Ød$_2$ mm	Pattern	B mm	E mm	F mm	H* mm	L mm
100	160	300	260	216	50	275 - 315	310
125	160	300	310	262	50	300 - 340	376
125	200	400	310	262	50	300 - 340	366
160	160	300	380	323	50	334 - 374	459
160	200	400	380	323	50	334 - 374	459
160	250	500	380	323	50	334 - 374	459
200	200	400	460	396	70	375 - 415	565
200	250	500	460	396	70	375 - 415	565
200	315	600	460	396	70	375 - 415	565
250	250	500	540	486	70	425 - 465	698
250	315	600	540	486	70	425 - 465	698
315	315	600	540	646	70	490 - 530	858

* Using accessory MBZ the H dimension will increase:
Ød$_2$ = 160 - 200 mm => H +40 mm
Ød$_2$ = 250 - 315 mm => H +60 mm

Order code

Product	MBB	aaa	bbb	E
Type MBB				
Duct connection Ød$_1$ Ø100-315				
Diffuser dimension Ød$_2$ Ø160-315				
Functional use E = Exhaust				

Example: GS-23-V-E-0-200-1+MBB-200-200-E

Versio

GS23

Technical data

Capacity

Air flow q_v [l/s] and [m^3/h], total pressure Δp_t [Pa], throw $l_{0.2}$ [m] and sound power level L_{WA} [dB(A)] can be seen in the diagrams.

Sound attenuation

Sound attenuation of the diffusers ΔL from duct to room, including end reflection - see table below.

GS23 + H

GS23 + H								
Size Ød	Centre frequency Hz							
mm	63	125	250	500	1K	2K	4K	8K
125	17	16	5	9	10	4	5	5
160	16	14	3	11	11	4	4	4
200	15	9	2	11	7	4	4	6
250	14	8	3	9	4	3	4	6
315	12	6	4	10	3	3	4	6

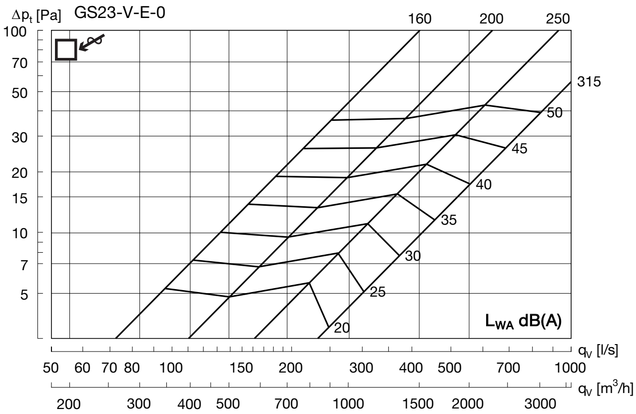
GS23-V + MBB

GS23-V + MBB									
Duct	GS23-V	Centre frequency Hz							
Ød_1	Ød_2	63	125	250	500	1K	2K	4K	8K
100	160	20	16	5	19	20	19	18	21
125	160	16	13	9	20	18	18	19	20
125	200	14	12	6	17	16	16	18	19
160	160	17	16	10	24	20	20	21	21
160	200	15	15	7	22	21	19	20	21
160	250	15	14	5	20	16	16	17	19
200	200	14	11	7	18	21	17	20	18
200	250	13	9	5	17	18	16	18	17
200	315	13	8	3	15	17	15	17	16
250	250	15	8	7	18	18	18	18	19
250	315	15	7	6	16	16	17	17	18
315	315	8	11	8	16	18	17	17	22

Mounting -and balancing instruction

For futher information go to www.lindQST.com and mounting -and balancing instruction.

GS23-V without plenum box - Exhaust air

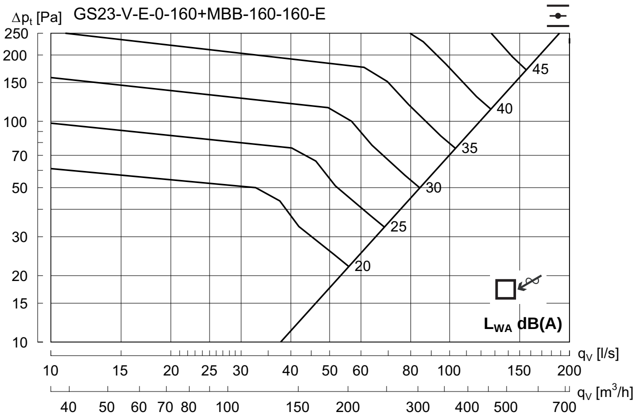


Versio

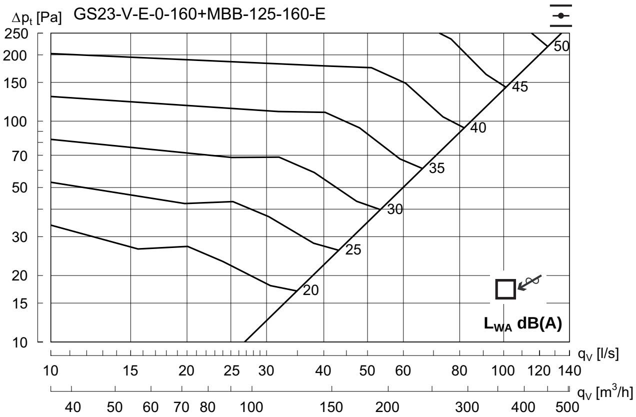
GS23

Technical data

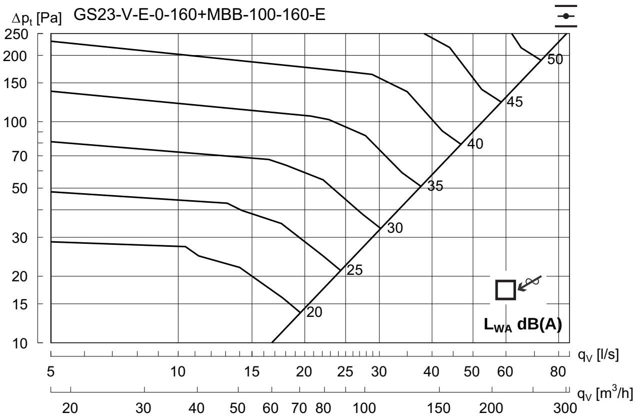
GS23-V 160 + MBB - Exhaust air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	15	5	0	-3	-6	-9	-14	-19

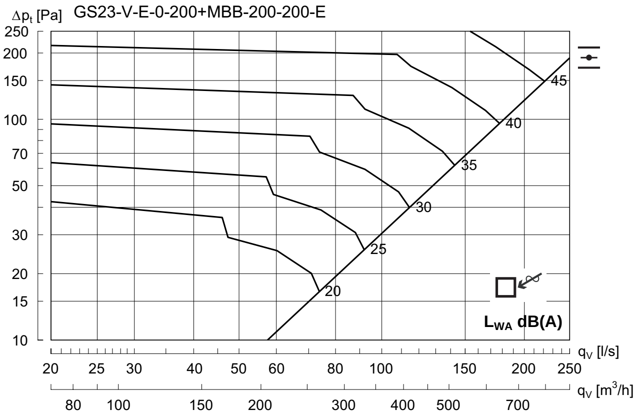


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	11	5	1	-2	-6	-11	-15	-22

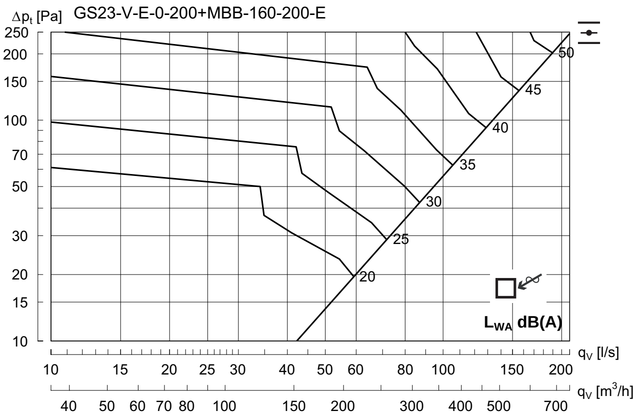


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	8	4	4	-2	-8	-12	-16	-23

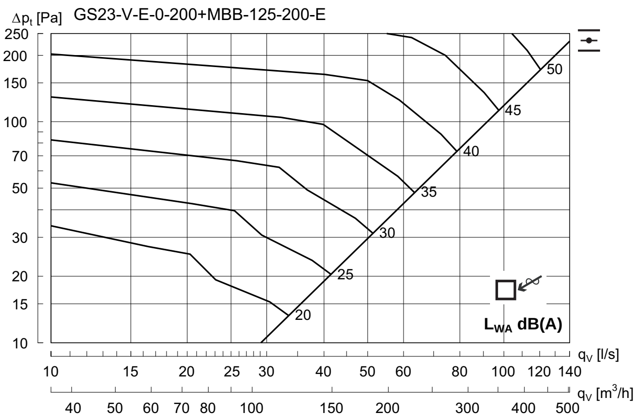
GS23-V 200 + MBB - Exhaust air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	14	5	1	-3	-6	-9	-13	-21



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	14	5	0	-3	-6	-9	-14	-21



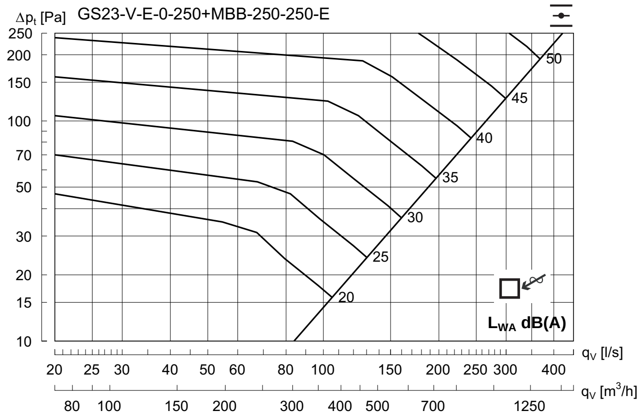
Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	9	4	1	-1	-6	-11	-15	-22

Versio

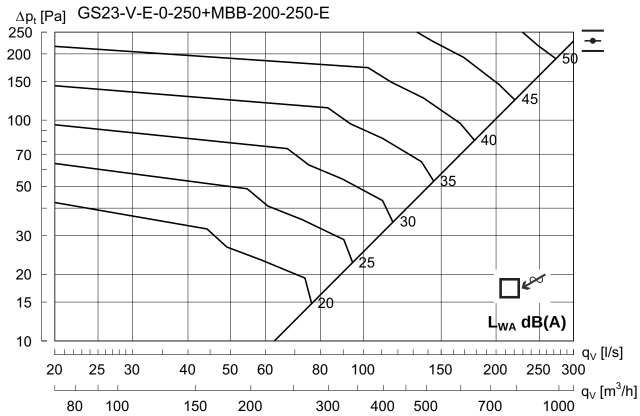
GS23

Technical data

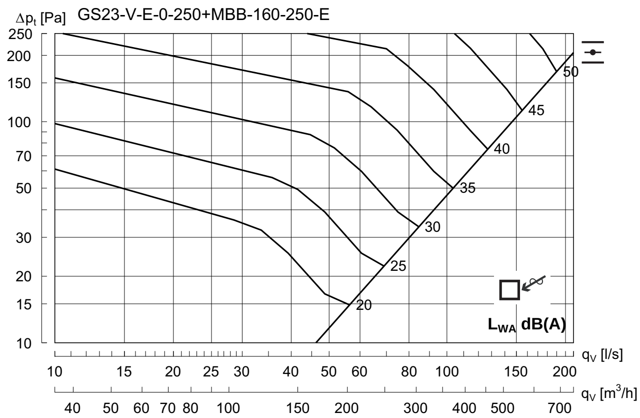
GS23-V 250 + MBB - Exhaust air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	10	5	2	-3	-6	-9	-15	-23

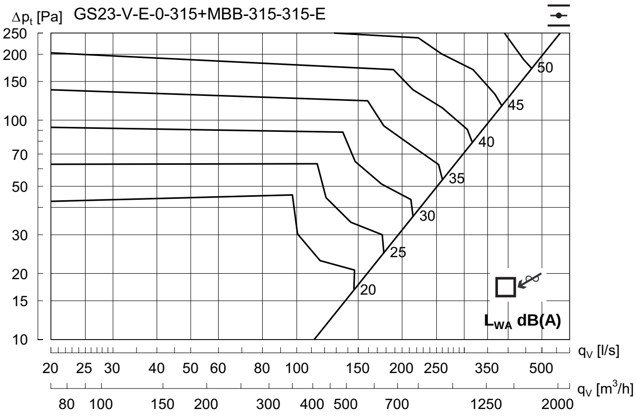


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	13	5	1	-3	-6	-10	-14	-22

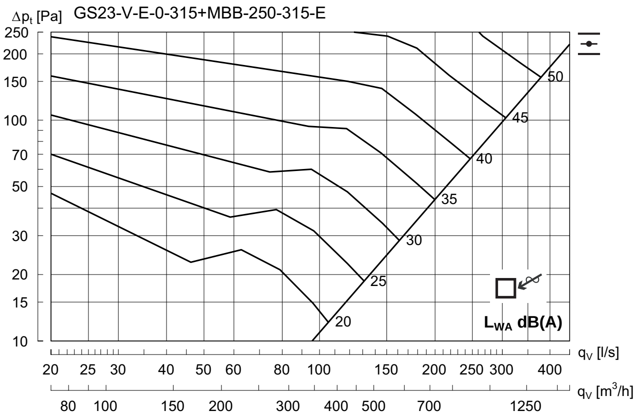


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	13	5	1	-3	-6	-9	-14	-22

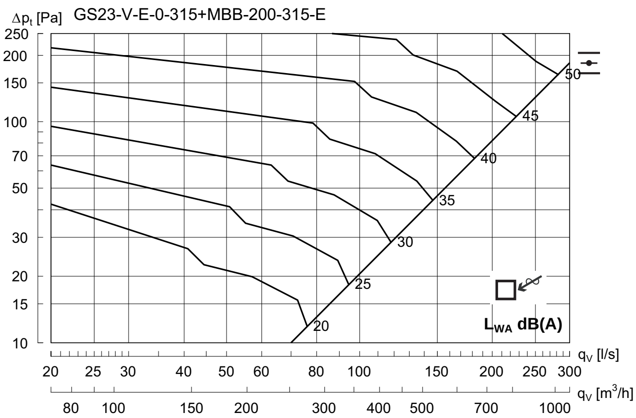
GS23-V 315 + MBB - Exhaust air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	11	5	3	-4	-7	-9	-14	-25



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	11	5	2	-3	-6	-10	-15	-24



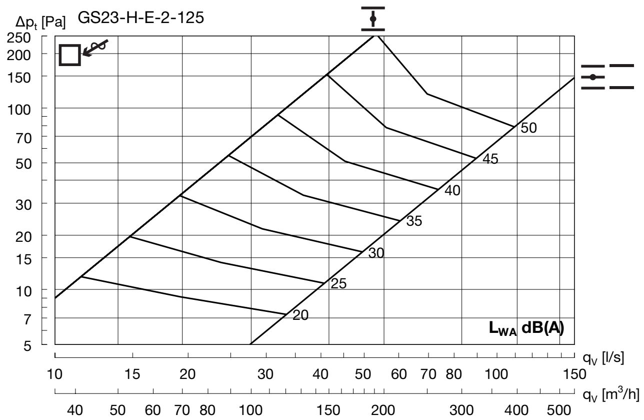
Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	13	5	1	-3	-6	-9	-14	-22

Versio

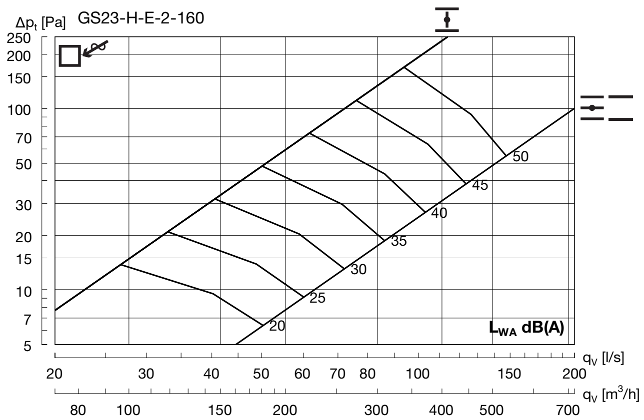
GS23

Technical data

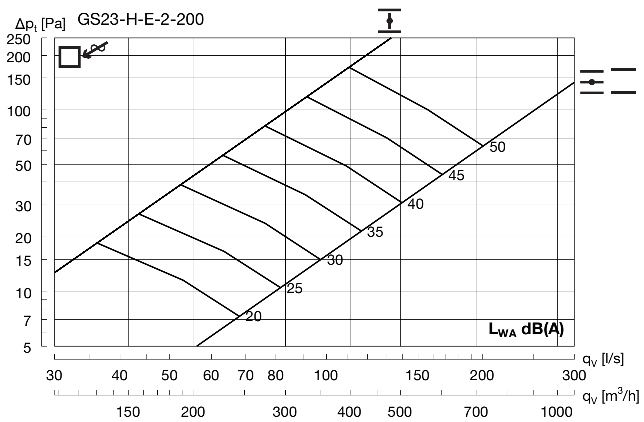
Exhaust with plenum box type H



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	4	4	5	-3	-9	-11	-18	-25

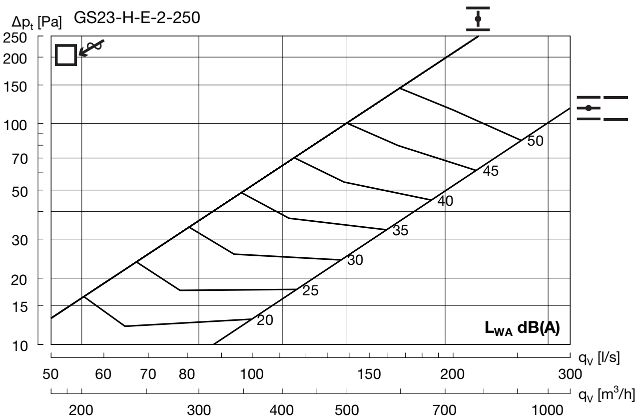


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	6	4	6	-3	-10	-13	-20	-29

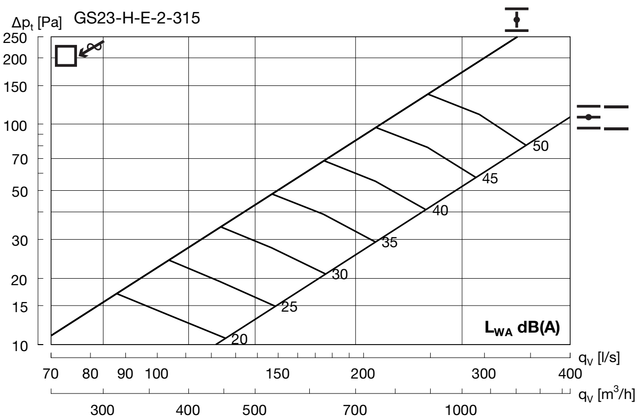


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	8	5	4	-2	-8	-11	-19	-24

Exhaust with plenum box type H



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	3	6	2	-2	-6	-12	-21	-32



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	10	6	2	-3	-5	-11	-20	-31

Lindab Lineo

MTL, Fingerrod C, Copenhagen Airport

Lindab Lineo

Slotdiffuser

	Product	Functions	Page
	MTL		265
	STB STU		272

Lindab Lineo

MTL, Hotel Marriot, Copenhagen

Lindab Lineo

With the slim construction of the slotdiffuser, it is possible to obtain a very simple solution for your ventilation needs, which can be integrated in very different environments.

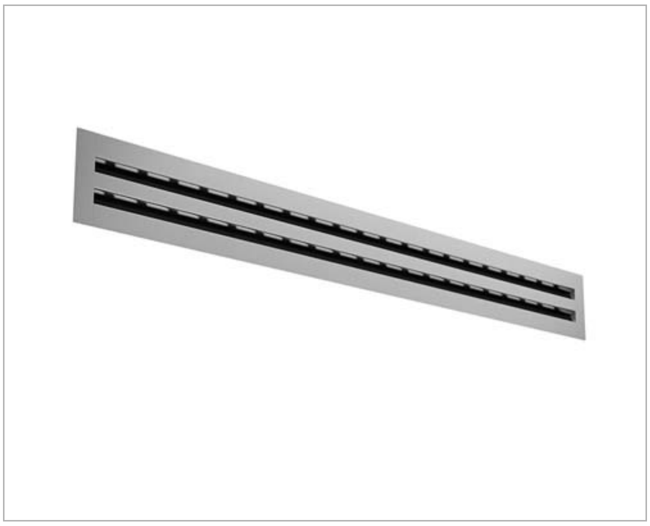
The slots can be mounted either in the ceiling or in the wall / skirting board. The best aero-technical qualities are obtained, when the slots are mounted in the middle of the room with a two-way supply of air. It is also a possibility to install the slots along the wall or along the facade, partly in order to make the installation seem as discrete as possible, and partly to free up the other part of the ceiling for other installations. The slots can be mounted in unbroken bands, where the best result is obtained when both active and passive - or exhaust-slots are combined in the same length.

Functionality

Lindab's slot diffuser MTL is available in two different widths, depending on the requirements for function or design. Furthermore, the corner pieces can be cut at an angle to suit. Normally the lengths are available in pieces up to 2 metres, but can be delivered in pieces up to 5 metres upon demand. If longer unbroken lengths are needed, the individual diffusers can be mounted with fixing-pipes. The plenum boxes STB and STU secure an even distribution and individual regulation of the slots.

MTL, slot diffuser.

Linear diffuser MTL



Description

MTL is a rectangular linear diffuser in aluminium. MTL is suitable for both supply and exhaust air. MTL is equipped with air guide baffles, making it possible to use MTL for horizontal supply air.

The horizontal dispersal pattern can be easily changed without the use of tools by turning the air guide baffle. The air guide baffle must be removed for vertical supply air.

MTL can be supplied in two versions, 15 mm or 19 mm, depending on capacity requirements or aesthetic considerations. MTL can be installed with plenum box STB/STU in order to achieve an even flow and individual adjustment.

MTL is normally supplied in lengths up to max. 2 m, but can be supplied on request up to 5 m. MTZ-1 is a 90º joint, when an aesthetically pleasing corner is required.

- Discrete appearance
- Used for both supply air and exhaust
- Horizontal and vertical supply air.

Maintenance

MTL can be removed to enable cleaning of internal parts or to gain access to the duct or box.
The visible parts of the diffuser can be wiped with a damp cloth.

Order code

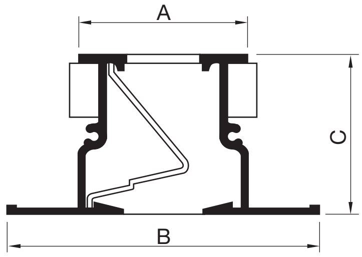
Product **MTL** **aa** **b** **cccc**

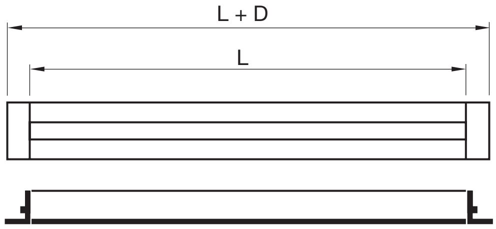
Type

Slot size 15, 19

No. of slots

Length





Both ends are equipped with flanges.

Slot width: 15 mm

No. of slots	A mm	B mm	C mm	D mm
1	25	45	25	30
2	50	70	25	30
3	75	95	25	30
4	100	120	25	30

Cutout: A + 10 mm x L + 10 mm

Slot width: 19 mm

No. of slots	A mm	B mm	C mm	D mm
1	40	75	38	56
2	79	113	38	56
3	117	151	38	56
4	157	189	38	56

Cutout: A + 20 mm x L + 20 mm

Materials and finish

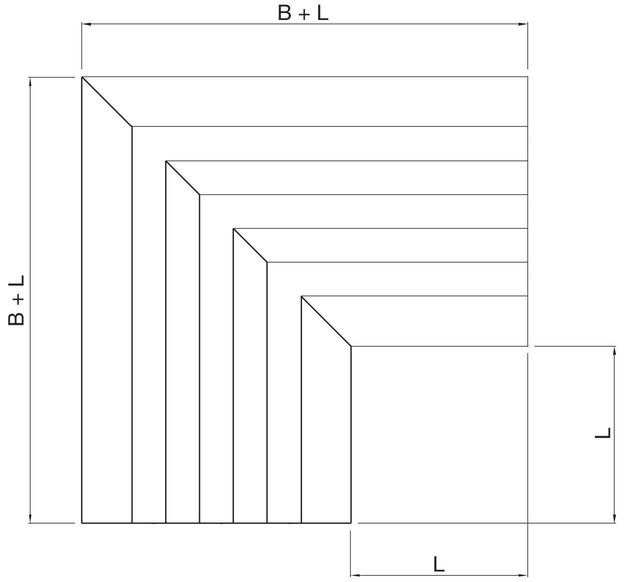
Slot: Aluminium
Standard finish: Natural anodised
Air guide baffle: Black ABS plastic

The diffuser is available in other colours. Please contact Lindab's sales department for further information.

Linear diffuser MTL

Accessories

MTZ-1



MTZ-1 15	L	B	MTZ-1 19	L	B
1	150	45	1	150	75
2	150	70	2	150	113
3	150	95	3	150	151
4	150	120	4	150	189

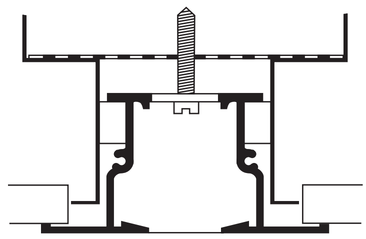
MTZ is supplied as two mitred ends (not one piece).

Order code

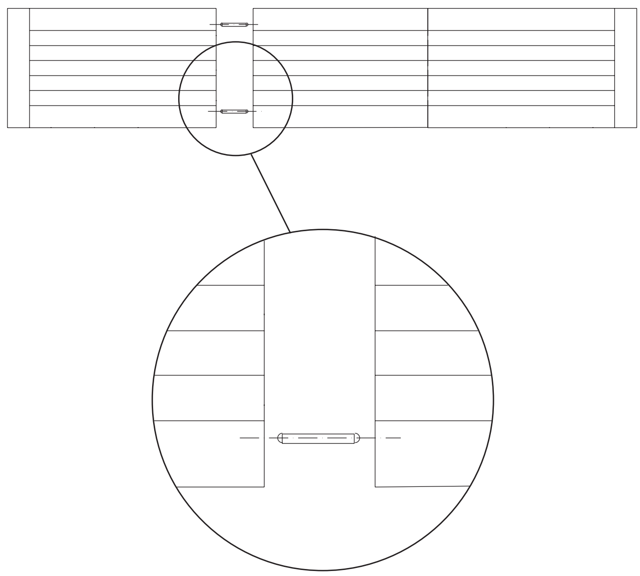
Product	MTZ-1	aa	b
Type			
Slot size 15 / 19			
No. of slots			

Installation in plenum box STB/STU

A self-tapping screw is fitted through the slot up into the perforated surface of the plenum box.



Installation of slots in continuous strips



The slots are often installed in continuous strips, where there is a need to join the slots, so that it resembles a single piece. In these cases, the full length must be specified when ordering, and the slots will be supplied adjusted to the total length. The outermost pieces will be equipped with end pieces, and the middle pieces will be supplied without end pieces. The slots are joined using the accompanying pins.

Linear diffuser MTL

Technical data

Capacity
Volume flow q_v [l/s] and [m^3/h], total pressure Δp_t[Pa], throw $l_{0.2}$ [m] and sound level L_{WA} [dB(A)] can be seen in the diagrams.

Throw $l_{0.2}$
Throw $l_{0.2}$ [m] at a speed of 0.2 m/s and 1 m slot length can be seen in the diagrams. Correction of throw at other slot lengths: see table 1.

Table 1: Correction of throw

Slot length	250	500	1000	1500	3000
Correction factor	0,7	0,85	1	1,1	1,2

Frequency-related sound effect level
The sound effect level in the frequency band is defined as L_{WA}+K_{ok}
K_{ok} values for MTL with box - see table 2 below.

Table 2: K_{ok} values [dB] for MTL with box.

No. of slots	Mean frequency Hz 63	125	250	500	1K	2K	4K	8K
1	12	12	7	2	-1	-7	-9	-11
2	14	9	9	3	-2	-8	-10	-12
3	14	10	9	2	-3	-9	-11	-12
4	17	11	8	1	-2	-6	-10	-12

Table 3: Correction for other slot lengths

Slot length	250	500	1000	1500	3000
correction [dB(A)]	-6	-3	0	2	5

Sound attenuation
Sound attenuation ΔL [dB] of MTL+STB including the end reflection, corresponding to the inlet diameter. See table 4 below.

Table 4: Sound attenuation ΔL [dB]

No. of slots	Mean frequency Hz 63	125	250	500	1K	2K	4K	8K
1	19	15	11	12	8	10	11	10
2	18	14	9	11	9	9	10	10
3	15	10	7	9	8	8	9	10
4	14	10	7	8	8	7	8	9

Balancing
Balancing data for control of air volume is available in a separate brochure.

Sample calculation:
Required data: Volume of air 200 m^3/h
Throw 6.5 m
Horizontal supply air
Slot length 1.5 m, i.e. 133 [(m^3/h)/m]

Solution: MTL 19

2-slot version is selected:
Throw according to diagram: 5.8 m

Throw correction according to table 1:

1.1 x 5.8 = 6.4 m
Pressure loss and sound level according to diagram:
Open damper: 13 Pa, 15 dB(A)
Closed damper: 38 Pa, 22 dB(A)

Correction according to table 3:

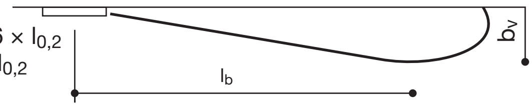
Open damper: 15 + 2 = 17 dB(A)
Closed damper: 22 + 2 = 24 dB(A)

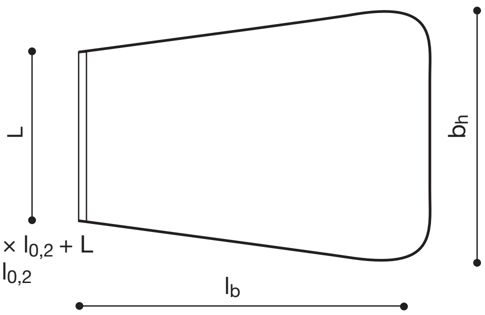
Linear diffuser MTL

Technical data

Horizontal supply air

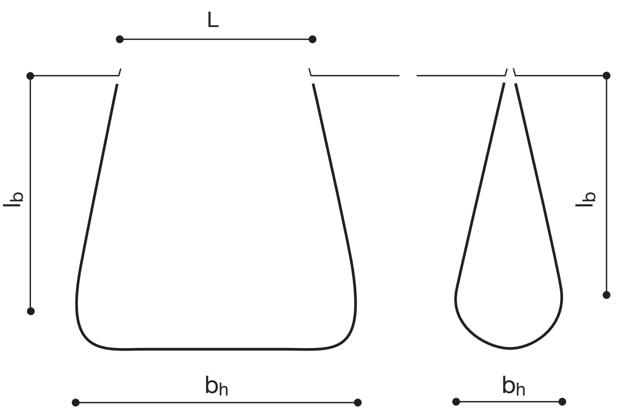
$b_v = 0.006 \times l_{0,2}$
$l_b = 0.6 \times l_{0,2}$





$b_h = 0.02 \times l_{0,2} + L$
$l_b = 0.5 \times l_{0,2}$

Vertical supply air

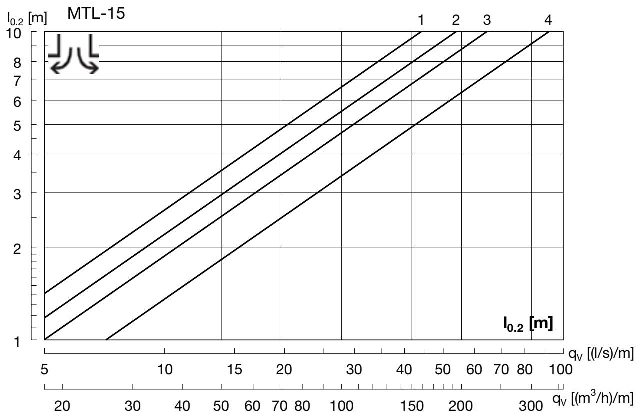


$b_h = 0.02 \times l_{0,2} + L$
$l_b = 0.6 \times l_{0,2}$

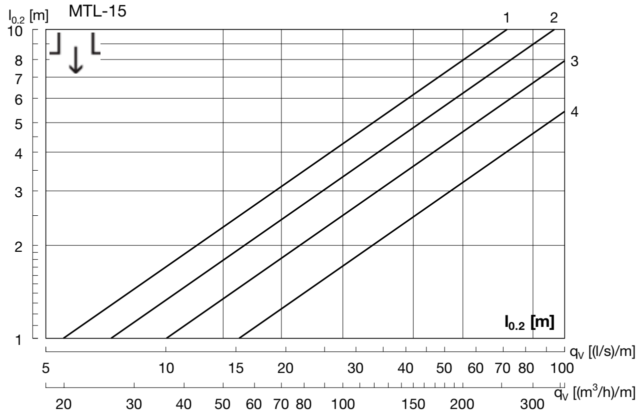
$b_h = 0.2 \times l_{0,2}$
$l_b = 0.6 \times l_{0,2}$

Throw MTL 15

Horizontal

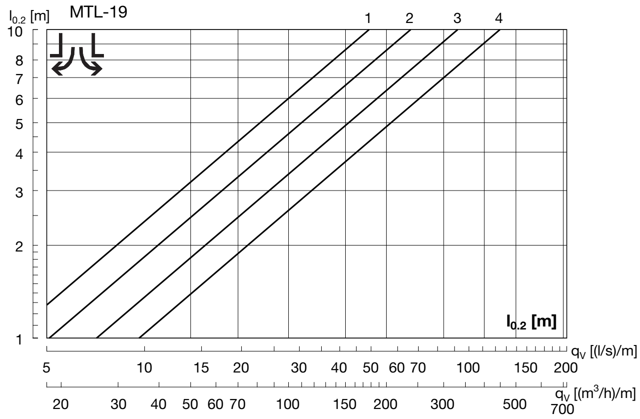


Vertical

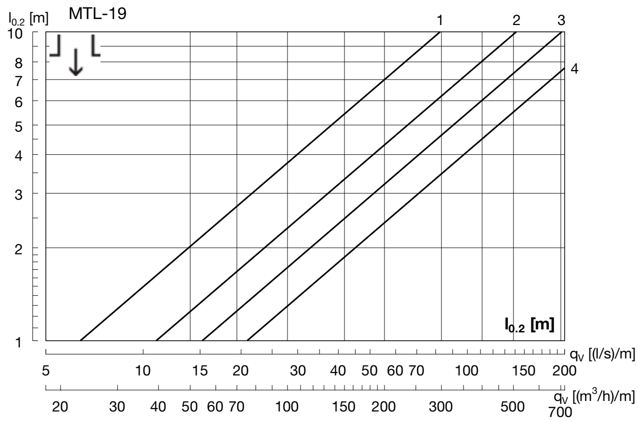


Throw MTL 19

Horizontal

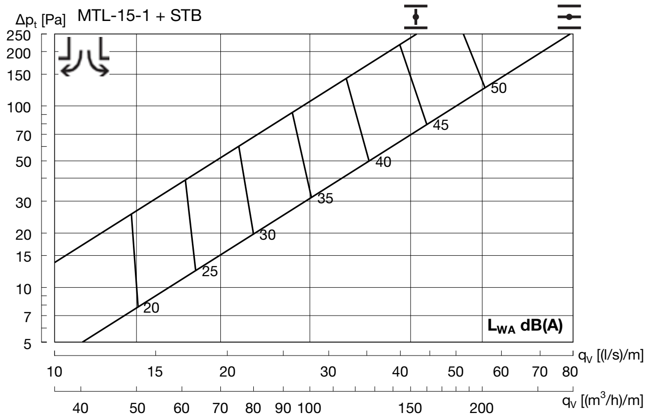


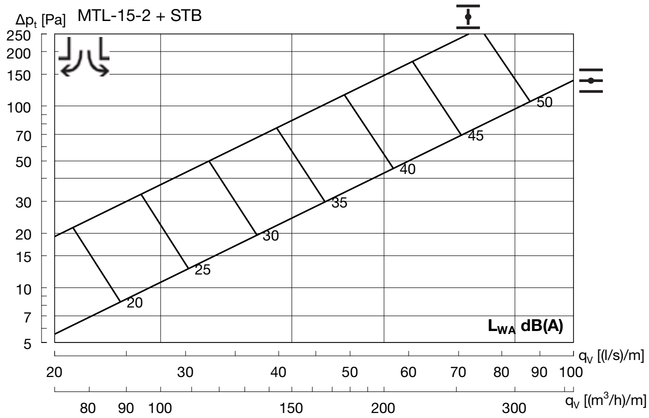
Vertical

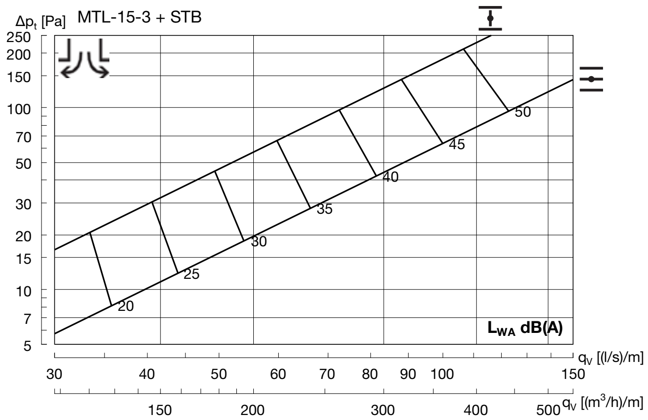


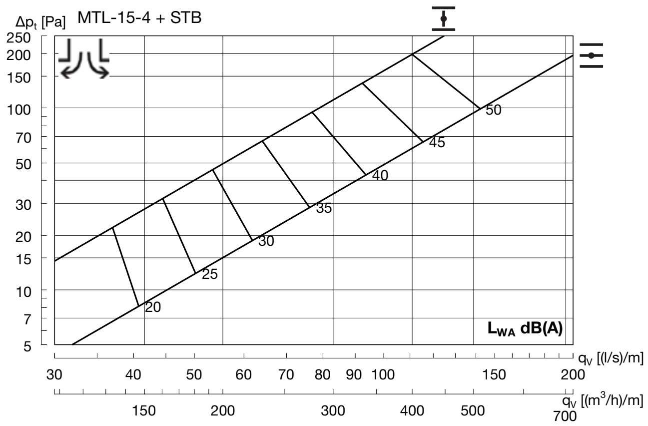
Linear diffuser MTL

Horizontal-supply

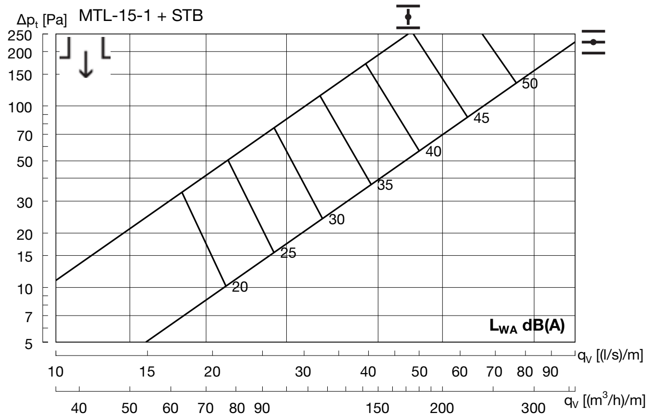


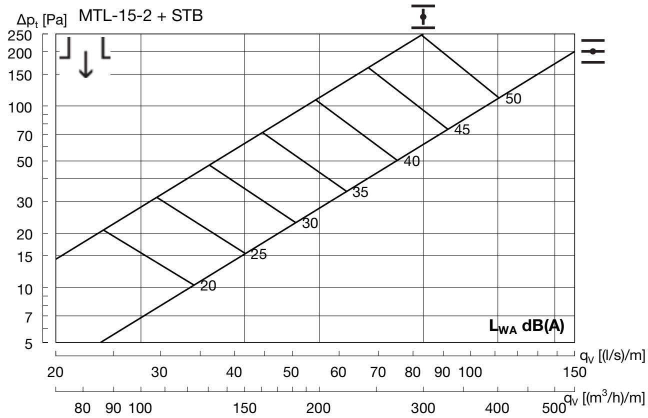


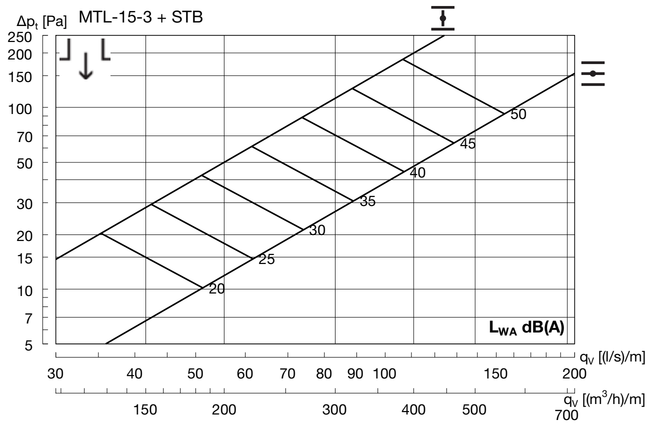


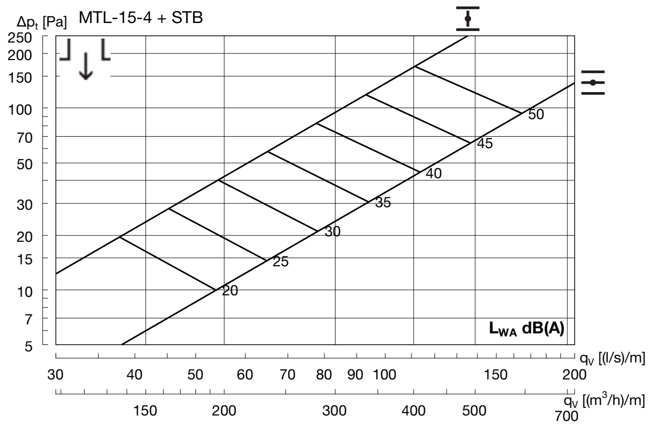


Vertical-supply





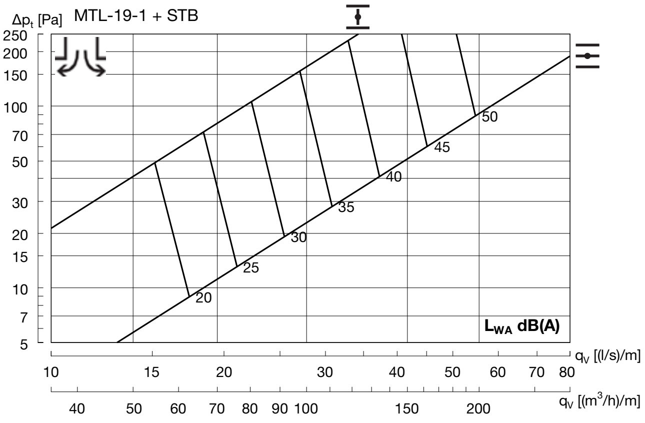


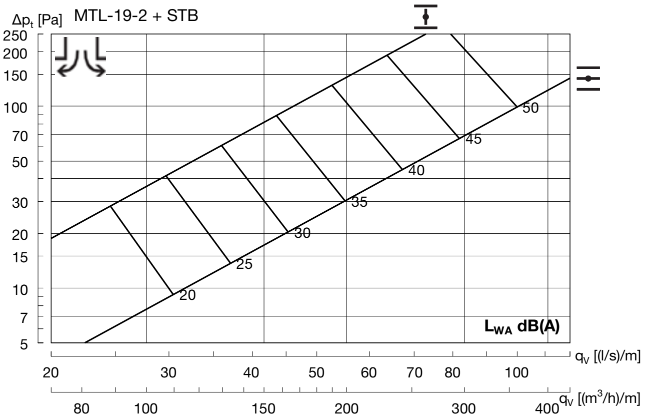


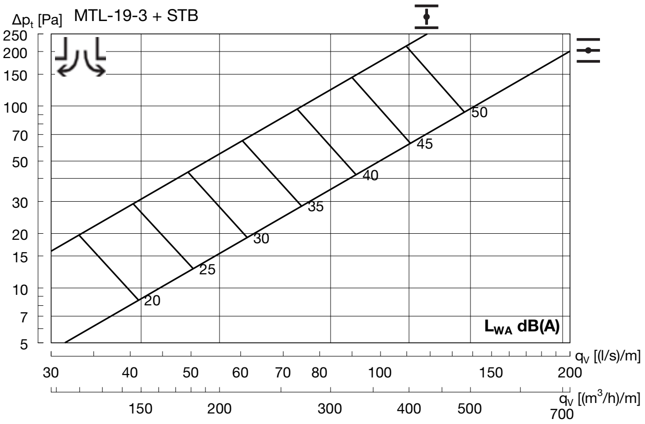
Linear diffuser MTL

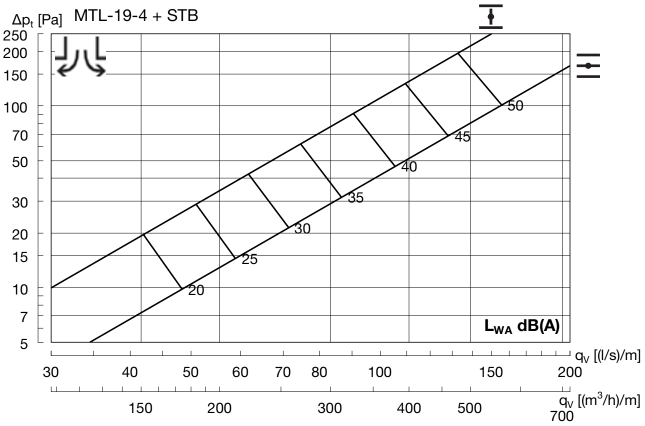
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

Horizontal-supply

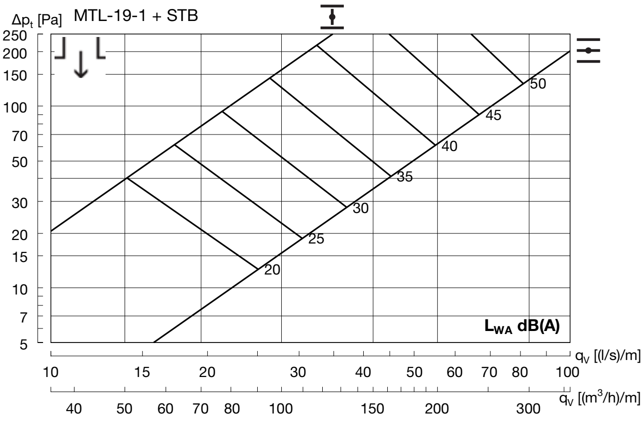


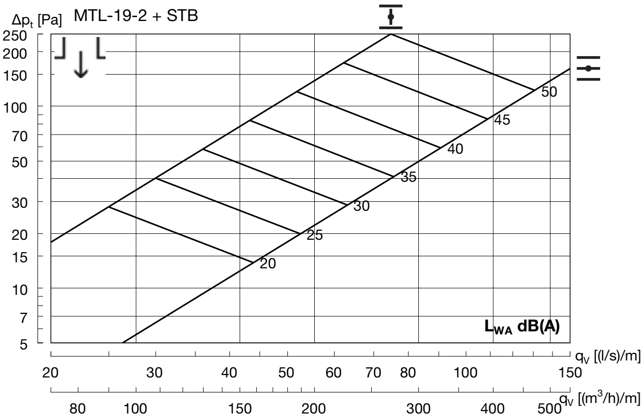


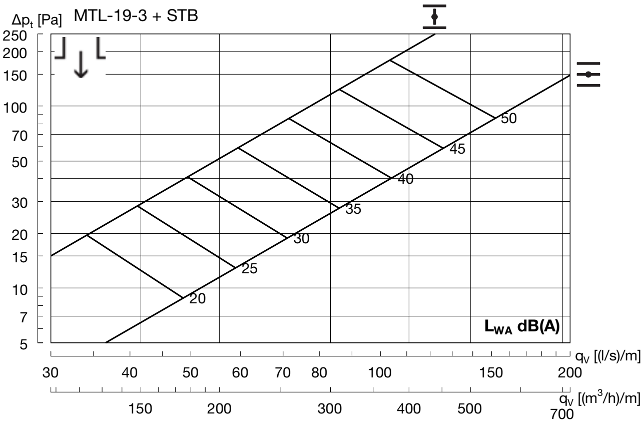


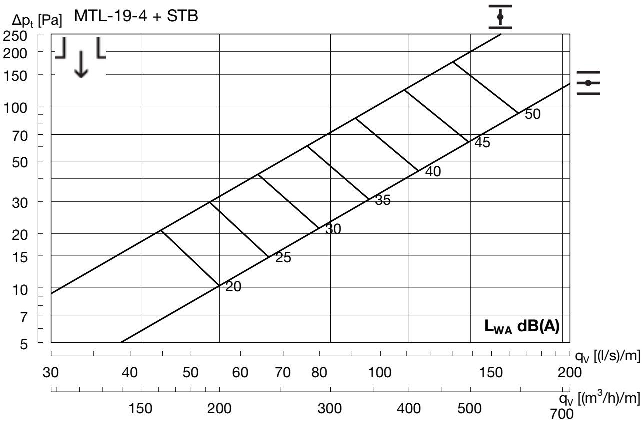


Vertical-supply





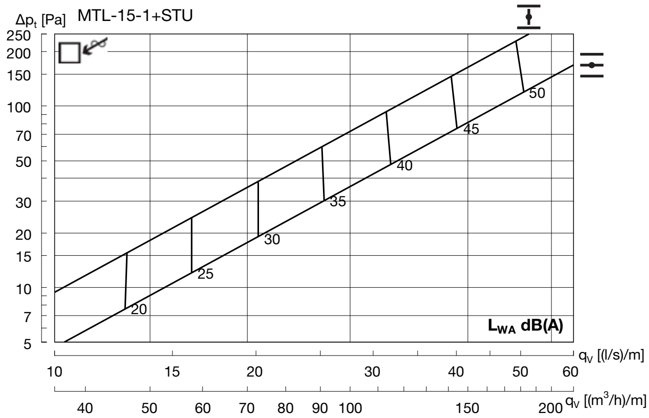


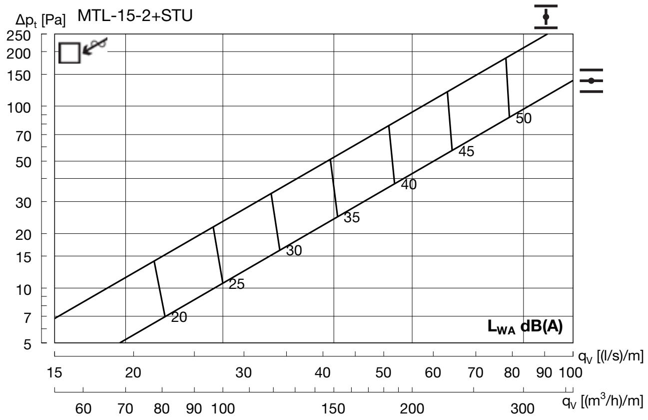


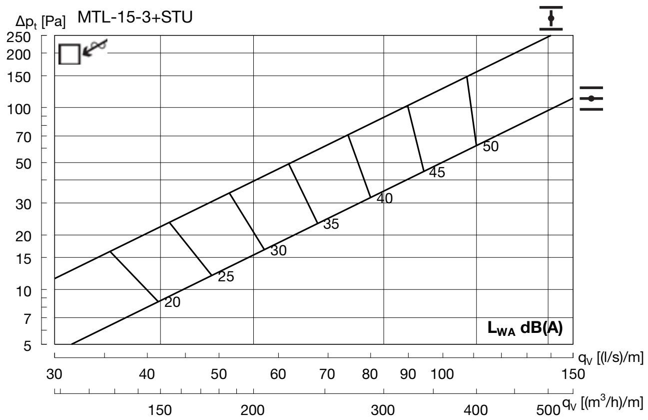
Linear diffuser

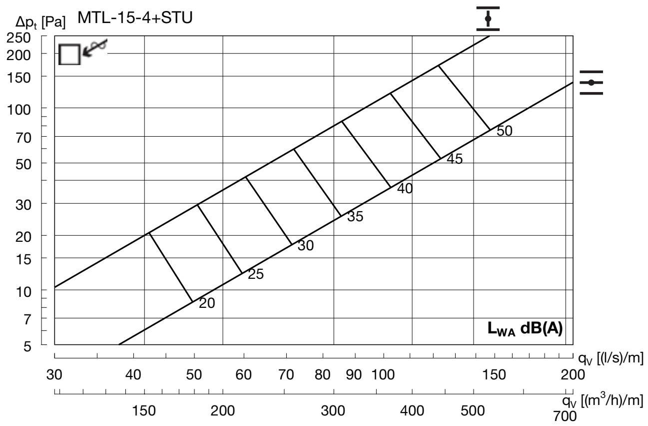
MTL

Exhaust air- MTL 15

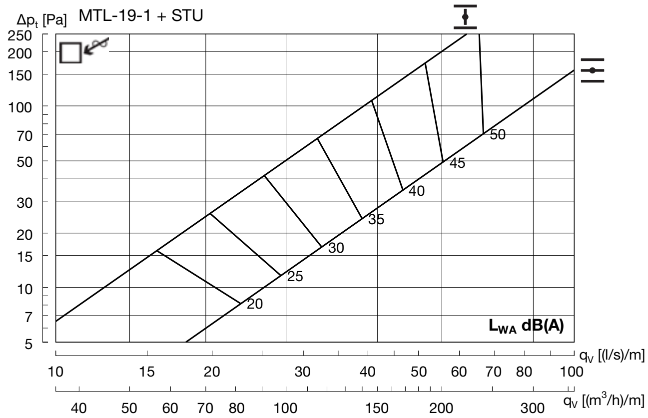


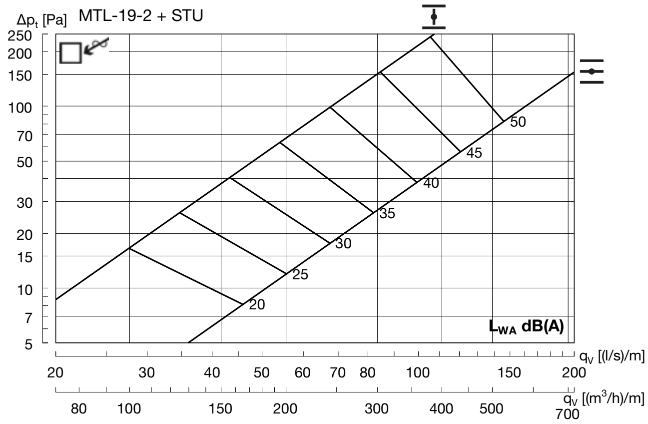


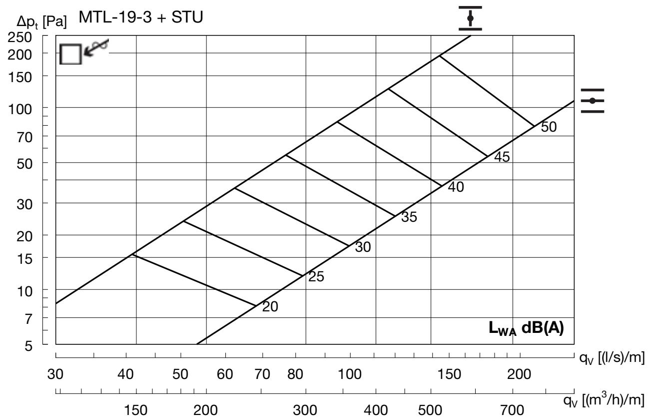


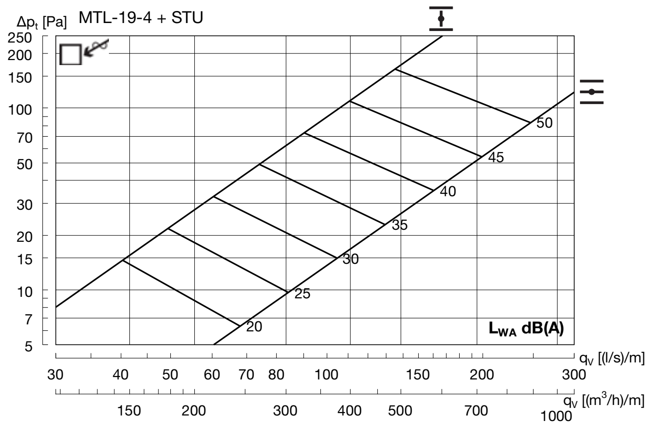


Exhaust air- MTL 19









Plenum box

STB/STU

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18

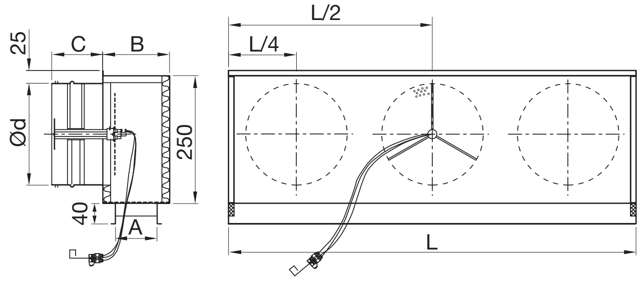
Description

STB is a rectangular plenum box for supply air for linear diffuser, MTL. The plenum box ensures even distribution over the linear diffuser. STB is equipped with a damper and an orifice plate to ensure individual regulation, and is supplied with acoustic insulation.

STU is a rectangular plenum box for air exhaust for linear diffuser, MTL. STU has the same properties as STB.

- Ensures even air distribution over the linear diffuser.
- Acoustically insulated.
- Supplied with damper and measuring device

Dimensions



Box type / Length					0-1199		1200-1799		1800-2000	
	Slot size									
No. of slots	15 A	15 B	19 A	19 B	Ød	No.	Ød	No.	Ød	No.
1	26	90	41	91	125	1	160	1	125	2
2	51	100	80	130	160	1	200	1	160	2
3	76	125	118	168	200	1	200	2	200	2
4	101	150	158	208	200	1	200	2	200	2

C dimension: STB = 100 mm
STU = 200 mm

Order code

Product **STB/STU** **a** **ba** **ccc**

Type

Slot size 15
19

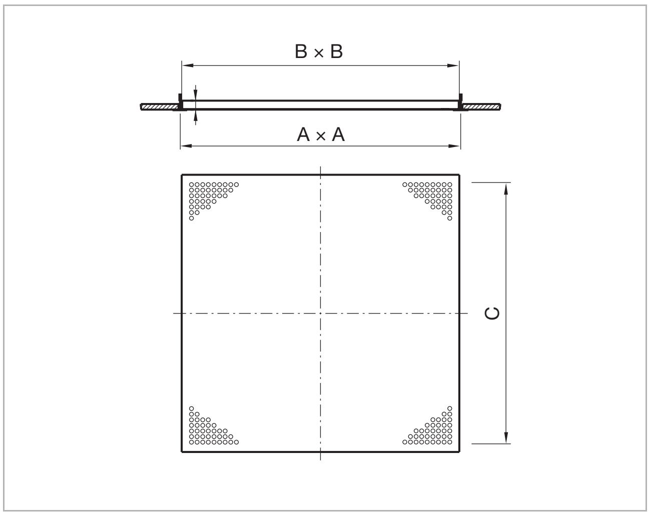
No. of slots

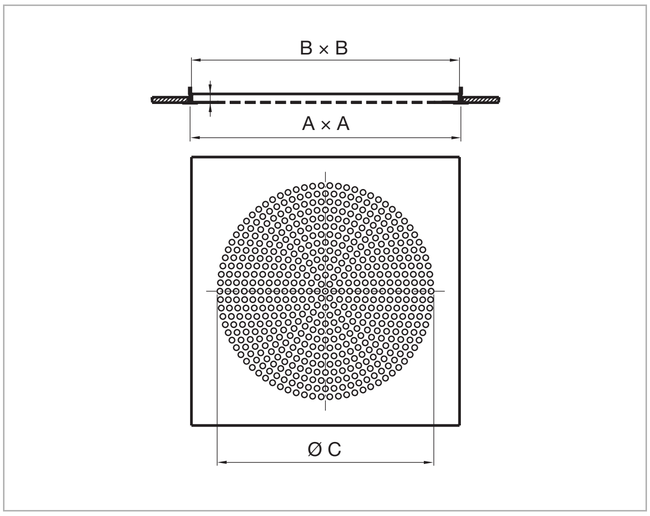
Length

Materials and finish

Plenum box: Galvanised steel
Standard finish: Galvanised steel
Insulation: Melamine foam plastic

Perforated exhaust plate PKY/PCY





Description

PKY/PCY is a “diffuser” without duct connection for installation in T-rail ceilings. PKY/PCY is used in situations where air is to be exhausted over a suspended ceiling, and a sufficient opening is required in the ceiling for the air to pass through.

- Architecturally and financially attractive “diffuser” solution for exhaust of air over a suspended ceiling
- Can be adapted for many different types of ceiling
- Low pressure loss and large air capacity

Maintenance

The visible parts of the diffuser can be wiped with a damp cloth.

Materials and finish

Material:	Galvanised steel
Standard finish:	Powder-coated
Standard colour:	RAL 9010, gloss 30

The diffuser is available in other colours. Please contact Lindab’s sales department for further information.

Ordering example

Product	PKY/PCY	aaa
Type		
Size		
Ceiling system - see introductory summary.		

Dimensions

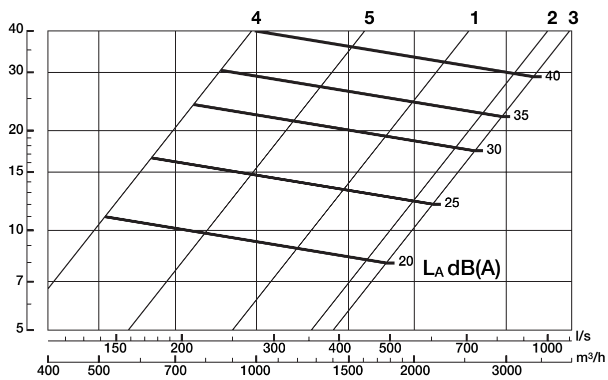
PKY

A Size	B mm	C mm	Free area m²	Curve no.	m kg
500	495	467	0,085	1	1,3
600	595	567	0,125	2	1,8
625	620	597	0,138	3	1,9

PCY

A Size	B mm	C mm	Free area m²	Curve no.	m kg
500	495	400	0,043	4	1,6
600	595	490	0,064	5	2,1
625	620	490	0,064	5	2,2

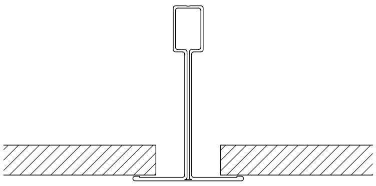
Pressure loss [Pa]



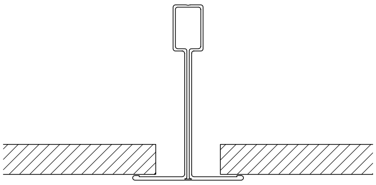
Ceiling tile adaption

Overview

1. T24/T15 Lay-in **278**

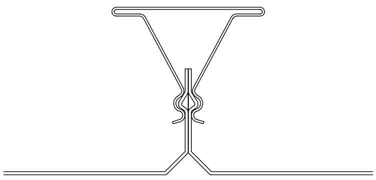


2. T24/T15 Lay-in not cleanable **279**

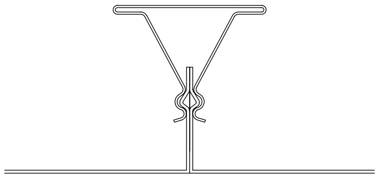


3. Permanent ceiling **279**

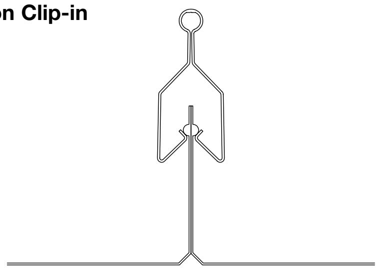
4. Dampa Clip-in bevelled edge **280**



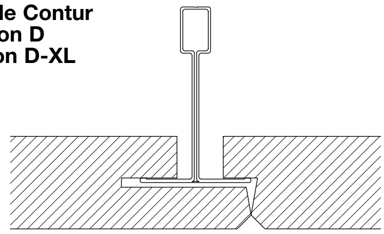
5. Dampa Clip-in square edge **281**



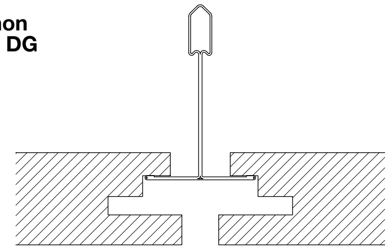
6. Luxalon Clip-in **282**



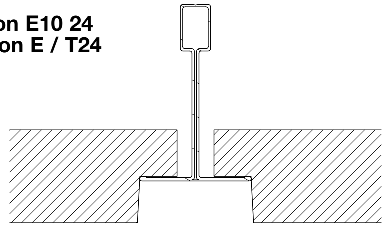
7. Danotile Contur
Ecophon D
Rockfon D-XL **283**



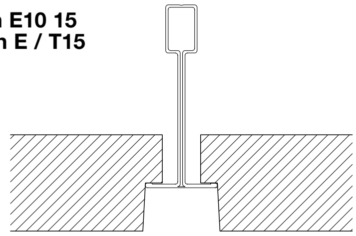
8. Ecophon
Focus DG **284**



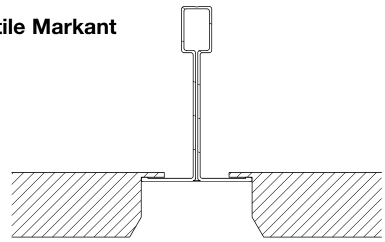
9. Rockfon E10 24
Ecophon E / T24 **285**



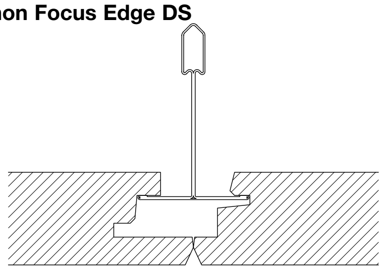
10. Rockfon E10 15
Ecophon E / T15 **286**



11. Danotile Markant **287**



14. Ecophon Focus Edge DS **288**



Right to alterations reserved

Ceiling tile adaption

Versio, Competence centre, Hobro.

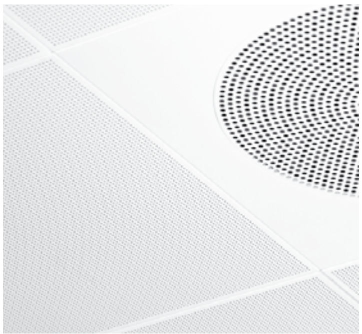
Ceiling systems

A harmonic and aesthetic ceiling solution with beautifully integrated components is a must in modern constructions. The individual components themselves define the appearance of the final solution. Lindab contributes to the holism by adapting the diffusers to most 600x600 ceiling systems. In this way the holism of the solution is maintained, and the final result will become just as planned.

Ceiling adaption

Most of Lindabs ceiling diffusers can be adapted to 600x600 ceiling systems. The individual diffusers are adapted to the ceiling system directly in the grille box, or by using adapted module plates / frames, depending on which ceiling system is chosen. The following pages show Lindab´s standard offering; both in terms of face plates and ceiling tile adaptions.

In the back of this chapter is an overview of adapted moduleplates.



PC7 diffuser.

Ceiling tile adaption

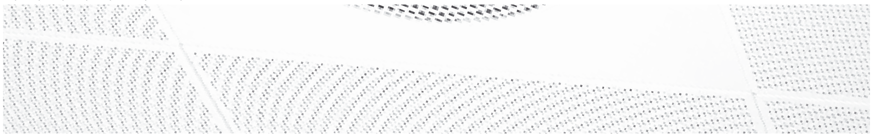
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18

Design

See Comfort and design

Ceiling systems

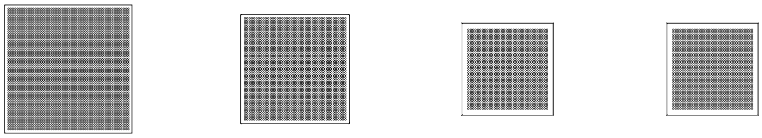
1, 3, 7, 8, 9, 10, 11, 14



Product

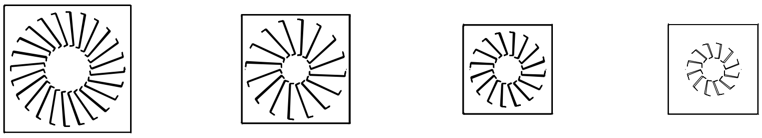
Perforated — Pattern 600, Pattern 500, Pattern 400, Pattern 300

PS — **1 - 11**



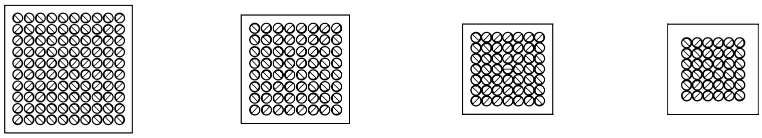
Swirl — Pattern 600, Pattern 500, Pattern 400, Pattern 300

RS — **14 - 16**



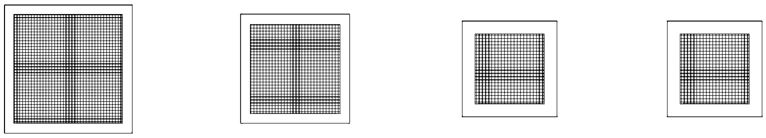
Nozzles — Pattern 600, Pattern 500, Pattern 400, Pattern 300

NS — **19**



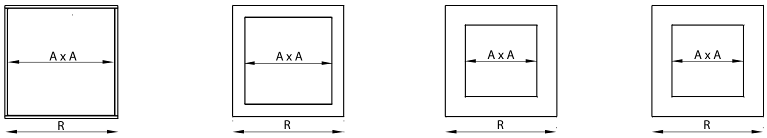
Grid — Pattern 600, Pattern 500, Pattern 400, Pattern 300

GS — **23**



Frame — Pattern 600, Pattern 500, Pattern 400, Pattern 300

R



		Pattern							
		600		500		400		300	
No.	**Ceiling type**	R mm	A x A mm	R mm	A x A mm	R mm	A x A mm	R mm	A x A mm
1	**Lay-in 24/15 T-rack**	595	564	595	464	595	383	595	383
3	**Permanent ceiling**	595	564	495	464	415	383	415	383
7	**Hidden T-bar**	*	599	599	464	599	383	599	383
8	**Partially visible t-rack T24**	*	592	592	464	592	383	592	383
9	**T24 E/markant**	*	575	595	464	595	383	595	383
10	**T15 E/markant**	*	584	584	464	584	383	584	383
11	**T24 Markant**	*	575	575	464	575	383	575	383
14	**Ecophon Focus edge DS**	*	599	599	464	599	383	599	383
Connection diffuser/box		Ød mm	U mm	Ød mm	U mm	Ød mm	U mm	Ød mm	U mm
Grille box type V		315	570	250	470	200	390	160	390
Plenum box type H		250/315	570	200	470	160	390	125	390
Rectangular connection		A x B mm	U mm	A x B mm	U mm	A x B mm	U mm	A x B mm	U mm
Plenum box type R		498 x 98	570	398 x 98	470	298 x 98	390	198 x 98	390

*** shows solutions without fame, A x A shows face plate measurement in mm, R shows measurements on frame around the face plate. U shows recess.**

Ceiling tile adaption

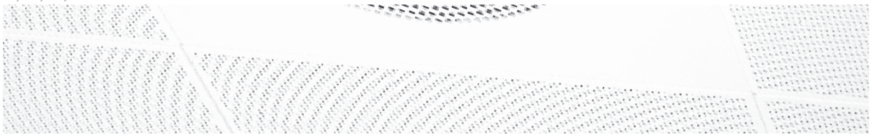
Design

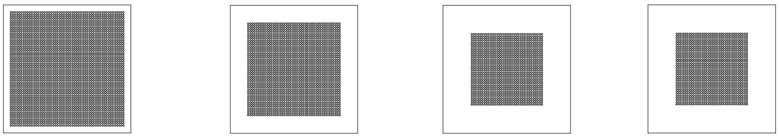
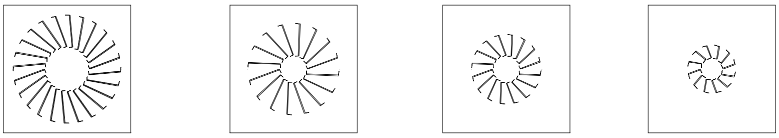
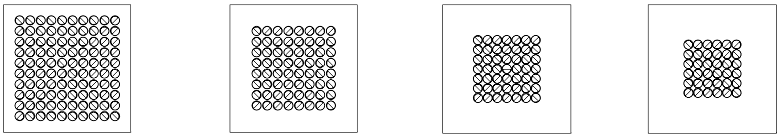
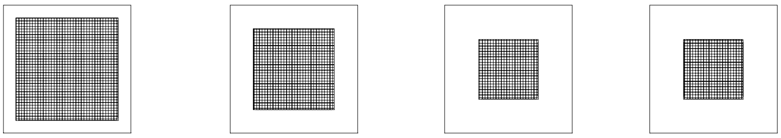
See Comfort and design

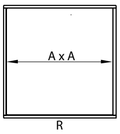
Product

Ceiling systems

2, 4, 5, 6



Product	Design	Pattern 600	Pattern 500	Pattern 400	Pattern 300
	Perforated				
PS	**1 - 11**				
	Swirl	Pattern 600	Pattern 500	Pattern 400	Pattern 300
RS	**14 - 16**				
	Nozzles	Pattern 600	Pattern 500	Pattern 400	Pattern 300
NS	**19**				
	Grid	Pattern 600	Pattern 500	Pattern 400	Pattern 300
GS	**23**				



A x A shows face plate dimension, A x A is the outer dimension of all face plates.

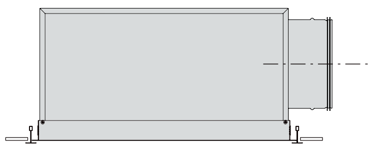
		Mønster			
		600	**500**	**400**	**300**
No.	**Ceiling type**	A x A mm	A x A mm	A x A mm	A x A mm
2	**Lay-in 24/15 T-rack not cleanable**	595	595	595	595
4	**Clip-in bevelled edge**	600	600	600	600
5	**Clip-in square edge**	600	600	600	600
6	**Clip-in**	600	600	600	600
Connection diffuser/box		Ød mm	Ød mm	Ød mm	Ød mm
Grille box type V		315	250	200	160
Plenum box type H		250/315	200	160	125
Rectangular connection		A x B mm	A x B mm	A x B mm	A x B mm
Plenum box type R		498 x 98	398 x 98	298 x 98	198 x 98

A x A shows face plate measurements in mm

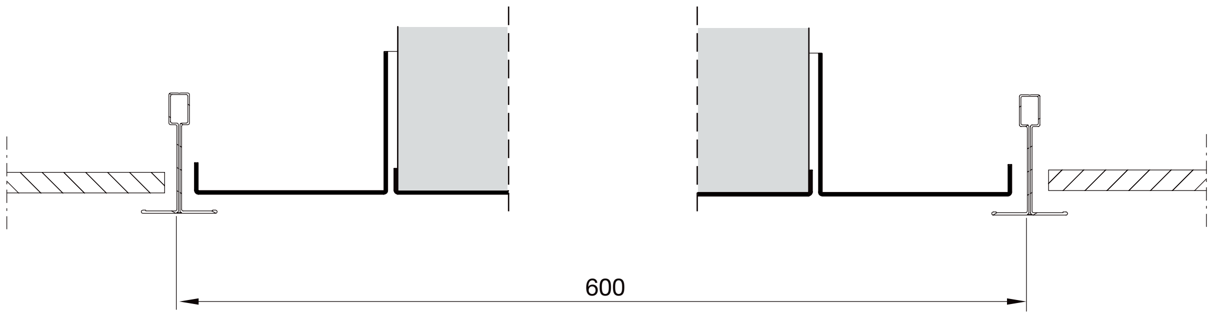
Ceiling tile adaption

1. Ceiling adaption T24/T15 Lay-in

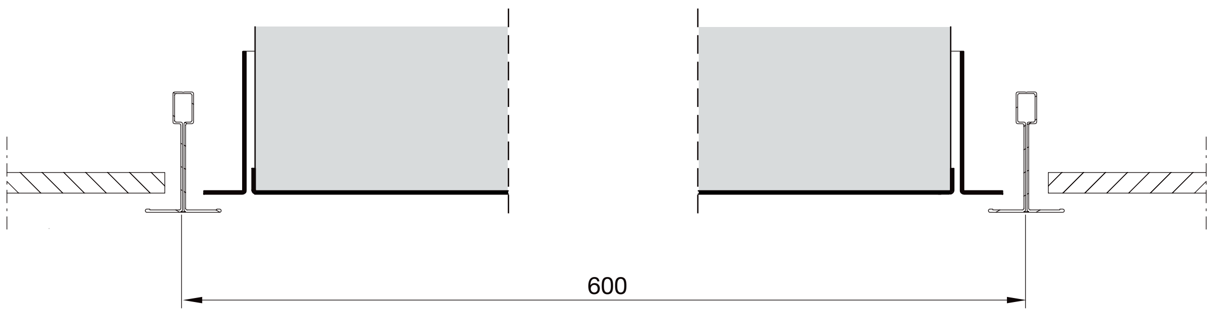
Lindab´s ceiling diffusers adapted to T 24 / T15 Lay-in is mounted directly in the ceiling system as depicted in the sketches. The diffuser is delivered with a detachable face plate, so full acess to the plenum box and the air duct is possible.



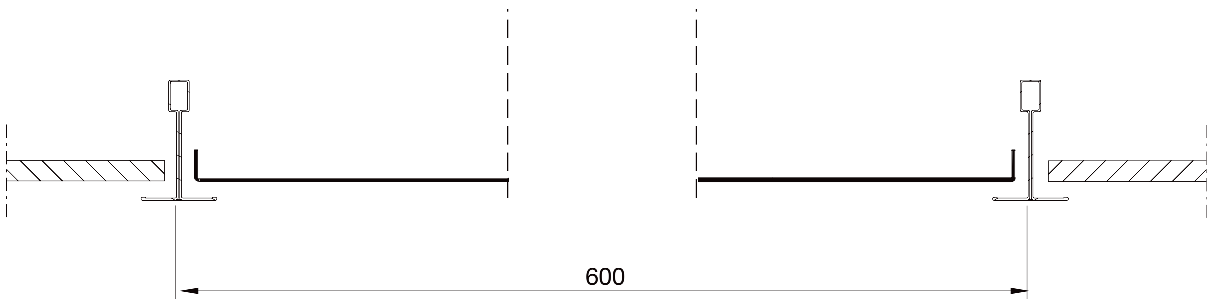
Sketch Versio- V, H, R pattern 300,400,500



Sketch Versio- V, H, R pattern 600



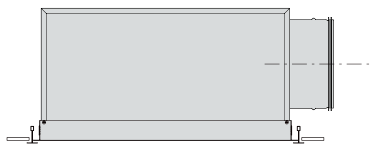
Sketch moduleplate type LM- Integra/Formo



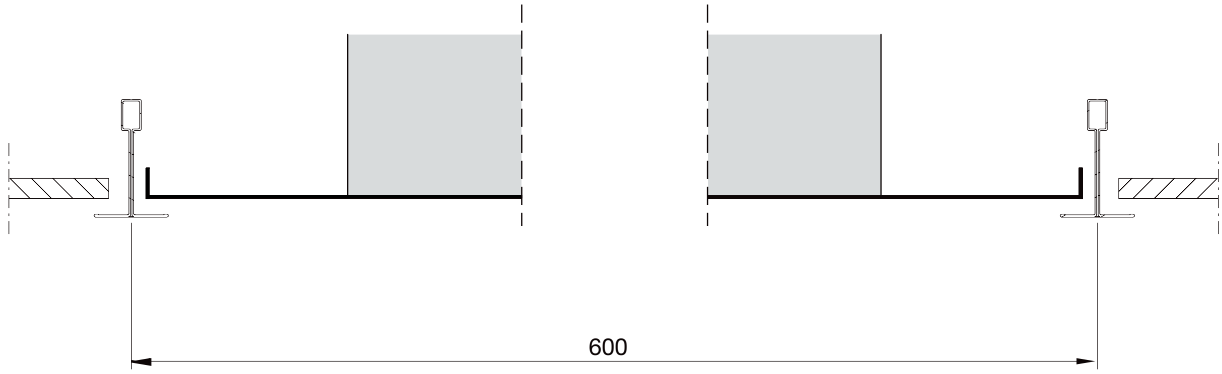
Ceiling tile adaption

2. Ceiling adaption T24/ T15 Lay-in not cleanable

Lindab´s diffuser adapted to T 24 / T15 Lay-in is mounted directly in the ceiling system, as depicted on the sketches. The face plate is in one piece and cannot be detached unless the diffuser is freed from the rack-system.

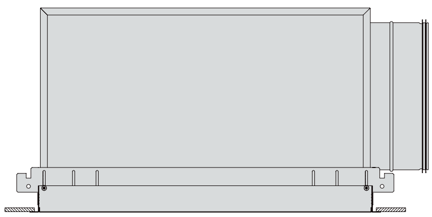


Sketch Versio- V, H, R all sizes

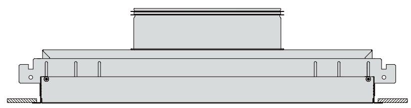


3. Permanent ceiling

Lindabs diffuser adapted to permanent ceiling is cut directly into the ceiling construction. The diffuser can be fastened with Lindabs different types of mounting brackets, see product pages for more details.

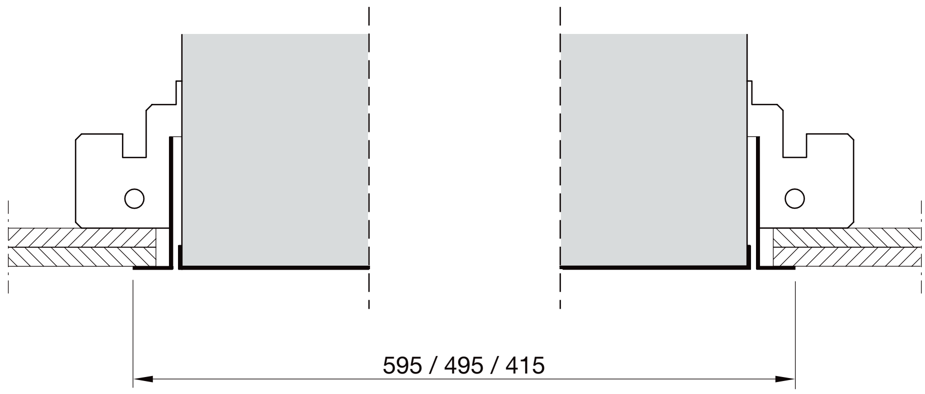


Plenum box type H including mounting bracket type PBB



Grille box type V including mounting bracket type PBB

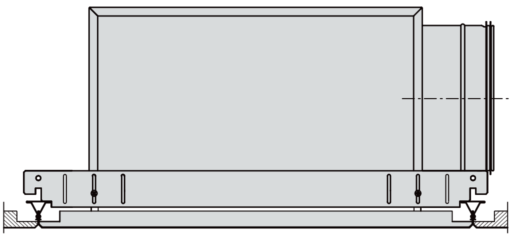
Sketch Versio- V, H, R all sizes



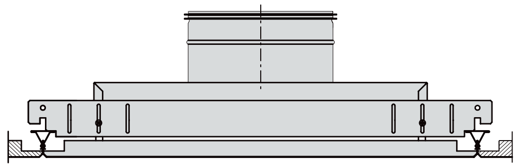
Ceiling tile adaption

4. Dampa Clip-in bevelled edge

Lindab´s diffuser adapted to Dampa Clip-in bevelled edge is mounted directly in the ceiling system, as depicted in the sketches. Mounting brackets type PBB comes with the diffuser series Versio.

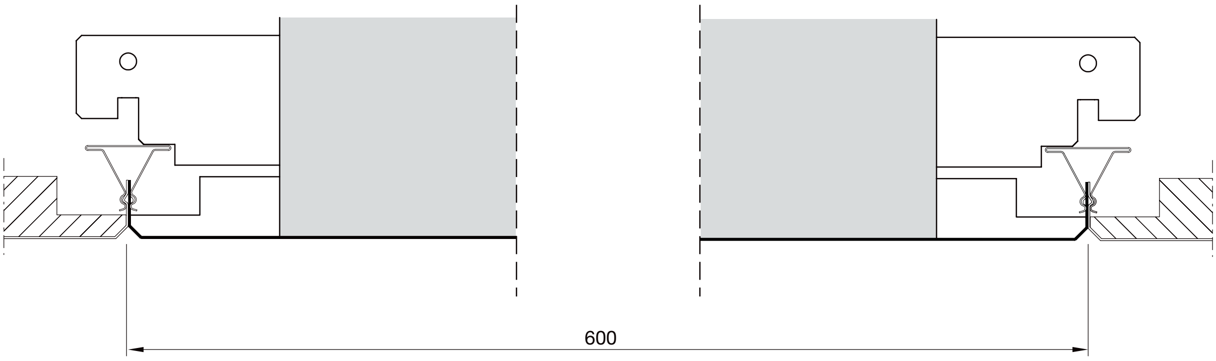


Plenum box type H including mounting bracket type PBB

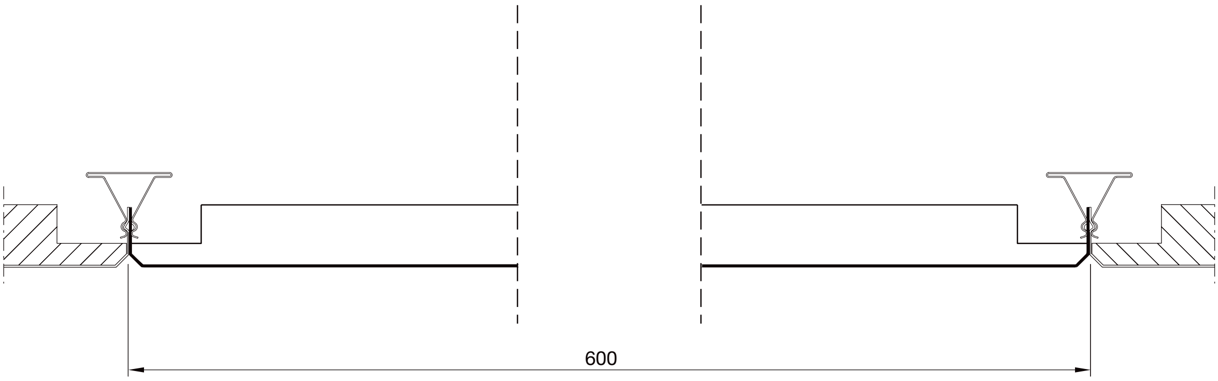


Grille box type V including mounting bracket type PBB

Sketch Versio- V, H, R all sizes



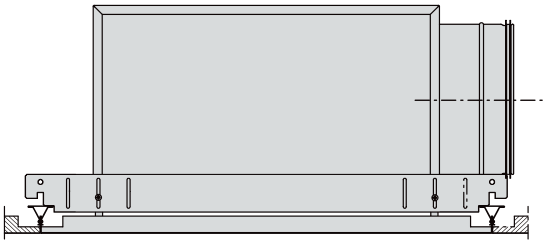
Sketch moduleplate type LM- Integra/Formo



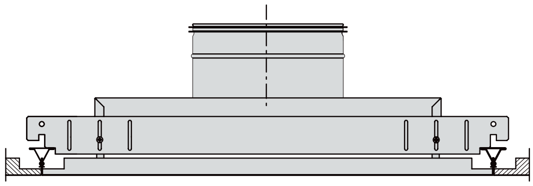
Ceiling tile adaption

5. Dampa Clip-in square edge

Lindab´s diffuser adapted to Dampa Clip-in square edge is mounted directly in the ceiling system, as depicted in the sketches. Mounting brackets type PBB comes with the diffuser series Versio.

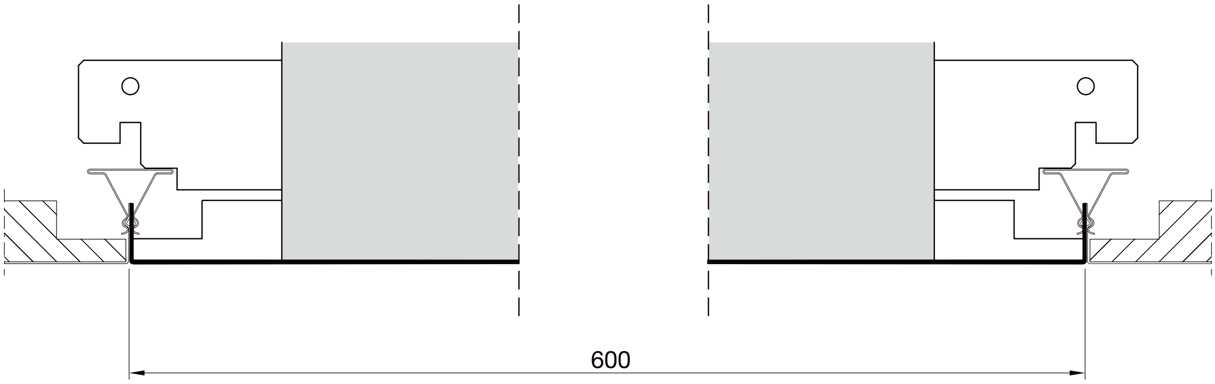


Plenum box type H including mounting brackets type PBB

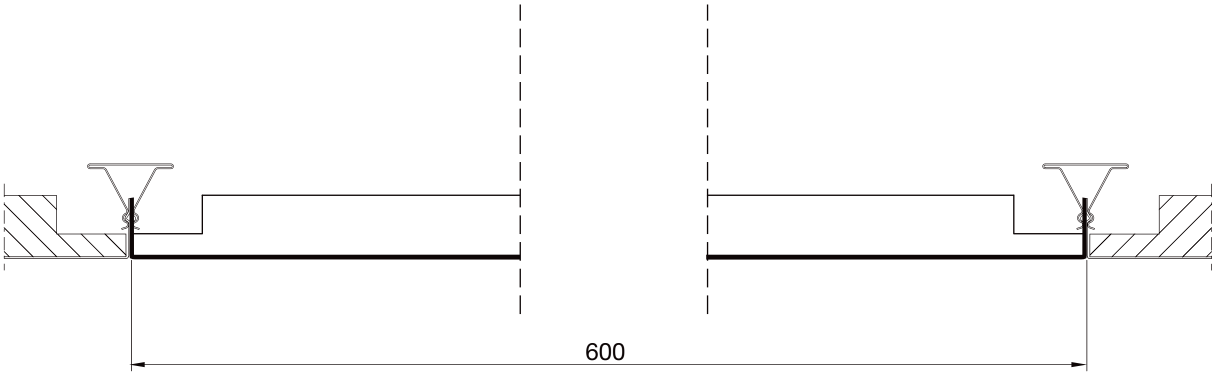


Grille box type V including mounting bracket type PBB

Sketch Versio- V, H, R all sizes



Sketch moduleplate type LM- Integra/Formo

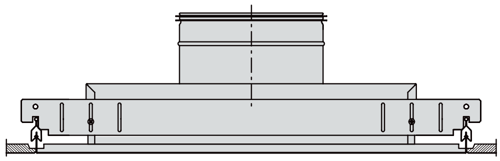


Ceiling tile adaption

6. Luxalon Clip-in

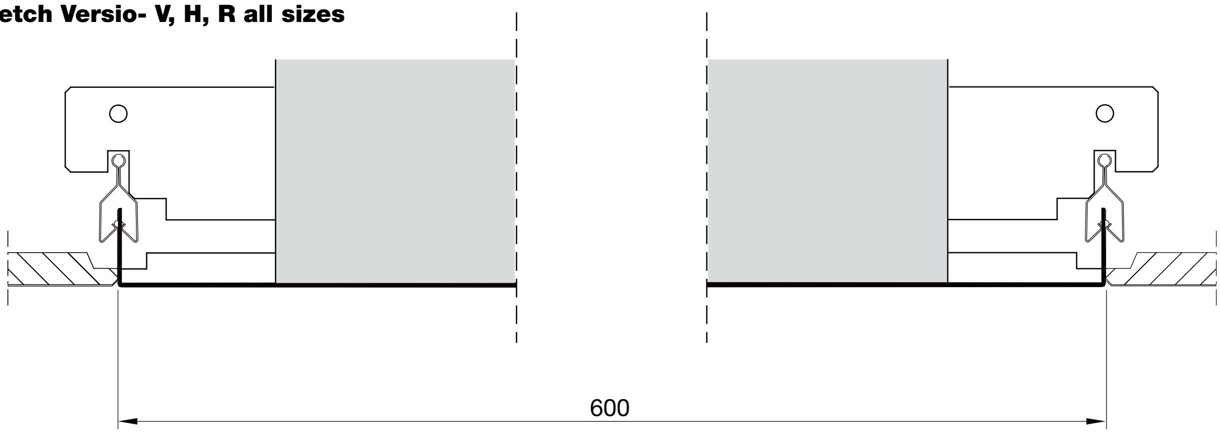
Lindab´s diffuser adapted to Luxalon Clip-in is mounted directly in the ceiling system, as depicted in the sketches. Mounting brackets type PBB comes with the diffuser series Versio.

Plenum box type H including mounting bracket type PBB

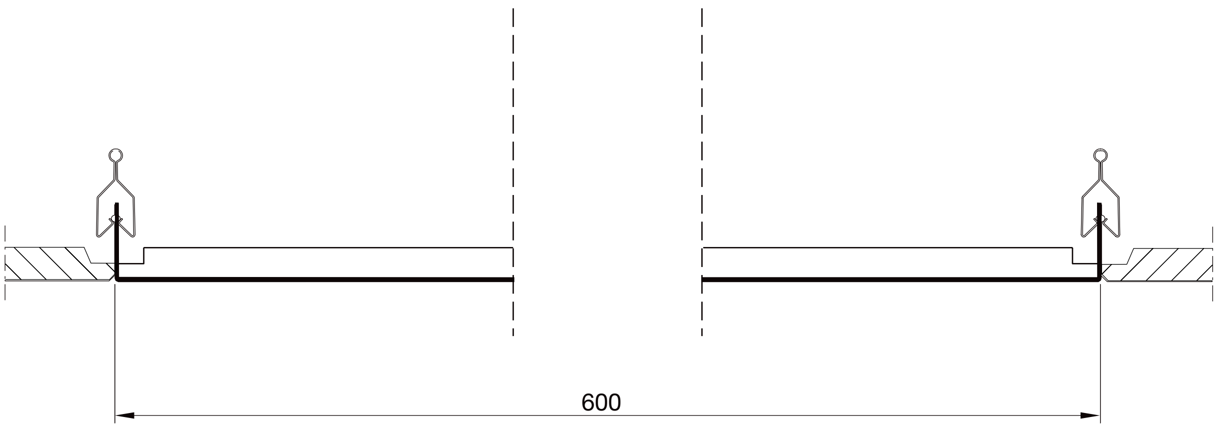


Grille box type V including mounting bracket type PBB

Sketch Versio- V, H, R all sizes



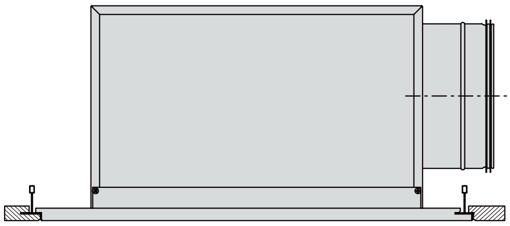
Sketch moduleplate type LM- Integra/Formo



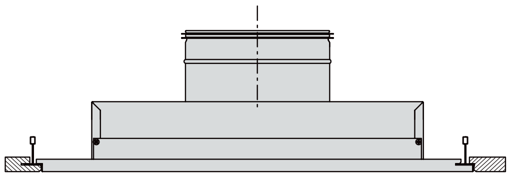
Ceiling tile adaption

7. Danotile Contur, Ecophon D and Rockfon D-XL

Lindab´s diffuser adapted to the above mentioned ceiling systems, is mounted directly in the ceiling system, as depicted in the sketches.

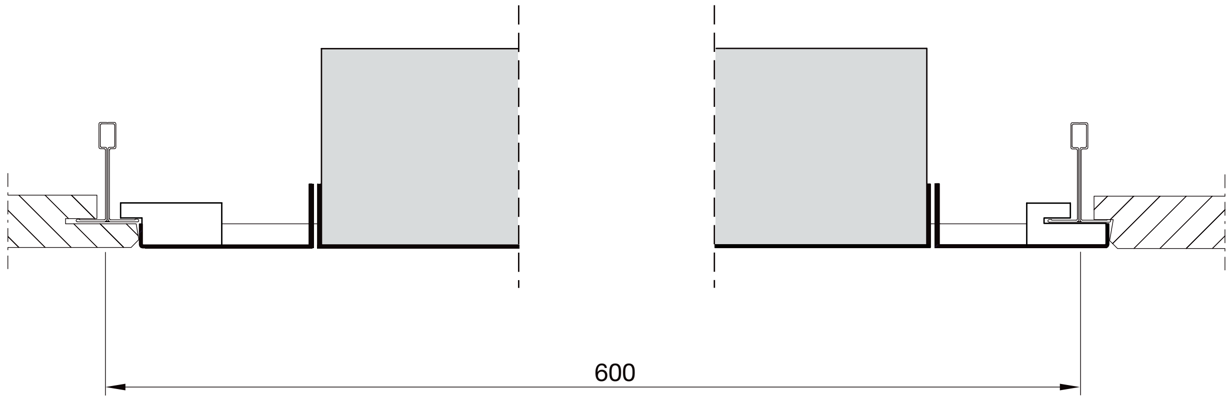


Plenum box type H

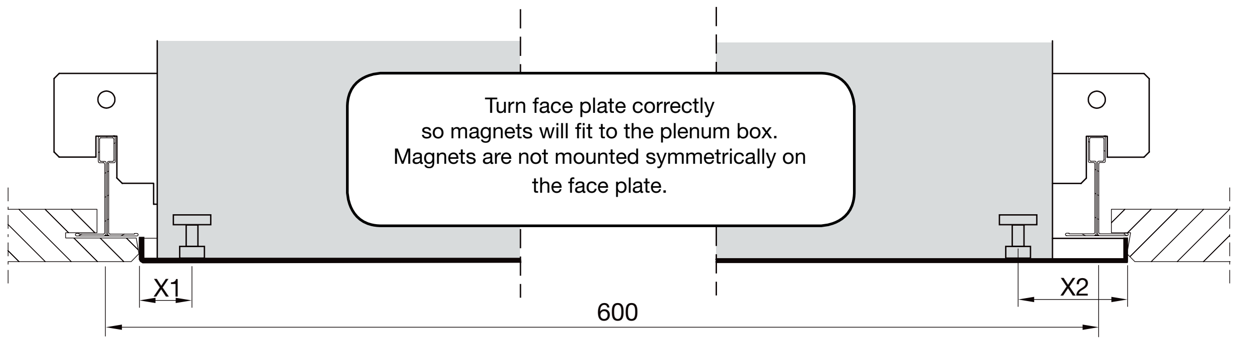


Grille box type V

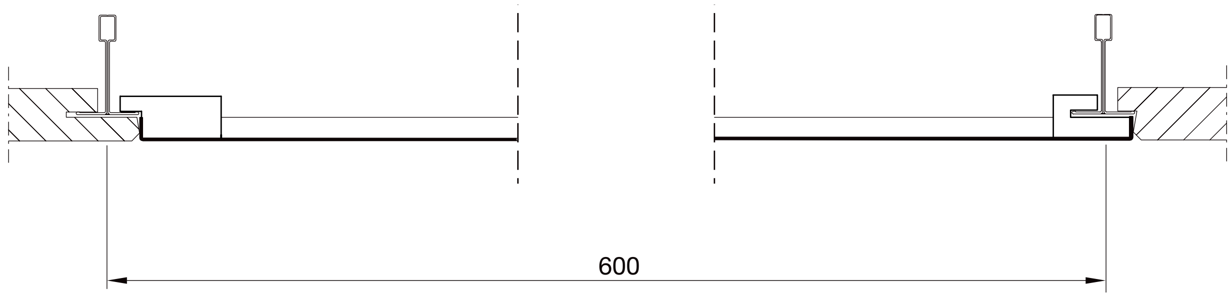
Sketch Versio- V, H, R pattern 300,400,500



Sketch Versio- V, H, R pattern 600
Comes with mounting bracket



Sketch moduleplate type LM- Integra/Formo

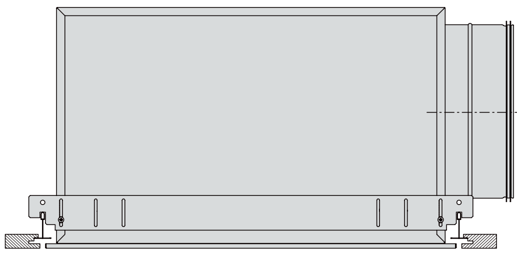


1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

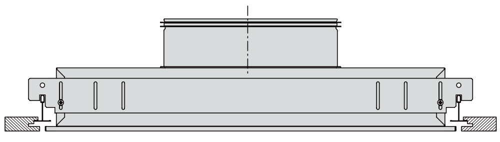
Ceiling tile adaption

8. Ecophon Focus DG

Lindab´s diffuser adapted to Ecophon Focus DG ceiling systems are mounted directly in the ceiling system, as depicted in the sketches.

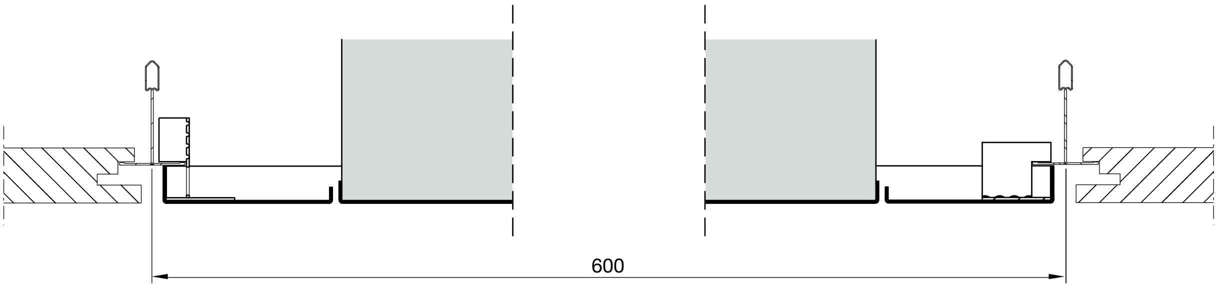


Plenum box type H including mounting bracket type PBB

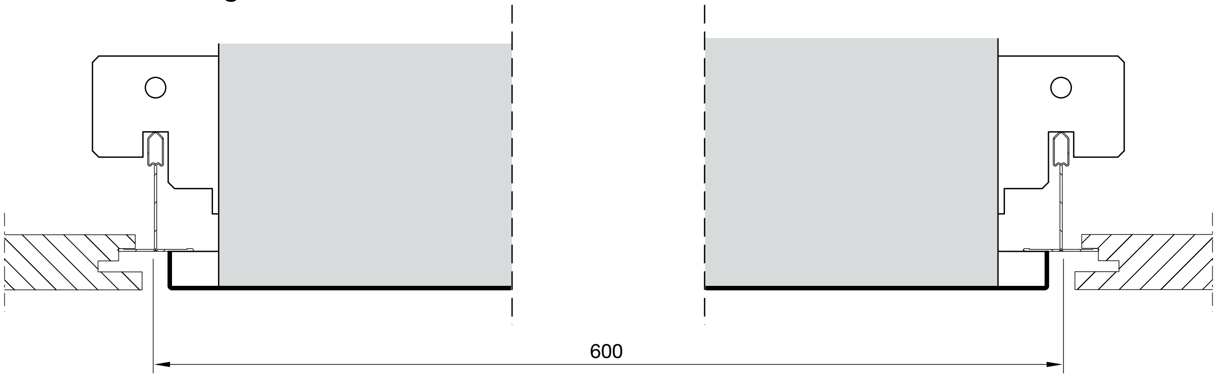


Grille box type V including mounting bracket type PBB

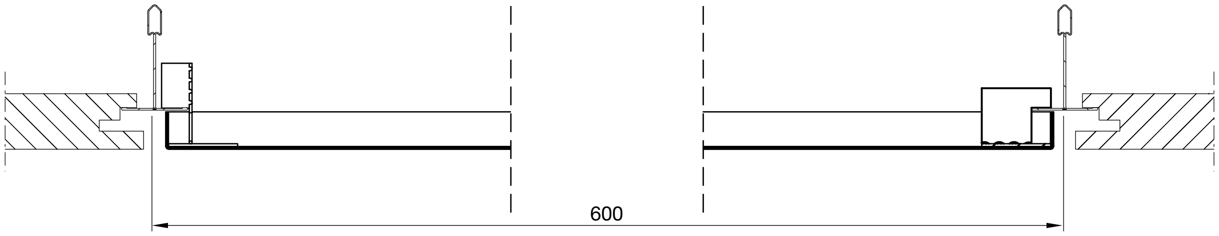
Sketch Versio- V, H, R pattern 300, 400, 500



Sketch Versio- V, H, R pattern 600
Comes with mounting bracket



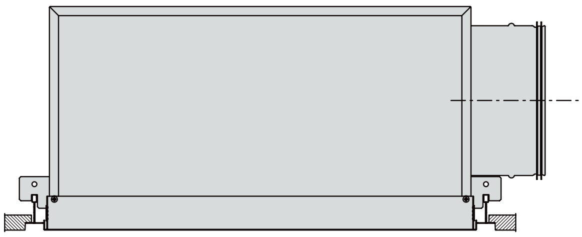
Sketch moduleplate type LM- Integra/Formo



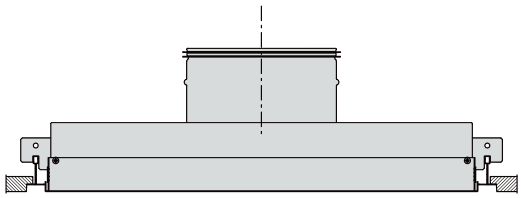
Ceiling tile adaption

9. Rockfon E10 24
Ecophon E / T24

Lindab´s diffuser adapted to the above mentioned ceiling system is mounted directly in the ceiling system, as depicted in the sketches.

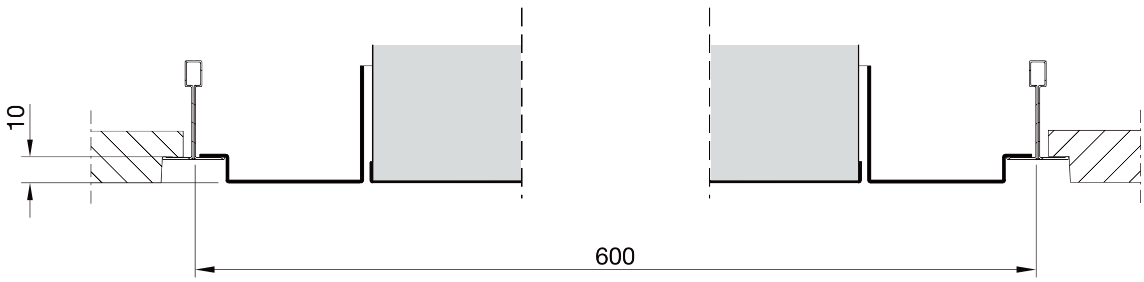


Plenum box type H including mounting bracket type PBB

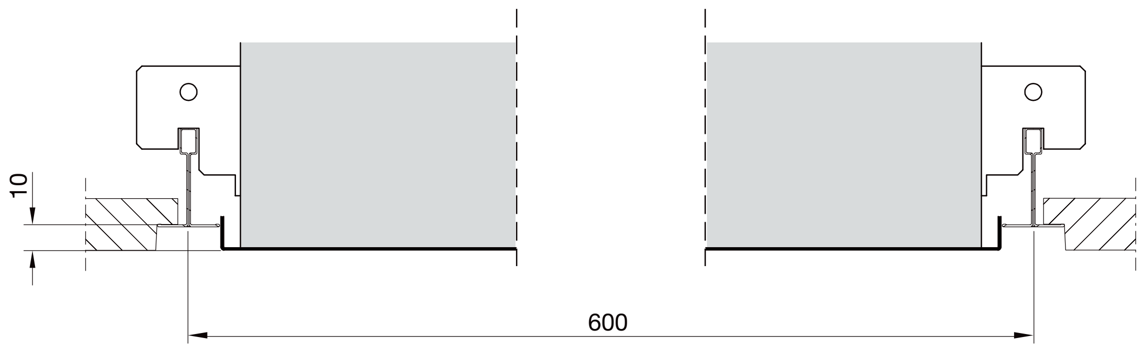


Grille box type V including mounting bracket type PBB

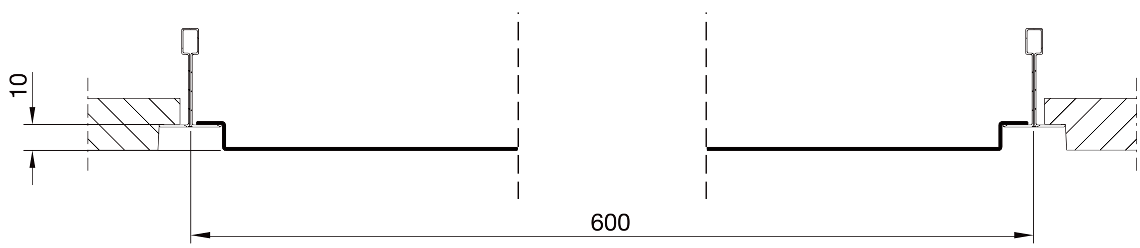
Sketch Versio- V, H, R pattern 300, 400, 500



Sketch Versio- V, H, R pattern 600
Comes with mounting bracket



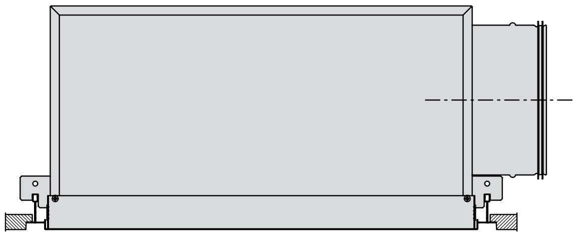
Sketch moduleplate type LM- Integra/Formo



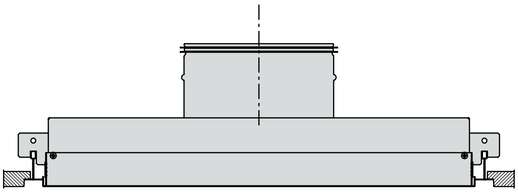
Ceiling tile adaption

10. Rockfon E10 15
Ecophon E / T15

Lindab´s ceiling diffusers adapted to the above mentioned ceiling systems are mounted directly in the ceiling system, as depicted in the sketches.

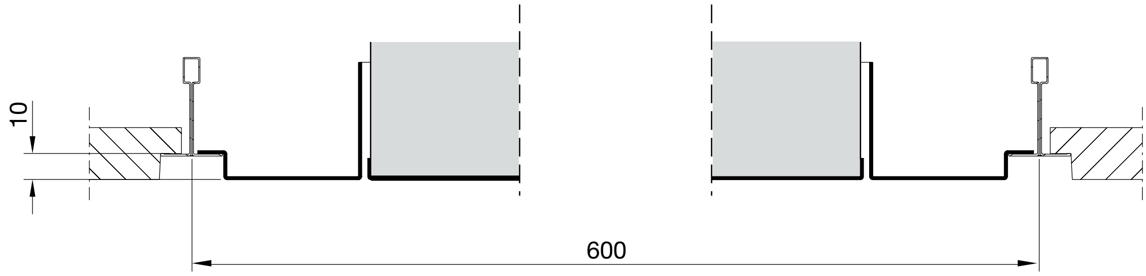


Plenum box type H including mounting bracket type PBB

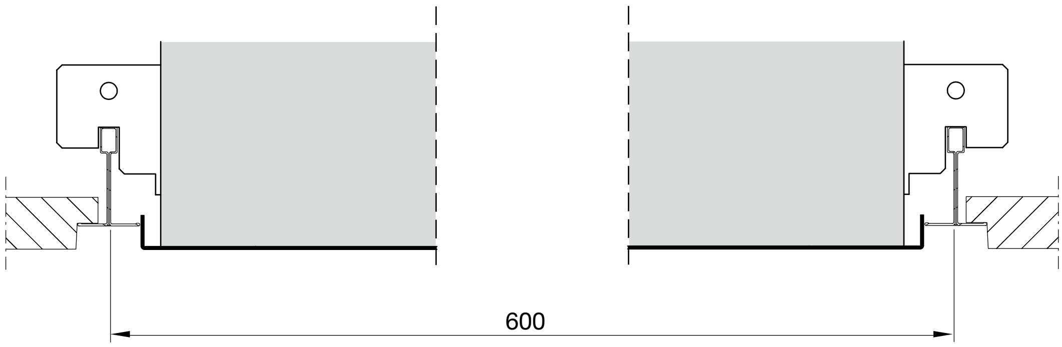


Grille box type V including mounting bracket type PBB

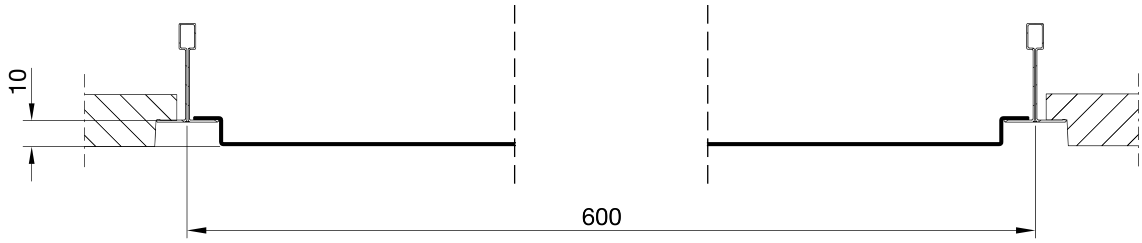
Sketch Versio- V, H, R pattern 300, 400, 500



Sketch Versio- V, H, R pattern 600
Comes with mounting bracket



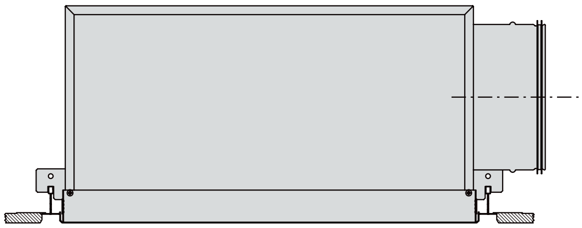
Sketch moduleplate type LM- Integra/Formo



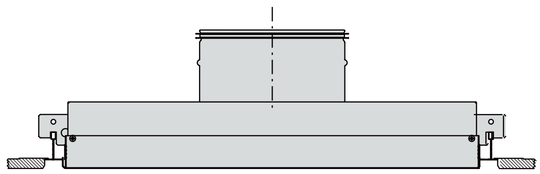
Ceiling tile adaption

11. Danotile Markant

Lindab´s ceiling diffusers adapted to the above mentioned ceiling systems are mounted directly in the ceiling system, as depticted in the sketches.

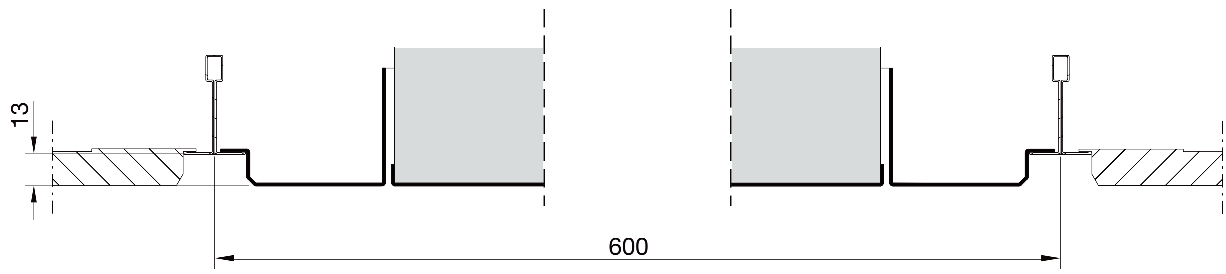


Plenum box type H including mounting bracket type PBB

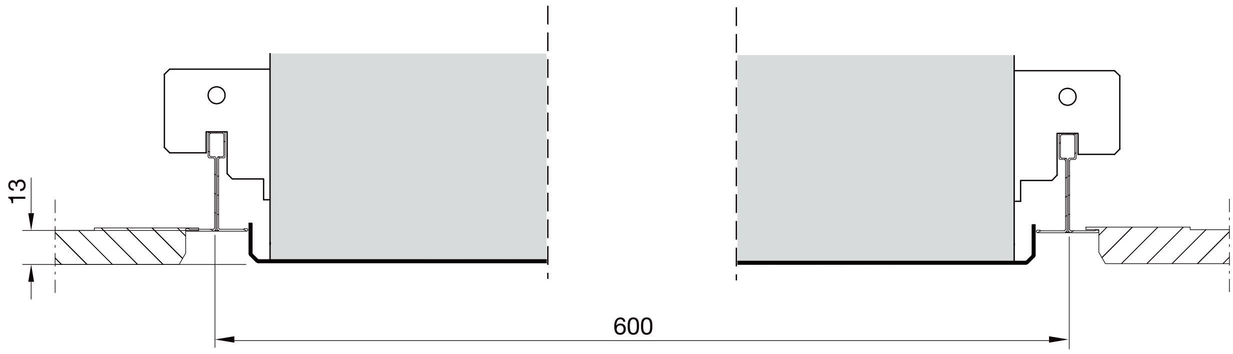


Grille box type V including mounting bracket type PBB

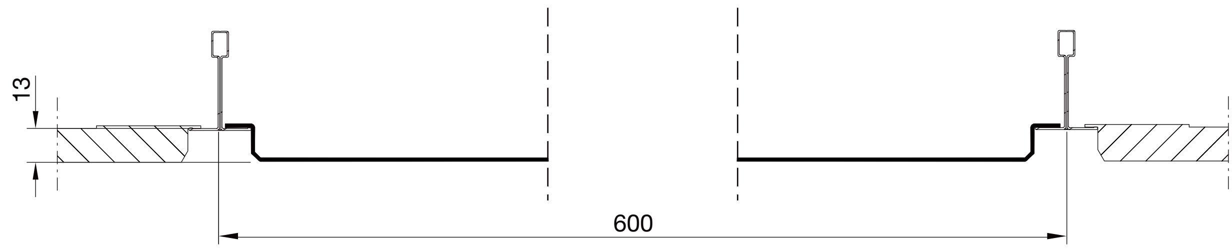
Sketch Versio- V, H, R pattern 300, 400, 500



Sketch Versio- V, H, R pattern 600
Comes with mounting bracket



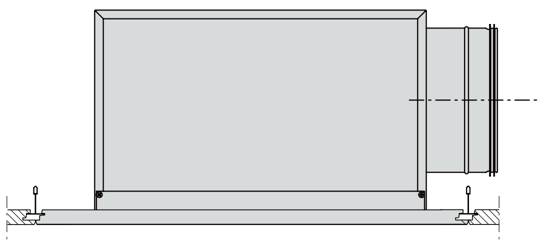
Sketch moduleplate type LM- Integra/Formo



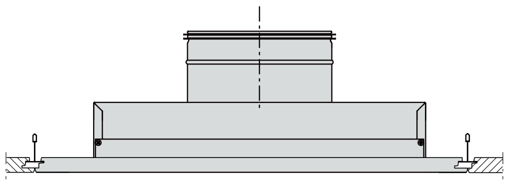
Ceiling tile adaption

14. Ecophon Focus edge DS

Lindab´s diffuser adapted to Ecophon Focus edge DS ceiling systems, is mounted directly in the ceiling system, as depicted in the sketches.

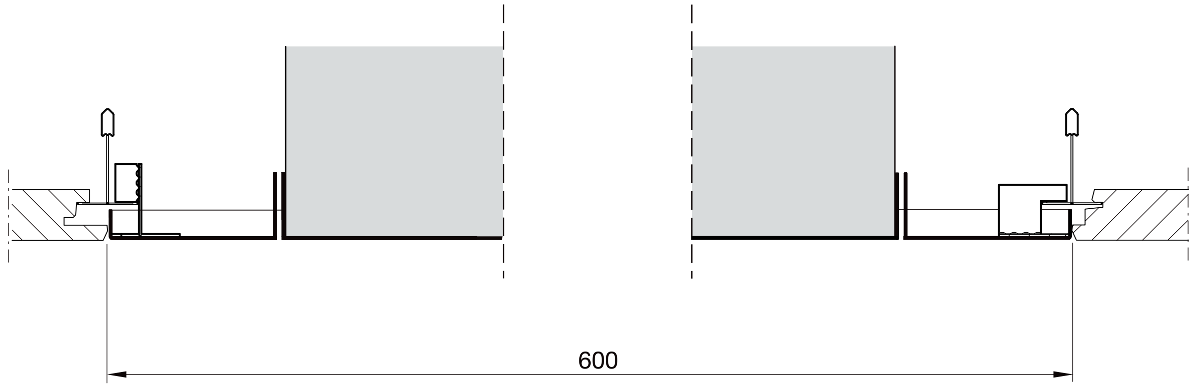


Plenum box type H

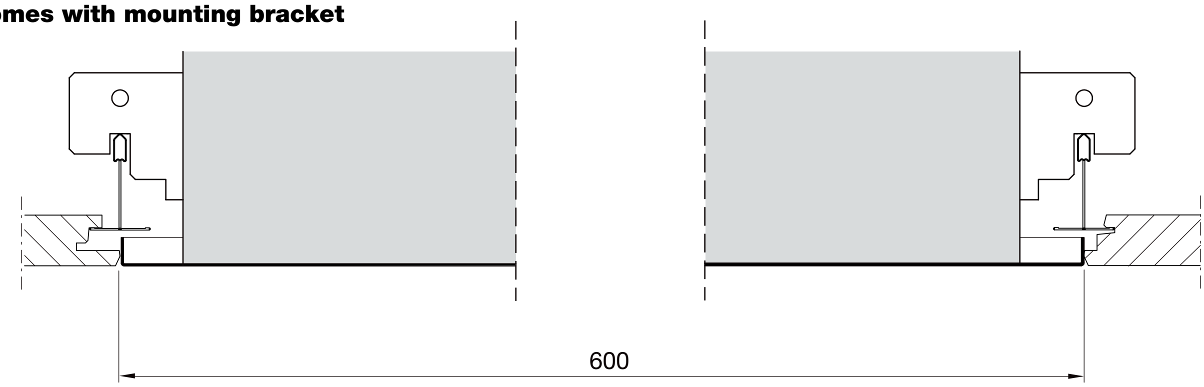


Grille box type V

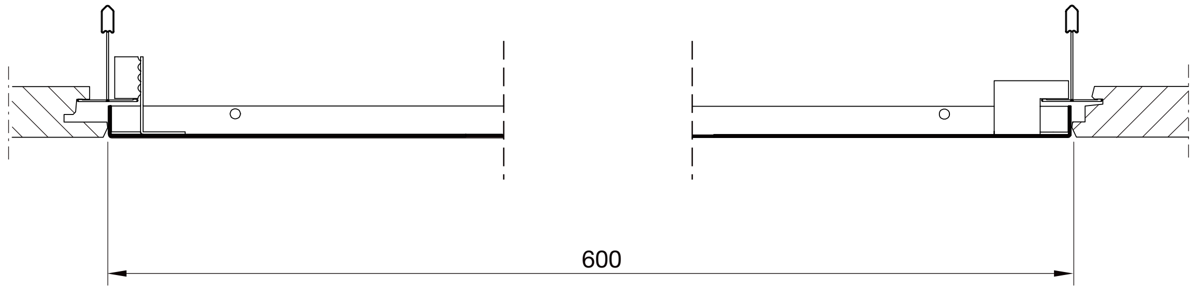
Sketch Versio- V, H, R pattern 300, 400, 500



Sketch Versio- V, H, R pattern 600
Comes with mounting bracket



Sketch moduleplate type LM- Integra/Formo

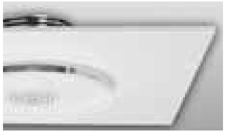


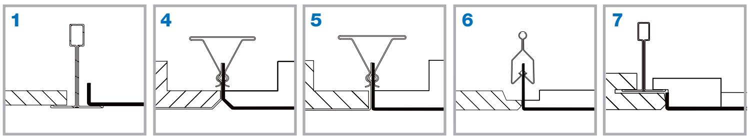
Ceiling tile adaption

Moduleplate

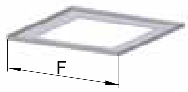
Ceiling tile adaption

Product

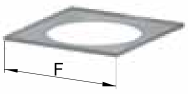




Ceiling types	Diffuser size Min. - max.	1	4	5	6	7
		Danotile T24/T15 Ecophon T24 Rockfon A24.	Dampa Clip-In bevelled edge	Dampa Clip-In square edge	Luxalon SQ Clip-In	Danotile Contur Ecophon D Rockfon D-XL
Moduleplate type LM	**mm**	F: 595 mm	F: 600 mm	F: 600 mm	F: 600 mm	F: 599 mm
PKA	**125 - 250**	●	●	●	●	●
LKA	**125 - 250**	●	●	●	●	●
PKV	**160 - 250**	●	●	●	●	●
LKV	**160 - 250**	●	●	●	●	●



Ceiling types	Diffuser size Min. - max.	1	4	5	6	7
Moduleplate type LM	**mm**	F: 595 mm	F: 600 mm	F: 600 mm	F: 600 mm	F: 599 mm
PCA	**100 - 400**	●	●	●	●	●
LCA	**100 - 400**	●	●	●	●	●
CRL	**100 - 400**					
RCG	**125 - 315**	●	●	●	●	●
PC6	**125 - 315**	●	●	●	●	●
PC7	**160 - 315**	●	●	●	●	●
RC14	**160 - 315**	●	●	●	●	●
RC15	**160 - 315**	●	●	●	●	●
NC19	**160 - 250**	●	●	●	●	●
PCV	**160 - 250**	●	●	●	●	●
LCV	**160 - 250**	●	●	●	●	●



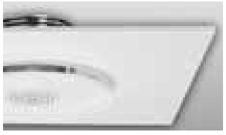
● Combination possible

Ceiling tile adaption

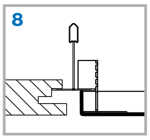
Moduleplate

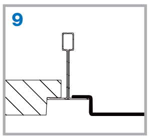
Ceiling tile adaption

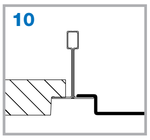
Product

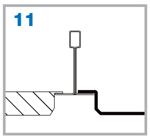


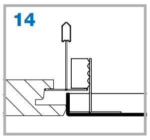
Diffuser size Min. - max.

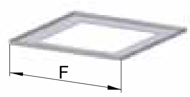
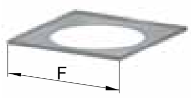










Ceiling types	Moduleplate type LM	mm	8 Ecophon Focus DG	9 Rockfon E10 24 Ecophon E / T24	10 Rockfon E10 15 Ecophon E / T15	11 Danotile Markant	14 Ecophon Focus edge DS
			F: 595 mm	F: 600 mm	F: 600 mm	F: 600 mm	F: 599 mm
PKA		125 - 250	●	●	●	●	●
LKA		125 - 250	●	●	●	●	●
PKV		160 - 250	●	●	●	●	●
LKV		160 - 250	●	●	●	●	●
	Moduleplate type LM	**mm**	F: 595 mm	F: 600 mm	F: 600 mm	F: 600 mm	F: 599 mm
PCA		100 - 400	●	●	●	●	●
LCA		100 - 400	●	●	●	●	●
CRL		100 - 400					
RCG		125 - 315	●	●	●	●	●
PC6		125 - 315	●	●	●	●	●
PC7		160 - 315	●	●	●	●	●
RC14		160 - 315	●	●	●	●	●
RC15		160 - 315	●	●	●	●	●
NC19		160 - 250	●	●	●	●	●
PCV		160 - 250	●	●	●	●	●
LCV		160 - 250	●	●	●	●	●

● Combination possible

Ceiling diffusers - visible

Ceiling diffusers - visible

Ceiling diffusers for visible mounting

Industrial diffusers

Ceiling diffusers - visible

PCS, Dahlerup's Packhus, converted warehouse, Copenhagen

Usage

Visible diffusers are normally used, where a suspended ceiling is not in place to hide the airduct systems and plenum boxes.

The diffusers normally function by the mixed ventilation principle, and are used typically in office environments, canteens, schools or similar rooms, for comfort ventilation. In rooms with different and variable loads, the PCS and LCS can be motorized in order to achieve the possibilty of VAV-function, and consequently the abillity to vary the air flow / volume and achieve an individual regulation of the ventilation in the room.

Function

The diffusers PCS, LCS and DCS are designed for visible mounting and fulfill most requirements of design and function. The diffusers have integrated plenum boxes with built-in dampers and measuring devices. As standard products the diffusers are available in circular design with a sideconnection painted in RAL 9010 gloss 30.

PCS, perforated ceiling diffuser

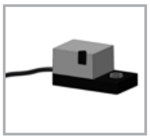
Ceiling diffusers - visible

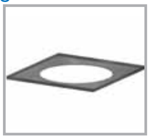
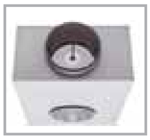
Design
See Comfort and Design

Motor

Accessories
See Product pages

Box

Product | Function | Supp./exhau. | Size

DCS – Nozzle diffuser

mm	Manual	Electric motor	Thermal actuator	Mounting bracket	Moduleplate	MBB
100	● (1)					
125	● (1)					
160	● (1)					
200	● (1)					
250	● (1)					
315	● (1)					

LCS – Plain diffuser

mm	Manual	Electric motor	Thermal actuator	Mounting bracket	Moduleplate	MBB
125	● (1)					
160	● (1)	● (3)				
200	● (1)	● (3)				
250	● (1)	● (3)				
315	● (1)	● (3)				

PCS – Perforated diffuser

mm	Manual	Electric motor	Thermal actuator	Mounting bracket	Moduleplate	MBB
125	● (1)					
160	● (1)	● (3)				
200	● (1)	● (3)				
250	● (1)	● (3)				
315	● (1)	● (3)				

RCW – Swirl diffuser

mm	Manual	Electric motor	Thermal actuator	Mounting bracket	Moduleplate	MBB
250	● (1)	● (1)	● (1)		● (3)	● (3)
315	● (1)	● (1)	● (1)		● (3)	● (3)
400	● (1)	● (1)	● (1)		● (3)	● (3)
500	● (1)	● (1)	● (1)			
630	● (1)	● (1)	● (1)			

RCWB – Swirl diffuser

mm	Manual	Electric motor	Thermal actuator	Mounting bracket	Moduleplate	MBB
250	● (1)	● (1)	● (1)			
315	● (1)	● (1)	● (1)			
400	● (1)	● (1)	● (1)			
500	● (1)	● (1)	● (1)			
630	● (1)	● (1)	● (1)			

HLD – Perforated diffuser

mm	Manual	Electric motor	Thermal actuator	Mounting bracket	Moduleplate	MBB
250	● (1)	● (1)		● (1)		
315	● (1)	● (1)		● (1)		
400	● (1)	● (1)		● (1)		
500	● (1)	● (1)		● (1)		
630	● (1)	● (1)		● (1)		

FKD – Multicone diffuser

mm	Manual	Electric motor	Thermal actuator	Mounting bracket	Moduleplate	MBB
160	● (1)				● (3)	● (1)
200	● (1)				● (3)	● (1)
250	● (1)				● (3)	● (1)
315	● (1)					● (1)
355	● (1)					
400	● (1)					● (1)
450	● (1)					
500	● (1)					
630	● (1)					

● 1. Product and tech. data depicted in catalogue.
○ 2. Combination possible. Tech. data depicted in catalogue.
● 3. Combination possible. Tech. data not in catalogue.
4. If space is empty, combination is not possible.

Nozzle diffuser DCS

Description

DCS is a circular diffuser with integrated box for visible installation. The diffuser is equipped with individually adjustable nozzles.

The diffuser has an built-in damper and a measuring device for individual adjustment. DCS is equipped with a threaded rod at the top for attaching the diffuser.

The diffuser is suitable for the horizontal supply of cooled air, where great flexibility in the dispersal pattern is required.

- Individually adjustable nozzles
- Supplied with threaded rod for suspension
- Detachable damper for cleaning of duct

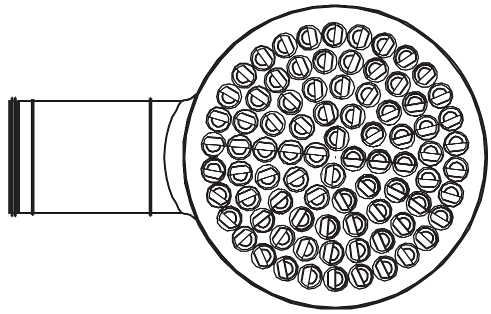
Maintenance

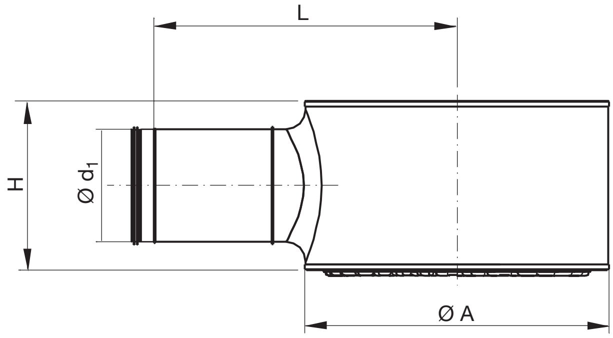
The face plate can be detached and the damper removed to enable cleaning of the internal parts or the duct. The visible parts of the diffuser can be wiped with a damp cloth.

Order code

Product	DCS	bbb	A
Type			
Size			
Version			

Dimensions





Ød$_1$ Size	ØA mm	Ød$_1$ mm	L mm	H mm	Weight kg
100	300	100	365	200	3,1
125	360	125	395	215	4,0
160	460	160	470	260	5,2
200	540	200	545	300	7,7
250	680	250	645	350	10,5
315	680	315	685	420	10,8

Materials and finish

Material: Galvanised steel
Nozzles ABS Plastic, white
Standard finish: Powder-coated
Standard colour: White, RAL 9010, gloss 30

The diffuser is available in other colours. Please contact Lindab's sales department for further information.

Nozzle diffuser DCS

Technical data

Capacity

Volume flow q_v [l/s] and [m^3/h], total pressure Δp_t [Pa], throw $l_{0.2}$ [m] and sound power level L_{WA} [dB(A)] can be seen in the diagrams.

Frequency-related sound effect level

The sound effect level in the frequency band is defined as $L_{WA} + K_{ok}$

K_{ok} values are specified in charts beneath the diagrams on the following pages

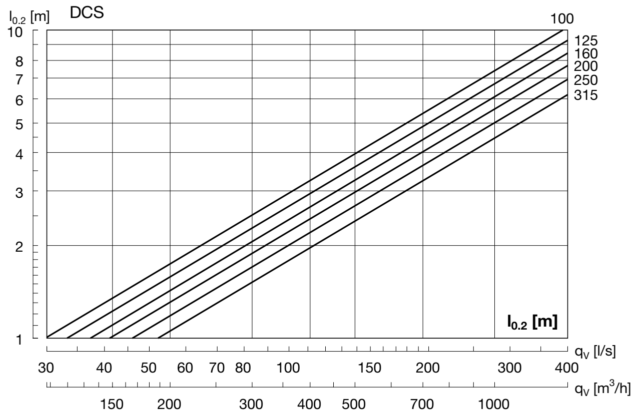
Quick selection

Supply air

Size	Minimum P_i=5 Pa l/s	m³/h	p_t=50 Pa L_{WA}=30dB(A) l/s	m³/h	p_t=50 Pa L_{WA}=35dB(A) l/s	m³/h
100	9	33	15	52	34	123
125	15	53	29	105	42	150
160	25	91	44	157	65	233
200	40	145	63	225	95	340
250	67	241	-	-	115	416
315	112	402	-	-	166	596

Throw $l_{0.2}$

The throw is specified at a speed of 0.2 m/s.



Sound attenuation

Sound attenuation of the diffusers ΔL from duct to room, including end reflection, see table below

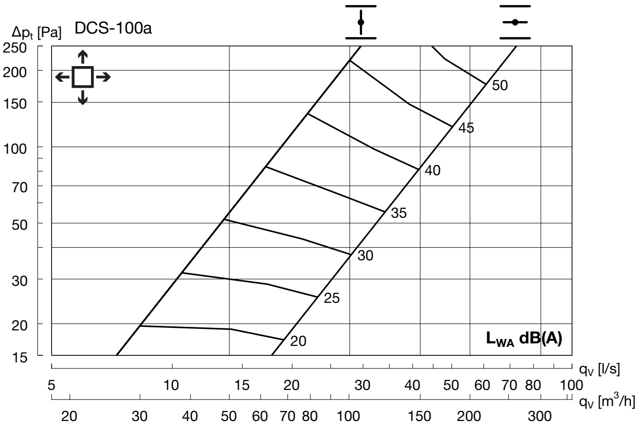
Size	Centre frequency Hz 63	125	250	500	1K	2K	4K	8K
100	14	9	6	17	14	11	9	16
125	16	11	5	14	12	9	10	16
160	14	10	5	16	10	9	9	14
200	11	7	7	13	8	7	9	14
250	11	7	9	9	7	7	10	14
315	9	6	11	9	6	8	10	14

Balancing

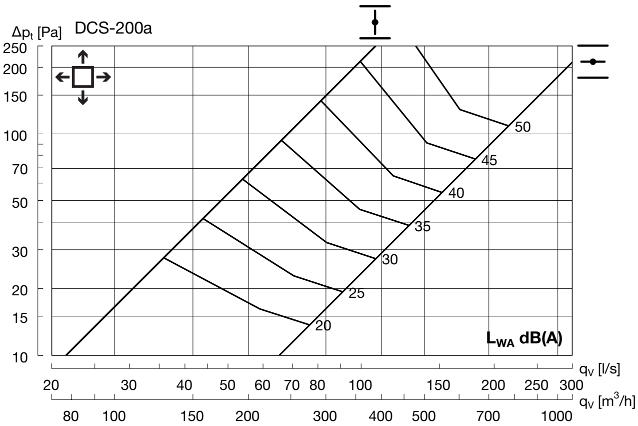
Balancing data is contained in a separate brochure.

Nozzle diffuser DCS

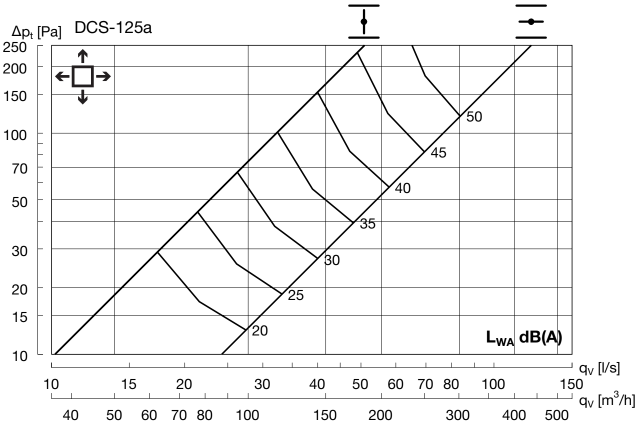
Technical data



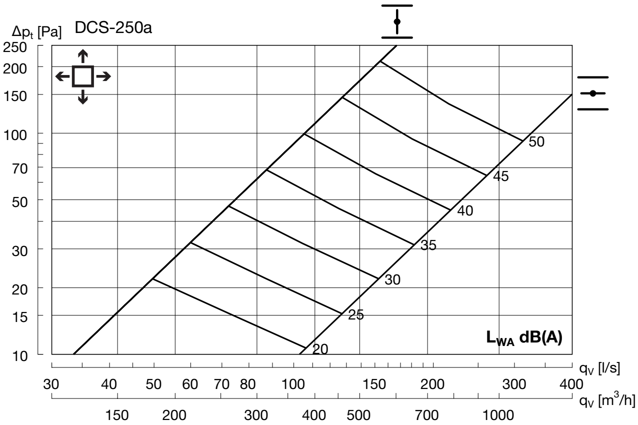
Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	7	4	5	-5	-7	-10	-14	-18



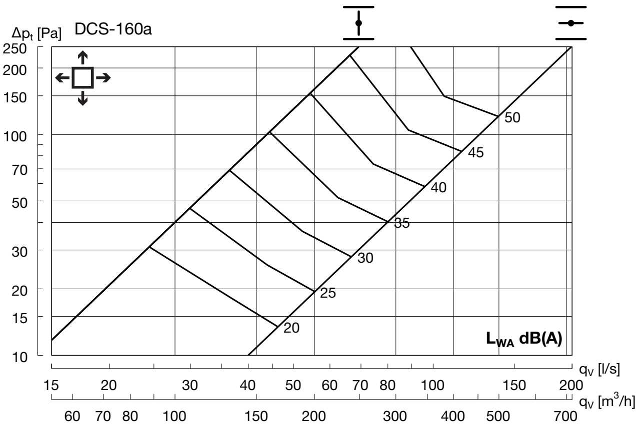
Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	11	8	1	-4	-6	-10	-15	-16



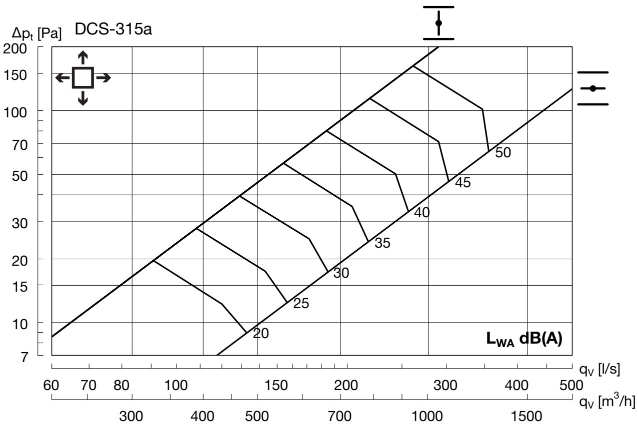
Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	7	4	4	-4	-7	-9	-14	-20



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	11	8	1	-5	-6	-10	-14	-16



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	11	8	3	-5	-6	-10	-17	-19



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	9	6	1	-2	-6	-13	-16	-16

Plain diffuser LCS

Description

LCS is a circular diffuser with integrated box for visible installation. The diffuser has an unperforated face plate and can be used for both supply and exhaust air.

The diffuser has a built-in damper and a measuring device for individual adjustment. LCS is equipped with a threaded rod at the top for suspending the diffuser.

The diffuser is suitable for the horizontal supply of cooled air, where high impulse is required.

- Can be used for both supply and exhaust air.
- Can be connected regardless of straight ducting before the diffuser
- Supplied with integrated threaded rod for suspension
- Detachable damper for cleaning of duct
- High impulse

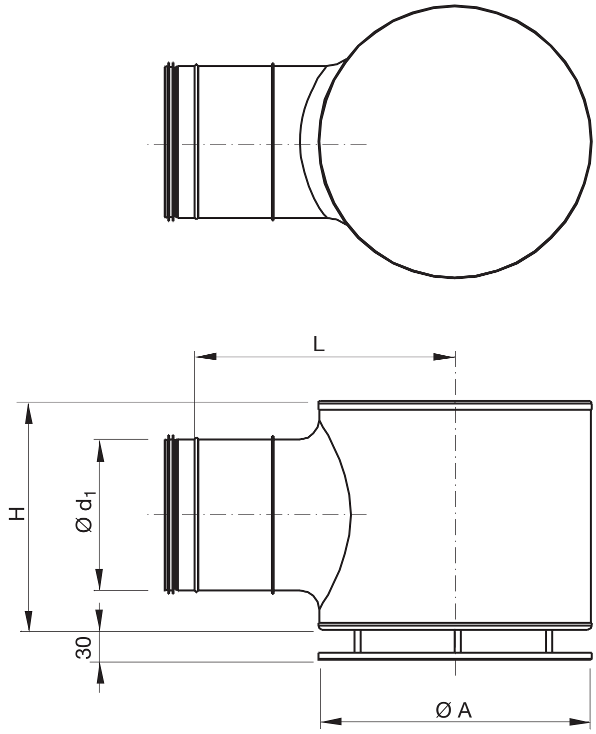
Maintenance

The face plate can be detached and the damper removed to enable cleaning of the internal parts or the duct. The visible parts of the diffuser can be wiped with a damp cloth.

Order code

Product	LCS	bbb	A
Type			
Size			
Version			

Dimensions



Ød_1 Size	ØA mm	Ød_1 mm	L mm	H mm	Weight kg
125	240	125	340	215	3,4
160	300	160	372	260	4,6
200	360	200	415	300	6.90
250	460	250	445	350	9,6
315	540	315	445	420	11,4

Materials and finish

Material: Galvanised steel
Standard finish: Powder-coated
Standard colour: White, RAL 9010, gloss 30

The diffuser is available in other colours. Please contact Lindab's sales department for further information.

Plain diffuser LCS

Technical data

Capacity

Volume flow q_v [l/s] and [m³/h], total pressure Δp_t [Pa], throw $l_{0.2}$ [m] and sound power level L_{WA} [dB(A)] can be seen in the diagrams.

Frequency-related sound effect level

The sound effect level in the frequency band is defined as L_{WA} + K_{ok} K_{ok} values are given in charts beneath the diagrams on the following pages.

Quick selection

Supply air

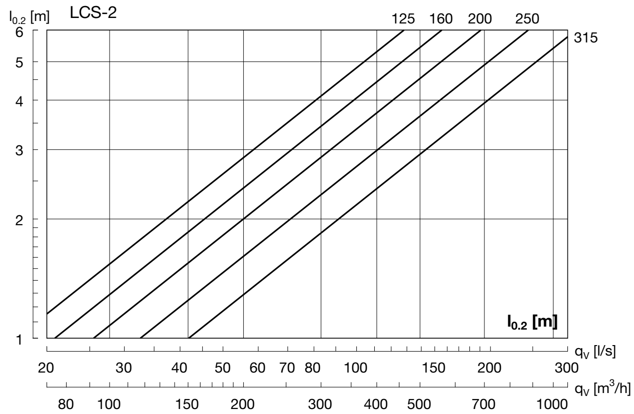
Size	Minimum P_i=5 Pa l/s	m³/h	p_t=50 Pa L_{WA}=30dB(A) l/s	m³/h	p_t=50 Pa L_{WA}=35dB(A) l/s	m³/h
125	18	65	33	119	42	151
160	30	108	53	191	63	227
200	44	158	68	245	84	302
250	69	248	105	378	132	475
315	88	317	-	-	181	652

Exhaust

Size	Minimum P_i=5Pa l/s	m³/h	P_t=50 Pa L_{WA}= 30 dB(A) l/s	m³/h	P_t=50 Pa L_{WA}= 35 dB(A) l/s	m³/h
125	18	66	33	117	43	156
160	30	107	43	156	65	235
200	44	157	67	242	101	362
250	69	248	125	448	147	530
315	88	316	151	543	186	668

Throw $l_{0.2}$

The throw is specified at a terminal velocity of 0.2 m/s.



Sound attenuation

Sound attenuation of the diffusers ΔL from duct to room, including end reflection, see table below

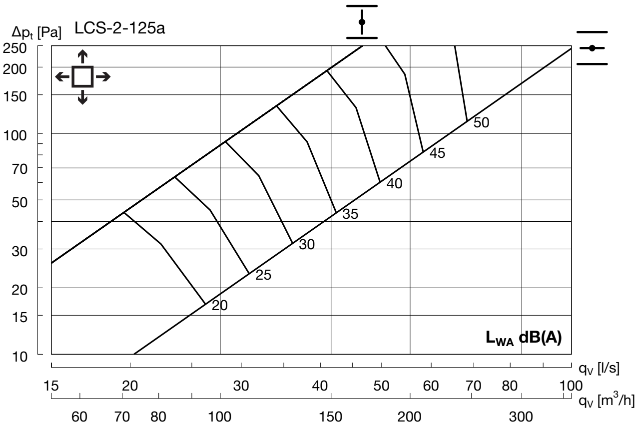
Size	Centre frequency Hz 63	125	250	500	1K	2K	4K	8K
125	19	14	7	19	12	15	14	20
160	14	10	6	15	14	14	14	17
200	14	10	11	10	17	12	15	18
250	20	16	15	20	15	12	16	19
315	17	14	14	17	13	12	15	18

Balancing

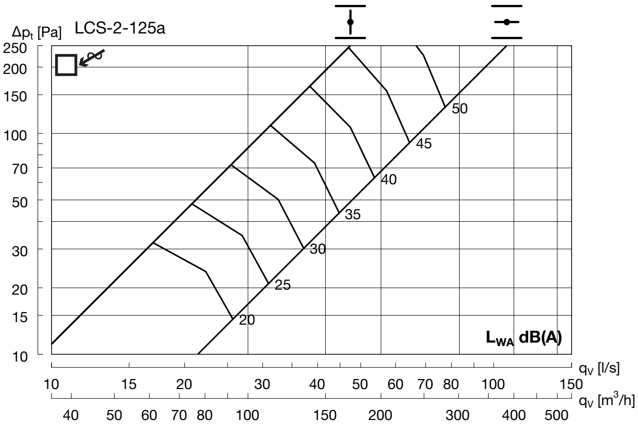
Balancing data is contained in a separate brochure.

Plain diffuser LCS

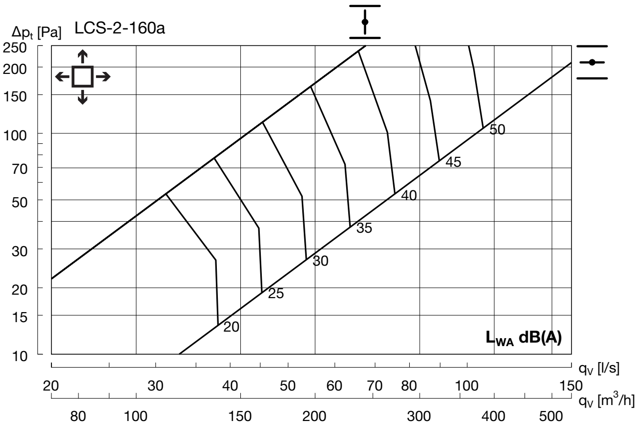
Technical data



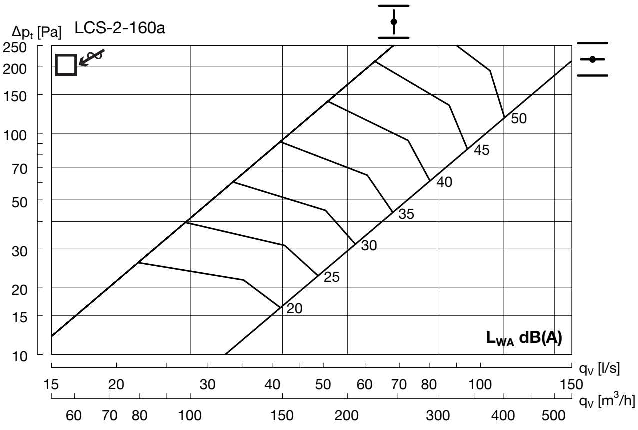
Hz	63	125	250	500	1K	2K	4K	8K
Kok	7	4	1	-3	-4	-12	-17	-17



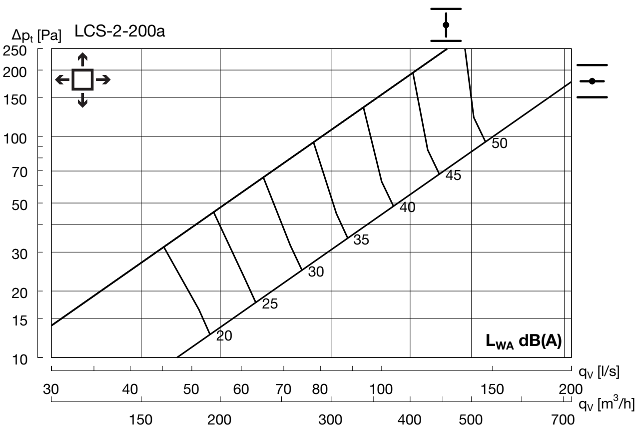
Hz	63	125	250	500	1K	2K	4K	8K
Kok	7	4	3	-4	-6	-11	-14	-16



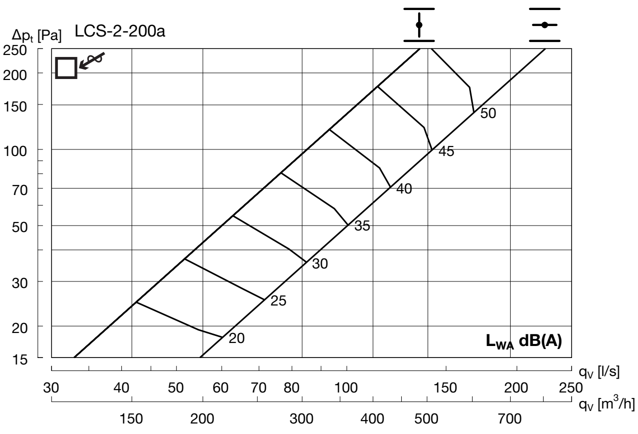
Hz	63	125	250	500	1K	2K	4K	8K
Kok	9	6	0	-2	-5	-12	-16	-16



Hz	63	125	250	500	1K	2K	4K	8K
Kok	10	7	2	-5	-6	-11	-14	-15



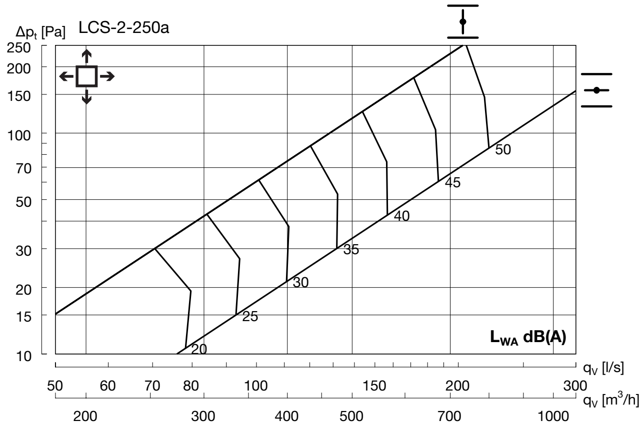
Hz	63	125	250	500	1K	2K	4K	8K
Kok	6	3	-2	-2	-4	-11	-19	-20



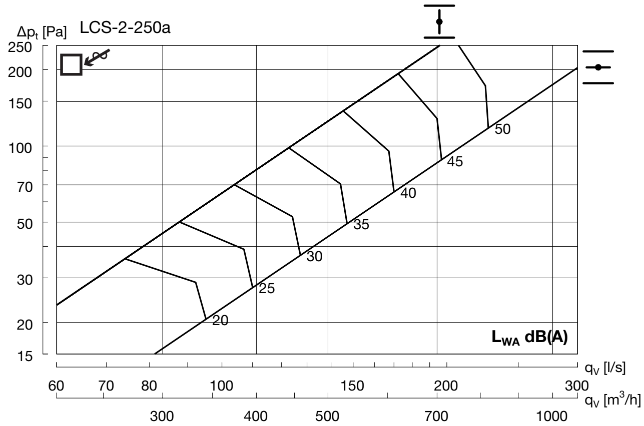
Hz	63	125	250	500	1K	2K	4K	8K
Kok	7	3	-2	-3	-5	-9	-15	-20

Plain diffuser LCS

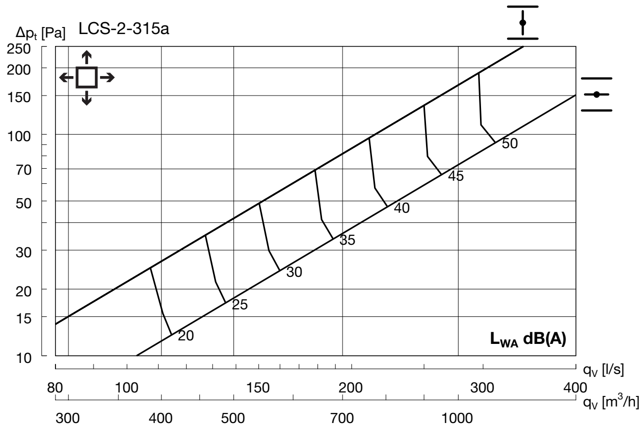
Technical data



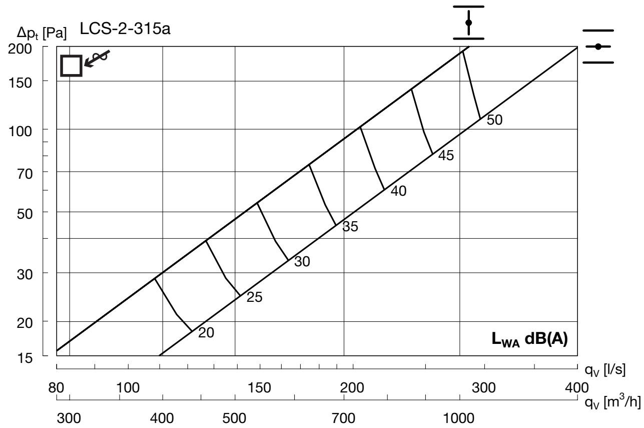
Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	5	2	-3	-2	-4	-11	-18	-19



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	7	4	-1	-3	-5	-10	-15	-17



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	4	1	-3	-2	-3	-11	-19	-22



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	6	3	-1	-2	-4	-12	-19	-18

Perforated diffuser PCS

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

Description

PCS is a circular diffuser with integrated box for visible installation. The diffuser has a perforated face plate and can be used for both supply and exhaust air.

The diffuser has a built-in damper and a measuring device for adjustment. PCS is equipped with a threaded rod at the top for suspending the diffuser.

The diffuser is suitable for the horizontal supply of cooled air.

- Can be used for both supply and exhaust air.
- Can be connected regardless of straight ducting before the diffuser
- Supplied with integrated threaded rod for suspension
- Detachable damper for cleaning of duct

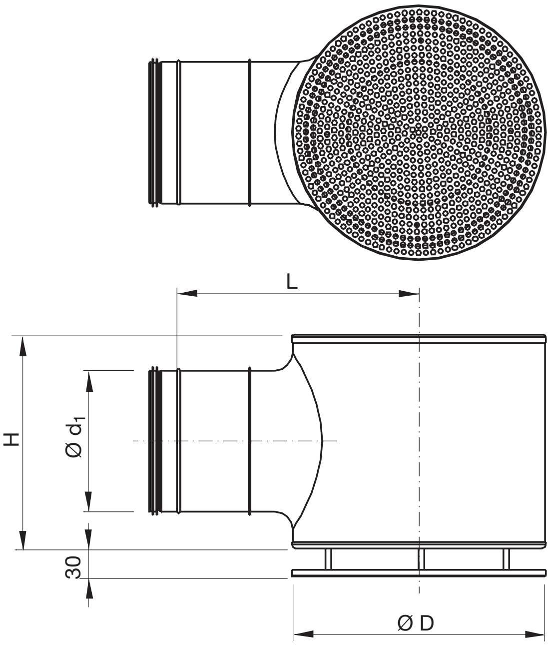
Maintenance

The face plate can be detached and the damper removed to enable cleaning of the internal parts or the duct. The visible parts of the diffuser can be wiped with a damp cloth.

Order code

Product	PCS 2	bbb	A
Type			
Size			
Version			

Dimensions



Size	ØD mm	Ød_1 mm	L mm	H mm	Weight kg
125	240	125	340	215	3,4
160	300	160	372	260	4,6
200	360	200	415	300	6,9
250	460	250	445	350	9,6
315	540	315	445	420	11,4

Materials and finish

Material: Galvanised steel
Standard finish: Powder-coated
Standard colour: White, RAL 9010, gloss 30

The diffuser is available in other colours. Please contact Lindab's sales department for further information.

Perforated diffuser PCS

Technical data

Capacity
Volume flow q_v [l/s] and [m^3/h], total pressure Δp_t [Pa], throw $l_{0.2}$ [m] and sound power level L_{WA} [dB(A)] can be seen in the diagrams.

Frequency-related sound effect level
The sound effect level in the frequency band is defined as $L_{WA}+K_{ok}$. K_{ok} values are specified in charts beneath the diagrams on the following pages.

Quick selection

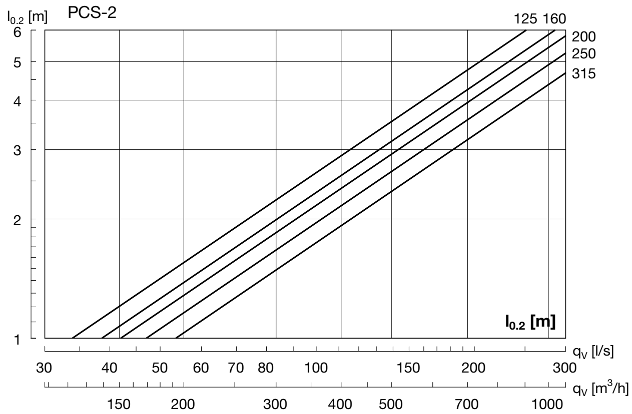
Supply air

	Minimum P_i=5 Pa		p_t=50 Pa L_{WA}=30dB(A)		p_t=50 Pa L_{WA}=35dB(A)	
Size	l/s	m^3/h	l/s	m^3/h	l/s	m^3/h
125	20	73	30	106	36	131
160	34	122	48	173	59	212
200	53	190	65	235	81	292
250	79	286	109	393	135	484
315	121	437	-	-	188	675

Exhaust

	Minimum P_i=5Pa		P_t=50 Pa L_{WA}= 30 dB(A)		P_t=50 Pa L_{WA}= 35 dB(A)	
Size	l/s	m^3/h	l/s	m^3/h	l/s	m^3/h
125	20	73	29	104	43	156
160	34	122	32	117	62	222
200	53	190	63	225	104	376
250	79	286	109	391	146	525
315	121	437	-	-	191	687

Throw $l_{0.2}$
The throw is specified at a terminal velocity of 0.2 m/s.



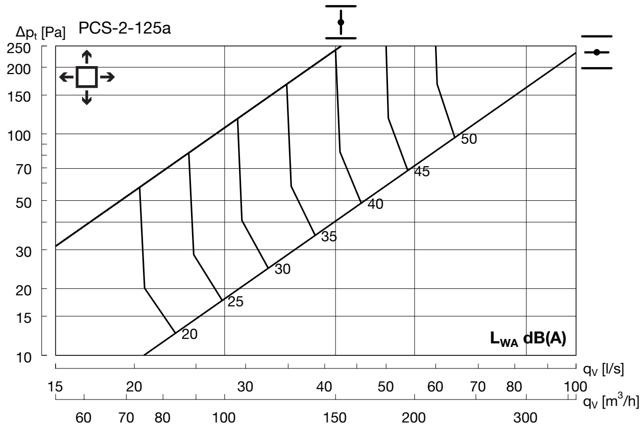
Sound attenuation
Sound attenuation of the diffusers ΔL from duct to room, including end reflection, see table below.

	Centre frequency Hz							
Size	63	125	250	500	1K	2K	4K	8K
125	21	16	6	19	14	12	11	17
160	15	11	9	21	15	12	13	16
200	12	8	6	15	15	9	11	14
250	19	15	12	17	12	9	11	14
315	16	13	11	14	12	9	12	13

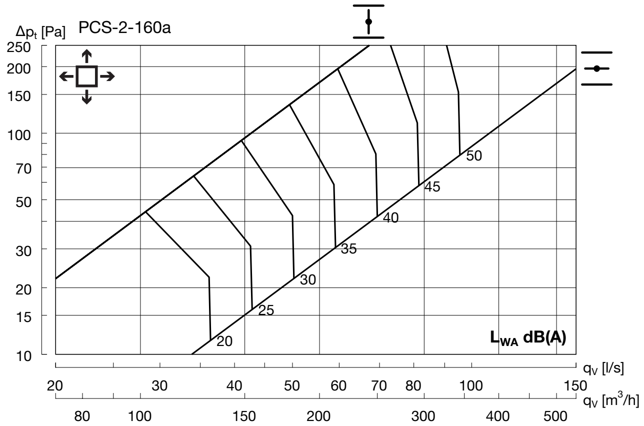
Balancing
Balancing data is contained in a separate brochure.

Perforated diffuser PCS

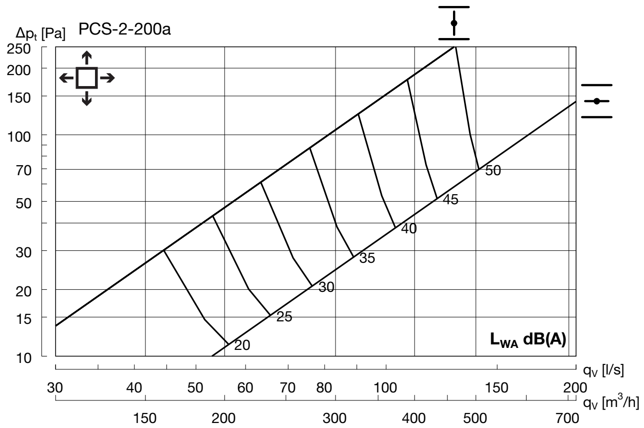
Technical data



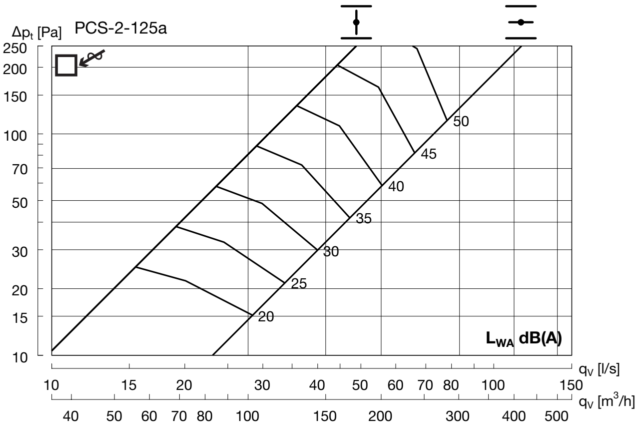
Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	6	3	1	-4	-5	-10	-15	-17



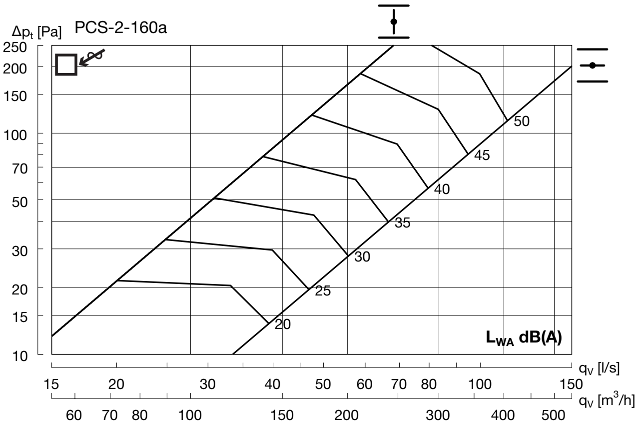
Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	6	3	-1	-4	-5	-9	-16	-17



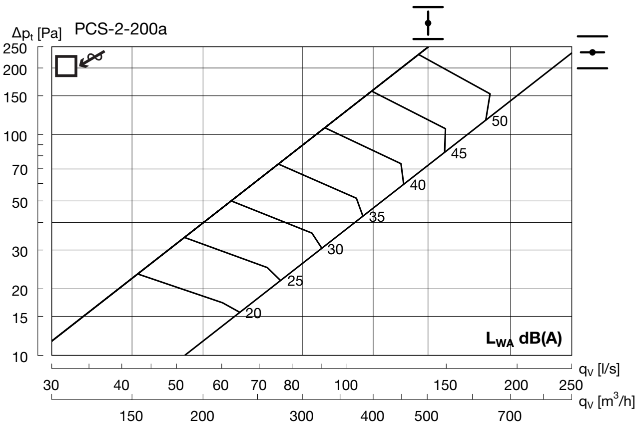
Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	3	0	-2	-3	-4	-9	-17	-19



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	6	3	2	-3	-6	-10	-13	-16



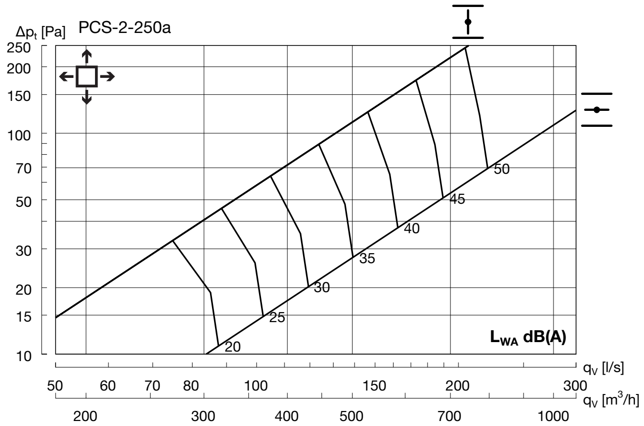
Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	5	2	0	-6	-5	-8	-13	-18



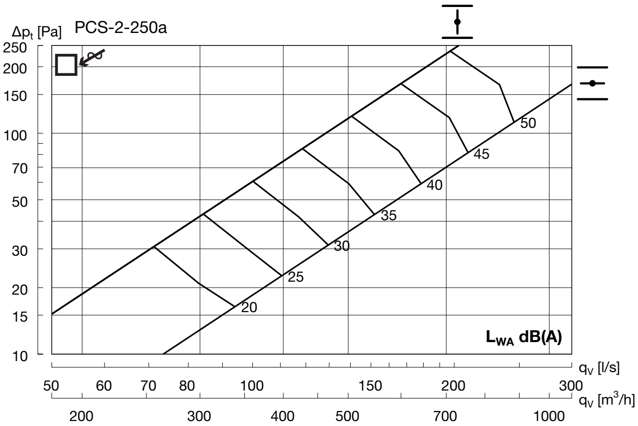
Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	7	4	-1	-3	-4	-9	-15	-19

Perforated diffuser PCS

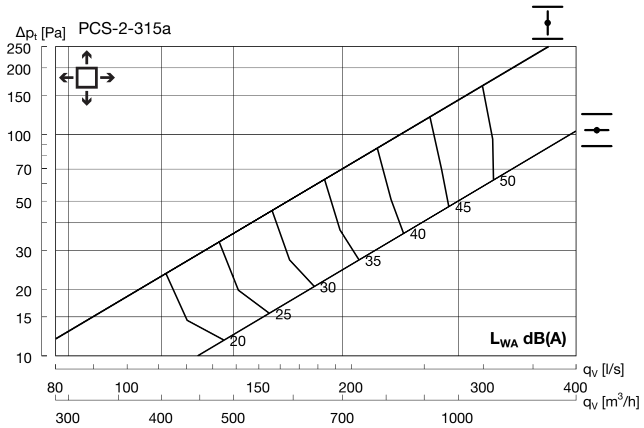
Technical data



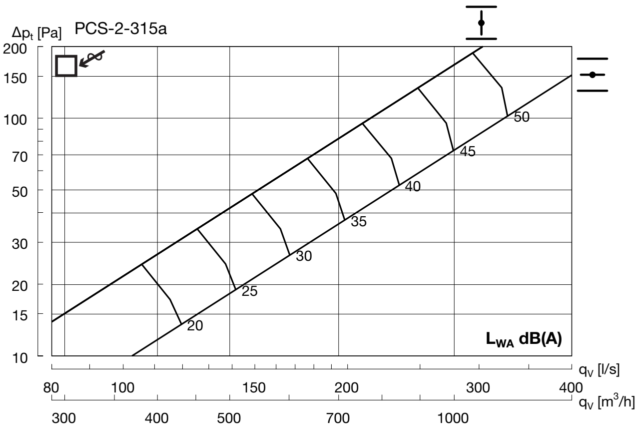
Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	4	1	-3	-3	-4	-9	-17	-18



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	8	5	-2	-3	-5	-9	-14	-16



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	5	2	-2	-1	-5	-11	-17	-16



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	6	3	-4	-3	-4	-8	-16	-22

Ceiling diffusers - visible

HLD, DSB, Aarhus.

Usage

For ventilation of larger rooms in industry, shopping malls, hangars, arenas and similar buildings, there will typically be a need for both heating and cooling. This makes demands on being able to vary the jet pattern from horizontal (cooling needs) to vertical (heating needs). This is in order to avoid too great a velocity in the occupied zone in the cooling situation, and that the air penetrates the occupied zone in the heating situation, so the greatest amount of efficiency is obtained.

Function

The diffusers have an adjustable jet pattern, which makes the diffusers suitable for both heating and cooling. The jet pattern can be adjusted manually or with several types of electric motors.

RCW/RCWB is available with a thermal actuator, where the jet pattern is adjustable in relation to the supply air temperature. This way costly electrical work for the individual diffusers is saved.

RCW, rotation diffuser

Ceiling diffusers - visible

Industrial diffusers

Swirl diffuser RCW

Description

RCW is a rotating diffuser particularly suitable for premises with a high ceiling.

The diffuser is equipped with adjustable blades, so the supply air pattern can be changed from vertical to horizontal.

The blade settings can be adjusted manually, or the function can be automated using various types of motor. RCW with manual blade adjustment is supplied as standard with a blade setting of 30°.

The motorized models are supplied as standard with a blade setting from 30° to 75°. In the motorized versions, RCW can be supplied with an electric on/off motor, a modulating motor or a thermal actuator, where the supply air pattern is changed in step with the supply air temperature

- Suitable for both cooling and heating
- Horizontal and vertical dispersal pattern
- High induction
- Can be supplied with an electric motor
- Can be supplied with a thermal actuator

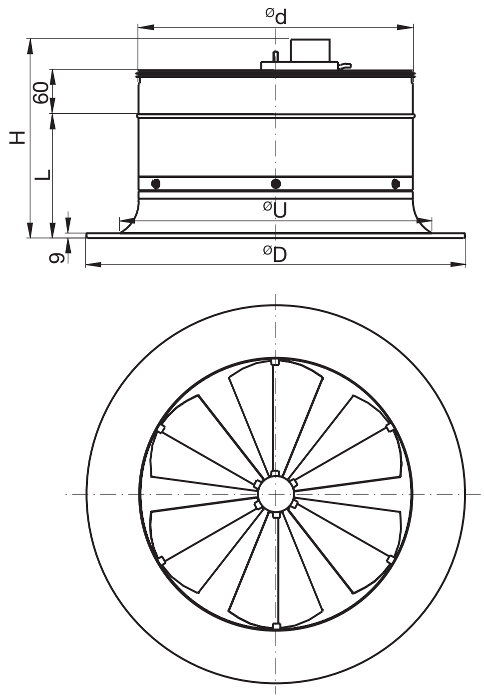
Maintenance

The visible parts of the diffuser can be wiped with a damp cloth. For other maintenance, see installation instructions.

Order code

Product	RCW	a	bbb	A
Type				
Manual	0			
Motorized - modulating	1			
Motorized- on/off	2			
Thermal actuator	3			
Size				
Version				

Dimensions



Ød Size	ØD mm	H mm	L mm	ØU mm	Weight * kg
250	360	240	143	285	2.40
315	460	267	168	365	3.10
400	560	292	178	450	4.40
500	670	341	226	570	6.80
630	870	391	273	740	9.90

* Motorized models weigh approx. 1 kg more than the weight stated in the table above.

Motor type

RCW-1 Ød	Motor
315-400	NM24A-MF-F
500-630	LH24A-MF60

RCW-2 Ød	Motor
250-400	NM24A-F
500-630	LH24A60

Materials and finish

Material: Aluminium & steel
Standard finish: Powder-coated
Standard colour: RAL 9010 Gloss 30

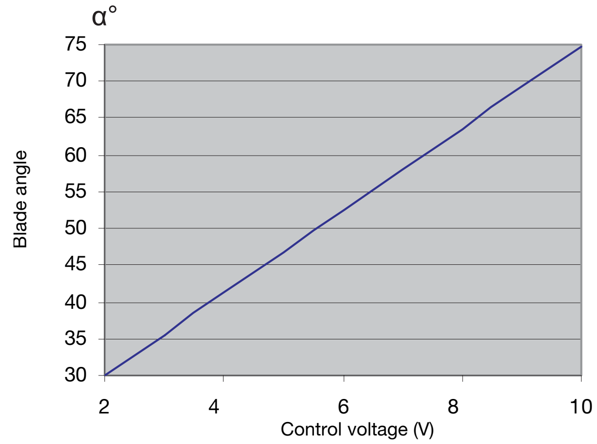
Available in other colours. Please contact Lindab's sales department for further information.
Other blade settings can be supplied on request.

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

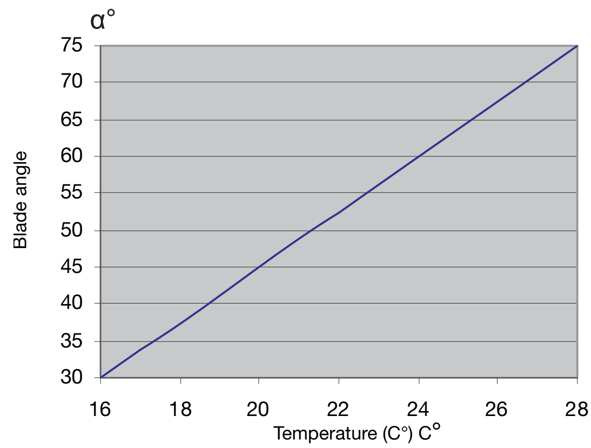
Swirl diffuser RCW

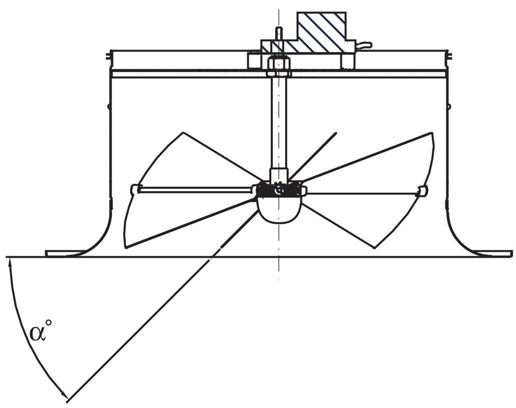
Technical data

RCW with electric modulating motor



RCW with thermal actuator





Capacity

Volume flow q_v [l/s] and [m^3/h], total pressure Δp_t [Pa], throw $l_{0.2}$ [m] and sound power level L_{WA} [dB(A)] can be seen in the diagrams.

Throw $l_{0.2}$ / turning point $l_{0.0}$

Throw $l_{0.2}$[m] can be seen in the diagrams for isothermal air at a speed of 0.2 m/s. Turning point $l_{0.0}$ [m] can be seen in the diagrams for heated air, +5 K, +10 K and +15 K respectively.

Frequency-related sound effect level

The sound effect level in the frequency band is defined as L_{WA}+K_{ok}. K_{ok} values are specified in charts beneath the diagrams on the following pages.

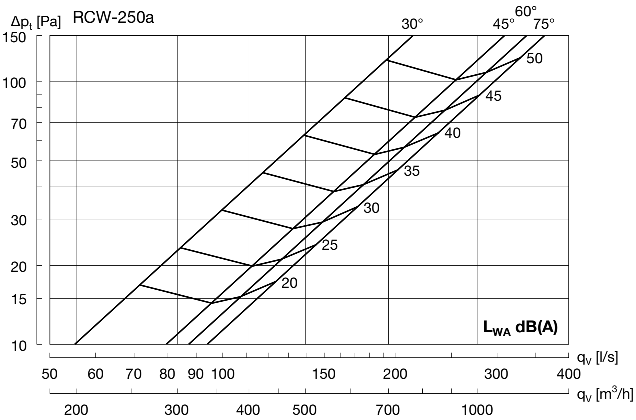
Quick selection

Size	Angle	q_v [l/s]	q_v [m³/h]	P_t [Pa]	$l_{0.2}$ isoterm [m]	$l_{0.0}$ +10K [m]
				L_{WA} = 40		
250	30°	138	498	63	10	
250	75°	138	498	22		5
315	30°	237	854	65	6	
315	75°	237	854	24		6
400	30°	361	1299	60	5	
400	75°	361	1299	22		6
500	30°	453	1630	52	5	
500	75°	453	1630	13		5
630	30°	818	2943	57	6	
630	75°	818	2943	17		7
				L_{WA} = 50		
250	30°	192	692	121	13	
250	75°	192	692	42		7
315	30°	329	1183	124	8	
315	75°	329	1183	46		8
400	30°	513	1846	122	7	
400	75°	513	1846	44		8
500	30°	636	2290	103	6	
500	75°	636	2290	25		6
630	30°	1136	4088	110	8	
630	75°	1136	4088	32		9
				L_{WA} = 60		
250	30°	267	962	234	18	
250	75°	267	962	81		10
315	30°	455	1638	238	10	
315	75°	455	1638	88		11
400	30°	729	2623	247	11	
400	75°	729	2623	89		12
500	30°	893	3216	203	8	
500	75°	893	3216	49		9
630	30°	1577	5679	213	11	
630	75°	1577	5679	62		12

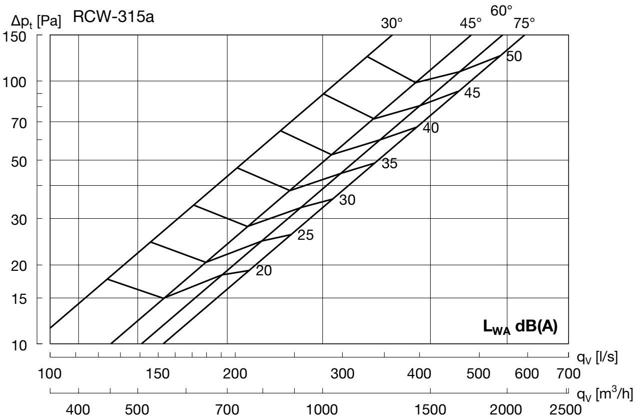
Lindab

Swirl diffuser RCW

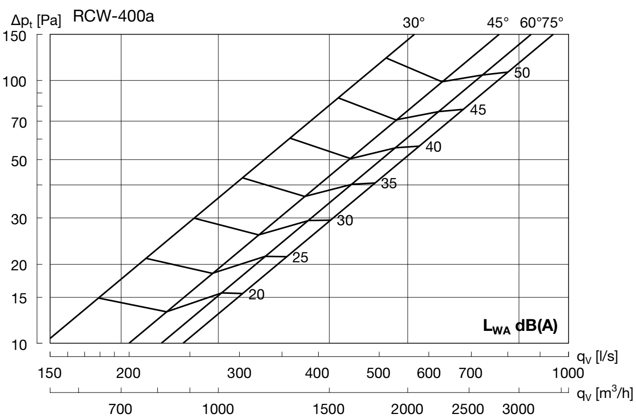
Technical data



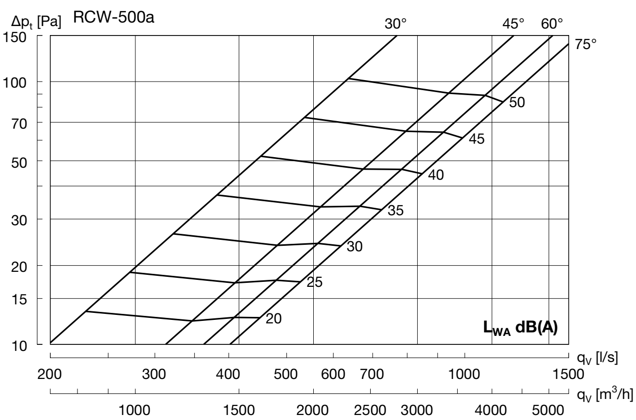
Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	7	1	-2	-2	-4	-9	-18	-21



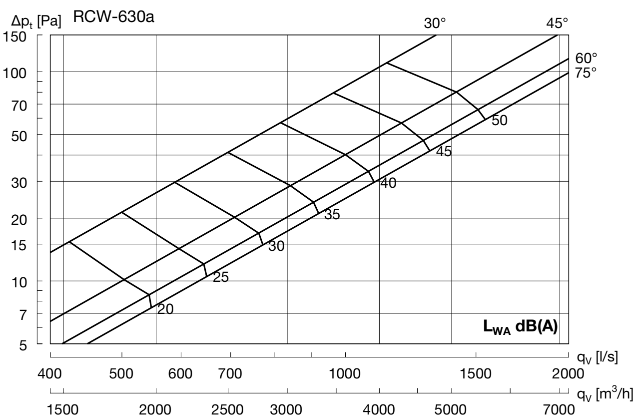
Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	10	2	-1	-3	-4	-10	-17	-21



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	12	1	-2	-2	-3	-13	-20	-23



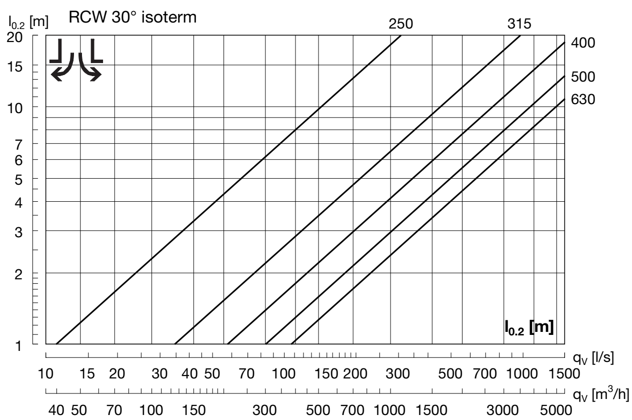
Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	12	1	-2	-1	-4	-12	-20	-22



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	15	5	0	-2	-5	-12	-18	-22

Throw $l_{0.2}$ horizontal

Horizontal throw $l_{0.2}$ is specified for free suspension. If the diffuser is installed < 300 mm from the ceiling, the value must be multiplied by 1.4.



Swirl diffuser RCW

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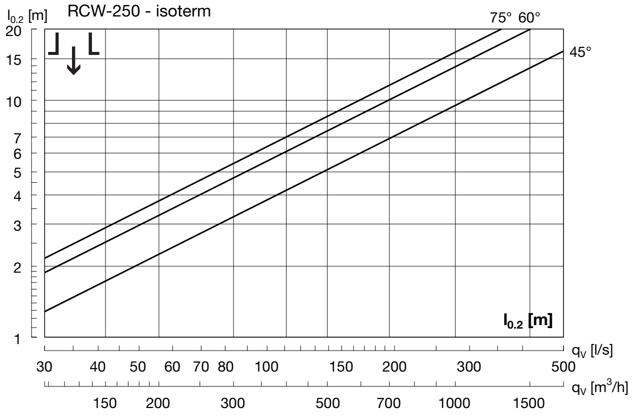
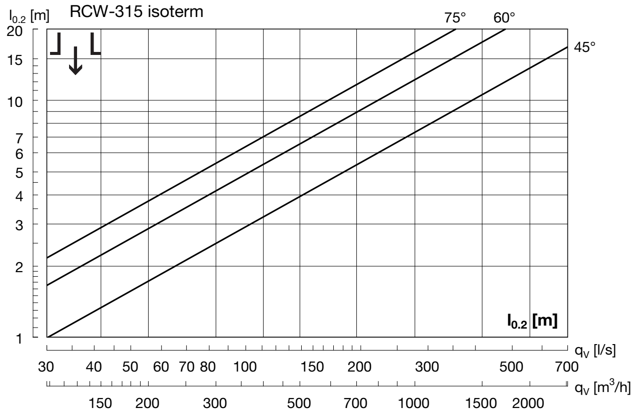
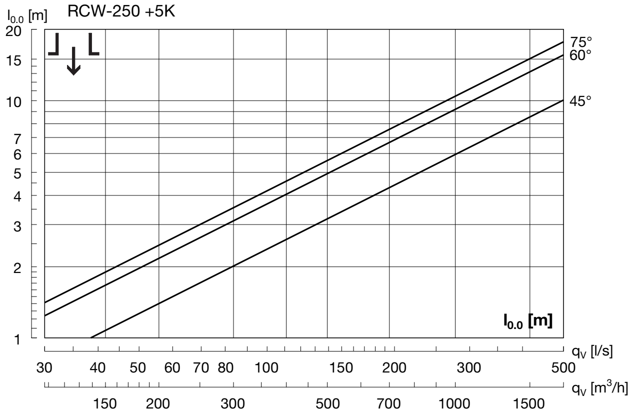
RCW-250 - isoterm



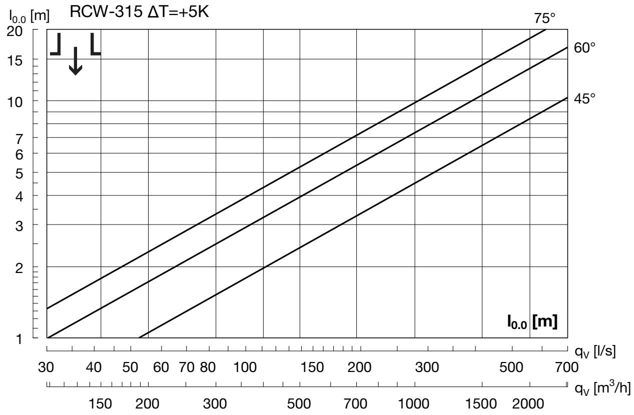
RCW-315 isoterm



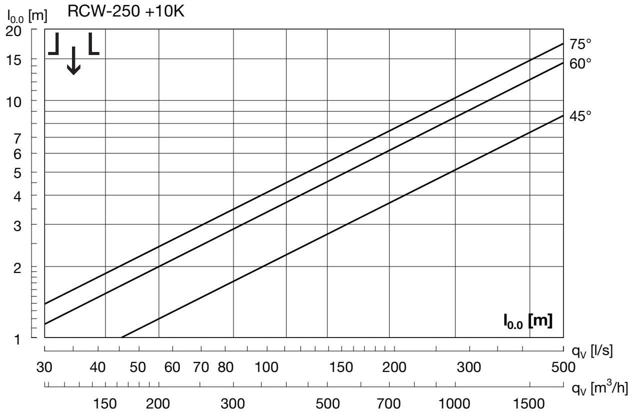
RCW-250 +5K



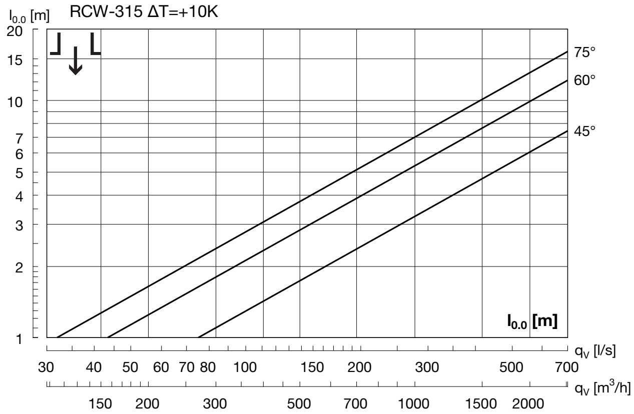
RCW-315 ΔT=+5K



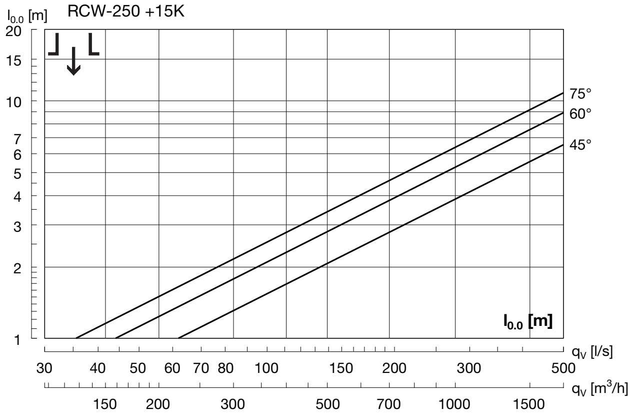
RCW-250 +10K



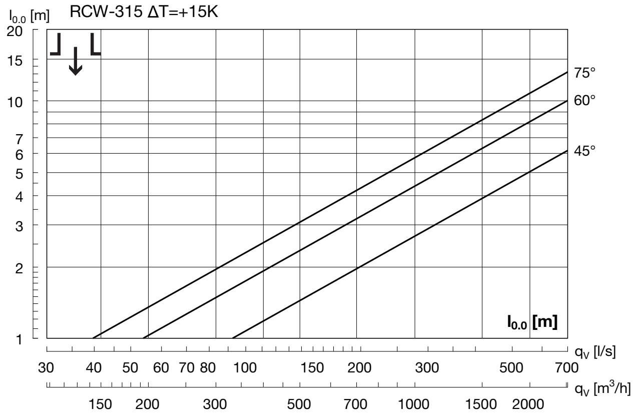
RCW-315 ΔT=+10K



RCW-250 +15K

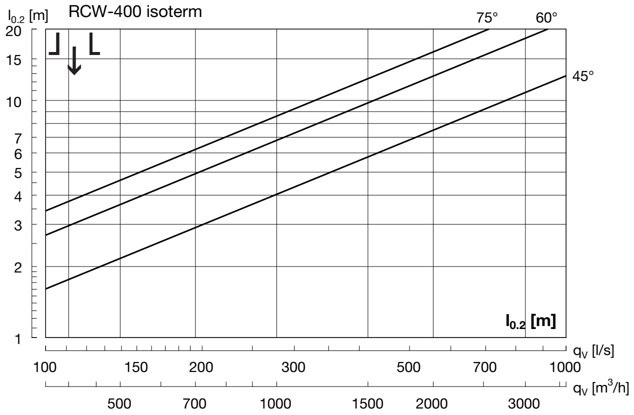


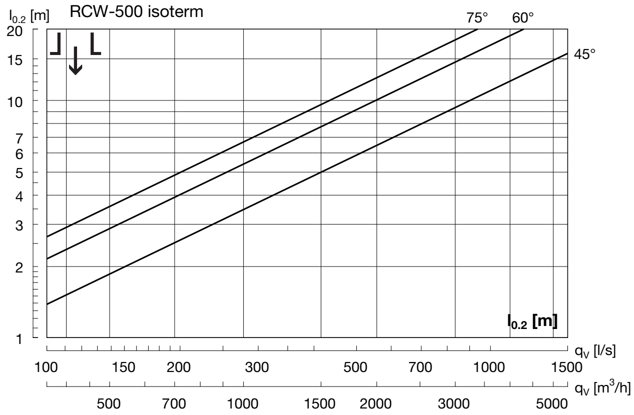
RCW-315 ΔT=+15K

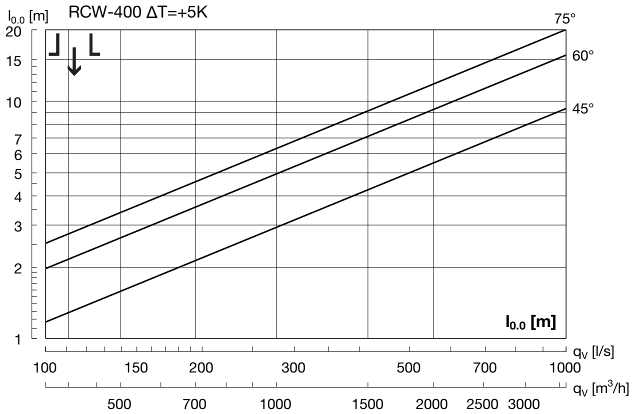


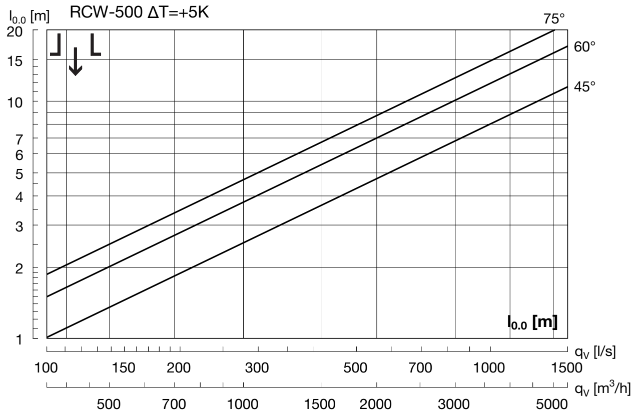
Swirl diffuser

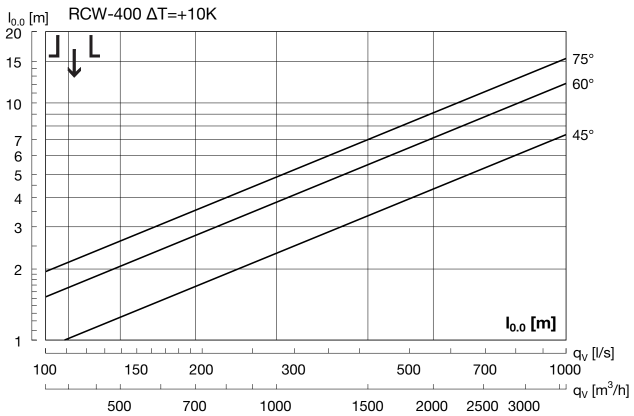
RCW

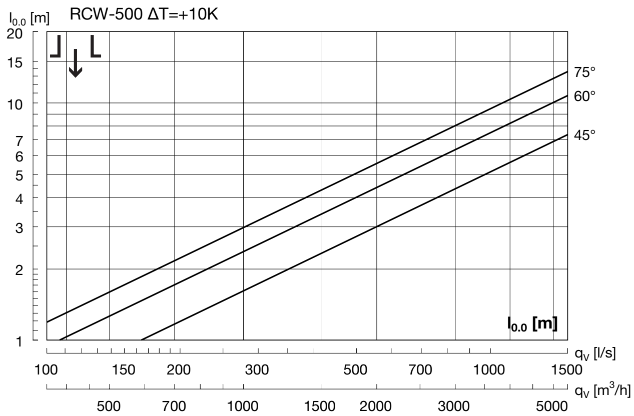


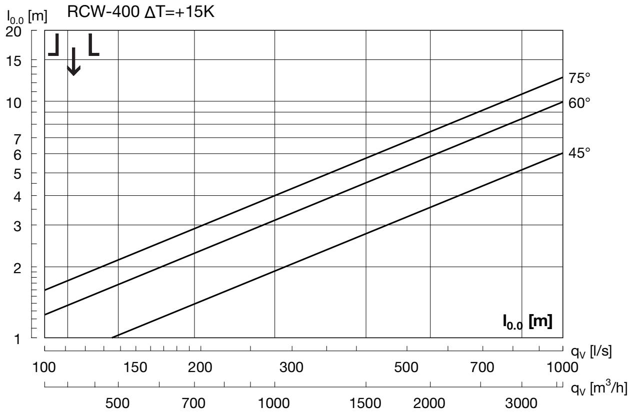


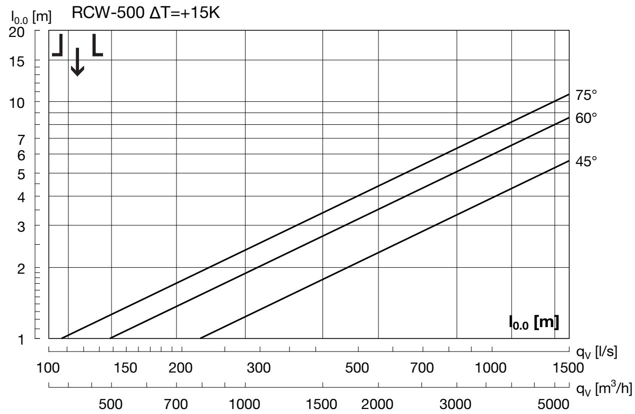




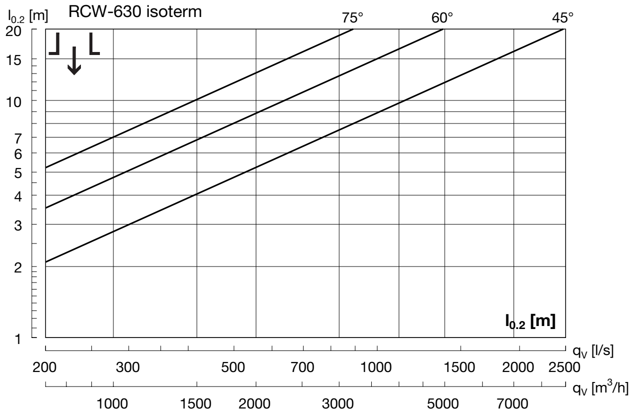


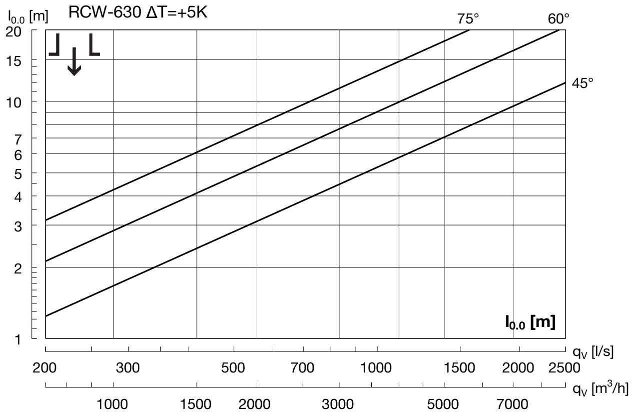


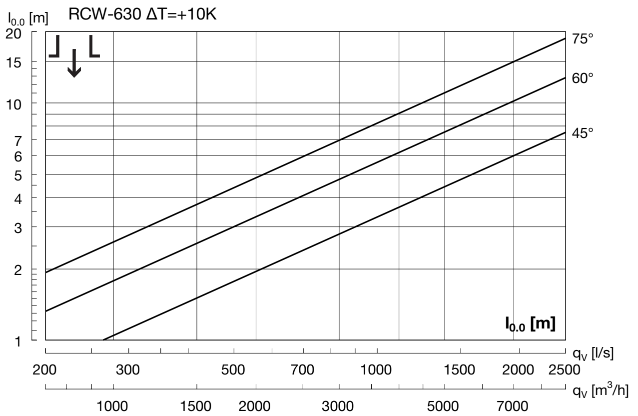


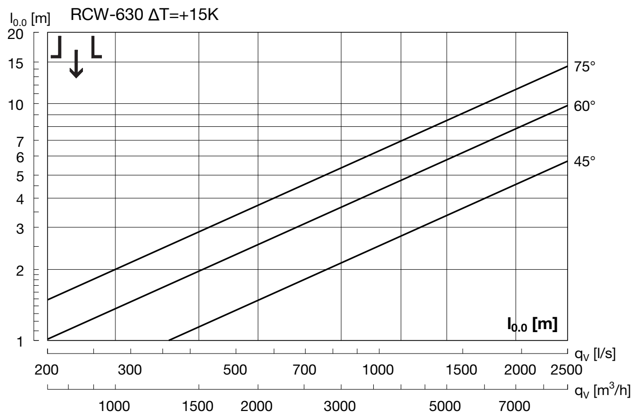


Swirl diffuser RCW









Swirl diffuser RCWB

Description

RCWB is a rotating diffuser (RCW) with integral box, particularly suitable for premises with a high ceiling.

The diffuser is equipped with adjustable blades, so the supply air pattern can be changed from vertical to horizontal. The blade settings can be adjusted manually, or the function can be automated using various types of motor.

RCWB with manual blade adjustment is supplied as standard with a blade setting of 30°.

The motorized models are supplied as standard with a blade setting from 30° to 75°. In the motorized versions, RCWB can be supplied with an electric on/off motor, a modulating motor or a thermal actuator, where the supply air pattern is changed in step with the supply air temperature.

- Suitable for both cooling and heating
- Horizontal and vertical dispersal patterns
- High induction
- Can be supplied with an electric motor
- Can be supplied with a thermal actuator

Order code

Product **RCWB** **a** **bbb** **c** **A**

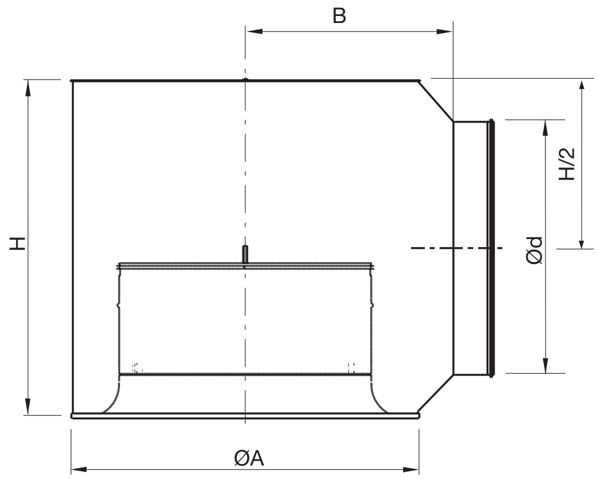
Type

Manual	0
Motorized - modulating	1
Motorized- on/off	2
Thermal actuator	3
Galvanised box	0
Box RAL 9010	1

Size

Version

Dimensions



Ød Size	ØA mm	H mm	B mm	Weight * kg
250	360	415	250	5.70
315	460	480	300	8.20
400	560	570	350	11.8
500	670	670	412	17.2
630	870	800	500	25.7

* Motorized models weigh approx. 1 kg more than the weight stated in the table above.

Motor type

RCWB-1 Ød	Motor
315-400	NM24A-MF-F
500-630	LH24A-MF60

RCWB-2 Ød	Motor
250-400	NM24A-F
500-630	LH24A60

Maintenance

The visible parts of the diffuser can be wiped with a damp cloth. For other maintenance, see installation instructions.

Materials and finish

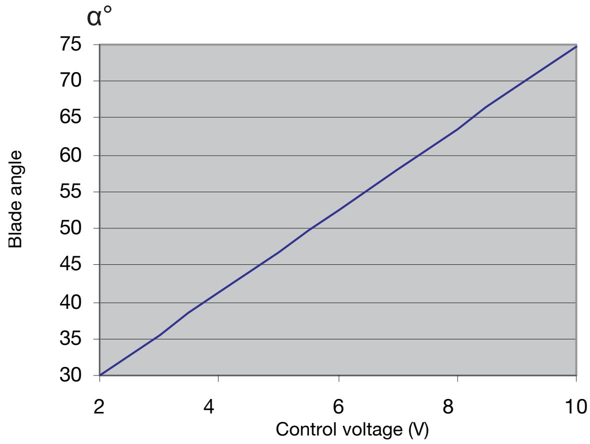
Material:	Aluminium & steel
Standard finish:	Powder-coated
Standard colour:	RAL 9010 Gloss 30
Box:	Hot-galvanised steel

Available in other colours. Please contact Lindab's sales department for further information.

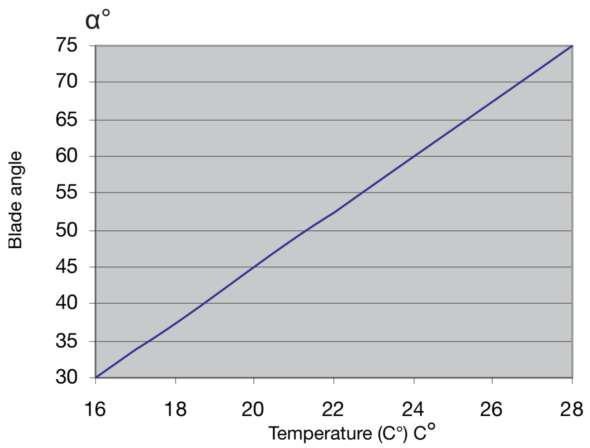
Swirl diffuser RCWB

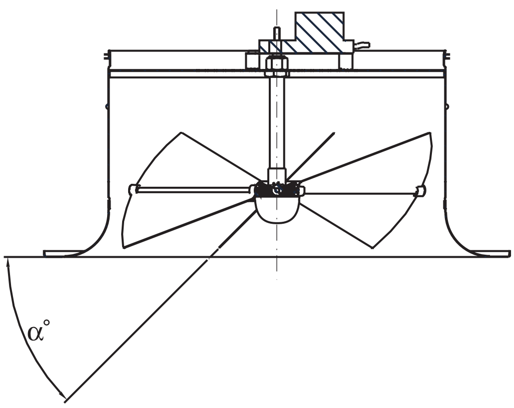
Technical data

RCWB with electric modulating motor



RCWB with thermal actuator





Capacity

Volume flow q_v [l/s] and [m³/h], total pressure Δp_t [Pa], throw $l_{0.2}$ [m] and sound power level L_{WA} [dB(A)] can be seen in the diagrams.

Throw $l_{0.2}$ / turning point $l_{0.0}$

Throw $l_{0.2}$[m] can be seen in the diagrams for isothermal air at a speed of 0.2 m/s. Turning point $l_{0.0}$ [m] can be seen in the diagrams for heated air, +5 K, +10 K and +15 K respectively.

Frequency-related sound effect level

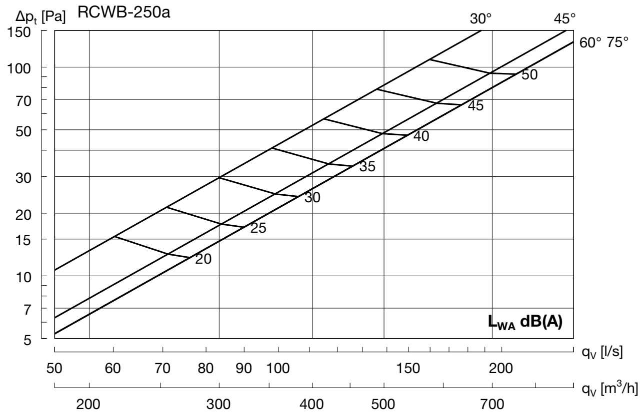
The sound effect level in the frequency band is defined as L_{WA}+K_{ok}. K_{ok} values are specified in charts beneath the diagrams on the following pages.

Quick selection

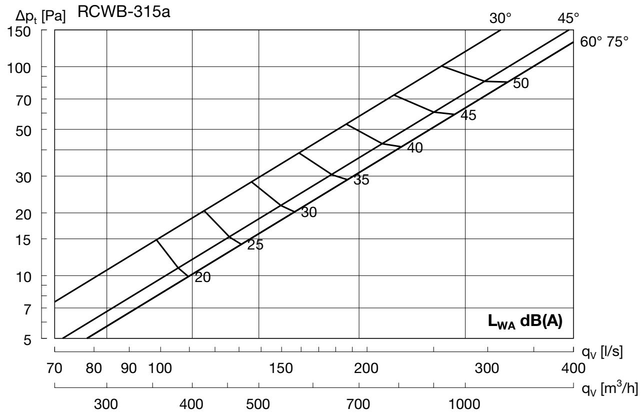
Size	Angle	q_v [l/s]	q_v [m³/h]	P_t [Pa]	$l_{0.2}$ isoterm [m]	$l_{0.0}$ +10K [m]
		L_{WA} = 40				
250	30°	115	415	57	8	
250	75°	115	415	28		5
315	30°	187	672	53	5	
315	75°	187	672	29		5
400	30°	290	1043	49	4	
400	75°	290	1043	27		5
500	30°	403	1451	47	4	
500	75°	403	1451	22		4
630	30°	605	2178	39	5	
630	75°	605	2178	19		5
		L_{WA} = 50				
250	30°	160	575	108	11	
250	75°	160	575	54		6
315	30°	257	924	101	6	
315	75°	257	924	54		7
400	30°	397	1428	91	6	
400	75°	397	1428	50		7
500	30°	565	2034	91	6	
500	75°	565	2034	43		6
630	30°	861	3098	80	7	
630	75°	861	3098	39		7
		L_{WA} = 60				
250	30°	221	796	208	15	
250	75°	221	796	103		8
315	30°	353	1271	190	8	
315	75°	353	1271	103		9
400	30°	543	1954	170	8	
400	75°	543	1954	93		9
500	30°	792	2851	180	8	
500	75°	792	2851	85		8
630	30°	1224	4407	161	9	
630	75°	1224	4407	78		10

Swirl diffuser RCWB

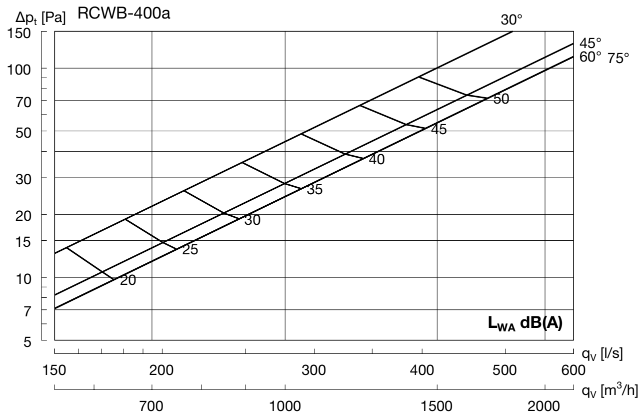
Technical data



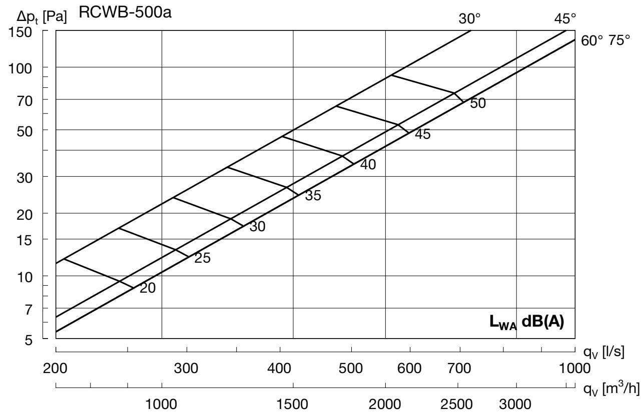
Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	5	0	-5	-4	-3	-9	-17	-26



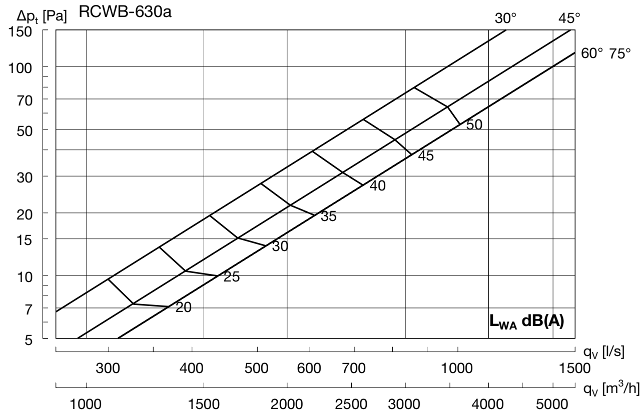
Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	7	-1	-4	-3	-3	-10	-19	-27



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	8	0	-5	-2	-3	-11	-20	-28



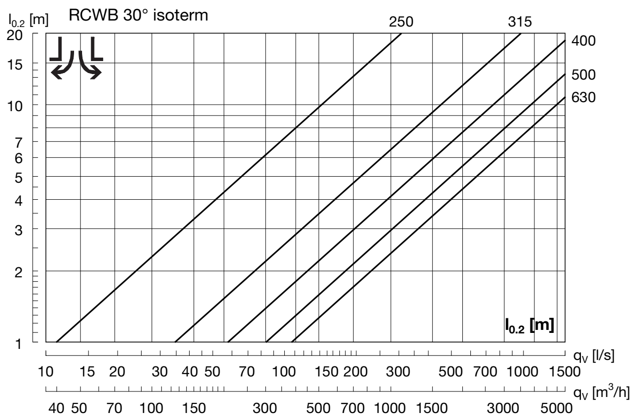
Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	8	2	-3	-2	-4	-11	-21	-30



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	7	-1	-3	-1	-4	-13	-24	-33

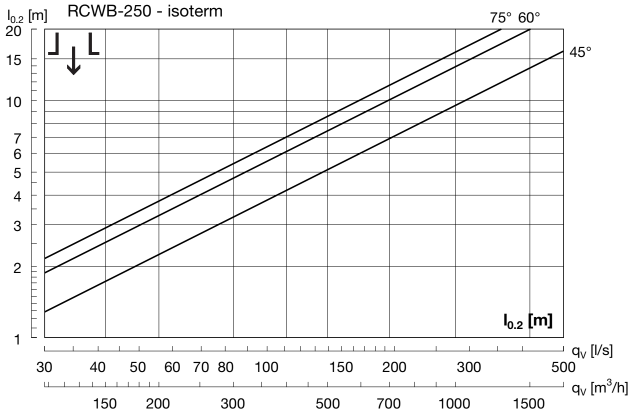
Throw $l_{0.2}$ horizontal

Horizontal throw $l_{0.2}$ is specified for free suspension. If the diffuser is installed < 300 mm from the ceiling, the value must be multiplied by 1.4.

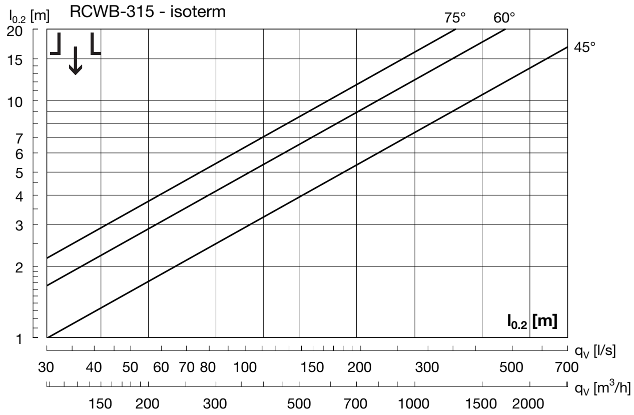


Swirl diffuser RCWB

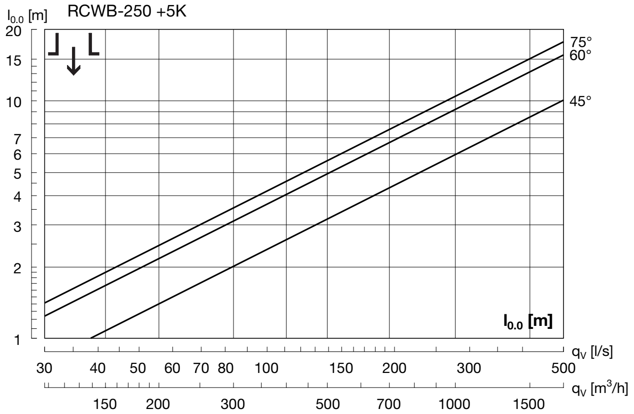
RCWB-250 - isoterm



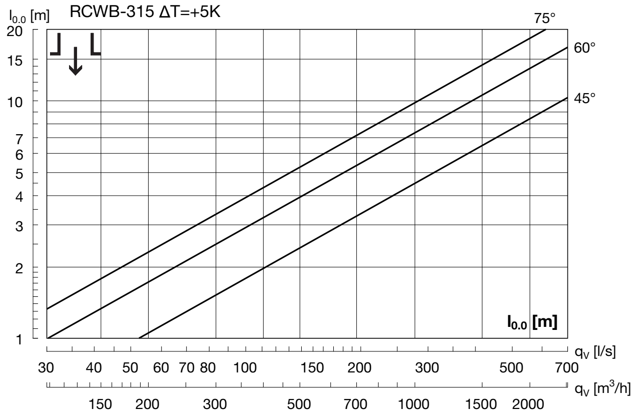
RCWB-315 - isoterm



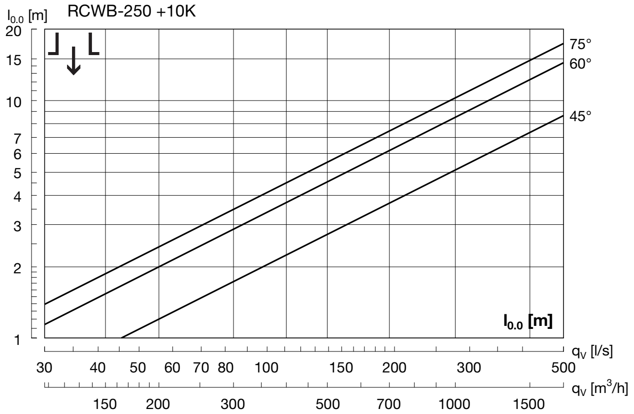
RCWB-250 +5K



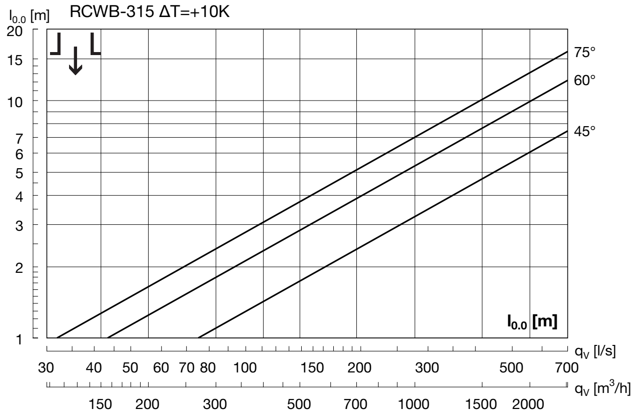
RCWB-315 ΔT=+5K



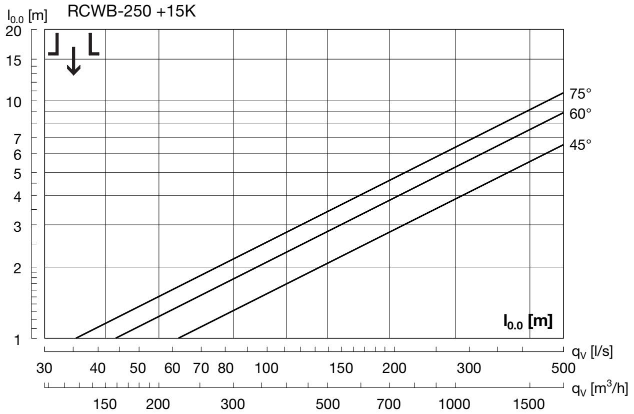
RCWB-250 +10K



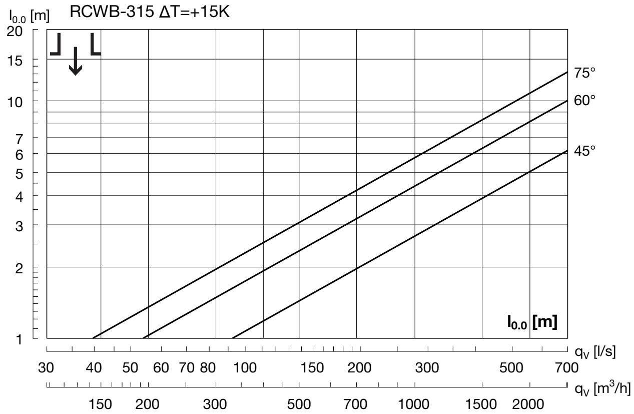
RCWB-315 ΔT=+10K



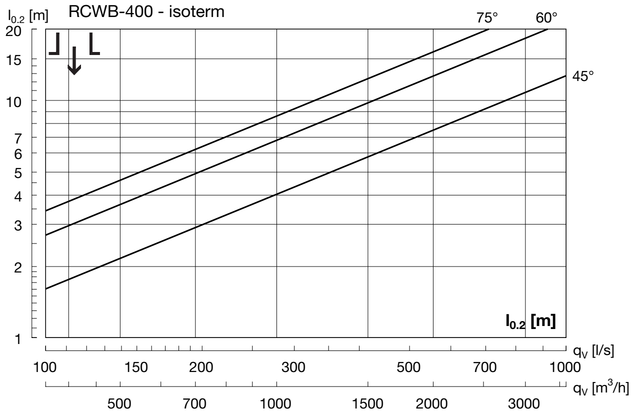
RCWB-250 +15K

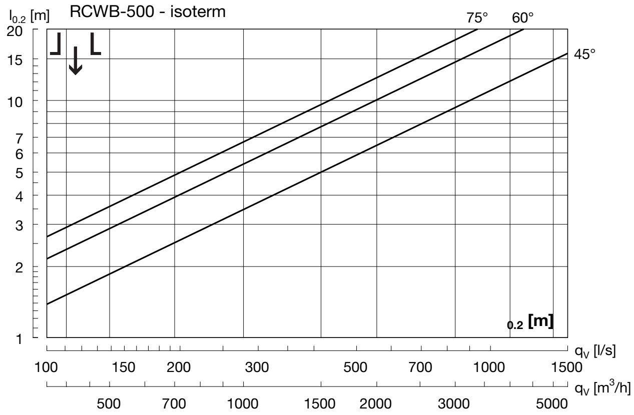


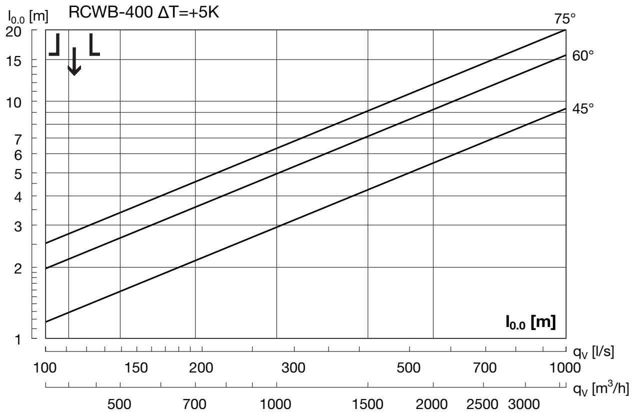
RCWB-315 ΔT=+15K

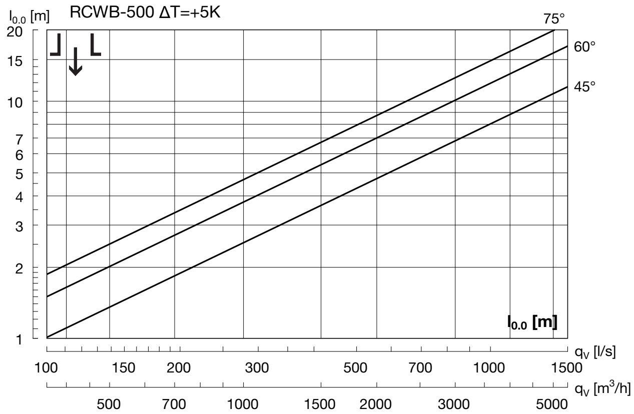


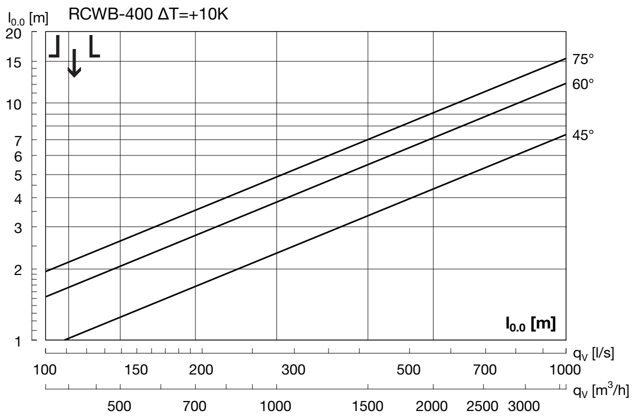
Swirl diffuser RCWB

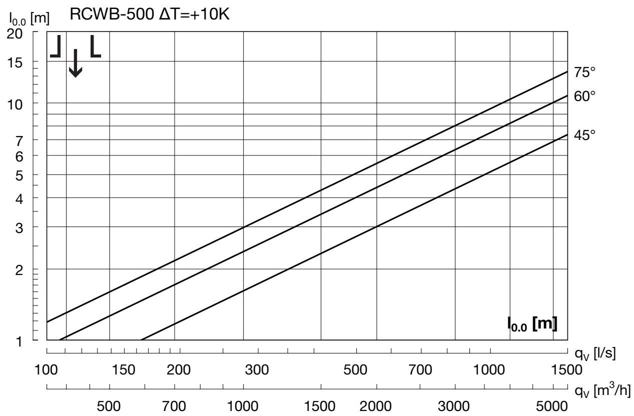


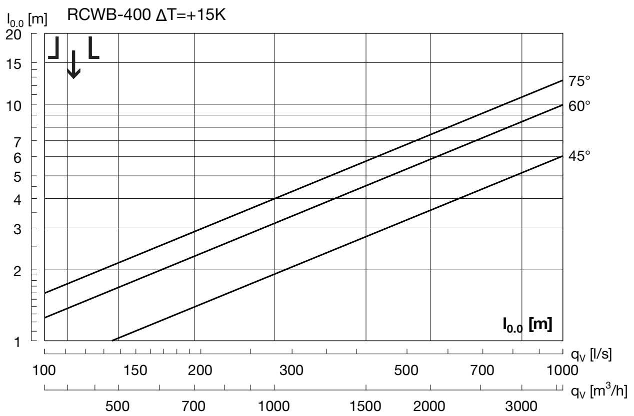


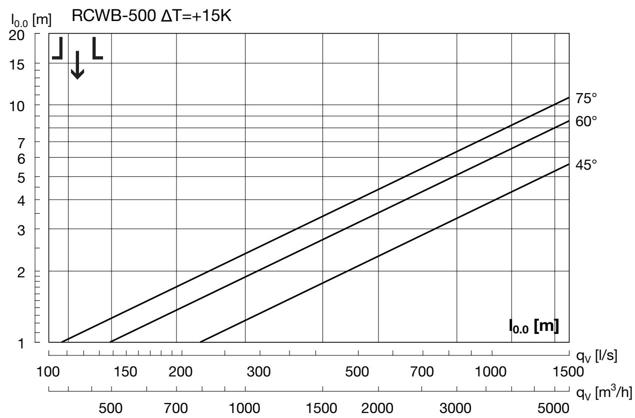






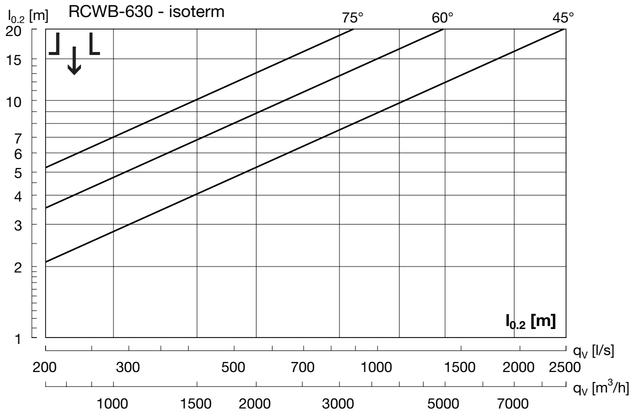


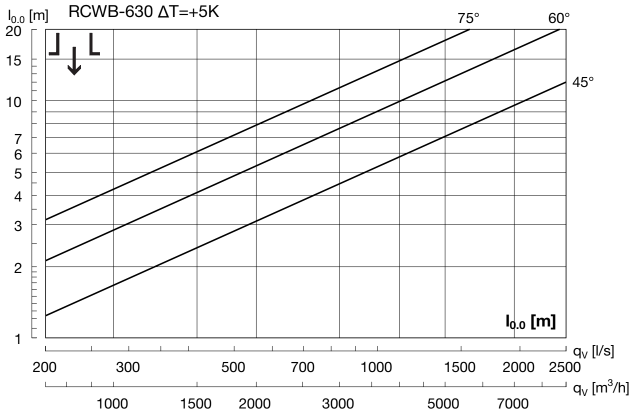


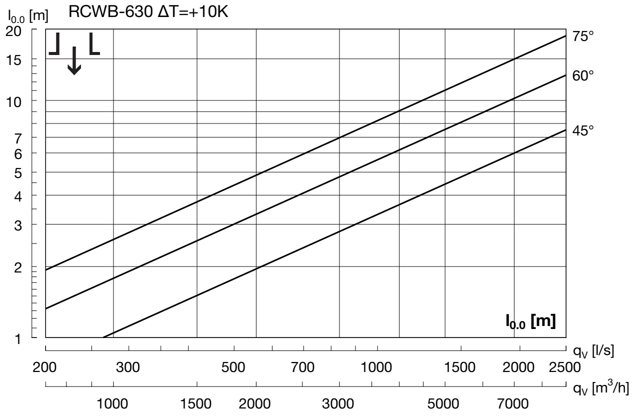


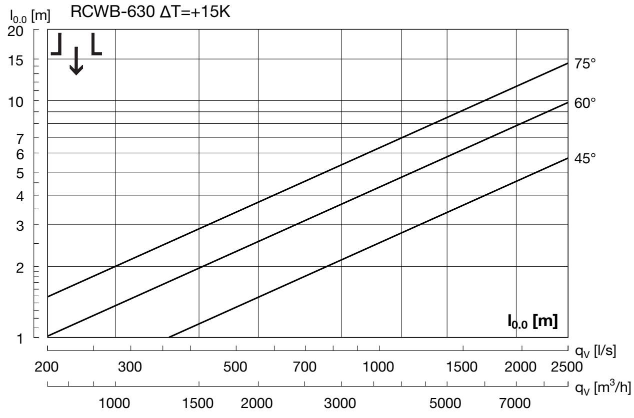
Swirl diffuser

RCWB

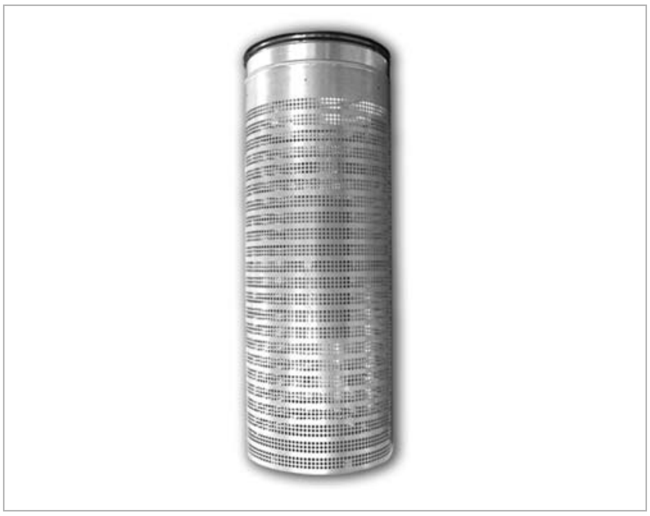








Perforated diffuser HLD



Description

HLD is a circular displacement diffuser adapted for industrial requirements. HLD is equipped with a damper function, which makes it possible to vary the supply air pattern between horizontal or vertical, depending on whether heating or cooling is required.
The switch can be made manually, or it can be automated using several types of motor. The external dimensions of the diffuser are adapted to the connection, making it easy to integrate into an ordinary duct system.
HLD can be suspended from or installed on a wall or column using the installation bracket, which ensures great flexibility no matter how premises are used.

- Suitable for both cooling and heating
- Horizontal and vertical dispersal patterns
- High capacity
- Flexible positioning
- Can be supplied with an electric motor
- Can be supplied with a thermal actuator

Maintenance

The visible parts of the diffuser can be wiped with a damp cloth. For other maintenance, see installation instructions.

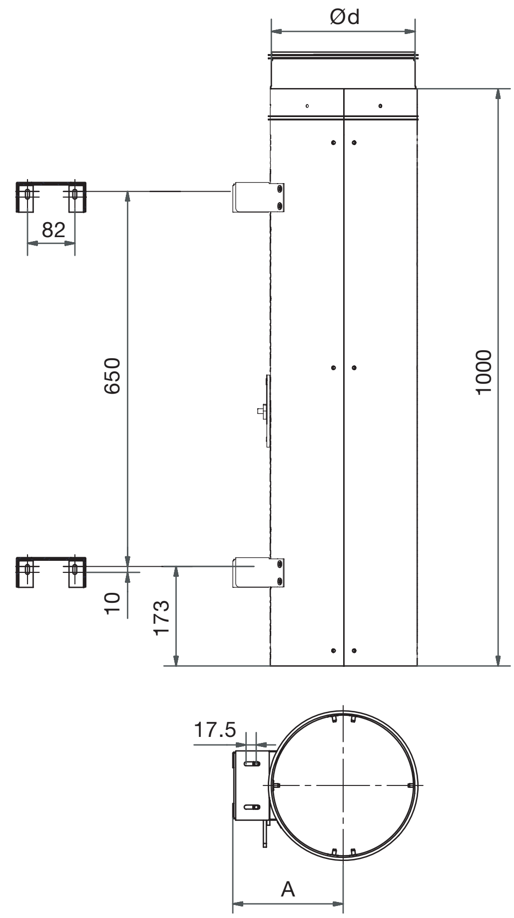
Order code

Product	**HLD**	**a**	**bbb**
Type	HLD		
Manual	0		
Motorized - modulating	1		
Motorized- on/off	2		
Automatic thermal actuator	3		
Size			bbb

Accessories

Product	**HLD**	**a**
Installation brackets (1set)	HLD	
Size		a

Dimensions



Ød Size	A mm	Weight * kg
250	192	11.5
315	225	13.7
400	270	17,0
500	322	21,0
630	390	27,0

*Motorized models weigh approx. 1 kg more than the weight stated in the table above.

Motor type

Type	Motor
HLD - 1	NM24A-MF-F
HLD - 2	NM24A-F

Materials and finish

Material: Galvanised steel
Standard finish: Galvanised

Can be supplied in both standard finish and industrial finish. HLD is also available in stainless steel. Please contact Lindab's sales department for further information.

Perforated diffuser HLD

Technical data

Capacity

Volume flow q_v [l/s] and [m³/h], total pressure Δp_t [Pa], throw $l_{0.2}$ [m] and sound power level L_{WA} [dB(A)] can be seen in the diagrams.

Throw $l_{0.2}$ / turning point $l_{0.0}$

Throw $l_{0.2}$[m] can be seen in the diagrams for isothermal air at a speed of 0.2 m/s. Turning point $l_{0.0}$ [m] can be seen in the diagrams for heated air, +5 K +10 K respectively.

Frequency-related sound effect level

The sound effect level in the frequency band is defined as $L_{WA}+K_{ok}$. K_{ok} values are specified in charts beneath the diagrams on the following pages.

Quick selection

Size		q_v [l/s]	q_v [m³/h]	P_t [Pa]	$l_{0.2}$ isoterm [m]	$l_{0.0}$ +5K [m]
		L_{WA} = 50				
250	Horizontal	259	934	44	2	
250	Vertical	259	934	44		3
315	Horizontal	394	1420	37	2	
315	Vertical	394	1420	37		3
400	Horizontal	586	2111	32	2	
400	Vertical	586	2111	32		2
500	Horizontal	938	3377	32	3	
500	Vertical	938	3377	32		2
630	Horizontal	1500	5401	32	4	
630	Vertical	1500	5401	32		2
		L_{WA} = 55				
250	Horizontal	305	1099	62	2	
250	Vertical	305	1099	62		3
315	Horizontal	457	1647	50	2	
315	Vertical	457	1647	50		3
400	Horizontal	680	2447	44	3	
400	Vertical	680	2447	44		3
500	Horizontal	1087	3915	42	3	
500	Vertical	1087	3915	42		3
630	Horizontal	1739	6262	42	4	
630	Vertical	1739	6262	42		2
		L_{WA} = 60				
250	Horizontal	359	1294	85	2	
250	Vertical	359	1294	85		4
315	Horizontal	531	1910	68	3	
315	Vertical	531	1910	68		3
400	Horizontal	788	2838	58	3	
400	Vertical	788	2838	58		3
500	Horizontal	1261	4539	57	4	
500	Vertical	1261	4539	57		3
630	Horizontal	2017	7260	57	5	
630	Vertical	2017	7260	57		3

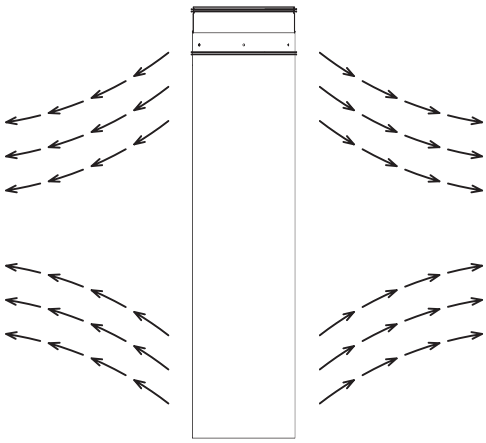
Supply air

With its special design, HLD is suitable for the supply of large volumes of air with short throws in a limited area. This concentrates the supplied air in a small area within a larger space, after which the air distributes itself around the premises. Normally, a horizontal dispersal pattern is recommended in cooling situations and a vertical dispersal pattern in heating situations.

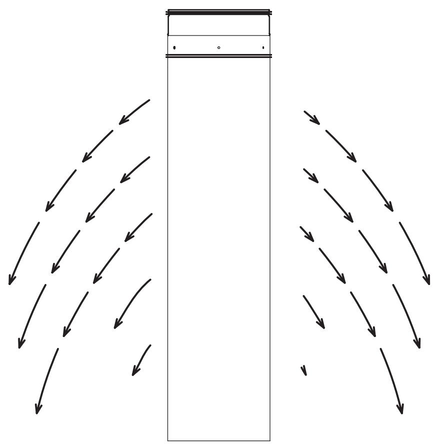
Planning

HLD with cooled air works in much the same way as displacement ventilation. Displacement ventilation has a higher temperature efficiency than mixing ventilation, and thus more power is discharged with the same volume of air and the same cooling temperature. For the calculation of discharged power in a cooling situation, use the calculation method for displacement ventilation. For HLD with heated air, power is calculated as for mixing ventilation.

Horizontal supply air - cooling



Vertical supply air - heating

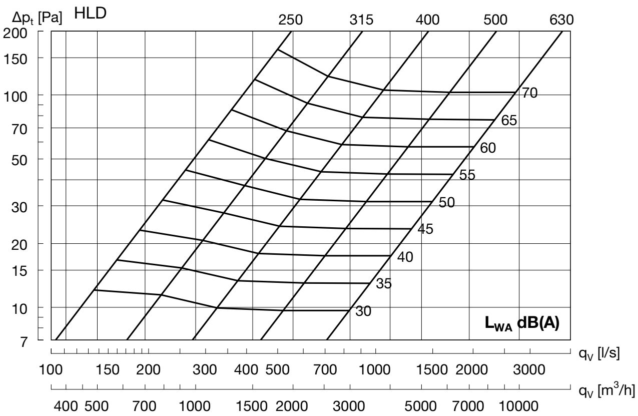


Perforated diffuser HLD

Technical data

Sound power level

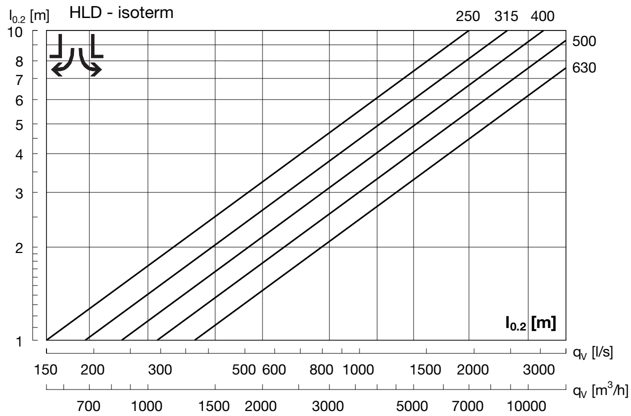
The diagram for sound effect level and pressure applies to both horizontal and vertical dispersal.

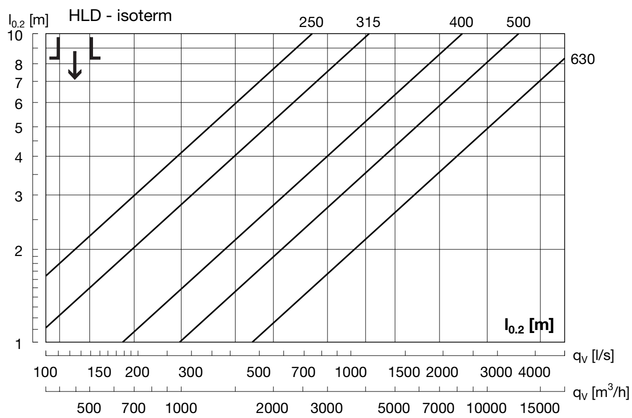


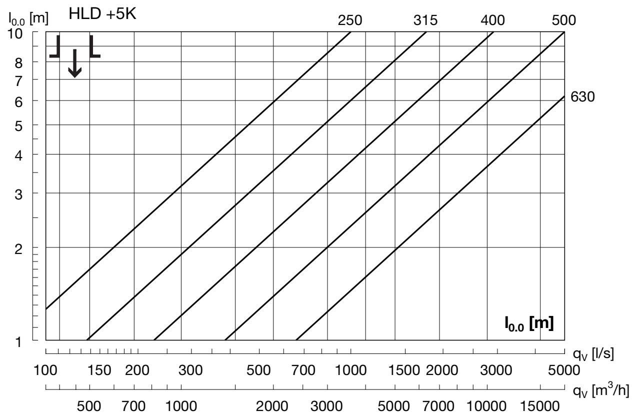
Size	Hz	63	125	250	500	1K	2K	4K	8K
250	K_{ok}	4	-3	-3	1	-6	-16	-29	-37
315	K_{ok}	12	1	0	1	-7	-16	-27	-36
400	K_{ok}	5	-3	2	1	-8	-17	-29	-41
500	K_{ok}	5	-3	2	1	-8	-17	-29	-41
630	K_{ok}	5	-3	2	1	-8	-17	-29	-41

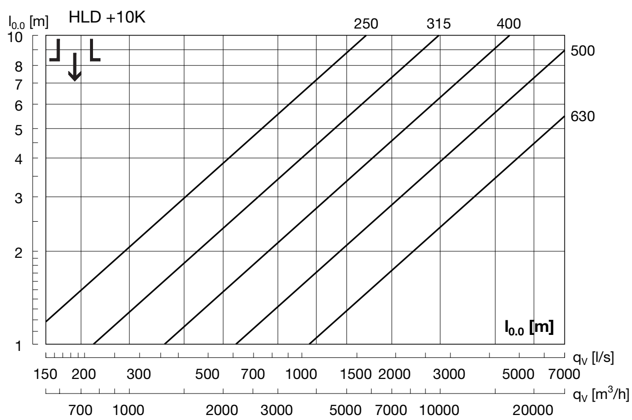
Throw $l_{0.2}$ / Turning point $l_{0.0}$

These diagrams apply for installation heights > 1 m









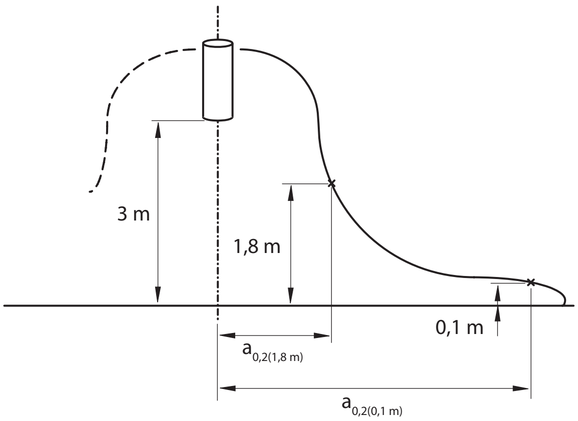
Perforated diffuser HLD

Technical data

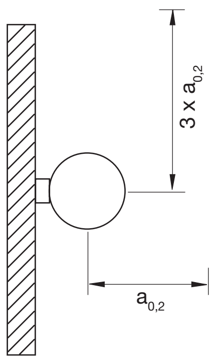
All diagrams apply for suspended installation.

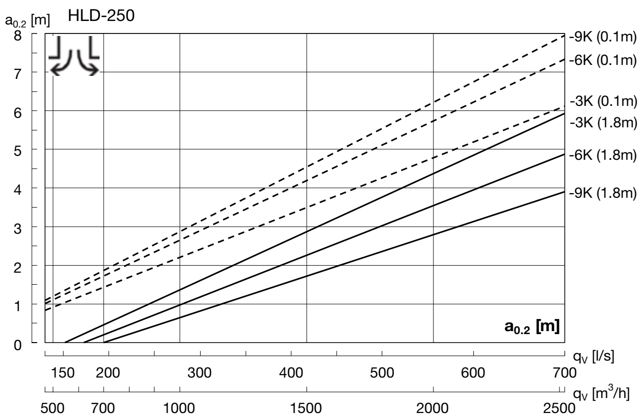
Near zones

For cooling and horizontal supply air, HLD will function as a displacement diffuser positioned high up.
The near zone is shown for two different heights, one "inner" near zone $a_{0.2\ (1.8\ m)}$ defined as the distance from the diffuser where the speed at a height of 1.8 m is 0.2 m/s, and an "outer" near zone $a_{0.2\ (0.1\ m)}$, which is the distance from the diffuser where the speed at a height of 0.1 m is 0.2 m/s.

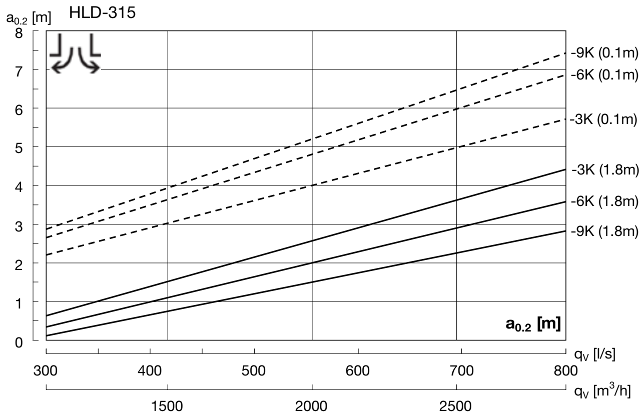


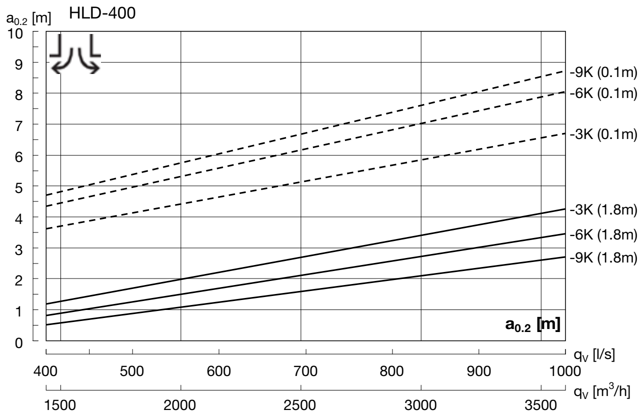
For wall installation the following corrections apply:
$a_{0.2}$ at right angles to wall = diagram value.
$a_{0.2}$ along wall = diagram value × 3.

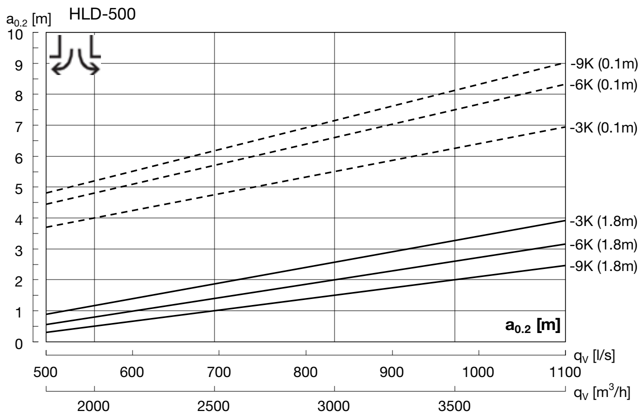


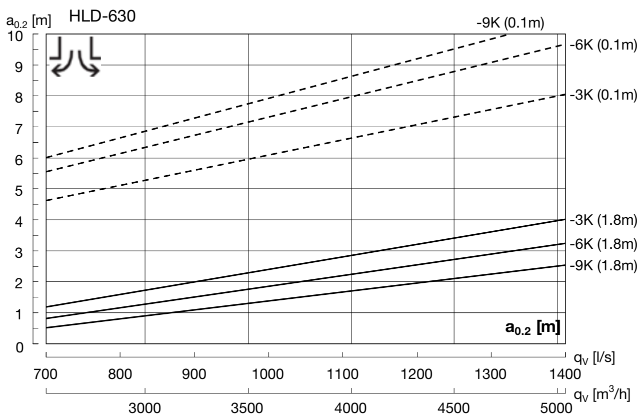


Nearzone, Horizontal







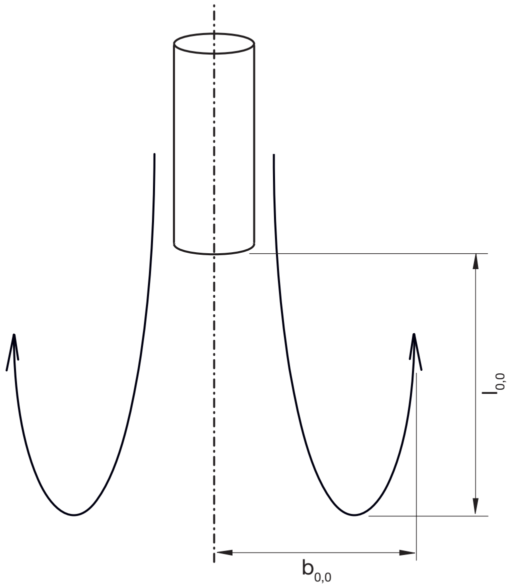


Perforated diffuser HLD

Technical data

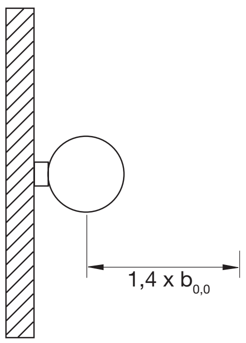
Spread

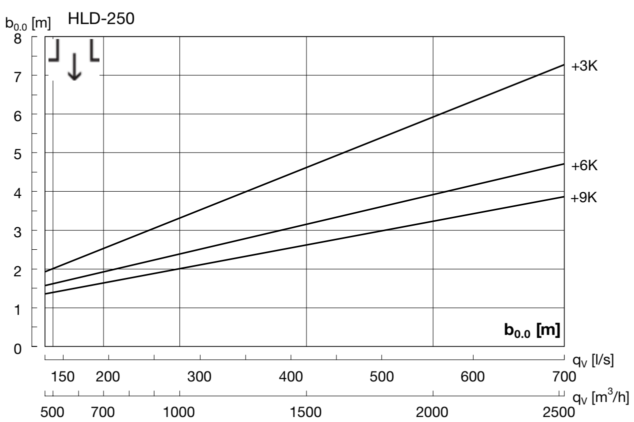
For vertical supply air with warm air, the air from the diffuser will turn at a vertical distance of $l_{0.0}$ from the diffuser. The width of the air jet, $b_{0.0}$, which can also be designated horizontal spread, can be seen in the diagrams for spread.



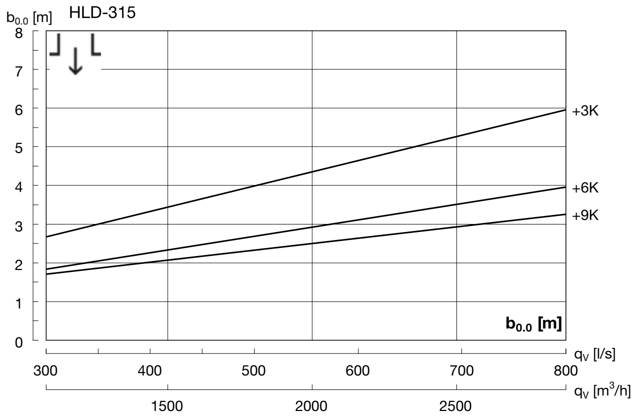
$l_{0.0}$ values in 2 diagrams bottom right hand corner page 323.

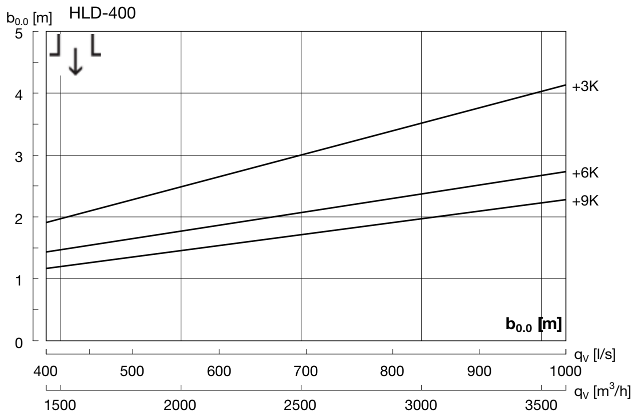
For wall installation the following correction applies:
$b_{0.0}$ wall = diagram value × 1.4.

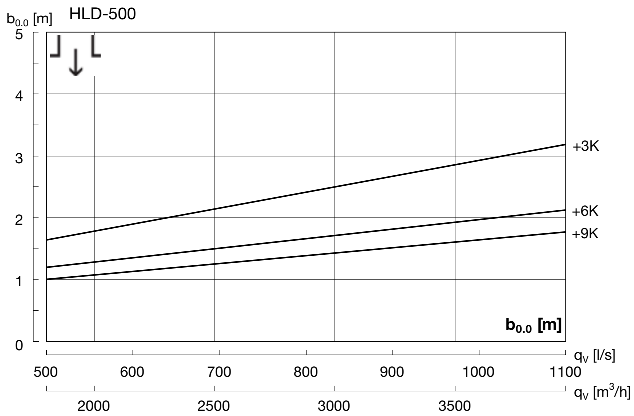


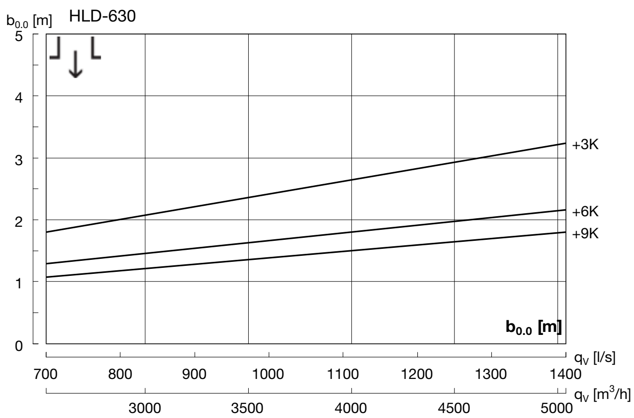


Spread, Vertical









Multi-cone diffuser FKD

Description

FKD is an adjustable circular multi-cone diffuser, which is typically used for supply air.

The diffuser can be switched between horizontal and vertical supply air and is therefore ideal for the supply of both heated and cooled air.

Installing an FKD diffuser up to size 400 in a plenum box type MBB can help to achieve a stable airflow to the diffuser as well as realise the potential for individual adjustment.

- Suitable for both supply and exhaust air
- Vertical or horizontal supply air pattern

Maintenance

The multi-cone insert can be removed to enable cleaning of internal parts or to gain access to the duct or box. The visible parts of the diffuser can be wiped with a damp cloth.

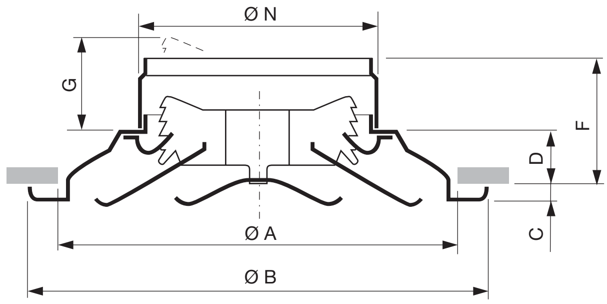
Order code

Product	FKD - aaa
Type FKD	
Connection dim. Ø160-630	

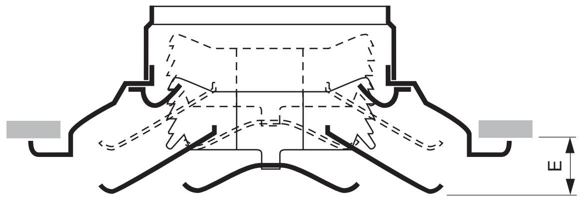
Example: FKD-200

Dimensions

Vertical



Horizontal



FKD Size	ØA mm	ØB mm	C mm	D mm	E mm	F mm	G mm	ØN mm	Weight kg
160	279	323	12	35	22	85	46	160	1.75
200	375	428	10	51	26	101	55	200	2.70
250	467	538	14	67	33	117	68	250	4.70
315	557	635	10	85	42	135	80	315	6.20
355	648	743	18	96	46	146	86	355	8,00
400	740	856	14	116	49	166	92	400	11.8
450	832	970	14	135	66	185	110	450	14,0
500	924	1081	17	149	66	199	116	500	18,0
630	1103	1286	18	182	66	232	116	630	21,0

Number of cones: size 160–400: 2
size 450-630: 3
Ø A: ceiling grid opening

Materials and finish

Material: Steel
Standard finish: Powder-coated
Standard colour: RAL 9010 white

The diffuser is available in other colours. Please contact Lindab's sales department for further information.

Multi-cone diffuser FKD

1
2
3
4
5
6
7
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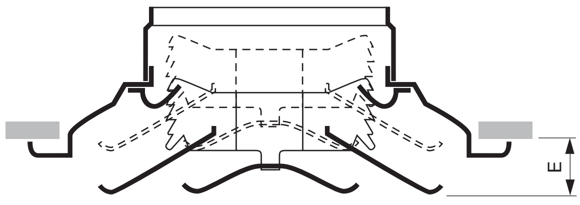
18

Dispersal patterns

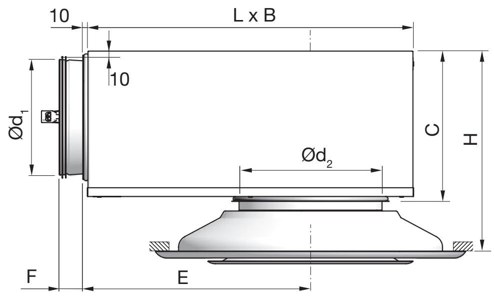
FKD is supplied for vertical supply air as standard.
The dispersal pattern can be altered to horizontal supply air by setting the inner part of the diffuser to its lowest position.



Accessories

Plenum box MBB

Dimensions FKD + MBB



FKD-V + MBB							
Duct $Ød_1$ mm	FKD-V $Ød_2$ mm	B mm	C mm	E mm	F mm	H mm	L mm
100	160	260	159	216	50	195 - 235	310
125	160	310	184	262	50	220 - 260	376
125	200	310	184	262	50	236 - 276	376
160	160	380	220	323	50	255 - 295	459
160	200	380	220	323	50	270 - 310	459
160	250	380	220	323	50	286 - 326	459
200	200	460	259	396	70	361 - 401	565
200	250	460	259	396	70	327 - 367	565
200	315	460	259	396	70	345 - 385	565
250	250	540	309	486	70	377 - 417	698
250	315	540	309	486	70	395 - 435	698
250	400	540	309	486	70	426 - 466	698
315	315	540	373	646	70	460 - 500	858
315	400	540	373	646	70	491 - 531	858

Order code

Product **MBB - aaa - bbb - c**

Type
MBB

Duct connection
Ø100-315

Diffuser dimension
Ø160-400

Functional use
S = Supply air
E = Exhaust

Example: FKD 200+MBB-160-200-S

Multi-cone diffuser FKD

Technical data

Capacity

Air flow q_v [l/s] and [m³/h], total pressure Δp_t [Pa], throw $l_{0.2}$ [m] and sound power level L_{WA} [dB(A)] can be seen in the diagrams.

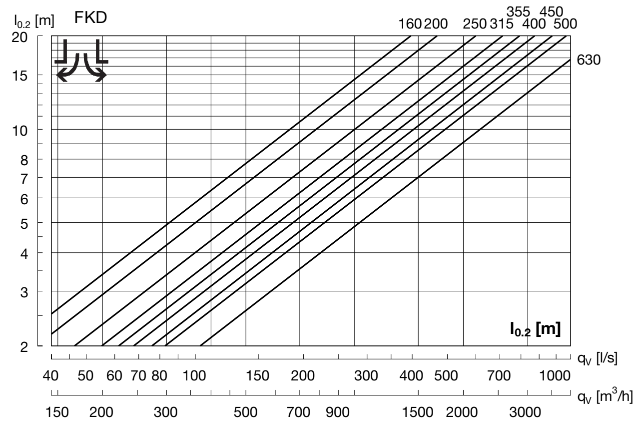
Throw $l_{0.2}$

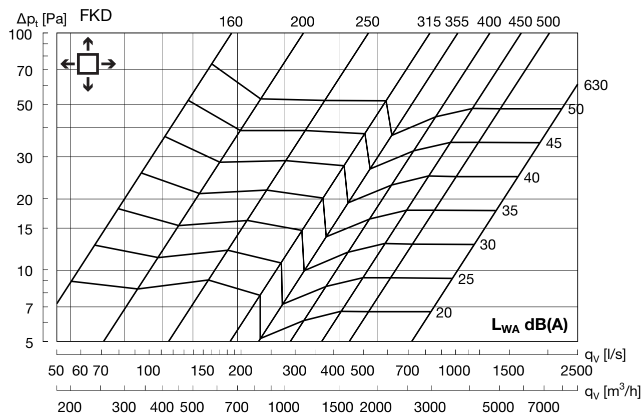
Throw $l_{0.2}$ [m] can be seen in the diagram for isothermal air at a speed of 0.2 m/s.

Frequency-related sound effect level

The sound effect level in the frequency band is defined as $L_{wok} = L_{WA} + K_{ok}$. K_{ok} values are specified in charts beneath the diagrams on the following pages. K_{ok} values for FKD without a box can be found in a separate supplement.

Horizontal





Sound attenuation

Sound attenuation of the diffuser ΔL from duct to room, including end reflection, see table below.

FKD + MBB									
Duct	FKD	Centre frequency Hz							
Ød1	Ød2	63	125	250	500	1K	2K	4K	8K
100	160	20	16	5	15	17	17	16	19
125	160	13	13	8	19	13	16	16	19
125	200	15	11	6	15	12	14	16	17
160	160	16	17	10	18	17	18	20	21
160	200	15	14	7	19	15	16	18	19
160	250	17	16	4	16	15	16	16	18
200	200	13	10	6	15	18	15	19	17
200	250	13	9	4	12	17	13	17	16
200	315	13	8	3	8	16	14	16	15
250	250	14	8	8	15	17	17	17	18
250	315	13	6	5	13	15	15	16	17
250	400	12	4	3	12	13	14	14	15
315	315	7	9	8	12	17	16	17	21
315	400	7	8	7	11	16	14	16	19

Balancing

Balancing data is contained in a separate brochure.

Multi-cone diffuser FKD

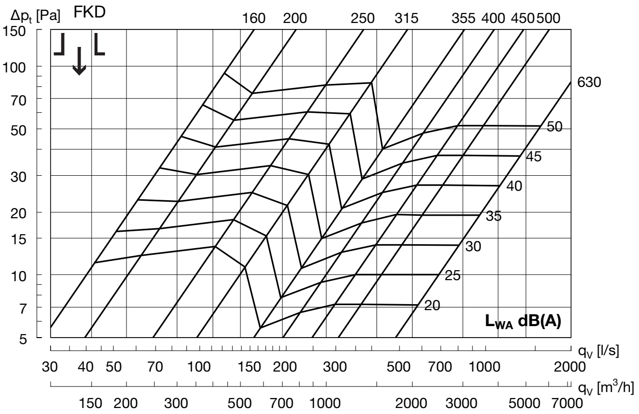
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

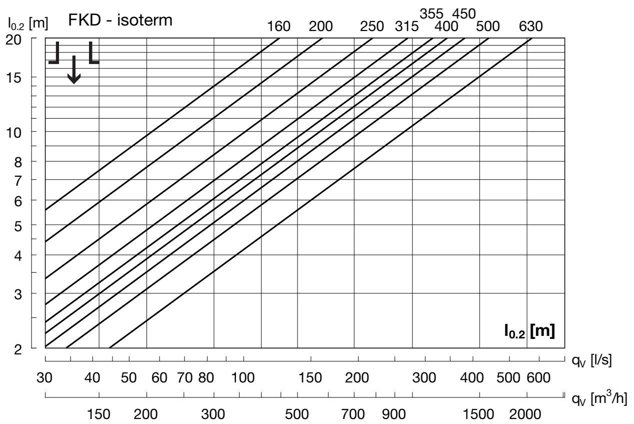
Technical data

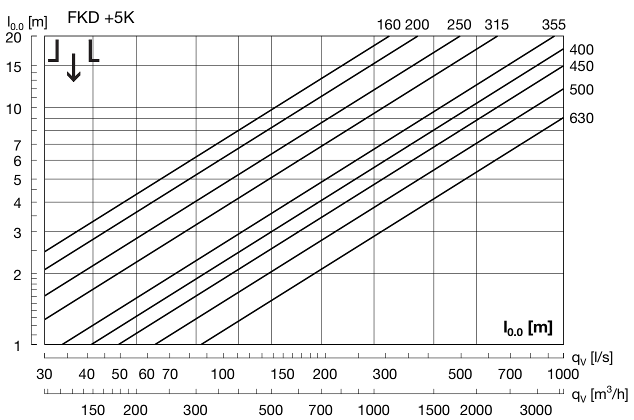
Throw $l_{0.2}$ / turning point $l_{0.0}$

Throws $l_{0.2}$[m] can be seen in the diagrams for isothermal air at a speed of 0.2 m/s. Turning point $l_{0.0}$ [m] can be seen in the diagrams for heated air, +5 K, +10 K respectively.

Vertical



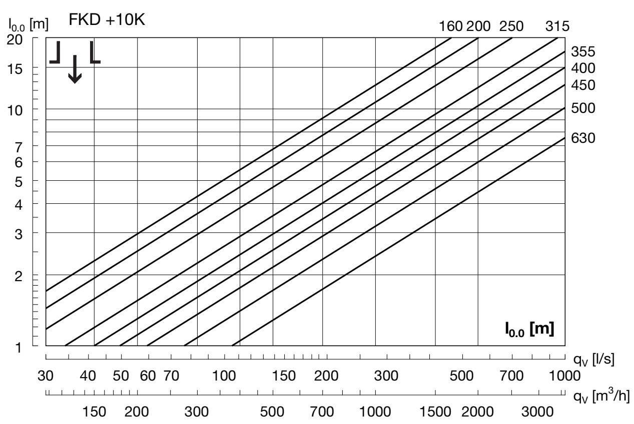




Vertical supply air correction sound power level (L_{WA}) and pressure loss (Δp_t)

On the following pages you can find diagrams for all sizes FKD+MBB horizontal supply air. When Vertical supply air values are wanted, use the correction factors in the table below.

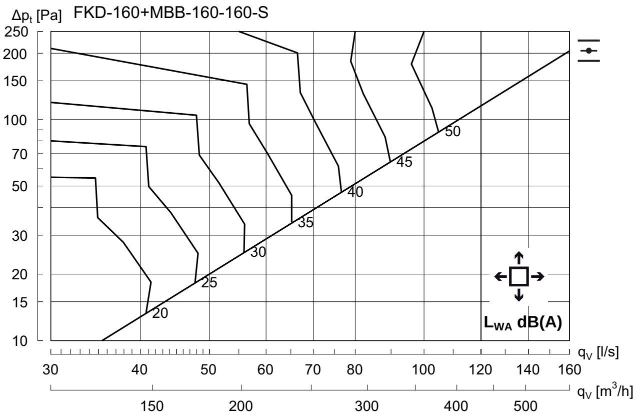
FKD + MBB		Correction factor	
Duct Ød_1	FKD Ød_2	L_{WA}	Δp_t
100	160	3	x 1,2
125	160	1	x 1,2
125	200	1	x 1,1
160	160	5	x 1,5
160	200	3	x 1,3
160	250	0	x 1,1
200	200	1	x 1,3
200	250	5	x 1,2
200	315	0	x 1,1
250	250	1	x 1,3
250	315	2	x 1,3
250	400	1	x 1,1
315	315	4	x 1,4
315	400	3	x 1,2



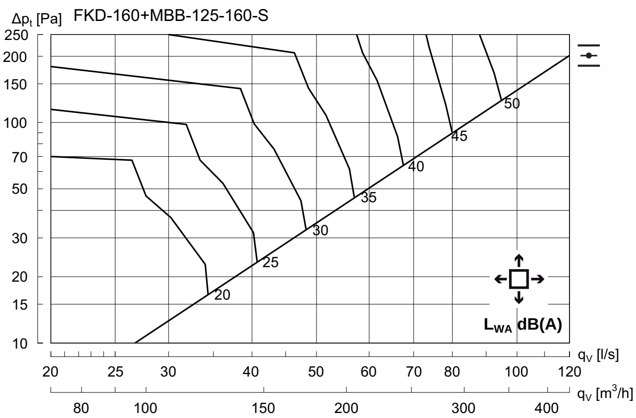
Multi-cone diffuser FKD

Technical data

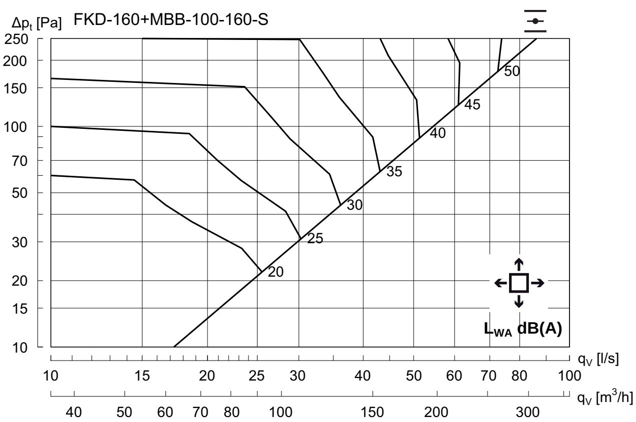
FKD 160 + MBB Horizontal



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	11	7	0	-6	-4	-9	-22	-31

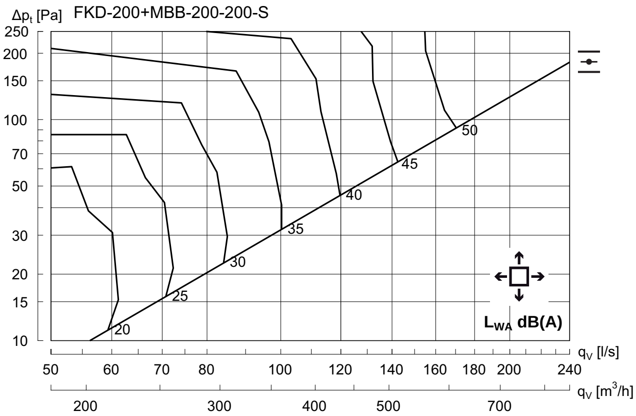


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	10	5	2	-5	-5	-9	-18	-25

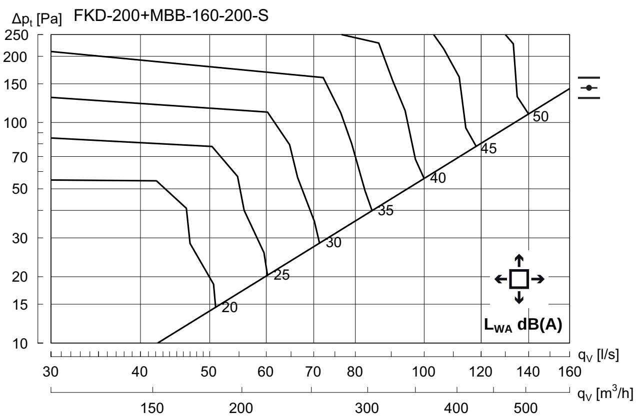


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	9	4	2	-3	-5	-9	-16	-22

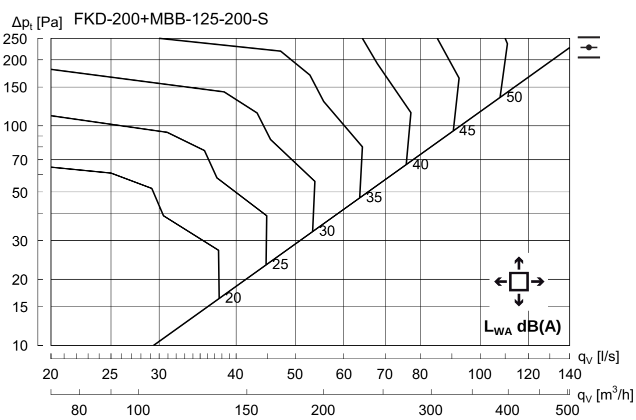
FKD 200 + MBB Horizontal



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	13	5	-2	-5	-3	-12	-22	-28



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	11	5	1	-5	-4	-11	-20	-25

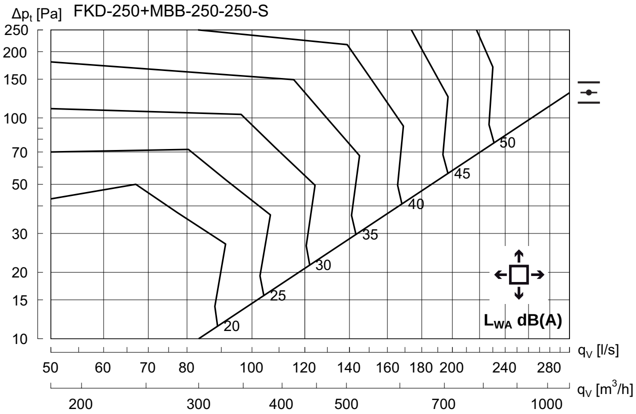


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	11	4	1	-4	-4	-10	-16	-23

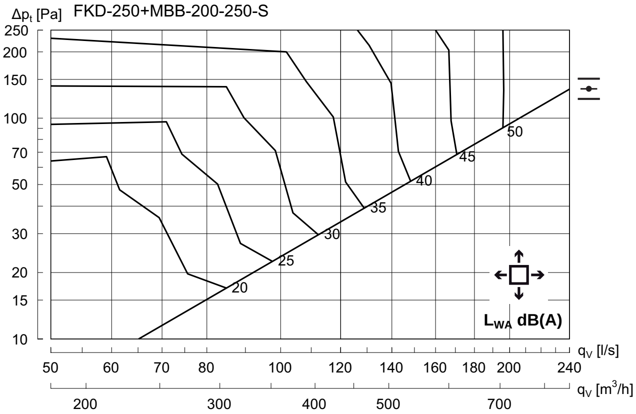
Multi-cone diffuser FKD

Technical data

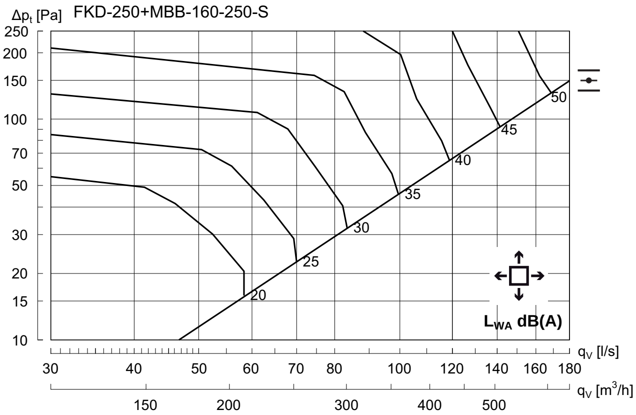
FKD 250 + MBB Horizontal



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	12	5	-2	-4	-3	-13	-20	-26

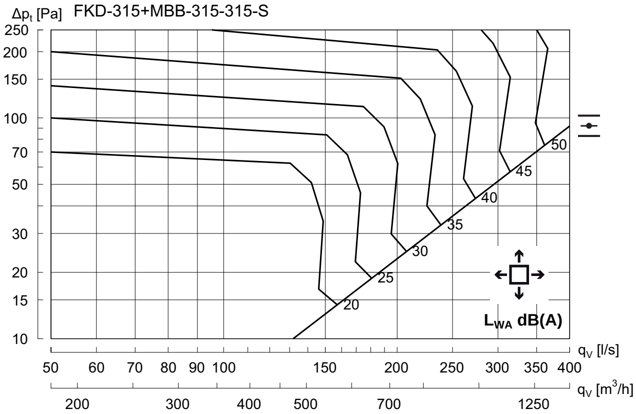


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	11	5	-2	-3	-3	-12	-19	-24

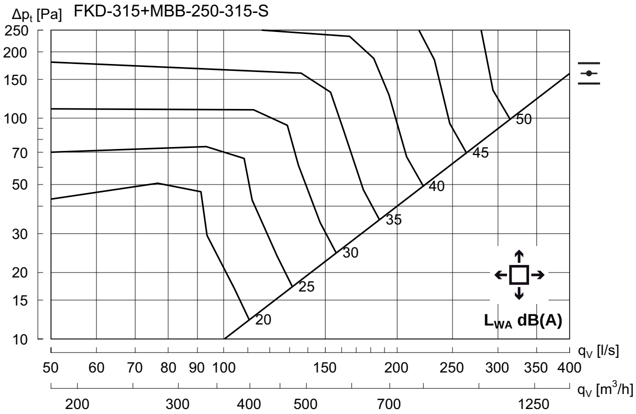


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	12	4	0	-3	-4	-12	-18	-24

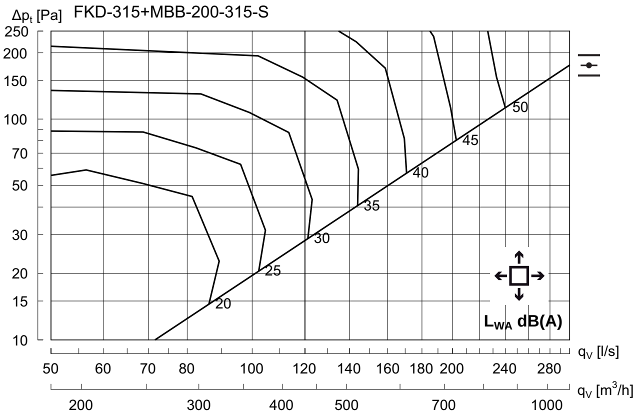
FKD 315 + MBB Horizontal



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	14	3	0	-2	-4	-14	-20	-26



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	12	5	-1	-2	-4	-12	-19	-21



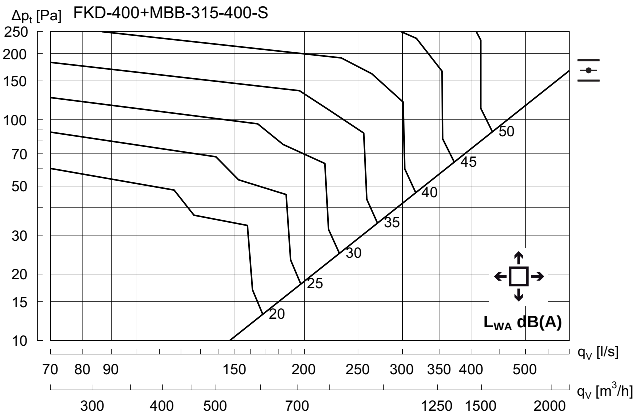
Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	9	5	-1	-2	-5	-11	-18	-24

Multi-cone diffuser

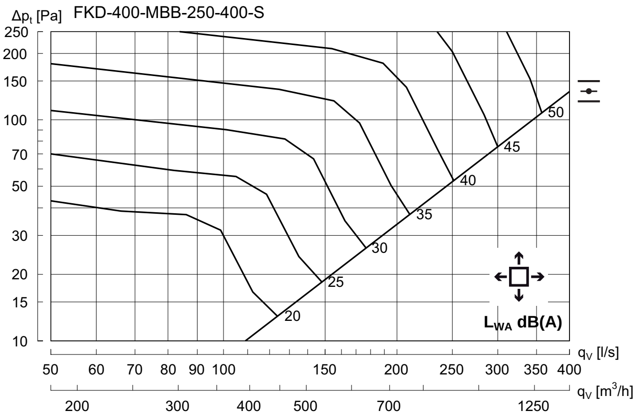
FKD

Technical data

FKD 400 + MBB Horizontal



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	11	4	1	-1	-6	-12	-17	-24



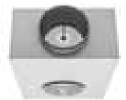
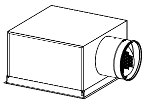
Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	9	4	1	-1	-6	-12	-17	-25

Plenum boxes

Plenum boxes

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

Plenum boxes

	Product	Functions	Page
	MBB		338
	H		340
	VBA		341
	WB		342

Plenum boxes

Plenum box type H

Plenum boxes

Plenum boxes are used for supply and exhaust of air through diffusers and grilles. The plenum box ensures a continuous flow to the diffuser, and plenum boxes equipped with dampers create the possibility of adjusting the diffuser on an individual level. Further more, the plenum box is usually supplied with acoustic insulation. This contributes to the sound attenuation inside the box. This way the noise from the air flow inside the air duct system and the sound from room to room is reduced.

Large selection

Lindab's selection of plenum boxes include plenum boxes for mounting in ceiling or wall/skirt. The plenum boxes are normally delivered with dampers and measuring devices in addition to acoustic insulation. The plenum boxes are equipped with a scaled adjustment wire with a lock-function where the K-factor is independent of the diffuser. The K-factors are printed on the adjustment wire. The plenum-boxes eliminate the need for a straight air duct in front of the diffuser, which gives a greater flexibility in mounting.

MBB box

Plenum box MBB

Description

MBB is a plenum box for supply and exhaust air, intended to achieve a stable airflow into diffusers, air flow measurement and balancing and also to attenuate sound from the duct system.
MBB includes a unique linear cone damper which gives the opportunity to use the full operational area (0-100%) and allows to balance with a high pressure drop over the box with low sound generation. Furthermore the construction of the damper gives a accurate and reliable measurement.
MBB has a readable K-value scale and can therefore be pre-adjusted before the final balancing.
MBB has small overall dimensions to ease up installation and handling.

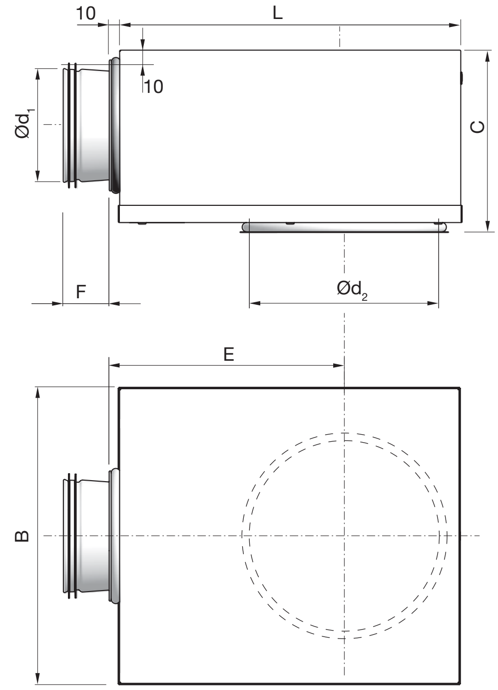
- Can work with high pressure with low sound
- Accurate and reliable measurement
- Large dynamic operational area (0-100%)
- Viable for future system changes
- Simplified installation and balancing
- Small dimensions

Order code

Product	MBB	aaa	bbb	c
Type MBB				
Duct connection Ød$_1$ Ø100-315				
Diffuser dimension Ød$_2$ Ø100-400				
Function S = Supply air, E = Exhaust				

Example: MBB-100-160-S

Dimensions



MBB		B	C	E	F	L
Ød$_1$ mm	Ød$_2$ mm	mm	mm	mm	mm	mm
100	100	260	159	216	50	310
100	125	260	159	216	50	310
100	160	260	159	216	50	310
125	125	310	184	262	50	376
125	160	310	184	262	50	376
125	200	310	184	262	50	376
160	160	380	220	323	50	459
160	200	380	220	323	50	459
160	250	380	220	323	50	459
200	200	460	259	396	70	565
200	250	460	259	396	70	565
200	315	460	259	396	70	565
250	250	540	309	486	70	698
250	315	540	309	486	70	698
250	400	540	309	486	70	698
315	315	540	373	646	70	858
315	400	540	373	646	70	858

Maintenance

The damper can be removed in connection with cleaning of the internal parts of the duct.

Materials and finish

Material: Galvanised steel
Standard colour: Galvanised steel

The plenum box is avalable in other colours. Please contact Lindab's sales department for futher information.

Lindab

Plenum box MBB

Technical data

Sound attenuation

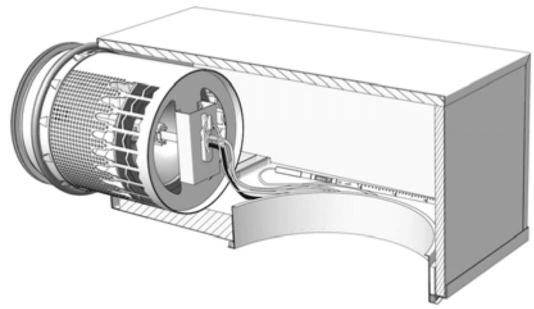
Sound attenuation of MBB + diffuser ΔL from duct to room, including end reflection, see table below.

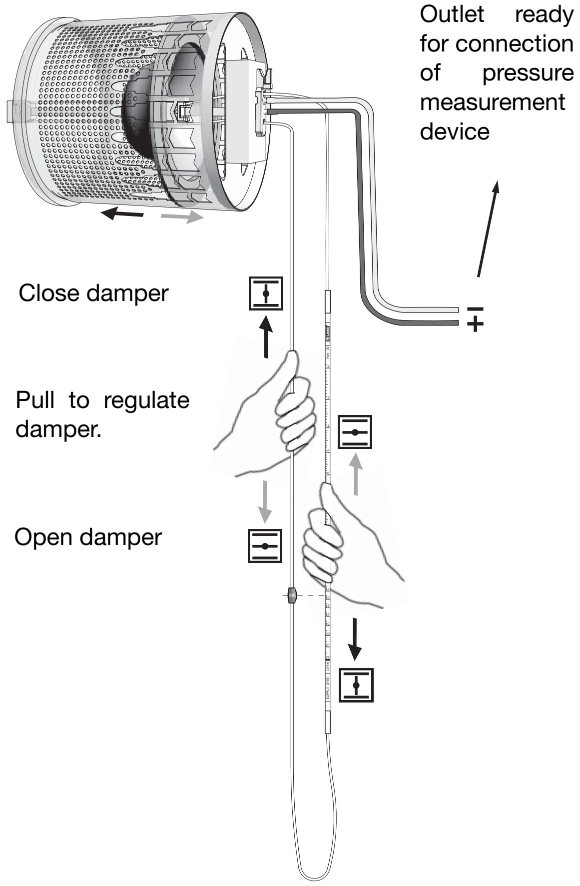
Example in Table: PCA + MBB

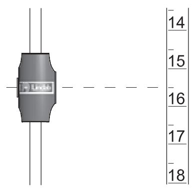
MBB		Centre frequency Hz							
$Ød_1$	$Ød_2$	63	125	250	500	1K	2K	4K	8K
100	100	18	17	8	20	19	20	19	23
100	125	19	16	7	19	18	18	18	21
100	160	21	16	5	15	17	18	16	19
125	125	18	13	9	20	13	19	18	19
125	160	12	13	8	19	13	16	17	19
125	200	16	11	5	16	13	15	15	17
160	160	17	17	11	19	18	17	20	20
160	200	14	14	7	21	15	16	18	19
160	250	15	15	5	17	13	15	16	18
200	200	15	10	6	16	17	15	19	18
200	250	12	9	5	14	17	15	17	17
200	315	12	7	4	11	15	14	16	15
250	250	14	8	8	14	16	17	17	18
250	315	12	6	6	15	15	15	16	17
250	400	13	5	4	13	14	14	15	15
315	315	7	9	8	14	17	16	17	21
315	400	7	8	8	12	16	16	16	18

For other diffuser types + MBB:
Find your diffuser in Comfort catalogue. Under technical data you will find sound attenuation table for your chosen diffuser + MBB.

Damper







For futher details go to www.lindabcomfort.com and see MBB mounting instruction.

Plenum box

H

Description

The type H plenum box is a side-connected plenum box for supply and exhaust air for the Versio range of diffusers. The plenum box can be equipped with an adjustment damper and a measuring device, depending on the configuration required.
The adjustment damper is operated from the front of the box by means of a graduated handle with integral lock function.
K-factors for determining the volume flow are printed on the damper handle. The plenum box has a low overall height and has internal sound insulation of fibre-free material.
For configuration with an integrated ceiling solution, the box is equipped with a frame and/or a face plate, depending on the type of ceiling. For further details, see the Versio range of ceiling diffusers.

- Can be used for both supply and exhaust air.
- Can be connected regardless of straight ducting before the box
- Detachable damper and plenum plate for access to duct
- The same box is used for all face plates and ceiling systems

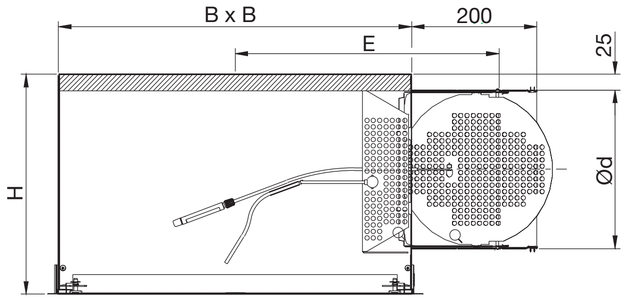
Maintenance

The damper can be removed in connection with cleaning of the internal parts or the duct.

Ordering information

Go to chapter: " ceiling diffusers - Versio "

Dimensions



Size	Ød mm	B mm	E mm	H mm
125	125	380	350	215
160	160	380	350	250
200	200	460	390	290
250	250	560	420	340
315	315	560	420	405

Materials and finish

The box, plenum plate and damper are made of hot-galvanised steel plate. Acoustic insulation is made of non-flammable material.

Plenum box VBA

Description

VBA is a plenum box for supply and exhaust air intended to achieve a stable flow to a rectangular grille or other types of face plates. VBA is equipped with an adjustment damper and pressure measurement device. The plenum box can be connected from the side, the top or the back. The adjustment damper is operated from the front of the box by means of a graduated handle with integral lock function.
VBA is equipped with a telescopic connection for easy installation. The same face plate and telescope are used as for WB boxes.

- Can be used for both supply and exhaust air
- Easy-to-detach face plate for access to duct
- Same box used for all front types

Materials and finish

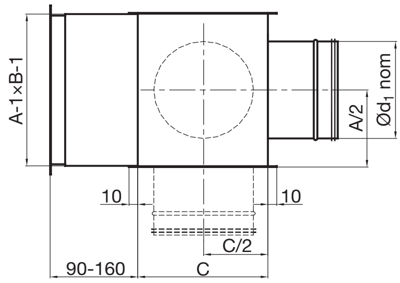
Box, plenum plate and damper are made of hot-galvanised steel plate.

Ordering example

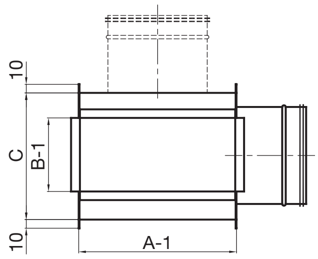
Product			VBA	a	bbb	ccc
Type						
Connection	back	1				
	side	2				
	top	4				
A-Measure						
B-Measure						

Dimensions

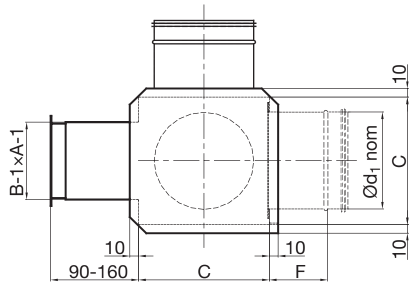
1.



2.

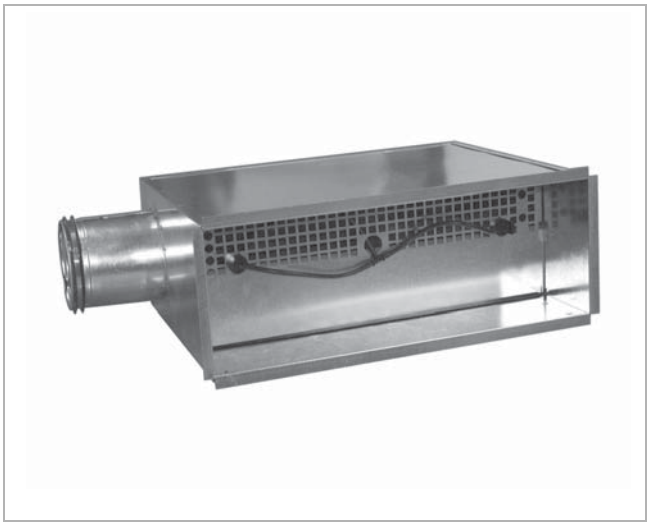


4.

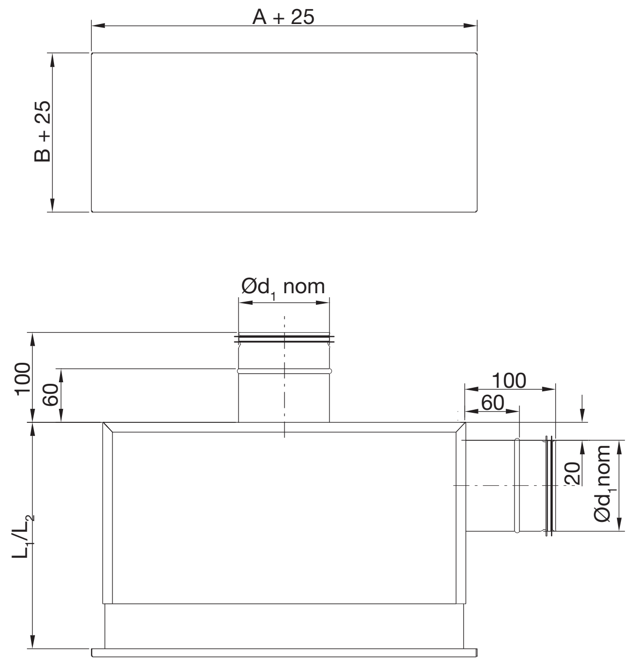


A	x	B	$Ød_1$ nom	C mm	F mm
200	x	100	125	165	90
300	x	100	160	200	110
400	x	100	160	200	110
500	x	100	200	240	130
600	x	100	250	290	155
800	x	100	250	290	155
1000	x	100	250	290	155
300	x	150	200	240	130
400	x	150	250	290	155
500	x	150	250	290	155
600	x	150	250	290	155
800	x	150	315	355	190
1000	x	150	315	355	190
300	x	200	250	290	155
400	x	200	250	290	155
500	x	200	315	355	190
600	x	200	315	355	190
800	x	200	315	355	190
1000	x	200	315	355	190
600	x	300	400	440	215

Plenum box WB



Dimensions



A	x	B	$Ød_1$ nom	A	B	Back L_1	Side L_2	Weight Kg
300	x	100	80	300	100	240-290	280-330	2,5
400	x	150	100	400	150	240-290	300-350	3,5
500	x	150	125	500	150	240-290	325-375	4,3
500	x	200	160	500	200	240-290	360-410	5,5
500	x	300	200	500	300	240-290	400-450	7,4

Description

WB is a plenum box for supply air intended to achieve a stable flow to rectangular front plates or grilles. WB is equipped with an adjustment damper and pressure measuring device. The plenum box can be connected from the side or the back. The adjustment damper is operated from the front of the box by means of a graduated handle with integral lock function. WB is equipped with a telescopic connection that can be adjusted up to 50 mm, which provides flexibility during the installation phase. WB has a maximum width of 500 mm, which ensures that you can install the box in a standrd wall structure with a centre distance of 600 mm between the plasterboard struts.

- Telescopic function
- Easy-to-detach face plate for access to duct
- Same box used for all front types

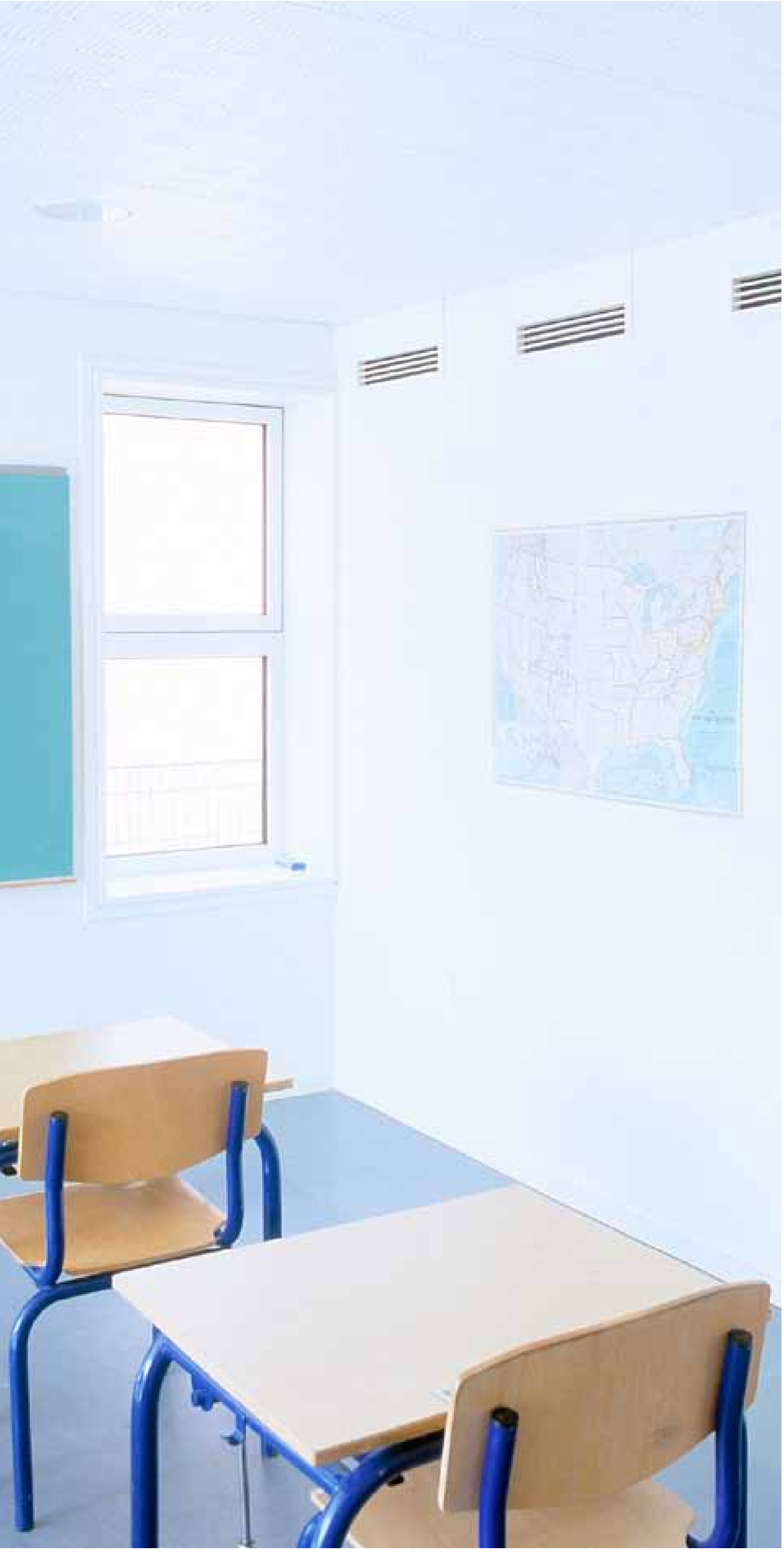
Materials and finish

Box, plenum plate and damper are made of hot-galvanised steel plate.

Order details

See section on wall diffusers.

Wall diffusers



Lindab wall diffusers

Wall diffusers

Fronts

Wall grilles

Grilles

Wall diffusers

C20, Oesterbro swimming hall, Copenhagen København.

Lindab wall diffusers

Wall diffusers, where the diffuser itself and the plenum box is placed in the wall or in a skirting board, is used in combination with - or as an alternative to ceiling diffusers. When the wall diffusers are used in combination with ceiling diffusers, the ceiling diffusers will typically be used for supply air and the wall diffusers for exhaust air. If the entire ceiling area has to be free for other installation needs, or because there isn't a suspended ceiling in the room, there is great advantage in using the wall diffusers for both supply air and exhaust air. That way you can avoid visible duct mounting in the room itself, and instead you get the possibility of placing air ducts in the corridor, hallway or other similar places.
In order to supply air to comfort zones, diffusers with an adjustable jet pattern or a built-in function to ensure the Coanda effect against the ceiling. That way too much velocity is avoided in the occupied zone.

Design

Lindabs series of wall diffusers include a number of different fronts with different designs and functions to fulfil most requirements for this type of ventilation. The fronts are adapted to several types of plenum boxes, and consequently there is the possibility of combining supply air and exhaust air in the same design and with the same geometrical measurements. The plenum boxes WB are available with back- or side-connection and have built-in telescopic function to ease mounting. Furthermore, the box has a maximum width of 500 mm, which ensures that it is always possible to mount the box in an ordinary wall construction with a centre-distance of 600 mm between the plasterboards struts.

PR1, wall diffuser

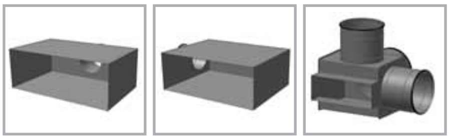
Lindab wall diffusers

Design

See chapter Comfort and Design

Plenum boxes

See Plenum boxes



WB-1 | WB-2 | VBA-1-2-4

PR — Perforated

Nr.: 1
Nr.: 2
Nr.: 3
Nr.: 4

Size A x B (mm)	Connection size WB	Connection size VBA	WB-1	WB-2	VBA-1-2-4
300 x 100	80	160	●	●	○
400 x 150	100	250	●	●	○
500 x 150	125	250	●	●	○
500 x 200	160	315	●	●	○
500 x 300	200		●	●	

NR — Nozzles

Size A x B (mm)	Connection size WB	Connection size VBA	WB - 1	WB-2	VBA 1 - 2 - 4
300 x 100	80	160	●	●	◍
400 x 150	100	250	●	●	◍
500 x 150	125	250	●	●	◍
500 x 200	160	315	●	●	◍
500 x 300	200		●	●	

DR — Adjustable blades

Size A x B (mm)	Connection size WB	Connection size VBA	WB - 1	WB-2	VBA 1 - 2 - 4
300 x 100	80	160	●	●	◍
400 x 150	100	250	●	●	◍
500 x 150	125	250	●	●	◍
500 x 200	160	315	●	●	◍
500 x 300	200		●	●	

Grilles — B3020, C20, C21, F20

B3020

C20
C21

F20

Size A x B (mm)	Connection size WB	Connection size VBA	WB - 1	WBA - 2	VBA 1 - 2 - 4
200 x 100		125			●
300 x 100	80	160	◍	◍	●
400 x 100		160			●
500 x 100		200			●
300 x 150		200			●
400 x 150	100	250	◍	◍	●
500 x 150	125	250	◍	◍	●
600 x 150		250			●
400 x 200		250			●
500 x 200	160	315	◍	◍	●
600 x 200		315			●
500 x 300	200		◍	◍	

G20 — Inclined bars

Size A x B (mm)	Connection size WB	Connection size VBA	WB - 1	WB-2	VBA 1 - 2 - 4
200 x 100		125			●
300 x 100	80	160	◍	◍	●
400 x 100		160			●
500 x 100		200			●
300 x 150		200			●
400 x 150	100	250	◍	◍	●
500 x 150	125	250	◍	◍	●
600 x 150		250			●
400 x 200		250			●
500 x 200	160	315	◍	◍	●
600 x 200		315			●
500 x 300	200		◍	◍	

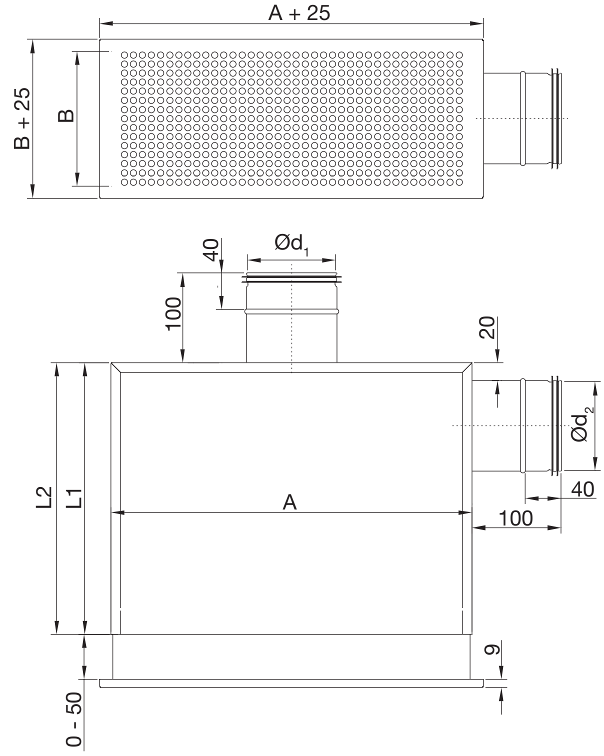
● 1. Products depicted in catalogue. Tech. data in catalogue
○ 2. Combination possible. Tech. data depicted in catalogue
◍ 3. Combination possible. Tech. data not in catalogue
4. If field is empty, combination is not possible

Lindab®

Wall diffuser

PR1

Dimensions



Description

PR1 is a rectangular diffuser for installation in a wall or skirting board with perforated front plate in various designs (see summary). The diffuser is suitable for the horizontal supply of cooled air and exhaust. The diffuser for supply air is used with a WB type plenum box, and for air exhaust, with a VBA type plenum box. The plenum boxes are equipped with a damper and measuring device, enabling individual adjustment.

- Large capacity
- Discrete appearance
- Regardless of straight ducting before the diffuser
- Telescopic function in the plenum box

Maintenance

The front can be removed and the damper taken out for cleaning of internal parts or to gain access to the duct. The visible parts of the diffuser can be wiped with a damp cloth.

Order code

Product **PR** **a** **b** **A x B**

Type
pattern: 1 - 4
Functional use S - E
Size A x B

Product **WB** **a** **A x B**

Type
Connection:
1 = Back
2 = Side
Size A x B

WB-1 Back connection

A x B Size	Ød1 mm	A mm	B mm	L1 mm	m kg
300 - 100	80	300	100	240	2,50
400 - 150	100	400	150	240	3,50
500 - 150	125	500	150	240	4,30
500 - 200	160	500	200	240	5,50
500 - 300	200	500	300	240	7,40

WB-2 Side connection

A x B Size	Ød2 mm	A mm	B mm	L2 mm	m kg
300 - 100	80	300	100	280	2,50
400 - 150	100	400	150	300	3,50
500 - 150	125	500	150	325	4,30
500 - 200	160	500	200	360	5,50
500 - 300	200	500	300	400	7,40

Materials and finish

Diffuser: Galvanised steel
Standard finish: Powder-coated
Standard colour: RAL 9010 white, gloss 30

The diffuser is available in other colours. Please contact Lindab's sales department for further information.

Wall diffuser PR1

Technical data

Capacity

Volume flow q_v [l/s] and [m^3/h], total pressure loss Δp_t [Pa], throw $l_{0.2}$ and sound level L_{WA} [dB(A)] can be seen in the diagrams.

Frequency-related sound effect level

The sound effect level in the frequency band is defined as $L_{WOK} = L_{WA} + K_{ok}$. K_{ok} values are specified in charts beneath the diagrams on the following pages.

Quick selection

WB-1 Back connection

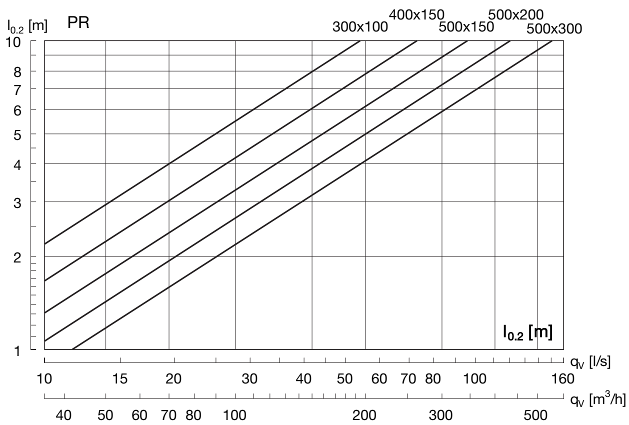
A x B Size	Minimum pi>5 Pa l/s	m³/h	p_t=50 Pa L_{WA}=30dB(A) l/s	m³/h	p_t=50 Pa L_{WA}=35dB(A) l/s	m³/h
300 - 100	12	42	23	83	28	101
400 - 150	22	78	-	-	40	144
500 - 150	34	122	37	133	60	216
500 - 200	38	138	-	-	79	284
500 - 300	38	137	83	299	107	385

WB-2 Side connection

A x B Size	Minimum pi>5 Pa l/s	m³/h	p_t=50 Pa L_{WA}=30dB(A) l/s	m³/h	p_t=50 Pa L_{WA}=35dB(A) l/s	m³/h
300 - 100	10	37	21	76	27	97
400 - 150	22	81	34	122	43	155
500 - 150	28	102	-	-	57	205
500 - 200	34	122	62	223	76	274
500 - 300	46	165	-	-	-	-

Throw $l_{0.2}$

The throw is specified at a terminal velocity of 0.2 m/s.



Sound attenuation

The diffuser's sound attenuation function from duct to room, including end reflection - see table below.

WB-1 Back connection

A x B Size	Centre frequency Hz 63	125	250	500	1K	2K	4K	8K
300 - 100	25	18	14	7	9	10	8	11
400 - 150	21	20	7	6	9	7	6	8
500 - 150	19	19	7	8	7	9	9	10
500 - 200	18	16	5	10	8	13	10	11
500 - 300	15	12	3	12	8	11	9	10

WB-2 Side connection

A x B Size	Centre frequency Hz 63	125	250	500	1K	2K	4K	8K
300 - 100	26	17	11	7	9	12	10	11
400 - 150	21	17	4	9	7	11	10	10
500 - 150	19	18	5	8	7	9	9	10
500 - 200	18	13	5	8	10	11	12	13
500 - 300	15	10	5	6	11	12	11	10

VBA

Size	Centre frequency Hz 63	125	250	500	1K	2K	4K	8K
300x100	23	19	11	10	8	12	10	12
400x150	14	10	8	10	11	12	10	12
500x150	15	11	9	8	8	11	10	10
500x200	13	10	9	8	8	9	10	11

Balancing

Balancing data is contained in a separate brochure.

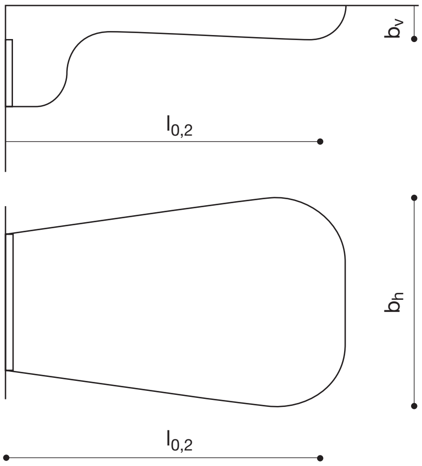
Wall diffuser

PR1

Technical data

Air jet dispersal

l_b = Distance from the diffuser to the point where there is maximum dispersal.
b_v = Depth of the air jet on a vertical plane.
b_h = Width of the air jet on a horizontal plane.

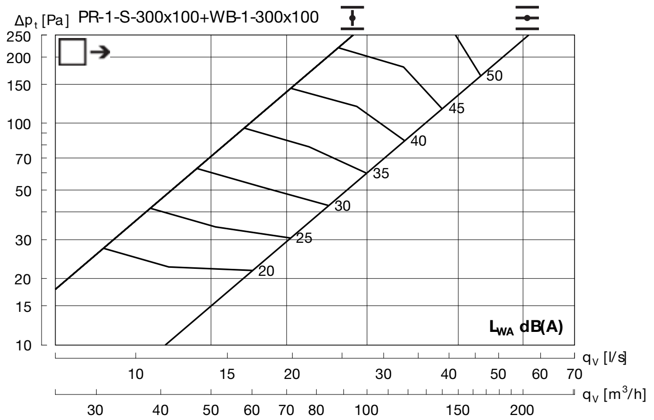


l_{02}: Diagram value
b_v: $0.05 \times l_{0.2}$
b_h: $0.7 \times l_{0.2}$

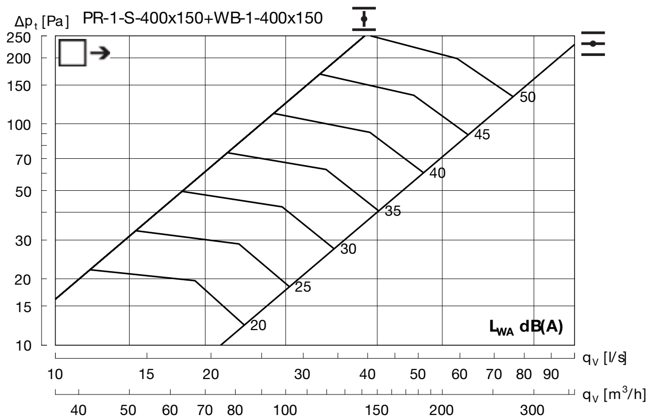
Wall diffuser PR1

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

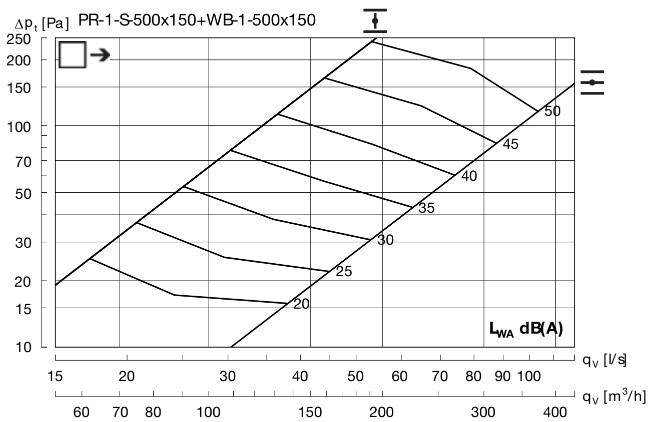
WB 1 - back connection



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	0	-4	1	-1	-5	-14	-20	-25

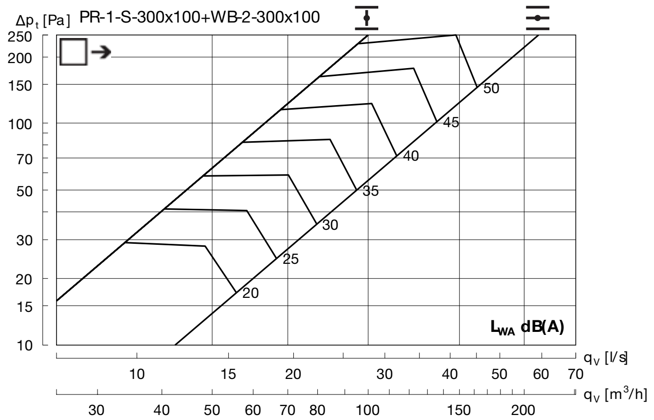


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	7	-2	1	0	-6	-15	-20	-26

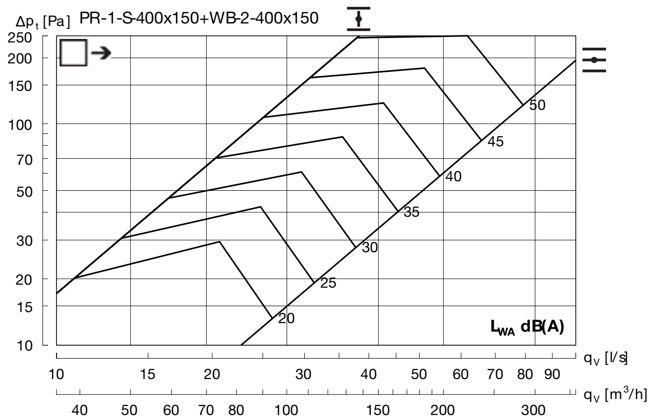


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	3	-1	2	0	-7	-16	-23	-29

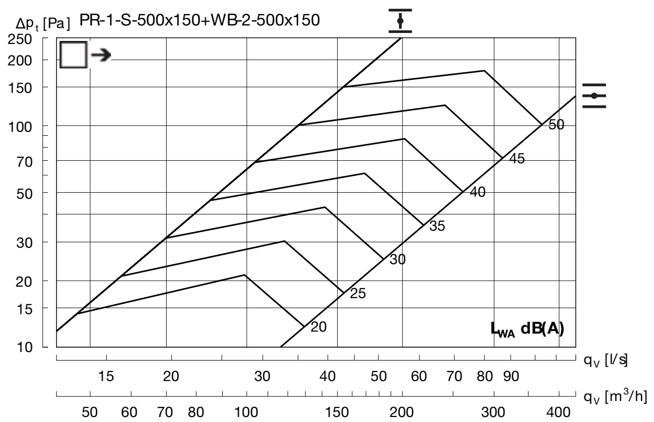
WB 2 -side connection



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	3	-1	4	-2	-6	-17	-22	-22



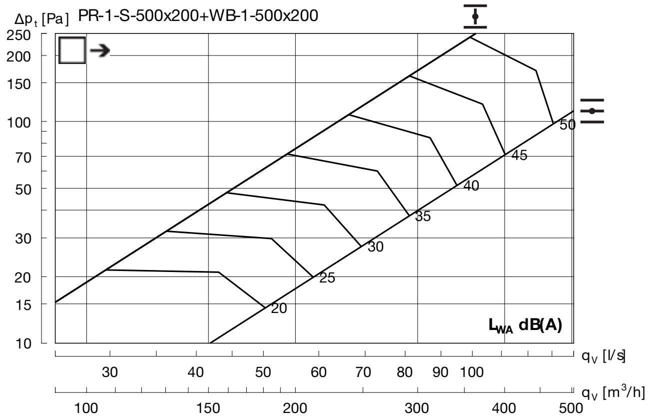
Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	-2	-1	1	-2	-3	-14	-20	-26



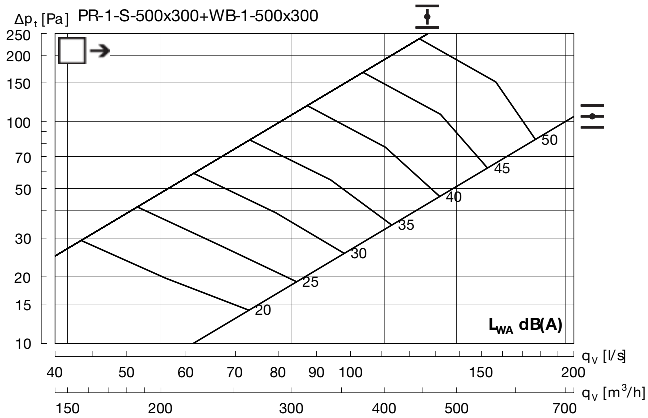
Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	8	-1	1	-1	-4	-15	-24	-32

Wall diffuser PR1

WB 1 - back connection

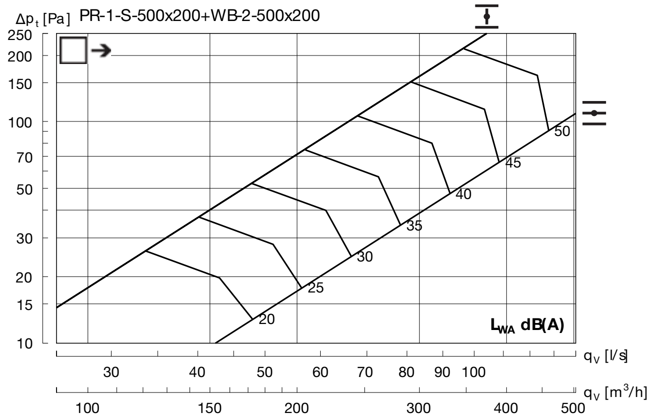


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	0	-1	2	0	-6	-18	-23	-32

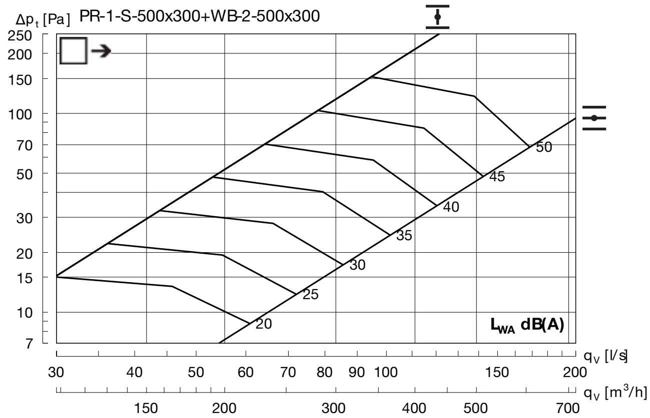


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	6	2	3	0	-7	-16	-22	-30

WB 2 - side connection



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	-1	2	2	0	-6	-18	-23	-31

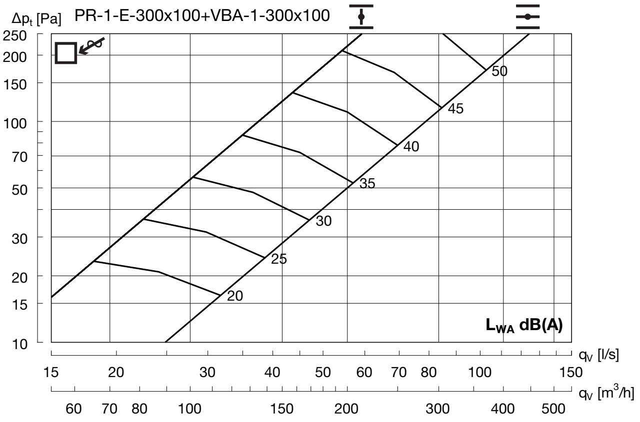


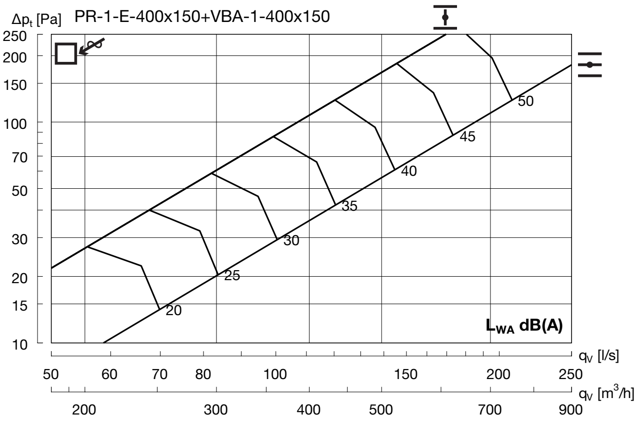
Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	1	2	-1	0	-4	-17	-26	-35

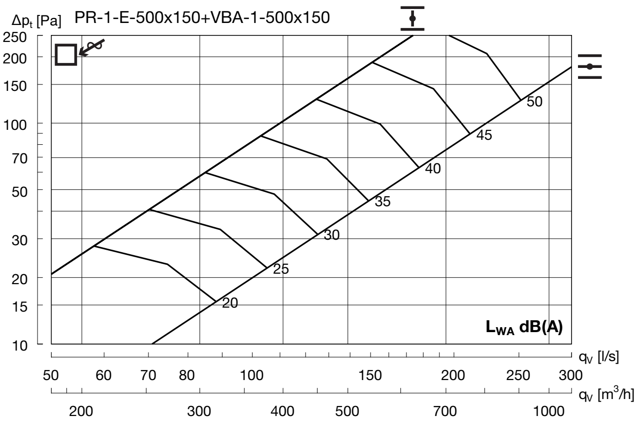
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

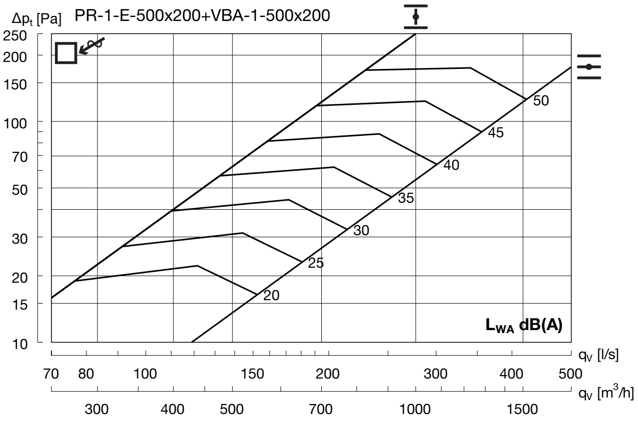
Wall diffuser PR1

VBA exhaust









Correction sound

Correction values for conversion of diagram data for connection from the side or top – see table below.

	PR + VBA-2 Side	PR + VBA-4 Top
Open damper	+2 dB	+4 dB
50 % open damper	+1 dB	+1 dB
Closed damper	0 dB	0 dB

Wall diffuser NR19

Description

NR19 is a rectangular diffuser with adjustable nozzles suitable for installation in a wall or skirting board. The diffuser is suitable for the horizontal supply of cooled air. The nozzles at the front make it possible to vary the dispersal pattern and thereby create different throws. The diffuser is used with a WB type plenum box. The plenum boxes are equipped with a damper and measuring device, enabling individual adjustment.

- Individually adjustable nozzles
- Flexible dispersal pattern
- Regardless of straight ducting before the diffuser
- Telescopic function in the plenum box

Maintenance

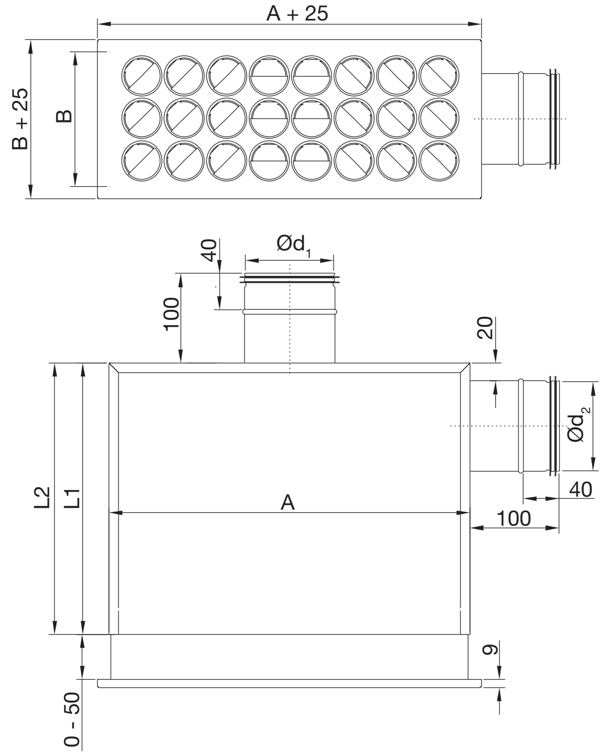
The front can be removed and the damper taken out for cleaning of internal parts or to gain access to the duct. The visible parts of the diffuser can be wiped with a damp cloth.

Order code

Product	NR19	S	A x B
Type			
Functional use S			
Size A x B			

Product	WB	a	A x B
Type			
Connection 1 = Back 2 = Side			
Size A x B			

Dimensions



WB-1 Back connection

A x B Size	$Ød_1$ mm	A mm	B mm	L1 mm	m kg
300 - 100	80	300	100	240	2,50
400 - 150	100	400	150	240	3,50
500 - 150	125	500	150	240	4,30
500 - 200	160	500	200	240	5,50
500 - 300	200	500	300	240	7,40

WB-2 Side connection

A x B Size	$Ød_2$ mm	A mm	B mm	L2 mm	m kg
300 - 100	80	300	100	280	2,50
400 - 150	100	400	150	300	3,50
500 - 150	125	500	150	325	4,30
500 - 200	160	500	200	360	5,50
500 - 300	200	500	300	400	7,40

Materials and finish

Diffuser:	Galvanised steel
Nozzles:	ABS plastic
Standard finish:	Powder-coated
Standard colour:	RAL 9010 white, gloss 30

The diffuser is available in other colours. Please contact Lindab's sales department for further information.

Wall diffuser

NR19

Technical data

Capacity

Volume flow q_v [l/s] and [m^3/h], total pressure loss Δp_t [Pa], throw $l_{0.2}$ and sound level L_{WA} [dB(A)] can be seen in the diagrams.

Frequency-related sound effect level

The sound effect level in the frequency band is defined as $L_{WOK} = L_{WA} + K_{ok}$. K_{ok} values are specified in charts beneath the diagrams on the following pages.

Quick selection

WB-1 Back connection

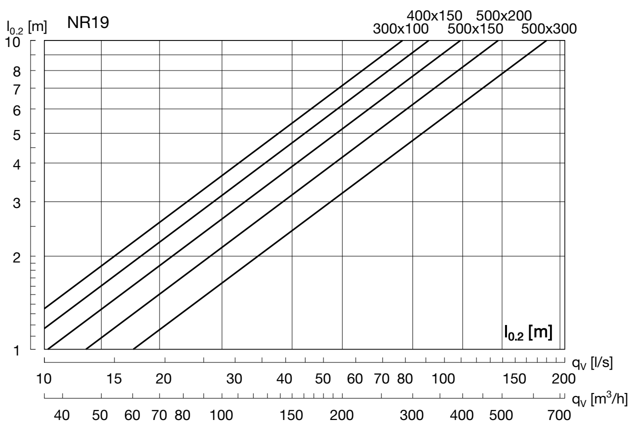
A x B	Minimum		p_t=50 Pa		p_t=50 Pa	
	pi>5 Pa		L_{WA}=30dB(A)		L_{WA}=35dB(A)	
Size	l/s	m³/h	l/s	m³/h	l/s	m³/h
300 - 100	12	42	23	83	28	101
400 - 150	23	81	28	101	42	151
500 - 150	29	103	38	137	60	216
500 - 200	36	130	55	198	78	281
500 - 300	51	184	-	-	103	371

WB-2 Side connection

A x B	Minimum		p_t=50 Pa		p_t=50 Pa	
	pi>5 Pa		L_{WA}=30dB(A)		L_{WA}=35dB(A)	
Size	l/s	m³/h	l/s	m³/h	l/s	m³/h
300 - 100	12	42	20	72	25	90
400 - 150	23	81	36	130	44	158
500 - 150	29	103	-	-	55	198
500 - 200	36	130	-	-	74	266
500 - 300	51	184	-	-	-	-

Throw $l_{0.2}$

The throw is specified at a terminal velocity of 0.2 m/s.



Sound attenuation

The diffuser's sound attenuation function from duct to room, including end reflection - see table below.

WB-1 Back connection

A x B	Centre frequency Hz							
Size	63	125	250	500	1K	2K	4K	8K
300 - 100	27	19	14	7	8	9	9	14
400 - 150	22	20	7	6	9	8	9	12
500 - 150	20	18	7	9	7	7	8	12
500 - 200	18	15	4	9	7	7	8	12
500 - 300	15	12	2	10	6	7	7	9

WB-2 Side connection

A x B	Centre frequency Hz							
Size	63	125	250	500	1K	2K	4K	8K
300 - 100	26	17	11	8	9	11	9	12
400 - 150	22	17	5	8	6	8	9	12
500 - 150	18	17	5	8	7	6	8	11
500 - 200	19	13	3	7	7	7	9	10
500 - 300	15	10	3	2	8	7	8	10

Balancing

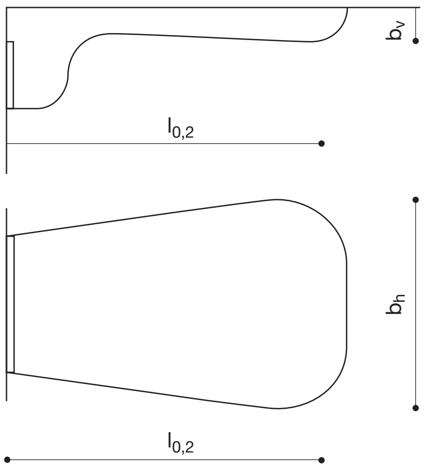
Balancing data is contained in a separate brochure.

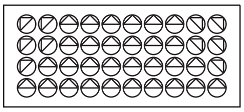
Wall diffuser

NR19

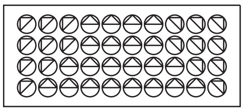
Air jet dispersal

l_b = Distance from the diffuser to the point where there is maximum dispersal.
b_v = Depth of the air jet on a vertical plane.
b_h = Width of the air jet on a horizontal plane.

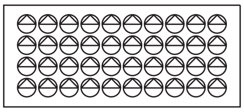




Normal nozzle setting
l_{02}: Diagram value
b_v: $0.05 \times l_{0.2}$
b_h: $0.7 \times l_{0.2}$



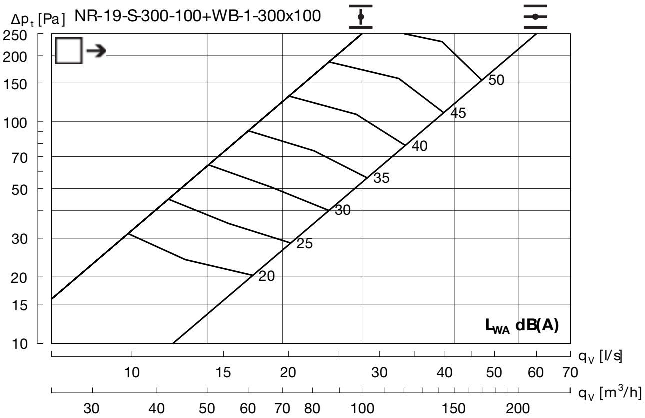
Short throw
l_{02}: $0.7 \times$ Diagram value
b_v: $0.05 \times l_{0.2}$
b_h: $0.85 \times l_{0.2}$



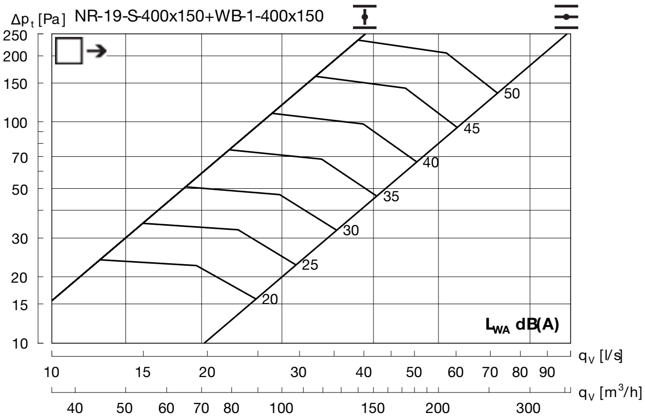
Long throw
l_{02}: $1.4 \times$ Diagram value
b_v: $0.05 \times l_{0.2}$
b_h: $0.5 \times l_{0.2}$

Wall diffuser NR19

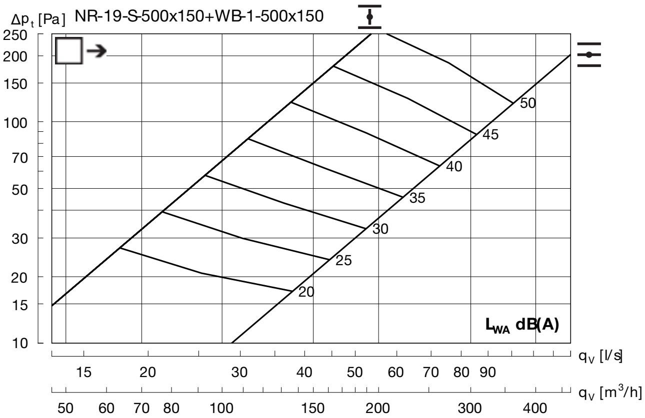
WB 1 - back connection



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	13	-3	1	-1	-4	-14	-19	-26

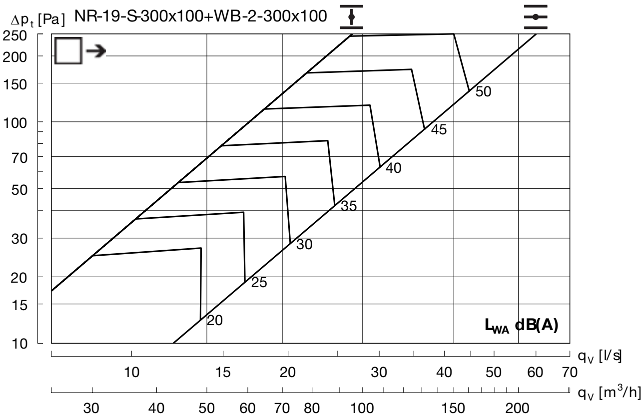


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	2	0	1	0	-6	-14	-20	-27

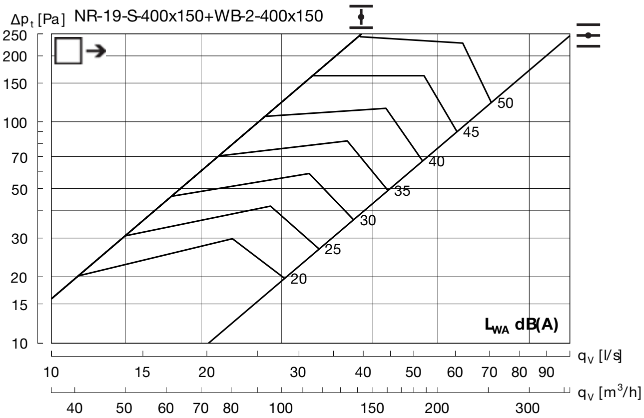


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	5	-1	2	0	-7	-14	-21	-29

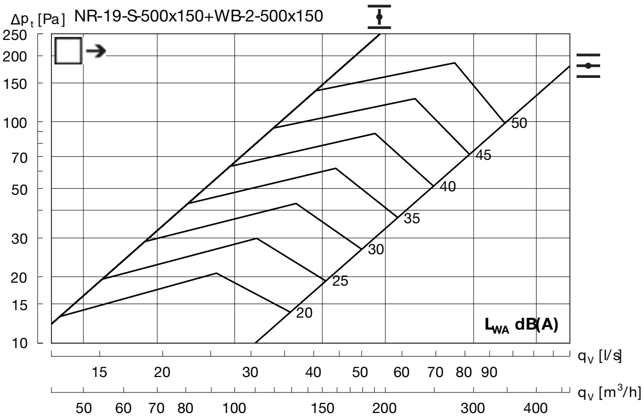
WB 2 - side connection



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	3	0	4	-1	-6	-16	-21	-28



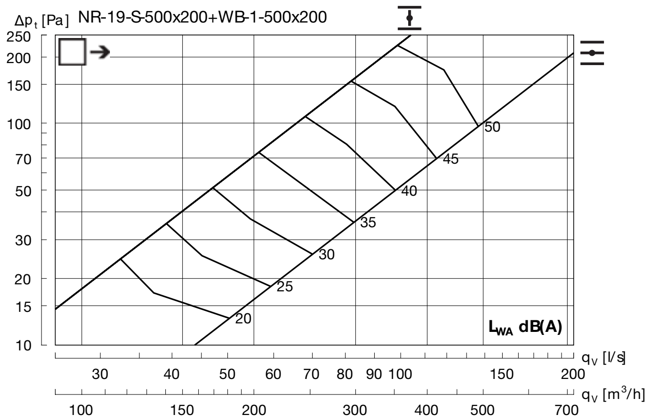
Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	4	2	2	-2	-5	-12	-20	-28



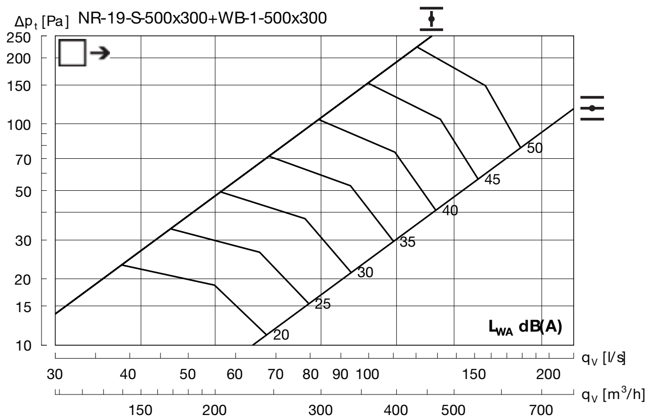
Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	5	1	0	-2	-4	-13	-22	-33

Wall diffuser NR19

WB 1 - back connection

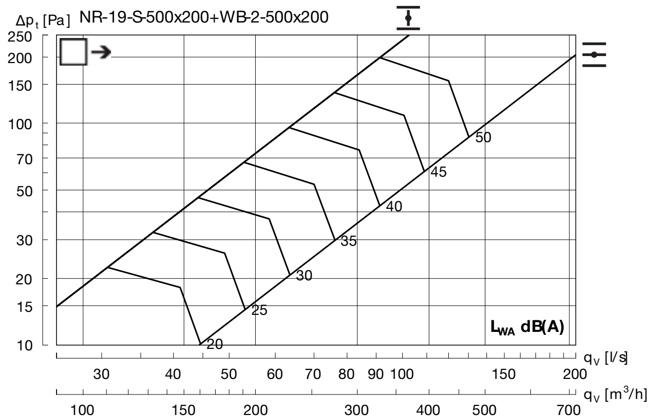


Hz	63	125	250	500	1K	2K	4K	8K
Kok	4	-1	1	0	-6	-14	-21	-29

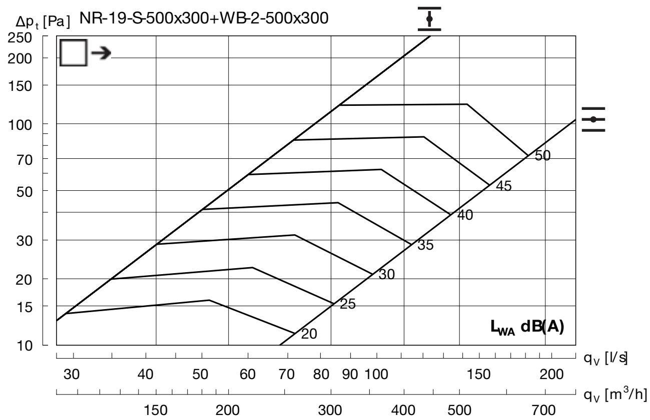


Hz	63	125	250	500	1K	2K	4K	8K
Kok	7	2	2	0	-7	-14	-21	-31

WB 2 - side connection



Hz	63	125	250	500	1K	2K	4K	8K
Kok	1	2	3	-1	-6	-16	-23	-31



Hz	63	125	250	500	1K	2K	4K	8K
Kok	1	3	0	-1	-4	-16	-26	-37

Wall diffuser DR24

Description

DR24 is a rectangular diffuser with adjustable bars suitable for installation in a wall or skirting board. The diffuser is suitable for the horizontal supply of cooled air. The bars in the front make it possible to vary the throw. The diffuser is used with a WB type plenum box. The plenum box is equipped with a damper and measuring device, enabling individual adjustment.

- Adjustable bars
- Flexible dispersal pattern
- Regardless of straight ducting before the diffuser
- Telescopic function in the plenum box

Maintenance

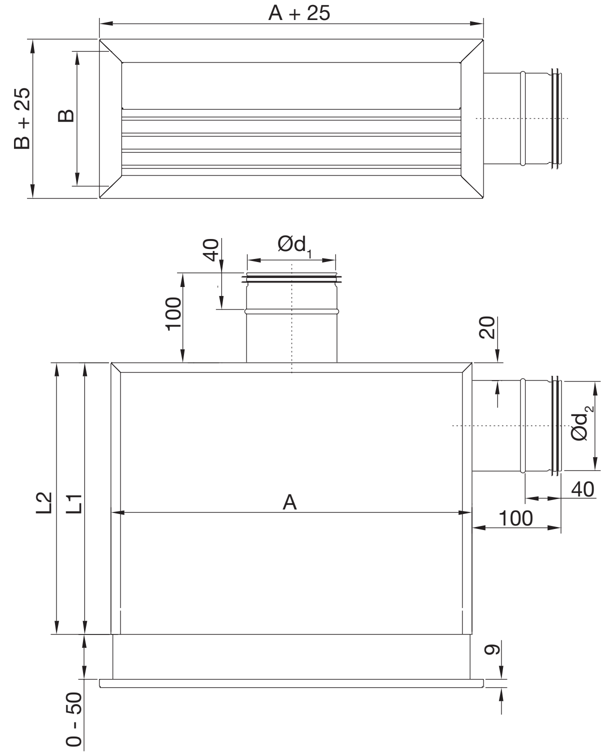
The front can be removed and the damper taken out for cleaning of internal parts or to gain access to the duct. The visible parts of the diffuser can be wiped with a damp cloth.

Order code

Product	DR24	S	A x B
Type	DR24		
Functional use S		S	
Size A x B			A x B

Product	WB	a	A x B
Type	WB		
Connection: 1 = Back, 2 = Side		a	
Size A x B			A x B

Dimensions



WB-1 Back connection

A x B Size	Ød1 mm	A mm	B mm	L1 mm	m kg
300 - 100	80	300	100	240	2,50
400 - 150	100	400	150	240	3,50
500 - 150	125	500	150	240	4,30
500 - 200	160	500	200	240	5,50
500 - 300	200	500	300	240	7,40

WB-2 Side connection

A x B Size	Ød2 mm	A mm	B mm	L2 mm	m kg
300 - 100	80	300	100	280	2,50
400 - 150	100	400	150	300	3,50
500 - 150	125	500	150	325	4,30
500 - 200	160	500	200	360	5,50
500 - 300	200	500	300	400	7,40

Materials and finish

Diffuser:	Galvanised steel
Standard finish:	Powder-coated
Standard colour:	RAL 9010 white, gloss 30

The diffuser is available in other colours. Please contact Lindab's sales department for further information.

Wall diffuser DR24

Technical data

Capacity
Volume flow q_v [l/s] and [m³/h], total pressure loss Δp_t [Pa], throw $l_{0.2}$ and sound level L_{WA} [dB(A)] can be seen in the diagrams.

Frequency-related sound effect level
The sound effect level in the frequency band is defined as $L_{WOK} = L_{WA} + K_{ok}$. K_{ok} values are specified in charts beneath the diagrams on the following pages.

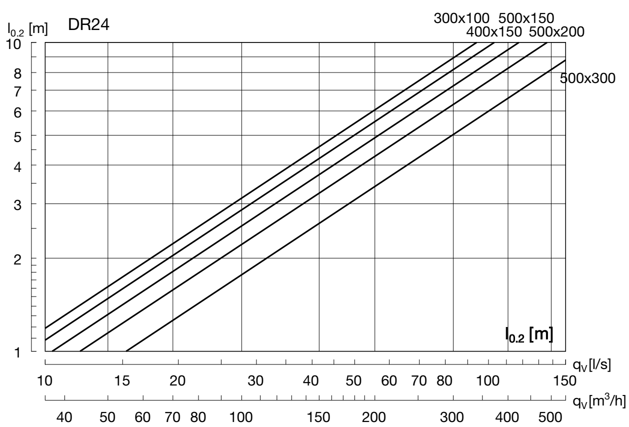
Quick selection
WB-1 Back connection

A x B	Minimum pi>5 Pa		p_t=50 Pa L_{WA}=30dB(A)		p_t=50 Pa L_{WA}=35dB(A)	
Size	l/s	m³/h	l/s	m³/h	l/s	m³/h
300 - 100	16	58	-	-	29	104
400 - 150	33	119	-	-	38	137
500 - 150	44	158	-	-	60	216
500 - 200	50	180	62	223	86	310
500 - 300	61	221	84	302	109	392

WB-2 Side connection

A x B	Minimum pi>5 Pa		p_t=50 Pa L_{WA}=30dB(A)		p_t=50 Pa L_{WA}=35dB(A)	
Size	l/s	m³/h	l/s	m³/h	l/s	m³/h
300 - 100	14	49	20	72	26	94
400 - 150	29	106	39	140	50	180
500 - 150	35	126	-	-	56	202
500 - 200	47	169	-	-	83	299
500 - 300	56	200	-	-	-	-

Throw $l_{0.2}$
The throw is specified at a terminal velocity of 0.2 m/s.



Sound attenuation
The diffuser's sound attenuation function from duct to room, including end reflection - see table below

WB-1 Back connection

A x B	Centre frequency Hz							
Size	63	125	250	500	1K	2K	4K	8K
300 - 100	24	18	14	7	9	11	11	12
400 - 150	21	19	7	6	9	11	11	11
500 - 150	20	19	7	9	8	10	10	10
500 - 200	17	15	5	10	8	12	10	10
500 - 300	15	12	4	13	9	11	10	10

WB-2 Side connection

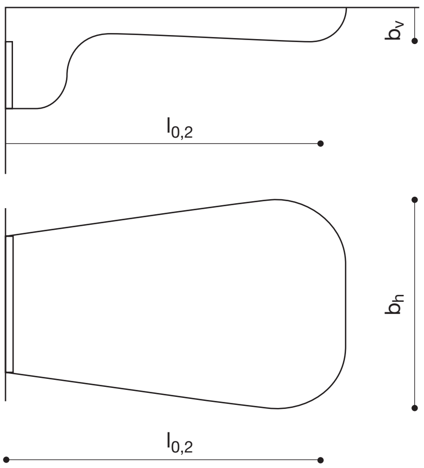
A x B	Centre frequency Hz							
Size	63	125	250	500	1K	2K	4K	8K
300 - 100	22	17	11	8	10	13	11	11
400 - 150	21	16	5	9	8	12	11	11
500 - 150	19	18	5	8	8	10	10	10
500 - 200	18	13	3	9	11	6	8	7
500 - 300	15	10	4	4	12	12	11	11

Balancing
Balancing data is contained in a separate brochure.

Wall diffuser DR24

Air jet dispersal

l_b = Distance from the diffuser to the point where there is maximum dispersal.
b_v = Depth of the air jet on a vertical plane.
b_h = Width of the air jet on a horizontal plane.

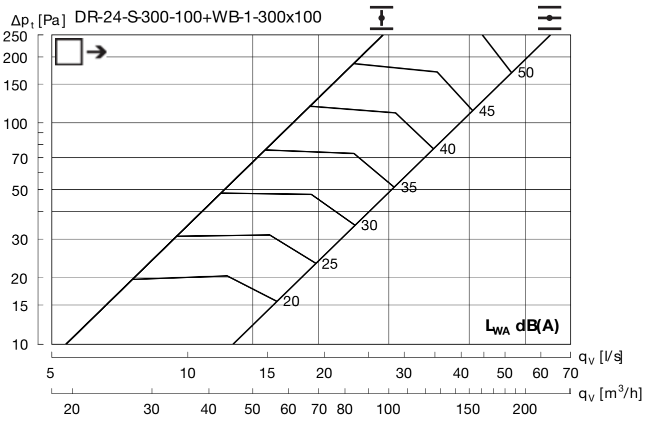


Normal throw 45° upwards
l_{02}: Diagram value
b_v: $0.05 \times l_{0.2}$
b_h: $1.8 \times l_{0.2}$

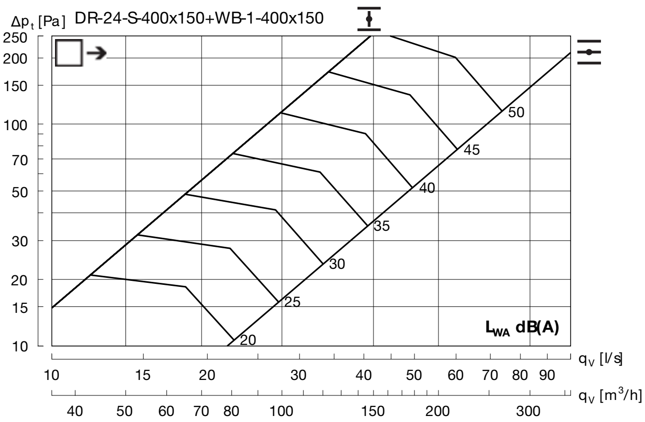
Long throw 0°
l_{02}: $1.5 \times$ Diagram value
b_v: $0.1 \times l_{0.2}$
b_h: $0.5 \times l_{0.2}$

Wall diffuser DR24

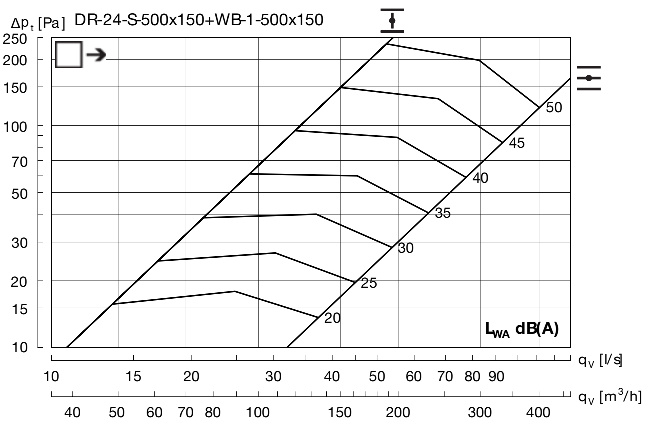
WB 1 - back connection



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	3	-5	1	-1	-4	-14	-23	-27

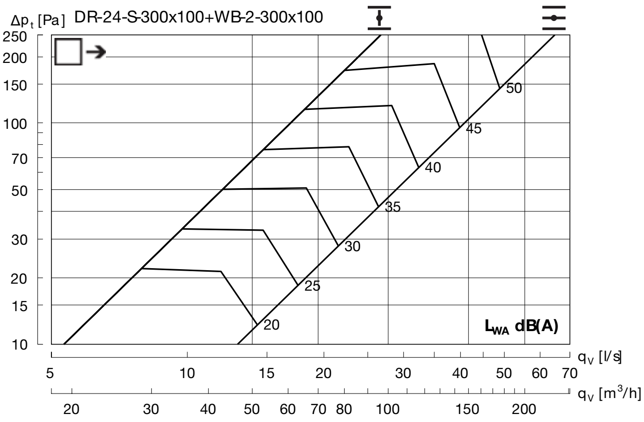


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	7	-1	1	0	-6	-17	-20	-26

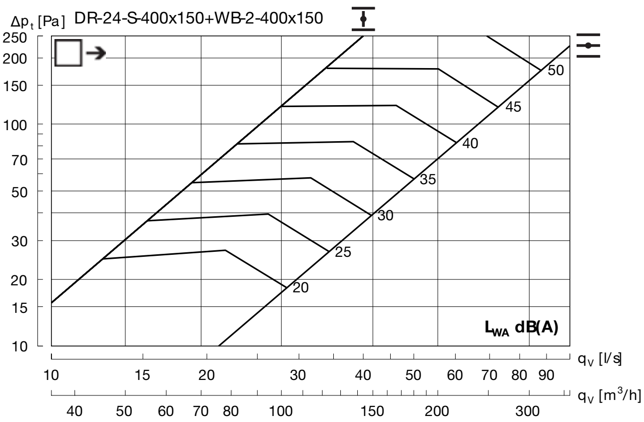


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	0	-1	2	1	-8	-15	-21	-28

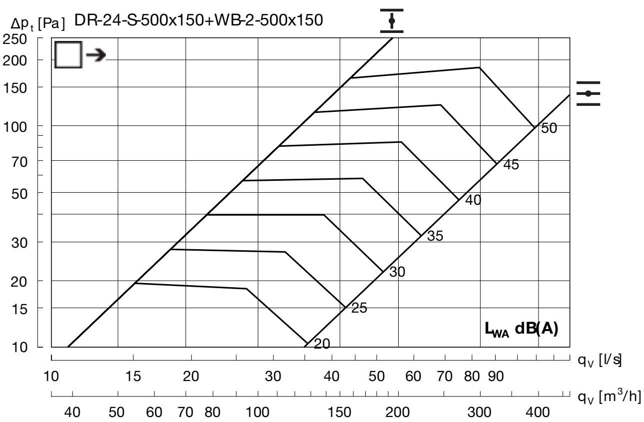
WB 2 - side connection



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	-2	1	4	-1	-6	-17	-22	-26



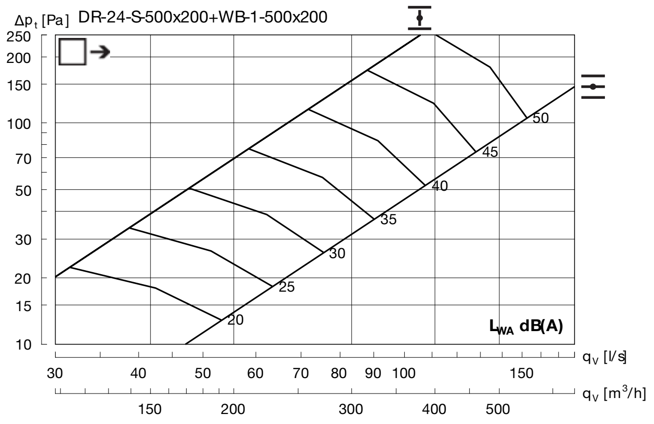
Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	1	3	2	-1	-6	-14	-20	-25



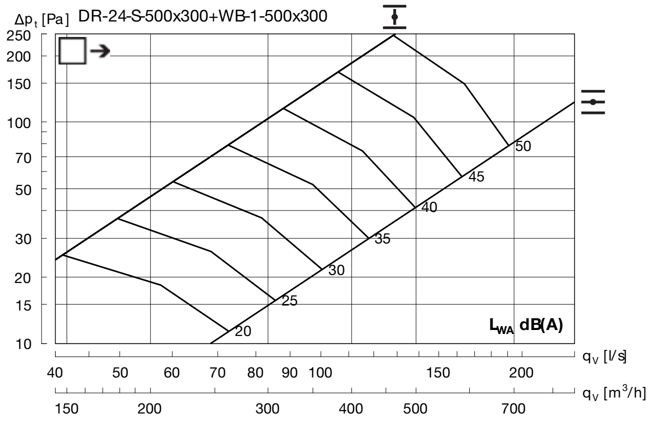
Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	2	0	-1	-2	-3	-13	-22	-32

Wall diffuser DR24

WB 1 - back connection

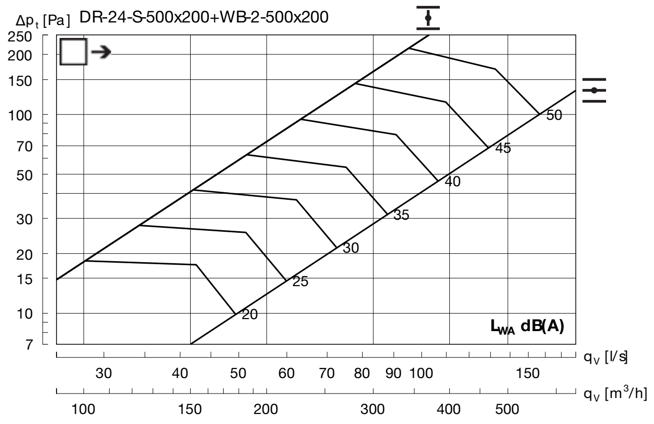


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	4	2	1	0	-7	-18	-23	-31

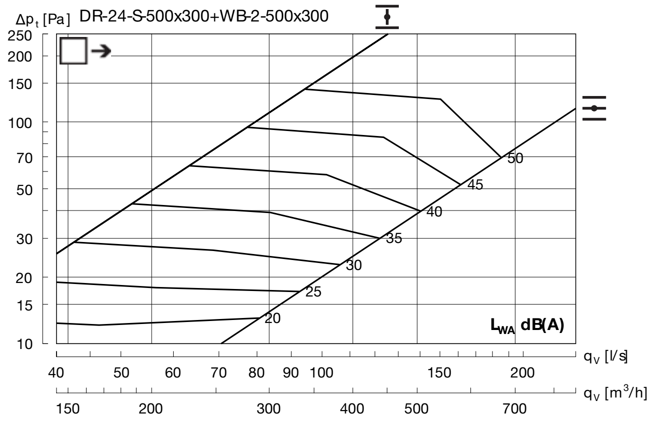


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	2	2	2	0	-7	-16	-22	-30

WB 2 - side connection



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	-1	2	0	-1	-4	-18	-23	-31



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	3	2	-2	0	-4	-17	-28	-37

Wall grille

B3020

Description

B3020 is a rectangular aluminium grille with fixed horizontal bars. B3020 can be used for supply air and exhaust. B3020 is supplied as standard with springs for installation in plenum boxes type VBA, WB. In the product photo the grille is shown with a VBA box.

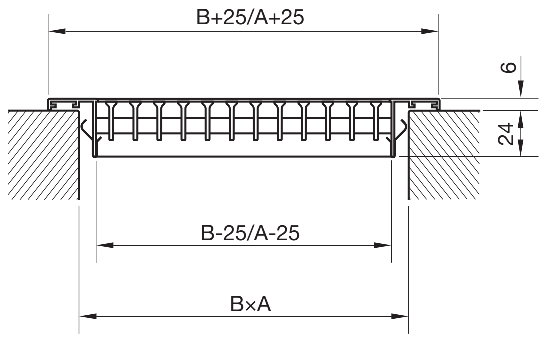
Maintenance

The grille should be removed to gain access to the plenum box or duct. The external parts should be wiped with a damp cloth.

Order code

Product	B3020	aaa	bbb
Type			
A - Measure			
B - Measure			

Dimensions



A x B mm			Free area F (m^2)	Weight kg
200	x	100	0,0072	0,3
300	x	100	0,0113	0,4
400	x	100	0,0155	0,5
500	x	100	0,0195	0,7
300	x	150	0,0189	0,6
400	x	150	0,0258	0,7
500	x	150	0,0326	1,0
600	x	150	0,0395	1,2
400	x	200	0,0361	0,8
500	x	200	0,0457	1,4
600	x	200	0,0553	1,6

Materials and finish

Grille: Aluminium
Standard finish: Natural anodized
On request: RAL 9010, gloss 30

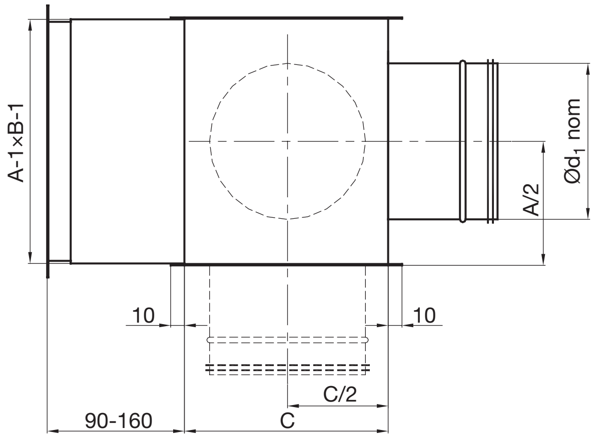
The grille is available in other colours. Please contact Lindab's sales department for further information.

Wall grille B3020

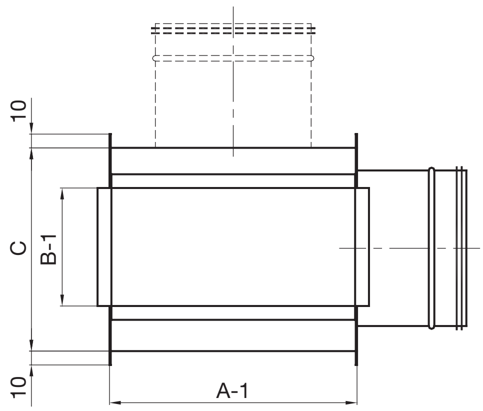
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

Dimensions

1:



2:



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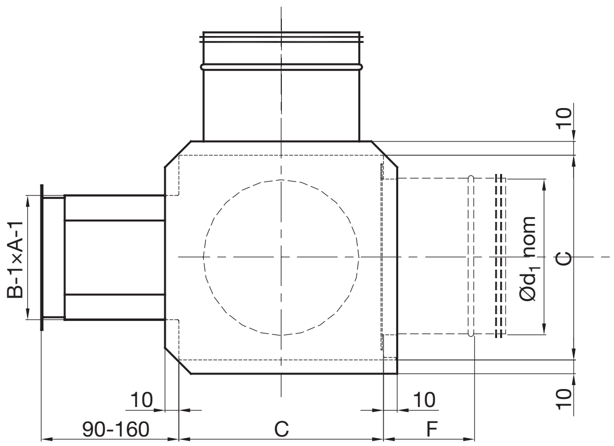


A x B mm	$Ød_1$ nom mm	C mm	F mm
200 x 100	125	165	90
300 x 100	160	200	110
300 x 150	200	240	130
400 x 100	160	200	110
400 x 150	250	290	155
400 x 200	250	290	155
500 x 100	200	240	130
500 x 150	250	290	155
500 x 200	315	355	190
600 x 150	250	290	155
600 x 200	315	355	190

Order code

Product **VBA** **a** **bbb** **ccc**

Type

Connection
1 = Back
2 = Side
4 = Top

A - Measure

B - Measure

We reserve the right to make changes without prior notice

Lindab

Wall grille

B3020

Technical data

Capacity

Volume flow q_v [l/s] and [m^3/h], total pressure loss Δp_t [Pa], throw $l_{0.2}$ [m] and sound level L_{WA} [dB(A)] can be seen in the diagrams.

Frequency-related sound effect level

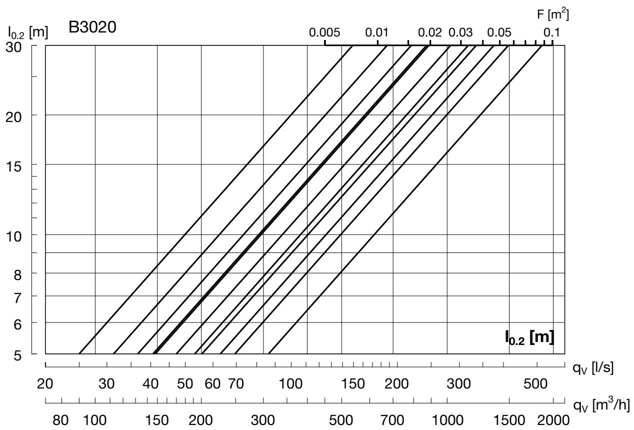
The sound effect level in the frequency band is defined as L_{WOK} = L_{WA}+ K_{ok} K_{ok} values are given in chart. See table below.

Supply air Size	Centre frequency Hz 63	125	250	500	1K	2K	4K	8K
Open damper	-2	-3	-3	-3	-4	-7	-18	-24
50 % open damper	-1	1	-2	-3	-4	-8	-17	-22
Closed damper	-2	0	-3	-3	-7	-9	-8	-10

Exhaust Size	Centre frequency Hz 63	125	250	500	1K	2K	4K	8K
Open damper	-6	-2	1	-2	-5	-11	-18	-22
50 % open damper	-5	0	1	-2	-4	-12	-20	-23
Closed damper	-11	-2	0	-4	-6	-12	-8	-9

Throw $l_{0.2}$

Throw $l_{0.2}$ [m] at an average speed of 0.2 m/s, 0º bar setting without ceiling effect (distance from diffuser to grille over 800 mm) can be seen in the diagrams. Correction for dispersal - see table below.



Correction of throw

Bar setting	45º	90º
Correction factor	0,8	0,5

Sound attenuation

The diffuser's sound attenuation function from duct to room, including end reflection - see table below (incl. VBA).

Size	Centre frequency Hz 63	125	250	500	1K	2K	4K	8K
200x100	25	20	12	10	6	12	12	12
300x150	16	12	8	10	10	11	11	12
300x100	23	19	11	10	8	12	10	12
400x150	14	10	8	10	11	12	10	12
400x200	15	12	9	8	8	11	12	12
400x100	21	17	10	10	8	11	11	12
500x200	13	10	9	8	8	9	10	11
500x150	15	11	9	8	8	11	10	10
500x100	20	16	9	9	8	13	11	11
600x200	13	10	9	8	8	9	11	11
600x150	14	10	8	9	8	10	10	11

Balancing

Balancing data is contained in a separate brochure.

Correction sound

Correction values for conversion of diagram data for connection from the side or top – see table below.

	B3020 + VBA-2 Side	B3020 + VBA-4 Top
Open damper	+2 dB	+4 dB
50 % open damper	+1 dB	+1 dB
Closed damper	0 dB	0 dB

Correction of sound level at bars (dB) - see table below.

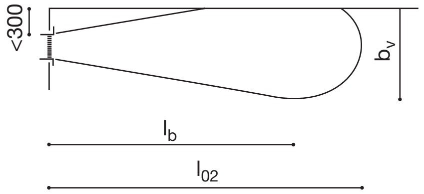
Bar setting	45º	90º
Correction factor	+3	+10

Wall grille

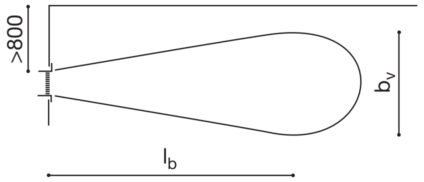
B3020

Technical data

Air jet dispersal



$b_v = 0{,}06 \times l_{0,2}$
$l_b = 0{,}6 \times l_{0,2}$



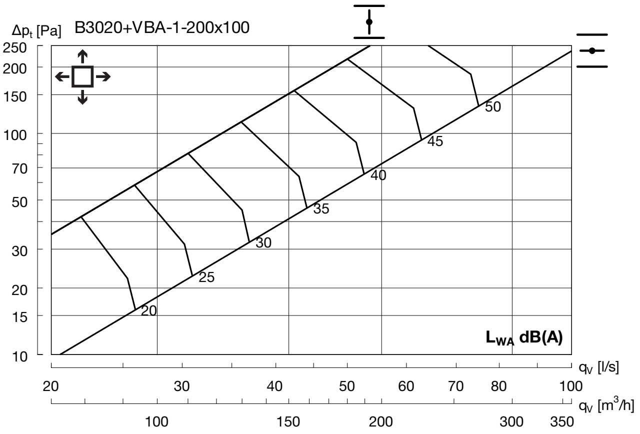
$b_v = 0{,}1 \times l_{0,2}$
$l_b = 0{,}5 \times l_{0,2}$

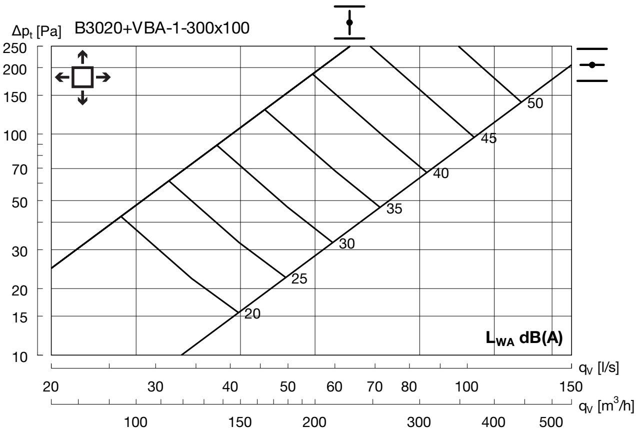
Wall grille

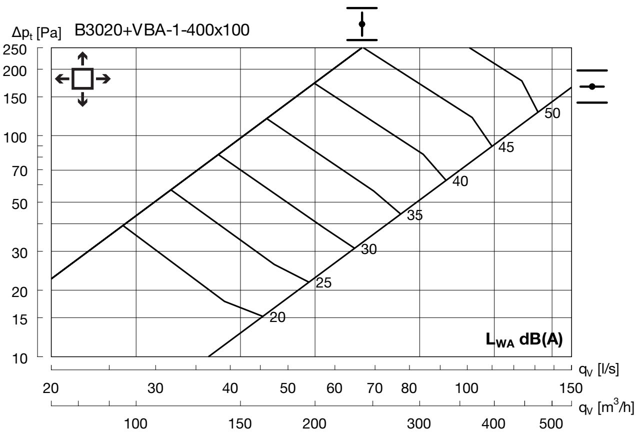
B3020

Technical data

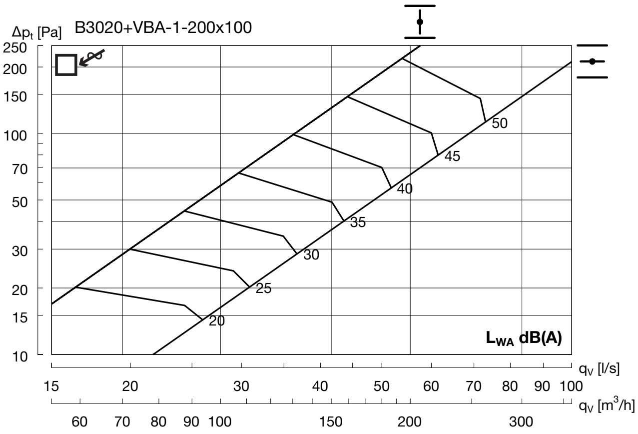
Supply air

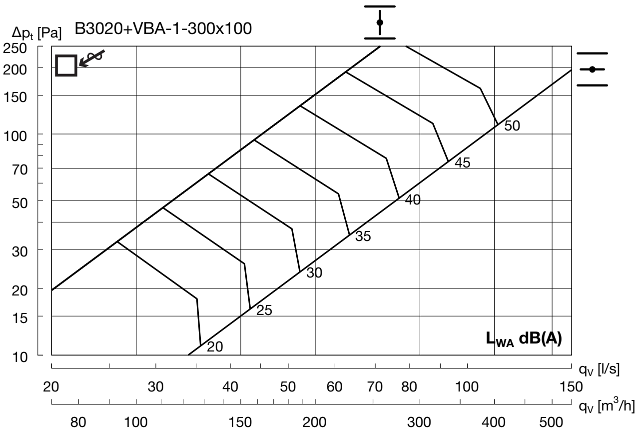


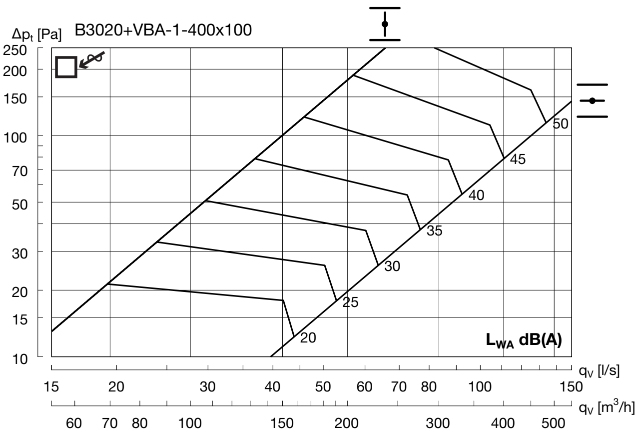




Exhaust air





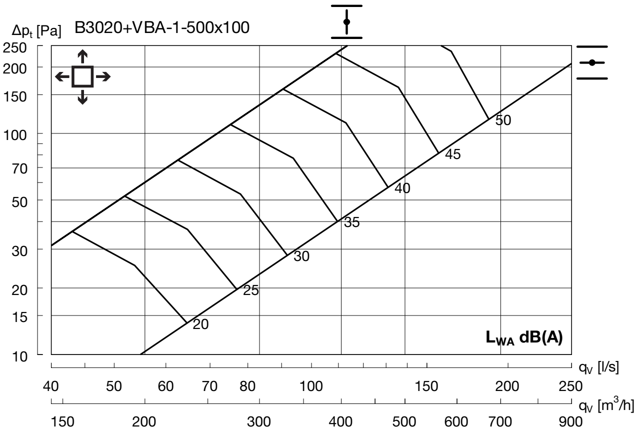


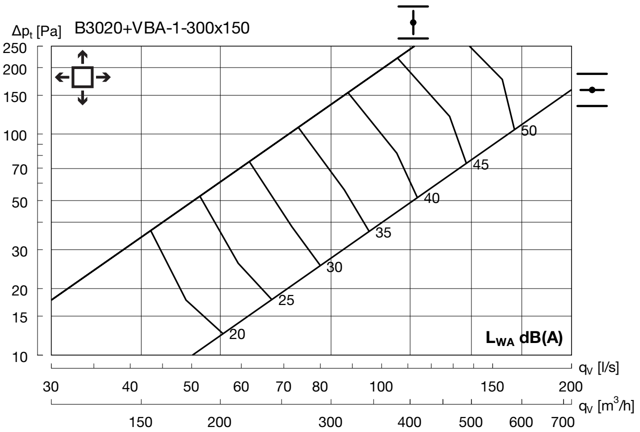
Wall grille

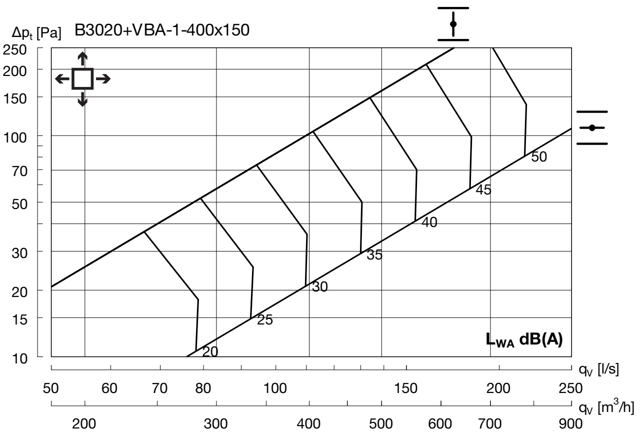
B3020

Technical data

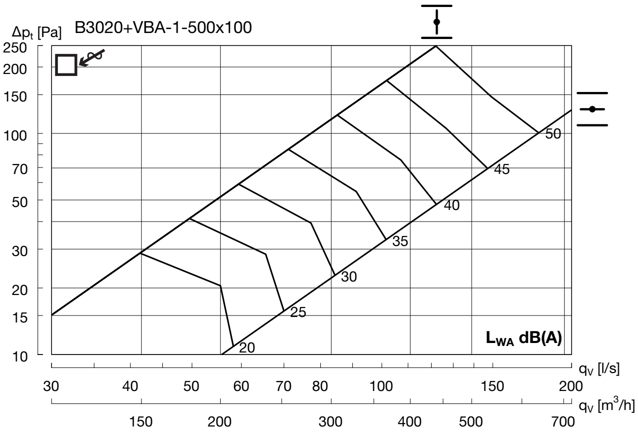
Supply air

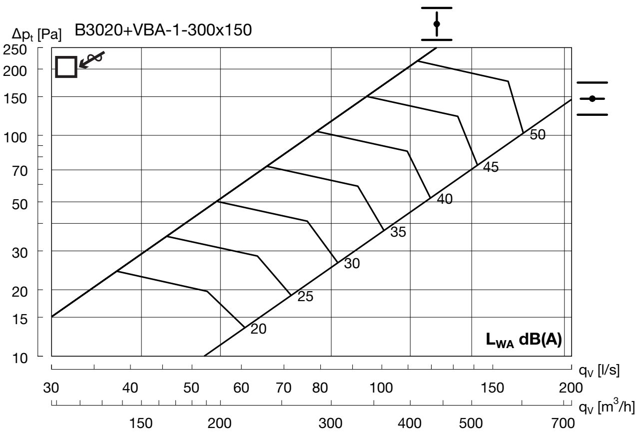


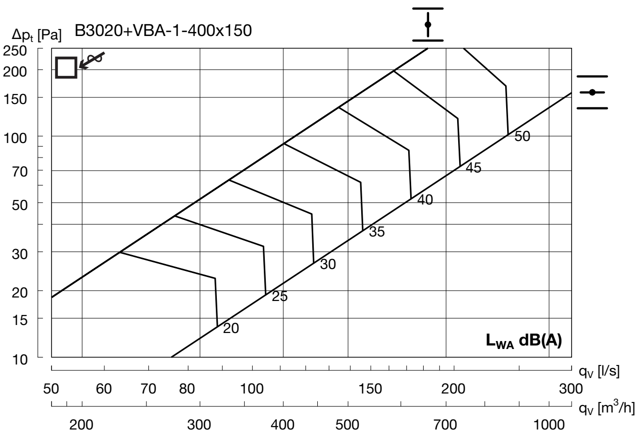




Exhaust air



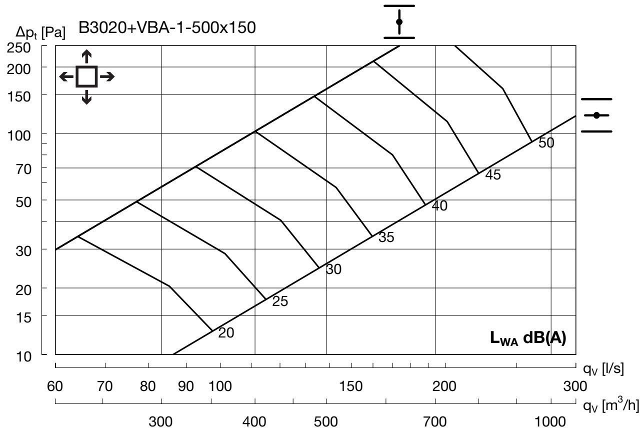


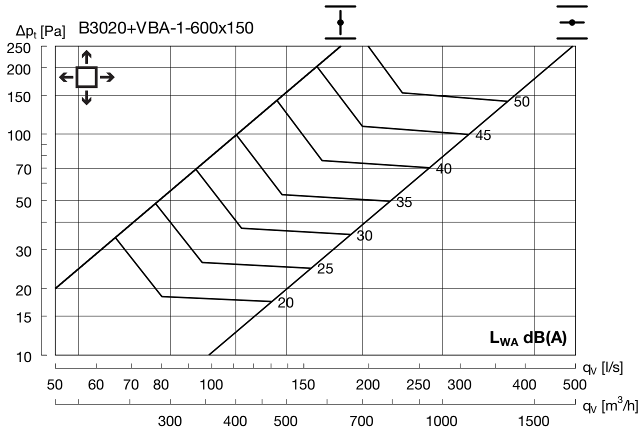


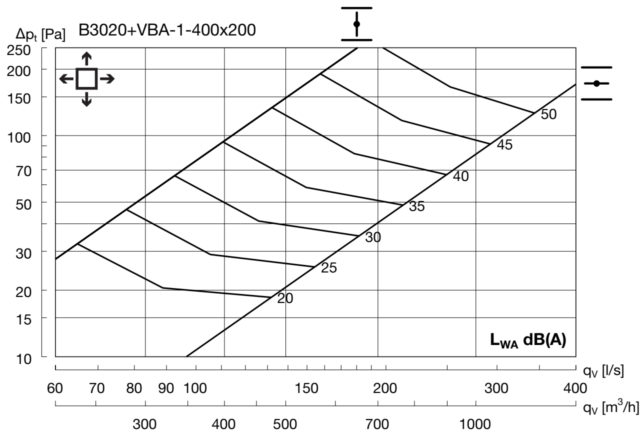
Wall grille B3020

Technical data

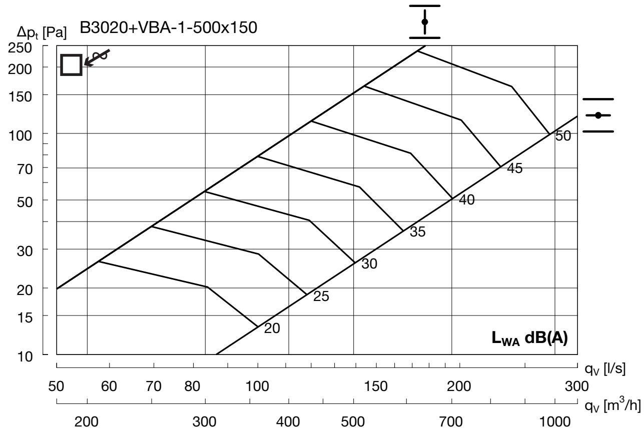
Supply air

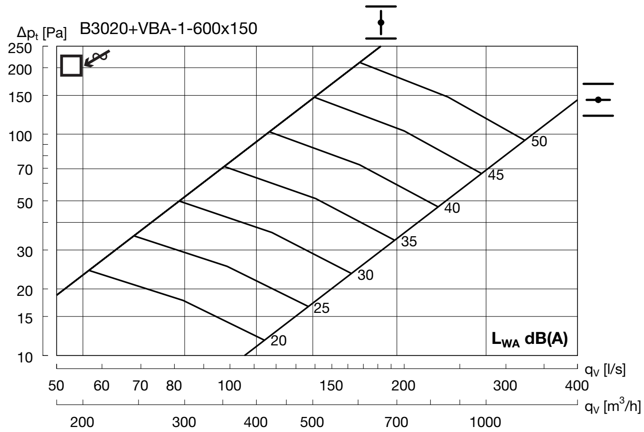


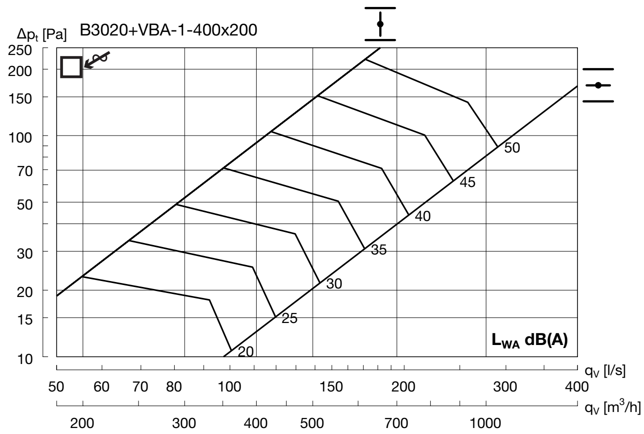




Exhaust air





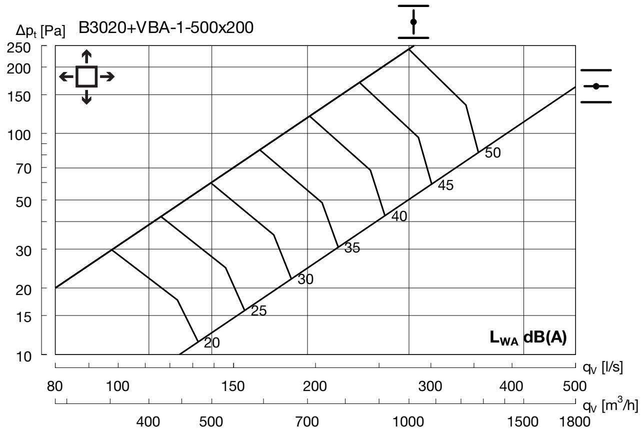


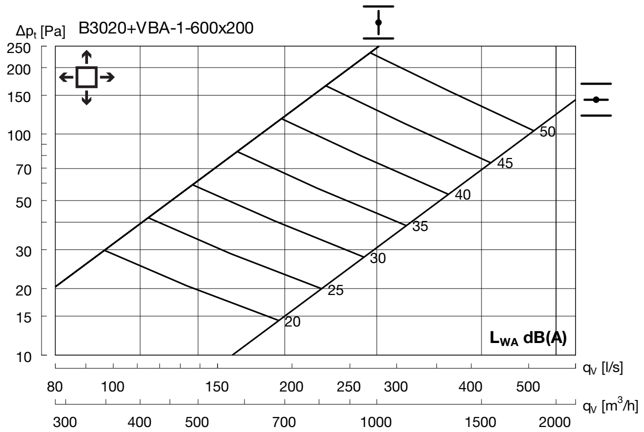
Wall grille

B3020

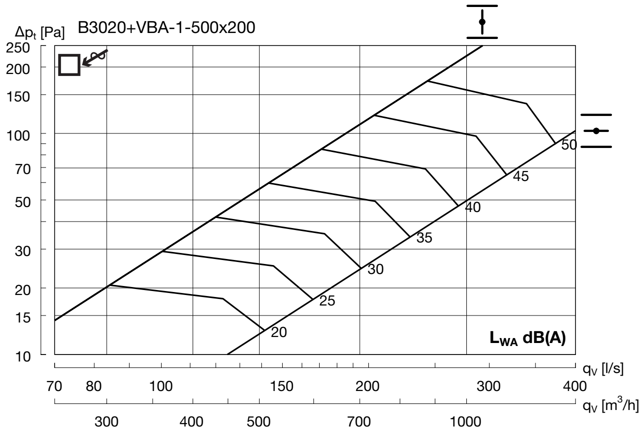
Technical data

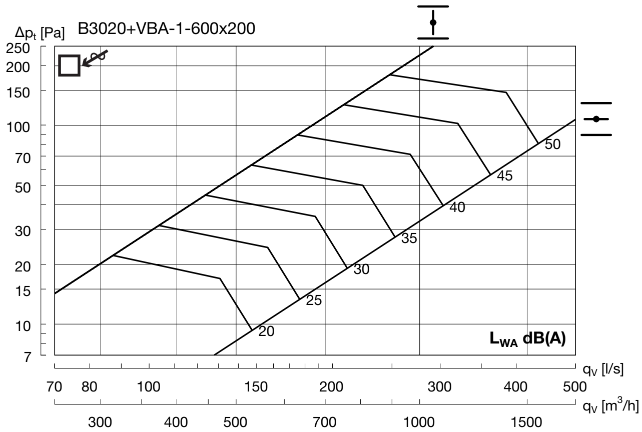
Supply air





Exhaust air





Wall grille C20/C21

Description

C20 is a rectangular aluminium grille with adjustable horizontal bars. C21 is also equipped with vertical directional bars for regulation of dispersal patterns. C20/C21 can be used for supply air and come as standard with springs for installation in plenum boxes type VBA and WB. In the product photo the grille is shown with a VBA box.

Maintenance

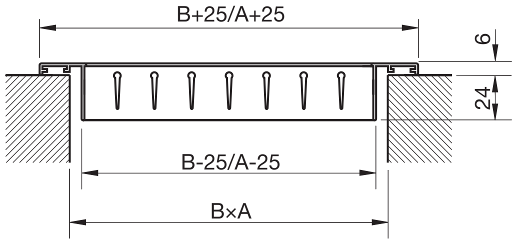
The grille should be removed to gain access to the plenum box or duct. The external parts should be wiped with a damp cloth.

Order code

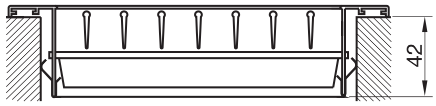
Product	C20/C21	aaa	bbb
Type			
A - Measure			
B - Measure			

Dimensions

C20



C21



A x B mm	Free area F(m²)	Weight kg
200 x 100	0,0105	0,3
300 x 100	0,0164	0,4
400 x 100	0,0225	0,5
500 x 100	0,0283	0,7
300 x 150	0,0275	0,6
400 x 150	0,0375	0,7
500 x 150	0,0475	1,0
600 x 150	0,0574	1,2
400 x 200	0,0525	0,9
500 x 200	0,0664	1,4
600 x 200	0,0804	1,6

Materials and finish

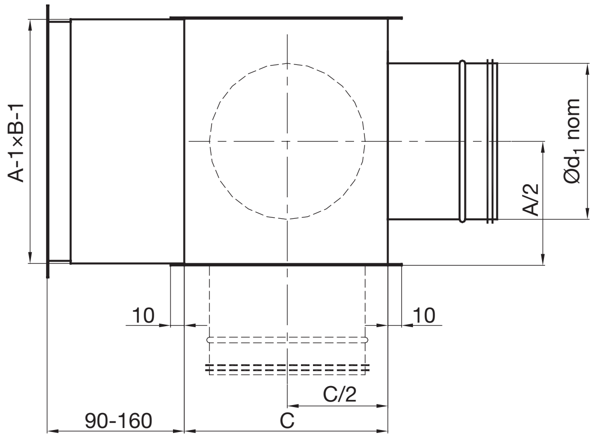
Grille: Aluminium
Standard finish: Natural anodized
On request: RAL 9010, gloss 30

The grille is available in other colours. Please contact Lindab's sales department for further information.

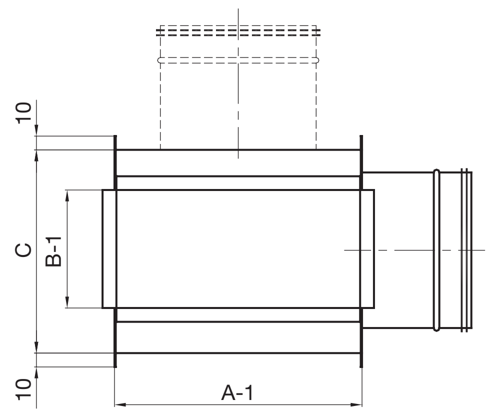
Wall grille C20/C21

Dimensions

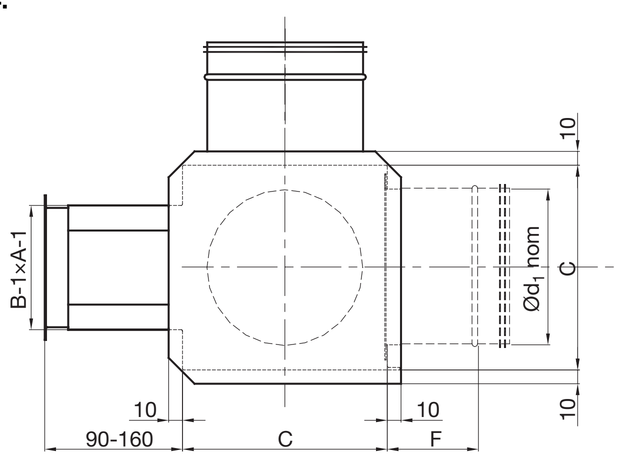
1:



2:



4:



A x B mm	Ød$_1$ nom mm	C mm	F mm
200 x 100	125	165	90
300 x 100	160	200	110
300 x 150	200	240	130
400 x 100	160	200	110
400 x 150	250	290	155
400 x 200	250	290	155
500 x 100	200	240	130
500 x 150	250	290	155
500 x 200	315	355	190
600 x 150	250	290	155
600 x 200	315	355	190

Order code

Product **VBA** **a** **bbb** **ccc**

Type

Connection 1 = back
2 = side
4 = Top

A - Measure

B - Measure

Wall grille

C20/C21

Technical data

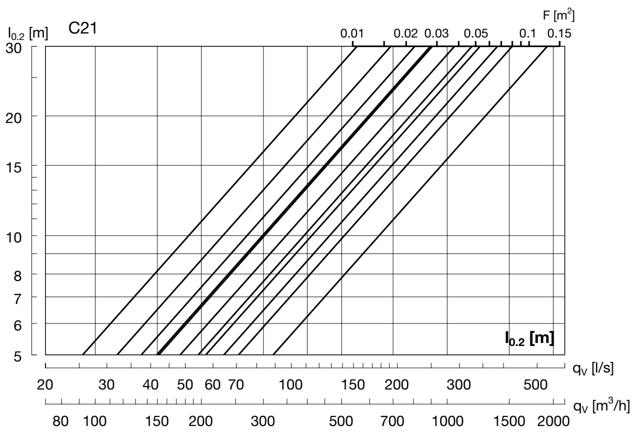
Capacity

Volume flow q_v [l/s] and [m^3/h], total pressure loss Δp_t [Pa], throw $l_{0.2}$ [m] and sound level L_{WA} [dB(A)] can be seen in the diagrams.

Size	Centre frequency Hz 63	125	250	500	1K	2K	4K	8K
Open damper	1	0	1	1	0	-3	-13	-19
50 % open damper	3	5	2	1	6	-4	-13	-18
Closed damper	2	4	1	1	-3	-5	-4	-6

Throw $l_{0.2}$

Throw $l_{0.2}$ [m] at an average speed of 0.2 m/s, 0º bar setting without ceiling effect (distance from diffuser to grille over 800 mm) can be seen in the diagrams. Correction for dispersal - see table below.



Correction of throw

Bar setting	45º	90º
Correction factor	0,8	0,5

Sound attenuation

The diffuser's sound attenuation function from duct to room, including end reflection - see table below

Size	Centre frequency Hz 63	125	250	500	1K	2K	4K	8K
200x100	25	20	12	10	6	12	12	12
300x150	16	12	8	10	10	11	11	12
300x100	23	19	11	10	8	12	10	12
400x150	14	10	8	10	11	12	10	12
400x200	15	11	9	8	8	11	12	12
400x100	21	17	10	10	8	11	11	12
500x200	13	10	9	8	8	9	10	11
500x150	15	11	9	8	8	11	10	10
500x100	20	16	9	9	8	13	11	11
600x200	13	10	9	8	8	9	11	11
600x150	14	10	8	9	8	10	10	11

Balancing

Balancing data is contained in a separate brochure.

Correction sound

Correction values for conversion of diagram data for connection from the side or top – see table below.

	C20/C21 + VBA-2 Side	C20/C21 + VBA-4 Top
Open damper	+2 dB	+4 dB
50 % open damper	+1 dB	+1 dB
Closed damper	0 dB	0 dB

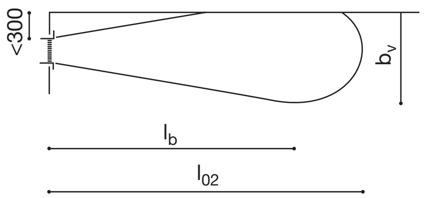
Correction of sound level at bars (dB) - see table below.

Bar setting	45º	90º
Correction factor	+3	+10

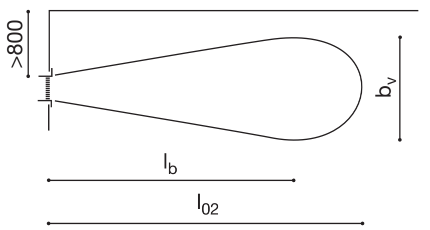
Wall grille C20/C21

Technical data

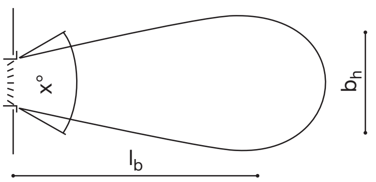
Air jet dispersal



$b_v = 0{,}06 \times l_{0,2}$
$l_b = 0{,}6 \times l_{0,2}$



$b_v = 0{,}1 \times l_{0,2}$
$l_b = 0{,}5 \times l_{0,2}$

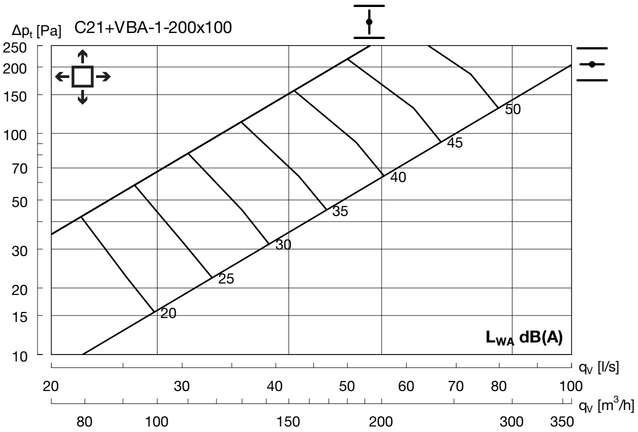


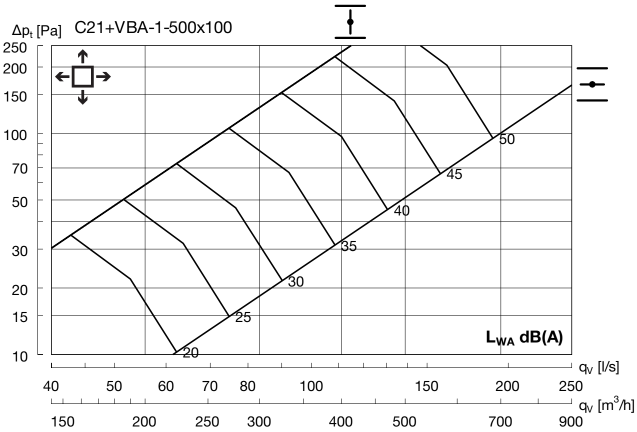
$X = 0^o$: $b_h = 0.3 \times l_{0.2}$ $l_b = 0.5 \times l_{0.2}$
$X = 45^o$: $b_h = 0.4 \times l_{0.2}$ $l_b = 0.5 \times l_{0.2}$
$X = 90^o$: $b_h = 0.6 \times l_{0.2}$ $l_b = 0.5 \times l_{0.2}$

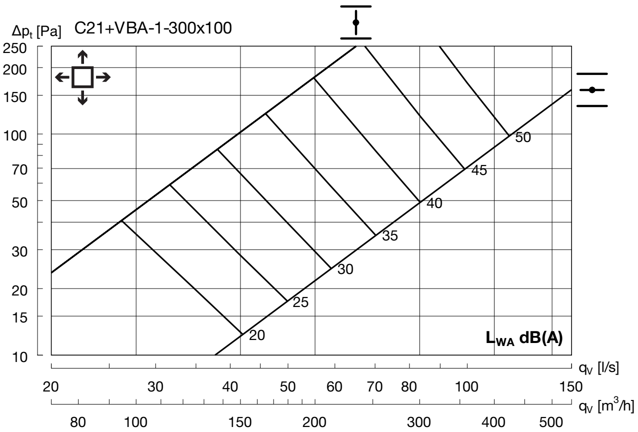
Wall grille C20/C21

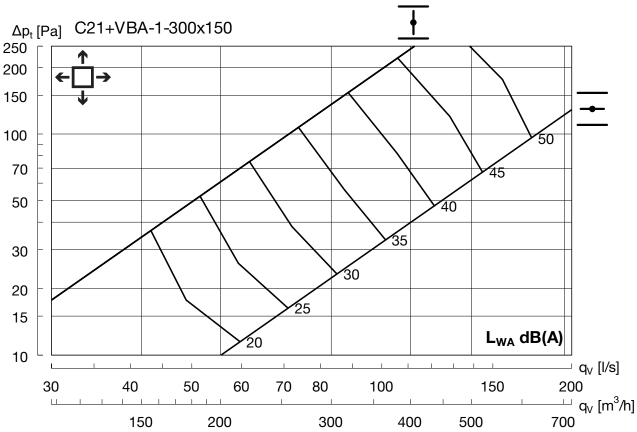
Technical data

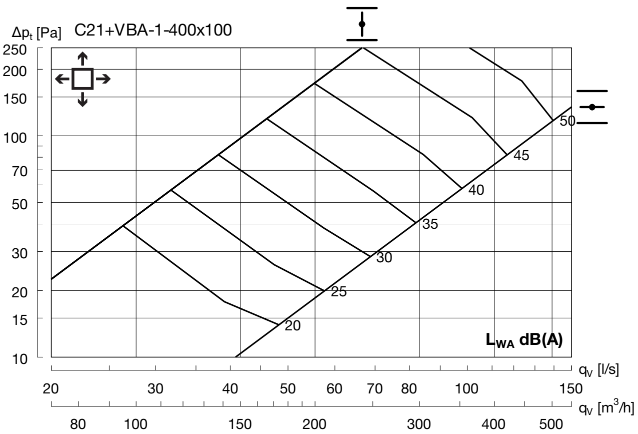
Supply air

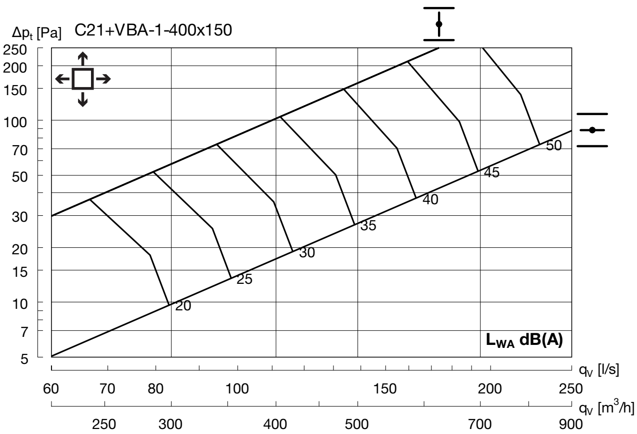










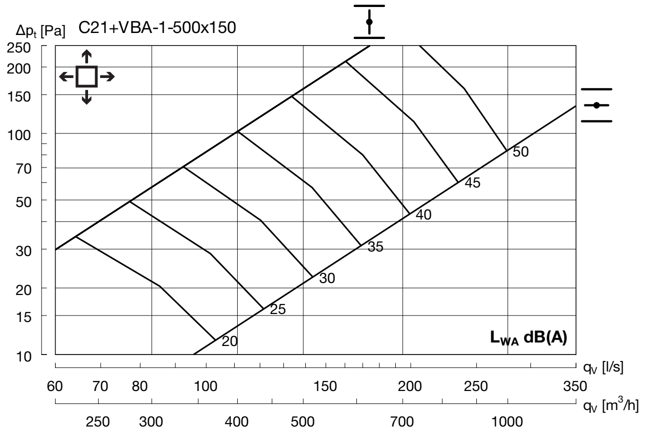


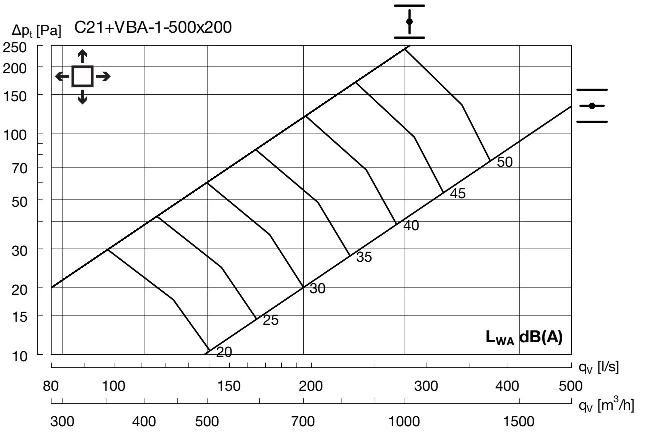
Wall grille

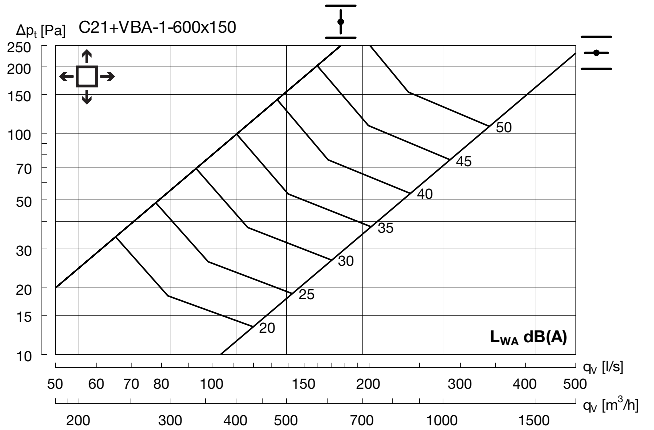
C20/C21

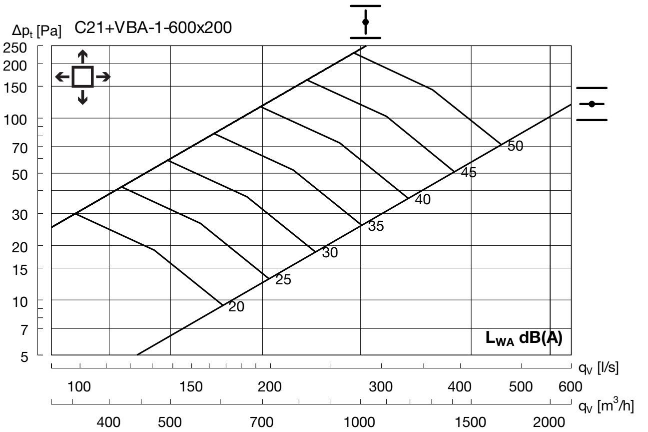
Technical data

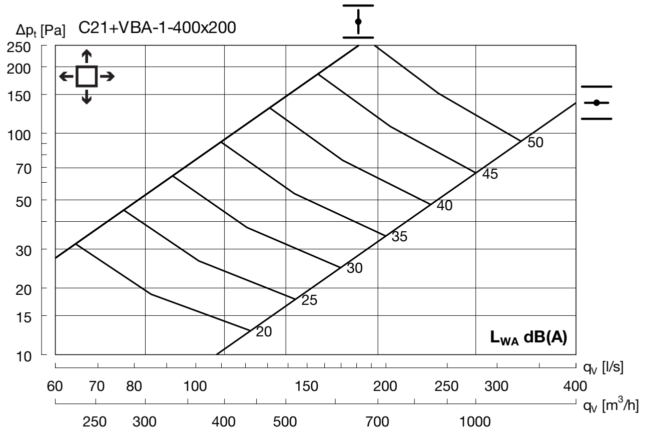
Supply air







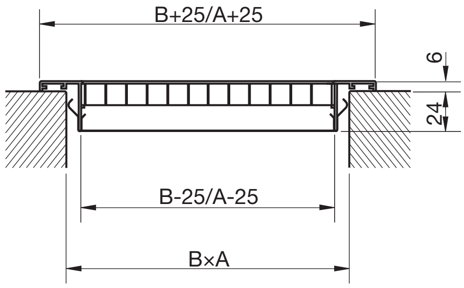




Wall grille

F20

Dimensions



A x B mm			Free area F(m2)	Weight kg
200	x	100	0,0111	0,2
300	x	100	0,0144	0,3
400	x	100	0,0240	0,3
500	x	100	0,0301	0,4
300	x	150	0,0292	0,3
400	x	150	0,0398	0,4
500	x	150	0,0504	0,5
600	x	150	0,0610	0,6
400	x	200	0,0557	0,5
500	x	200	0,0706	0,6
600	x	200	0,0854	0,7

Description

F20 is a rectangular aluminium grille with fixed slanting horizontal bars. F20 is used for air exhaust and is supplied as standard with springs for installation in plenum boxes type VBA and WB. In the product photo the grille is shown with a VBA box.

Maintenance

The grille should be removed to gain access to the plenum box or duct. The external parts should be wiped with a damp cloth.

Order code

Product	F20	aaa	bbb
Type			
A - Measure			
B - Measure			

Materials and finish

Grille: Aluminium
Standard finish: Natural anodized
On request: RAL 9010, gloss 30

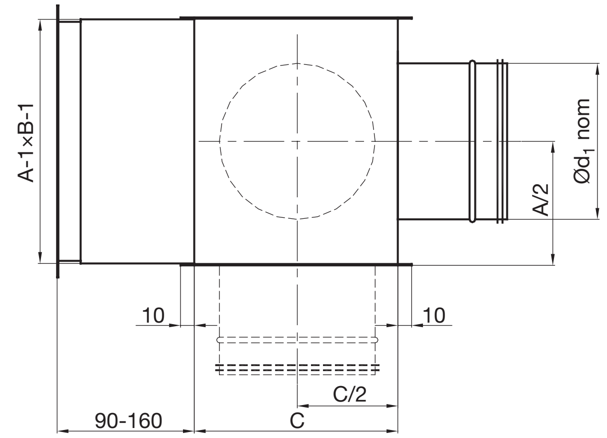
The grille is available in other colours. Please contact Lindab's sales department for further information.

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

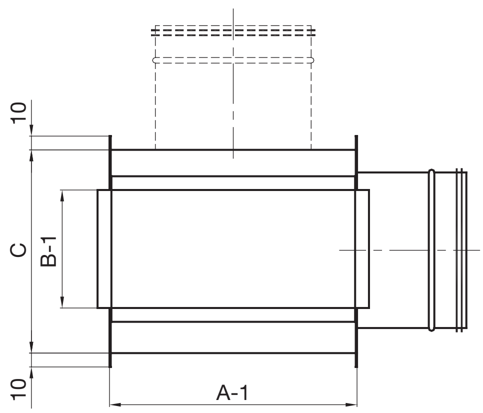
Wall grille F20

Dimensions

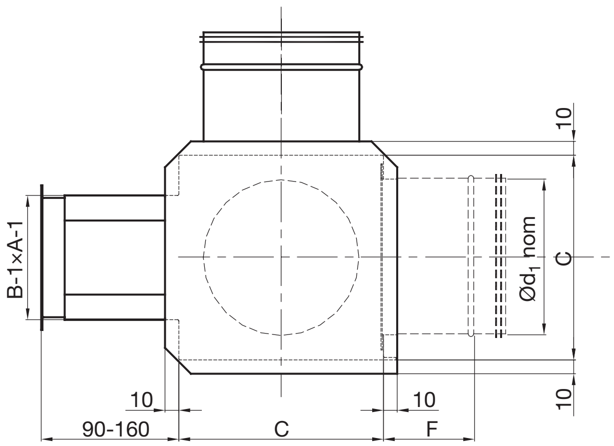
1:



2:



4:



A x B mm	$Ød_1$ nom mm	C mm	F mm
200 x 100	125	165	90
300 x 100	160	200	110
300 x 150	200	240	130
400 x 100	160	200	110
400 x 150	250	290	155
400 x 200	250	290	155
500 x 100	200	240	130
500 x 150	250	290	155
500 x 200	315	355	190
600 x 150	250	290	155
600 x 200	315	355	190

Order code

Product	**VBA**	**a**	**bbb**	**ccc**
Type	VBA			
Connection: 1 = Back, 2 = Side, 4 = Top		a		
A - Measure			bbb	
B - Measure				ccc

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18

Lindab

Wall grille F20

Technical data

Capacity

Volume flow q_v [l/s] and [m^3/h], total pressure drop Δp_t [Pa], and sound level L_{WA} [dB(A)] can be seen in the diagrams.

Size	Centre frequency Hz 63	125	250	500	1K	2K	4K	8K
Open damper	-3	2	2	0	1	-4	-13	-20
50 % open damper	-1	6	4	1	0	-6	-11	-17
Closed damper	-4	2	2	1	0	-5	-7	-9

Correction sound

Correction values for conversion of diagram data for connection from the side or top – see table below.

	F20 + VBA-2 Side	F20 + VBA-4 Top
Open damper	+2 dB	+4 dB
50 % open damper	+1 dB	+1 dB
Closed damper	0 dB	0 dB

Sound attenuation

The diffuser's sound attenuation function from duct to room, including end reflection - see table below (incl. VBA).

Size	Centre frequency Hz 63	125	250	500	1K	2K	4K	8K
200x100	25	20	12	10	6	12	12	12
300x150	16	12	8	10	10	11	11	12
300x100	23	19	11	10	8	12	10	12
400x150	14	10	8	10	11	12	10	12
400x200	15	11	9	8	8	11	12	12
400x100	21	17	10	10	8	11	11	12
500x200	13	10	9	8	8	9	10	11
500x150	15	11	9	8	8	11	10	10
500x100	20	16	9	9	8	13	11	11
600x200	13	10	9	8	8	9	11	11
600x150	14	10	8	9	8	10	10	11

Balancing

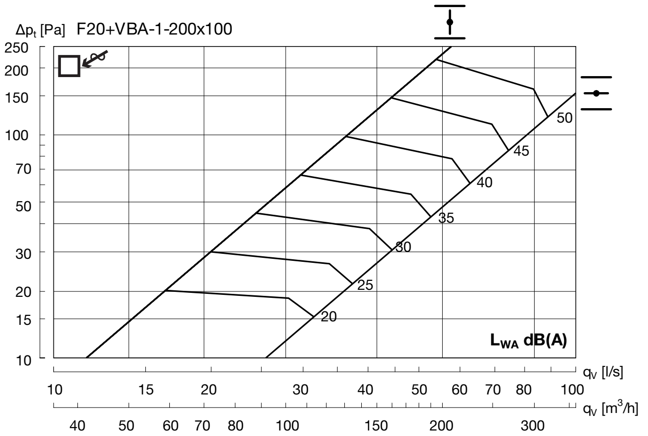
Balancing data is contained in a separate brochure.

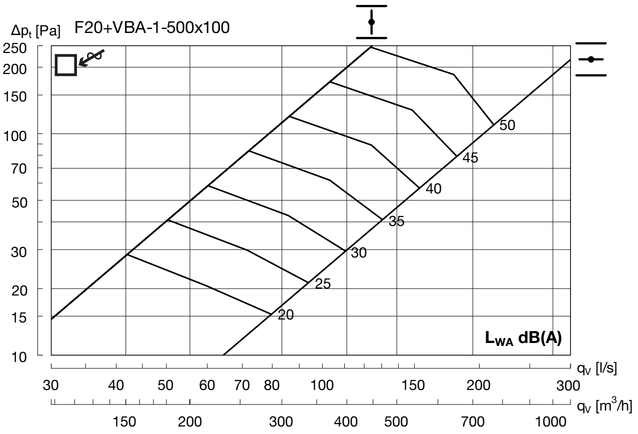
Wall grille

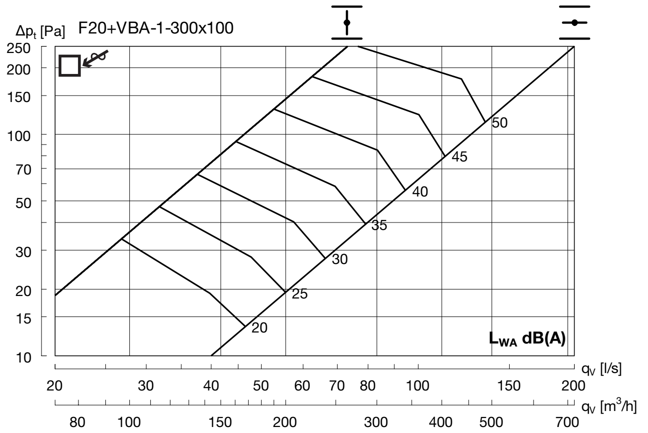
F20

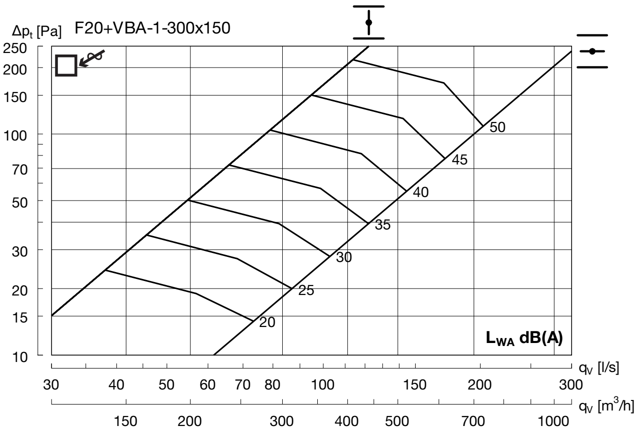
Technical data

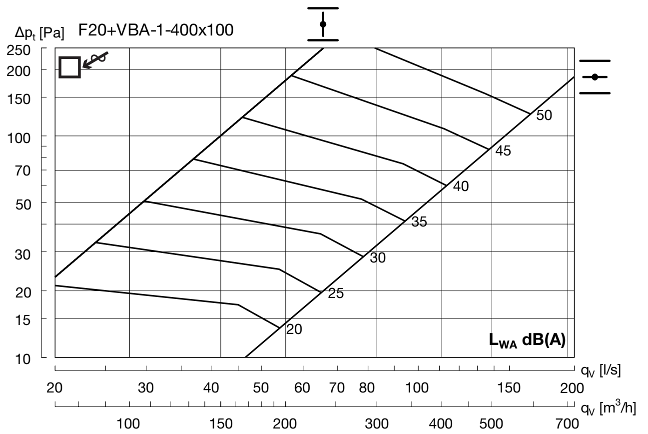
Exhaust air

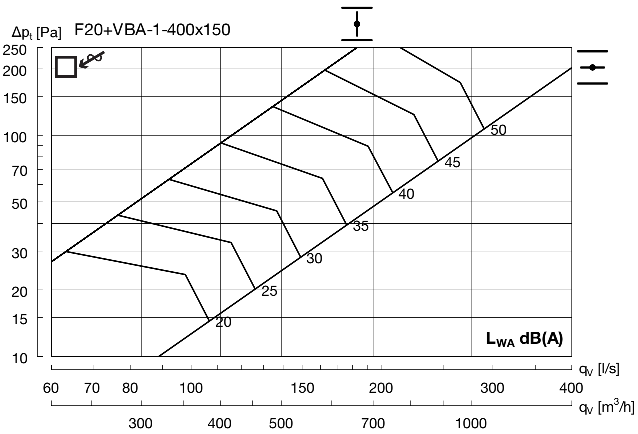










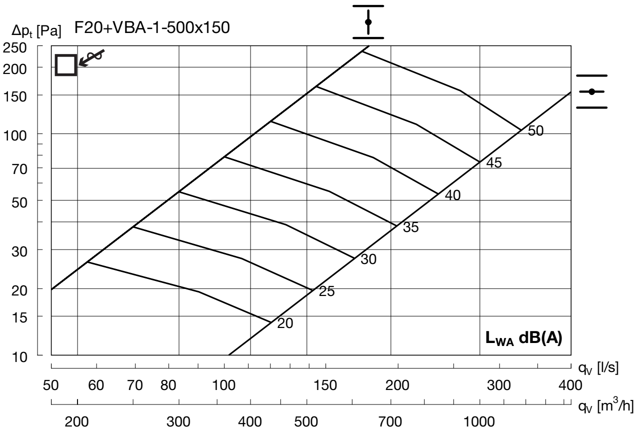


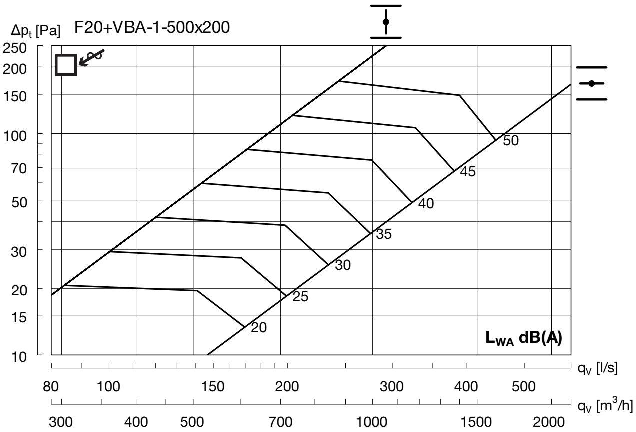
Wall grille

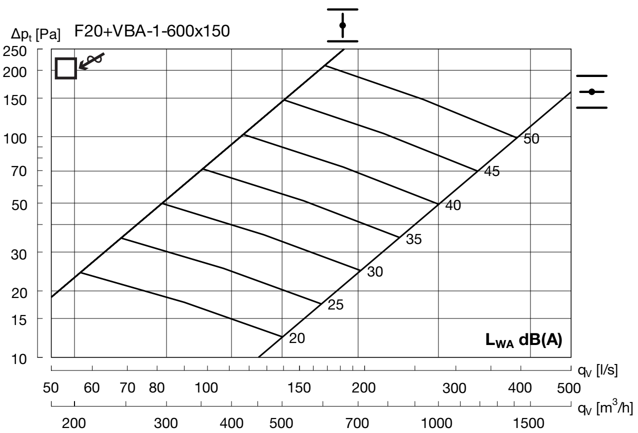
F20

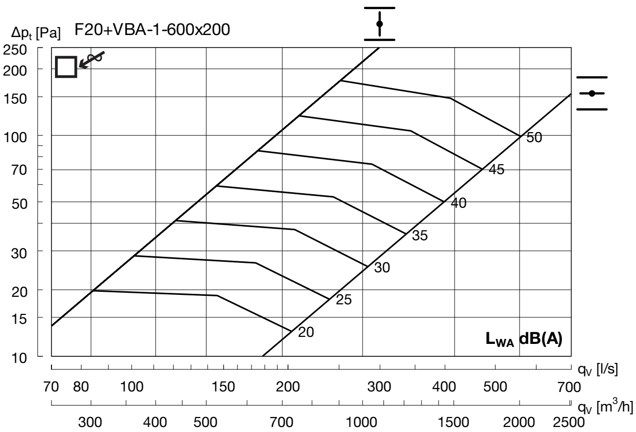
Technical data

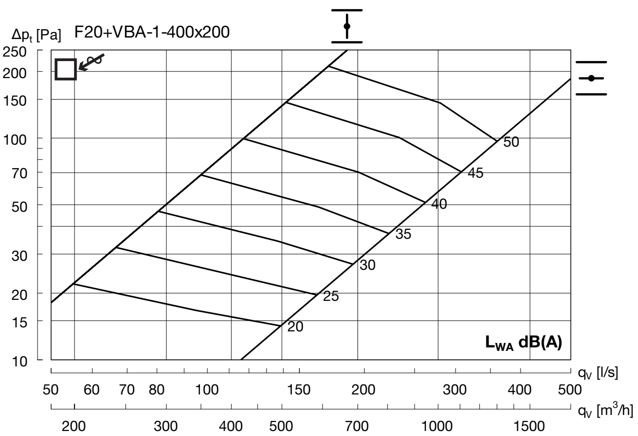
Exhaust air











Wall grille G20

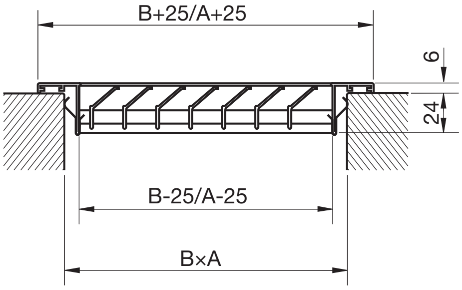
Description

G20 is a rectangular aluminium grille with fixed slanting horizontal bars. G20 can be used for exhaust. G20 is supplied as standard with springs for installation in plenum boxes, type VBA. In the product photo the grille is shown with a VBA box

Maintenance

The grille should be removed to gain access to the plenum box or duct. The external parts should be wiped with a damp cloth.

Dimensions



A x B mm	Free area F(m2)	Weight kg
200 x 100	0,0066	0,3
300 x 100	0,0103	0,3
400 x 100	0,0141	0,4
500 x 100	0,0178	0,6
300 x 150	0,0172	0,5
400 x 150	0,0234	0,6
500 x 150	0,0297	0,9
400 x 200	0,0328	0,8
500 x 200	0,0416	1,2
600 x 150	0,0359	1,0
600 x 200	0,0503	1,4

Order code

Product	G20	aaa	bbb
Type			
A - Measure			
B - Measure			

Materials and finish

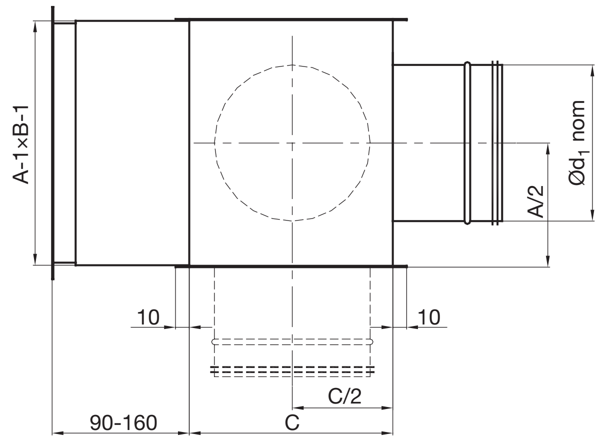
Grille: Aluminium
Standard finish: Natural anodized
On request: RAL 9010, gloss 30

The grille is available in other colours. Please contact Lindab's sales department for further information.

Wall grille G20

Dimensions

1:



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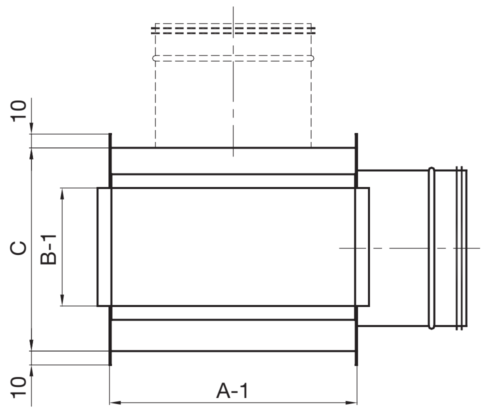

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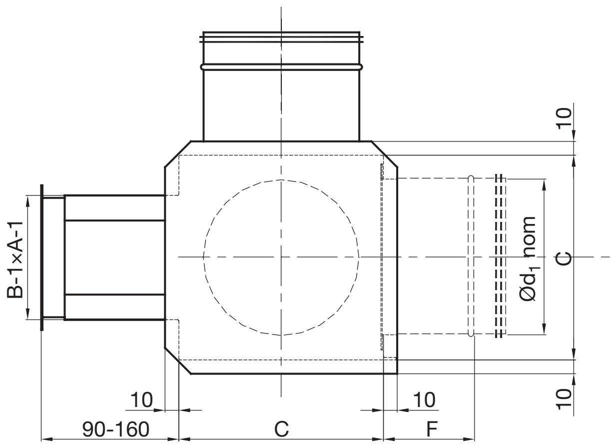


A x B mm	$Ød_1$ nom mm	C mm	F mm
200x100	125	165	90
300x100	160	200	110
300x150	200	240	130
400x100	160	200	110
400x200	250	290	155
400x150	250	290	155
500x100	200	240	130
500x150	250	290	155
500x200	315	355	190
600x150	250	290	155
600x200	315	355	190

Order code

Product **VBA** **a** **bbb** **ccc**

Type

Connection 1 = Back
2 = Side
4 = Top

A - Measure

B - Measure

Wall grille

G20

Technical data

Capacity

Volume flow q_v [l/s] and [m^3/h], total pressure drop Δp_t [Pa], throw $l_{0.2}$ and sound level L_{WA} [dB(A)] can be seen in the diagrams.

Size	Centre frequency Hz 63	125	250	500	1K	2K	4K	8K
Open damper	3	2	9	3	-3	-12	-21	-27
50 % open damper	1	6	6	4	-3	-8	-15	-26
Closed damper	-3	4	2	1	-3	-3	-6	-13

Correction sound

Correction values for conversion of diagram data for connection from the side or top – see table below.

	G20 + VBA-2 Side	G20 + VBA-4 Top
Open damper	+2 dB	+4 dB
50 % open damper	+1 dB	+1 dB
Closed damper	0 dB	0 dB

Sound attenuation

The diffuser's sound attenuation function from duct to room, including end reflection - see table below (incl. VBA).

Size	Centre frequency Hz 63	125	250	500	1K	2K	4K	8K
200x100	25	20	12	10	6	12	12	12
300x150	16	12	8	10	10	11	11	12
300x100	23	19	11	10	8	12	10	12
400x150	14	10	8	10	11	12	10	12
400x200	15	11	9	8	8	11	12	12
400x100	21	17	10	10	8	11	11	12
500x200	13	10	9	8	8	9	10	11
500x150	15	11	9	8	8	11	10	10
500x100	20	16	9	9	8	13	11	11
600x200	13	10	9	8	8	9	11	11
600x150	14	10	8	9	8	10	10	11

Balancing

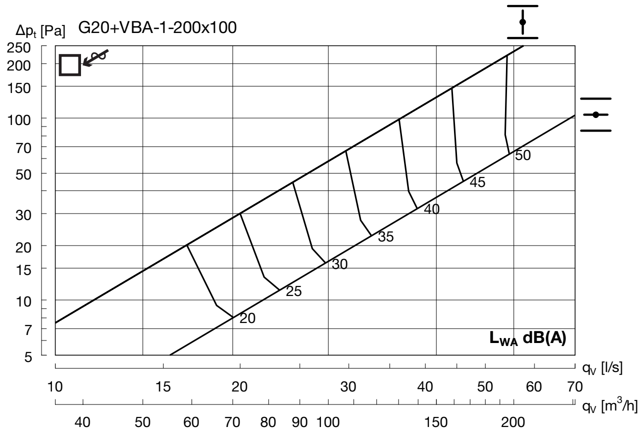
Balancing data is contained in a separate brochure.

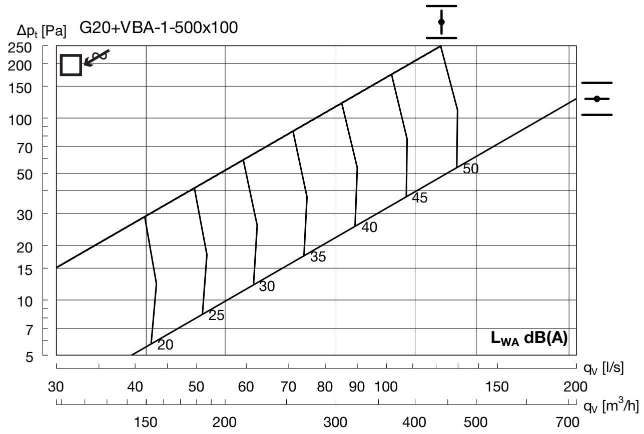
Wall grille

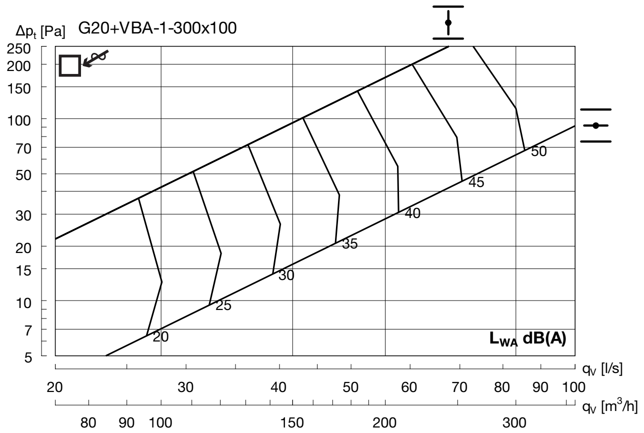
G20

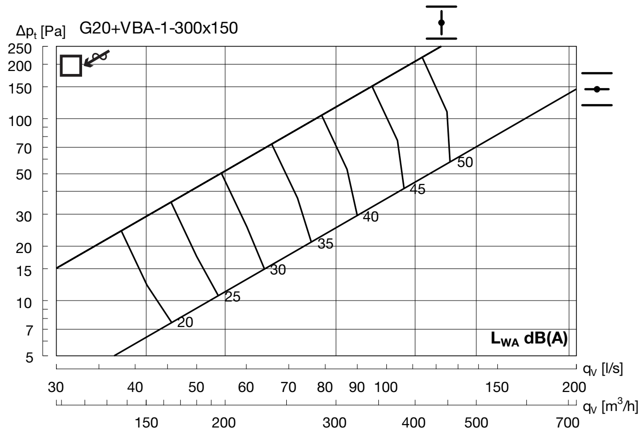
Technical data

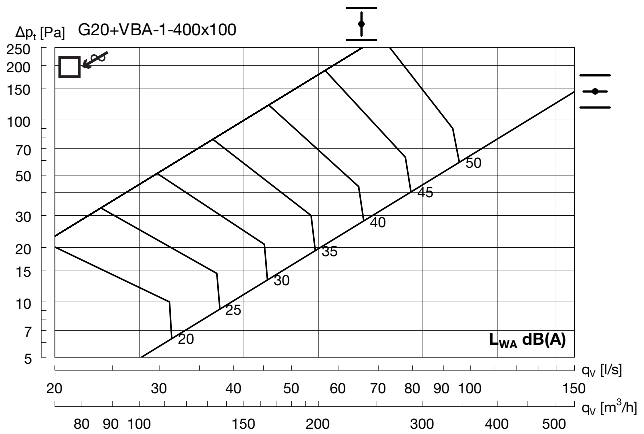
Exhaust air

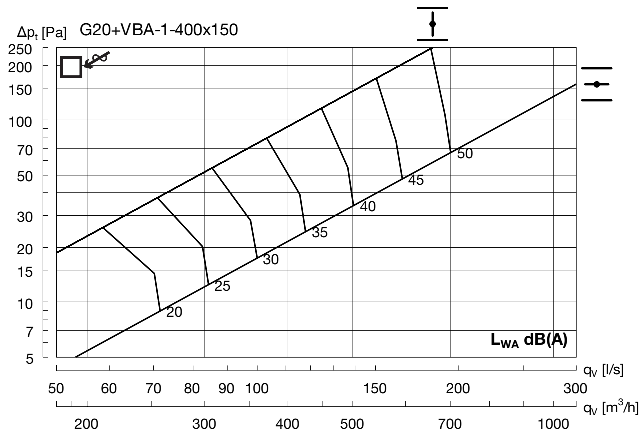










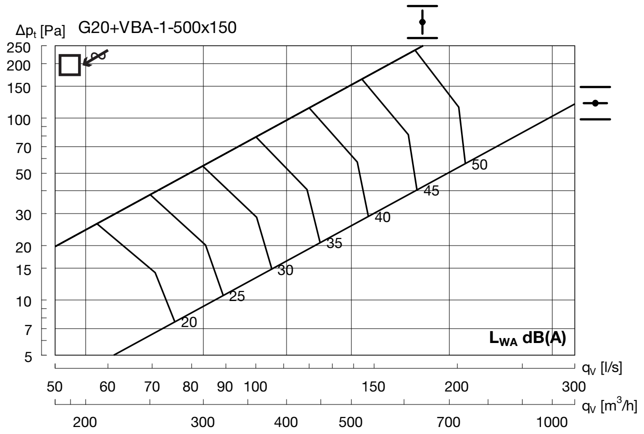


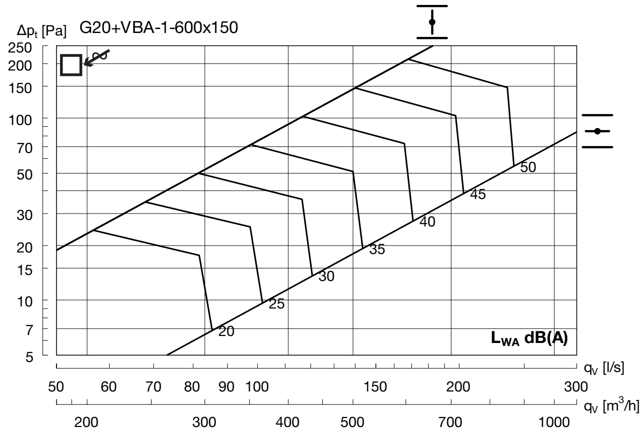
Wall grille

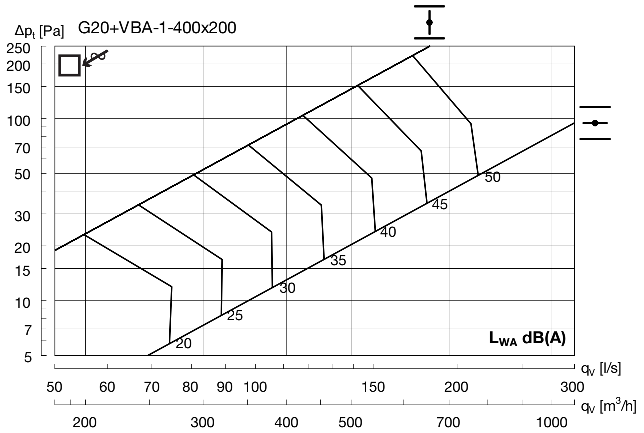
G20

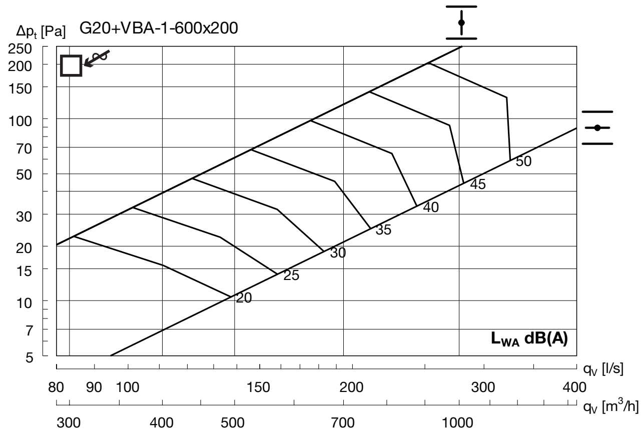
Technical data

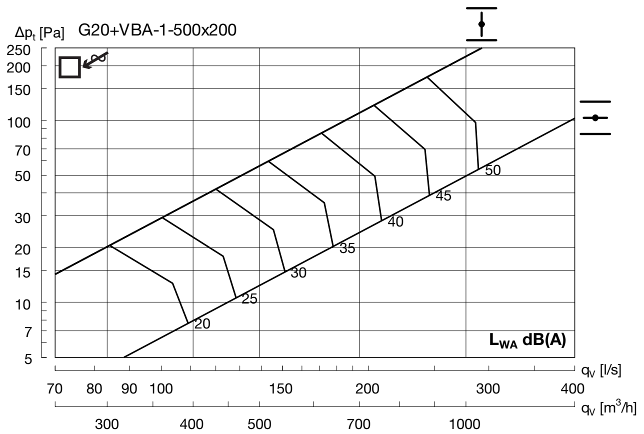
Exhaust air











Lindab

Nozzles

Nozzles

Nozzles

Nozzles

GD nozzles, painted white, Bauhaus A/S, Glostrup

Nozzles

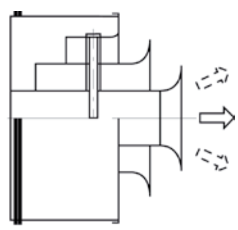
Nozzles can be used with great advantage in rooms where long air throws are desirable, even at small air flows/volumes. Nozzles are suitable for both heating and cooling. Depending on the chosen nozzle the supplied air pattern can be adapted to the job at hand.

Consequently, nozzles can be used to solve very different problems, but excell especially at ventilation of larger rooms with high ceilings. The nozzles can also be used as a “help-system” to lead heated air from units placed high up, down into the occupied zone.

Calculation

In the back of this chapter is a number of examples of calculations to be used in connection with planning. Lindab can offer specific calculations on a definite installation due to our internal dimensioning-programme.

Please contact Lindab for further information.



Example of supply air pattern and direction

Nozzle diffuser GTI

Description

GTI is a flexible supply air nozzle that is suitable for ventilation of large areas. The nozzle can be used for both heated and cooled air and can be adjusted from diffused to concentrated supply air patterns. The supply air pattern can be adjusted by turning the insert in relation to the central line of the nozzle. The nozzle is equipped with Lindab Safe and can be installed directly into a circular duct, fitting, wall or duct side.

- Flexible nozzle for cooling and heating
- Adjustable dispersal pattern
- Simple installation

Maintenance

The visible parts of the diffuser can be wiped with a damp cloth.

Materials and finish

Insert:	Steel
Connection:	Galvanised steel
Standard finish:	Powder-coated
Standard colour:	RAL 9010, gloss 30

The diffuser is available in other colours. Please contact Lindab's sales department for further information.

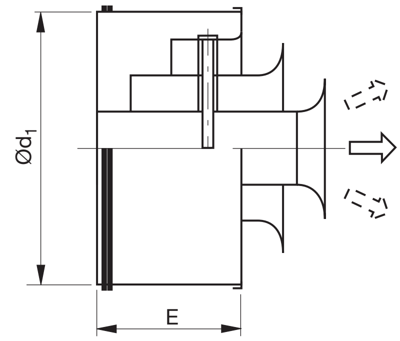
Order code

Product **GTI** **bbb** **A**

Type — GTI
Size — bbb
Version — A

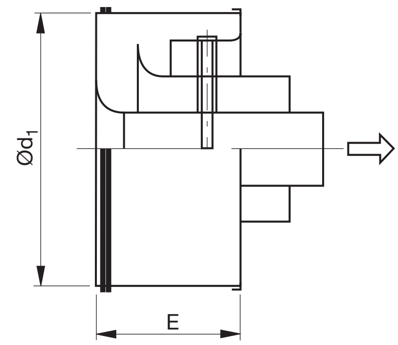
Dimensions

Installation 0



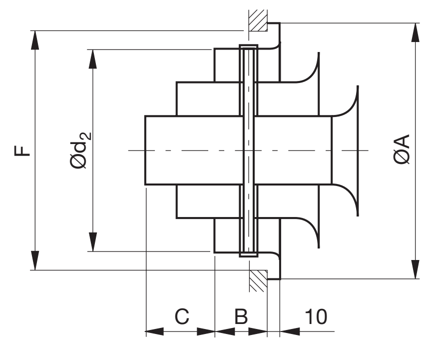
Diffused supply air – for installation in a circular duct or fitting. Supplied adapted to this form of installation as standard.

Installation 1



Concentrated supply air – for installation in a circular duct or fitting. The insert is turned 180 degrees.

Installation 2



Diffused supply air – for installation in a wall or duct side. Remove the external pipe.

Size	ØA mm	B mm	C mm	$Ød_1$ mm	E mm	F mm	$Ød_2$ mm	Weight kg
200	203	40	55	198	109	170	158	0,8
250	253	50	75	248	139	210	198	1,3
315	318	60	95	313	169	260	248	2,0
400	403	70	115	398	199	321	313	2,8

Free area for GTI nozzle – see pages *Nozzle calculations*.

Nozzle diffuser GTI

Technical data

Capacity

Volume flow q_v [l/s] and [m^3/h], total pressure Δp_t[Pa], throw $l_{0.3}$ and sound level L_{WA} [dB(A)] can be seen in the diagrams.

Throw $l_{0.3}$

Throw $l_{0.3}$ can be seen in the diagrams for isothermal air at a terminal velocity of 0.3 m/s

Resulting sound effect level

The sound effect level from the nozzles must be added logarithmically to the sound effect level from the flow noise in the duct. See sample calculation, pages *Nozzle calculations*.

Frequency-related sound effect level

The sound effect level in the frequency band is defined as $L_{wok} = L_{WA} + K_{ok}$. K_{ok} values can be seen in the table below.

Table 1 - diffused supply air

	Centre frequency Hz							
Size	**63**	**125**	**250**	**500**	**1K**	**2K**	**4K**	**8K**
200	15	0	-5	-6	-2	-10	-22	-32
250	13	-3	-6	-6	-1	-14	-14	-33
315	16	-1	-6	-2	-3	-15	-26	-35
400	14	-1	-3	0	-5	-16	-27	-32

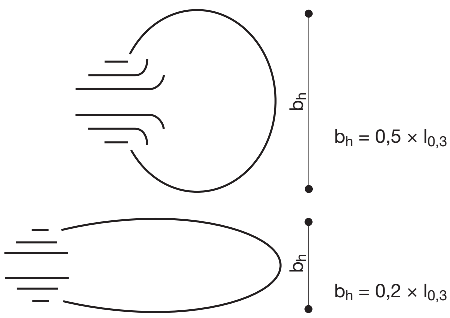
Table 2 - concentrated supply air

	Centre frequency Hz							
Size	**63**	**125**	**250**	**500**	**1K**	**2K**	**4K**	**8K**
200	14	0	-3	-4	-2	-13	-27	-37
250	16	-3	-6	-4	-2	-16	-25	-28
315	18	-1	-5	-2	-3	-16	-29	-40
400	15	-4	-6	-4	-2	-21	-34	-38

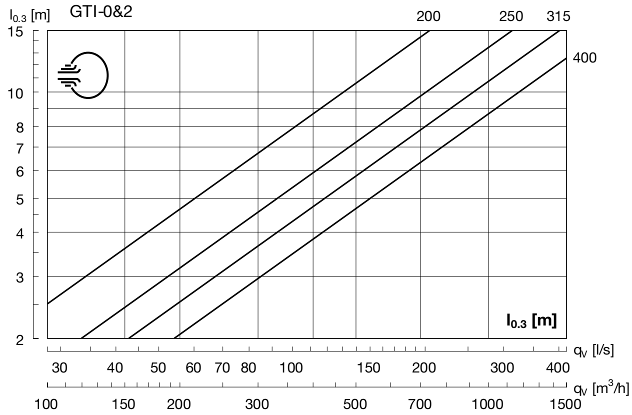
Air jet width b_h

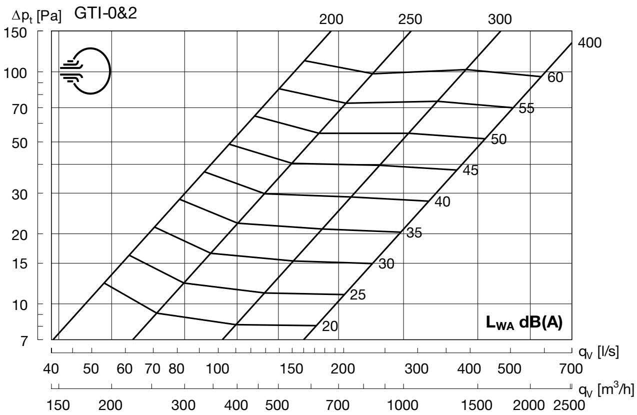
Diffuse

Concentrated

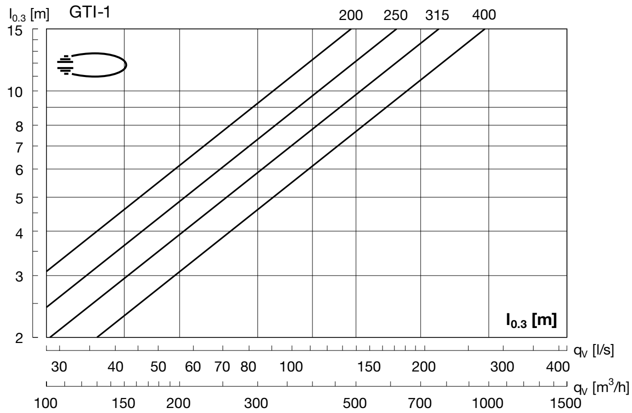


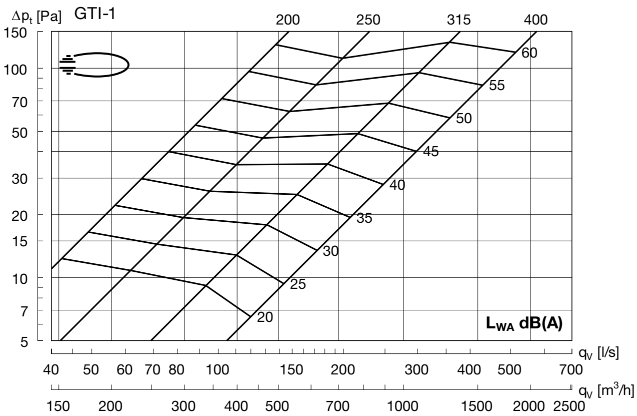
Diffuse supply





Concentrated supply





Lindab

Supply air nozzle DAD

Description

DAD is an adjustable supply air nozzle suitable for ventilation of large areas where long throws are required. The nozzle can be freely rotated 30 degrees in any direction in relation to the central line of the nozzle. The nozzle can be used for both heated and cooled air. The nozzle can be installed directly into a circular duct, fitting, wall or duct side. Supplied with screw holes through flange.

- Flexible adjustable nozzle
- Long throws
- Simple installation

Maintenance

The visible parts of the diffuser can be wiped with a damp cloth.

Materials and finish

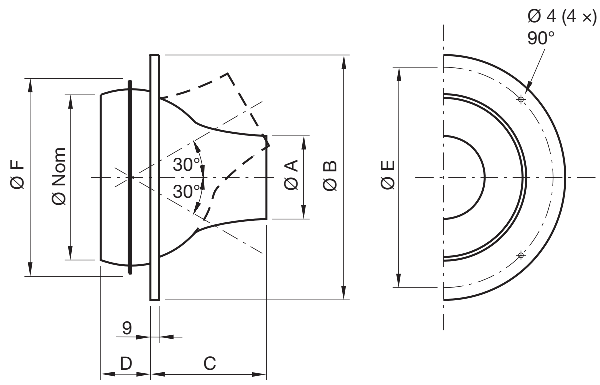
Material:	Aluminium
Standard finish:	Powder-coated
Standard colour:	RAL 9010, gloss 30

The diffuser is available in other colours. Please contact Lindab's sales department for further information.

Dimensions

DAD-0

With flange for mounting on a wall or duct side.

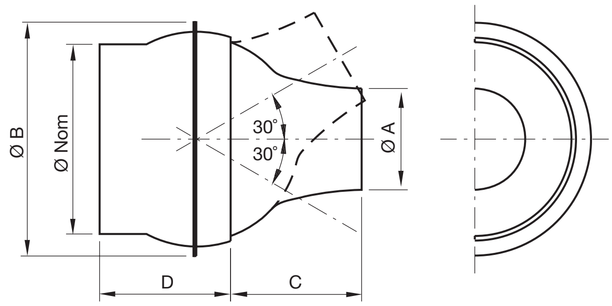


ØF = min. hole dimension

Ø nom Size	ØA mm	ØB mm	C mm	D mm	ØE mm	ØF mm	Weight kg
160	85	248	120	51	225	200	0.60
200	110	298	150	66	270	245	0.90
250	140	363	190	81	320	295	1.40
315	175	448	255	90	390	360	2.40

DAD-1

Installation in circular duct.



ØNom includes male connection measure

Ø nom Size	ØA mm	ØB mm	C mm	D mm	Weight kg
160	85	196	110	110	0.50
200	110	238	140	125	0.90
250	140	288	180	140	1.40
315	175	355	245	165	2.40

Free area for DAD nozzle – see section *Nozzle calculations*.

Order code

Product	**DAD**	**a**	**bbb**
Type			
with flange 0			
for circular ducts 1			
Size			

Supply air nozzle DAD

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Technical data

Capacity

Volume flow q_v [l/s] and [m^3/h], total pressure Δp_t [Pa], throw $l_{0.3}$ and sound level L_{WA} [dB(A)] can be seen in the diagrams.

Throw $l_{0.3}$

Throw $l_{0.3}$ can be seen in the diagrams for isothermal air at a terminal velocity of 0.3 m/s

Resulting sound effect level

The sound effect level from the nozzles must be added logarithmically to the sound effect level from the flow noise in the duct. See sample calculation, section *Nozzle calculations*.

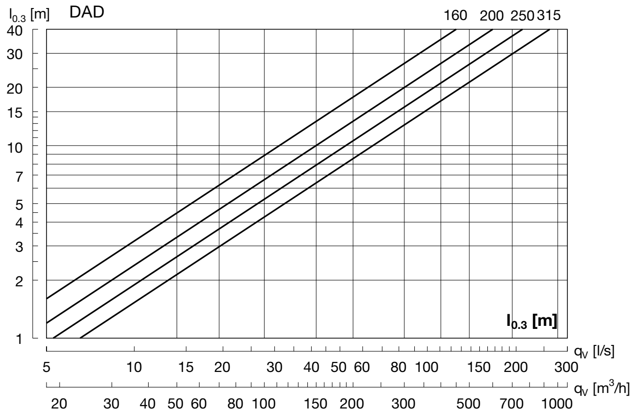
Frequency-related sound effect level

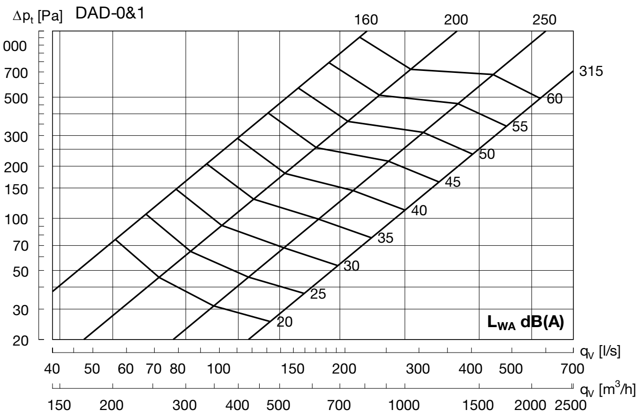
The sound effect level in the frequency band is defined as $L_{wok} = L_{WA} + K_{ok}$. K_{ok} values can be seen in the table below.

Table

	Centre frequency Hz							
Size	**63**	**125**	**250**	**500**	**1K**	**2K**	**4K**	**8K**
160	10	-1	-5	-5	-5	-8	-9	-10
200	11	1	1	-4	-4	-10	-16	-23
250	17	0	0	-4	-4	-13	-21	-29
315	16	1	-1	-2	-4	-13	-21	-32

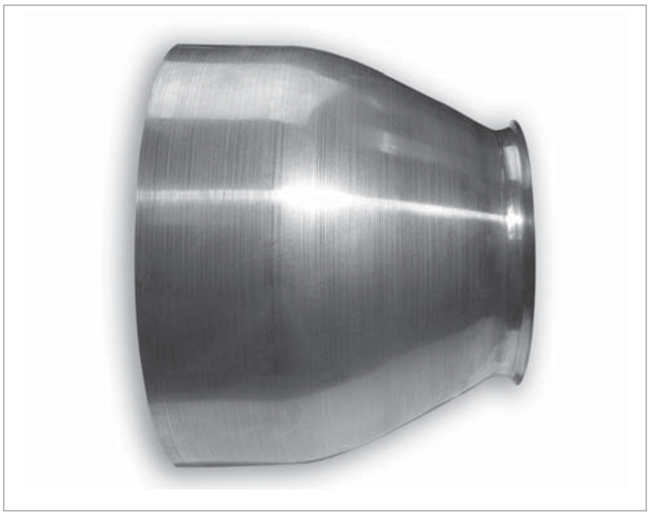
Supply air





We reserve the right to make changes without prior notice

Supply air nozzle LAD



Description

LAD is an supply air nozzle suitable for ventilation of large areas where long throws are required. The nozzle can be used for both heated and cooled air. LAD has a standard MF measure and can be installed directly on a male spigot in the desired direction.

- Directional airflow
- Long throws
- Simple installation

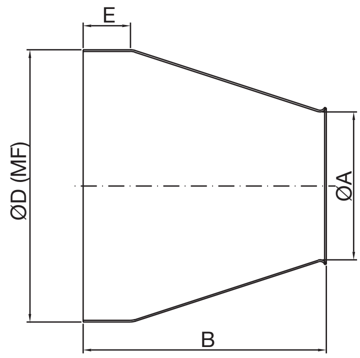
Maintenance

The visible parts of the diffuser can be wiped with a damp cloth.

Order code

Product			LAD	a	bbb
Type					
Colour:	Untreated	0			
	Other colour	1			
Size					

Dimensions



Size	ØA mm	B mm	ØD mm	E mm	Free area A[m²]	Weight kg
125	60	116	125	40	0.0029	0.10
160	95	140	160	40	0.0071	0.10
200	110	180	200	40	0.0095	0.20
250	145	205	250	60	0.0165	0.30
315	180	235	315	60	0.0254	0.50
400	225	270	400	80	0.0398	0.60

Materials and finish

Material: Aluminium
Standard finish: Untreated or powder-coated

The diffuser is available in other colours. Please contact Lindab's sales department for further information.

Supply air nozzle LAD

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Technical data

Capacity

Volume flow q_v [l/s] and [m^3/h], total pressure Δp_t [Pa], throw $l_{0.3}$ and sound level L_{WA} [dB(A)] can be seen in the diagrams.

Throw $l_{0.3}$

Throw $l_{0.3}$ can be seen in the diagrams for isothermal air at a terminal velocity of 0.3 m/s

Resulting sound effect level

The sound effect level from the nozzles must be added logarithmically to the sound effect level from the flow noise in the duct. See sample calculation, section *Nozzle calculations*.

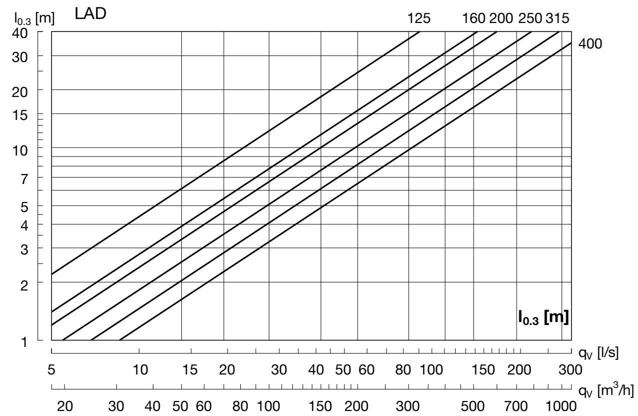
Frequency-related sound effect level

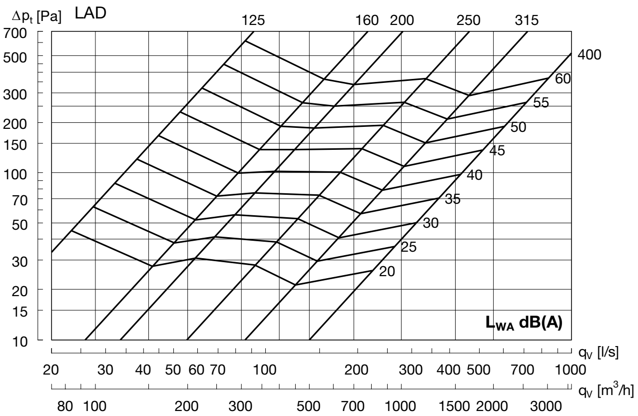
The sound effect level in the frequency band is defined as $L_{wok} = L_{WA} + K_{ok}$. K_{ok} values can be seen in the table below.

Table 1

	Centre frequency Hz							
Size	**63**	**125**	**250**	**500**	**1K**	**2K**	**4K**	**8K**
125	13	4	3	-5	-4	-18	-21	-21
160	19	6	5	-3	-10	-23	-30	-34
200	18	6	1	-1	-10	-15	-18	-26
250	19	6	3	-1	-14	-21	-24	-26
315	22	5	2	-3	-12	-14	-22	-27
400	21	3	1	-5	-7	-10	-19	-25

Supply air





Lindab

Supply air nozzle GD

Description

GD is a rubber supply air nozzle suitable for ventilation of large areas where long throws are required. The nozzle can be adjusted for directional airflow, and can be installed directly into circular ducts, (min. Ø250 mm), or duct walls, (min. height = 100 mm). The nozzle can be used for both heated and cooled air.

- Directional airflow
- Long throws
- Simple installation

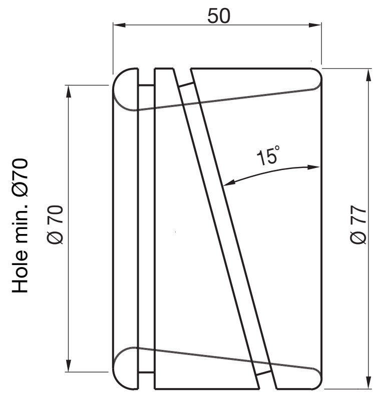
Maintenance

The visible parts of the nozzle can be wiped with a damp cloth.

Order code

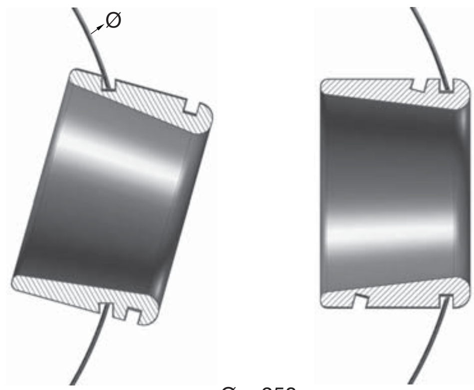
Product	GD
Type	

Dimensions

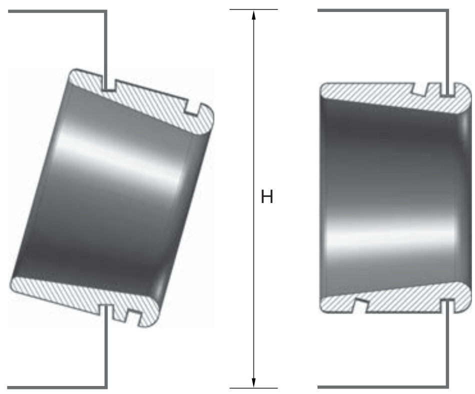


Free area: 0.0027 m^2
Straight groove: For rectangular duct.
Oblique groove: For circular duct.

Mounted in duct



Ø ≥ 250



H ≥ 100

Materials and finish

Nozzle: EPDM rubber, hardness 60, black

Supply air nozzle GD

Technical data

Capacity

Volume flow q_v [l/s] and [m³/h], total pressure Δp_t [Pa], throw $l_{0.3}$ and sound level L_{WA} [dB(A)] can be seen in the diagrams.

Throw $l_{0.3}$

Throw $l_{0.3}$ can be seen in the diagrams for isothermal air at a terminal velocity of 0.3 m/s.

Resulting sound effect level

The sound effect level from the nozzles must be added logarithmically to the sound effect level from the flow noise in the duct. See sample calculation, section *Nozzle calculations*.

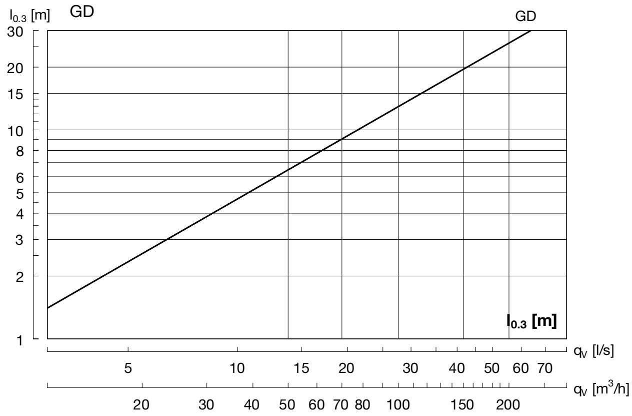
Frequency-related sound effect level

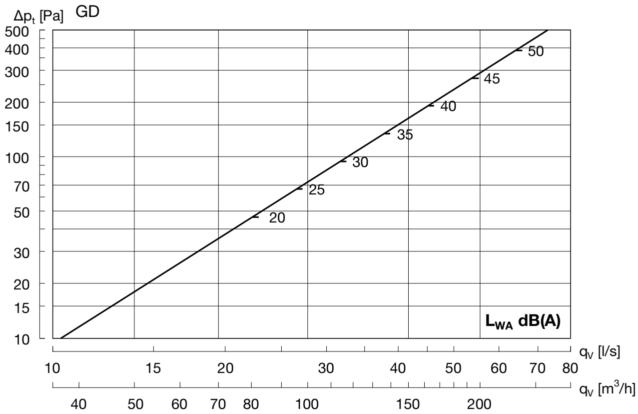
The sound effect level in the frequency band is defined as $L_{wok} = L_{WA} + K_{ok}$. K_{ok} values can be seen in the table below.

Table

	Centre frequency Hz							
Size	**63**	**125**	**250**	**500**	**1K**	**2K**	**4K**	**8K**
GD	9	-2	0	1	-6	-14	-21	-25

Supply air





Supply air nozzle

Calculation

Resulting sound effect level

To calculate the resulting sound effect level from the nozzles, add the sound effect level from the nozzles (L_{WA} nozzle) and the sound effect level from the flow noise in the duct (L_{WA} duct) logarithmically.

Diagram 1, sound effect duct, L_{WA} duct.

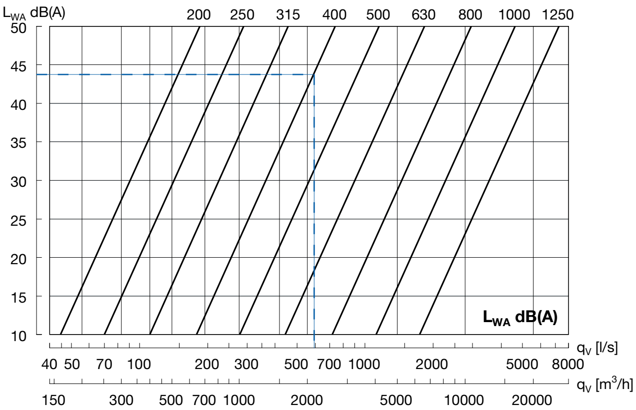
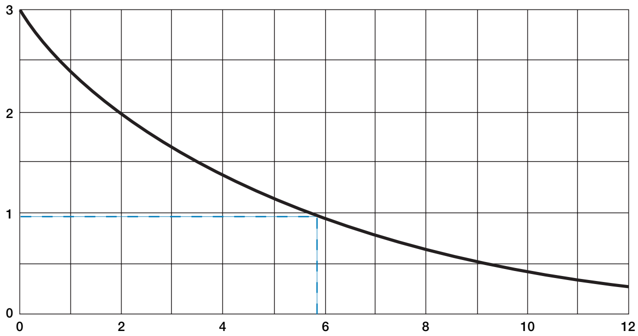
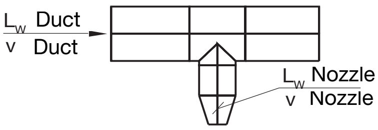


Diagram 2, addition of sound levels.
Difference to be added to the highest dB value (dB)



Difference between the dB values (dB)



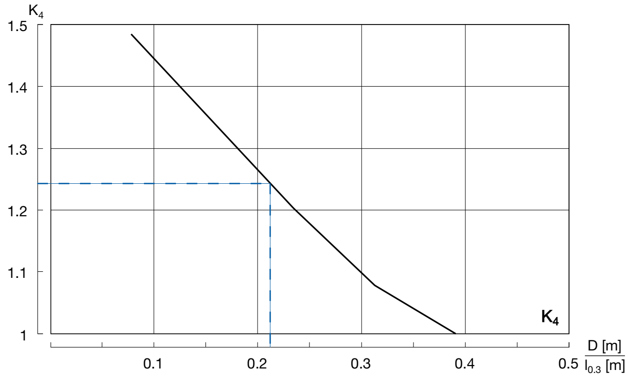
Sample calculation:

LAD-200	q = 100 l/s
ΔP_t nozzle	90 Pa

Duct size:
In order to achieve a sensible distribution of the air out to the nozzles without using a damper, it is recommended that the pressure loss in the nozzle be 3 times higher than the dynamic pressure in the duct system.

Selected duct dimension	Ø 400
Number of nozzles at joint	6
Volume of air in the duct	6 x 100 = 600 l/s
L_{WA} duct (can be seen in diagram 1)	43 dB(A)
L_{WA} nozzle (can be seen in product diagram)	37 dB(A)
Difference between db values	6 dB(A)
Value to be added to the highest dB value (diagram 2)	1 dB(A)
Resulting sound effect level: 43 +1	= 44 dB(A)

Extension of throw for two nozzles, positioned side by side:
If two nozzles are positioned next to each other, the air jets will be amplified, thereby extending the throw. To calculate this, use the diagram below, in which the distance between the nozzles is designated D. The calculation factor K_4 must be multiplied by the throw l_{03}. The throw is not extended further with more nozzles.



Sample calculation:

LAD-125. Distance D = 1.5 metres.

Volume of air:	q = 15 l/s

Diagram throw under selected nozzle

Specified throw:	$l_{0.3}$ = 7 m
D [m] / $l_{0.3}$[m]	1.5 / 7 = 0.21

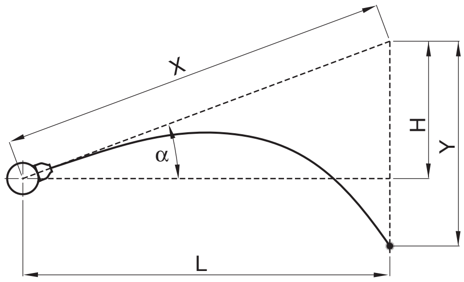
K_4 calculation factor

Can be seen in the diagram	K_4 = 1.25
Resulting throw:	K_4 x l0.3 = 1.25 x 7 m = 8.75 m

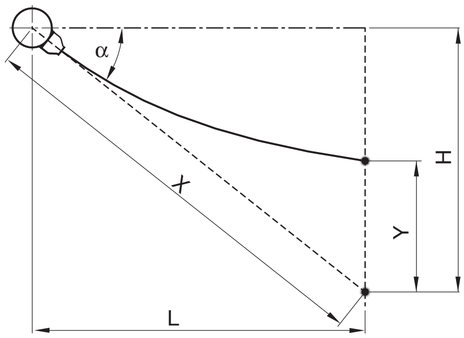
Supply air nozzle

Calculation

Supply air with cooled air



Supply air with heated air



$$X = \frac{L}{\cos \alpha} = \frac{H}{\sin \alpha}$$

$$H = L \times \tan \alpha$$

Terminal velocity V_X:

$$v_x = K_1 \times \frac{q}{X}$$

Deflection Y:

$$Y = K_2 \times \frac{X^3}{q^2} \times \Delta t$$

Sample calculation: Cooled air

LAD-200: $q = 400\ m^3/h$
$\Delta t = -6K \quad \alpha = 30°$
Final velocity $v_x = 0{,}3\ m/s$

$$v_x = K_1 \times \frac{q}{X}$$

$$X = K_1 \times \frac{q}{v_x} = 0{,}020 \times \frac{400}{0{,}3} = 27\ m$$

$$Y = K_2 \times \frac{X^3}{q^2} \times \Delta t = 24 \times \frac{27^3}{400^2} \times 6 = 17{,}7\ m$$

$H = X \times \sin \alpha = 27 \times 0{,}5 = 13{,}5\ m$
$L = X \times \cos \alpha = 27 \times 0{,}87 = 23{,}4\ m$

Sample calculation: Heated air

LAD-200: $q = 400\ m^3/h$
$\Delta t = -6K \quad \alpha = 60°$
Final velocity $v_x = 0{,}3\ m/s$

$$X = K_1 \times \frac{q}{v_x} = 0{,}020 \times \frac{400}{0{,}3} = 27\ m$$

$$Y = K_2 \times \frac{X^3}{q^2} \times \Delta t = 24 \times \frac{27^3}{400^2} \times 6 = 17{,}7\ m$$

$H = X \times \sin \alpha = 27 \times 0{,}87 = 23{,}4\ m$
$L = X \times \cos \alpha = 27 \times 0{,}5 = 13{,}5\ m$

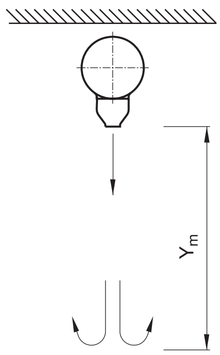
Supply air nozzle

Calculation

Calculation factors:

Size	Free area A m²	K1 m³/h	K1 l/s	K2 m³/h	K2 l/s	K3 m³/h	K3 l/s
LAD							
125	0.0029	0.037	0.133	3.9	0.30	0.24	0.86
160	0.0071	0.023	0.083	15.6	1.20	0.122	0.44
200	0.0095	0.020	0.072	24.0	1.85	0.097	0.35
250	0.0165	0.0153	0.055	54.4	4.2	0.064	0.230
315	0.0254	0.0122	0.044	104	8.0	0.046	0.166
400	0.0398	0.0097	0.035	206	15.9	0.033	0.119
DAD							
160	0.0056	0.026	0.094	10.7	0.83	0.145	0.52
200	0.0095	0.020	0.072	24.0	1.85	0.097	0.35
250	0.0154	0.0157	0.057	49.0	3.78	0.068	0.24
315	0.0240	0.0127	0.046	96.0	7.41	0.048	0.17
GD							
	0.0027	0.038	0.137	3.5	0.27	0.26	0.92
GTI-1							
200	0.0200	0.0090	0.032	114	8.8	0.048	0.173
250	0.0310	0.0073	0.026	219	16.9	0.034	0.122
315	0.0490	0.0058	0.021	435	34	0.024	0.086
400	0.0780	0.0046	0.017	875	68	0.017	0.062

Vertical supply air with heated air



$$Y_m = K_3 \times \frac{q}{\sqrt{\Delta t}} \text{ (m)}$$

Sample calculation:

LAD-160

$q = 200\ m^3/h$
$\Delta t = 10\ K$

The distance to the turning point of the air jet:

$$Y_m = K_3 \times \frac{q}{\sqrt{\Delta t}} \text{ (m)}$$

$$Y_m = 0{,}122 \times \frac{200}{\sqrt{10}} \text{ (m)}$$

$$Y_m = 7{,}7 \text{ m}$$

Ventiduct® nozzle ducts

Ventiduct ® nozzle ducts

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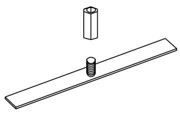
Nozzle ducts

Air distribution system

Nozzle ducts - accessories

Air distribution system



Ventiduct® nozzle ducts

Office building, Copenhagen

Ventiduct® nozzle ducts

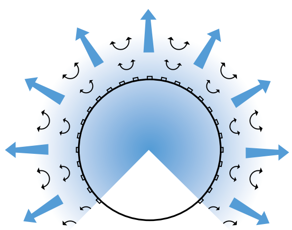
Air distribution by way of nozzle ducts can be used to great effect in all places that need chilled air. This means from industrial places to comfort-projects. Consequently, it is a great alternative to the more traditional supply-air diffusers. This is especially so, when a visible installation is desired as functional decor.
Those rooms where Ventiduct nozzle ducts are not used, an alternative is possible by using unperforated spiral ducts.
Ventiduct is a strong alternative to supply-bags.

Principle of ventilation

The principle of ventilation is a form of active thermal displacement, suited for ventilation and cooling purposes.
The air pattern in active thermal displacement consists of both up-ward directed and down-ward directed airflows. The name means that the airflow in the occupied zone is caused by the supply air diffuser and the heating sources.

Function

Ventiduct nozzle ducts give a great cooling effect, since it can be supplied with a cooling temperature of up to approx. 10 K. The supplied air is added with great velocity through the many small nozzles, which are pressed up against the duct-walls. This creates a good induction. Ventiduct has a large area of dynamics, which makes it possible to regulate the air-volume / air flow from 30 - 100%.



Ventiduct® nozzle duct - cross section

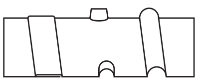
Ventiduct nozzle ducts VSR

Description

Ventiduct is an air distribution system consisting of spiral-seamed circular ducts that is equipped with a large number of small nozzles inserted into the duct wall. They are supplied in five sizes from ø200 mm to ø500 mm and with various nozzle patterns, which should be chosen according to the task in hand.
Maximum standard length is 3,000 mm. The ducts have a raised protective cover to prevent the nozzles becoming deformed during transport. Ventiduct ducts can be supplied in hot-galvanised or powder-coated versions. The system should be primarily used for the supply of cooled air.

- Large cooling effect
- Large dynamic range
- Large induction rate
- Short throw
- Discrete diffuser design
- Easy to install

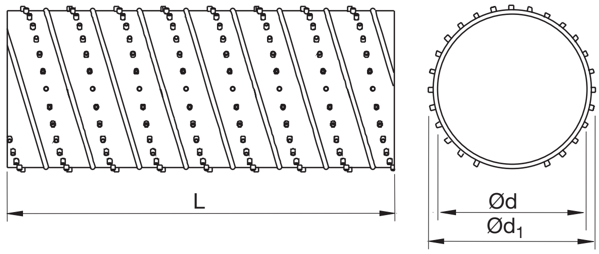
Cross-section of nozzle duct



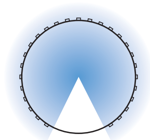
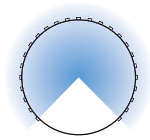
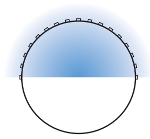
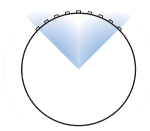
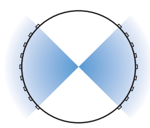
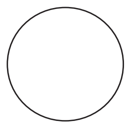
Order code

Product	VSR	aaa	bbb	cccc	d/e
Type	VSR				
Ød		aaa			
Nozzle pattern			bbb		
Length/no. of parts				cccc	
Finish					d/e
0 Galvanised					
1 Powder coated					

Dimensions



Ød mm	Ød1 mm	L mm	Weight kg
200	212	3000	4,5
250	262	3000	5,4
315	327	3000	6,9
400	412	3000	8,6
500	512	3000	10,9

Nozzle pattern		Code
300°		300
270°		270
180°		180
90°		090
2 × 90°		290
Blind piece without nozzles spiral-seamed long-seamed		 000 001

The blind piece is a specially made spiral-seamed pipe that resembles ventiduct in design, as it has no actual nozzles.

Available in the same length as ordinary nozzle ducts.

Alternatively long-seamed pipes can be used, which creates an attractive contrasting effect.

Ventiduct nozzle ducts VSR

Dispersal patterns

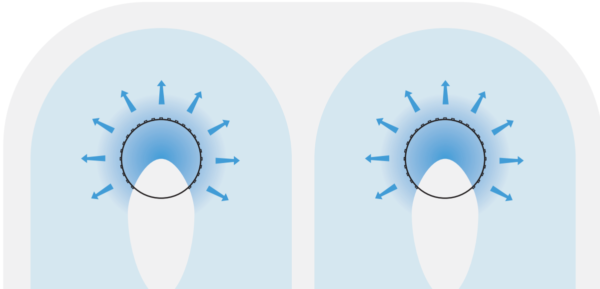
With Ventiduct nozzle ducts, various flow conditions can be achieved in the room. The downward supply of air always creates the greatest air speeds in the occupied zone and is therefore used mostly in industrial ventilation. The choice between air being supplied horizontally or upwards depends on the required form of flow.

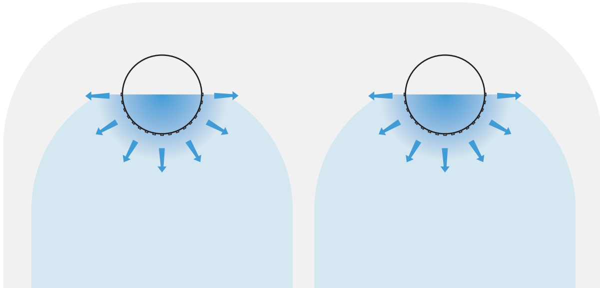
Upward supply air
When cooled air is supplied upwards, the cool air mixes with the warmer room air close to the blowing ducts. The blown air typically covers a vertical area of 2-4 metres below the ducts. At greater distances between the blowing ducts, the blown air flows behind in a displacement flow further out in the room.
Depending on the required volume flow, a nozzle pattern of between 90° and 300° is used.

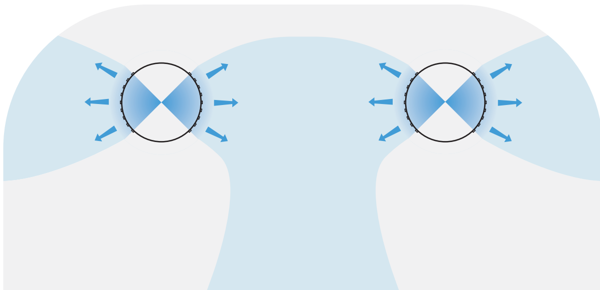
Downward supply air
When air is supplied downwards, the air speeds in the occupied zone are increased by the thermal forces (by cooling) and by the dynamic forces (blowing speed). This can result in quite high air speeds in the occupied zone, which is not acceptable for traditional comfort ventilation. However, blowing can be recommended if a stable downward flow of air is required, and if increased air speeds in the occupied zone are acceptable. This could, for example, be desirable for industrial assignments. A nozzle pattern between 90° and 300° is used, depending on the volume flow required.

Horizontal supply air
When air is supplied horizontally, air jets are formed, creating a mixed flow in the room. Depending on the various parameters, maximum air speeds occur in the occupied zone due to the thermal load, air jet speeds or a combination of both. When low blowing speeds are being used (low volume flow or large ducts/nozzle patterns) the form of the flow approximates a form of low impulse blowing, as with blowing upwards. Horizontal blowing can be used in locations where there is a deliberate demand for a flow of air throughout the premises in accordance with the mixing principle, and therefore where an upward supply is not being used.

Dispersal patterns







Recommended working areas for Ventiduct
The values stated are for guidance only and should be used with care, as incoming volume flow, cooling temperature, duct design and air pattern all have a great deal of influence on the resulting speed in the occupied zone. For more detailed calculations, Lindab will be happy to carry out a computer calculation based on an actual installation.

Air pattern	Up	Down	Horizon-tal
Installation height [m] *	2,5–5,0	3,0–8,0	2,5–5,0
Min. distance from ceiling [m] **	0,2	0,1–0,2	0,1
Δt (t_1 - t_r) [K]	-1..–10	-1..–6	-1..–8

* Distance from floor to lower edge of duct

** Distance from upper edge of duct to ceiling must be maintained to avoid dirtying the ceiling

Ventiduct nozzle ducts VSR

Technical data

Max. volume flow per metre pipe (m^3/h)

	Nozzle pattern			
Dim	90°	180°/2×90°	270°	300°
200	45	95	140	155
250	60	115	175	195
315	75	150	220	245
400	95	190	280	315
500	115	235	350	390

Max. total duct length (m)

	Nozzle pattern			
Dim	90°	180°/2×90°	270°	300°
200	14	7	5	4
250	17	8	6	5
315	21	11	7	6
400	27	14	9	8
500	34	17	11	10

Sound effect level L_w (dB) = $L_{WA} + K_{ok}$

Dim	125	250	500	1K	2K	4K	8K
200	-7	0	1	-6	-15	-21	-27
250	-5	1	-1	-5	-11	-18	-22
315	1	2	-2	-4	-11	-16	-19
400	-1	-1	-3	-4	-9	-14	-17
500	4	0	-3	-4	-9	-16	-14

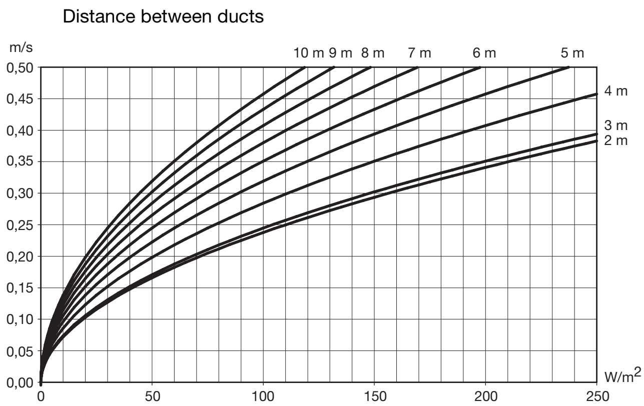
Technical data

Speed in the occupied zone

The speed in the occupied zone is a result of air jet speeds and thermal air movements in the room. An exact calculation of the resulting speed in the living zone can be performed using a computer program (contact the sales department in Farum or Viby).

For upward supply the maximum speeds in the occupied zone are dependent on the temperature difference t_i-t_r. The best results are achieved by using maximum supply per metre pipe according to the table on the left.
Depending on the thermal load (W/m^2) and the pipe length, the maximum speed in the occupied zone is indicated as a rough estimate in the diagram below.

Diagram only applies to upward dispersal pattern with maximum volume flow per metre pipe:
(distance to ceiling > 4 × Ø d).



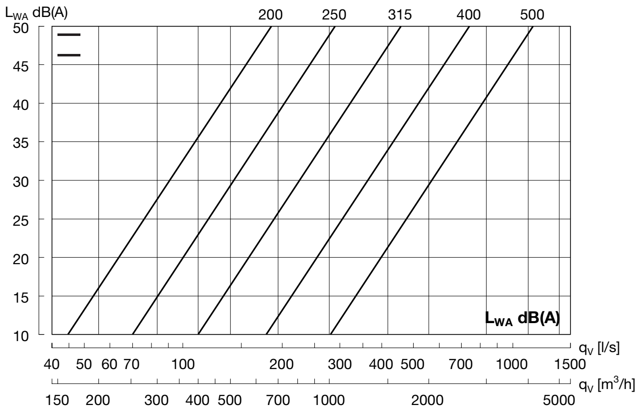
Please contact Lindab's sales department for further information.

Ventiduct nozzle ducts VSR

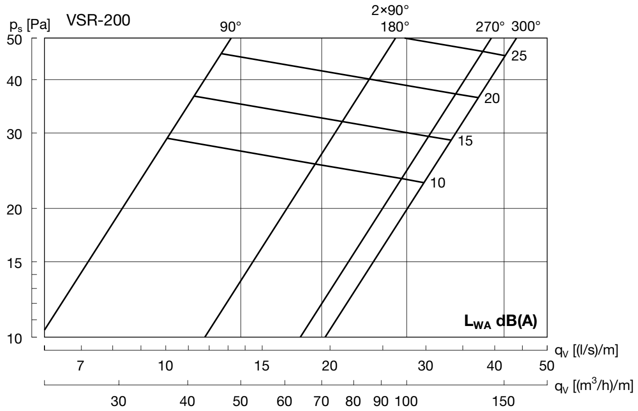
Pressure and sound

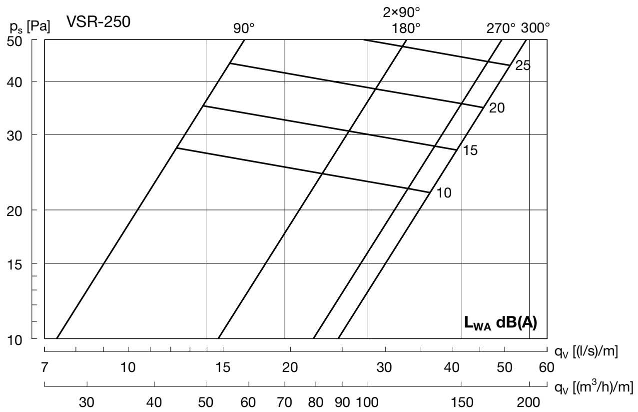
For calculation of the resulting sound power level from a ventiduct, add the sound power level from the nozzles ($L_{WA\ nozzles}$) and the sound power level from the flow noise in the ventiduct ($L_{WA\ pipe}$) logarithmically.

Flow noise in duct



Sound effect level from nozzles

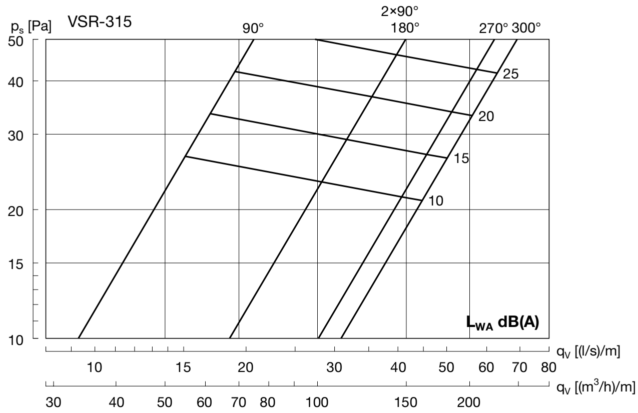


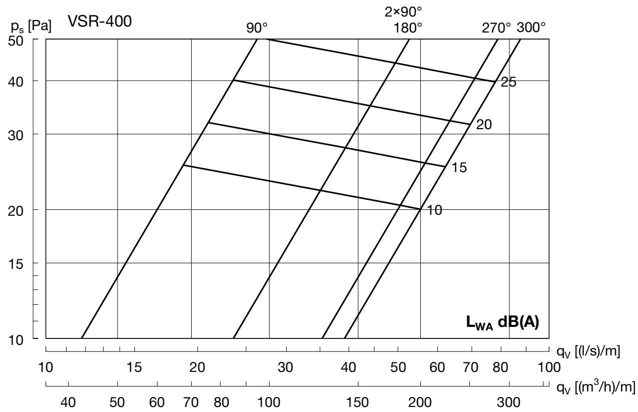


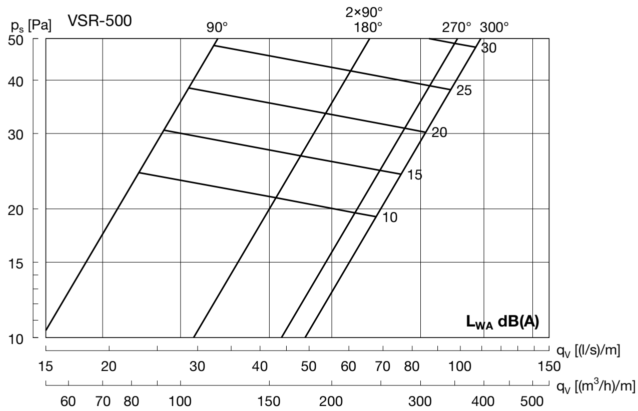
The sound levels from the nozzles apply for duct length 1 m

Correction for other duct lengths:

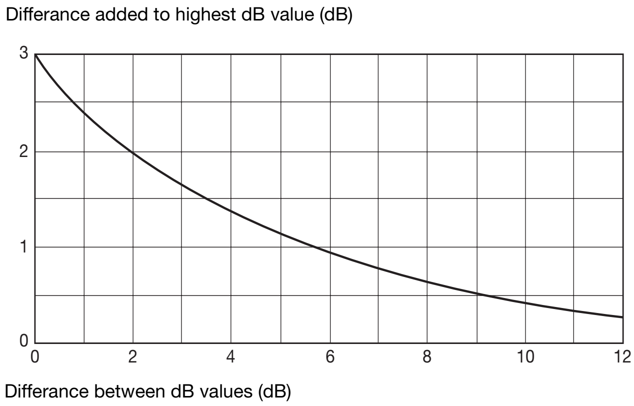
Length m	1,0	1,5	2,0	2,5	3,0	4,0	5,0	6,0
Corrections	0	2	3	4	5	6	7	8







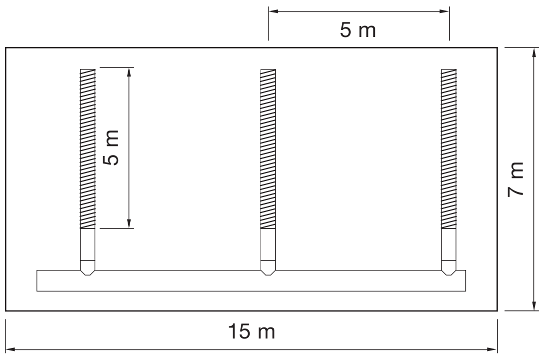
Addition of sound levels from nozzles and duct:



Ventiduct nozzle ducts VSR

Technical data

Calculation example



Required information:

Pressure loss: p_t [pa]
Resulting sound level in the premises: L_p [dB(A)]
Max. speed in the occupied zone: v_{occ} [m/s]

Calculation based on catalogue values:

VSR-250, 270°	
Ceiling height	5,0 m
Installation height upper edge duct	4,5 m
Volume of the room:	525 m³
Hard room	($T_s \sim$ 1,9 s)
Volume flow	2400 m³/h (667 l/s)

The following can be determined from the diagrams on the previous page:

Pressure loss:	40 Pa
Sound effect: $L_{WA\ pipe}$:	41 dB(A)
Sound effect: $L_{WA\ nozzle}$:	22 dB(A)

Duct length of 5 m = > correction of + 7

Sound effect nozzles corrected: $L_{WA\ nozzles}$ = 22 + 7 = 29 dB(A)

Addition of sound levels from nozzles and duct:

Difference: 12 dB -> No addition
Three identical sound sources: + 4,8
(see figure 25 in the Theory section)
Sound effect L_{WA} for three pipes: 41+ 5= 46 dB(A)

Resulting sound level:
The sound formula from *page 46 in the Theory section* is used

The absorption area of the room is determined by

A = 0,16 (V/T_s) = 0,16 (525/1,9) = 44 m² Sabine

Based on *Figures 27 and 28 in the Theory section*, room attenuation D is determined:

Figure 27: $\sqrt{n}/\sqrt{Q}$ = 1,7 for direction factor Q = 1 and n = 3

1.5 m above the floor is distance to pipe r = 4.5-0.25-1.5 = 2.75 m

Figure 28: $r\sqrt{(n/Q)}$ = 4.7 and A = 44 => D = 10 dB

Resulting sound pressure in the room:

$L_p = L_{WA}$ (for three pipes) – D = 46–10 = 36 dB(A)

Φ = 3,2 kW => ΔT = 3200/(667·1,2) = -4 K

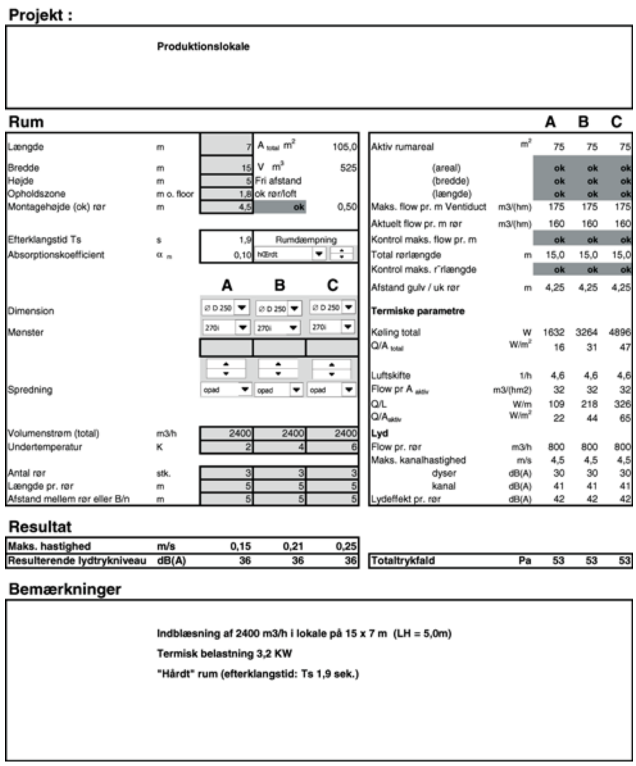
3200 W/(15 m x 5 m)

=> 43 W/m² in the actively ventilated area

Speed in the occupied zone according to the diagram:

43 W/m² and 5 m distance => v_{occ} = 0.21 m/s

Dimensiononig of Ventiduct



Projekt :

Produktionslokale

Rum

Længde	m	7	A total m²	105,0
Bredde	m	15	V m³	525
Højde	m	5	Fri afstand	
Opholdszone	m o. floor	1,8	ok rør/loft	
Montagehøjde (ok) rør	m	4,5	ok	0,50
Efterklangstid Ts	s	1,9	Rumdæmpning	
Absorptionskoefficient	α m	0,10	hÆrdt	

		A	B	C
Dimension		Ø D 250	Ø D 250	Ø D 250
Mønster		270i	270i	270i
Spredning		opad	opad	opad
Volumenstrøm (total)	m3/h	2400	2400	2400
Undertemperatur	K	2	4	6
Antal rør	stk.	3	3	3
Længde pr. rør	m	5	5	5
Afstand mellem rør eller B/n	m	5	5	5

		A	B	C
Aktiv rumareal	m²	75	75	75
(areal)		ok	ok	ok
(bredde)		ok	ok	ok
(længde)		ok	ok	ok
Maks. flow pr. m Ventiduct	m3/(hm)	175	175	175
Aktuelt flow pr. m rør	m3/(hm)	160	160	160
Kontrol maks. flow pr. m		ok	ok	ok
Total rørlængde	m	15,0	15,0	15,0
Kontrol maks. r˝rlængde		ok	ok	ok
Afstand gulv / uk rør	m	4,25	4,25	4,25
Termiske parametre				
Køling total	W	1632	3264	4896
Q/A total	W/m²	16	31	47
Luftskifte	1/h	4,6	4,6	4,6
Flow pr A aktiv	m3/(hm2)	32	32	32
Q/L	W/m	109	218	326
Q/A aktiv	W/m²	22	44	65
Lyd				
Flow pr. rør	m3/h	800	800	800
Maks. kanalhastighed	m/s	4,5	4,5	4,5
dyser	dB(A)	30	30	30
kanal	dB(A)	41	41	41
Lydeffekt pr. rør	dB(A)	42	42	42

Resultat

Maks. hastighed	**m/s**	**0,15**	**0,21**	**0,25**
Resulterende lydtrykniveau	**dB(A)**	**36**	**36**	**36**
Totaltrykfald	**Pa**	**53**	**53**	**53**

Bemærkninger

Indblæsning af 2400 m3/h i lokale på 15 x 7 m (LH = 5,0m)
Termisk belastning 3,2 KW
"Hårdt" rum (efterklangstid: Ts 1,9 sek.)

(Printout from the program)

Lindab is able to offer complete calculations for an actual installation using our internal dimensioning program (see printout above from the program). Based on the specification of a large number of variables, detailed information can be obtained on maximum speeds in the occupied zone, pressure loss and resulting sound levels in the premises for the overall installation. Variables that it is not possible to include in calculations based on the catalogue values.

Contact Lindab for further information.

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

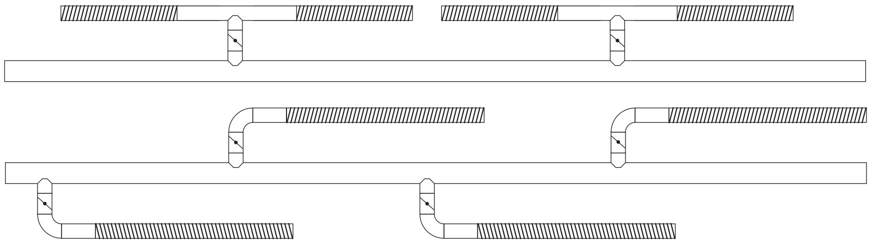
Ventiduct nozzle ducts VSR

Technical data

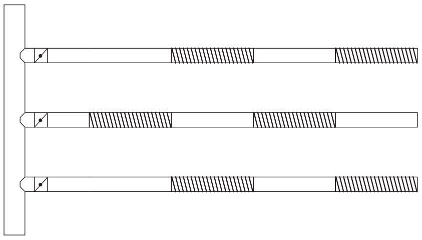
Examples of duct design

Ventiduct nozzle ducts can be installed in various ways. In high-ceilinged premises it is generally an advantage to install Ventiduct nozzle ducts as low down as possible (min. height above floor 2.5 m). This provides the greatest efficiency.

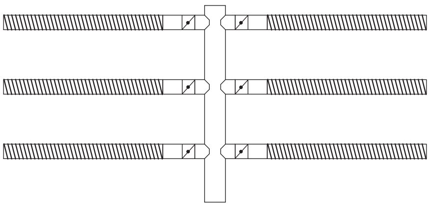
Cactus model
This solution is used for long, narrow rooms.



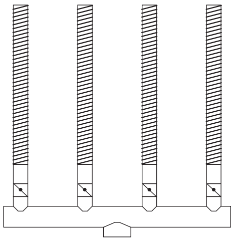
Exchange model
An ideal solution for long, narrow premises. This model provides an even distribution of supplied air.



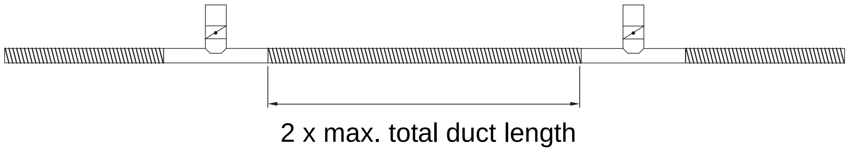
Fishbone model
Ventiduct nozzle ducts stretch out from both sides of the main duct. It is recommended that an adjustment damper be used for accurate regulation of the air volume.



Fork model
Here the Ventiduct nozzle ducts are positioned on one side of a main or branch duct.

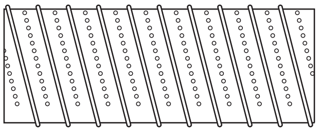


Line model
A simple solution that makes duct installation easier and minimises the number of adjustment dampers. The distance between the connection ducts is equivalent to twice Ventiduct's maximum length plus the two blind pieces.

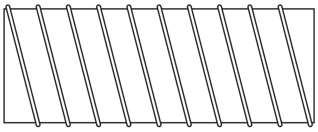


Ventiduct nozzle ducts VSR

Components



VSR nozzle duct - Nozzle pattern 90 - 300
Ventiduct nozzle ducts over 3 m are supplied in multiple sections, e.g. one 4 m long duct is supplied in two 2 m lengths.



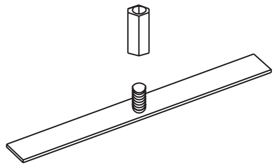
VSR 000
Blind piece without nozzles, spiral-seamed.

VSR 001
Blind piece without nozzles, long-seamed (smooth)

Order code

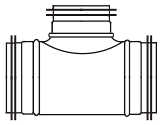
Product	INV	aaa
Type		
Dimension Ød		

Accessories

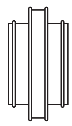


INV
Mounting bracket for Ventiduct

OSB10
Threaded rod

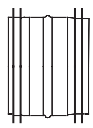


TCPU
T-piece

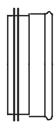


DIRU
Iris damper

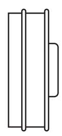
DRU
Balancing damper



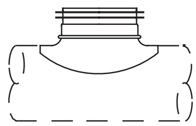
NPU
Spigot



ESU
End cap



ESUH
End cap with handle



PSU
Saddle

All accessories are supplied in the same material as the Ventiducts, and can also be supplied with a powder-coated finish.

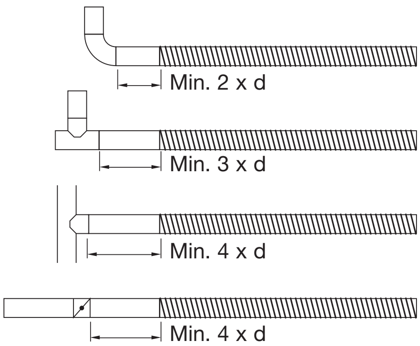
Other components
Motorised shut-off and adjustment damper DCT and volume flow regulator VRU incl. accompanying silencer SLU.

Ventiduct nozzle ducts VSR

Technical data

Building-in distance

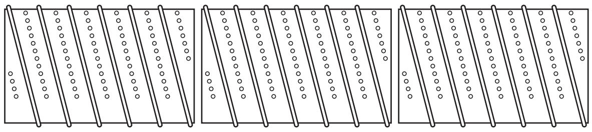
Ventiducts should not be positioned too close to dampers, bends, T-pieces or other elements that may create turbulence and hence noise.
Straight duct sections should be installed between the Ventiducts and potentially disruptive components, as shown in the illustration below. Suitable duct sections are available.



Mounting

Assembly

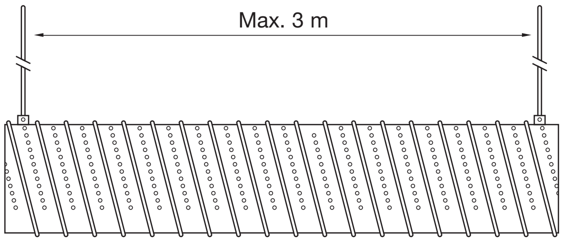
The Ventiducts are individually packed in cardboard boxes at the factory, to minimise the risk of transport damage.
The packaging is numbered to ensure that the ducts are mounted in the correct order, so that the spiral seam is continuous.



Suspension

If it is necessary to be able to dismantle the Ventiducts, e.g. for cleaning, we recommend using Lindab Transfer connections (see Lindab's Duct Systems catalogue)

IMPORTANT: In order to maintain the number sequence, the Ventiducts should be left in their packaging until mounting commences.



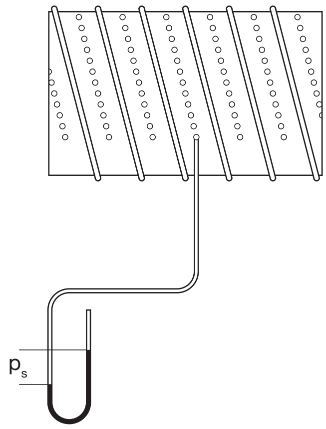
Maximum distance between suspension loops is 3 metres.

Balancing

Measuring of the airflow

The easiest way to measure the volume flow is to measure the nozzle pressure in the middle of the Ventiduct (see sketch).
To do this, attach the hose from the manometer to one of the nozzles. The static pressure (P_S) in the duct can then be read.
Once you know the static pressure, you can read the volume flow per m/duct from the "Sound and pressure" diagram for the relevant duct dimension and nozzle pattern.

The total volume flow can thus be calculated by multiplying the relevant diagram value by the total active length of the Ventiduct.

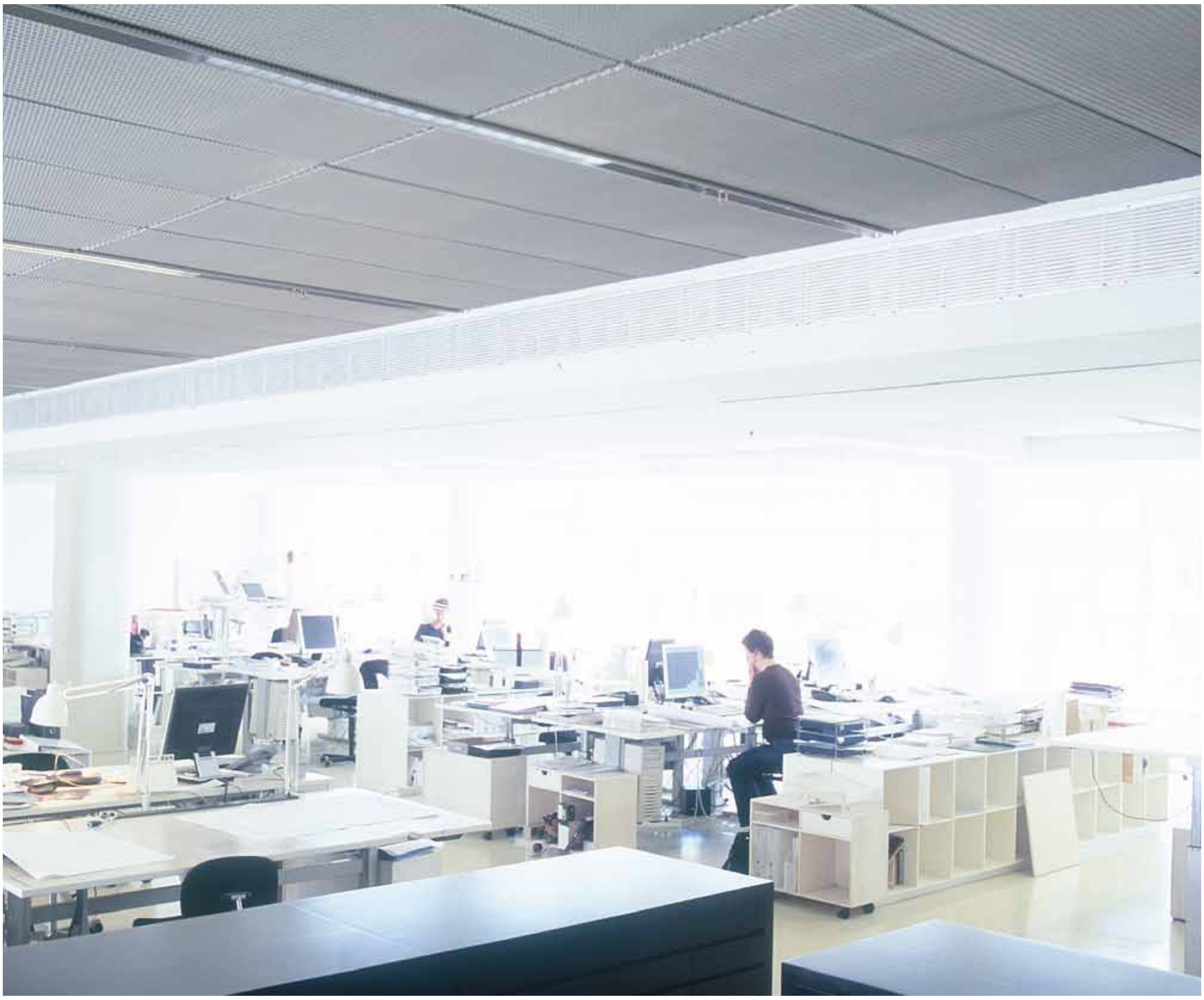


Grilles

Grilles

Grilles

Grilles



Henning Larsen Tegnestue, Copenhagen

Usage

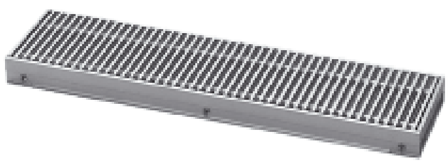
Supply and exhaust through ventilation grilles is traditionally used in pretty much all types of buildings. Supply is usually placed in the wall near the ceiling, or in the floor in long facades. Exhaust is usually placed in the ceiling or in the wall near the ceiling.

Supply air near the floor or in the window-sills is typically used along facades in order to reduce drop in temperature or heating due to the sun, and often in a combination with ceiling diffusers. In the same manner, the ventilation grilles are also used in large numbers as convection grilles to conceal convector channels or window-sills or similar openings, where the grille does not have an aero-technical function.

Great flexibility

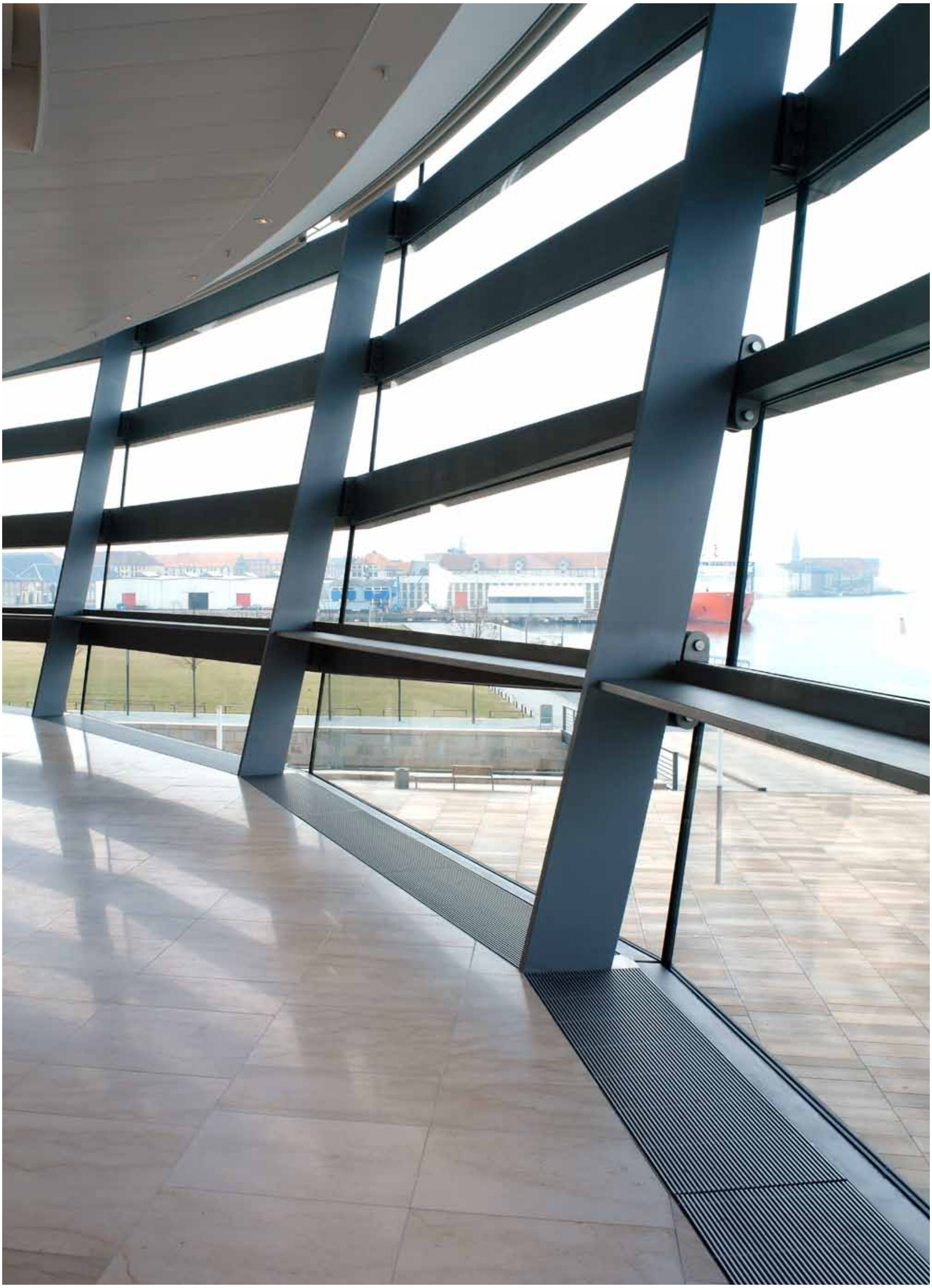
In the Lindab programme of ventilation grilles, there are grilles for any purpose. We produce grilles in both aluminium and steel.

Grilles can be mounted in the floor, wall, outer wall, ceiling and directly into circular air ducts and rectangular air ducts. Most of Lindabs grilles can be adjusted to specific measurements upon demand. The ventilation grilles are made in special customer-adjusted varieties to fit any need.



IGR, grille

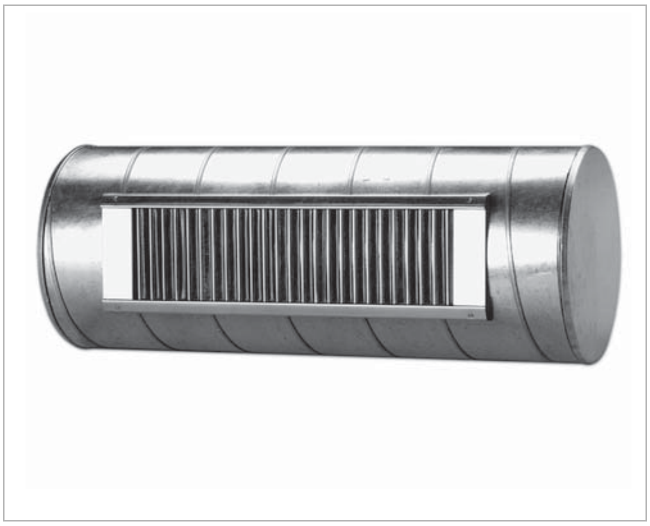
Grilles



B-grill, Opera House, Copenhagen.

Circular duct grille

RGS



Description

RGS is a rectangular ventilation grille with vertical adjustable bars for direct installation in circular ducts. The grille can be used for both supply and exhaust air. The grille can be supplied with horizontal directional bars, straight or slanting sliding damper or blade damper. The grille is designed so that the grille flanges always fit tight to the duct regardless of the duct diameter. RGS is made of hot-galvanised steel plate and is put together without welding. This means that the grille can be used without further surface treatment. The exterior of the grille thus matches the duct surface.

- Can be used for both supply and exhaust air
- Installed directly in circular duct
- Can be fitted with many types of accessory

Maintenance

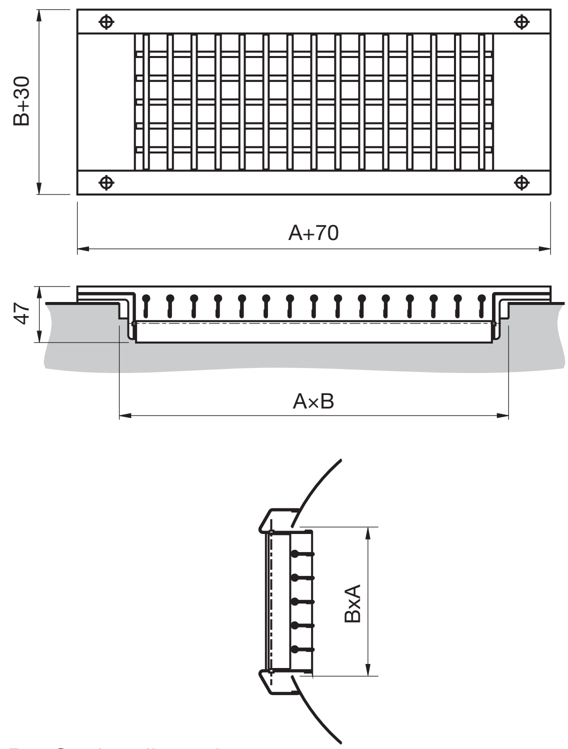
The grille should be removed to gain access to the duct.

Order code

Product	RGS	a	bbb	ccc
Type	x			
Accessories		x		
A - measure			x	
B - measure				x

A x B = Cutting dimension

Dimensions



A x B = Cutting dimension

Screws included.

Materials and finish

Grille: Hot-galvanised steel
Sliding damper: Electro-galvanised steel
Blade damper: Electro-galvanised steel

The diffuser is available in other colours. Please contact Lindab's sales department for further information.

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

Circular duct grille

RGS

Dimensions

Measure A	x	B	Min duct measure mm	Free area F(m²)	C - Measure mm	RGS 1 Weight kg
325	X	75	160	0.017	106	1.10
325	X	75	160	0.017	106	1.10
325	X	150	315	0.034	106	1.40
325	X	225	500	0.056	106	2.20
425	X	75	160	0.023	116	1.40
425	X	125	250	0.037	116	1.80
425	X	150	315	0.045	116	1.90
425	X	225	500	0.074	116	3,00
525	X	75	160	0.028	126	1.70
525	X	125	250	0.047	126	2,00
525	X	150	315	0.056	126	2.30
525	X	225	500	0.093	126	3.40
625	X	75	160	0.034	131	1.90
625	X	125	250	0.056	131	2.40
625	X	150	315	0.068	131	2.60
625	X	225	500	0.112	131	3.70
825	X	75	160	0.045	151	2.40
825	X	125	250	0.074	151	3.10
825	X	150	315	0.093	151	3.50
825	X	225	500	0.148	151	5.10
1025	X	75	200	0.056	186	2.90
1225	X	75	200	0.068	186	3.20
1225	X	125	250	0.112	186	4,00
1225	X	150	315	0.136	186	4.40
1225	X	225	500	0.224	186	6.30

Use

RGS-2
Suitable for supply and exhaust air. The grille is equipped with a single adjustment damper and has a lower sound level than RGS-6.

RGS-3
As RGS-2 with horizontal directional bars specifically for supply air.

RGS-4
The grille is suitable for exhaust only.

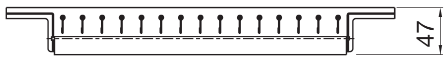
RGS-6 Slanting sliding damper
Suitable for supply and exhaust air. The grille is equipped with a slanting sliding damper, which means the air is distributed evenly over the whole grille.

RGS-7
As RGS-6 with horizontal directional bars specifically for supply air.

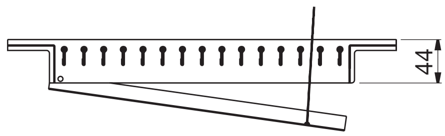
Accessories

RGS-0, without accessories.

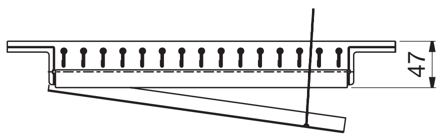
RGS-1, With directional bars.



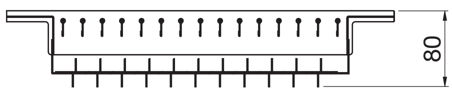
RGS-2, With blade damper.



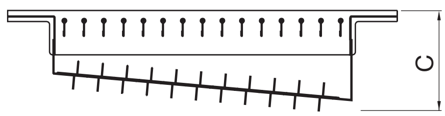
RGS-3, With directional bars and blade damper.



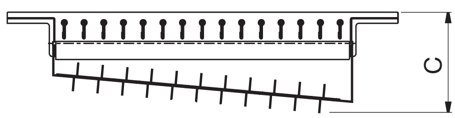
RGS-4, With straight sliding damper.



RGS-6, With slanting sliding damper.



RGS-7, With directional bars and slanting sliding damper.



We reserve the right to make changes without prior notice

Lindab

Circular duct grille

RGS

Technical data

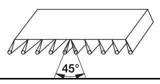
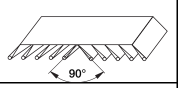
Effective speed v_0

The diagram for throw (see next page) specifies effective speed v_0 [m/s] as a function of the volume flow q [m^3/h, l/s] for each grille size with 0º bar setting.

Throw $l_{0.2}$

The diagram for throw (see next page) specifies the throw $l_{0.2}$ [m] at an average terminal velocity of 0.2 m/s, 0º bar setting without ceiling effect. (Distance from grille to ceiling greater than 800 mm.)

Table 1: Correction for dispersal:

Bar setting		
Correction factor V_0	1,1	1,2
Correction factor $l_{0,2}$	0,8	0,5

Ceiling effect

If the distance from grille to ceiling is less than 300 mm, the throw $l_{0.2}$ must be multiplied by 1.4.

Total pressure p_t

The diagram "Pressure – sound level" page 414 states the grille's total pressure p_t [Pa].

Sound effect level L_{WA}

The diagram "Pressure – sound level" states the grille's sound effect level L_{WA} [dB(A)] at a free area of 0.05 m^2.

Table 2: Correction for free area:

Correction free area											
F [m^2]	0,02	0,025	0,03	0,04	0,05	0,06	0,08	0,1	0,13	0,17	0,2
correction [dB]	-4	-3	-2	-1	0	+1	+2	+3	+4	+5	+6

Duct speed v_k

Pressure and sound effect level are stated for different duct speeds v_k [m/s].

For duct speeds v_k < 1 m/s, the sound values L_{WA} must be corrected by -7 dB.

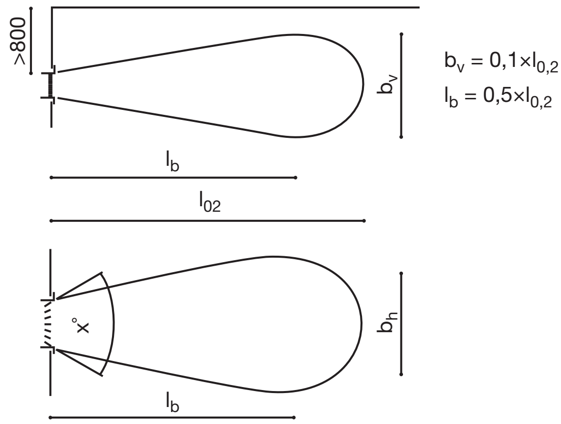
The diagrams on the following pages are in table form. See dimensioning tables.

The values apply to grilles with 0º dispersal.

Table 3: Correction for dispersal:

Bar setting	45º	90º
Pressure	x1,15	x1,3
Sound power level	+1	+2

Air jet dispersal



X = 0º : $b_h = 0.3 \times l_{0.2}$ $l_b = 0.5 \times l_{0.2}$
X = 45º : $b_h = 0.4 \times l_{0.2}$ $l_b = 0.5 \times l_{0.2}$
X = 90º : $b_h = 0.6 \times l_{0.2}$ $l_b = 0.5 \times l_{0.2}$

$l_{0.2}$: catalogue values

Sample calculation

Room width: W = 6 m,	Room height: H = 2.6 m
Volume flow per grille:	300 m^3/h
Duct speed	v_k = 4 m/s
Speed in the occupied zone:	< 0.25 m/s

From next page:

$$v_x = \frac{l_{0,2}}{B + C} \times 0{,}2 \qquad C = H - 1{,}8 = 0{,}8 \text{ m}$$

$$v_x = \leq 0{,}25 \text{ m/s} \qquad B + C = 6{,}8 \text{ m}$$

$$l_{0,2} \leq (B + C) \times \frac{v_x}{0{,}2} \leq 6{,}8 \times \frac{0{,}25}{0{,}20} \leq 8{,}5 \text{ m}$$

The diagram "Effective speed v_o- Throw $l_{0.2}$" (next pages):

Grille 625 x 75: $l_{0.2}$ = 8.0 m
v_o = 2.5 m/s

Pressure loss and sound effect level:
The diagram "Pressure – Sound level": 100% open damper

v_0 = 2.5 m/s v_k = 4.0 m/s
p_t = 23 Pa
L_{WA} = 44 dB(A)

Free area: 0.034 m^2
Correction table 2: - 2

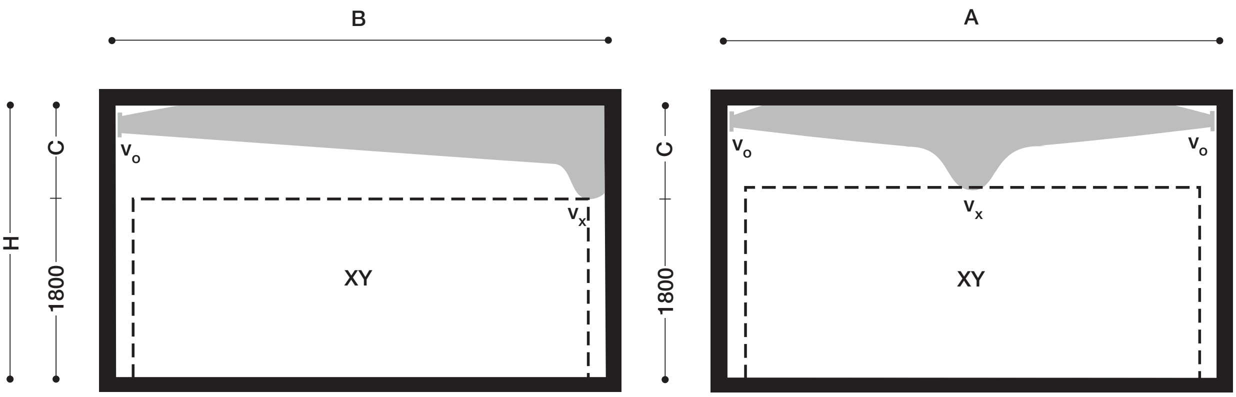
L_{WA} = 44 - 2 = 42 dB(A)

The diagram "Pressure – Sound level": 50% open damper:

p_t = 42 Pa
L_{WA} = 50 - 2 = 48 dB(A)

Circular duct grille RGS

Technical data - Supply air



XY = occupied zone

Final velocities

The speed in occupied zone v_x:

$$v_x = \frac{l_{0,2}}{B + C} \times 0{,}2 \text{ m/s} \qquad v_x = \frac{l_{0,2}}{\frac{A}{2} + C} \times 0{,}2 \text{ m/s}$$

Terminal velocity v_x at distance X:

$$v_x = \frac{l_{0,2} \times 0{,}2}{X}$$

Other terminal velocities v_x:

The distance to the point where the speed has decreased to

v_x is:

$X = K \times l_{0.2}$

Table 4:

v_x	0,15	0,2	0,25	0,3	0,35	0,4
K	1,33	1,0	0,8	0,67	0,57	0,5

Sample calculation

Room: Width: W = 7 m, Height: 2.7 m

C = 2.7 – 1.8 = 0.9 m

Grille: 825 x 75 Volume flow: 400 m^3/h

Throw according to the diagram on the next page:

$l_{0.2}$ = 9.0 m

The speed in the occupied zone:

$$v_x = \frac{l_{0,2}}{B + C} \times 0{,}2 = \frac{9{,}0}{7{,}9} \times 0{,}2 = 0{,}23 \text{ m/s}$$

The speed 4 m from the grille is:

$$v_x = \frac{l_{0,2} \times 0{,}2}{B + C} = \frac{9 \times 0{,}2}{4} = 0{,}45 \text{ m/s}$$

The distance to the point where the speed has decreased to 0,3 m/s is:

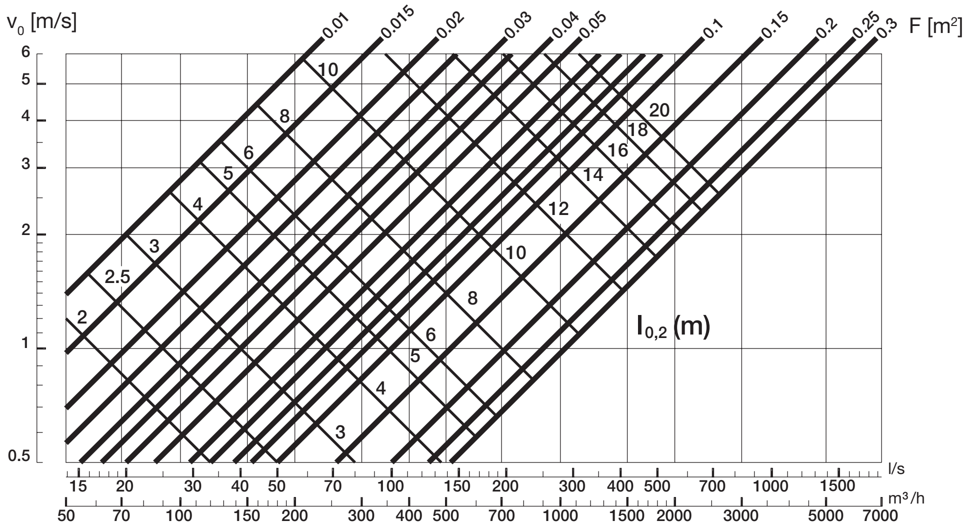
$0{,}67 \times l_{0,2} = 0{,}67 \times 9 = \underline{6{,}0 \text{ m}}$

Circular duct grille

RGS

Technical data - Supply and exhaust air

Effective speed v_0 - Throw $l_{0.2}$



Sample calculation

Grille 1025 x 75

Volume flow: 500 m^3/h

Supply air speed: v_0 = 2.7 m/s

Throw: $l_{0.2}$ = 10.0 m

With 90° dispersal: (See table 1, page 441)

v_0 = 1.2 x 2.7 = 3.2 m/s

$l_{0.2}$ = 0.5 x 10.0 = 5.0 m.

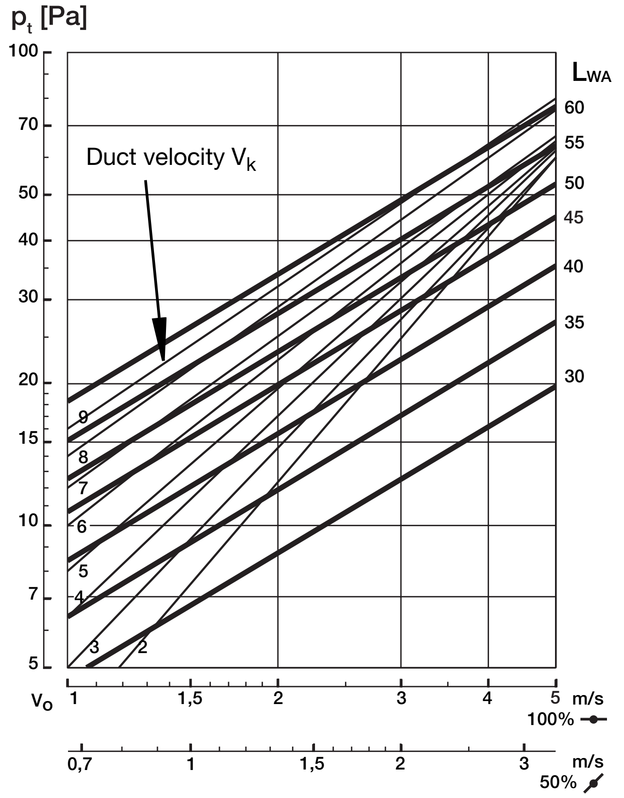
Circular duct grille RGS

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

Technical data- - Supply and exhaust air

Pressure - Sound level

RGS with accessories 4, 6 and 7



Correction

Correction for RGS with accessories 2 and 3.

Table 5:

Total pressure p_t	x 0,75	Pa
Sound power level L_{WA}	-3	dB(A)

Table 6: Correction for free area.:

Correction free area											
F [m²]	0,02	0,025	0,03	0,04	0,05	0,06	0,08	0,1	0,13	0,17	0,2
correction [dB]	-4	-3	-2	-1	0	+1	+2	+3	+4	+5	+6

Sample calculation

RGS-6 625 x 75 Area: 0.034 m²

Volume flow: 250 m³/h

Supply air speed: v_0 = 2.0 m/s

Duct speed: v_k = 4 m/s

100% open damper:

p_t = 17 Pa
L_{WA} = 42 dB

Table 6:

0.03 m²: -2 dB
L_{WA} = 42 - 2 = 40 dB

50% open damper:

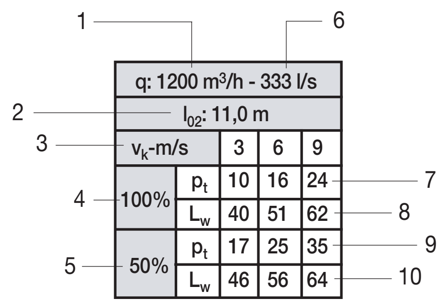
p_t = 30 Pa
L_{WA} = 47 - 2 = 45 dB

Dimensioning tables for RGS

The following pages contain dimensioning tables for RGS with accessories 4, 6 and 7.
Correction for RGS with accessories 2 and 3 - see table 5.

Explanation for dimensioning tables

1. Volume of air (m³/h)
2. Throw
3. Duct speed
4. 100% open damper
5. 50% open damper
6. Volume of air (l/s)
7. Pressure loss
8. Sound level
9. Pressure loss
10. Sound level



Circular duct grille RGS

Technical data-Supply and exhaust air

Dimensioning table with accessories 4, 6 and 7

B dimension: 75 mm

	q: 75 m^3/h - 21 l/s $l_{0,2}$: 2,0 m					q: 100 m^3/h - 28 l/s $l_{0,2}$: 3,0 m					q: 150 m^3/h - 42 l/s $l_{0,2}$: 4,5 m					q: 200 m^3/h - 56 l/s $l_{0,2}$: 7,0 m					q: 250 m^3/h - 69 l/s $l_{0,2}$: 9,0 m				
325×75 0,017 m^2	v_k-m/s		3	6	9	v_k-m/s		3	6	9	v_k-m/s		3	6	9	v_k-m/s		3	6	9	v_k-m/s		3	6	9
	100%	p_t	7	12	20	100%	p_t	11	17	26	100%	p_t	20	28	38	100%	p_t	30	38	52	100%	p_t	43	51	62
		L_W	29	41	49		L_W	32	43	54		L_W	37	46	55		L_W	41	49	56		L_W	45	50	56
	50%	p_t	12	21	30	50%	p_t	21	28	40	50%	p_t	38	45	60	50%	p_t	60	65	81	50%	p_t	83	92	104
		L_W	34	44	54		L_W	38	46	55		L_W	44	50	56		L_W	49	51	58		L_W	54	57	60

	q: 100 m^3/h - 28 l/s $l_{0,2}$: 2,5 m					q: 150 m^3/h - 42 l/s $l_{0,2}$: 4,5 m					q: 200 m^3/h - 56 l/s $l_{0,2}$: 5,5 m					q: 250 m^3/h - 69 l/s $l_{0,2}$: 7,0 m					q: 300 m^3/h - 83 l/s $l_{0,2}$: 9,0 m				
425×75 0,023 m^2	v_k-m/s		3	6	9	v_k-m/s		3	6	9	v_k-m/s		3	6	9	v_k-m/s		3	6	9	v_k-m/s		3	6	9
	100%	p_t	7	12	20	100%	p_t	12	20	29	100%	p_t	20	28	38	100%	p_t	27	35	48	100%	p_t	36	44	56
		L_W	29	42	50		L_W	34	44	53		L_W	38	47	56		L_W	41	49	56		L_W	44	51	56
	50%	p_t	12	21	30	50%	p_t	26	31	43	50%	p_t	38	45	60	50%	p_t	51	56	74	50%	p_t	70	79	90
		L_W	35	45	55		L_W	40	49	56		L_W	45	51	57		L_W	49	51	58		L_W	53	57	60

	q: 150 m^3/h - 42 l/s $l_{0,2}$: 3,9 m					q: 200 m^3/h - 56 l/s $l_{0,2}$: 5,5 m					q: 250 m^3/h - 69 l/s $l_{0,2}$: 7,5 m					q: 300 m^3/h - 83 l/s $l_{0,2}$: 9,0 m					q: 350 m^3/h - 97 l/s $l_{0,2}$: 10,0 m				
525×75 0,028 m^2	v_k-m/s		3	6	9	v_k-m/s		3	6	9	v_k-m/s		3	6	9	v_k-m/s		3	6	9	v_k-m/s		3	6	9
	100%	p_t	11	16	25	100%	p_t	14	22	32	100%	p_t	21	28	38	100%	p_t	25	35	48	100%	p_t	35	43	55
		L_W	33	44	55		L_W	36	46	56		L_W	39	48	57		L_W	41	50	57		L_W	45	52	58
	50%	p_t	20	28	38	50%	p_t	28	37	47	50%	p_t	38	47	60	50%	p_t	47	55	68	50%	p_t	69	78	89
		L_W	39	47	56		L_W	42	50	57		L_W	46	52	58		L_W	49	53	59		L_W	54	58	61

	q: 200 m^3/h - 56 l/s $l_{0,2}$: 5,0 m					q: 250 m^3/h - 69 l/s $l_{0,2}$: 6,5 m					q: 300 m^3/h - 83 l/s $l_{0,2}$: 8,5 m					q: 350 m^3/h - 97 l/s $l_{0,2}$: 9,5 m					q: 400 m^3/h - 111 l/s $l_{0,2}$: 10,5 m				
625×75 0,034 m^2	v_k-m/s		3	6	9	v_k-m/s		3	6	9	v_k-m/s		3	6	9	v_k-m/s		3	6	9	v_k-m/s		3	6	9
	100%	p_t	11	16	25	100%	p_t	14	22	32	100%	p_t	21	28	38	100%	p_t	25	35	48	100%	p_t	30	38	52
		L_W	34	45	54		L_W	37	47	57		L_W	40	49	58		L_W	42	51	58		L_W	44	52	59
	50%	p_t	20	30	40	50%	p_t	28	37	47	50%	p_t	38	47	60	50%	p_t	48	57	67	50%	p_t	60	65	81
		L_W	40	48	57		L_W	43	51	58		L_W	47	53	59		L_W	50	54	60		L_W	52	54	61

	q: 250 m^3/h - 69 l/s $l_{0,2}$: 5,2 m					q: 300 m^3/h - 83 l/s $l_{0,2}$: 7,0 m					q: 400 m^3/h - 111 l/s $l_{0,2}$: 9,0 m					q: 500 m^3/h - 139 l/s $l_{0,2}$: 10,5 m					q: 600 m^3/h - 167 l/s $l_{0,2}$: 12,0 m				
825×75 0,045 m^2	v_k-m/s		3	6	9	v_k-m/s		3	6	9	v_k-m/s		3	6	9	v_k-m/s		3	6	9	v_k-m/s		3	6	9
	100%	p_t	10	16	24	100%	p_t	12	20	29	100%	p_t	21	28	38	100%	p_t	27	35	48	100%	p_t	37	46	57
		L_W	35	46	57		L_W	37	47	56		L_W	41	50	59		L_W	44	52	59		L_W	48	55	60
	50%	p_t	17	25	35	50%	p_t	26	31	43	50%	p_t	38	47	60	50%	p_t	51	56	74	50%	p_t	72	82	93
		L_W	40	50	58		L_W	43	52	59		L_W	48	54	60		L_W	52	54	61		L_W	57	60	63

	q: 300 m^3/h - 83 l/s $l_{0,2}$: 6,0 m					q: 400 m^3/h - 111 l/s $l_{0,2}$: 8,5 m					q: 500 m^3/h - 139 l/s $l_{0,2}$: 10,0 m					q: 600 m^3/h - 167 l/s $l_{0,2}$: 11,5 m					q: 700 m^3/h - 194 l/s $l_{0,2}$: 13,0 m				
1025×75 0,056 m^2	v_k-m/s		3	6	9	v_k-m/s		3	6	9	v_k-m/s		3	6	9	v_k-m/s		3	6	9	v_k-m/s		3	6	9
	100%	p_t	10	16	24	100%	p_t	14	22	32	100%	p_t	21	28	38	100%	p_t	27	35	48	100%	p_t	35	43	55
		L_W	36	47	58		L_W	39	49	59		L_W	42	51	60		L_W	45	53	60		L_W	48	55	61
	50%	p_t	17	25	35	50%	p_t	28	37	47	50%	p_t	38	47	60	50%	p_t	51	56	74	50%	p_t	69	78	89
		L_W	41	51	59		L_W	45	53	60		L_W	49	55	61		L_W	53	55	61		L_W	57	61	64

	q: 400 m^3/h - 111 l/s $l_{0,2}$: 7,0 m					q: 500 m^3/h - 139 l/s $l_{0,2}$: 9,0 m					q: 600 m^3/h - 167 l/s $l_{0,2}$: 10,5 m					q: 700 m^3/h - 194 l/s $l_{0,2}$: 11,5 m					q: 800 m^3/h - 222 l/s $l_{0,2}$: 13,0 m				
1225×75 0,068 m^2	v_k-m/s		3	6	9	v_k-m/s		3	6	9	v_k-m/s		3	6	9	v_k-m/s		3	6	9	v_k-m/s		3	6	9
	100%	p_t	11	17	26	100%	p_t	14	22	32	100%	p_t	21	28	38	100%	p_t	25	35	48	100%	p_t	30	38	52
		L_W	37	48	59		L_W	40	50	60		L_W	43	52	61		L_W	45	54	61		L_W	47	55	62
	50%	p_t	20	28	38	50%	p_t	28	37	47	50%	p_t	38	47	60	50%	p_t	48	57	68	50%	p_t	60	65	81
		L_W	43	51	60		L_W	46	52	61		L_W	50	54	62		L_W	53	57	63		L_W	55	57	64

Circular duct grille RGS

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

Technical data- Supply and exhaust air

Dimensioning table with accessories 4, 6 and 7

B dimension: 125 mm

325×125 0,028 m^2	**q: 150 m^3/h - 42 l/s $l_{0,2}$: 3,9 m**					**q: 200 m^3/h - 56 l/s $l_{0,2}$: 5,5 m**					**q: 250 m^3/h - 69 l/s $l_{0,2}$: 7,5 m**					**q: 300 m^3/h - 83 l/s $l_{0,2}$: 9,0 m**					**q: 350 m^3/h - 97 l/s $l_{0,2}$: 10,0 m**				
	v_k-m/s		3	6	9	v_k-m/s		3	6	9	v_k-m/s		3	6	9	v_k-m/s		3	6	9	v_k-m/s		3	6	9
	100%	p_t	11	16	25	100%	p_t	14	22	32	100%	p_t	21	28	38	100%	p_t	25	35	48	100%	p_t	35	43	55
		L_W	33	44	55		L_W	36	46	56		L_W	39	48	57		L_W	41	50	57		L_W	45	52	58
	50%	p_t	20	28	38	50%	p_t	28	37	47	50%	p_t	38	47	60	50%	p_t	47	55	68	50%	p_t	69	78	89
		L_W	39	47	56		L_W	42	50	57		L_W	46	52	58		L_W	49	53	59		L_W	54	58	61
425×125 0,037 m^2	**q: 200 m^3/h - 56 l/s $l_{0,2}$: 4,5 m**					**q: 250 m^3/h - 69 l/s $l_{0,2}$: 6,0 m**					**q: 300 m^3/h - 83 l/s $l_{0,2}$: 7,5 m**					**q: 350 m^3/h - 97 l/s $l_{0,2}$: 9,0 m**					**q: 400 m^3/h - 111 l/s $l_{0,2}$: 10,0 m**				
	v_k-m/s		3	6	9	v_k-m/s		3	6	9	v_k-m/s		3	6	9	v_k-m/s		3	6	9	v_k-m/s		3	6	9
	100%	p_t	10	16	24	100%	p_t	12	20	28	100%	p_t	19	26	36	100%	p_t	22	29	39	100%	p_t	27	35	48
		L_W	34	45	56		L_W	36	46	55		L_W	40	49	57		L_W	40	50	59		L_W	43	51	58
	50%	p_t	17	25	35	50%	p_t	26	35	46	50%	p_t	34	44	56	50%	p_t	43	52	62	50%	p_t	51	56	74
		L_W	39	49	57		L_W	42	49	57		L_W	46	52	59		L_W	47	53	59		L_W	51	53	59
525×125 0,047 m^2	**q: 250 m^3/h - 69 l/s $l_{0,2}$: 5,2 m**					**q: 300 m^3/h - 83 l/s $l_{0,2}$: 7,0 m**					**q: 400 m^3/h - 111 l/s $l_{0,2}$: 9,0 m**					**q: 500 m^3/h - 139 l/s $l_{0,2}$: 10,5 m**					**q: 600 m^3/h - 167 l/s $l_{0,2}$: 12,0 m**				
	v_k-m/s		3	6	9	v_k-m/s		3	6	9	v_k-m/s		3	6	9	v_k-m/s		3	6	9	v_k-m/s		3	6	9
	100%	p_t	10	16	24	100%	p_t	12	20	29	100%	p_t	21	28	38	100%	p_t	27	35	48	100%	p_t	37	46	57
		L_W	35	46	57		L_W	37	47	56		L_W	41	50	59		L_W	44	52	59		L_W	48	55	60
	50%	p_t	17	25	35	50%	p_t	26	31	43	50%	p_t	38	47	60	50%	p_t	51	56	74	50%	p_t	72	82	93
		L_W	40	50	58		L_W	43	52	59		L_W	48	54	60		L_W	52	54	61		L_W	57	60	63
625×125 0,056 m^2	**q: 300 m^3/h - 83 l/s $l_{0,2}$: 6,0 m**					**q: 400 m^3/h - 111 l/s $l_{0,2}$: 8,5 m**					**q: 500 m^3/h - 139 l/s $l_{0,2}$: 10,0 m**					**q: 600 m^3/h - 167 l/s $l_{0,2}$: 11,5 m**					**q: 700 m^3/h - 194 l/s $l_{0,2}$: 13,0 m**				
	v_k-m/s		3	6	9	v_k-m/s		3	6	9	v_k-m/s		3	6	9	v_k-m/s		3	6	9	v_k-m/s		3	6	9
	100%	p_t	10	16	24	100%	p_t	14	22	32	100%	p_t	21	28	38	100%	p_t	27	35	48	100%	p_t	35	43	55
		L_W	36	47	58		L_W	39	49	59		L_W	42	51	60		L_W	45	53	60		L_W	48	55	61
	50%	p_t	17	25	35	50%	p_t	28	37	47	50%	p_t	38	47	60	50%	p_t	51	56	74	50%	p_t	69	78	89
		L_W	41	51	59		L_W	45	53	60		L_W	49	55	61		L_W	53	55	61		L_W	57	61	64
825×125 0,074 m^2	**q: 400 m^3/h - 111 l/s $l_{0,2}$: 7,5 m**					**q: 500 m^3/h - 139 l/s $l_{0,2}$: 9,0 m**					**q: 600 m^3/h - 167 l/s $l_{0,2}$: 11,0 m**					**q: 700 m^3/h - 194 l/s $l_{0,2}$: 11,5 m**					**q: 800 m^3/h - 222 l/s $l_{0,2}$: 13,0 m**				
	v_k-m/s		3	6	9	v_k-m/s		3	6	9	v_k-m/s		3	6	9	v_k-m/s		3	6	9	v_k-m/s		3	6	9
	100%	p_t	10	16	24	100%	p_t	12	20	28	100%	p_t	19	26	36	100%	p_t	22	29	39	100%	p_t	27	35	48
		L_W	36	47	58		L_W	39	49	58		L_W	43	52	60		L_W	43	53	62		L_W	46	54	62
	50%	p_t	17	25	35	50%	p_t	26	35	46	50%	p_t	34	44	56	50%	p_t	43	52	62	50%	p_t	51	56	74
		L_W	42	52	60		L_W	45	52	60		L_W	49	55	61		L_W	50	56	62		L_W	54	56	62
1025×125 0,093 m^2	**q: 500 m^3/h - 139 l/s $l_{0,2}$: 8,0 m**					**q: 600 m^3/h - 167 l/s $l_{0,2}$: 9,5 m**					**q: 700 m^3/h - 194 l/s $l_{0,2}$: 10,5 m**					**q: 800 m^3/h - 222 l/s $l_{0,2}$: 12,0 m**					**q: 1000 m^3/h - 278 l/s $l_{0,2}$: 14,0 m**				
	v_k-m/s		3	6	9	v_k-m/s		3	6	9	v_k-m/s		3	6	9	v_k-m/s		3	6	9	v_k-m/s		3	6	9
	100%	p_t	10	16	24	100%	p_t	12	20	29	100%	p_t	16	23	33	100%	p_t	20	28	38	100%	p_t	27	35	48
		L_W	37	48	59		L_W	40	50	59		L_W	40	52	61		L_W	44	53	62		L_W	47	55	63
	50%	p_t	17	25	35	50%	p_t	26	31	43	50%	p_t	29	39	50	50%	p_t	38	45	60	50%	p_t	51	56	74
		L_W	43	53	61		L_W	46	55	62		L_W	48	56	63		L_W	51	57	63		L_W	55	57	63
1225×125 0,112 m^2	**q: 600 m^3/h - 167 l/s $l_{0,2}$: 9,0 m**					**q: 700 m^3/h - 194 l/s $l_{0,2}$: 10,0 m**					**q: 800 m^3/h - 222 l/s $l_{0,2}$: 11,5 m**					**q: 1000 m^3/h - 278 l/s $l_{0,2}$: 13,0 m**					**q: 1200 m^3/h - 333 l/s $l_{0,2}$: 15,0 m**				
	v_k-m/s		3	6	9	v_k-m/s		3	6	9	v_k-m/s		3	6	9	v_k-m/s		3	6	9	v_k-m/s		3	6	9
	100%	p_t	10	16	24	100%	p_t	12	19	27	100%	p_t	14	22	32	100%	p_t	21	28	38	100%	p_t	27	35	48
		L_W	38	49	60		L_W	41	51	62		L_W	42	52	62		L_W	45	54	63		L_W	48	56	64
	50%	p_t	17	25	35	50%	p_t	21	30	41	50%	p_t	28	37	47	50%	p_t	38	47	60	50%	p_t	51	56	74
		L_W	44	54	62		L_W	46	55	63		L_W	52	58	63		L_W	52	58	64		L_W	56	58	64

Circular duct grille RGS

Technical data- Supply and exhaust air

Dimensioning table with accessories 4, 6 and 7

B dimension: 150 mm

325×150, 0,034 m²

q	$l_{0,2}$	Damper	v_k-m/s	3	6	9
200 m³/h - 56 l/s	5,0 m	100%	p_t	11	16	25
			L_W	34	45	54
		50%	p_t	20	30	40
			L_W	40	48	57
250 m³/h - 69 l/s	6,5 m	100%	p_t	14	22	32
			L_W	37	47	57
		50%	p_t	28	37	47
			L_W	43	51	58
300 m³/h - 83 l/s	8,5 m	100%	p_t	21	28	38
			L_W	40	49	58
		50%	p_t	38	47	60
			L_W	47	53	59
350 m³/h - 97 l/s	9,5 m	100%	p_t	25	35	48
			L_W	42	51	58
		50%	p_t	48	57	67
			L_W	50	54	60
400 m³/h - 111 l/s	10,5 m	100%	p_t	30	38	52
			L_W	44	52	59
		50%	p_t	60	65	81
			L_W	52	54	61

425×150, 0,045 m²

q	$l_{0,2}$	Damper	v_k-m/s	3	6	9
250 m³/h - 69 l/s	5,2 m	100%	p_t	10	16	24
			L_W	35	46	57
		50%	p_t	17	25	35
			L_W	40	50	58
300 m³/h - 83 l/s	7,0 m	100%	p_t	12	20	29
			L_W	37	47	56
		50%	p_t	26	31	43
			L_W	43	52	59
400 m³/h - 111 l/s	9,0 m	100%	p_t	21	28	38
			L_W	41	50	59
		50%	p_t	38	47	60
			L_W	48	54	60
500 m³/h - 139 l/s	10,5 m	100%	p_t	27	35	48
			L_W	44	52	59
		50%	p_t	51	56	74
			L_W	52	54	61
600 m³/h - 167 l/s	12,0 m	100%	p_t	37	46	57
			L_W	48	55	60
		50%	p_t	72	82	93
			L_W	57	60	63

525×150, 0,056 m²

q	$l_{0,2}$	Damper	v_k-m/s	3	6	9
300 m³/h - 83 l/s	6,0 m	100%	p_t	10	16	24
			L_W	36	47	58
		50%	p_t	17	25	35
			L_W	41	51	59
400 m³/h - 111 l/s	8,5 m	100%	p_t	14	22	32
			L_W	39	49	59
		50%	p_t	28	37	47
			L_W	45	53	60
500 m³/h - 139 l/s	10,0 m	100%	p_t	21	28	38
			L_W	42	51	60
		50%	p_t	38	47	60
			L_W	49	55	61
600 m³/h - 167 l/s	11,5 m	100%	p_t	27	35	48
			L_W	45	53	60
		50%	p_t	51	56	74
			L_W	53	55	61
700 m³/h - 194 l/s	13,0 m	100%	p_t	35	43	55
			L_W	48	55	61
		50%	p_t	69	78	89
			L_W	57	61	64

625×150, 0,068 m²

q	$l_{0,2}$	Damper	v_k-m/s	3	6	9
400 m³/h - 111 l/s	7,0 m	100%	p_t	11	17	26
			L_W	37	48	59
		50%	p_t	20	28	38
			L_W	43	51	60
500 m³/h - 139 l/s	9,0 m	100%	p_t	14	22	32
			L_W	40	50	60
		50%	p_t	28	37	47
			L_W	46	54	61
600 m³/h - 167 l/s	10,5 m	100%	p_t	21	28	38
			L_W	43	52	61
		50%	p_t	38	47	60
			L_W	50	52	62
700 m³/h - 194 l/s	11,5 m	100%	p_t	25	35	48
			L_W	45	54	61
		50%	p_t	48	57	68
			L_W	53	57	63
800 m³/h - 222 l/s	130 m	100%	p_t	30	38	52
			L_W	47	55	62
		50%	p_t	60	65	81
			L_W	55	57	64

825×150, 0,093 m²

q	$l_{0,2}$	Damper	v_k-m/s	3	6	9
500 m³/h - 139 l/s	8,0 m	100%	p_t	10	16	24
			L_W	37	48	59
		50%	p_t	17	25	35
			L_W	43	53	61
600 m³/h - 167 l/s	9,5 m	100%	p_t	12	20	29
			L_W	40	50	59
		50%	p_t	26	31	43
			L_W	46	55	62
700 m³/h - 194 l/s	10,5 m	100%	p_t	16	23	33
			L_W	40	52	61
		50%	p_t	29	39	50
			L_W	48	56	63
800 m³/h - 222 l/s	12,0 m	100%	p_t	20	28	38
			L_W	44	53	62
		50%	p_t	38	45	60
			L_W	51	57	63
1000 m³/h - 278 l/s	14,0 m	100%	p_t	27	35	48
			L_W	47	55	63
		50%	p_t	51	56	74
			L_W	55	57	63

1025×150, 0,112 m²

q	$l_{0,2}$	Damper	v_k-m/s	3	6	9
600 m³/h - 167 l/s	9,0 m	100%	p_t	10	16	24
			L_W	38	49	60
		50%	p_t	17	25	35
			L_W	44	54	62
700 m³/h - 194 l/s	10,0 m	100%	p_t	12	19	27
			L_W	41	51	62
		50%	p_t	21	30	41
			L_W	46	55	63
800 m³/h - 222 l/s	11,0 m	100%	p_t	14	22	32
			L_W	42	52	62
		50%	p_t	28	37	47
			L_W	48	56	63
1000 m³/h - 278 l/s	13,0 m	100%	p_t	21	28	38
			L_W	45	54	63
		50%	p_t	38	47	60
			L_W	52	58	64
1200 m³/h - 333 l/s	15,0 m	100%	p_t	27	35	48
			L_W	48	56	64
		50%	p_t	51	56	74
			L_W	56	58	64

1225×150, 0,136 m²

q	$l_{0,2}$	Damper	v_k-m/s	3	6	9
700 m³/h - 222 l/s	8,5 m	100%	p_t	8	15	22
			L_W	39	49	61
		50%	p_t	16	23	33
			L_W	41	53	62
800 m³/h - 278 l/s	10,0 m	100%	p_t	11	16	25
			L_W	39	50	61
		50%	p_t	20	28	38
			L_W	45	53	62
1000 m³/h - 333 l/s	11,5 m	100%	p_t	14	22	32
			L_W	42	52	62
		50%	p_t	28	37	47
			L_W	48	56	63
1200 m³/h - 389 l/s	13,0 m	100%	p_t	21	28	38
			L_W	45	54	63
		50%	p_t	38	47	60
			L_W	52	58	64
1400 m³/h - 444 l/s	15,0 m	100%	p_t	25	35	48
			L_W	47	56	63
		50%	p_t	48	57	67
			L_W	55	59	65

Circular duct grille

RGS

Technical data-Supply and exhaust air

Dimensioning table with accessories 4, 6 og 7

B dimension: 225 mm

325×225 0,056 m^2	q: 300 m^3/h - 83 l/s $l_{0,2}$: 6,0 m					q: 400 m^3/h - 111 l/s $l_{0,2}$: 8,5 m					q: 500 m^3/h - 139 l/s $l_{0,2}$: 10,0 m					q: 600 m^3/h - 167 l/s $l_{0,2}$: 11,5 m					q: 700 m^3/h - 194 l/s $l_{0,2}$: 13,0 m				
	v_k-m/s		3	6	9	v_k-m/s		3	6	9	v_k-m/s		3	6	9	v_k-m/s		3	6	9	v_k-m/s		3	6	9
	100%	p_t	10	16	24	100%	p_t	14	22	32	100%	p_t	21	28	38	100%	p_t	27	35	48	100%	p_t	35	43	55
		L_W	36	47	58		L_W	39	49	59		L_W	42	51	60		L_W	45	53	60		L_W	48	55	61
	50%	p_t	17	25	35	50%	p_t	28	37	47	50%	p_t	38	47	60	50%	p_t	51	56	74	50%	p_t	69	78	89
		L_W	41	51	59		L_W	45	53	60		L_W	49	55	61		L_W	53	55	61		L_W	57	61	64

425×225 0,074 m^2	q: 400 m^3/h - 111 l/s $l_{0,2}$: 7,5 m					q: 500 m^3/h - 139 l/s $l_{0,2}$: 9,0 m					q: 600 m^3/h - 167 l/s $l_{0,2}$: 11,0 m					q: 700 m^3/h - 194 l/s $l_{0,2}$: 11,5 m					q: 800 m^3/h - 222 l/s $l_{0,2}$: 13,0 m				
	v_k-m/s		3	6	9	v_k-m/s		3	6	9	v_k-m/s		3	6	9	v_k-m/s		3	6	9	v_k-m/s		3	6	9
	100%	p_t	10	16	24	100%	p_t	12	20	28	100%	p_t	19	26	36	100%	p_t	22	29	39	100%	p_t	27	35	48
		L_W	36	47	58		L_W	39	49	58		L_W	43	52	60		L_W	43	53	62		L_W	46	54	62
	50%	p_t	17	25	35	50%	p_t	26	35	46	50%	p_t	34	44	56	50%	p_t	43	52	62	50%	p_t	51	56	74
		L_W	42	52	60		L_W	45	52	60		L_W	49	55	61		L_W	50	56	62		L_W	54	56	62

525×225 0,093 m^2	q: 500 m^3/h - 139 l/s $l_{0,2}$: 8,0 m					q: 600 m^3/h - 167 l/s $l_{0,2}$: 9,5 m					q: 700 m^3/h - 194 l/s $l_{0,2}$: 10,5 m					q: 800 m^3/h - 222 l/s $l_{0,2}$: 12,0 m					q: 1000 m^3/h - 278 l/s $l_{0,2}$: 14,0 m				
	v_k-m/s		3	6	9	v_k-m/s		3	6	9	v_k-m/s		3	6	9	v_k-m/s		3	6	9	v_k-m/s		3	6	9
	100%	p_t	10	16	24	100%	p_t	12	20	29	100%	p_t	16	23	33	100%	p_t	20	28	38	100%	p_t	27	35	48
		L_W	37	48	59		L_W	40	50	59		L_W	40	52	61		L_W	44	53	62		L_W	47	55	63
	50%	p_t	17	25	35	50%	p_t	26	31	43	50%	p_t	29	39	50	50%	p_t	38	45	60	50%	p_t	51	56	74
		L_W	43	53	61		L_W	46	55	62		L_W	48	56	63		L_W	51	57	63		L_W	55	57	63

625×225 0,112 m^2	q: 600 m^3/h - 167 l/s $l_{0,2}$: 9,0 m					q: 700 m^3/h - 194 l/s $l_{0,2}$: 10,0 m					q: 800 m^3/h - 222 l/s $l_{0,2}$: 11,0 m					q: 1000 m^3/h - 278 l/s $l_{0,2}$: 13,0 m					q: 1200 m^3/h - 333 l/s $l_{0,2}$: 15,0 m				
	v_k-m/s		3	6	9	v_k-m/s		3	6	9	v_k-m/s		3	6	9	v_k-m/s		3	6	9	v_k-m/s		3	6	9
	100%	p_t	10	16	24	100%	p_t	12	19	27	100%	p_t	14	22	32	100%	p_t	21	28	38	100%	p_t	27	35	48
		L_W	38	49	60		L_W	41	51	62		L_W	42	52	62		L_W	45	54	63		L_W	48	56	64
	50%	p_t	17	25	35	50%	p_t	21	30	41	50%	p_t	28	37	47	50%	p_t	38	47	60	50%	p_t	51	56	74
		L_W	44	54	62		L_W	46	55	63		L_W	48	56	63		L_W	52	58	64		L_W	56	58	64

825×225 0,148 m^2	q: 800 m^3/h - 222 l/s $l_{0,2}$: 9,5 m					q: 1000 m^3/h - 278 l/s $l_{0,2}$: 11,5 m					q: 1200 m^3/h - 333 l/s $l_{0,2}$: 13,0 m					q: 1400 m^3/h - 389 l/s $l_{0,2}$: 15,0 m					q: 1600 m^3/h - 444 l/s $l_{0,2}$: 17,0 m				
	v_k-m/s		3	6	9	v_k-m/s		3	6	9	v_k-m/s		3	6	9	v_k-m/s		3	6	9	v_k-m/s		3	6	9
	100%	p_t	10	16	24	100%	p_t	12	20	28	100%	p_t	19	26	36	100%	p_t	22	30	40	100%	p_t	27	35	48
		L_W	39	50	61		L_W	42	52	61		L_W	46	55	63		L_W	46	56	64		L_W	49	57	65
	50%	p_t	17	25	35	50%	p_t	27	35	45	50%	p_t	34	44	56	50%	p_t	43	52	62	50%	p_t	51	56	74
		L_W	45	55	63		L_W	48	55	63		L_W	52	58	65		L_W	53	59	65		L_W	57	59	65

1025×225 0,186 m^2	q: 1000 m^3/h - 278 l/s $l_{0,2}$: 11,0 m					q: 1200 m^3/h - 333 l/s $l_{0,2}$: 12,0 m					q: 1400 m^3/h - 389 l/s $l_{0,2}$: 13,5 m					q: 1600 m^3/h - 444 l/s $l_{0,2}$: 15,0 m					q: 1800 m^3/h - 500 l/s $l_{0,2}$: 17,0 m				
	v_k-m/s		3	6	9	v_k-m/s		3	6	9	v_k-m/s		3	6	9	v_k-m/s		3	6	9	v_k-m/s		3	6	9
	100%	p_t	10	16	24	100%	p_t	12	20	30	100%	p_t	16	23	33	100%	p_t	20	27	37	100%	p_t	23	31	42
		L_W	40	51	62		L_W	43	53	62		L_W	43	55	64		L_W	47	56	65		L_W	48	57	66
	50%	p_t	17	25	35	50%	p_t	26	31	43	50%	p_t	30	41	49	50%	p_t	38	45	60	50%	p_t	44	52	64
		L_W	46	56	64		L_W	49	58	65		L_W	51	59	66		L_W	54	60	66		L_W	56	61	66

1225×225 0,224 m^2	q: 1200 m^3/h - 333 l/s $l_{0,2}$: 11,0 m					q: 1400 m^3/h - 389 l/s $l_{0,2}$: 12,0 m					q: 1600 m^3/h - 444 l/s $l_{0,2}$: 14,0 m					q: 1800 m^3/h - 500 l/s $l_{0,2}$: 15,5 m					q: 2000 m^3/h - 556 l/s $l_{0,2}$: 17,0 m				
	v_k-m/s		3	6	9	v_k-m/s		3	6	9	v_k-m/s		3	6	9	v_k-m/s		3	6	9	v_k-m/s		3	6	9
	100%	p_t	10	16	24	100%	p_t	12	19	27	100%	p_t	14	22	32	100%	p_t	18	25	35	100%	p_t	21	28	38
		L_W	40	51	62		L_W	43	53	64		L_W	44	54	64		L_W	47	56	64		L_W	47	56	65
	50%	p_t	17	25	35	50%	p_t	21	30	41	50%	p_t	28	37	47	50%	p_t	34	44	56	50%	p_t	38	47	60
		L_W	46	56	64		L_W	48	57	65		L_W	50	58	66		L_W	53	59	66		L_W	54	60	66

Ventilation grille

B3020

Description

B3020 is a rectangular aluminium grille with fixed horizontal bars. B3020 is used for both supply and exhaust air, and is supplied as standard with springs for installation in plenum boxes type VBA, WB or mounting frame type GGR. B3020 can also be used with volume regulator GAT.

Maintenance

The grille should be removed to gain access to the plenum box or duct. The external parts should be wiped with a damp cloth.

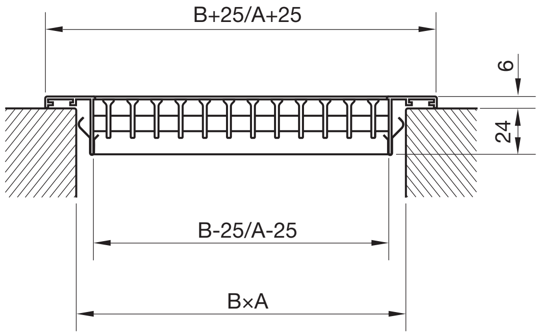
Accessories

Plenum box: VBA, WB
Mounting frame: GGR
Volume regulator: GAT

Order code

Product	B 3020	aaa	bbb
Type			
A - measure			
B - measure			

Dimensions



A x B mm	Free area F (m^2)	Weight kg
200 x 100	0,0072	0,3
300 x 100	0,0113	0,4
400 x 100	0,0155	0,5
500 x 100	0,0195	0,7
300 x 150	0,0189	0,6
400 x 150	0,0258	0,7
500 x 150	0,0326	1,0
600 x 150	0,0395	1,2
400 x 200	0,0361	0,8
500 x 200	0,0457	1,4
600 x 200	0,0553	1,6

Other sizes and types can be supplied - see special grille B.

Materials and finish

Grille: Aluminium
Standard finish: Natural anodised
On request: RAL 9010, gloss 30

The grille is available in other colours. Please contact Lindab's sales department for further information.

Special grille

B

Description

Special grille type B is a range of aluminium grilles with fixed bars. The grille can be configured on the basis of the summary on the following pages. As part of the configuration you can select frame, grids, type of mounting and accessories. Finally the A x B dimension is specified. Please note that the A x B dimension varies according to the frame selected. A x B dimensions have certain limitations, which are shown under the order code.

Materials and finish

Grille:	Aluminium
Standard finish:	Natural anodized
	On request: RAL 9010 Gloss 30

The grille is available in other colours. Please contact Lindab's sales department for further information.

Order code

Product	B	a	b	c	d	eee	fff

Type
Frame
Grid
Installation
Accessories
A - Measure
B - Measure

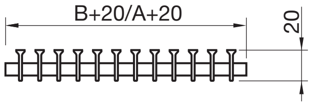
A x B: Duct/cutout
A dimension: along the bars
B dimension: across the bars
Can be supplied in all dimensions.

Max. A x B = 2000 x 2000
Min. A x B = 100 x 60
Free area F [m^2]= (A-25) x (B-25) x 0.55 x 10^{-6}

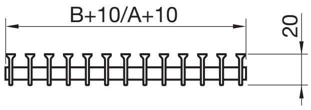
Mounting frame and volume regulator - see GGR/GAT.

Frame

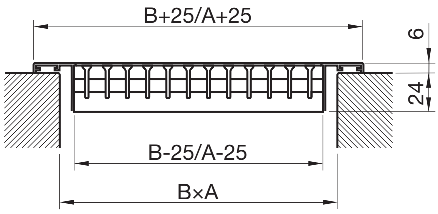
1 No frame



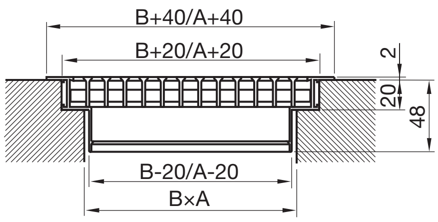
2 No frame



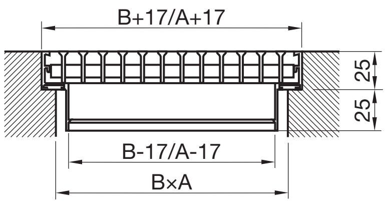
3 With 25 mm flange - wall/ceiling



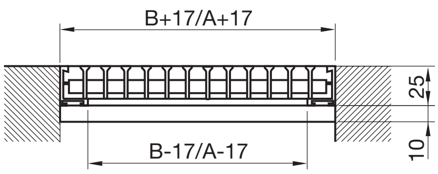
4 With flange - floor



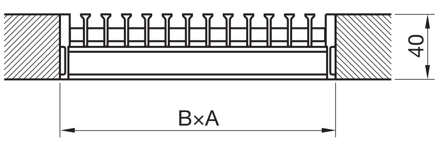
5 With Z frame - wall
6 With Z frame - floor



7 With angle frame - wall
8 With angle frame - floor



9 Special floor frame, only design 9600

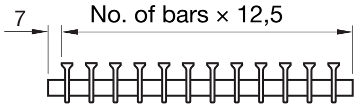


Special grille

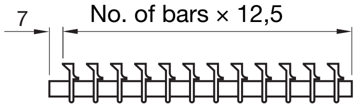
B

Grid

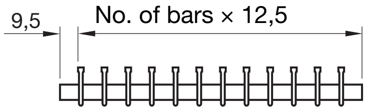
0 0° Free area: 55%



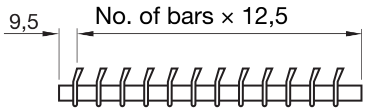
1 30° bend Free area: 55%



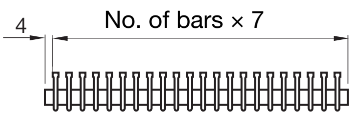
2 0° Free area: 70%



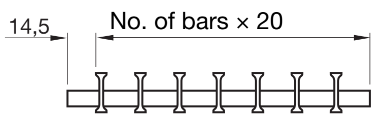
3 15° bendFree area: 70%



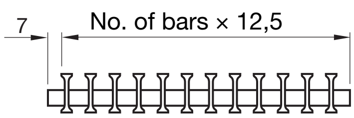
4 0° Free area: 60%



5 0° Free area: 75%

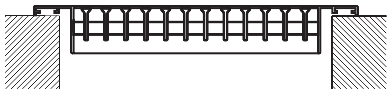


6 0° Free area: 55%

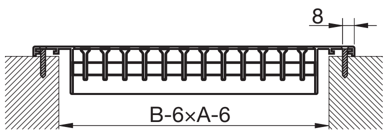


Mounting

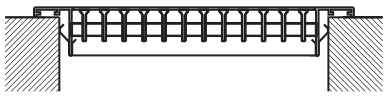
0 Not prepared for mounting



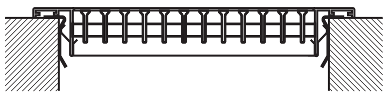
1 Screw holes, only frame 3



2 With clamp springs. -only frame 3.

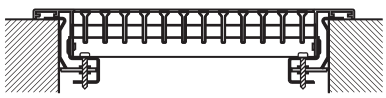


3 Mounting frame and springs
-only frame 3



4 Frame types 5-6-7-8
with wall anchors

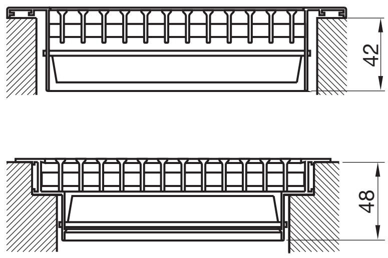
8 Hidden screws. - only frame 3



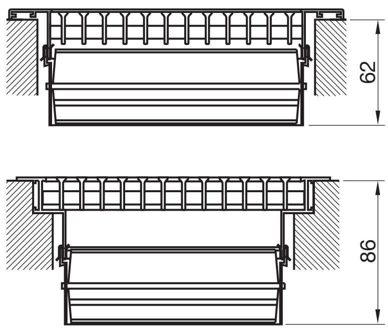
Accessories

0 No accessories

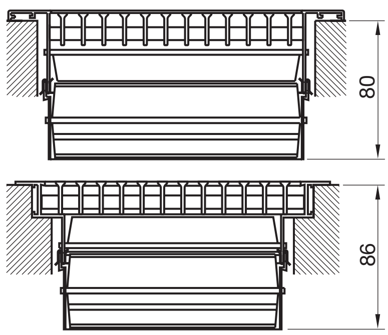
1 Direction control



2 Volume control damper



3 Direction and volume
control damper



Direction and volume control damper only possible with frame types 3-4-5 and 6.

Max. B = 1200mm with direction control

Ventilation grille/Special grille B3020/B

Technical data

Capacity

Volume flow q_v [l/s] and [m³/h], total pressure drop Δp_t [Pa], throw $l_{0.2}$ [m] and sound level L_{WA} [dB(A)] can be seen in the diagrams.

Throw $l_{0.2}$

Throw $l_{0.2}$ [m] at an average speed of 0.2 m/s, 0º bar setting without ceiling effect (distance from diffuser to grille over 800 mm) can be seen in the diagrams. Correction for dispersal - see table below.

Bar setting	45º	90º
Correction factor	0,8	0,5

Sound effect level L_{WA}

Sound effect level L_{WA} [dB(A)] at 0º bar setting can be seen in the diagrams. The sound levels apply for grilles without a volume regulator. See the table below for correction of sound level on dispersal [dB].

Bar setting	45º	90º
Correction factor	+3	+10

Frequency-related sound effect level

The sound effect level in the frequency band is defined as $L_{WA}+K_{ok}$. The K_{ok} values are given in chart. See table below.

	Centre frequency Hz							
	63	125	250	500	1K	2K	4K	8K
Supply air	1	-4	-2	0	-6	-10	-14	-19
Exhaust	-3	-8	-3	-1	-3	-12	-19	-22

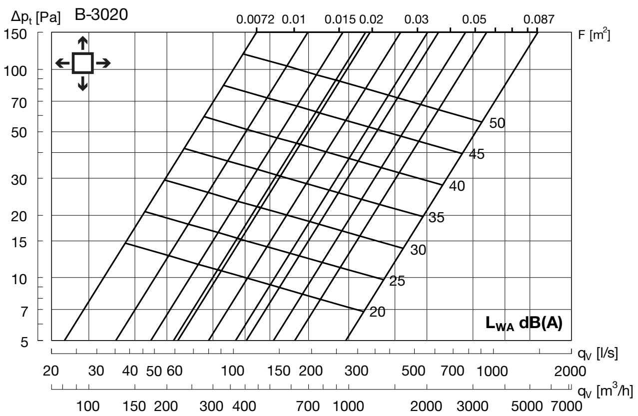
Volume regulator GAT

Correction of total pressure p_t [Pa] and sound effect level L_{WA} [dB(A)] using volume regulator. See table below.

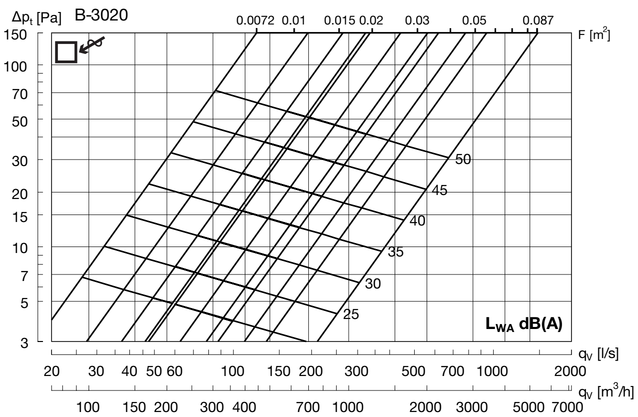
Supply air	Open	45º	Closed
Pressure [Pa]	x1,3	x3	x12
Sound power level [dB(A)]	+5	+12	+32

Exhaust	Open	45º	Closed
Pressure [Pa]	x1,3	x3	x10
Sound power level [dB(A)]	+3	+12	+30

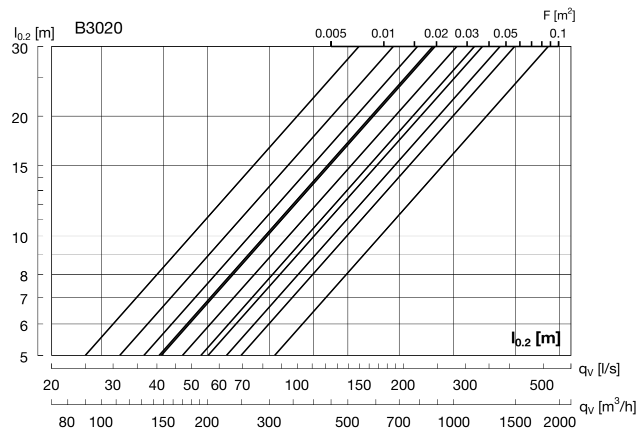
Dimensioning diagram – supply air



Dimensioning diagram - exhaust



Throw



1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

Ventilation grille C20/C21

Description

C20 is a rectangular aluminium grille with adjustable horizontal bars. C21 is also equipped with vertical directional bars for regulation of dispersal patterns. C20/C21 should be used for supply air. C20/C21 are supplied as standard with springs for installation in plenum boxes type VBA, WB or mounting frame type GGR. C20/C21 can also be used with volume regulator GAT.

Maintenance

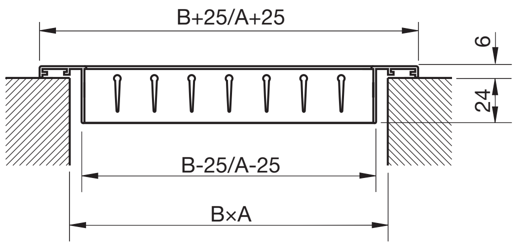
The grille should be removed to gain access to the plenum box or duct. The external parts should be wiped with a damp cloth.

Accessories

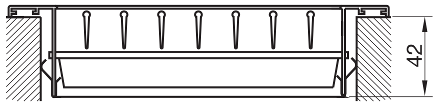
Plenum box: VBA, WB
Mounting frame: GGR
Volume regulator: GAT

Dimensions

C20



C21



A x B mm	Free area $F(m^2)$	Weight kg
200 x 100	0,0105	0,3
300 x 100	0,0164	0,4
400 x 100	0,0225	0,5
500 x 100	0,0283	0,7
300 x 150	0,0275	0,6
400 x 150	0,0375	0,7
500 x 150	0,0475	1,0
600 x 150	0,0574	1,2
400 x 200	0,0525	0,9
500 x 200	0,0664	1,4
600 x 200	0,0804	1,6

Other sizes and types can be supplied - see special grille C.

Order code

Product	**C20/C21**	**aaa**	**bbb**
Type			
A - measure			
B - measure			

Materials and finish

Grille: Aluminium
Standard finish: Natural anodised
On request: RAL 9010, gloss 30

The grille is available in other colours. Please contact Lindab's sales department for further information.

Special grille

C

Description

Special grille type C is a range of aluminium grilles with adjustable horizontal bars for supply air systems. The grille can be configured on the basis of the summary. As part of the configuration you can select the type of mounting and accessories. Finally, A x B dimensions are specified. These have certain limitations, which are shown under the order code.

Materials and finish

Grille and accessories:	Aluminium
Mounting frame:	Galvanised steel
Standard finish:	Natural anodised
	On request: RAL 9010 Gloss 30

The grille is available in other colours. Please contact Lindab's sales department for further information.

Order code

Product	**C**	**a**	**b**	**ccc**	**ddd**
Type	C				
Mounting		a			
Accessories			b		
A - measure				ccc	
B - measure					ddd

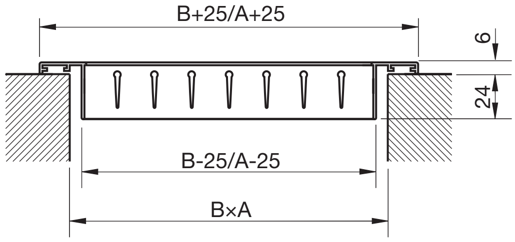
A x B: Duct/cutout
A dimension: along the bars
B dimension: across the bars
Can be supplied in all dimensions.

Max. A x B = 1200 x 500
Min. A x B = 100 x 60
Free area F [m^2]= (A-25) x (B-25) x 0.8 x 10^{-6}

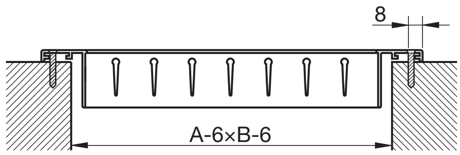
Mounting frame and volume regulator - see GGR/GAT.

Mounting

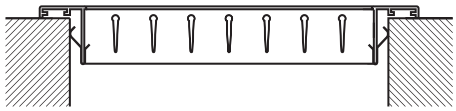
0. Not prepared for installation



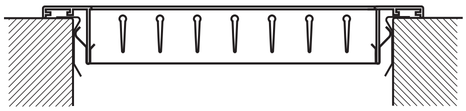
1. With screw holes



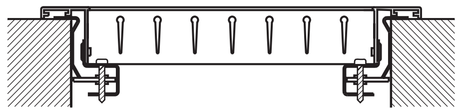
2. With springs only for installation in box



3. With springs and mounting frame

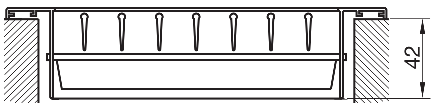


8. With concealed screw fitting and mounting frame

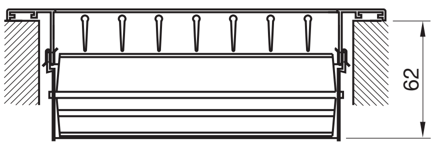


Accessories

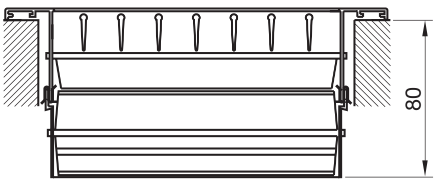
0. Without accessories
1. With direction regulation



2. With volume regulator



3. With direction and volume regulator



Ventilation grille/Special grille C20/C21/C

Technical data

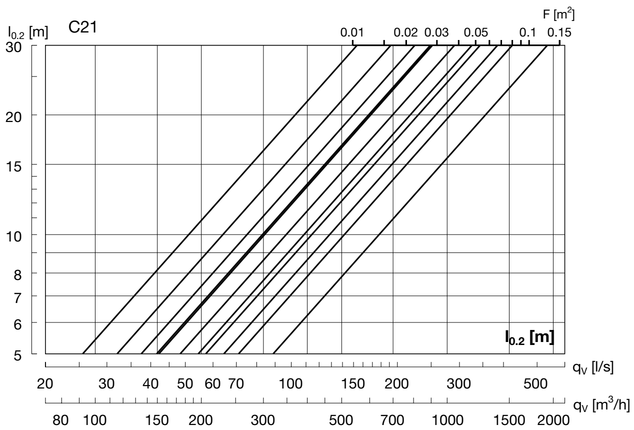
Capacity

Volume flow q_v [l/s] and [m^3/h], total pressure loss Δp_t [Pa], throw $l_{0.2}$ [m] and sound level L_{WA} [dB(A)] can be seen in the diagrams.

Throw $l_{0.2}$

Throw $l_{0.2}$ [m] at an average speed of 0.2 m/s, 0º bar setting without ceiling effect (distance from diffuser to grille over 800 mm) can be seen in the diagrams. Correction for dispersal - see table below.

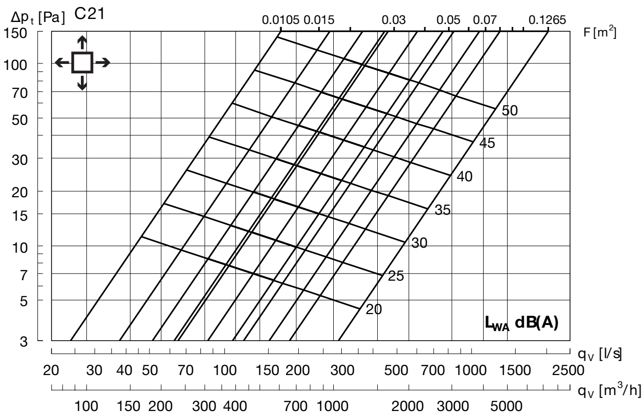
Bar setting	45º	90º
Correction factor	0,8	0,5



Sound level L_{WA}

Sound effect level L_{WA} [dB(A)] at 0º bar setting can be seen in the diagrams. The sound levels apply for grilles without volume regulator. See the table below for correction of sound level for dispersal [dB].

Bar setting	45º	90º
Correction factor	+3	+10



Frequency-related sound effect level

The sound effect level in the frequency band is defined as L_{WA}+ K_{ok} . K_{ok} values are given in chart. See table below.

	Centre frequency Hz							
	63	125	250	500	1K	2K	4K	8K
Supply air	1	-4	-2	0	-6	-10	-14	-19

Volume regulator

Correction of total pressure p_t [Pa] and sound effect level L_{WA} [dB(A)] with volume regulator. See table below.

Supply air	Open	45º	Closed
Pressure [Pa]	x1,3	x3	x18
Sound power level dB(A)	+5	+12	+37

Lindab

Ventilation grille G20

Description

G20 is a rectangular aluminium grille with fixed slanting horizontal bars. G20 is used for air exhaust and is supplied as standard with springs for installation in plenum boxes type VBA, WB or mounting frame type GGR. G20 can also be used with volume regulator GAT.

Maintenance

The grille should be removed to gain access to the plenum box or duct. The external parts should be wiped with a damp cloth.

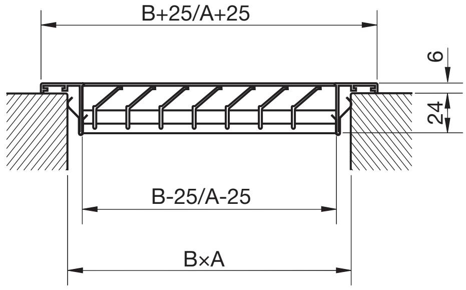
Accessories

Plenum box:	VBA, WB
Mounting frame:	GGR
Volume regulator:	GAT

Order code

Product	**G20**	**aaa**	**bbb**
Type			
A - Measure			
B - Measure			

Dimensions



A x B mm			Free area F(m^2)	Weight kg
200	x	100	0,0066	0,3
300	x	100	0,0103	0,3
400	x	100	0,0141	0,4
500	x	100	0,0178	0,6
300	x	150	0,0172	0,5
400	x	150	0,0234	0,6
500	x	150	0,0297	0,9
400	x	200	0,0328	0,8
500	x	200	0,0416	1,2
600	x	150	0,0359	1,0
600	x	200	0,0503	1,4

Other sizes and types are available - see special grille G.

Materials and finish

Grille:	Aluminium
Standard finish:	Natural anodised
	On request: RAL 9010, gloss 30

The grille is available in other colours. Please contact Lindab's sales department for further information.

Special grille

G

Description

Special grille type G is a range of aluminium grilles with fixed slanting horizontal bars for air exhaust. The grille can be configured on the basis of the summary. As part of the configuration you can select the type of mounting and accessories. Finally, A x B dimensions are specified. These have certain limitations, which are shown under the order code.

Maintenance

Depending on the configuration, the grille can be removed to enable cleaning. The external parts should be wiped with a damp cloth.

Order code

Product	a	b	ccc	ddd
Type				
Mounting				
Accessories				
A - measure				
B - measure				

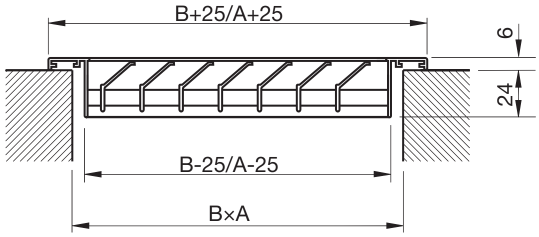
A x B: Duct/cutout
A dimension: along the bars
B dimension: across the bars
Can be supplied in all dimensions.

Max. A x B = 2000 x 2000
Min. A x B = 100 x 60
Free area F [m^2]= (A-25) x (B-25) x 0.5 x 10^{-6}

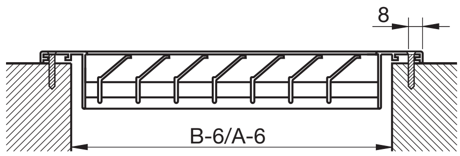
Mounting frame and volume regulator - see GGR/GAT.

Mounting

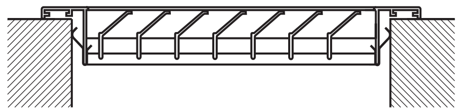
0. Not prepared for installation



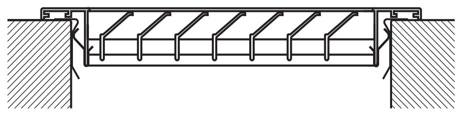
1. With screw holes



2. With springs only for installation in box

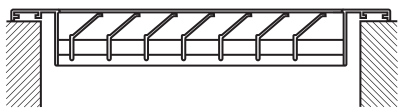


3. With springs and mounting frame

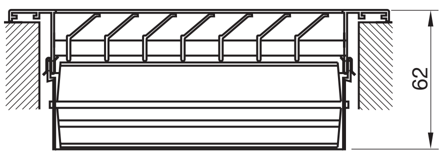


Accessories

0. Without accessories



2. With damper



Materials and finish

Grille and accessories:	Aluminium
Mounting frame:	Galvanised steel
Standard finish:	Natural anodised
	On request: RAL 9010 Gloss 30

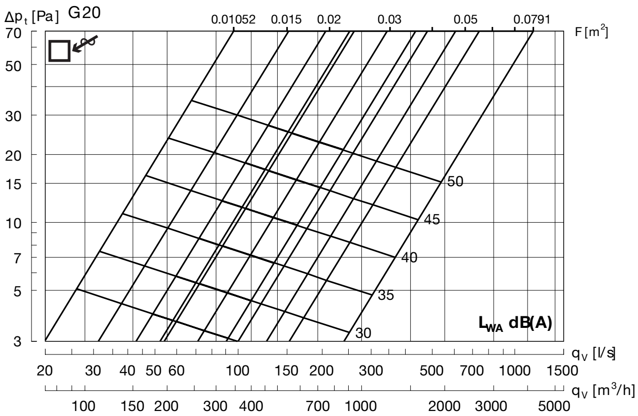
The grille is available in other colours. Please contact Lindab's sales department for further information.

Ventilation grille/Special grille G20/G

Technical data

Capacity

Volume flow q_v [l/s] and [m^3/h], total pressure drop Δp_t [Pa], throw $l_{0.2}$ and sound level L_{WA} [dB(A)] can be seen in the diagrams.



Frequency-related sound effect level

The sound effect level in the frequency band is defined as L_{WA}+ K_{ok}. K_{ok} values are given in chart. See table below.

	Centre frequency Hz							
	63	125	250	500	1K	2K	4K	8K
K_{ok}	4	-1	3	-1	-6	-14	-22	-22

Volume regulator

Correction of sound pressure p_t [Pa] and sound level L_{WA} [dB(A)] using volume regulator. See table below.

Exhaust	Open	45°	Closed
Pressure [Pa]	x1,3	x 3	x12
Sound power level [dB(A)]	+3	+12	+32

Mounting frame and damper GGR/GAT

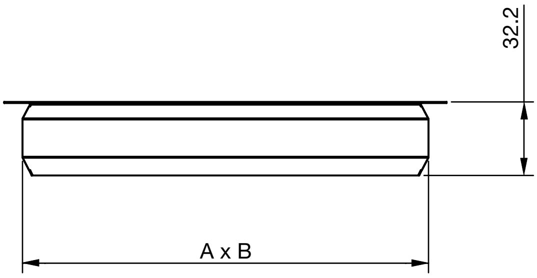
Technical data

Mounting frame GGR

for installation in duct connector or duct side.

Material

Galvanised steel



A x B = Duct dimension

Order code

Product	GGR	aaa	bbb
Type			
A - Size			
B - Size			

Weight (Kg)

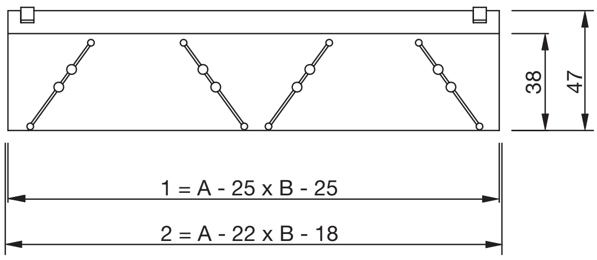
B	A				
	200	300	400	500	600
100	0,2	0,3	0,3	0,4	0,5
150	0,3	0,3	0,4	0,4	0,5
200	0,3	04	0,5	0,5	0,6

Volume regulator GAT

With opposing blades that can be set from the front of the grille.
Installed directly in the grille using springs.

Material

Aluminium.



1. Internal dimension

2. External dimension

Order code

Product	GAT	aaa	bbb
Type			
A - Size			
B - Size			

Weight (Kg)

B	A				
	200	300	400	500	600
100	0,2	0,3	0,4	0,4	0,5
150	0,3	0,4	0,5	0,7	0,8
200	0,5	0,7	1,0	1,2	1,4

Ventilation grille F20

Description

F20 is a rectangular aluminium grille with square grids. F20 is particularly suitable for air exhaust. F20 is supplied as standard with springs for installation in plenum boxes type VBA, WB or mounting frame type GGR. F20 can also be used with volume regulator GAT.

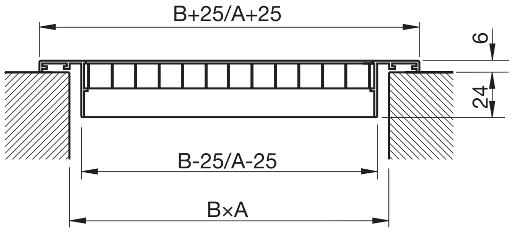
Maintenance

The grille should be removed to gain access to the plenum box or duct. The external parts should be wiped with a damp cloth.

Accessories

Pressure distribution box: VBA, WB
Mounting frame: GGR
Volume regulator: GAT

Dimensions



A x B mm	Free area F(m²)	Weight kg
200 x 100	0,0111	0,2
300 x 100	0,0144	0,3
400 x 100	0,0240	0,3
500 x 100	0,0301	0,4
300 x 150	0,0292	0,3
400 x 150	0,0398	0,4
500 x 150	0,0504	0,5
600 x 150	0,0610	0,6
400 x 200	0,0557	0,5
500 x 200	0,0706	0,6
600 x 200	0,0854	0,7

For other sizes and types, see special grille F.

Order code

Product	F20	aaa	bbb
Type			
A - measure			
B - measure			

Materials and finish

Grille: Aluminium
Standard finish: Natural anodised
On request: RAL 9010, gloss 30

The grille is available in other colours. Please contact Lindab's sales department for further information.

Special grille

F

Description

Type F special grilles are a range of aluminium grilles with square grids for air exhaust. The grille can be configured on the basis of the summary. As part of the configuration you can select type of mount and accessories. Finally, A x B dimensions are specified. These have certain limitations, which are shown under the order code.

Materials and finish

Grille and accessories: Aluminium
Mounting frame: Galvanised steel
Standard finish: Natural anodised
On request: RAL 9010 Gloss 30

The grille is available in other colours. Please contact Lindab's sales department for further information.

Order code

Product	F	a	b	ccc	ddd
Type	F				
Mounting		a			
Accessories			b		
A - measure				ccc	
B - measure					ddd

A x B: Duct/cutout
A dimension: along the bars
B dimension: across the bars
Can be supplied in all dimensions.

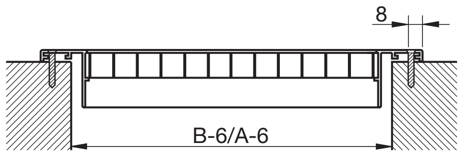
Max. A x B = 1200 x 1200
Min. A x B = 100 x 60
Free area F [m^2]= (A-25) x (B-25) x 0.85 x 10^{-6}

Mounting frame and volume regulator - see GGR/GAT.

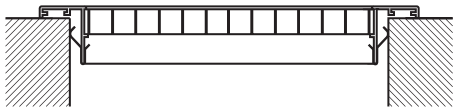
Mounting

0. Not prepared for installation

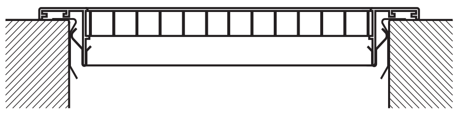
1. With screw holes



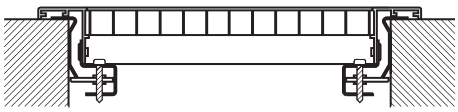
2. With springs only for installation in box



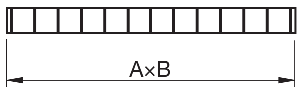
3. With springs and mounting frame



8. With concealed screw fitting and mounting frame

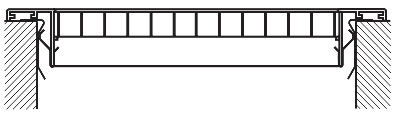


9. Loose grid

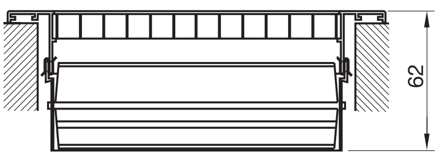


Accessories

0. Without accessories



2. With volume regulator

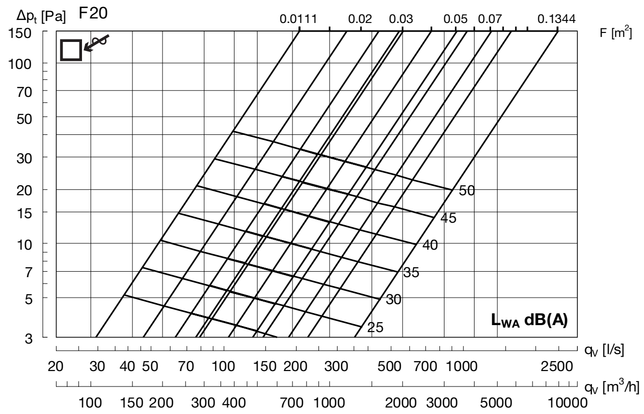


Ventilation grille/Special grille F20/F

Technical data

Capacity

Volume flow q_v [l/s] and [m³/h], total pressure drop Δp_t [Pa], and sound level L_{WA} [dB(A)] can be seen in the diagrams.



Frequency-related sound effect level

The sound effect level in the frequency band is defined as $L_{WA}+K_{ok}$. K_{ok} values are given in chart. See table below.

	Centre frequency Hz							
	63	125	250	500	1K	2K	4K	8K
K_{ok}	-7	-12	-9	-5	-3	-6	-17	-23

Volume regulator

Correction of total pressure p_t [Pa] and sound effect level L_{WA} [dB(A)] using volume regulator. See table below.

	Open	45°	Closed
Pressure [Pa]	× 1,3	× 3	× 15
Sound power level [L_{WA} dB(A)]	+5	+12	+35

Door grille D11

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

Description

D11 is a rectangular aluminium grille with fixed slanting horizontal bars. D11 is used as an overflow grille for mounting in doors. D11 is supplied as standard with countersunk screw holes and mating flange for doors, thickness from 18 to 43 mm. D11 can be supplied for doors thicknesses up to 61mm.

Maintenance

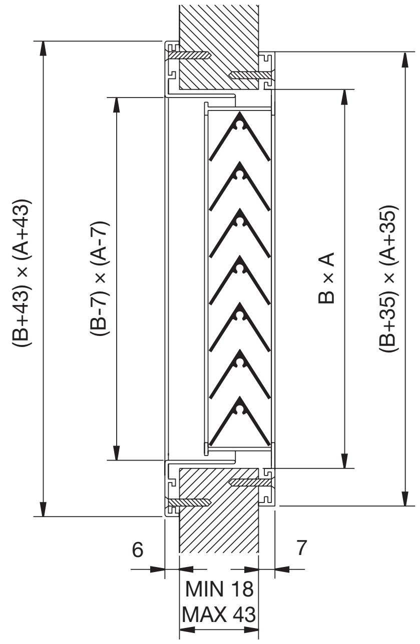
The external parts should be wiped with a damp cloth.

Order code

Product	D11	aaa	bbb
Type	D11		
A - Measure		aaa	
B - Measure			bbb

A x B: Cutting dimension

Dimensions



Can be supplied on request for door thicknesses up to 61 mm.

A x B mm	Free area F(m²)	Weight kg
200 X 97	0,0046	0,3
300 X 97	0,0071	0,4
300 X 157	0,0139	0,7
400 X 157	0,0188	0,9
500 X 157	0,0237	1,2
600 X 157	0,0285	1,4
300 X 197	0,0185	0,9
400 X 197	0,0250	1,2
500 X 197	0,0314	1,5
600 X 197	0,0380	1,7

D11 can be used in other sizes, although there are certain limitations.

A dimension: Max. 1,000 mm
Min. 100 mm
B dimension: Max. 1,000 mm
Min. 97 mm

B dimensions should always end in 17-37-57-77-97 mm

Materials and finish

Grille: Aluminium
Standard finish: Natural anodised
On request: RAL 9010 Gloss 30

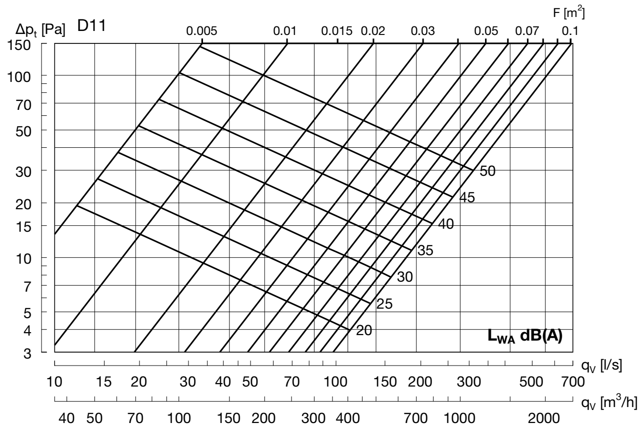
The grille is available in other colours. Please contact Lindab's sales department for further information.

We reserve the right to make changes without prior notice

Door grille

D11

Technical data



Free area F (m^2) = (A-15) (B-35) 0.4 X 10^{-6} m^2
(A and B in mm)

Capacity

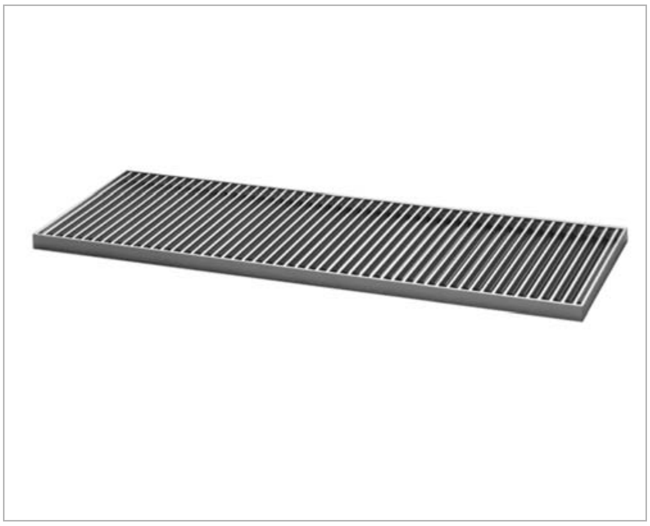
Volume flow q_v [l/s] and [m^3/h], total pressure drop Δp_t [Pa], throw $l_{0.2}$ and sound level L_{WA} [dB(A)] can be seen in the diagram.

Frequency-related sound effect level

The sound effect level in the frequency band is defined as L_{WA}+ K_{ok} . K_{ok} values are given in chart in the table below.

	Centre frequency Hz							
Size	**63**	**125**	**250**	**500**	**1K**	**2K**	**4K**	**8K**
K_{ok}	13	7	4	-3	-6	-10	-14	-16

Radiator grille A1



Description

Radiator grille A1 is an aluminium grille with fixed bars specially designed to cover convector channels. A1 is always supplied with the bars running between the longest sides. The distance between the bars is 20 mm and the grille has a free area of 75%.
The grille is dimensioned for a personal load up to a width of 500 mm. The grille can be supplied in 4 different anodized finishes.

Maintenance

The grille should be removed when cleaning the convector channel. The external parts should be wiped with a damp cloth.

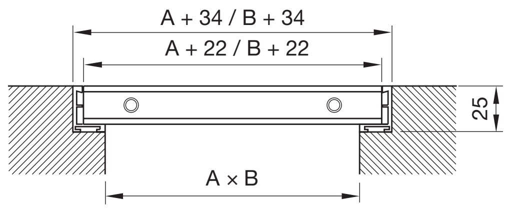
Order code

Product **A1** **a** **b** **ccc** **ddd**

- Type (A1)
- Colour (a)
- Frame (b)
- A - Measure (ccc)
- B - Measure (ddd)

Standard A dimension:
200 - 250 - 300 - 350 - 400 - 450 - 500
Supplied in all dimensions.
The grilles are supplied divided into 1 m sections.
The frame is supplied in one piece to a maximum of 3 m.
For longer lengths, connecting pieces are also supplied.
Maximum A dimension at personal load: 500 mm.

Dimensions



Colours:

0 - Natural anodised
1 - Brass anodised
2 - Black anodised
3 - Bronze anodised

Materials and finish

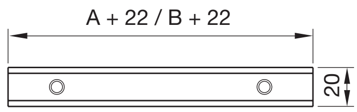
Grille:	Aluminium
Standard finish:	Natural anodised

The grille is available in other colours. Please contact Lindab's sales department for further information.

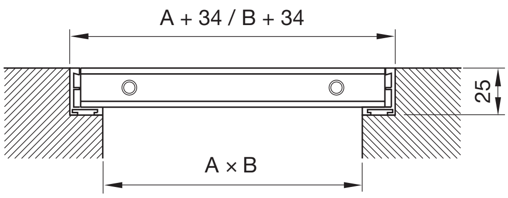
Radiator grille A1

Dimensions

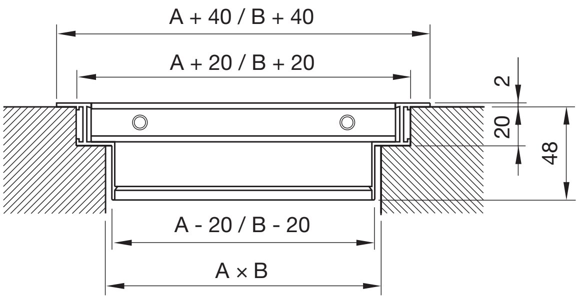
0 - Without frame

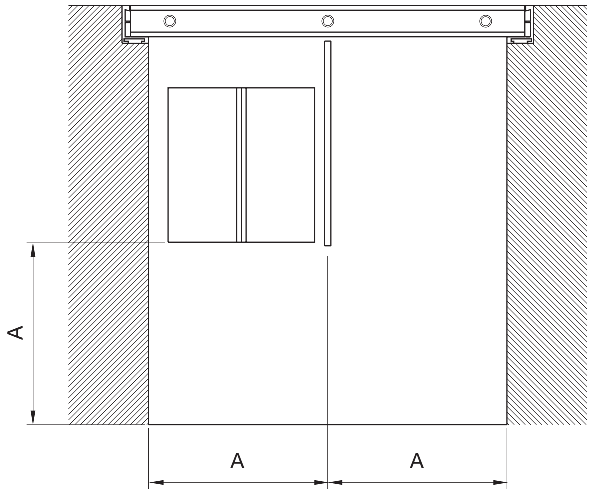


1 - With angle frame



3 - Z-frame with flange





The convector channel should be dimensioned in accordance with the convector manufacturer's instructions and the illustration above.

Installation grille IGR

Description

Installation floor grille type IGR is supplied as standard as an I-profile with 12.5 mm divisions and 55% free area. However, the grille can also be supplied with other profile types and with other divisions.

Load with standard grid

The grille can handle the following load without permanent deformation.

Evenly distributed:	Up to 1,500 kg/m^2
Point load:	Up to 500 kg tested with a nylon wheel with a diameter of 200 mm and a width of 63 mm.

0 = Without accessories
1 = Volume regulation damper
2 = Air distributor
3 = Air distributor and basic filter G85 (EU3)
4 = Air distributor and fine filter F45 (EU5)

Order code

Product **IGR** **a** **b** **ccc** **ddd**

Type → IGR

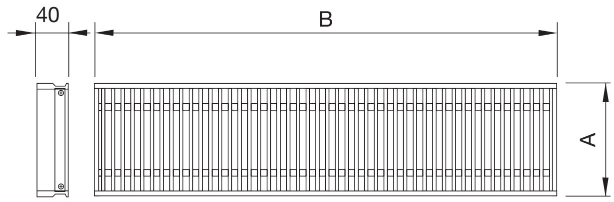
a: 0, 1, 2, 3, 4

b: 0 = Without dirt trap; 1 = With dirt trap

ccc: A - measure

ddd: B - measure

Dimensions



A dimension along bars
B dimension across bars

A x B mm			Free area F(m^2)	Weight kg
150	X	600	0,045	2,3
200	X	600	0,062	2,8
300	X	600	0,094	3,6
600	X	600	0,191	6,6

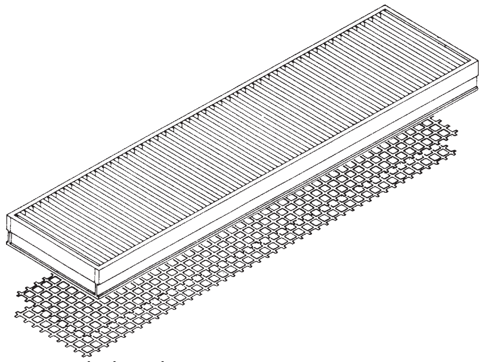
Materials and finish

Grille and frame:	Aluminium
Damper/air distributor:	Hot-galvanised plate
Standard finish:	Natural anodised

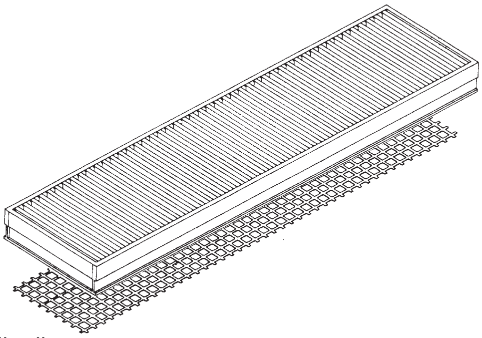
The diffuser is available in other colours. Please contact Lindab's sales department for further information.

Installation grille IGR

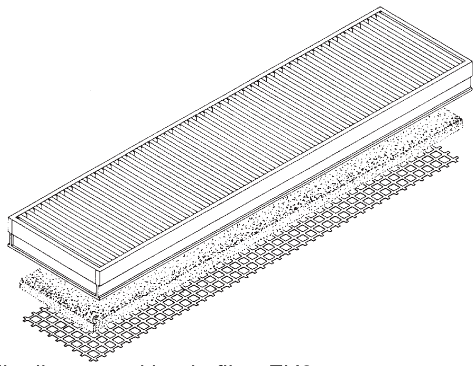
Accessories



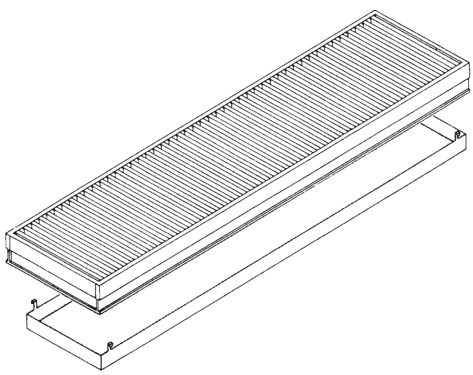
1. Volume regulation damper



2. Air distributor



3. Air distributor and basic filter EU3
4. Air distributor and fine filter EU5



Dirt trap
The dirt trap prevents dust and dirt from above getting under the actual installation floor. The dirt trap can be easily cleaned by raising the grille.

Technical data

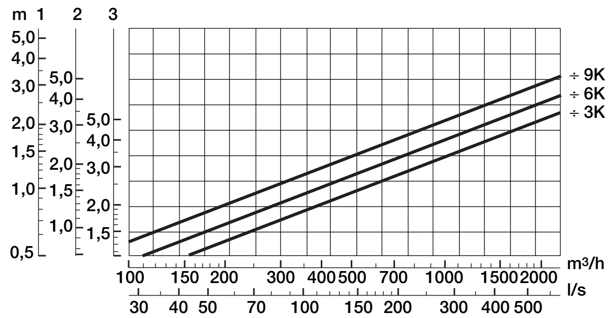
Table 1
Recommended volume flow in m^3/h (l/s)

Δt	A x B 150 x 600	200 x 600	300 x 600	600 x 600
- 3K	90-220 (25-60)	120-300 (35-85)	220-550 (60-150)	450-1100 (125-300)
- 6K	135-380 (40-110)	180-510 (50-140)	330-930 (90-260)	680-1800 (190-500)
- 9K	155-440 (45-120)	210-590 (60-160)	380-1100 (110-300)	790-2000 (200-560)

As long as the recommended volume flow is not exceeded, a maximum air jet height of 0.5-2.0 m is achieved.

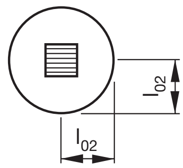
Diagram 1

Near zone $l_{0.2}$

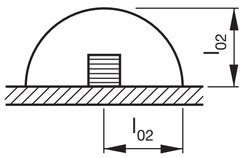


Positioning

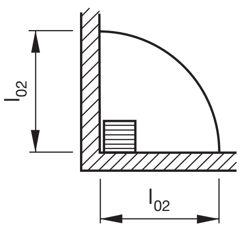
1: Free area



2: Against wall



3: In corner



Near zone $l_{0.2}$ does not depend on the size of the grille, as long as the recommended volume flow in table 1 is maintained.

Installation grille IGR

1 2 3 4 5 6 7 8 9 10 **11** 12 13 14 15 16 17 18

Technical data

Capacity

Volume flow q [l/s] and [m^3/h], total pressure drop p_t [Pa] and throw $l_{0.2}$ [m] can be seen in the diagrams.

Near zone $l_{0.2}$

The area around the grille where the average speed is greater than 0.20 m/s is specified as the near zone. Near zone spread $l_{0.2}$ is shown in the dimensioning diagrams for Δt -3 K, -6 K and -9 K where Δt is the temperature difference between the supplied air and the air in the room measured 1 m above the floor.

Sound level L_A

The sound values L_A [dB(A)] apply at a room attenuation of 4 dB, which corresponds to the attenuation in the echo field in a room with a room constant of 10 m^2 SABINE.

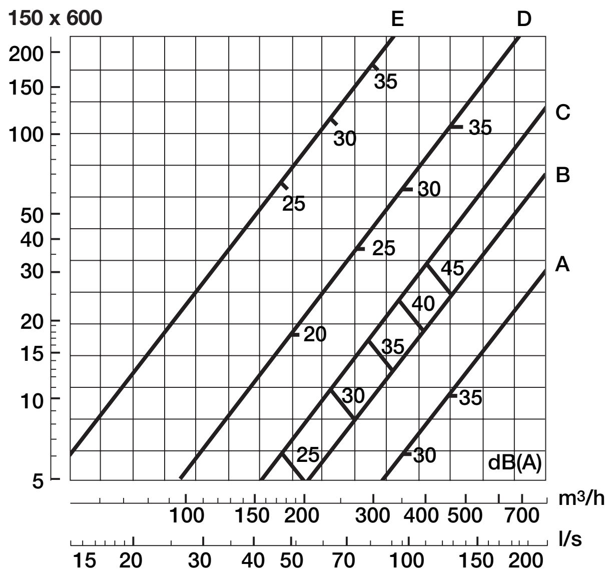
A: IGR without accessories

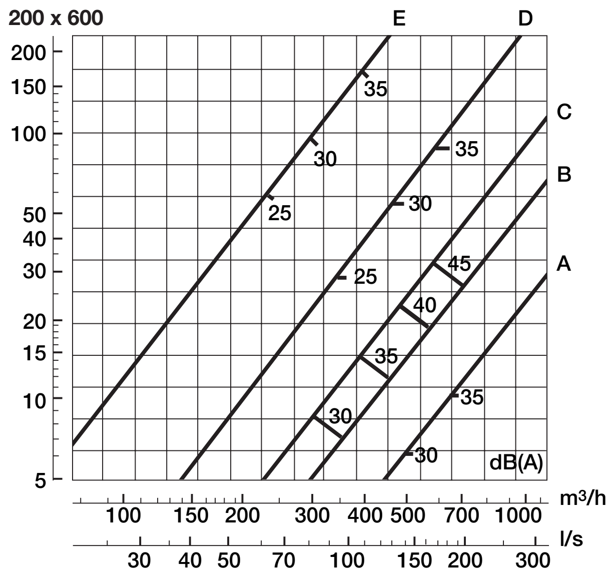
B: IGR with open volume regulation damper or with air distributor

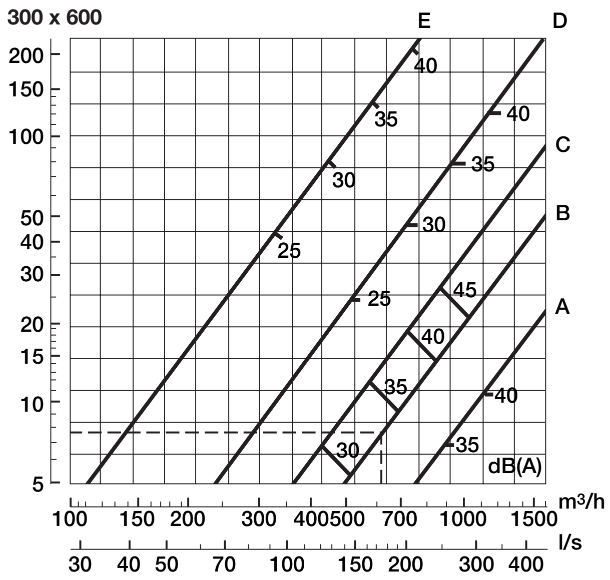
C: IGR with closed volume regulation damper

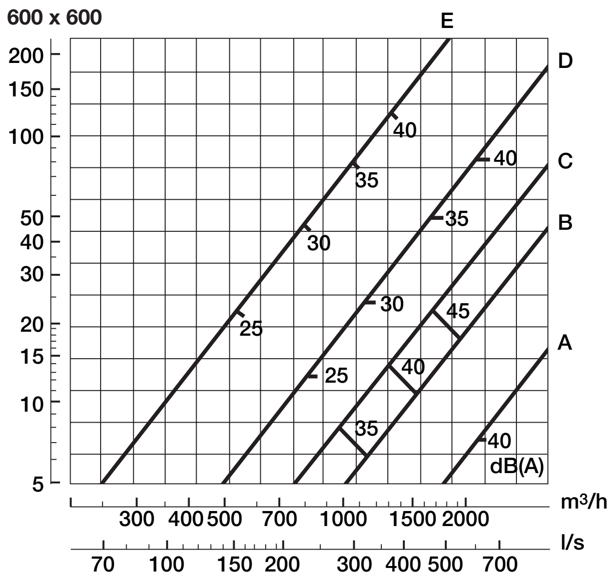
D: IGR with air distributor and basic filter

E: IGR with air distributor and fine filter









External wall grille

YGC

Description

Valve for outdoor air intake and extract air discharge. Designed with a fixed louvre. Ø 100–500 is equipped with net. Ø 630–1250 can be delivered with net to order. Mesh width 10×10 mm. Screws or nails connect to an external wall.

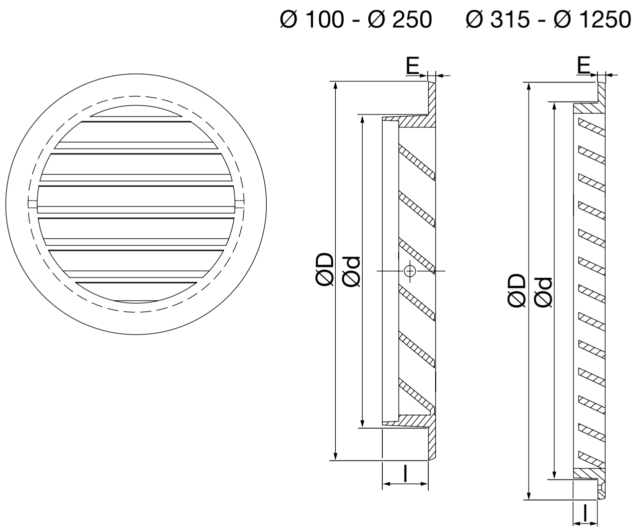
Maintenance

The grille should be removed to gain access to the duct. The external parts should be wiped with a damp cloth.

Order code

Product	YGC	aaaa
Type		
Size Ød		

Dimensions



Ød nom	ØD mm	l mm	E mm	A_f (m^2)	Weight kg
100*	131	22,0	3,5	0,004	0,17
125*	151	22,5	3,5	0,007	0,25
160*	188	21,5	3,5	0,012	0,39
200*	230	21,5	3,5	0,020	0,51
250*	278	24,5	3,5	0,031	0,83
315**	350	15,5	6,5	0,047	1,81
400	430	34,0	6,5	0,075	3,00
500	530	34,0	6,5	0,118	5,50
630	660	50,5	1,5	0,187	8,80
800	830	50,5	1,5	0,300	14,6
1000	1030	50,5	1,5	0,470	21,0
1250	1280	50,5	1,5	0,740	35,0

* The grill has 2 x Ø 4,2 mm screw holes on the side for mounting.

** The grill has 3 x Ø4,0 mm screw holes on the front for mounting.

Ød > 315 mm , no pre-drilled holes for mounting.

A_f (m^2) = Free area.

Materials and finish

Grille:	ø100-500	Cast aluminium
Grille:	ø630-1,250	Galvanised steel
Standard finish:	Untreated	

Can be supplied powder-coated. Contact Lindab's sales department for further information.

External wall grille

YGC

Technical data

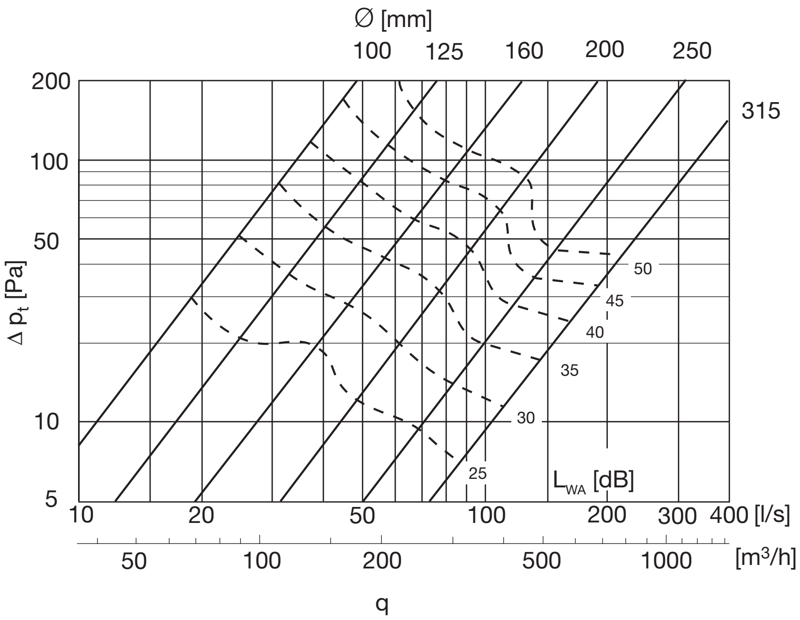
Capacity

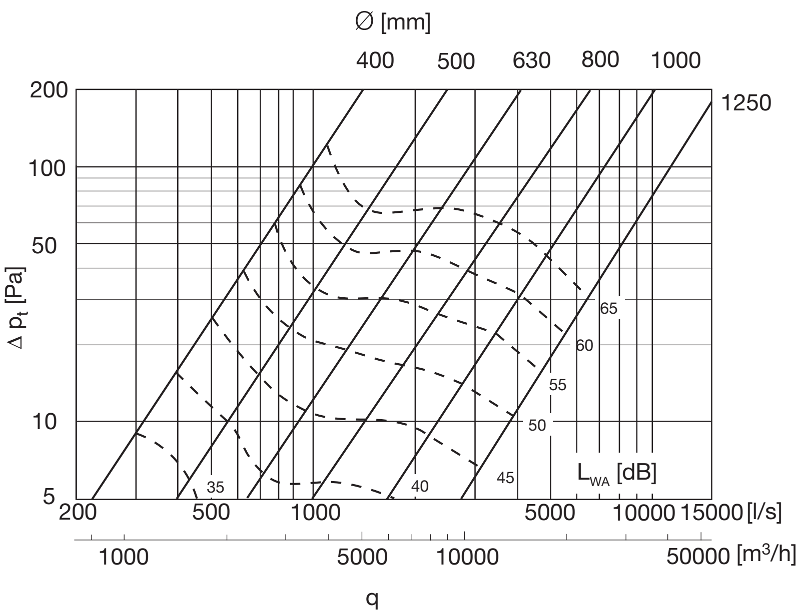
Volumeflow, q [l/s] and [m³/h], total pressure drop, Δp_t [Pa], can be seen in the diagrams.

Sound level in free field (1/4 spherical)

The sound effect level L_{WA} is shown in the diagram.
For sound level at distance X [m],
$L_A = L_{WA} - K$, see table below.

X [m]	1	2	3	4	5	10	20
K [dB]	-5	-12	-15	-17	-19	-25	-30





External wall grille VR

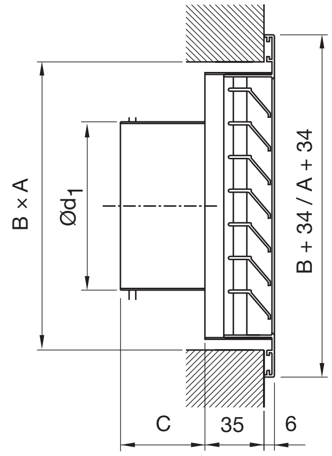
Description

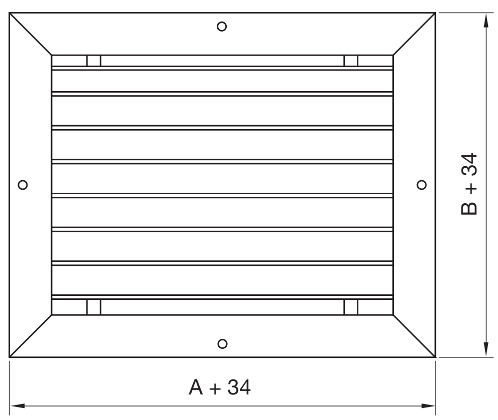
VR is a square louvred grille for installation in external walls. VR is used for both fresh air intake and discharge. VR is equipped as standard with a safe-seal circular connection.

Maintenance

The grille should be removed to gain access to the duct. The external parts should be wiped with a damp cloth.

Dimensions





$Ød_1$ Size	A mm	B mm	C mm	Free area F (m^2)	Weight kg
125	226	206	40	0,018	1,00
160	226	206	40	0,018	1,00
200	276	276	40	0,032	1,50
250	336	336	60	0,048	1,90
315	416	416	60	0,076	3,20
400	546	546	90	0,136	4,70

Order code

Product	VR	aaa
Type		
Size		

Materials and finish

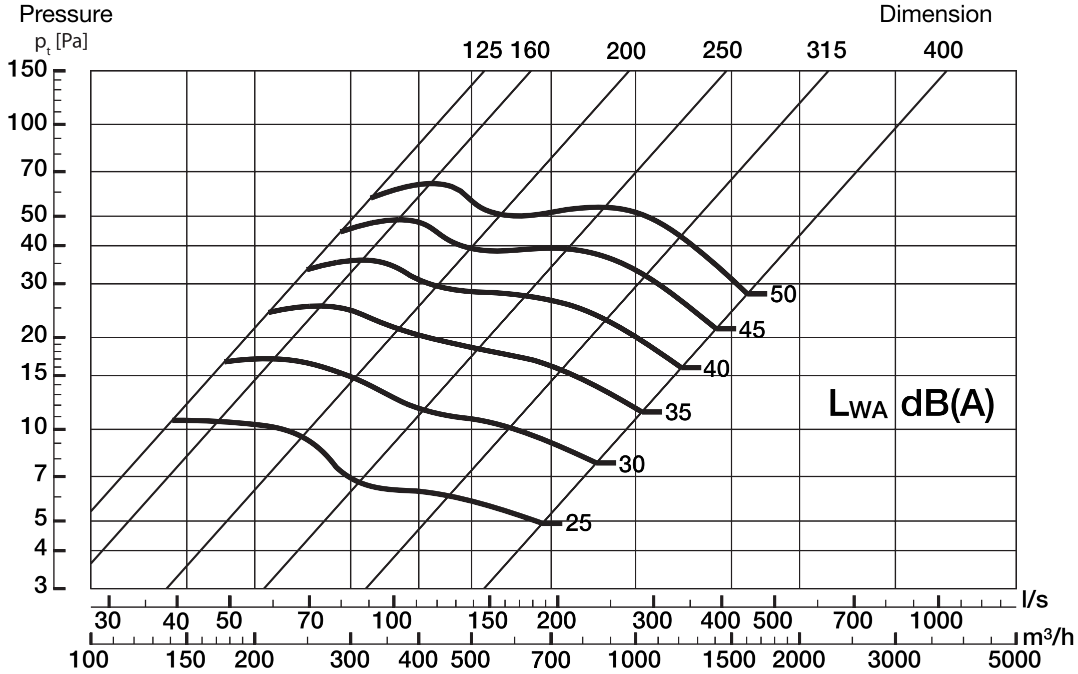
Grille: Aluminium
Standard finish: Untreated

Can be supplied anodized or powder-coated. Contact Lindab's sales department for further information.

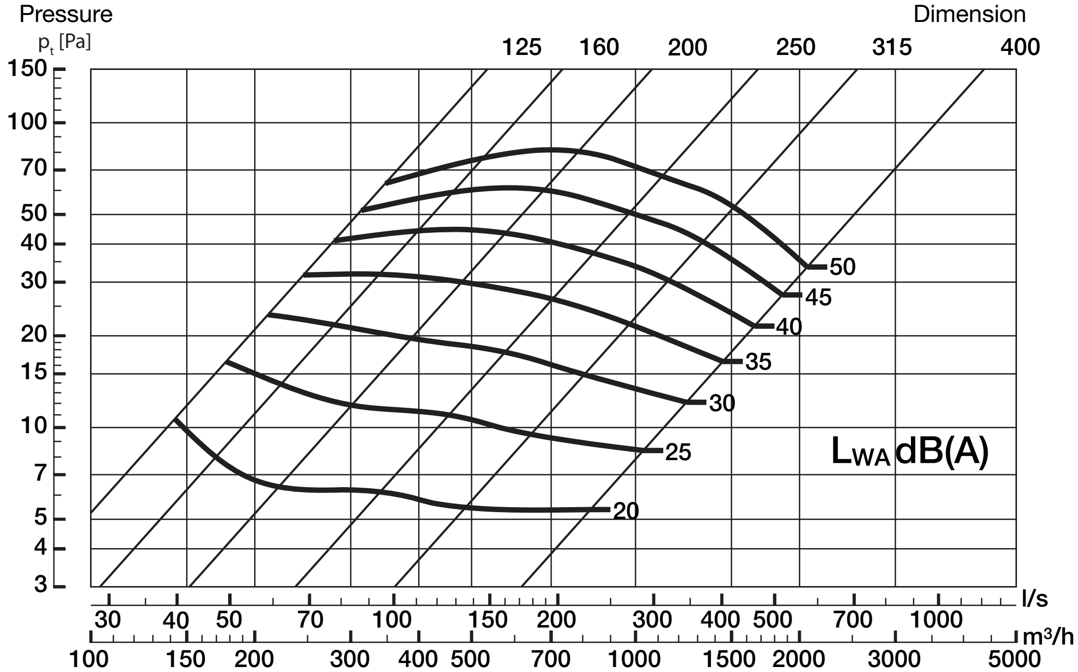
External wall grille VR

Technical data

Intake



Discharge



External wall grille H1

Description

H1 is a louvred grille for installation in external walls. H1 is used for both fresh air intake and discharge. H1 is supplied as standard with a water stop at the rear edge, drip nose and bird netting.

Maintenance

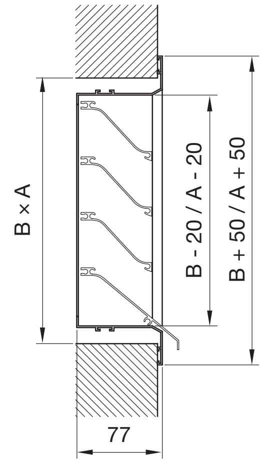
The grille should be removed to gain access to the duct. The external parts should be wiped with a damp cloth.

NOTE !:
In connection with the design and dimensioning please be aware of the risk of water penetration and drift snow. Wind effects, especially in connection with grilles that are not connected to ducts, may result in water and snow being pressed through the grille; therefore please make sure to take any necessary precautions.

Order code

Product	**H1**	**a**	**bbb**	**ccc**
Type				
Mounting				
0 - Not prepared				
1 - Wall anchors				
2 - Screw holes				
3 - Insertion frame				
A - Measure				
B - Measure				

Dimensions



A x B mm	Free area F (m^2)	Weight kg
300 x 300	0,039	0,9
400 x 400	0,075	1,8
500 x 500	0,124	2,9
600 x 600	0,184	4,4

The grille can be supplied in all dimensions.
Max. A X B = 3,000 X 3,000 mm.

Materials and finish

Grille: Aluminium
Standard finish: Untreated

Can be supplied powder-coated. Contact Lindab's sales department for further information.

External wall grille

H1

Technical data

Capacity

Volume flow q [l/s] and [m^3/h], total pressure drop p_t [Pa] can be seen in the diagrams.

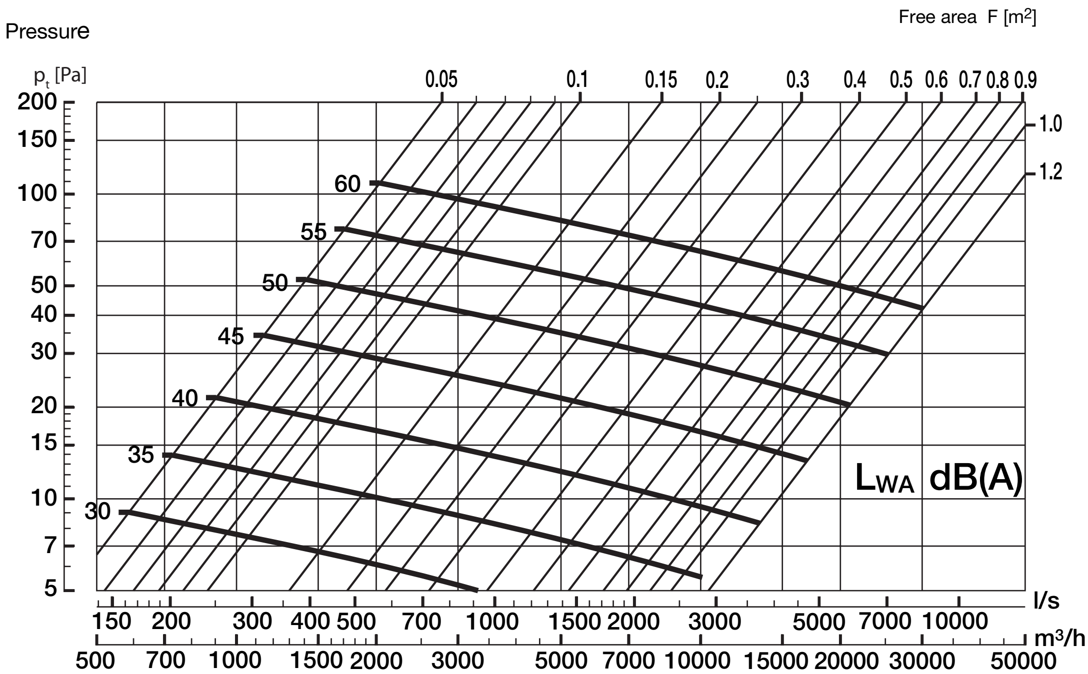
Sound level in free field (1/4 spherical)

The sound effect level L_{WA} is shown in the diagram.
For the sound level at distance X (m)
$L_A = L_{WA}$ - K, see table below.

Distance x (m)	1	2	3	4	5	10	20
K [dB]	5	12	15	17	19	25	30

Free area F (m^2)

F [m^2]= (A-20) x (B-70) x 0.6 x 10^{-6}



External wall grille H2

Description

H2 is a louvred grille for installation in external walls. H2 is used for both fresh air intake and discharge. H2 is supplied as standard with a water stop at the rear edge and bird netting.

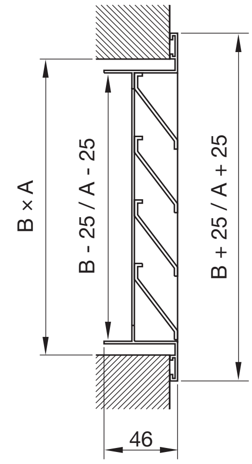
Maintenance

The grille should be removed to gain access to the duct. The external parts should be wiped with a damp cloth.

Order code

Product	H2	a	bbb	ccc
Type	H2			
Mounting				
0 - Not prepared		a		
1 - Wall anchors		a		
2 - Screw holes		a		
3 - Insertion frame		a		
A - Measure			bbb	
B - Measure				ccc

Dimensions



A x B mm	Free area F (m^2)	Weight kg
300 x 300	0,022	0,55
400 x 400	0,044	1,10
500 x 500	0,072	1,77
600 x 600	0,107	2,69

Grilles can be supplied in all dimensions.
Max. A x B = 3,000 x 3,000 mm.

Materials and finish

Grille: Aluminium
Standard finish: Untreated

Can be supplied anodized or powder-coated. Contact Lindab's sales department for further information.

External wall grille

H2

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18

Technical data

Capacity

Volume flow q [l/s] and [m³/h], total pressure drop p_t [Pa], can be seen in the diagrams.

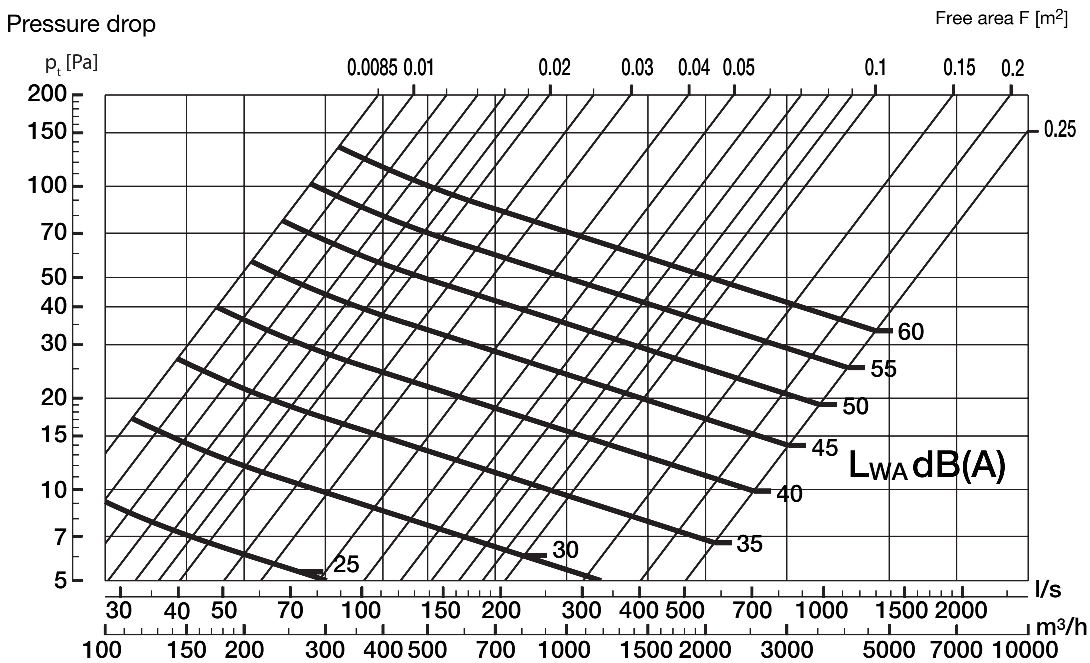
Sound level in free field (1/4 spherical)

The sound effect level L_{WA} is shown in the diagram.
For the sound level at distance x (m)
$L_A = L_{WA} - K$, see table below.

Distance x (m)	1	2	3	4	5	10	20
K (dB)	5	12	15	17	19	25	30

Free area F (m^2)

F [m^2] = (A-38) x (B-55) x 0.35 x 10^{-6}



Displacement diffusers

Lindab Comdif

Lindab Comdif

CSC, canteen, Copenhagen

Lindab Comdif

By using displacement ventilation, the air is supplied to the room directly into the occupied zone at floor-level - at a low velocity and a cooling temperature. The air spreads out across the floor and displaces the hot contaminated air, which is sent to the ceiling by the convection flow from the heated sources. Extraction should take place by the ceiling, where a hot “contaminated” layer of air forms.

The increase in ventilation efficiency means that cooling power can be saved, or that the cooling effect of the fresh air can be utilized better.

The ventilation efficiency of displacement ventilation is larger than that of mixed ventilation, owing to this division of layers. The difference increases when the ceiling and thermal load are higher.

Flexibility by displacement ventilation

Comdif is a series of air distribution diffusers for displacement ventilation. Comdif is available in various designs for any purpose and consists of a pressure chamber with a number of nozzles.

The diffusers are all equipped with adjustable nozzles, so it is possible to change the near-zones geometry. The diffuser comes standard supplied with a perforated frontplate with a free area of approx. 38%.

The diffusers are available in special designs with several different types of perforation, plate-thickness and choice of materials. The diffusers can also be constructed to fit other dimensions and different geometry on request.

CCA, circular displacement unit

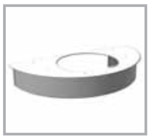
Lindab Comdif a series of displacement diffusers

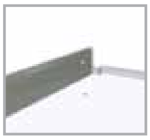
Design

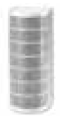
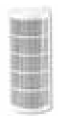
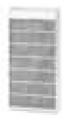
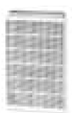
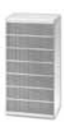
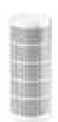
See chapter on Comfort and Design

Accessories

See page Accessories



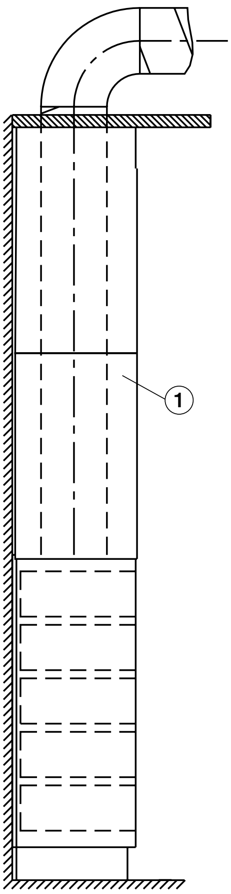


Product	Design	Function	supp./exhau.	Size (mm)	Duct cover	Connection duct	Plinth	Mounting bracket
CBA	Perforated diffuser - semicircular 			1207	○		○	○
				1607	○		○	○
				2010	○		○	○
				2510	○		○	○
				3115	○		○	○
				4020			○	○
				5020			○	○
CHA	Perforated diffuser - semicircular 			1207	○		○	○
				1607	○		○	○
				2010	○		○	○
				2510	○		○	○
				3115	○		○	○
				4020	○		○	○
				5020			○	○
				6320			○	○
CQA	Perforated diffuser - corner 			1207	○		○	○
				1607	○		○	○
				2010	○		○	○
				2510	○		○	○
				3115	○		○	○
				4020			○	○
CRA	Perforated diffuser - rectangular 			3010		○	○	
				5010		○	○	
				8010		○	○	
				8020		○	○	
CVA	Perforated diffuser - built-in 			3005		○		
				5005		○		
				6005		○		
				6008		○		
				8008		○		
CEA	Perforated diffuser - rectangular 			2010			○	
				2510			○	
				3115			○	
				4015			○	
CKA	Perforated diffuser - square 			2010			○	
				2510			○	
				3110			○	
				4015			○	
				5020			○	
				6320			○	
CCA	Perforated diffuser - circular 			1207			○	
				1607			○	
				2010			○	
				2510			○	
				3115			○	
				4020			○	
				5020			○	
				6320			○	

Comdif accessories

Duct covers

Duct cover Type 0



1. Duct cover

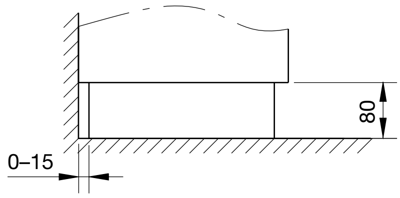
Duct covers are available for displacement diffusers type CBA,CHA,CQA from size 1207 to 3115.

Type CHAZ-0, CQAZ-0 & CBAZ-0

Size	A mm	Max. room height mm	Min. room-height mm	m kg/m
1207	250	3300	2400	6,0
1607	300	3300	2400	7,5
2010	330	3300	2400	9,5
2510	400	3300	2400	12,0
3115	520	3200	2400	15,0

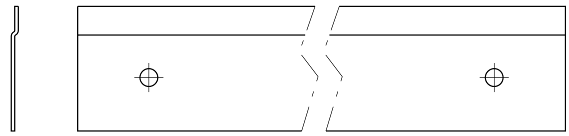
Plinth CHAZ-2

Plinth CHAZ-2 is available in all sizes for free standing diffusers.

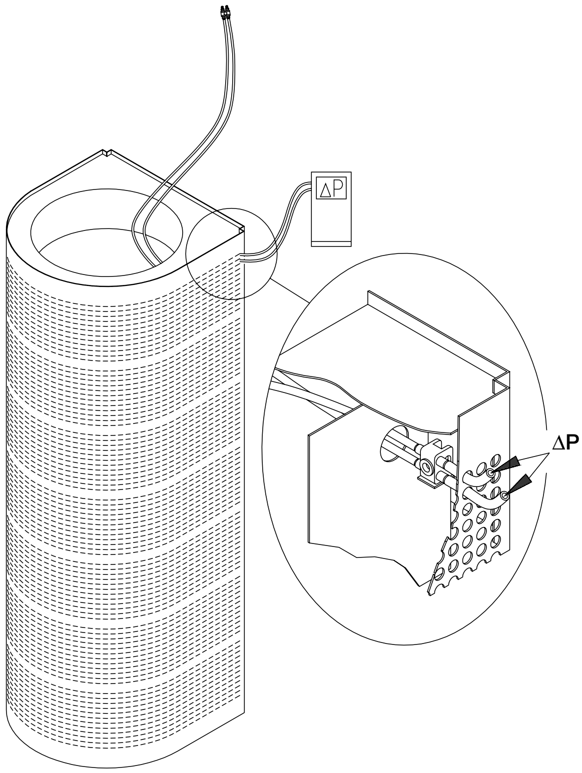


Mounting bracket CHAZ-3

Mounting bracket CHAZ-3 is available in all sizes for free standing diffusers.



Comdif is equipped with pressure nozzles, which can be connected through pipes to a flow measuring device (FMI, FMDU, DIRU) or one similar inside the air duct system. The couplings are mounted behind the holes in the front plate, so the measurements can be taken without removing the front plate.



Perforated diffuser - semicircular CBA

Description

Comdif CBA is a semicircular perforated displacement diffuser for installation against/on a wall or column.
Behind the perforated front plate, CBA is equipped with individually adjustable nozzles, making it possible to alter the geometry of the near zone. The diffuser can be turned and has a circular duct connection (MF measure), so the diffuser can be connected at the top or bottom. The diffuser is suitable for the supply of large volumes of moderately cooled air.

- The diffuser is suitable for the supply of large volumes of air.
- The geometry of the near zone can be adjusted using adjustable nozzles.
- Duct covers, plinths and wall brackets can be supplied as accessories

Maintenance

The front plate can be removed from the diffuser, making it possible to clean the nozzles. The visible parts of the diffuser can be wiped with a damp cloth.

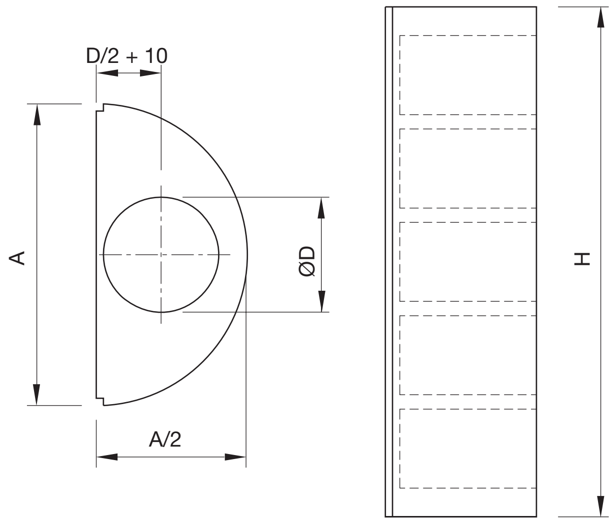
Order code

Product	**CBA**	**aaaa**
Type		
Size		

Order - accessories

Cover: CBAZ - 0 - size
Plinth: CBAZ - 2 - size
Wall bracket: CBAZ - 3 - size

Dimensions



Size	A mm	ØD mm	H mm	Weight kg
1207	350	125	710	6,50
1607	420	160	710	7,50
2010	500	200	970	13,0
2510	600	250	970	18,0
3115	730	315	1490	35,0
4020	900	400	2010	58,0
5020	1100	500	2010	78,0

Accessories

Can be supplied with duct cover, plinth and bracket for wall mounting.

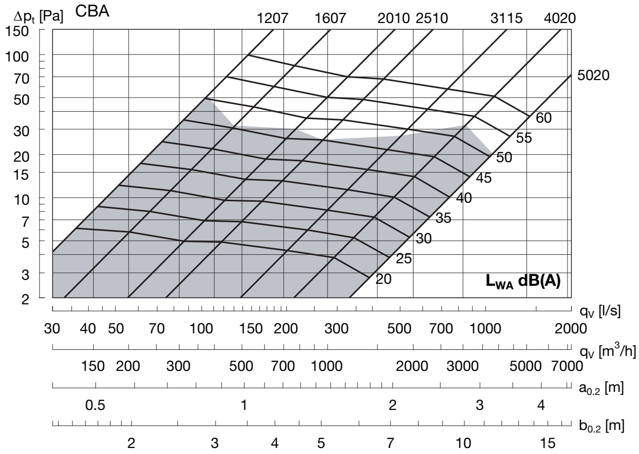
Materials and finish

Diffuser:	Galvanised steel
Nozzles:	Black plastic
Front plate:	1 mm galvanised steel
Standard finish:	Powder-coated
Standard colour:	RAL 9010 - white, gloss 30

The diffuser is available in other colours. Please contact Lindab's sales department for further information.

Perforated diffuser - semicircular CBA

Technical data



Recommended maximum volume flow

The near zone is given at an under-temperature of -3 K to a maximum terminal velocity of 0.20 m/s.

Conversion to other terminal velocities - see table 1, correction of the near zone for -3 K and -6 K respectively.

Sound effect level

Sound effect level L_W [dB] = L_{WA} + K_{ok}

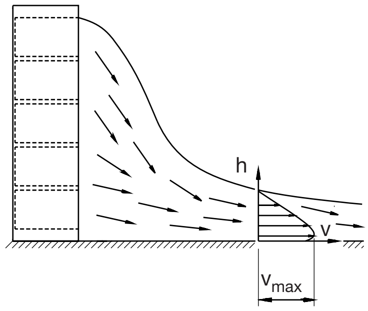
	Centre frequency Hz							
Size	**63**	**125**	**250**	**500**	**1K**	**2K**	**4K**	**8K**
1207	8	-3	0	1	-8	-15	-27	-38
1607	10	-3	3	0	-8	-18	-30	-33
2010	15	-2	3	0	-9	-16	-30	-37
2510	10	-1	4	-1	-9	-16	-29	-41
3115	11	1	4	-1	-8	-17	-30	-42
4020	13	3	4	-1	-9	-17	-30	-43
5020	7	2	2	0	-6	-16	-19	-17

Sound attenuation

Sound attenuation ΔL [dB] including end reflection.

	Centre frequency Hz							
Size	**63**	**125**	**250**	**500**	**1K**	**2K**	**4K**	**8K**
1207	19	14	5	3	2	1	2	1
1607	16	12	4	1	2	1	2	2
2010	12	8	4	2	3	2	2	2
2510	12	8	5	2	1	1	1	1
3115	11	8	3	2	1	1	2	2
4020	9	6	1	1	1	1	1	1
5020	7	5	0	1	1	1	1	2

Nearzone



Large diffusion (factory setting) | Small diffusion

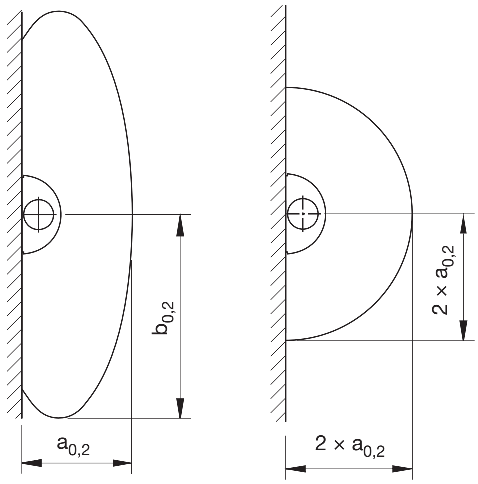
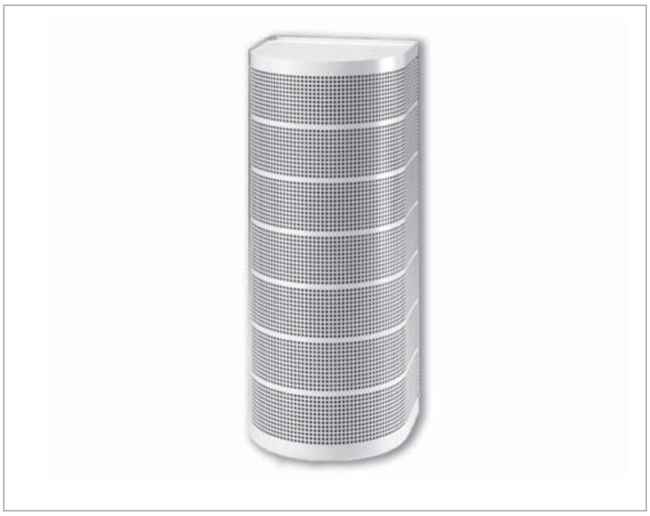


Table 1
Correction of the near zone ($a_{0.2}$, $b_{0.2}$)

Under-temperature T_i-T_r	Maximum velocity m/s	Mean velocity m/s	Correction factor
-3K	0.20	0.10	1.00
	0.25	0.12	0.80
	0.30	0.15	0.70
	0.35	0.17	0.60
	0.40	0.20	0.50
-6K	0.20	0.10	1.20
	0.25	0.12	1.00
	0.30	0.15	0.80
	0.35	0.17	0.70
	0.40	0.20	0.60

Perforated diffuser - semicircular CHA



Description

Comdif CHA is a semicircular perforated displacement diffuser for installation against a wall or column. Behind the perforated front plate, CHA is equipped with individually adjustable nozzles, making it possible to alter the geometry of the near zone. The diffuser can be turned and has a circular duct connection (MF measure), so the diffuser can be connected at the top or bottom. The diffuser is suitable for the supply of large volumes of moderately cooled air.

- The diffuser is suitable for the supply of large volumes of air.
- The geometry of the near zone can be adjusted using adjustable nozzles
- Duct covers, plinths and wall brackets can be supplied as accessories

Maintenance

The front plate can be removed from the diffuser, making it possible to clean the nozzles. The visible parts of the diffuser can be wiped with a damp cloth.

Order code

Product **CHA** **aaaa**

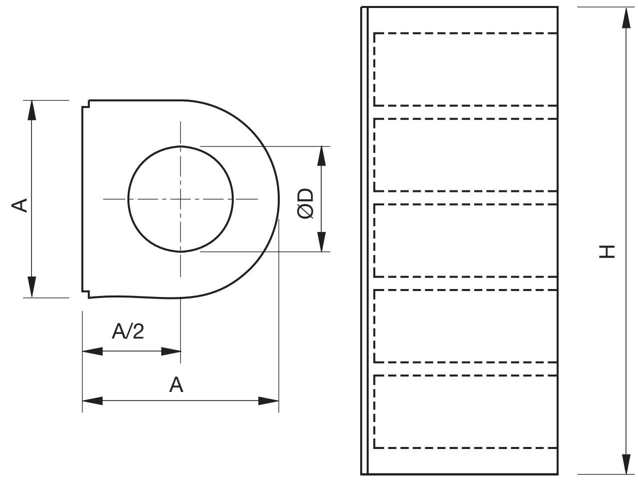
Type

Size

Order - accessories

Cover: CHAZ - 0 - size
Plinth: CHAZ - 2 - size
Wall bracket: CHAZ - 3 - size

Dimensions



Size	A mm	ØD mm	H mm	Weight kg
1207	250	125	710	6,50
1607	300	160	710	7,50
2010	330	200	970	13,0
2510	400	250	970	18,0
3115	520	315	1490	35,0
4020	630	400	2010	58,0
5020	730	500	2010	78,0
6320	830	630	2010	106

Accessories

Can be supplied with duct cover, plinth and bracket for wall mounting.

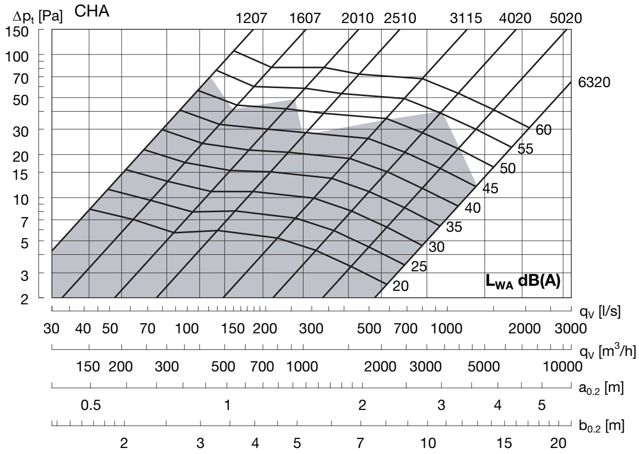
Materials and finish

Diffuser:	Galvanised steel
Nozzles:	Black plastic
Front plate:	1 mm galvanised steel
Standard finish:	Powder-coated
Standard colour:	RAL 9010 - white, gloss 30

The diffuser is available in other colours. Please contact Lindab's sales department for further information.

Perforated diffuser - semicircular CHA

Technical data



Recommended maximum volume flow

The near zone is given at an under-temperature of -3 K to a maximum terminal velocity of 0.20 m/s.

Conversion to other terminal velocities - see table 1, correction of the near zone for -3 K and -6 K respectively.

Sound effect level

Sound effect level L_W [dB] = $L_{WA} + K_{ok}$

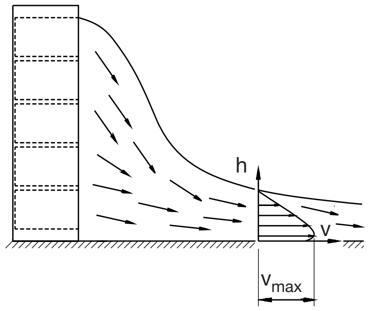
	Centre frequency Hz							
Size	**63**	**125**	**250**	**500**	**1K**	**2K**	**4K**	**8K**
1207	11	-4	1	1	-9	-16	-28	-34
1607	9	-2	2	0	-8	-16	-28	-34
2010	10	-2	3	0	-7	-16	-28	-39
2510	11	0	4	-2	-7	-15	-27	-37
3115	13	1	3	-1	-7	-17	-29	-42
4020	7	3	2	-1	-5	-14	-19	-14
5020	7	3	2	0	-6	-16	-19	-17
6320	7	3	2	0	-6	-16	-29	-17

Sound attenuation

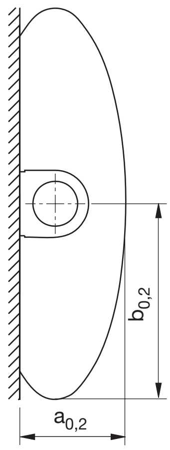
Sound attenuation ΔL [dB] including end reflection.

	Centre frequency Hz							
Size	**63**	**125**	**250**	**500**	**1K**	**2K**	**4K**	**8K**
1207	19	14	5	3	2	1	2	1
1607	16	12	4	1	2	1	2	2
2010	12	8	4	2	3	2	2	2
2510	12	8	5	2	1	1	1	1
3115	11	8	3	2	1	1	2	2
4020	9	6	1	1	1	1	1	1
5020	7	5	0	1	1	1	1	2
6320	5	3	1	1	0	0	0	0

Nearzone



Large diffusion (factory setting)



Small diffusion

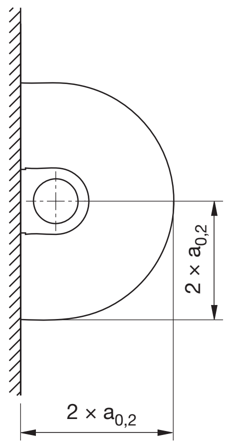
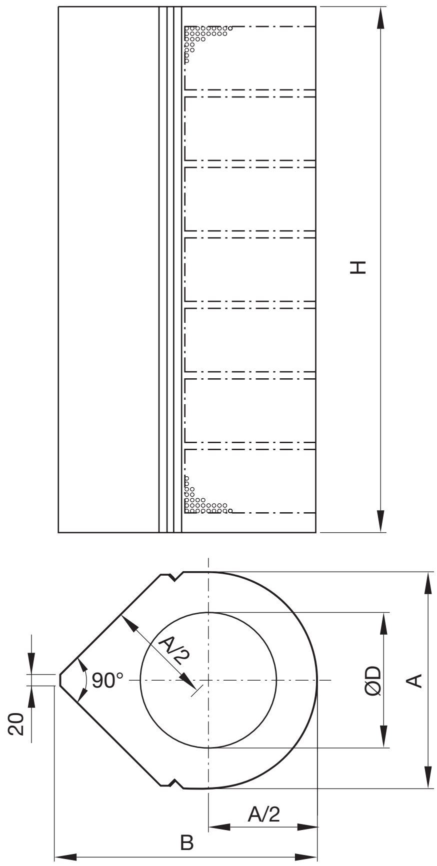


Table 1
Correction of the near zone ($a_{0.2}$, $b_{0.2}$)

Under-temperature T_i-T_r	Maximum velocity m/s	Mean velocity m/s	Correction factor
	0.20	0.10	1.00
	0.25	0.12	0.80
-3K	0.30	0.15	0.70
	0.35	0.17	0.60
	0.40	0.20	0.50
	0.20	0.10	1.20
	0.25	0.12	1.00
-6K	0.30	0.15	0.80
	0.35	0.17	0.70
	0.40	0.20	0.60

Perforated diffuser - corner CQA

Dimensions



Description

Comdif CQA is a semicircular perforated displacement diffuser for corner installation. Behind the perforated front plate, CQA is equipped with individually adjustable nozzles, making it possible to alter the geometry of the near zone. The diffuser can be turned and has a circular duct connection (MF measure), so the diffuser can be connected at the top or bottom. The diffuser is suitable for the supply of large volumes of moderately cooled air.

- The diffuser is suitable for the supply of large volumes of air.
- The geometry of the near zone can be adjusted using adjustable nozzles
- Duct covers, plinths and wall brackets can be supplied as accessories

Size	A mm	B mm	ØD mm	H mm	Weight kg
1207	250	302	125	710	8,00
1607	300	362	160	710	9,00
2010	330	398	200	970	14,0
2510	400	483	250	970	20,0
3115	520	628	315	1490	40,0
4020	630	760	400	2010	64,0

Maintenance

The front plate can be removed from the diffuser, making it possible to clean the nozzles. The visible parts of the diffuser can be wiped with a damp cloth.

Accessories

Can be supplied with duct cover, plinth and bracket for wall mounting.

Order code

Product	**CQA**	**aaaa**
Type	✓	
Size		✓

Order - accessories

Cover:	CQAZ - 0 - size
Plinth:	CQAZ - 2 - size
Wall bracket:	CQAZ - 3 - size

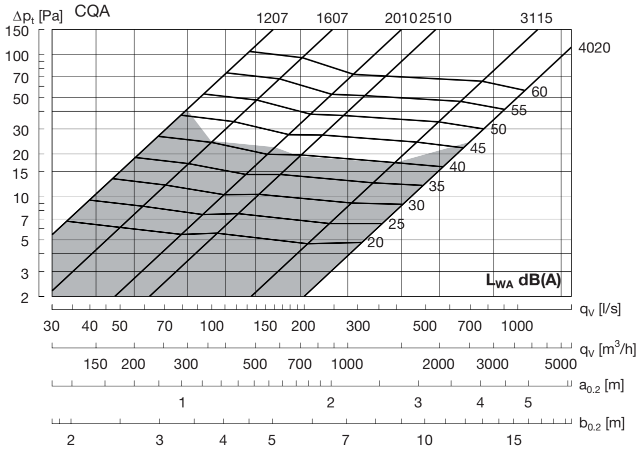
Materials and finish

Diffuser:	Galvanised steel
Nozzles:	Black plastic
Front plate:	1 mm galvanised steel
Standard finish:	Powder-coated
Standard colour:	RAL 9010 - white, gloss 30

The diffuser is available in other colours. Please contact Lindab's sales department for further information.

Perforated diffuser - corner CQA

Technical data



Recommended maximum volume flow.

The near zone is given at an under-temperature of -3 K to a maximum terminal velocity of 0.20 m/s.

Conversion to other terminal velocities - see table 1, correction of the near zone for -3 K and -6 K respectively.

Sound effect level

Sound effect level L_W [dB] = L_{WA} + K_{ok}

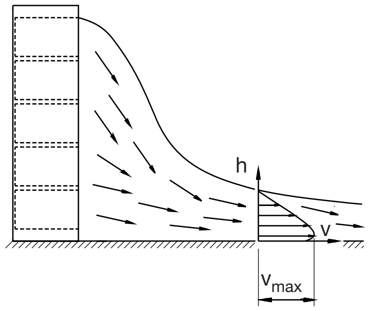
	Centre frequency Hz							
Size	**63**	**125**	**250**	**500**	**1K**	**2K**	**4K**	**8K**
1207	8	-3	3	0	-7	-15	-27	-35
1607	11	-1	5	-2	-8	-16	-28	-34
2010	11	0	5	-2	-7	-16	-28	-40
2510	11	2	5	-2	-7	-15	-29	-39
3115	11	3	5	-2	-8	-17	-29	-38
4020	12	4	2	0	-8	-16	-30	-41

Sound attenuation

Sound attenuation ΔL [dB] including end reflection.

	Centre frequency Hz							
Size	**63**	**125**	**250**	**500**	**1K**	**2K**	**4K**	**8K**
1207	18	13	5	3	3	2	2	2
1607	15	11	3	1	2	2	2	2
2010	11	7	3	8	5	5	7	7
2510	10	6	5	7	5	4	4	5
3115	9	6	5	4	4	5	5	7
4020	8	5	2	3	2	3	3	3

Nearzone



Large diffusion (factory setting)

Small diffusion

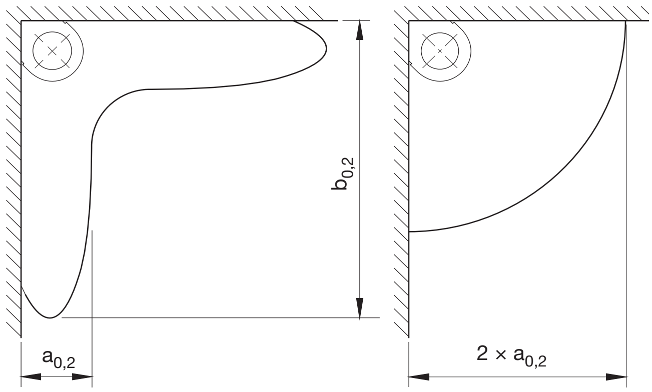


Table 1
Correction of the near zone ($a_{0.2}$, $b_{0.2}$)

Under-temperature T_i-T_r	Maximum velocity m/s	Mean velocity m/s	Correction factor
	0.20	0.10	1.00
	0.25	0.12	0.80
-3K	0.30	0.15	0.70
	0.35	0.17	0.60
	0.40	0.20	0.50
	0.20	0.10	1.20
	0.25	0.12	1.00
-6K	0.30	0.15	0.80
	0.35	0.17	0.70
	0.40	0.20	0.60

Perforated diffuser - rectangular CRA

Description

Comdif CRA is a rectangular perforated displacement diffuser for installation against a wall or column. CRA has a rectangular connection and therefore has a limited depth, making it ideal for installation in premises where a discrete appearance is required. Behind the perforated front plate, CRA is equipped with individually adjustable nozzles, making it possible to alter the geometry of the near zone. The diffuser can be turned and has a rectangular duct connection, so the diffuser can be connected at the top or bottom. The connection duct CRAZ with a circular connection is available as an accessory. The diffuser is suitable for the supply of large volumes of moderately cooled air.

- The diffuser is suitable for the supply of large volumes of air.
- The geometry of the near zone can be adjusted using adjustable nozzles
- Duct connections and plinths can be supplied as accessories

Maintenance

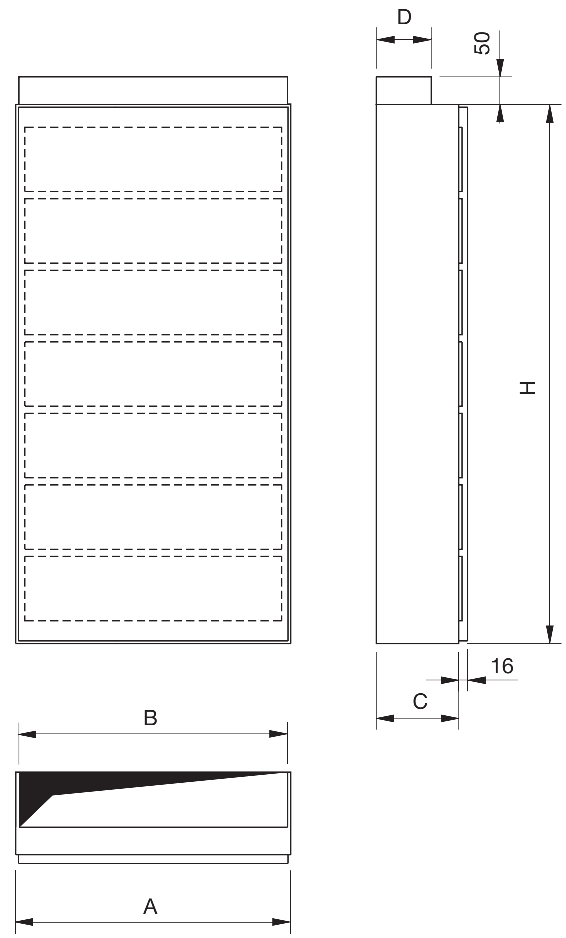
The front plate can be removed from the diffuser, making it possible to clean the nozzles. The visible parts of the diffuser can be wiped with a damp cloth.

Order code

Product	**CRA**	**aaaa**
Type		
Size		

Order - accessories
Connection duct: CRAZ - 1 - size
Plinth: CRAZ - 2 - size

Dimensions



Size	A mm	B mm	C mm	D mm	H mm	Weight kg
3010	300	278	150	98	980	10,0
5010	500	478	150	98	980	17,0
8010	800	778	150	98	980	27,0
8020	800	778	250	198	2020	32,0

Accessories

Can be supplied with duct connection and plinth.

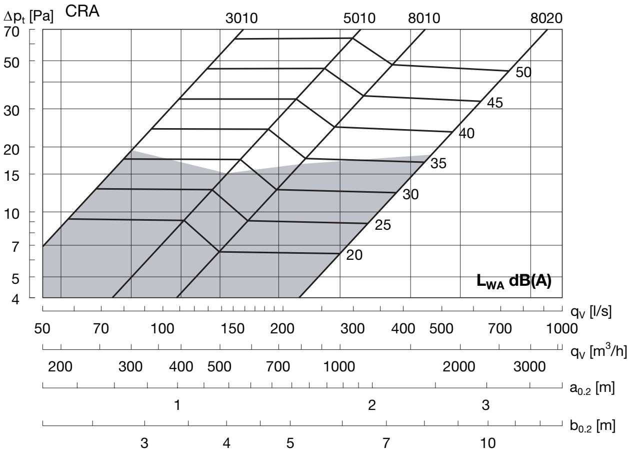
Materials and finish

Diffuser:	Galvanised steel
Nozzles:	Black plastic
Front plate:	1,5 mm galvanised steel
Standard finish:	Powder-coated
Standard colour:	RAL 9010 - white, gloss 30

The diffuser is available in other colours. Please contact Lindab's sales department for further information.

Perforated diffuser - rectangular CRA

Technical data



Recommended maximum volume flow

The near zone is given at an under-temperature of -3 K to a maximum terminal velocity of 0.20 m/s.

Conversion to other terminal velocities - see table 1, correction of the near zone for -3 K and -6 K respectively.

Sound effect level

Sound effect level L_W [dB] = $L_{WA} + K_{ok}$

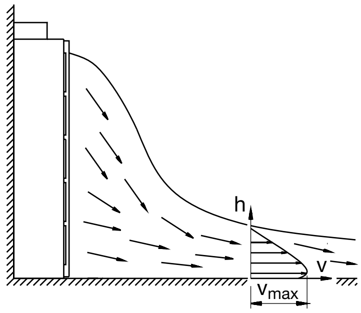
	Centre frequency Hz							
Size	**63**	**125**	**250**	**500**	**1K**	**2K**	**4K**	**8K**
3010	9	-1	5	-1	-11	-17	-30	-41
5010	7	1	4	0	-11	-19	-32	-42
8010	15	0	4	0	-12	-20	-31	-43
8020	10	4	6	-2	-11	-21	-33	-39

Sound attenuation

Sound attenuation ΔL [dB] including end reflection.

	Centre frequency Hz							
Size	**63**	**125**	**250**	**500**	**1K**	**2K**	**4K**	**8K**
3010	11	7	6	4	2	2	1	2
5010	10	6	6	4	2	2	1	2
8010	10	6	4	3	2	1	1	1
8020	7	4	3	2	1	1	1	1

Nearzone



Large diffusion (factory setting)

Small diffusion

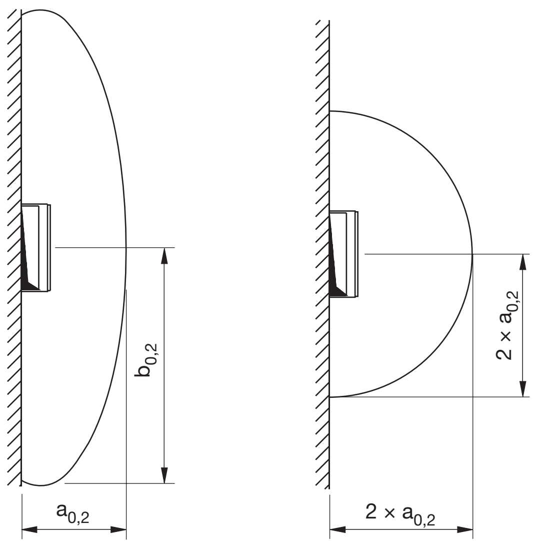


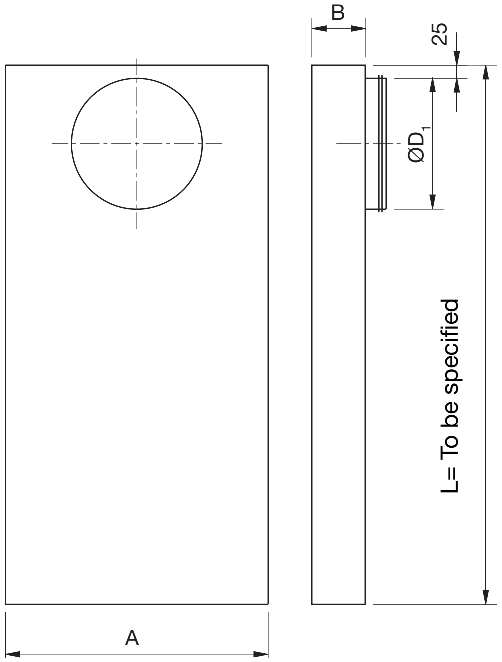
Table 1
Correction of the near zone ($a_{0.2}$, $b_{0.2}$)

Under-temperature T_i-T_r	Maximum velocity m/s	Mean velocity m/s	Correction factor
-3K	0.20	0.10	1.00
	0.25	0.12	0.80
	0.30	0.15	0.70
	0.35	0.17	0.60
	0.40	0.20	0.50
-6K	0.20	0.10	1.20
	0.25	0.12	1.00
	0.30	0.15	0.80
	0.35	0.17	0.70
	0.40	0.20	0.60

Perforated diffuser - rectangular CRA

Accessories

Connection duct CRAZ-1



Size	A mm	B mm	$ØD_1$ mm	Weight kg/m
3010	280	100	200	5,0
5010	480	100	250	7,0
8010	780	100	315	9,0
8020	780	200	400	11,0

Order code

Connection duct **CRAZ-1 aaaa bbbb c**

Type

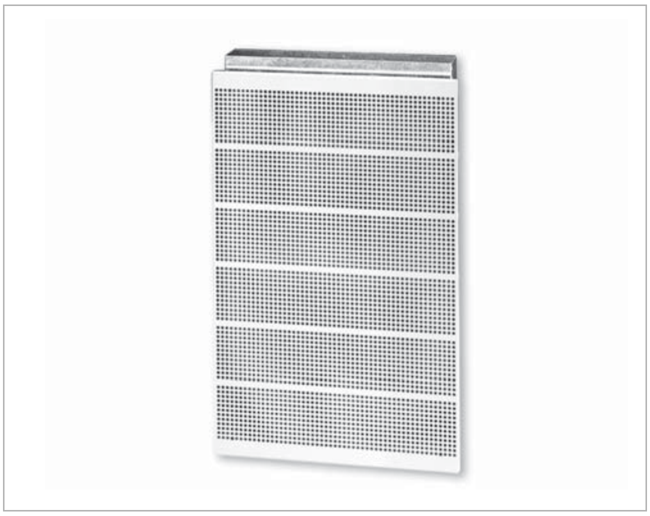
Size

Length According to dimensions in mm L=max. 2,000 mm

Connection Front 0
Back (Standard) 1

Lindab

Perforated diffuser - installation CVA



Description

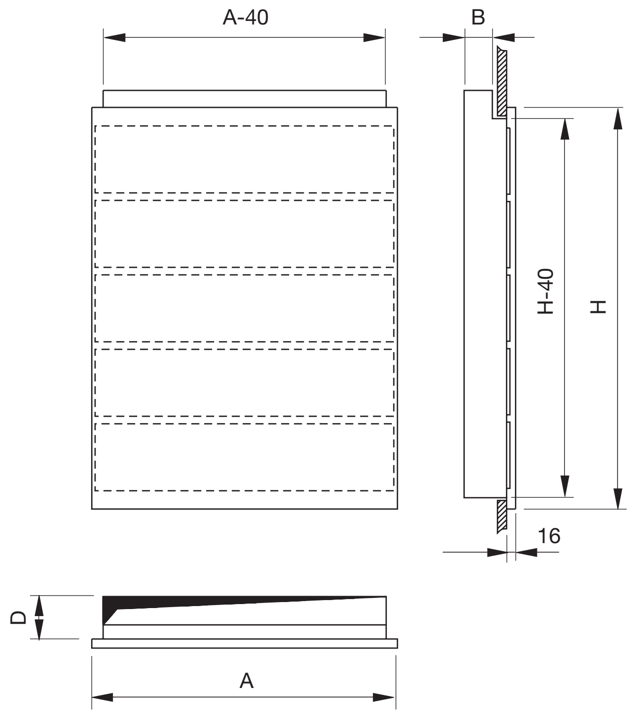
Comdif CVA is a rectangular perforated displacement diffuser for installation in walls or similar structures. CVA has a rectangular connection. Behind the perforated front plate, CVA is equipped with individually adjustable nozzles, making it possible to alter the geometry of the near zone. The diffuser can be turned and has a rectangular duct connection, so the diffuser can be connected at the top or bottom. A wall duct with circular connection is supplied as an accessory. The diffuser is suitable for the supply of large volumes of moderately cooled air.

- The diffuser is suitable for installation in walls.
- The geometry of the near zone can be adjusted using adjustable nozzles.
- A wall duct can be supplied as an accessory.

Maintenance

The front plate can be removed from the diffuser, making it possible to clean the nozzles. The visible parts of the diffuser can be wiped with a damp cloth.

Dimensions



Size	A mm	B mm	D mm	H mm	m kg
3005	540	50	75	320	4,40
5005	540	50	75	450	5,80
6005	540	50	75	580	8,70
6008	540	80	105	580	9,00
8008	540	80	105	840	12,0

Cutting dimension: A - 30 x H - 30

Accessories

Can be supplied with wall duct.

Order code

Product	**CVA**	**aaaa**
Type		
Size		

Order - accessories

Wall duct: CVAZ -1 - size

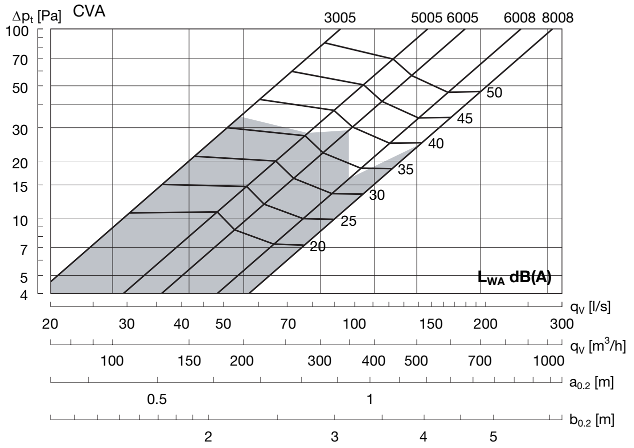
Materials and finish

Diffuser:	Galvanised steel
Nozzles:	Black plastic
Front plate:	1,5 mm galvanised steel
Standard finish:	Powder-coated
Standard colour:	RAL 9010 - white, gloss 30

The diffuser is available in other colours. Please contact Lindab's sales department for further information.

Perforated diffuser - installation CVA

Technical data



Recommended maximum volume flow

The near zone is given at an under-temperature of -3 K to a maximum terminal velocity of 0.20 m/s.

Conversion to other terminal velocities - see table 1, correction of the near zone for -3 K and -6 K respectively.

Sound effect level

Sound effect level L_W [dB] = $L_{WA} + K_{ok}$

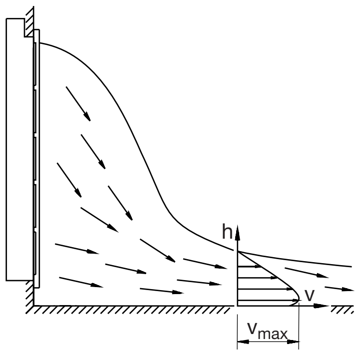
	Centre frequency Hz							
Size	**63**	**125**	**250**	**500**	**1K**	**2K**	**4K**	**8K**
3005	7	-2	-2	1	-8	-17	-27	-38
5005	7	-3	-1	1	-7	-17	-29	-36
6005	11	-4	-1	1	-7	-17	-29	-37
6008	12	-4	2	1	-9	-20	-31	-31
8008	10	-4	2	1	-9	-19	-30	-43

Sound attenuation

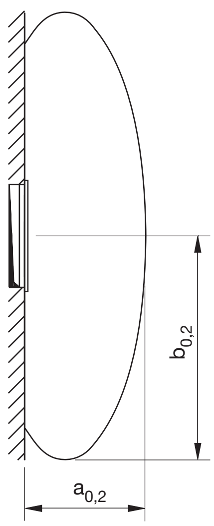
Sound attenuation ΔL [dB] including end reflection.

	Centre frequency Hz							
Size	**63**	**125**	**250**	**500**	**1K**	**2K**	**4K**	**8K**
3005	18	13	9	4	1	0	0	1
5005	15	11	8	2	2	1	0	0
6005	15	10	4	2	0	0	0	1
6008	12	8	3	2	0	0	0	0
8008	12	8	3	1	0	0	0	0

Nearzone



Large diffusion
(factory setting)



Small diffusion

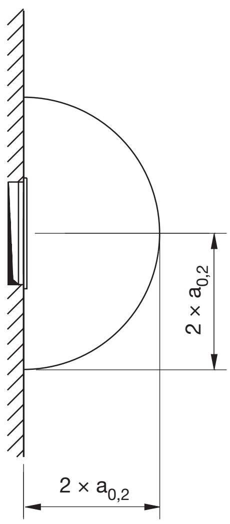


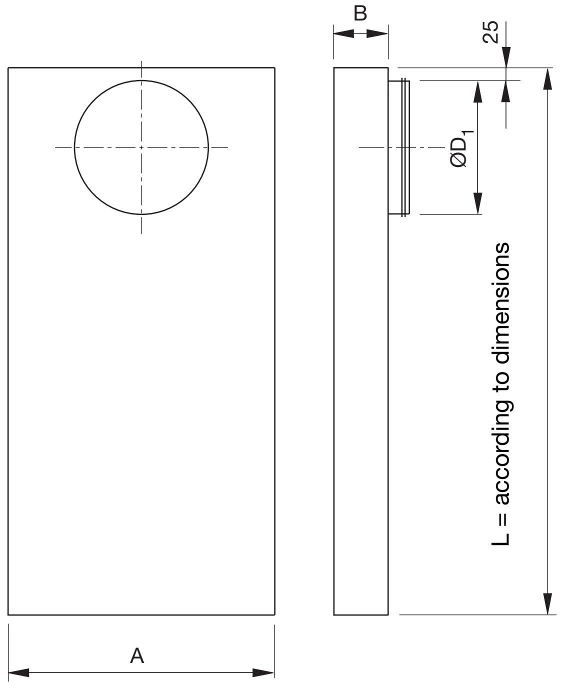
Table 1
Correction of the near zone ($a_{0.2}$, $b_{0.2}$)

Under-temperature T_i-T_r	Maximum velocity m/s	Mean velocity m/s	Correction factor
-3K	0.20	0.10	1.00
	0.25	0.12	0.80
	0.30	0.15	0.70
	0.35	0.17	0.60
	0.40	0.20	0.50
-6K	0.20	0.10	1.20
	0.25	0.12	1.00
	0.30	0.15	0.80
	0.35	0.17	0.70
	0.40	0.20	0.60

Perforated diffuser - installation CVA

Accessories

Wall duct CVAZ-1



Size	A mm	B mm	$ØD_1$ mm	Weight kg/m
3005	502	52	125	6,0
5005	502	52	160	6,0
6005	502	52	200	6,0
6008	502	82	250	6,5
8008	502	82	315	6,5

Order code

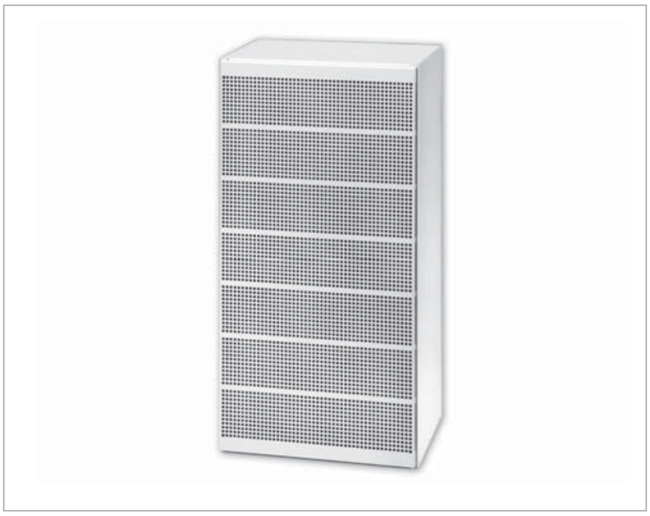
Wall duct **CVAZ-1** **aaaa** **bbbb**

Type

Size

Length According to dimensions in mm L=max. 2,000 mm

Perforated diffuser - rectangular CEA



Description

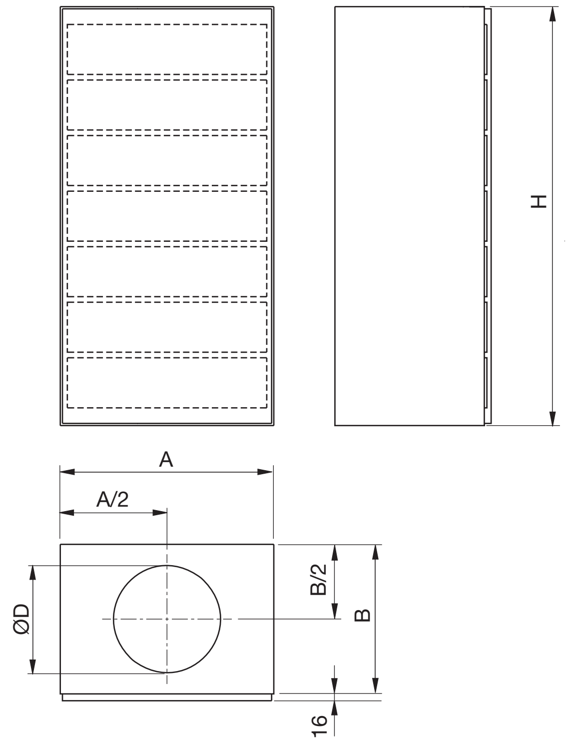
Comdif CEA is a rectangular perforated displacement diffuser for installation against a wall or column. Behind the perforated front plate, CEA is equipped with individually adjustable nozzles, making it possible to alter the geometry of the near zone. The diffuser can be turned and has a circular duct connection (MF measure), so the diffuser can be connected at the top or bottom. The diffuser is suitable for the supply of large volumes of moderately cooled air.

- The diffuser is suitable for the supply of large volumes of air.
- The geometry of the near zone can be adjusted using adjustable nozzles.
- Plinths be supplied as accessories.

Maintenance

The front plate can be removed from the diffuser, making it possible to clean the nozzles. The visible parts of the diffuser can be wiped with a damp cloth.

Dimensions



Size	A mm	B mm	ØD mm	H mm	Weight kg
200	300	300	200	980	12,0
250	500	350	250	980	24,0
315	800	500	315	1500	80,0
400	800	600	400	1500	96,0

Accessories

Can be supplied with plinth.

Order code

Product	**CEA**	**aaaa**
Type		
Size		

Order - accessories
Plinth: CEAZ - 2 - size

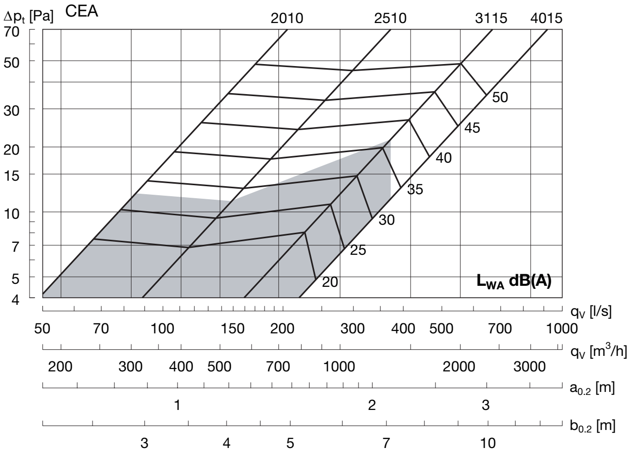
Materials and finish

Diffuser:	Galvanised steel
Nozzles:	Black plastic
Front plate:	1,5 mm galvanised steel
Standard finish:	Powder-coated
Standard colour:	RAL 9010 - white, gloss 30

The diffuser is available in other colours. Please contact Lindab's sales department for further information.

Perforated diffuser - rectangular CEA

Technical data



Recommended maximum volume flow.

The near zone is given at an under-temperature of -3 K to a maximum terminal velocity of 0.20 m/s.

Conversion to other terminal velocities - see table 1, correction of the near zone for -3 K and -6 K respectively.

Sound effect level

Sound effect level L_W [dB] = $L_{WA} + K_{ok}$

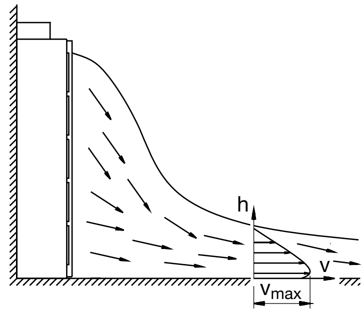
	Centre frequency Hz							
Size	**63**	**125**	**250**	**500**	**1K**	**2K**	**4K**	**8K**
2010	11	4	4	-1	-8	-14	-25	-37
2510	8	4	2	0	-6	-16	-27	-40
3115	14	6	3	-1	-8	-17	-29	-25
4015	11	3	2	1	-10	-18	-30	-37

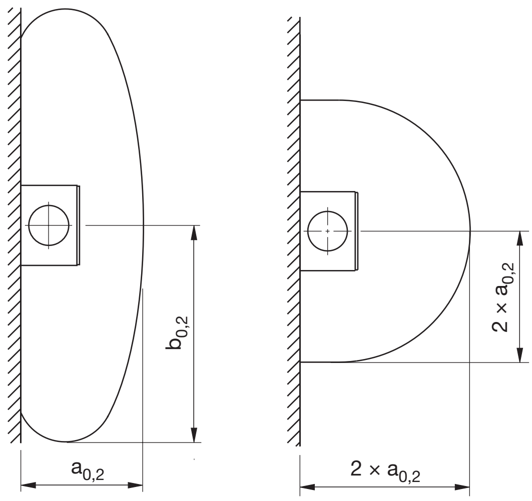
Sound attenuation

Sound attenuation ΔL [dB] including end reflection.

	Centre frequency Hz							
Size	**63**	**125**	**250**	**500**	**1K**	**2K**	**4K**	**8K**
2010	10	6	1	4	5	3	4	4
2510	10	6	6	4	2	2	4	3
3115	9	6	5	3	3	4	4	5
4015	8	5	3	3	2	3	4	4

Nearzone

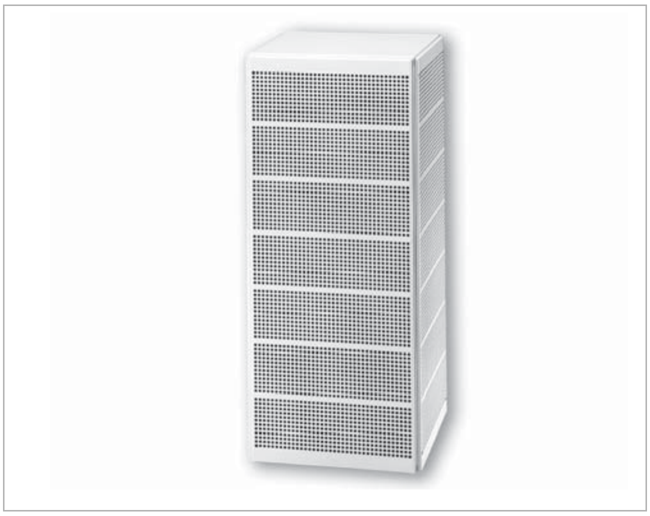




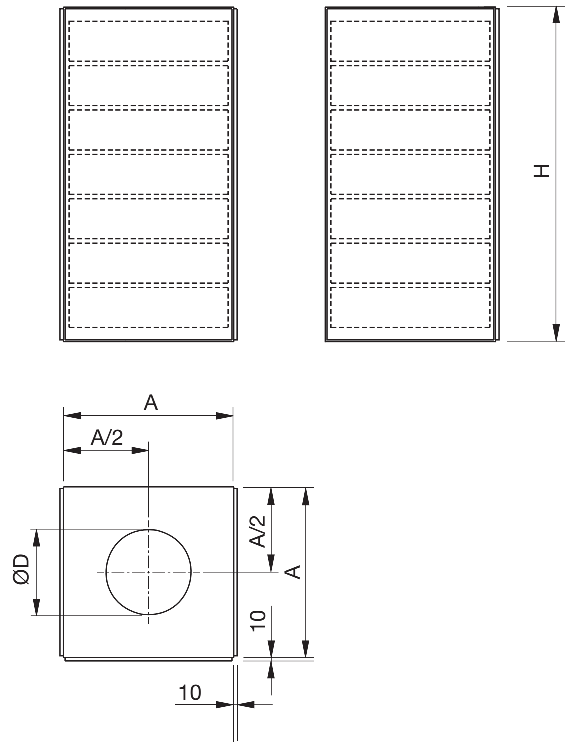
Correction of the near zone ($a_{0.2}$, $b_{0.2}$)

Under-temperature T_i-T_r	Maximum velocity m/s	Mean velocity m/s	Correction factor
-3K	0.20	0.10	1.00
	0.25	0.12	0.80
	0.30	0.15	0.70
	0.35	0.17	0.60
	0.40	0.20	0.50
-6K	0.20	0.10	1.20
	0.25	0.12	1.00
	0.30	0.15	0.80
	0.35	0.17	0.70
	0.40	0.20	0.60

Perforated diffuser - square CKA



Dimensions



Description

Comdif CKA is a square perforated displacement diffuser for installation against a wall or column. Behind the perforated front plate, CKA is equipped with individually adjustable nozzles, making it possible to alter the geometry of the near zone. The diffuser can be turned and has a circular duct connection (MF measure), so the diffuser can be connected at the top or bottom. The diffuser is suitable for the supply of large volumes of moderately cooled air.

- The diffuser is suitable for the supply of large volumes of air
- The geometry of the near zone can be adjusted using adjustable nozzles
- Plinths can be supplied as accessories

Size	A mm	ØD mm	H mm	Weight kg
200	300	200	980	11,0
250	400	250	980	20,0
315	500	315	980	30,0
400	500	400	1500	45,0
500	800	500	2020	150
630	800	630	2020	150

Maintenance

The front plate can be removed from the diffuser, making it possible to clean the nozzles. The visible parts of the diffuser can be wiped with a damp cloth.

Accessories

Can be supplied with plinth.

Order code

Product	**CKA**	**aaaa**
Type	┘	
Size		┘

Order - accessories

Plinth: CKAZ - 2 - size

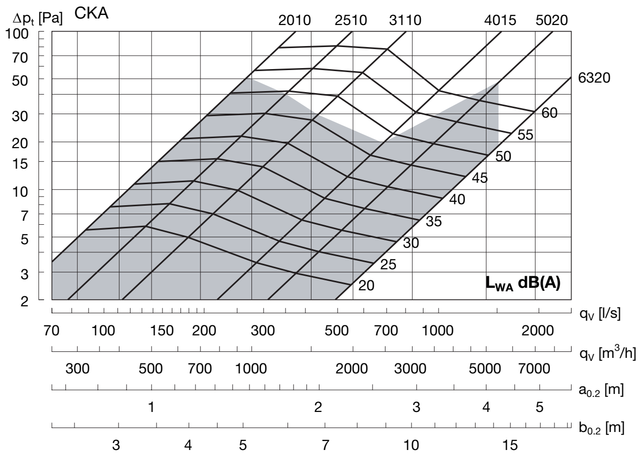
Materials and finish

Diffuser:	Galvanised steel
Nozzles:	Black plastic
Front plate:	1,5 mm galvanised steel
Standard finish:	Powder-coated
Standard colour:	RAL 9010 - white, gloss 30

The diffuser is available in other colours. Please contact Lindab's sales department for further information.

Perforated diffuser - square CKA

Technical data



Recommended maximum volume flow.

The near zone is given at an under-temperature of -3 K to a maximum terminal velocity of 0.20 m/s.

Conversion to other terminal velocities - see table correction of the near zone for -3 K and -6 K respectively.

Sound effect level

Sound effect level L_W [dB] = L_{WA} + K_{ok}

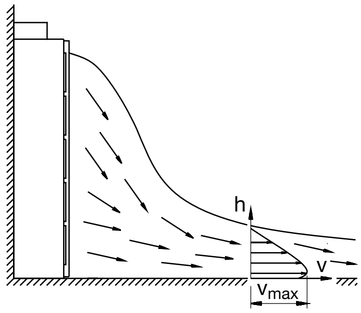
	Centre frequency Hz							
Size	**63**	**125**	**250**	**500**	**1K**	**2K**	**4K**	**8K**
2010	10	0	4	0	-8	-18	-29	-43
2510	11	1	4	-1	-8	-19	-30	-42
3110	14	3	4	-1	-10	-18	-30	-32
4015	10	1	2	0	-8	-17	-27	-42
5020	7	3	2	0	-6	-16	-19	-17
6320	7	3	2	0	-6	-16	-19	-17

Sound attenuation

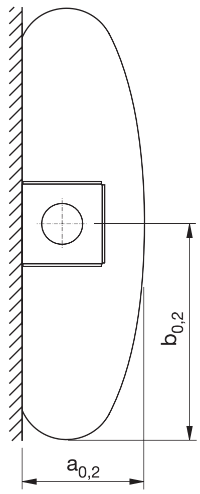
Sound attenuation ΔL [dB] including end reflection.

	Centre frequency Hz							
Size	**63**	**125**	**250**	**500**	**1K**	**2K**	**4K**	**8K**
2010	12	8	4	2	1	1	1	1
2510	10	6	6	4	2	2	4	3
3110	10	7	3	1	2	1	2	1
4015	9	6	1	1	1	1	1	1
5020	6	4	1	1	1	1	1	1
6320	5	3	1	0	0	0	0	0

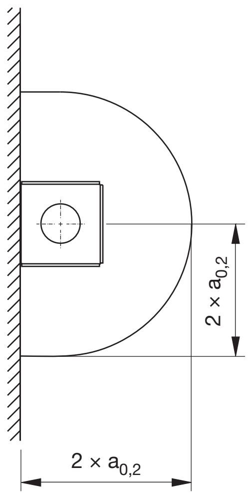
Nearzone



Large diffusion (factory setting)



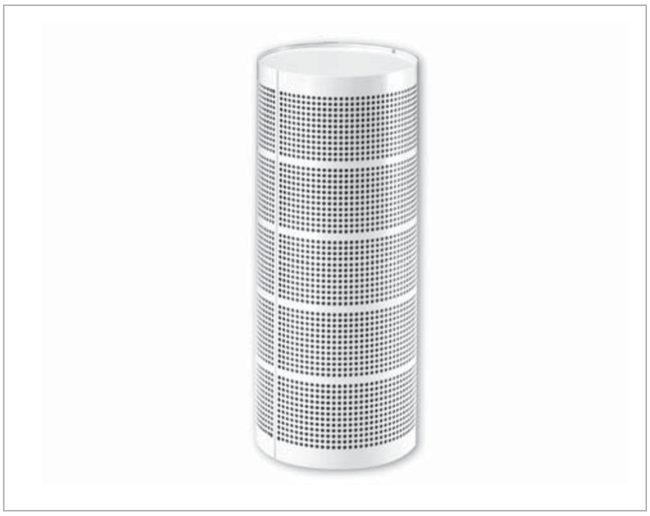
Small diffusion



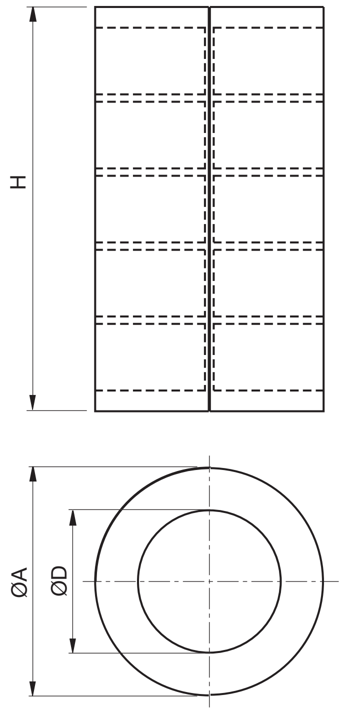
Correction of the near zone ($a_{0.2}$, $b_{0.2}$)

Under-temperature T_i-T_r	Maximum velocity m/s	Mean velocity m/s	Correction factor
	0.20	0.10	1.00
	0.25	0.12	0.80
-3K	0.30	0.15	0.70
	0.35	0.17	0.60
	0.40	0.20	0.50
	0.20	0.10	1.20
	0.25	0.12	1.00
-6K	0.30	0.15	0.80
	0.35	0.17	0.70
	0.40	0.20	0.60

Perforated diffuser - circular CCA



Dimensions



Description

Comdif CCA is a circular perforated displacement diffuser for freestanding installation. Behind the perforated front plate, CCA is equipped with individually adjustable nozzles, making it possible to alter the geometry of the near zone. The diffuser can be turned and has a circular duct connection (MF measure), so the diffuser can be connected at the top or bottom. The diffuser is suitable for the supply of large volumes of moderately cooled air.

- The diffuser is suitable for the supply of large volumes of air.
- The geometry of the near zone can be adjusted using adjustable nozzles.
- Plinth can be supplied as accessory.

Maintenance

The front plate can be removed from the diffuser, making it possible to clean the nozzles. The visible parts of the diffuser can be wiped with a damp cloth.

Size	ØA mm	ØD mm	H mm	Weight kg
1207	250	125	710	5,00
1607	300	160	710	7,50
2010	360	200	970	13,0
2510	400	250	970	18,0
3115	520	315	1490	35,0
4020	630	400	2010	58,0
5020	730	500	2010	78,0
6320	830	630	2010	106

Accessories

Can be supplied with plinth.

Order code

Product	**CCA**	**aaaa**
Type	✓	
Size		✓

Order - accessories

Plinth: CCAZ - 2 - size

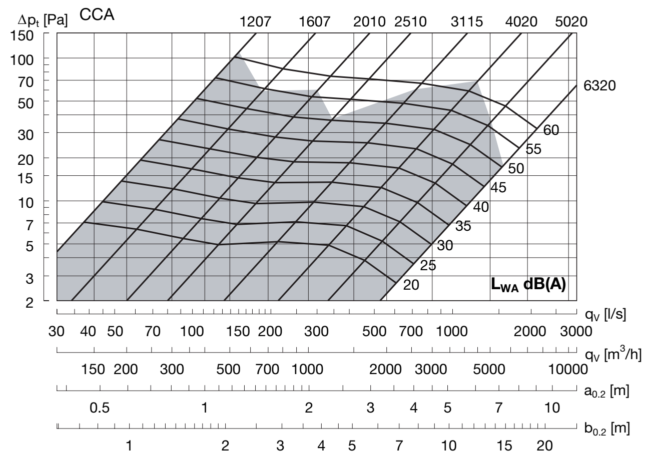
Materials and finish

Diffuser:	Galvanised steel
Nozzles:	Black plastic
Front plate:	1 mm galvanised steel
Standard finish:	Powder-coated
Standard colour:	RAL 9010 - white

The diffuser is available in other colours. Please contact Lindab's sales department for further information.

Perforated diffuser - circular CCA

Technical data



Recommended maximum volume flow

The near zone is given at an under-temperature of -3 K to a maximum terminal velocity of 0.20 m/s.

Conversion to other terminal velocities - see table correction of the near zone for -3 K and -6 K respectively.

Sound effect level

Sound effect level L_W [dB] = L_{WA} + K_{ok}

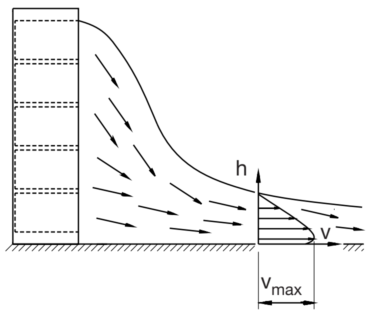
	Centre frequency Hz							
Size	**63**	**125**	**250**	**500**	**1K**	**2K**	**4K**	**8K**
1207	8	-1	1	1	-9	-17	-28	-40
1607	10	-1	1	1	-8	-17	-29	-33
2010	10	-1	3	0	-9	-17	-27	-40
2510	7	-1	3	0	-7	-18	-28	-41
3115	13	2	3	-1	-8	-17	-29	-27
4020	13	2	3	-1	-7	-16	-28	-43
5020	7	3	2	0	-6	-16	-19	-17
6320	7	3	2	0	-8	-16	-20	-17

Sound attenuation

Sound attenuation ΔL [dB] including end reflection.

	Centre frequency Hz							
Size	**63**	**125**	**250**	**500**	**1K**	**2K**	**4K**	**8K**
1207	19	14	5	3	2	1	2	1
1607	16	12	4	1	2	1	2	2
2010	12	8	4	2	3	2	2	2
2510	12	8	5	2	1	1	1	1
3115	11	8	3	2	1	1	2	2
4020	9	6	1	1	1	1	1	1
5020	6	4	1	1	1	1	1	1
6320	5	3	1	1	0	0	0	1

Nearzone



Oval diffusion

Circular diffusion (factory setting)

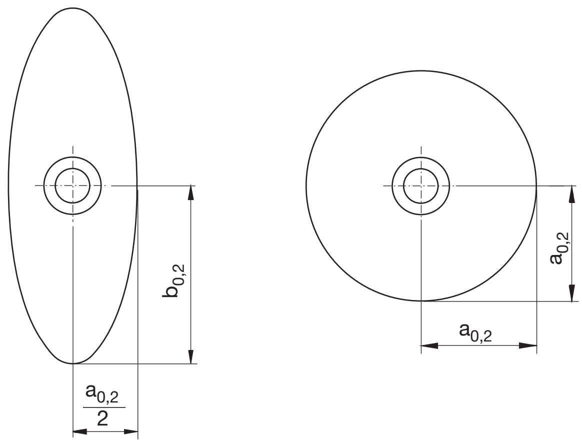


Table 1
Correction of the near zone ($a_{0.2}$, $b_{0.2}$)

Under-temperature T_i-T_r	Maximum velocity m/s	Mean velocity m/s	Correction factor
	0.20	0.10	1.00
	0.25	0.12	0.80
-3K	0.30	0.15	0.70
	0.35	0.17	0.60
	0.40	0.20	0.50
	0.20	0.10	1.20
	0.25	0.12	1.00
-6K	0.30	0.15	0.80
	0.35	0.17	0.70
	0.40	0.20	0.60

Theatre diffusers

Opera House, Copenhagen

Theatre diffusers

For ventilation in auditoriums, theatres, cinemas etc., where many people sit together, it is a great advantage to use the displacement principle and diffusers especially for that purpose.
Typically diffusers are either placed in the stairs or in the floor under the rows of seats. Normal small air volumes (10-14 l/s) are supplied with a limited cooling temperature, usually distributed in the ratio of one diffuser per person. This ensures the best division of layers. An added bonus is that the thermal load from the people is removed.
The velocity of the air in the diffusers near-zone is an important parameter in planning. Normally 0,20 m/s at a temperature gradient of 1,5 K is acceptable. The velocity depends on how much air is supplied per metre of chair-rows in the room, in addition to the air diffusion. Usurally air diffusion pattern is directed so the air is supplied in the direction of the chairs. This ensures a reduction in the velocity before the air is spread throughout the room.

Unique solutions

In the series of theatre diffusers are also diffusers for displacement ventilation. The theatre diffusers come in circular and rectangular with the possibility of being mounted directly in the air duct system or pressure chamber.
The diffusers are delivered with perforated front plates and blending profiles, which makes it possible to direct the air flow patterns to small near-zones. The diffusers are delivered pre-set for chosen pressure and air flow, so adjustment is not necessary.
In many instances, it is necessary to create especially designed solutions due to the increased requirements for acoustics, architecture, constructional needs etc.
The diffusers are therefore available in a number of special designs and varieties. Please contact Lindab for further information.

CCU, theatre diffuser

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

Theatre diffuser

CRP

Description

CRP is a rectangular displacement diffuser for installation under seats in theatres, auditoriums, etc. It is suitable for installation in a pressure chamber and has a fixed resistance that ensures even distribution of the air. The diffuser can be adapted to the correct air volume and pressure, specified according to the actual conditions.

- It has built-in resistance that ensures even distribution over the diffusers
- The diffuser can be supplied with a specified pressure setting
- The diffuser is available in other dimensions

Maintenance

The front plate of the diffuser can be removed to enable cleaning of the internal components. The visible parts of the diffuser can be wiped with a damp cloth.

Materials and finish

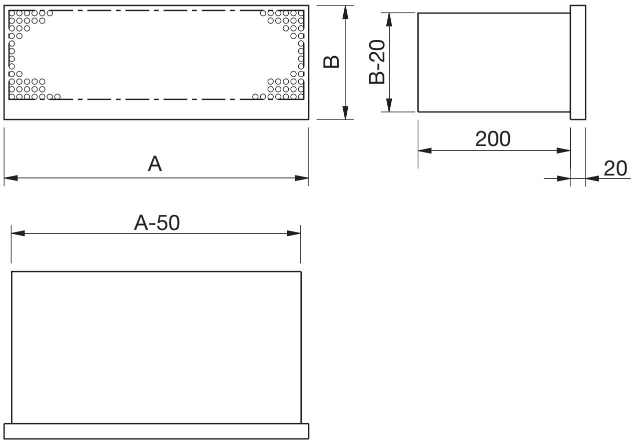
Diffuser:	Galvanised steel
Front plate:	1 mm galvanised steel
Standard finish:	Powder-coated
Standard colour:	RAL 7040 - grey, gloss 30
	RAL 9010 - white, gloss 30

The diffuser is available in other colours. Please contact Lindab's sales department for further information.

Order code

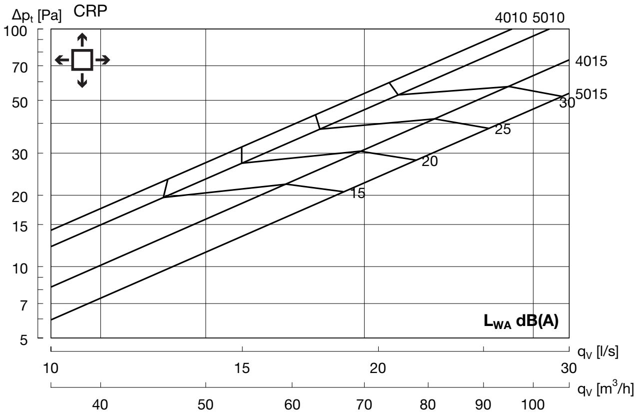
Product		CRP	a	bbbb
Type				
Colour	RAL 7040 - grey	0		
	RAL 9010 - white	1		
	Special colour	2		
Size				

Dimensions



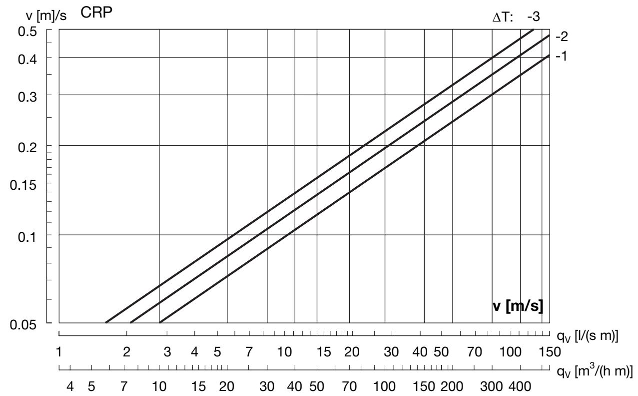
Size	A mm	B mm	Weight kg
4010	400	100	1,60
4015	400	150	2,20
5010	500	100	2,00
5015	500	150	2,70

Pressure, sound level



Size	63	125	250	500	1K	2K	4K	8K
4010	5	-6	-5	-2	-4	-9	-17	-26
4015	0	-4	-1	0	-6	-10	-18	-27
5010	7	-4	-3	0	-6	-12	-18	-29
5015	5	-3	-1	0	-6	-11	-19	-30

Near zone



The speed is measured 0.5 m from the diffuser.

Theatre diffuser

CRU

Description

CRU is a rectangular displacement diffuser for installation under seats in theatres, auditoriums, etc. The diffuser is supplied with a circular connection. The diffuser can be supplied with a fixed resistance adapted to the correct air volume and pressure, specified according to the actual conditions.

- Circular connection with Lindab Safe.
- The diffuser can be supplied with a fixed resistance at a specified pressure setting
- The diffuser is available in other dimensions.

Maintenance

The front plate can be removed from the diffuser for cleaning of the internal components. The visible parts of the diffuser can be wiped with a damp cloth.

Materials and finish

Diffuser:	Galvanised steel
Front plate:	1 mm galvanised steel
Standard finish:	Powder-coated
Standard colour:	RAL 7040 - grey, gloss 30
	RAL 9010 - white, gloss 30

The diffuser is available in other colours. Please contact Lindab's sales department for further information.

Order code

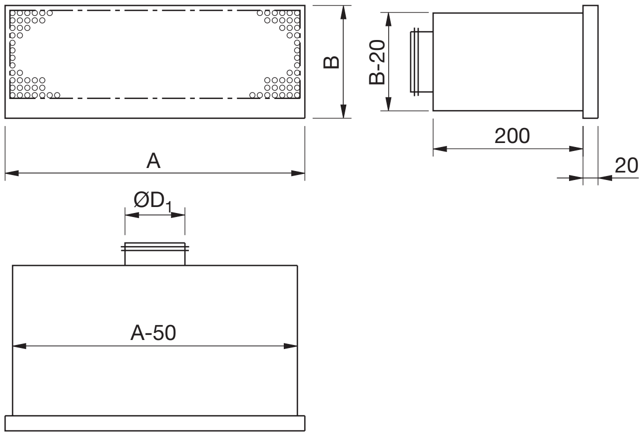
Product **CRU** **aaaa** **bbbb**

Type

Colour	RAL 7040 - grey	0
	RAL 9010 - white	1
	Special colour	2

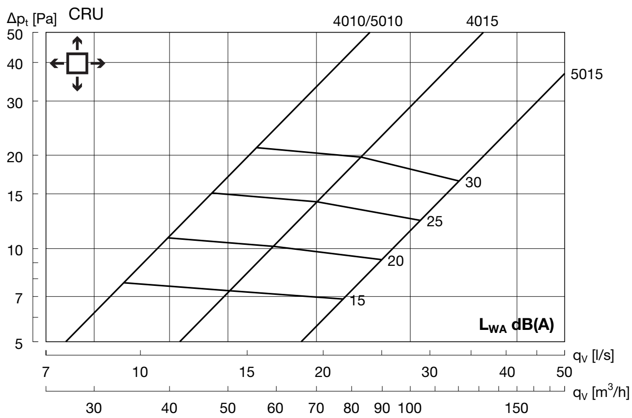
Size

Dimensions



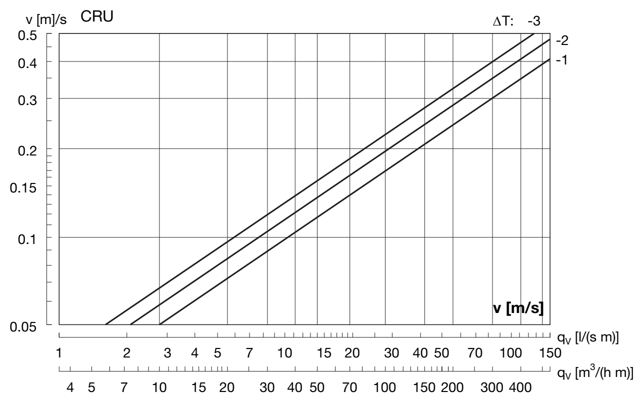
Size	A mm	B mm	$ØD_1$ mm	Weight kg
4010	400	100	80	1,40
4015	400	150	100	2,00
5010	500	100	80	1,70
5015	500	150	125	2,50

Pressure, sound level



Size	63	125	250	500	1K	2K	4K	8K
4010	5	-4	-2	2	-9	-18	-30	-42
4015	9	-2	-2	2	-10	-17	-30	-37
5010	5	-4	-2	2	-9	-18	-30	-42
5015	7	-6	-2	2	-11	-21	-33	-28

Near zone



The speed is measured 0.5 m from the diffuser.

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

Theatre diffuser CCP

Description

CCP is a circular displacement diffuser for installation under seats in theatres, auditoriums, etc. This diffuser is suitable for installation in a pressure chamber. It has a fixed resistance that ensures even distribution of the air. The diffuser can be adapted to the correct air volume and pressure, specified according to the actual conditions.

- It has built-in resistance that ensures even distribution over the diffuser
- The diffuser can be supplied with a specified pressure setting
- The diffuser is available in other dimensions

Maintenance

The front plate of the diffuser can be removed to enable cleaning of the internal components.The visible parts of the diffuser can be wiped with a damp cloth.

Materials and finish

Diffuser:	Galvanised steel
Front plate:	1 mm galvanised steel
Standard finish:	Powder-coated
Standard colour:	RAL 7040 - grey, gloss 30
	RAL 9010 - white, gloss 30

The diffuser is available in other colours. Please contact Lindab's sales department for further information.

Order code

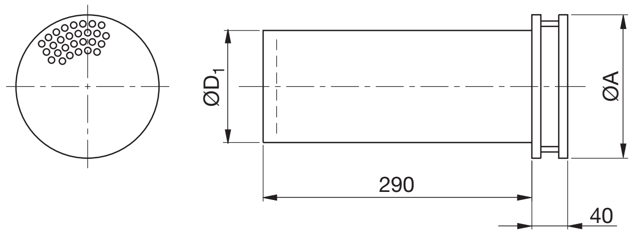
Product **CCP** **a** **bbb**

Type

Colour RAL 7040 - grey 0
RAL 9010 - white 1
Special colour 2

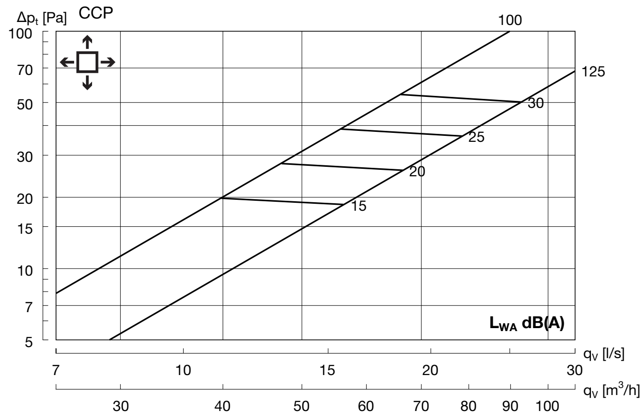
Size

Dimensions



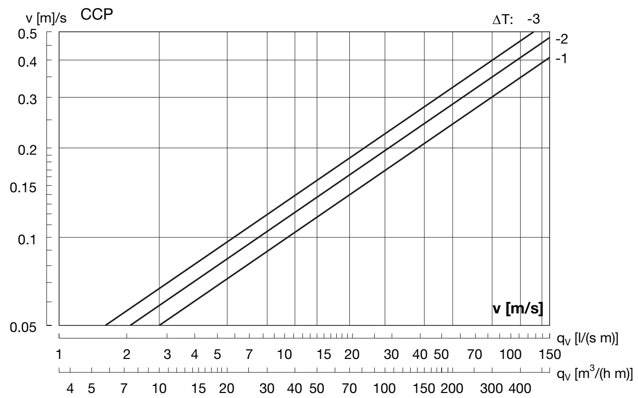
Size	ØA mm	ØD1 mm	Weight kg
100	140	100	0,70
125	160	125	0,90

Pressure, sound level



Size	63	125	250	500	1K	2K	4K	8K
100	10	-7	-6	-1	-5	-8	-13	-24
125	3	-7	-5	0	-5	-10	-15	-27

Near zone



The speed is measured 0.5 m from the diffuser.

Theatre diffuser CCU

Description

CCU is a circular displacement diffuser for installation under seats in theatres, auditoriums, etc. The diffuser is supplied with a circular connection. The diffuser can be supplied with a fixed resistance, adapted to the correct air volume and pressure, specified according to the actual conditions.

- Circular connection with Lindab Safe.
- The diffuser can be supplied with a fixed resistance at a specified pressure setting.
- The diffuser is available in other dimensions.

Maintenance

The front plate of the diffuser can be removed to enable cleaning of the internal components. The visible parts of the diffuser can be wiped with a damp cloth.

Materials and finish

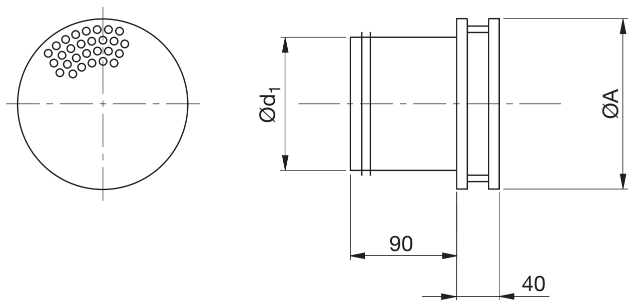
Diffuser:	Galvanised steel
Front plate:	1 mm galvanised steel
Standard finish:	Powder-coated
Standard colour:	RAL 7040 - grey, gloss 30
	RAL 9010 - white, gloss 30

The diffuser is available in other colours. Please contact Lindab's sales department for further information.

Order code

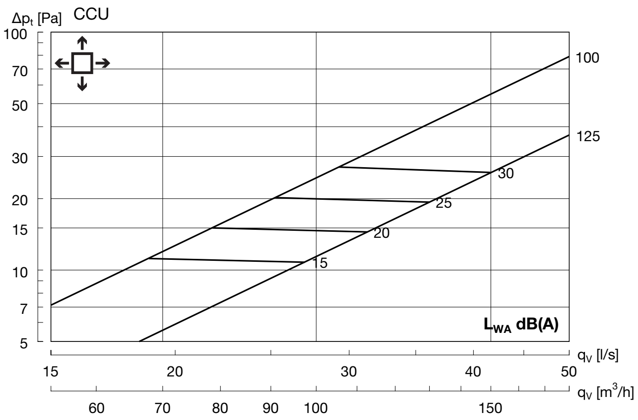
Product		CCU	a	bbb
Type				
Colour	RAL 7040 - grey	0		
	RAL 9010 - white	1		
	Special colour	2		
Size				

Dimensions



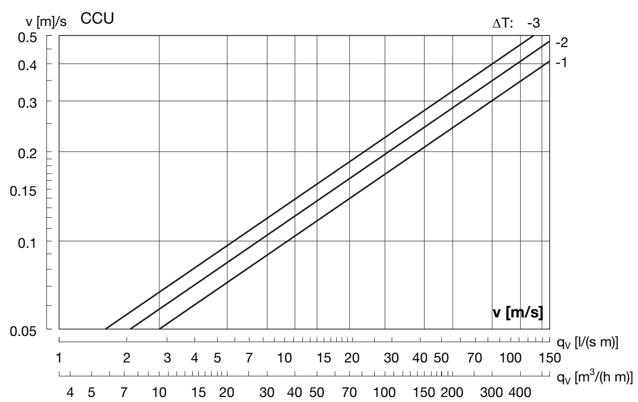
Size	ØA mm	ØD1 mm	Weight kg
100	140	100	0,40
125	160	125	0,50

Pressure, sound level



Size	63	125	250	500	1K	2K	4K	8K
100	10	1	-2	-3	-3	-11	-19	-29
125	9	-1	-2	-3	-3	-12	-20	-19

Near zone



The speed is measured 0.5 m from the diffuser.

Low impulse

CBAL, LEO pharma, Ballerup

Low-impulse supplied air

At low-impulse supplied air, cooling temperature air is added at a low velocity from either ceiling- or wall mounted diffusers. That way, the clean air will partially displace the contaminated air. The need for this type of supplied air method usually arises when the environment and health issues demand supplied air as a substitute for the air which is exhausted by fume cubboards, cooking hoods or other types of exhaust diffusers. This often results in air changes up to 50 times per hour.

With an air change that high, it will not usually be possible to use diffusers based on the traditional mixed ventilation without creating draughts. The supply air method with low impulse is different from the traditional supplied air diffusers, and helps to ensure short air throws and limited velocities in the occupied zone. In order to avoid draughts it is however a pre-requisite that air with a limited cooling temperature (-3 to -4 K) is added. Despite the limited cooling temperature, the large air change will normally result in an unproblematic removal of the thermal load.

Large selection

Lindab offers a large selection of low-impulse diffusers for visible mounting in the ceiling on on the wall. Likewise, the product-programme contains square and circular perforated diffusers for mounting in suspended ceilings with or without plenum boxes type MBA (see chapter on ceiling diffusers). These diffusers have in common, that Lindab in many instances adapts the diffuser for a specific ceiling system or in other ways adapts the diffuser to the constructual or architectual room conditions. In this chapter we will show some of the varieties Lindab has delivered as an inspiration.

CBAV, diffuser

Low impulse

Planning guide

The planning guide below is made for rooms with up to 4 metres room height.

Sound power level and total pressure

Sound power level L_{WA} and total pressure loss can be read in the diagrams, which are shown in connection with product-documentation.

Recommended maximum air flow

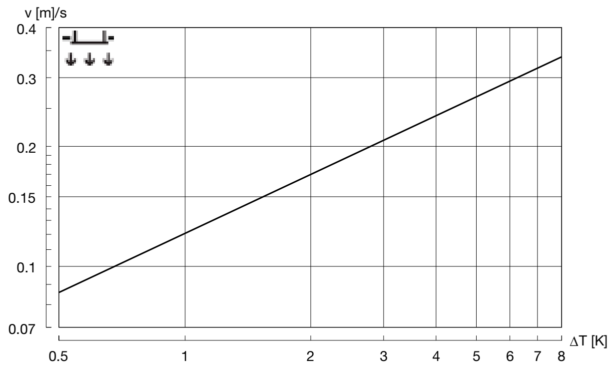
Please note the schedule below for the individual products.

Produkt	q_{max} recommended m³/h	q_{max} recommended l/s
CBAL-1200	1000	278
CBAL-1800	1600	444
CBAV-1200	800	222
CBAV-1800	1200	333
PS-1V/H-L-160	190	53
PS-1V/H-L-200	190	53
PS-1V/H-L-250	300	83
PS-1V/H-L-315	450	125
PC-6-L-125	135	38
PC-6-L-160	230	64
PC-6-L-200	230	64
PC-6-L-250	300	83
PC-6-L-315	300	83

Vertical temperature gradient

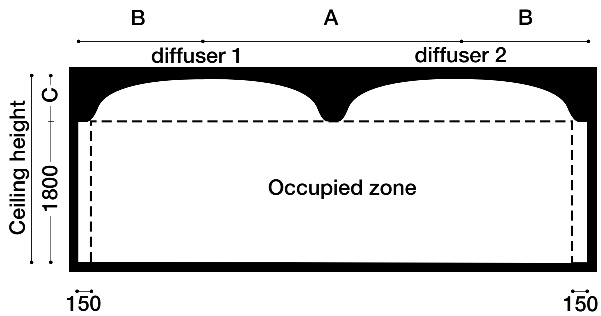
When air is supplied at a cooling temperature of up to –6K it will not be possible to register temperatures higher than - 1K lower than the surrounding room temperature, within the diffusers air diffusion area. This is the case no matter the air flow.
The tolerance level for the temperature is +/- 0,5 K.

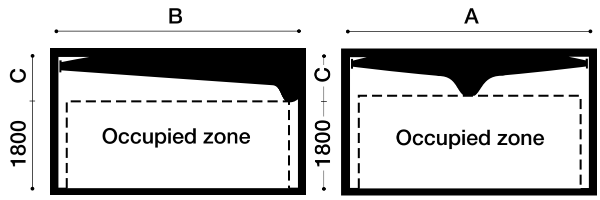
Velocities in the occupied zone



Please note that for the diffusers PS-1 and PC-6 the diagram is only valid, if the minimum distance between the diffusers is enforced as described in the formula below:

$L_{0,2}$ < A/2+C (see chapter on theory for more information)

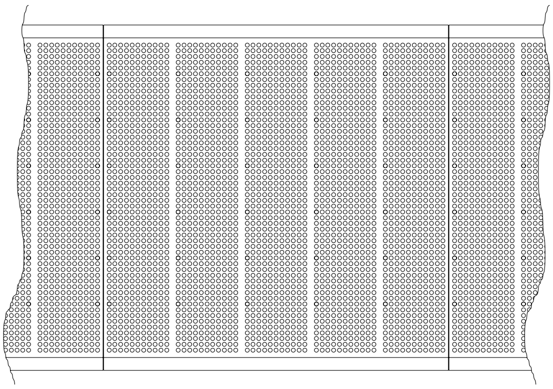




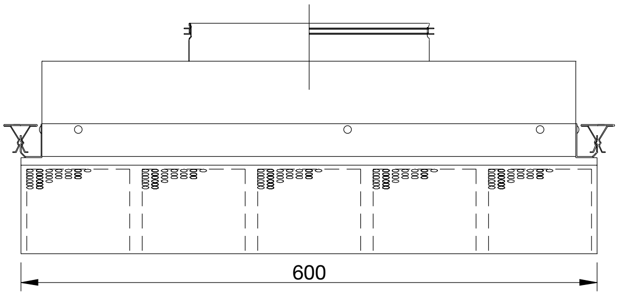
Low impulse

Types of CBAL

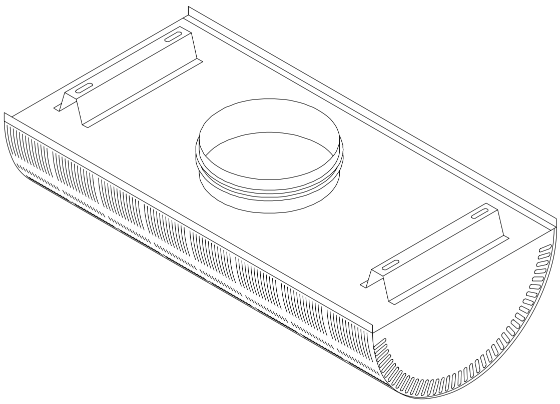
Lindab offers a variety of standard products. On this page we will show a small selection.

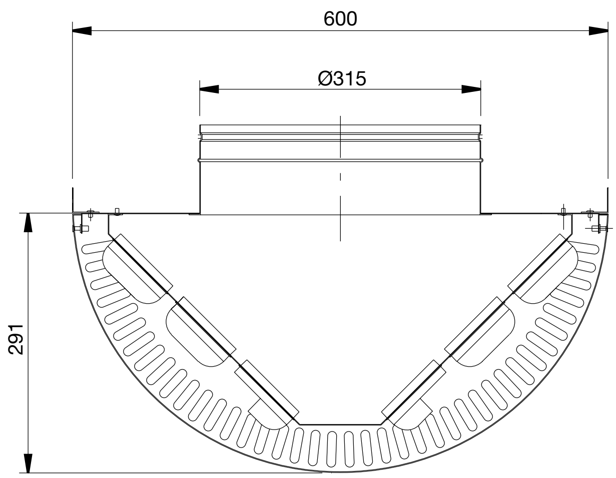


Continuous mounting



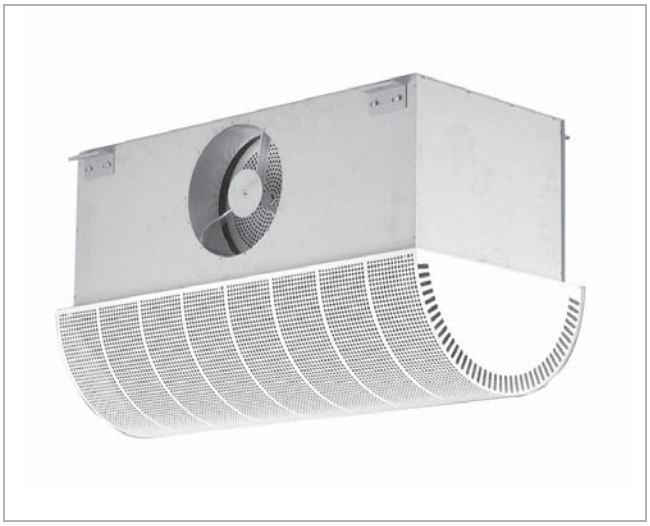
CBAL adapted to 600x600 ceiling systems is used directly in the air duct with moderate velocities, which in principle will function as a pressure chamber. Diffusers are available as 1, 2 or 3 module sections, which can be combined as needed. The diffuser is delivered with built-in resistance, so that adjustment of the individual diffusers is not needed. The individual diffuser can be made inactive by closing. It is possible to “move the air” and obtain a great deal of flexibility when furnishing the room.





CBAL without plenum box is used, when there is a need for a lower building height. The diffuser is usurally mounted directly in an air duct placed above the diffuser. The diffuser is available in a length of 1200,1800 in addition to 2400 mm with 1 and 2 piece ø315 connections and 2 x ø400 connections respectively. The diffuser is also adaptable to most ceiling systems.

Perforated diffuser CBAL

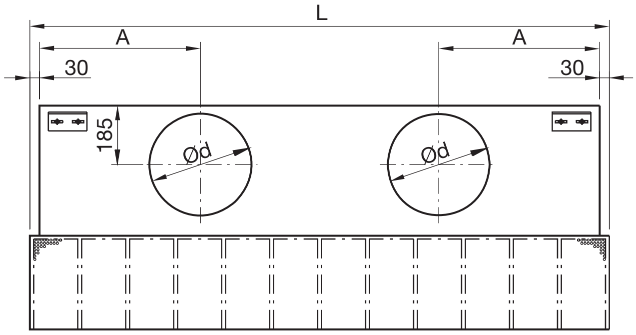


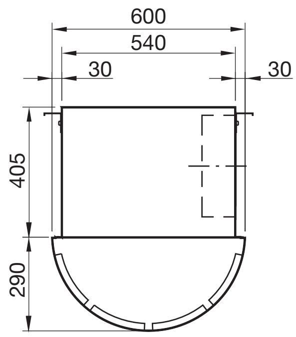
Description
CBAL is a low-impulse diffuser for ceiling installation. The diffuser is suitable for the supply of replacement air in laboratories, commercial kitchens, etc. The diffuser is equipped with adjustable nozzles behind the perforated face plate, allowing the dispersal pattern to be adjusted according to the conditions.

Maintenance
The face plate and nozzle tray can be removed from the diffuser to enable cleaning of the nozzles. The visible parts of the diffuser can be wiped with a damp cloth.

Dimensions

L Size mm	A mm	ØD mm	Number of connections
1200	570	315	1
1800	500	315	2





Order code

Product	CBAL	bbbb
Type		
Size	1200	
	1800	

Materials and finish
Material: Galvanised steel
Nozzles: Black ABS plastic
Standard finish: Powder-coated
Standard colour: RAL 9010 Gloss 30

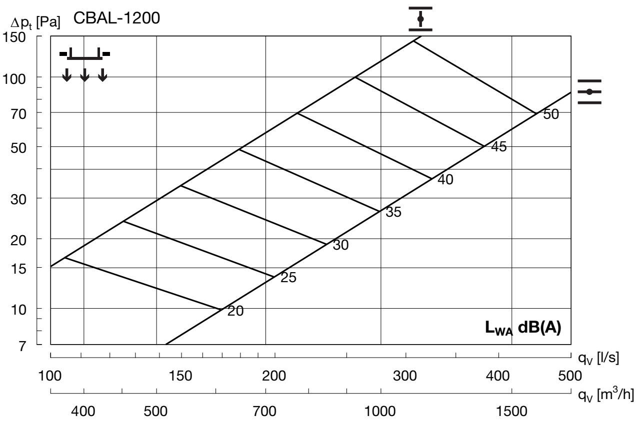
The diffuser is available in other colours. Please contact Lindab's sales department for further information.

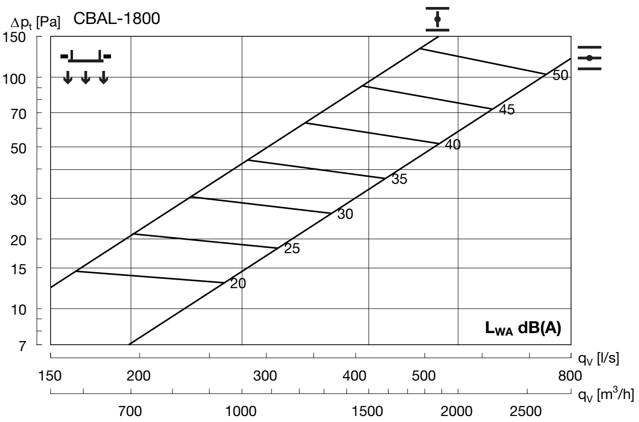
Perforated diffuser CBAL

Technical data

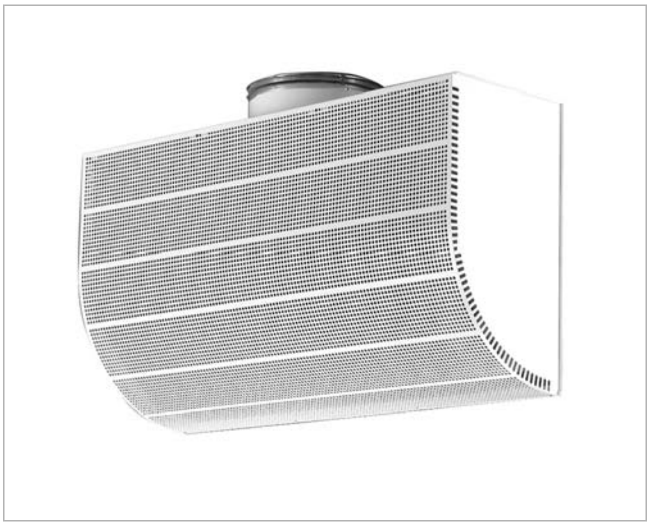
Supply air

CBAL





Perforated diffuser CBAV



Description

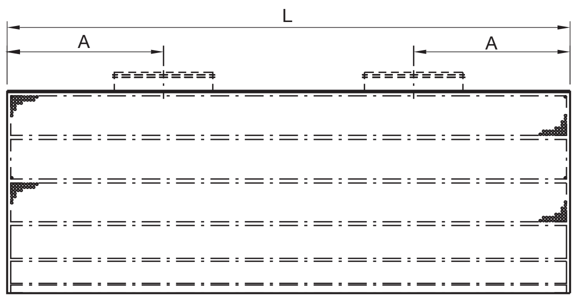
CBAV is a low-impulse diffuser for ceiling installation against a wall or skirt. The diffuser is suitable for the supply of replacement air in laboratories, commercial kitchens, etc. The diffuser is equipped with adjustable nozzles behind the perforated face plate, allowing the dispersal pattern to be adjusted according to the conditions.

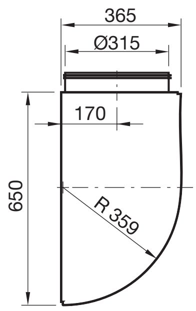
Maintenance

The face plate and nozzle tray can be removed from the diffuser to enable cleaning of the nozzles. The visible parts of the diffuser can be wiped with a damp cloth.

Dimensions

L Size mm	A mm	ØD mm	Number of connections
1200	600	315	1
1800	500	315	2





Order code

Product	CBAV	bbbb
Type		
Size 1200 / 1800		

Materials and finish

Material: Galvanised steel
Nozzles: Black ABS plastic
Standard finish: Powder-coated
Standard colour: RAL 9010 Gloss 30

The diffuser is available in other colours. Please contact Lindab's sales department for further information.

Perforated diffuser CBAV

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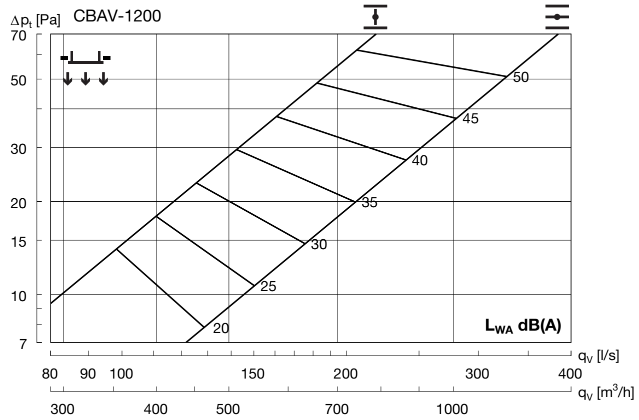
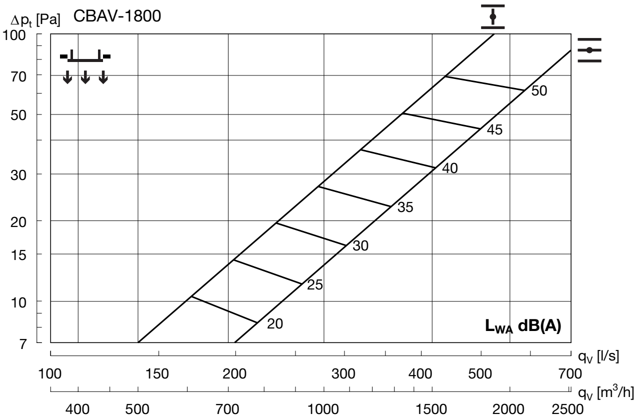
Technical data

Supply air

CBAV





VAV

VAV

VAV units

VAV

LKPV, IBM, Aarhus.

Optimized usage

Ventilation makes up considerable part of energy costs in the daily usage of the building. At the same time authorities have several requirements concerning how much energy is to be spent on ventilation. In pretty much all types of systems, it consequently makes good sense to use some sort of VAV, making it possible to reduce the air volume depending on the need in each individual room. The reduction of air volume in connection with transport of the air, in addition to the energy needed to cool/heat the outer air, will reduce costs.

Besides saving money on the energy, it also makes it possible to maintain a desired temperature in the individual room at varying loads. Through documented research and testing, it has turned out that there is a specific connection between the operative temperature in the room and the people's productivity. If the temperature in the room is not right, the productivity will fall, which in many instances will mean an economical loss to the individual users of the construction.

With these parameters taken into consideration, there is no doubt that VAV, despite the more expensive one-off investment, will pay for itself in the long run.

Complete programme

Lindab's series of VAV products include several types of supply air diffusers with motorized dampers, in order to reduce the air volume from 100% to 0 %. At the same time a constant air throw is ensured, in order to maintain the Coanda effect and avoid the risk of the air dropping in the occupied zone. Likewise, air flow regulators are available to regulate zones, in addition to motorized dampers for pressure regulation in the distribution ducts. Furthermore room regulator REGULA Combi and pressure regulator PR are available as well.

VRU / FRU

VAV

General information on VAV

VAV is short for ”Variable Air Volume”. VAV is a demand-controlled ventilation, to be used when the loads in a building vary. In rooms with changing numbers of people, a more satisfactory air quality can be ensured by regulating the air flow in relation to CO_2 concentration, which is a good indicator of air quality. It is however often the heat load, such as people, computers and sun, that is dimensioning the ventilation need in a room. These heat loads will almost always vary throughout the day and the night. By maintaining a constant supply air temperature, lower than the room temperature and instead regulate the air flow in ratio to the desired room temperature, the demand-controlled ventilation will cancel out the heat load.

The variations in airflow are brought about by a duct-damper or by motorized supply air diffusers with a damper function.
VAV-units can be produced for both with displacement ventilation and mixed ventilation.

Description of regulation types

In VAV-units, it is a pre-requisite that the fans can be speed-controlled.
Furthermore the VAV-unit must be divided into zones, typically one zone for each distribution air duct. These zones can be identified from two different principles. The airflow regulation or pressure regulation.

Airflow regulation

With airflow regulation, it is the airflow / air volume in the distribution air duct which is measured and regulated. The airflow is set to be able to vary between a pre-programmed minimum and maximum airflow. An electronic signal from a sensor (temperature, CO_2, movement) or CTS regulates the airflow within the set minimum and maximum airflow limits.

In airflow regulation, the right airflow will be achieved even when the pressure conditions in the air duct are changing, since the airflow regulator is independent of the pressure (and only requires a minimum pre-pressure).

This type of regulation is usually used for zone-regulation in connection with diffusers without dampers in mixed- or displacement systems. If mixed ventilation units without dampers are used, and the temperature difference is high. (ΔT = -8 to 10 K) between supply air and room air, the attention should turn to the risk of cold-drops from the supply air diffusers.

Since the airflow should be measured, there is a minimum limit on the airflow regulator. The minimum airflow must not be set lower than the measurement limit for the velocity of approx. 1.75 m/s. Airflow regulation can be used in the distribution air duct both for supply air and exhaust, either with a parallel signal from a sensor or CTS or with a Master/Slave function. If for example an over- or under pressure in a room is desired, with respect to the surroundings, a Master/Slave function is advisable.

Pressure regulation

Normally it is the distribution air duct on the supply air side which is regulated for pressure. A pressure regulation entails that a constant static pressure is maintained in the air duct. The static pressure is measured by a probe mounted inside the air duct. The probe is connected by a pipe to an electronic unit (pressure regulator) which registers the static pressure in the air duct with a membrane sensor unit.

For units with motorized supply air diffusers there should be a pressure regulation in the distribution air duct, since the diffusers are set and calibrated for a certain airflow variation at a given pressure. Furthermore the pressure regulation ensures that the correct pressure loss over the diffusers is reached, and consequently unwanted diffuser noise is avoided at a minimum airflow.

If instead, un-motorized diffusers are used, and airflow variations are made from motorized dampers in the air duct, a pressure regulation in the distribution air duct will ensure stable pressure conditions in the zone, and therefore good conditions for controlling these air duct dampers.

No matter the unit type however, the pressure loss in the zones distribution air duct has to be taken into consideration, in order to obtain a similar if not identical pressure at all branches to the connection ducts. As a general rule, the pressure loss in the distribution air duct from the first branch to the last branch should not exceed approx. 40 % of the static pressure.

In principle it is possible to obtain an airflow variation from 0-100% using air pressure regulation. The variation is solely dependent on which dampers or VAV-units are being used.

Pressure regulation of a distribution air duct using the supply air diffuser can be combined with an airflow regulation of the exhaust air. Using the Master/Slave principle and measuring the airflow /air volume, in the supply air, the signal for the measured airflow can be used as a signal to the airflow regulator on the exhaust air. That way it is definite that the same volume of air will be removed from a VAV-zone as the volume supplied.

A more simple, but less precise method to secure the same volume of air in and out of the VAV-zone, is to use a mechanical slave-control of the exhaust-damper, which takes the same position as the supply air-damper. Regulation of the exhaust-damper happens by a simple electronic adjustment, when the turning angle has been determined.

VAV

Choice of regulation type

In smaller zones, with a clear pressure conditions (not too long supply air ducts) both in supply air and exhaust air, a VAV-system with a pressure regulation of the distribution air ducts is preferable. If motorized VAV-diffusers are required, a pressure regulation of the zone is necessary.

For units with widely varying pressure conditions, we instead recommend an airflow regulation of each zone.

In zones with longer distribution air ducts, eg. big office spaces, where not much variety happens in the thermal loads, airflow regulation will be preferable.

Airflow regulation

+ full control over airflow
+ measuring of actual airflow
+ signal to CTS about airflow
+ no airflow variations at pressure variations in the air duct system
- minimum airflow limited to 1.75 m/s
- demands special equipment to change settings (compact model)

Pressure regulation

+ very low minimum airflow
+ can be set without the help of tools
+ levels pressure variations from the system in the VAV-zone
+ ensures a low noise level for diffuser and dampers
+ possibility of combination with CAV
- no airflow control
- small pressure loss in distribution air duct is important

Choice of diffuser

Mixed ventilation

1) Motorized supply air diffusers

Advantages:
Built-in damper function, and no extra dampers necessary. Constant air throw despite varying airflow, resulting in good mix even at minimum airflow. Also suitable for supply air at cooling temperature.

Limitations:
Owing to sound generation in the diffuser, the duct pressure must be maintained at a constant (relatively low) level.

2) Non-motorized supply air diffusers

Advantages:
Simple diffusers without moveable parts.
Low sound level particularly at reduced air flow.

Existing systems can be changed to VAV without change of diffuser.
No electrical installations needed for diffusers.
More diffusers can be controlled by one motor damper.
Shut-off is possible with duct damper or airflow regulator.

Limitations:
Minimum airflow should not be chosen less than 50% for perforated or unperforated diffusers, and 40% for swirl diffusers, if cooling supply air is used at a temperature difference of (ΔT = -8 to -10 K) between supply air and room air.

Displacement ventilation

All displacement units are suitable for VAV-systems. The units should be dimensioned for the maximum airflow, where the biggest near-zones and the highest sound levels arise. When the airflow is reduced, so is the near-zone and the sound level. Consequently there is no lower limit to the size of minimum airflow, which is why an airflow variation from 0-100% is possible.

Possible consequences should be evaluated in each case.

VAV

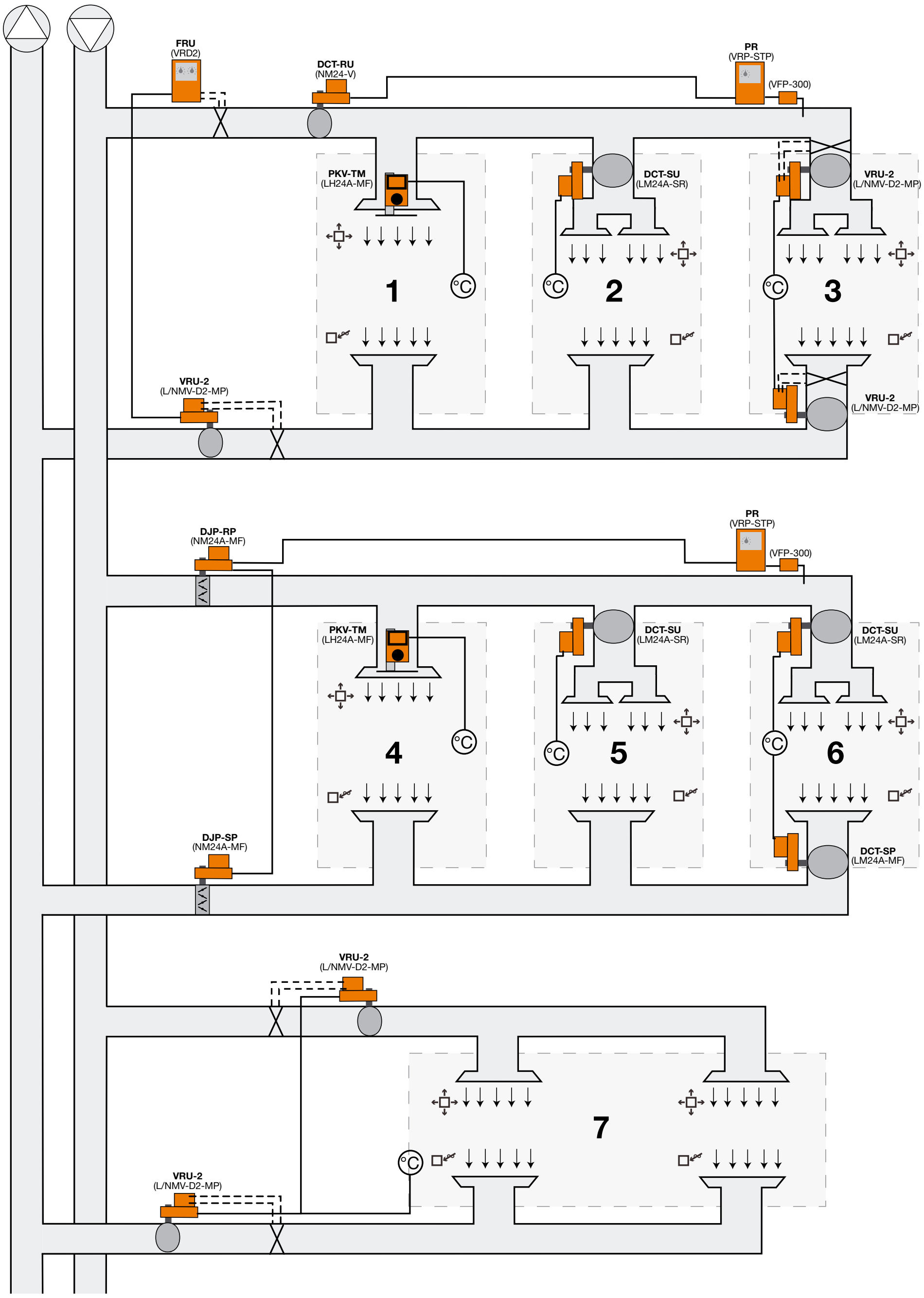
Component qualities

SUPPLY AIR		Airflow control	Pressure control	
		VRU	VAV-unit	Damper
Measurement of airflow - airflow signal to CTS		yes	no	no
Linear functions		yes	no	no
Reliability of airflow		yes	dependent on pressure variation	dependent on pressure variation
Limitation of airflow	max:	yes (standard up to 7 m/s)	pressure dependent	pressure dependent
	min:	yes (standard of 1.75 m/s)	approx. 20% of max. (standard)	damper angle
Shut-off possible		yes	no	yes
Constant airthrow (only mixed ventilation)		no	yes	no
Balancing		not necessary (diffusers are controlled)	by setting of static pressure or damper-position	by setting of static pressure or damper-position

EXHAUST AIR	Airflow control	Mechanical slave control
	VRU	Dampers
Requirements for supply air	VRU/FRU	motor for slave control
Measurement airflow (exhaust) - air flow signal to CTS	yes	no
Reliability of airflow	yes	highly pressure dependent, therefore inaccurate
Control of over pressure, under pressure or pressure balance in room	yes	no
Balancing	not necessary (diffuser controls)	by setting of static pressure or damper-position

VAV

System descriptions



Explanations of units

PR: Pressure regulation incl. pressure sensor	DCT-RU: Regulator controlled motorized damper
FRU: Measuring device	DCT-SU: Modulating motorized damper
VRU-2: Airflow regulator (compact model)	DCT-SP: Modulating motorized damper, to be programmed
PKV-TM: Motorized VAV-unit	DJP-RP: Regulator controlled motorized damper, to be programmed
°C: Regula Combi	DJP-SP: Modulating motorized damper, to be programmed

VAV

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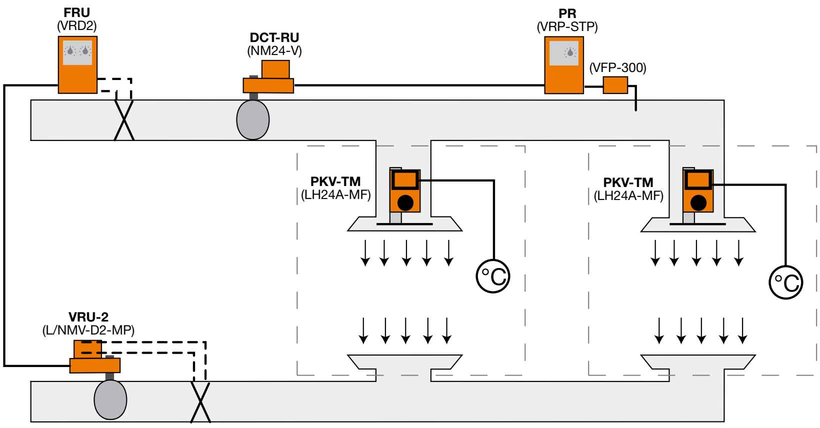
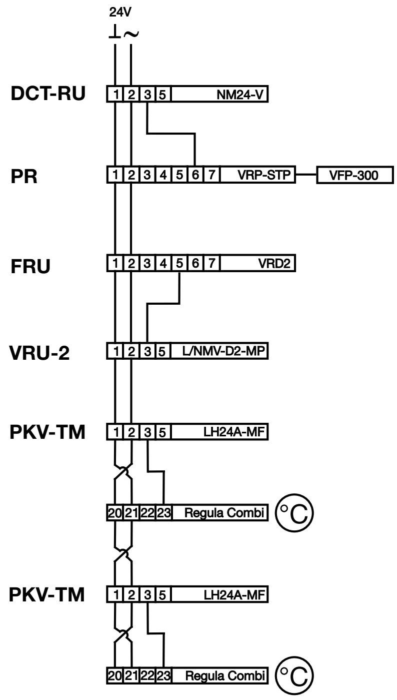
System 1

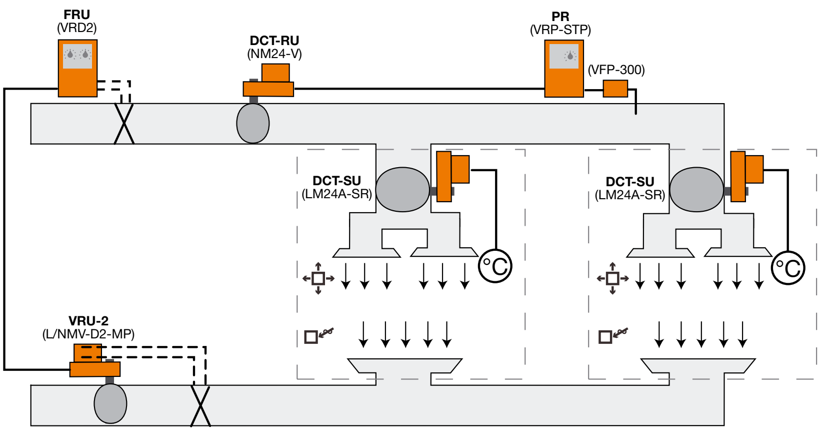
The supply air in the zone is pressure regulated. For details, see section “Pressure regulation”, page 500, under “Description of regulation types”.
The supply air to the rooms is carried through motorized VAV-units controlled by Regula Combi.
Exhaust in the zone is regulated with an airflow regulator, connected by a Master/Slave connection to a measuring device in the supply air, which measures the airflow. That way the same airflow is ensured going in or out of the zone, or a percentage difference if desired.

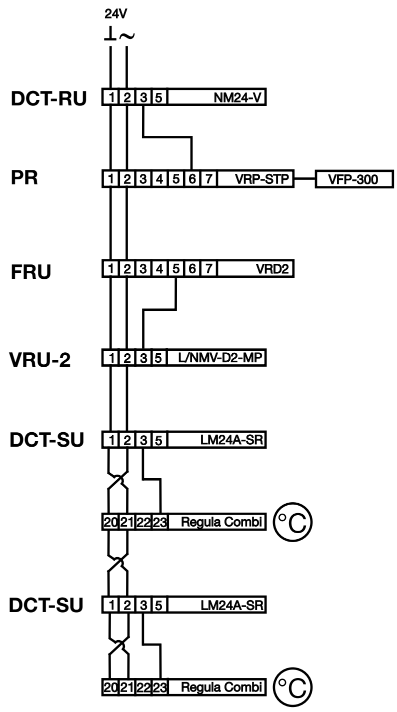




System 2

The supply air in the zone is pressure regulated. For details, see section “Pressure regulation”, page 500 under “Description of regulation types”.
The supply air to the rooms is carried through non-motorized diffusers. The air flow variation is obtained by Regula Combi controlling the damper in the distribution ducts, so that more diffusers can be controlled by a single motorized damper.
The exhaust air in the zone is regulated by an air flow regulator connected to a Master/Slave connection to a measuring device in the supply air duct, which measures the air flow. That way the same airflow is ensured going in or out of the zone, or a percentage difference if desired.

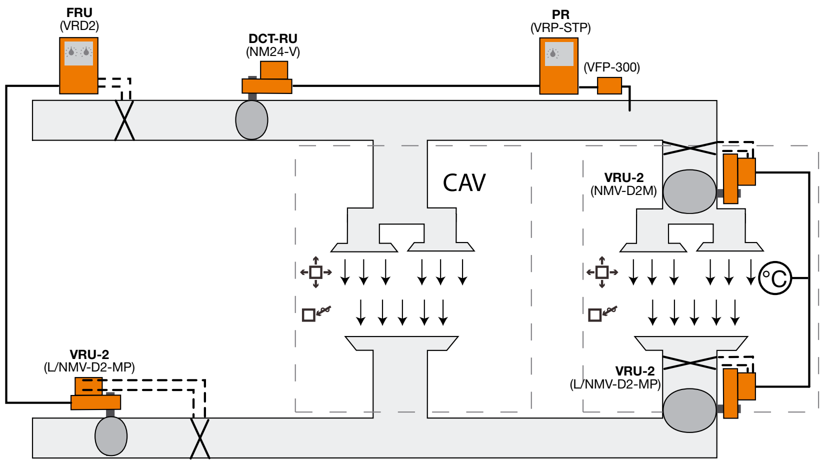


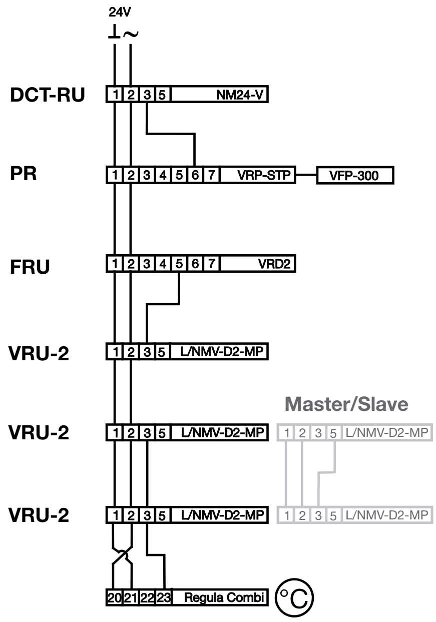


VAV

System 3

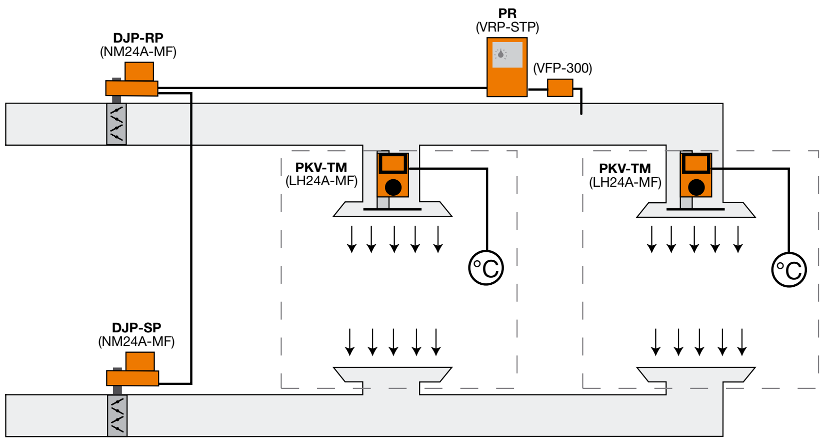
The supply air in the zone is pressure regulated. For details, see section “Pressure regulation”, page 500 under “Description of regulation types”.
Supply air to the rooms is carried by non-motorized diffusers. In the right-hand room the air flow variation is obtained by the Regula Combi controlling the airflow regulators in the distribution duct for both supply air and exhaust. In the left-hand room there is a constant air flow (CAV), which is possible due to the supply air duct being pressure regulated. Possible pressure changes caused by the air flow regulators in the right room will be regulated in the supply air duct.
Exhaust air in the zone is regulated by an airflow regulator, connected to a Master/Slave connection to a measuring device in the supply air, measuring the airflow. That way the same airflow is ensured going in or out of the zone, or a percentage difference if desired.

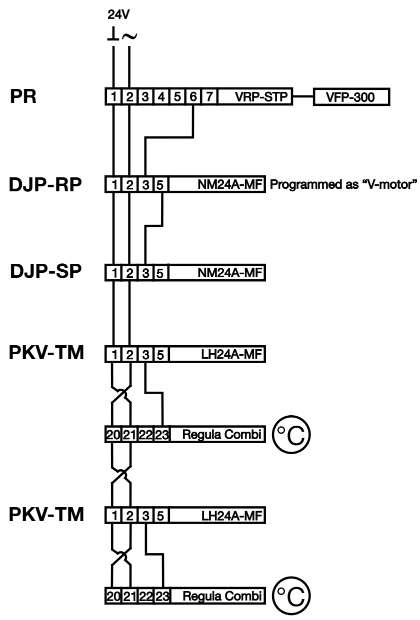




System 4

The supply air in the zone is pressure regulated. For details, see section “Pressure regulation”, page 500 under “Description of regulation types”.
The pressure regulation damper is supplied with a motor to be programmed, whose signal gives information about the damper position.
The supply air to the rooms is carried through motorized VAV-units, controlled by Regula Combi.
The exhaust in the zone is controlled by a damper by “mechanical slave control” which means that the exhaust damper takes the same position as the supply air damper. Regulation of the exhaust air flow happens by simple electronic control, when the turning angle has been set.

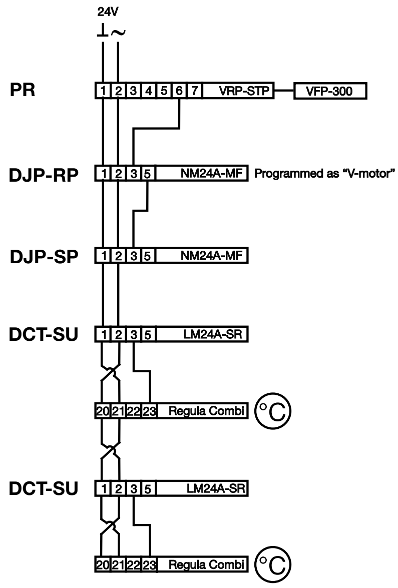


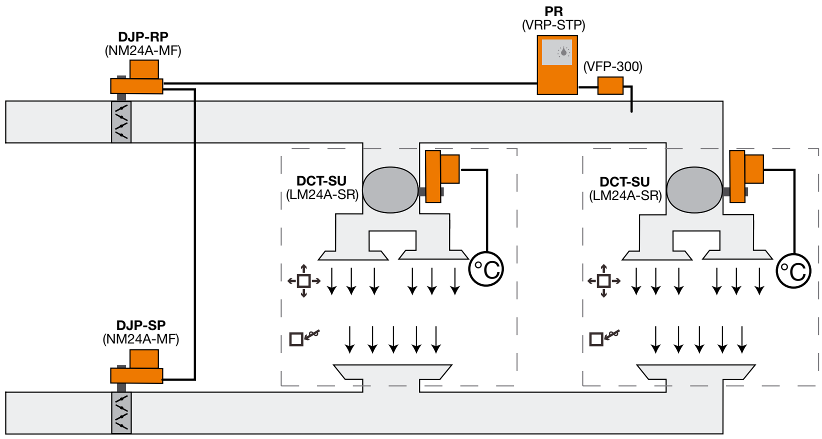


VAV

System 5

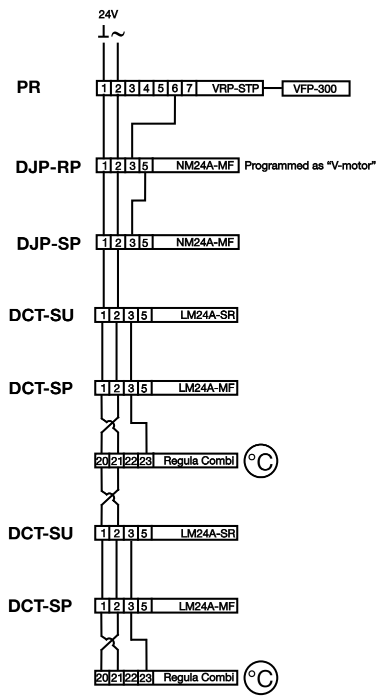
Supply air in the zone is pressure regulated. For details, see section “Pressure regulation”, page 500 under “Description of regulation types”.
The pressure regulation damper is supplied with a motor to be programmed, and whose signal gives information about the damper position.
Supply air to the rooms is carried through non-motorized diffusers. The airflow variation is obtained by the Regula Combi controlling the damper in the distribution ducts, so that more diffusers can be controlled by a single motorized damper. The exhaust in the zone is controlled by a “mechanical slave control”, which means that the exhaust damper takes the same position as the supply air damper. Regulation of the exhaust airflow happens by simple electronic control, when the turning angle has been set.

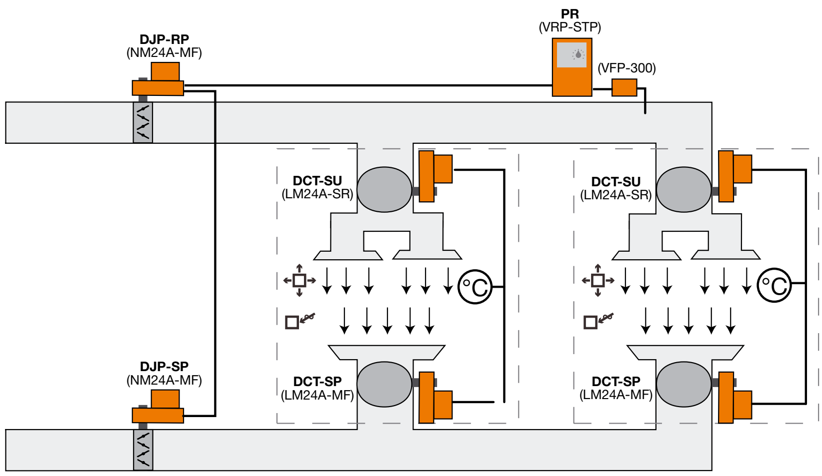




System 6

The supply air in the zone is pressure regulated. For details, see section “Pressure regulation”, page 500 under “Description of regulation types”.
The pressure regulation damper is supplied with a motor to be programmed, whose signal gives information about the damper position.
Supply air to the rooms is carried by non-motorized diffusers. The airflow variation is obtained by the Regula Combi controlling the damper in the distribution ducts, so that more diffusers can be controlled by a single motorized damper. Parallel to this the Regula Combi controls dampers in the exhaust, to be regulated with a simple electronic control, when the turning angle has been set.
The exhaust air in the zone is controlled by a damper by “mechanical slave control”, which means the exhaust damper takes the same position as the supply air damper. Regulation of the exhaust airflow happens by a simple electronic control when the turning angle has been set.

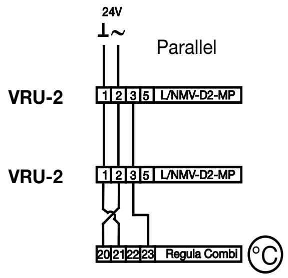


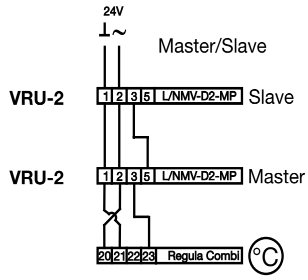


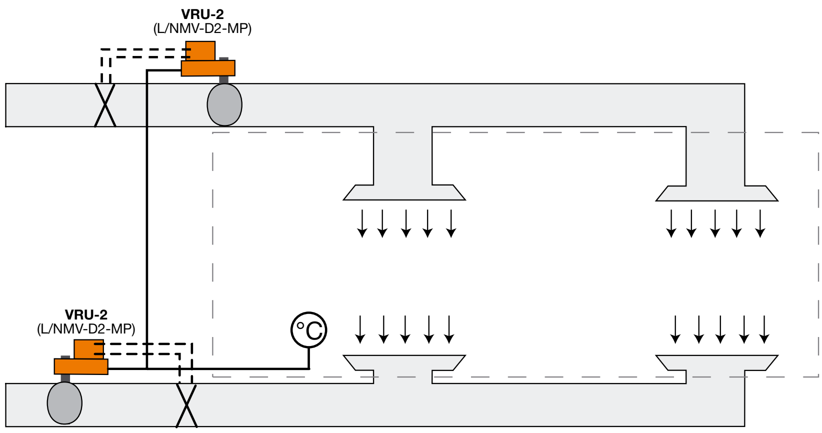
VAV

System 7

Both supply air and exhaust air in the zone are airflow regulated. For details see section “Airflow regulation”, page 500 under “Description of regulation types”. Diffusers for supply air and exhaust air are normal diffusers. The temperature in the zone is maintained by the signal from Regula Combi which is used as a parallel signal to the airflow regulators in supply and exhaust air.
Using this connection, the same airflow can be ensured in and out of the zone or with a constant difference between supply and exhaust air. If instead a percentage difference is wanted, a Master/Slave connection must be used.







VAV diffuser

PKV

Description

PKV is a square PKA type diffuser with integrated motor for supply air of variable air volume (VAV). The integrated motorized damper ensures a constant throw so the Coanda effect always is maintained. The damper setting can be controlled by a room regulator, BMS or other 2-10 V control signal.

- Can vary the volume flow between 0-100 %
- Min. flow preset from factory *)
- Max. flow to be set in MBB box based on k-value
- Settings can be changed with ZTH-GEN or Belimo PC-tool
- VAV zone pressure must be controlled
- The diffuser must be installed together with an MBB-S type plenum box
- For exhaust PKA can be used

*) Min. setting and k-value are made from a pre-defined, available constant pressure in the air duct immediately before the diffuser. The diffuser is typically used at a constant pressure of 30-50 Pa.

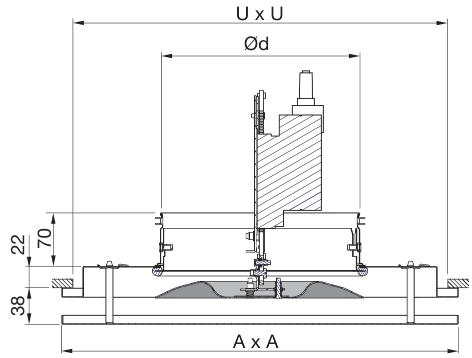
Order code

Product	PKV	aaa	bb	cc	dd
Type					
PKV	PKV				
Dimension					
Ø160-315		aaa			
Flow settings					
Min. airflow			bb		
Max. airflow				cc	
Pressure					dd

Example: PKV-200 - 15 l/s - 60 l/s - 40 Pa

When ordering, MBB plenum type must be specified.

Dimensions



PKV Ød mm	A mm	U * mm	Weight (kg) (with Motor)
160	295	260	3,3
200	395	360	4,3
250	495	460	5,7
315	595	560	7,2

U x U = Ceiling grid opening

Maintenance

The face plate and damper insert can be removed to enable cleaning of internal parts or to gain access to the duct or box. The visible parts of the diffuser can be wiped with a damp cloth.

Materials and finish

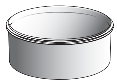
Diffuser:	Galvanised steel
Diffuser finish:	Powder-coated
Standard colour:	RAL 9010, gloss 30
Motor:	Manufact. Belimo type LH24A-MF

Other colours are available. Please contact Lindab's sales department for further information.

VAV diffuser PKV

Accessories

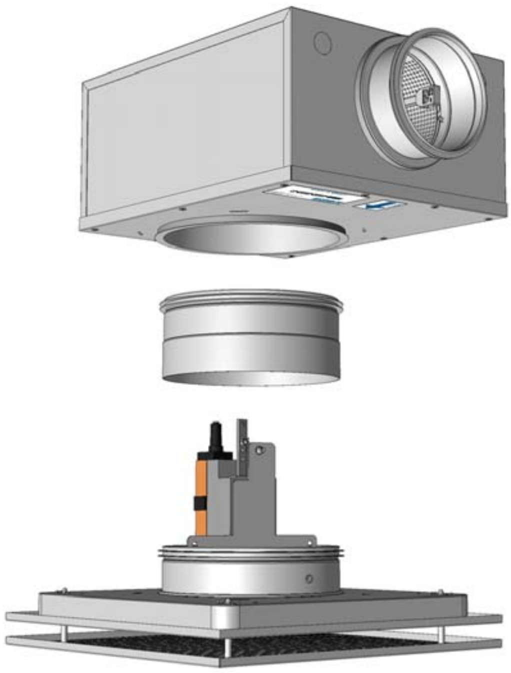
MBZ - Extension piece



Order code MBZ

Product	**MBZ**	**aaa**
Type		
MBZ	┘	
Dimension		
Ø160-315		┘

Example: MBZ-200



When PKV is used with small MBB plenums:

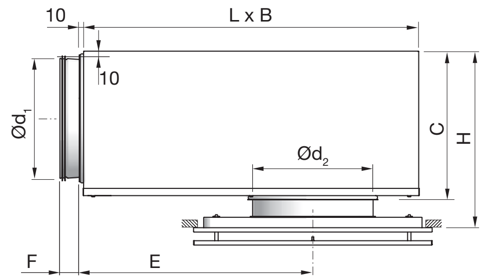
For the following MBB sizes, the MBZ extension piece must be used to ensure full movement of motor-rack.

Size: MBB-100-160-S
MBB-125-160-S
MBB-125-200-S

For other PKV accessories, see the section on Formo ceiling diffusers

MBB - Plenum box

PKV+MBB-S



PKV + MBB							
Duct	PKV	B	C	E	F	H*	L
$Ød_1$ mm	$Ød_2$ mm	mm	mm	mm	mm	mm	mm
100	160	260	159	216	50	200 - 240	310
125	160	310	184	262	50	225 - 265	376
125	200	310	184	262	50	225 - 265	376
160	160	380	220	323	50	259 - 299	459
160	200	380	220	323	50	259 - 299	459
160	250	380	220	323	50	259 - 299	459
200	200	460	259	396	70	300 - 340	565
200	250	460	259	396	70	300 - 340	565
200	315	460	259	396	70	300 - 340	565
250	250	540	309	486	70	350 - 390	698
250	315	540	309	486	70	350 - 390	698
315	315	540	373	646	70	415 - 455	858

* Using accessory MBZ the H dimension will increase:
$Ød_2$ = 160 - 200 mm => H + 40 mm
$Ød_2$ = 250 - 315 mm => H + 60 mm

Order code

Product	**MBB**	**aaa**	**bbb**	**S**
Type				
MBB	┘			
Duct connection $Ød_1$				
Ø100-315		┘		
Diffuser dimension $Ød_2$				
Ø160-315			┘	
Function				
S = Supply air				┘

Example: MBB-160-200-S

VAV diffuser

PKV

Technical data

Diagrams on this page apply to PKV supply. For exhaust air and supplementary technical exhaust data, see the section on Formo ceiling diffusers.

Capacity

Max. volume flow [l/s], [m^3/h], total pressure drop p_t [Pa], throw l_{02} [m] and sound effect level L_{WA} [dB(A)] can be seen in the diagrams.

Quick selection, supply air

Quick selection 30 dB(A)

PKV + MBB		30 dB(A)					
		30 Pa		35 Pa		40 Pa	
Duct	PKV	q_v		q_v		q_v	
Ød$_1$	Ød$_2$	l/s	m^3/h	l/s	m^3/h	l/s	m^3/h
100	160	28	100	28	100	29	104
125	160	37	133	37	133	37	133
125	200	45	162	48	172	49	176
160	160	42	151	42	151	42	151
160	200	64	230	62	223	62	223
160	250	73	262	73	262	73	262
200	200	67	241	66	237	65	234
200	250	85	306	84	302	83	298
200	315	99	356	100	360	99	356
250	250	91	327	91	327	91	327
250	315	112	403	112	403	112	403
315	315	115	414	112	403	110	396

Quick selection 35 dB(A)

PKV + MBB		35 dB(A)					
		30 Pa		35 Pa		40 Pa	
Duct	PKV	q_v		q_v		q_v	
Ød$_1$	Ød$_2$	l/s	m^3/h	l/s	m^3/h	l/s	m^3/h
100	160	28	100	30	108	32	115
125	160	39	140	42	151	43	154
125	200	45	162	49	176	52	187
160	160	48	172	49	176	49	176
160	200	64	230	70	252	75	270
160	250	73	262	79	284	84	302
200	200	75	270	78	280	78	280
200	250	95	342	97	349	98	352
200	315	108	388	115	414	116	417
250	250	104	374	104	374	105	378
250	315	126	453	128	460	129	464
315	315	139	500	137	493	135	486

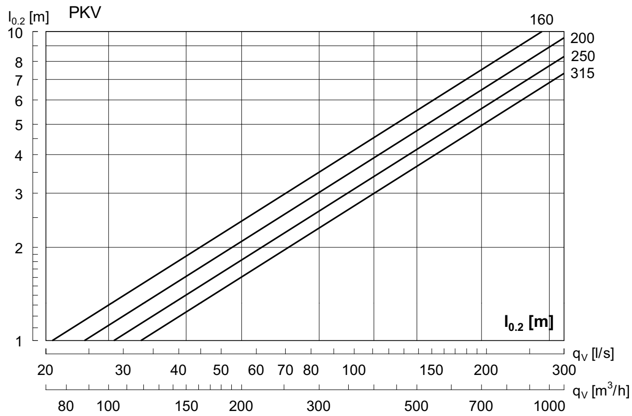
Sound attenuation

Sound attenuation of the diffuser ∆L from duct to room, including end reflection, see table below.

PKV + MBB		Centre frequency Hz							
Duct	PKV								
Ød$_1$	Ød$_2$	63	125	250	500	1K	2K	4K	8K
100	160	12	13	8	19	13	16	17	19
125	160	12	13	8	19	13	16	17	19
125	200	16	11	5	16	13	15	15	17
160	160	17	17	11	19	18	17	20	20
160	200	14	14	7	21	15	16	18	19
160	250	15	15	5	17	13	15	16	18
200	200	15	10	6	16	17	15	19	18
200	250	12	9	5	14	17	15	17	17
200	315	12	7	4	11	15	14	16	15
250	250	14	8	8	14	16	17	17	18
250	315	12	6	6	15	15	15	16	17
315	315	7	9	8	14	17	16	17	21

Throw

The throw is specified at a terminal velocity of 0.2 m/s.

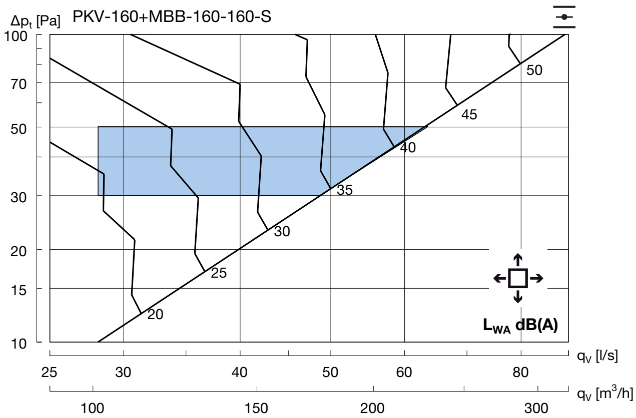


VAV diffuser PKV

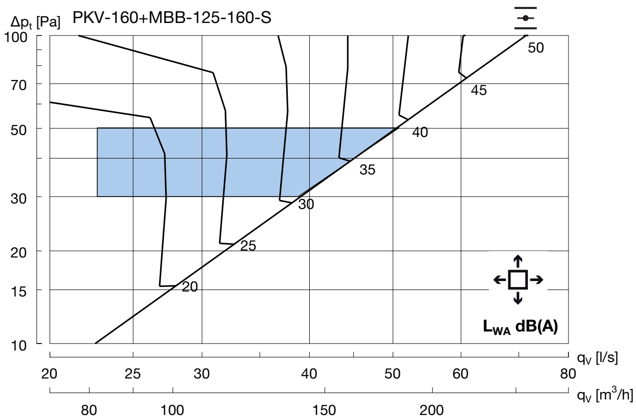
Technical data

Setting range for max. volume flow.

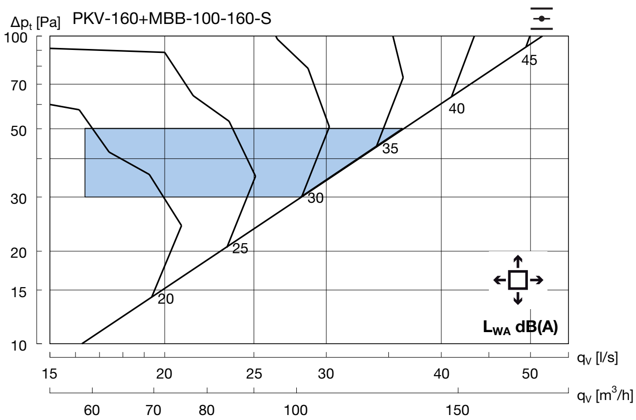
PKV-160 + MBB - Supply air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	7	9	-1	-5	-4	-11	-23	-32

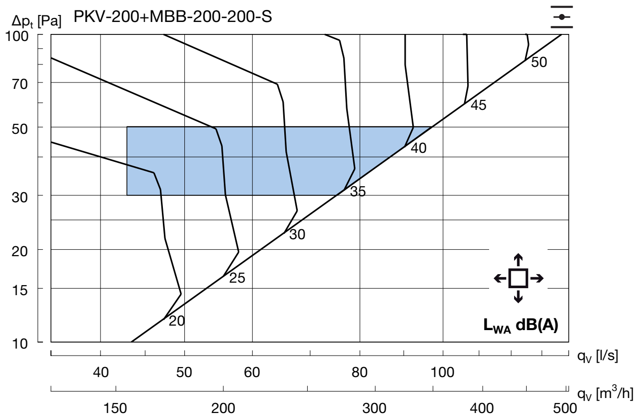


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	10	5	-1	-4	-3	-11	-22	-30

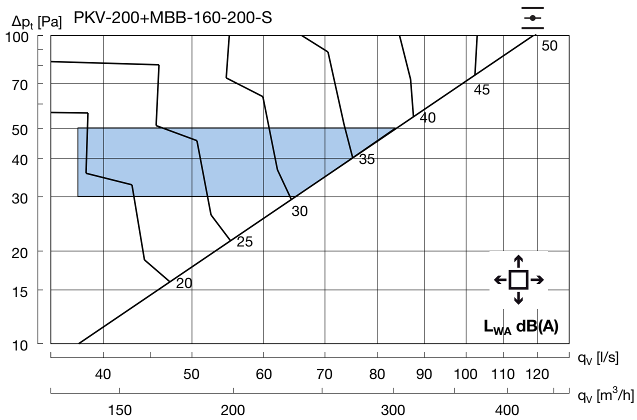


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	6	4	0	-5	-4	-8	-20	-25

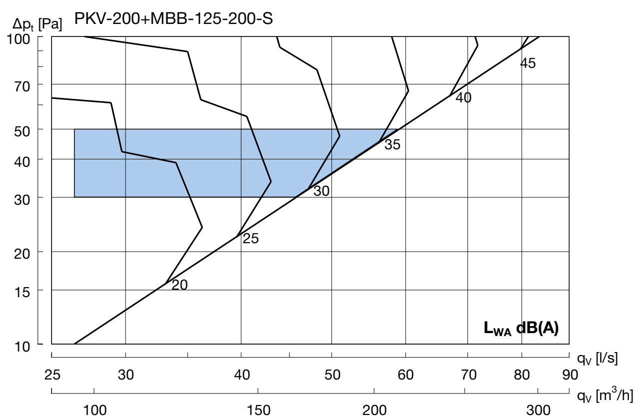
PKV-200 + MBB - Supply air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	12	9	0	-4	-4	-12	-22	-32



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	10	8	0	-5	-4	-11	-20	-26



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	11	7	0	-4	-4	-11	-17	-23

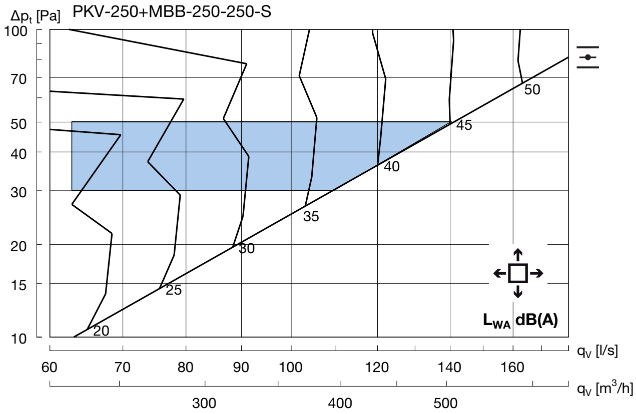
VAV diffuser

PKV

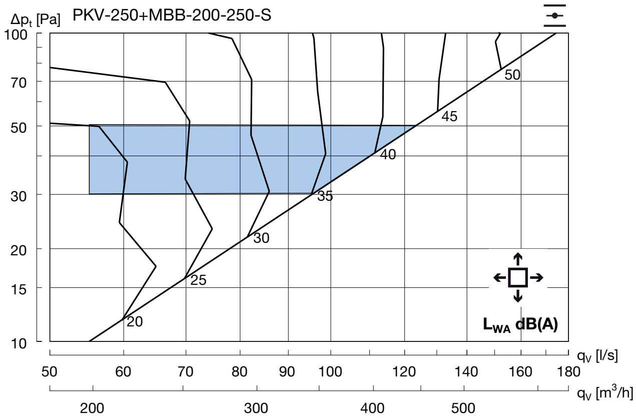
Technical data

Setting range for max. volume flow.

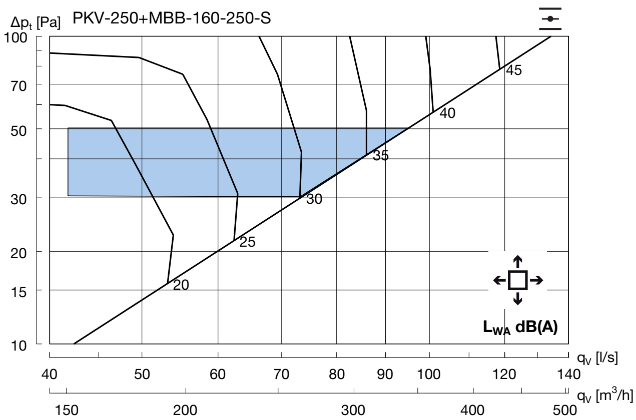
PKV-250 + MBB - Supply air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	10	6	-2	-3	-4	-11	-23	-31

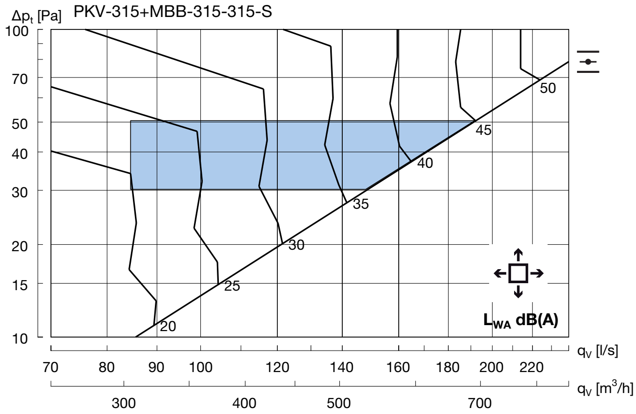


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	11	8	-2	-3	-4	-11	-22	-29

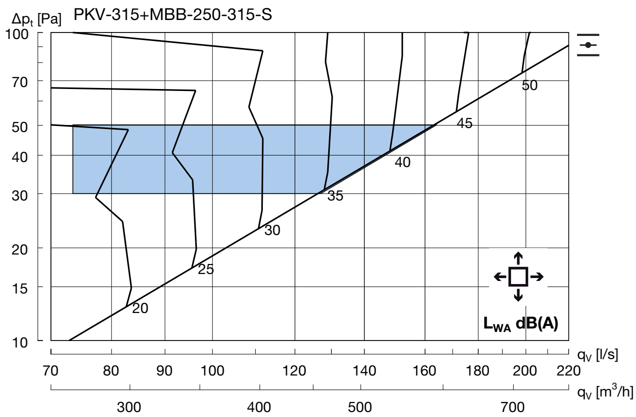


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	9	7	-1	-4	-4	-11	-18	-22

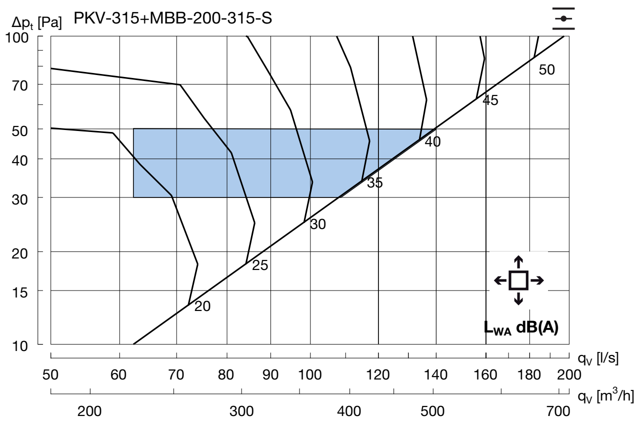
PKV-315 + MBB - Supply air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	10	4	-2	-2	-4	-11	-23	-32



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	13	7	-2	-2	-4	-12	-22	-30



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	12	9	-2	-4	-5	-10	-18	-26

1
2
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5
6
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9
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11
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18

VAV diffuser

PCV

Description

PCV is a circular PCA type diffuser with integrated motor for supply air of variable air volume (VAV). The integrated motorized damper ensures a constant throw so the Coanda effect always is maintained. The damper setting can be controlled by a room regulator, BMS or other 2-10 V control signal.

- Can vary the volume flow between 0-100 %
- Min. flow preset from factory *)
- Max. flow to be set in MBB box based on k-value
- Settings can be changed with ZTH-GEN or Belimo PC-tool
- VAV zone pressure must be controlled
- The diffuser must be installed together with a MBB-S type plenum box
- For exhaust PCA can be used

*) Min. setting and k-value are made from a pre-defined, available constant pressure in the air duct immediately before the diffuser. The diffuser is typically used at a constant pressure of 30-50 Pa.

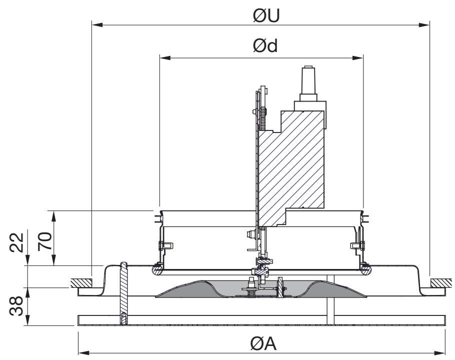
Order code

Product	PCV	aaa	bb	cc	dd
Type					
PCV					
Dimension					
Ø160-315					
Flow settings					
Min. airflow					
Max. airflow					
Pressure					

Example: PCV-200 - 15 l/s - 60 l/s - 40 Pa

When ordering, MBB plenum type must be specified.

Dimensions



PCV Ød mm	ØA mm	ØU * mm	Weight (kg) (with Motor)
160	300	260	3.0
200	360	320	3.8
250	460	420	4.9
315	540	500	6.1

ØU = Ceiling grid opening.

Maintenance

The face plate and damper insert can be removed to enable cleaning of internal parts or to gain access to the duct or box. The visible parts of the diffuser can be wiped with a damp cloth.

Materials and finish

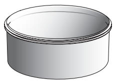
Diffuser:	Galvanised steel
Diffuser finish:	Powder-coated
Standard colour:	RAL 9010, gloss 30
Motor:	Manufact. Belimo type LH24A-MF

Other colours are available. Please contact Lindab's sales department for further information.

VAV diffuser PCV

Accessories

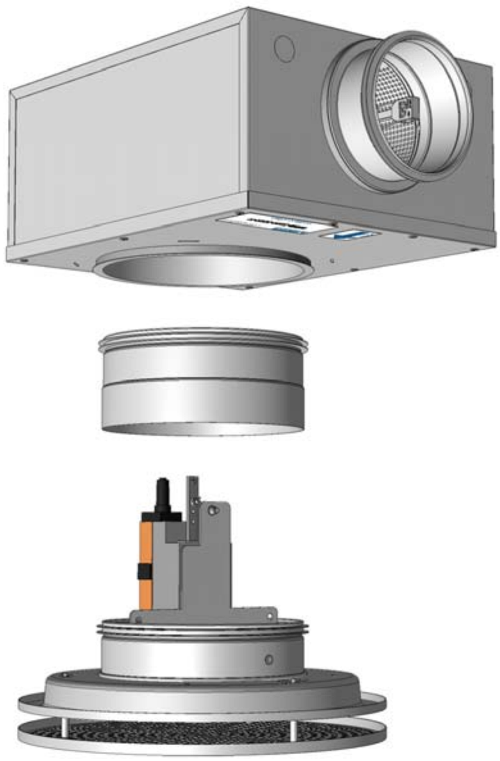
MBZ - Extension piece



Order code MBZ

Product	MBZ	aaa
Type MBZ		
Dimension Ø160-315		

Example: MBZ-200



When PCV is used with small MBB plenums:

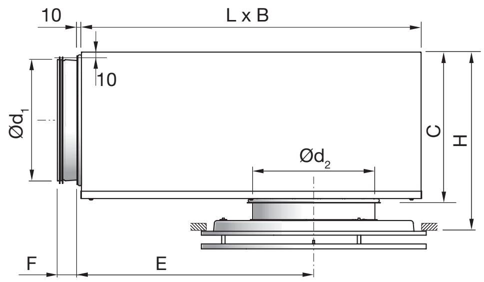
For the following MBB sizes, the MBZ extension piece must be used to ensure full movement of motor-rack.

Size: MBB-100-160-S
MBB-125-160-S
MBB-125-200-S

For other PCV accessories, see the section on Formo ceiling diffusers, PCA.

MBB - Plenum box

PCV+MBB-S



PCV + MBB							
Duct Ød_1 mm	PCV Ød_2 mm	B mm	C mm	E mm	F mm	H* mm	L mm
100	160	260	159	216	50	200 - 240	310
125	160	310	184	262	50	225 - 265	376
125	200	310	184	262	50	225 - 265	376
160	160	380	220	323	50	259 - 299	459
160	200	380	220	323	50	259 - 299	459
160	250	380	220	323	50	259 - 299	459
200	200	460	259	396	70	300 - 340	565
200	250	460	259	396	70	300 - 340	565
200	315	460	259	396	70	300 - 340	565
250	250	540	309	486	70	350 - 390	698
250	315	540	309	486	70	350 - 390	698
315	315	540	373	646	70	415 - 455	858

* Using accessory MBZ, the H-dimension will increase:
Ød_2 = 160 - 200 mm => H + 40 mm
Ød_2 = 250 - 315 mm => H + 60 mm

Order code

Product	MBB	aaa	bbb	S
Type MBB				
Duct connection Ød_1 Ø100-315				
Diffuser dimension Ød_2 Ø160-315				
Function S = Supply air				

Example: MBB-160-200-S

VAV diffuser

PCV

Technical data

Diagrams on this page apply to PCV supply. For exhaust air and supplementary technical exhaust data, see the section on Formo ceiling diffusers.

Capacity

Max. volume flow [l/s], [m³/h], total pressure drop p_t [Pa], throw l_{02} [m] and sound effect level L_{WA} [dB(A)] can be seen in the diagrams.

Quick selection, supply air

Quick selection 30 dB(A)

PCV + MBB		30 dB(A)					
		30 Pa		35 Pa		40 Pa	
Duct	PCV	q_v		q_v		q_v	
Ød1	Ød2	l/s	m³/h	l/s	m³/h	l/s	m³/h
100	160	28	100	28	100	29	104
125	160	37	133	37	133	37	133
125	200	45	162	48	172	49	176
160	160	42	151	42	151	42	151
160	200	64	230	62	223	62	223
160	250	73	262	73	262	73	262
200	200	67	241	66	237	65	234
200	250	85	306	84	302	83	298
200	315	99	356	100	360	99	356
250	250	91	327	91	327	91	327
250	315	112	403	112	403	112	403
315	315	115	414	112	403	110	396

Quick selection 35 dB(A)

PCV + MBB		35 dB(A)					
		30 Pa		35 Pa		40 Pa	
Duct	PCV	q_v		q_v		q_v	
Ød1	Ød2	l/s	m³/h	l/s	m³/h	l/s	m³/h
100	160	28	100	30	108	32	115
125	160	39	140	42	151	43	154
125	200	45	162	49	176	52	187
160	160	48	172	49	176	49	176
160	200	64	230	70	252	75	270
160	250	73	262	79	284	84	302
200	200	75	270	78	280	78	280
200	250	95	342	97	349	98	352
200	315	108	388	115	414	116	417
250	250	104	374	104	374	105	378
250	315	126	453	128	460	129	464
315	315	139	500	137	493	135	486

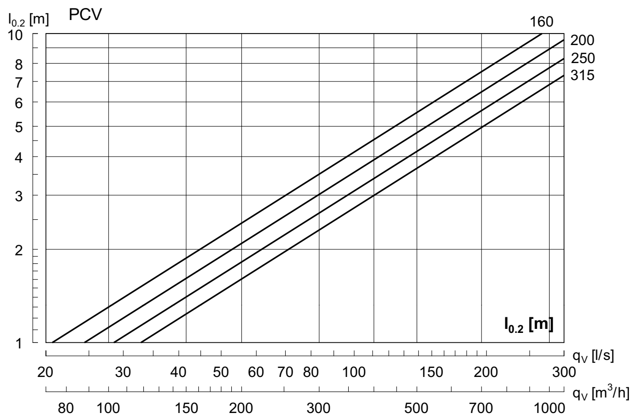
Sound attenuation

Sound attenuation of the diffuser ΔL from duct to room, including end reflection, see table below.

PCV + MBB									
Duct	PCV	Centre frequency Hz							
Ød1	Ød2	63	125	250	500	1K	2K	4K	8K
100	160	21	16	5	15	17	18	16	19
125	160	12	13	8	19	13	16	17	19
125	200	16	11	5	16	13	15	15	17
160	160	17	17	11	19	18	17	20	20
160	200	14	14	7	21	15	16	18	19
160	250	15	15	5	17	13	15	16	18
200	200	15	10	6	16	17	15	19	18
200	250	12	9	5	14	17	15	17	17
200	315	12	7	4	11	15	14	16	15
250	250	14	8	8	14	16	17	17	18
250	315	12	6	6	15	15	15	16	17
315	315	7	9	8	14	17	16	17	21

Throw

The throw is specified at a terminal velocity of 0.2.

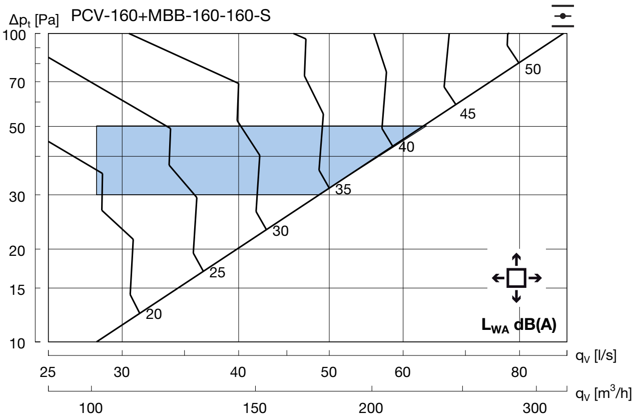


VAV diffuser PCV

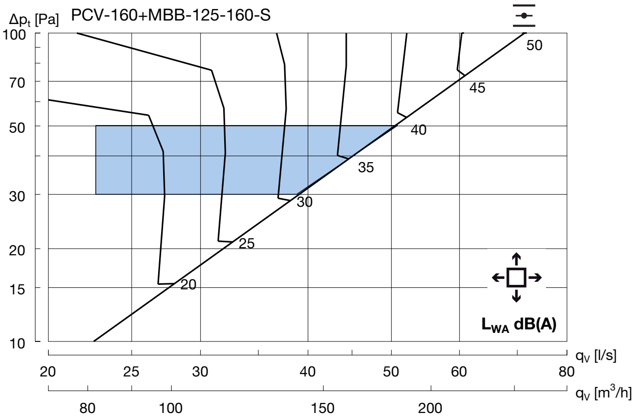
Technical data

Setting range for max. volume flow.

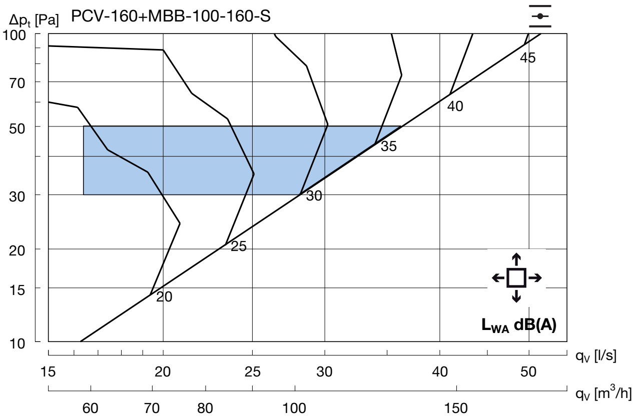
PCV-160 + MBB - Supply air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	7	9	-1	-5	-4	-11	-23	-32

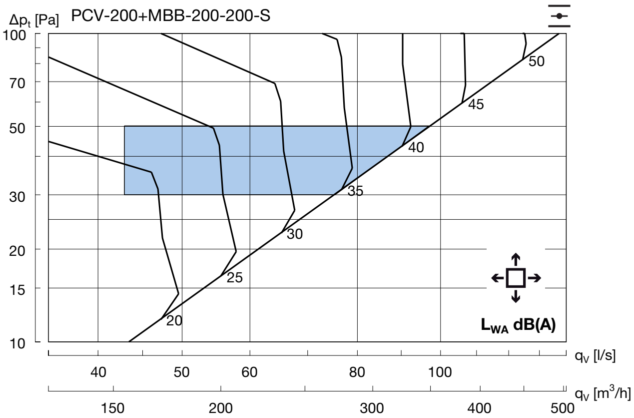


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	10	5	-1	-4	-3	-11	-22	-30

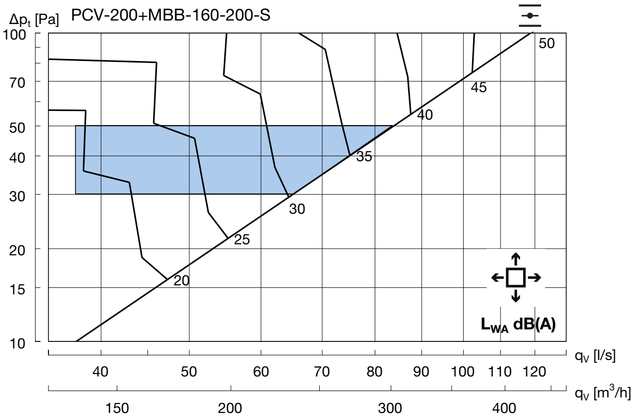


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	6	4	0	-5	-4	-8	-20	-25

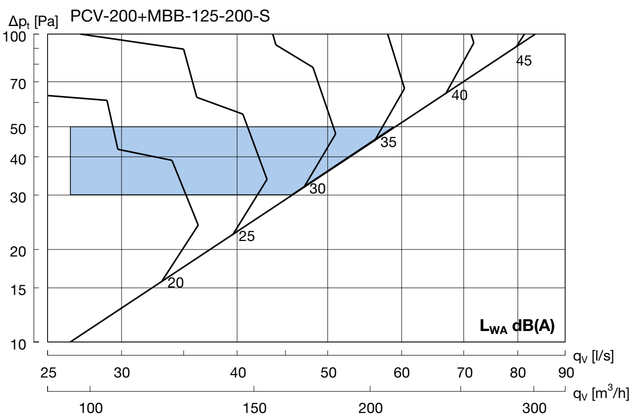
PCV-200 + MBB - Supply air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	12	9	0	-4	-4	-12	-22	-32



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	10	8	0	-5	-4	-11	-20	-26



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	11	7	0	-4	-4	-11	-17	-23

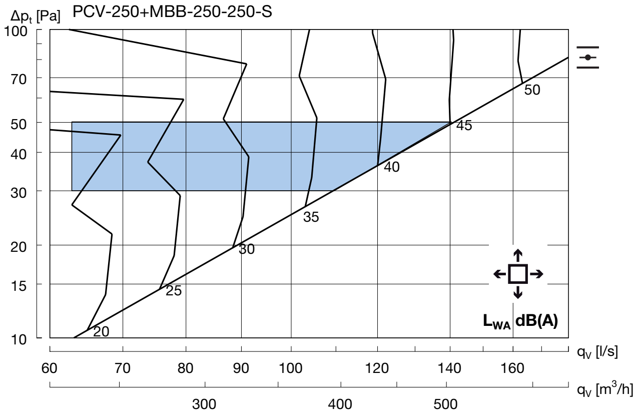
VAV diffuser

PCV

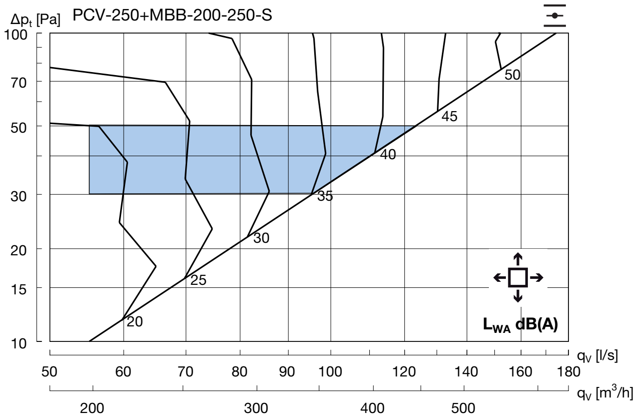
Technical data

Setting range for max. volume flow.

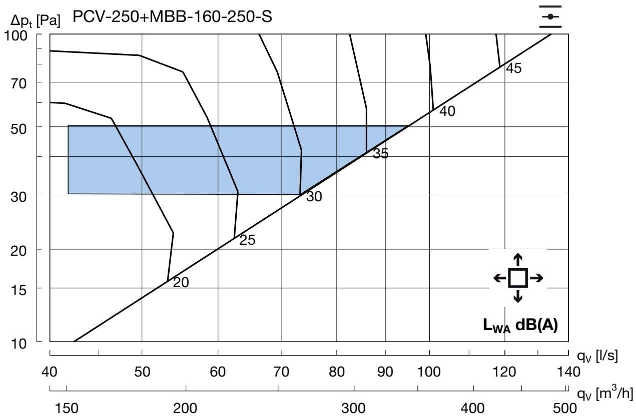
PCV-250 + MBB - Supply air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	10	6	-2	-3	-4	-11	-23	-31

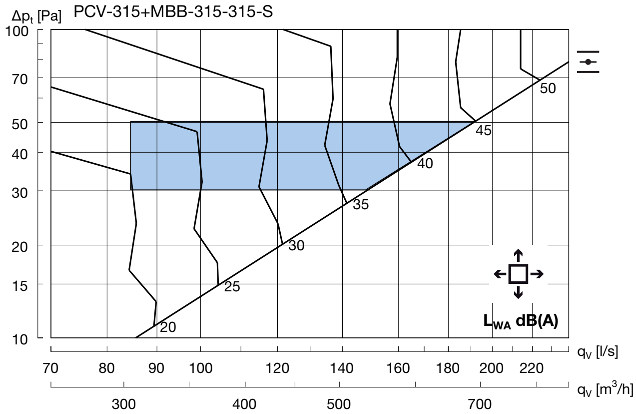


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	11	8	-2	-3	-4	-11	-22	-29

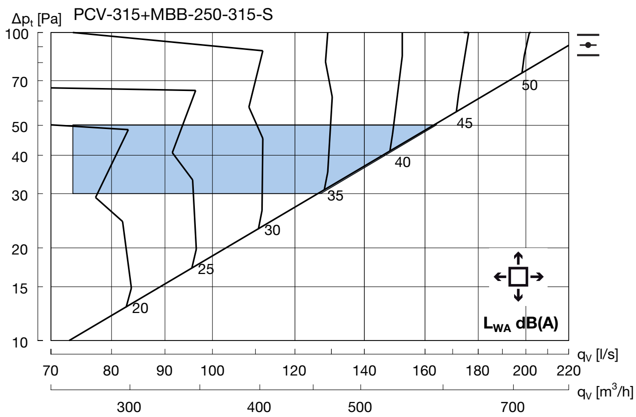


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	9	7	-1	-4	-4	-11	-18	-22

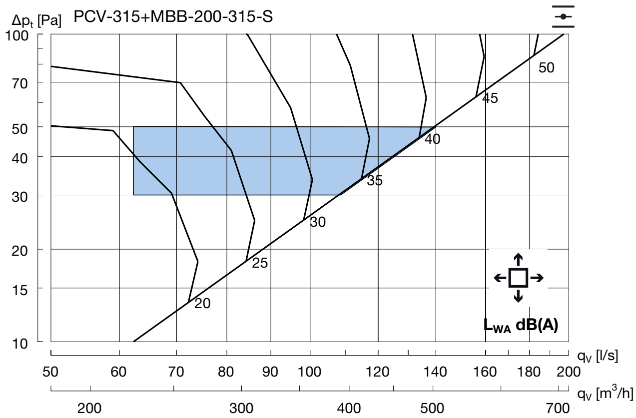
PCV-315 + MBB - Supply air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	10	4	-2	-2	-4	-11	-23	-32



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	13	7	-2	-2	-4	-12	-22	-30



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	12	9	-2	-4	-5	-10	-18	-26

VAV diffuser

LKV

Description

LKV is a square LKA type diffuser with integrated motor for supply air of variable air volume (VAV). The integrated motorized damper ensures a constant throw so the Coanda effect always is maintained. The damper setting can be controlled by a room regulator, BMS or other 2-10 V control signal.

- Can vary the volume flow between 0-100 %
- Min. flow preset from factory *)
- Max. flow to be set in MBB box based on k-value
- Settings can be changed with ZTH-GEN or Belimo PC-tool
- VAV zone pressure must be controlled
- The diffuser must be installed together with a MBB-S type plenum box
- For exhaust LKA can be used

*) Min. setting and k-value are made from a pre-defined, available constant pressure in the air duct immediately before the diffuser. The diffuser is typically used at a constant pressure of 30-50 Pa.

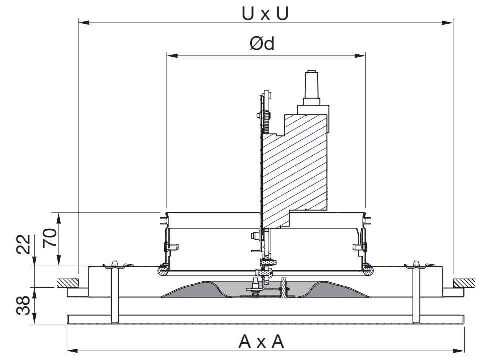
Order code

Product	LKV	aaa	bb	cc	dd
Type LKV	LKV				
Dimension Ø160-315		aaa			
Flow settings Min. airflow			bb		
Max. airflow				cc	
Pressure					dd

Example: LKV-200 - 15 l/s - 60 l/s - 40 Pa

When ordering, MBB plenum type must be specified.

Dimensions



LKV Ød mm	A mm	U * mm	Weight (kg) (with Motor)
160	295	260	3,3
200	395	360	4,3
250	495	460	5,7
315	595	560	7,2

U x U = Ceiling grid opening.

Maintenance

The face plate and damper insert can be removed to enable cleaning of internal parts or to gain access to the duct or box. The visible parts of the diffuser can be wiped with a damp cloth.

Materials and finish

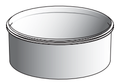
Diffuser:	Galvanised steel
Diffuser finish:	Powder-coated
Standard colour:	RAL 9010, gloss 30
Motor:	Manufact. Belimo type LH24A-MF

Other colours are available. Please contact Lindab's sales department for further information.

VAV diffuser LKV

Accessories

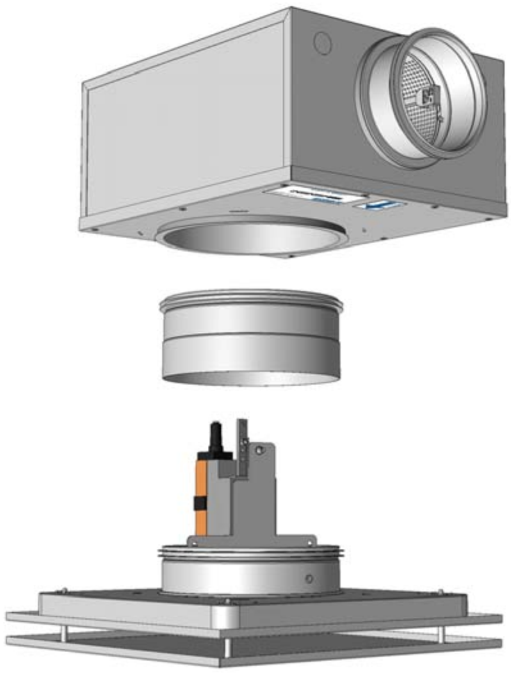
MBZ - Extension piece



Order code MBZ

Product	**MBZ**	**aaa**
Type		
MBZ		
Dimension		
Ø160-315		

Example: MBZ-200



When LKV is used with small MBB plenums:

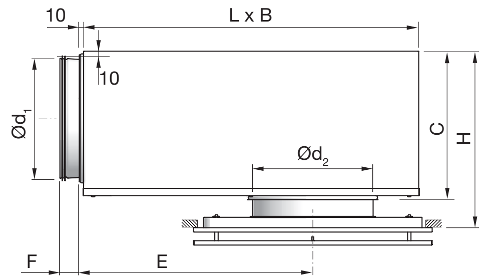
For the following MBB sizes, the MBZ extension piece must be used to ensure full movement of motor-rack.

Size: MBB-100-160-S
MBB-125-160-S
MBB-125-200-S

For other LKV accessories, see the section on Formo ceiling diffusers, LKA.

MBB - Plenum box

LKV+MBB-S



LKV + MBB							
Duct $Ød_1$ mm	LKV $Ød_2$ mm	B mm	C mm	E mm	F mm	H* mm	L mm
100	160	260	159	216	50	200 - 240	310
125	160	310	184	262	50	225 - 265	376
125	200	310	184	262	50	225 - 265	376
160	160	380	220	323	50	259 - 299	459
160	200	380	220	323	50	259 - 299	459
160	250	380	220	323	50	259 - 299	459
200	200	460	259	396	70	300 - 340	565
200	250	460	259	396	70	300 - 340	565
200	315	460	259	396	70	300 - 340	565
250	250	540	309	486	70	350 - 390	698
250	315	540	309	486	70	350 - 390	698
315	315	540	373	646	70	415 - 455	858

* Using accessory MBZ, the H-dimension will increase:
$Ød_2$ = 160 - 200 mm => H + 40 mm
$Ød_2$ = 250 - 315 mm => H + 60 mm

Order code

Product	**MBB**	**aaa**	**bbb**	**S**
Type				
MBB				
Duct connection $Ød_1$				
Ø100-315				
Diffuser dimension $Ød_2$				
Ø160-315				
Function				
S = Supply air				

Example: MBB-160-200-S

VAV diffuser

LKV

Technical data

Diagrams on this page apply to LKV supply. For exhaust air and supplementary technical exhaust data, see the section on Formo ceiling diffusers.

Capacity

Max. volume flow [l/s], [m³/h], total pressure drop p_t [Pa], throw l_{02} [m] and sound effect level L_{WA} [dB(A)] can be seen in the diagrams.

Quick selection, supply air

Quick selection 30 dB(A)

LKV + MBB		30 dB(A)					
		30 Pa		35 Pa		40 Pa	
Duct	LKV	q_v		q_v		q_v	
Ød₁	Ød₂	l/s	m³/h	l/s	m³/h	l/s	m³/h
100	160	27	97	29	104	30	108
125	160	37	133	39	140	40	144
125	200	46	165	49	176	51	183
160	160	42	151	42	151	42	151
160	200	63	226	62	223	61	219
160	250	74	266	77	277	77	277
200	200	65	234	65	234	65	234
200	250	84	302	84	302	84	302
200	315	104	374	101	363	102	367
250	250	90	324	90	324	90	324
250	315	110	396	111	399	112	403
315	315	115	414	115	414	114	410

Quick selection 35 dB(A)

LKV + MBB		35 dB(A)					
		30 Pa		35 Pa		40 Pa	
Duct	LKV	q_v		q_v		q_v	
Ød₁	Ød₂	l/s	m³/h	l/s	m³/h	l/s	m³/h
100	160	27	97	29	104	31	111
125	160	37	133	40	144	43	154
125	200	46	165	49	176	53	190
160	160	49	176	50	180	50	180
160	200	63	226	68	244	73	262
160	250	74	266	80	288	85	306
200	200	74	266	76	273	77	277
200	250	93	334	101	363	100	360
200	315	106	381	115	414	121	435
250	250	105	378	106	381	106	381
250	315	122	439	127	457	129	464
315	315	135	486	135	486	136	489

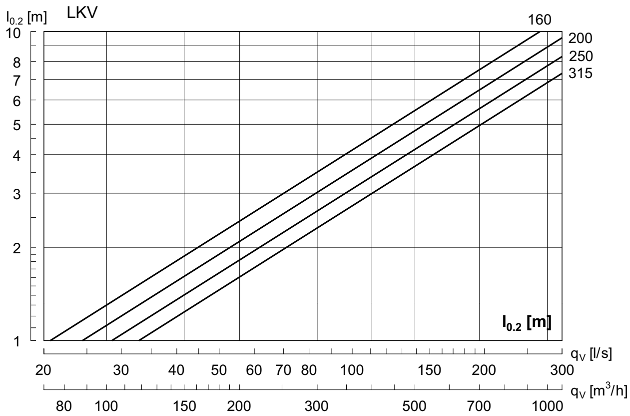
Sound attenuation

Sound attenuation of the diffuser ΔL from duct to room, including end reflection, see table below.

LKV + MBB									
Duct	LKV	Centre frequency Hz							
Ød₁	Ød₂	63	125	250	500	1K	2K	4K	8K
100	160	21	17	5	12	19	20	18	21
125	160	13	13	9	18	18	18	18	20
125	200	14	12	7	15	16	18	17	19
160	160	18	17	11	16	21	19	20	21
160	200	15	14	9	20	21	20	20	20
160	250	16	16	7	17	13	18	19	20
200	200	14	11	8	15	21	18	20	18
200	250	13	10	8	16	20	17	19	17
200	315	15	9	6	14	17	17	18	17
250	250	16	9	9	17	20	19	19	19
250	315	15	8	9	16	18	16	18	18
315	315	8	10	10	16	20	19	18	23

Throw

The throw is specified at a terminal velocity of 0.2 m/s.



1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

VAV diffuser LKV

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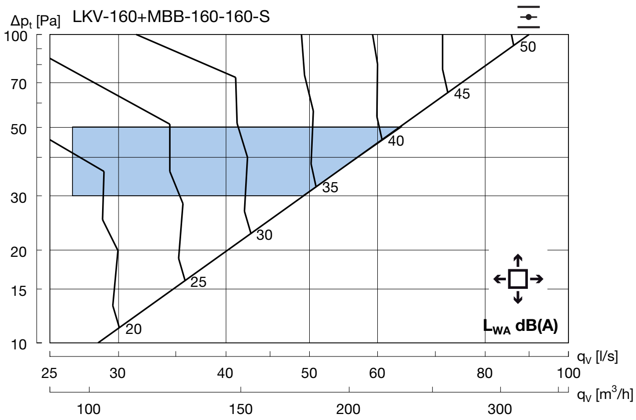
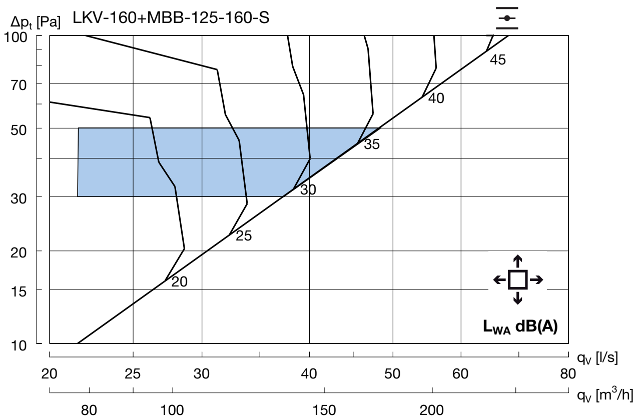
Technical data

Setting range for max. volume flow.

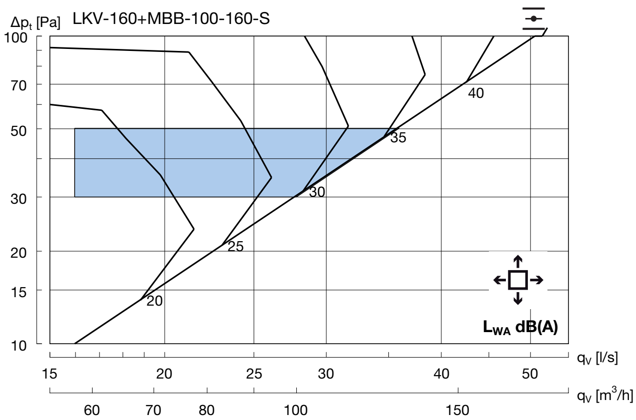
LKV-160 + MBB - Supply air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	12	9	-1	-2	-5	-14	-22	-32

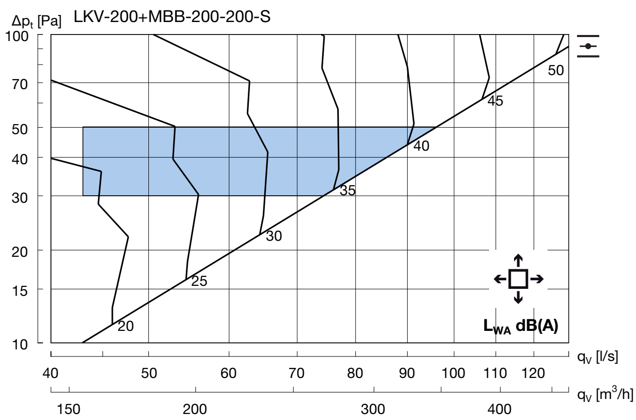


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	10	6	-1	-1	-5	-12	-21	-29

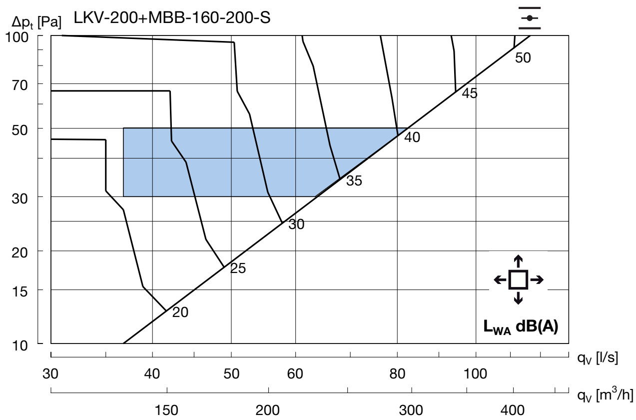


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	6	6	0	-1	-6	-10	-19	-26

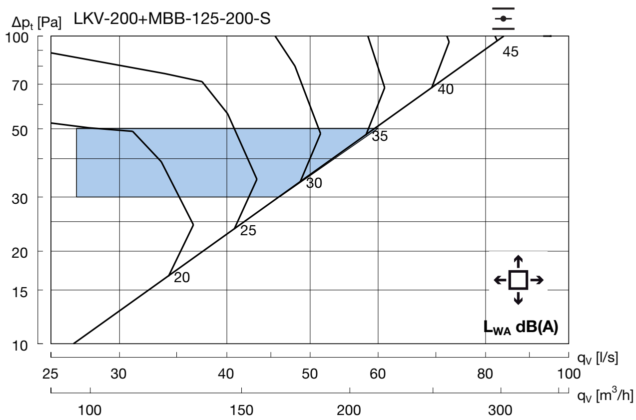
LKV-200 + MBB - Supply air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	10	8	-1	-1	-5	-15	-24	-32



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	11	9	-1	-2	-5	-15	-20	-26



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	9	8	0	-2	-5	-13	-16	-22

VAV diffuser

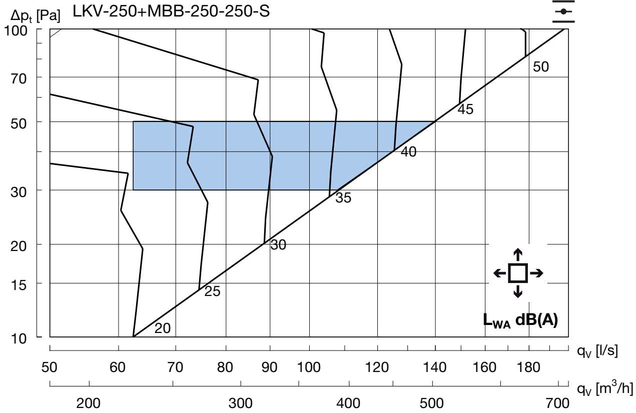
LKV

Technical data

Setting range for max. volume flow.

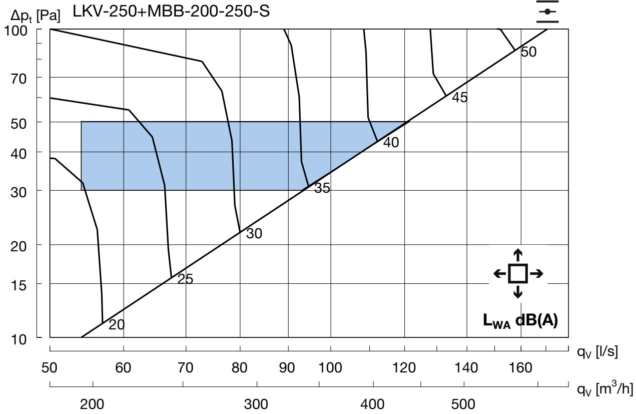
LKV-250 + MBB - Supply air

Δp$_t$ [Pa] LKV-250+MBB-250-250-S



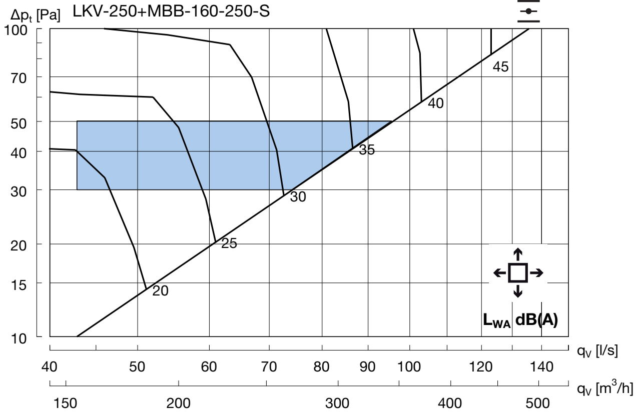
Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	12	6	-3	-2	-4	-17	-24	-30

Δp$_t$ [Pa] LKV-250+MBB-200-250-S



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	11	7	-2	-2	-4	-16	-21	-27

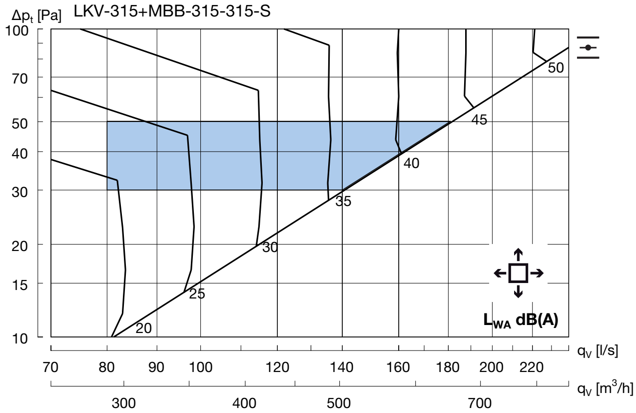
Δp$_t$ [Pa] LKV-250+MBB-160-250-S



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	10	8	-1	-3	-4	-13	-17	-20

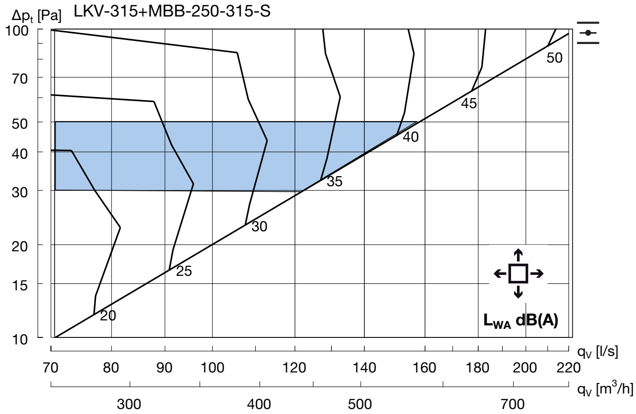
LKV-315 + MBB - Supply air

Δp$_t$ [Pa] LKV-315+MBB-315-315-S



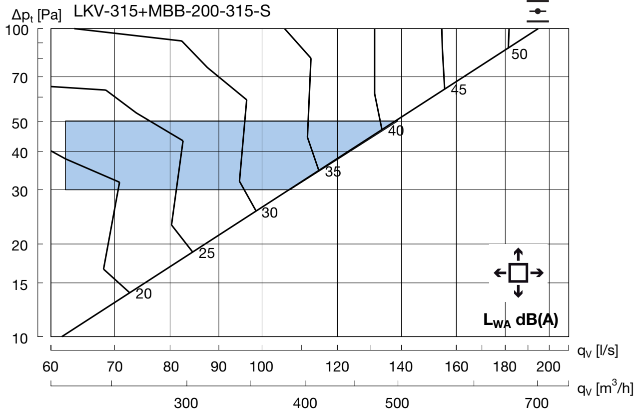
Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	12	4	-2	0	-5	-18	-25	-33

Δp$_t$ [Pa] LKV-315+MBB-250-315-S



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	12	6	-3	-1	-5	-18	-23	-27

Δp$_t$ [Pa] LKV-315+MBB-200-315-S



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	12	8	-2	-2	-5	-14	-20	-25

VAV diffuser

LCV

Description

LCV is a circular LCA type diffuser with integrated motor for supply air of variable air volume (VAV). The integrated motorized damper ensures a constant throw so the Coanda effect always is maintained. The damper setting can be controlled by a room regulator, BMS or other 2-10 V control signal.

- Can vary the volume flow between 0-100 %
- Min. flow preset from factory *)
- Max. flow to be set in MBB box based on k-value
- Settings can be changed with ZTH-GEN or Belimo PC-tool
- VAV zone pressure must be controlled
- The diffuser must be installed together with a MBB-S type plenum box
- For exhaust LCA can be used

*) Min. setting and k-value are made from a pre-defined, available constant pressure in the air duct immediately before the diffuser. The diffuser is typically used at a constant pressure of 30-50 Pa.

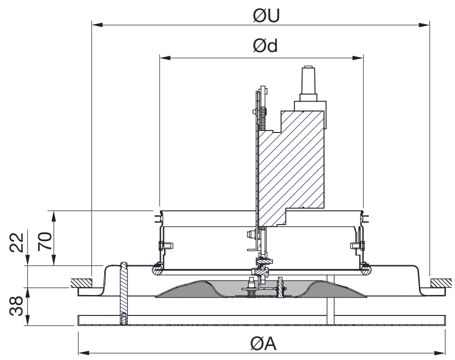
Order code

Product	LCV	aaa	bb	cc	dd
Type LCV	LCV				
Dimension Ø160-315		aaa			
Flow settings Min. airflow			bb		
Max. airflow				cc	
Pressure					dd

Example: LCV-200 - 15 l/s - 60 l/s - 40 Pa

When ordering, MBB plenum type must be specified.

Dimensions



LCV Ød mm	ØA mm	ØU * mm	Weight (kg) (with Motor)
160	300	260	1.50
200	360	320	2.30
250	460	420	3.40
315	540	500	4.60

ØU = Ceiling grid opening.

Maintenance

The face plate and damper insert can be removed to enable cleaning of internal parts or to gain access to the duct or box. The visible parts of the diffuser can be wiped with a damp cloth.

Materials and finish

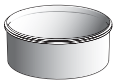
Diffuser:	Galvanised steel
Diffuser finish:	Powder-coated
Standard colour:	RAL 9010, gloss 30
Motor:	Manufact. Belimo type LH24A-MF

Other colours are available. Please contact Lindab's sales department for further information.

VAV diffuser LCV

Accessories

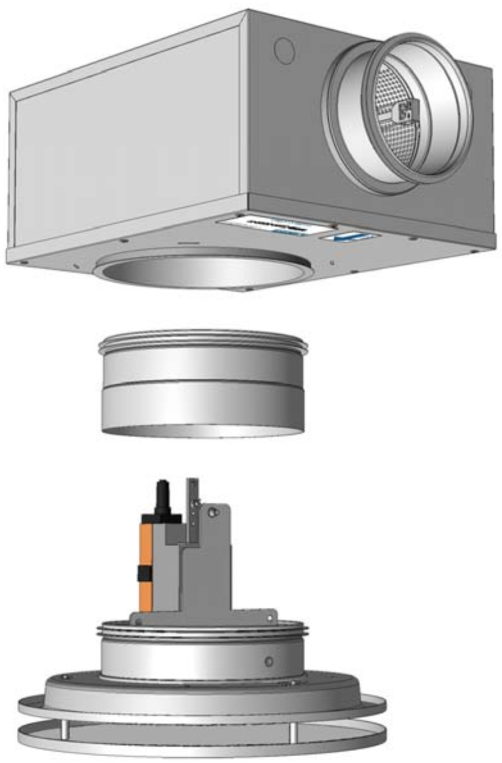
MBZ - Extension piece



Order code MBZ

Product	MBZ	aaa
Type		
MBZ		
Dimension		
Ø160-315		

Example: MBZ-200



When LCV is used with small MBB plenums:

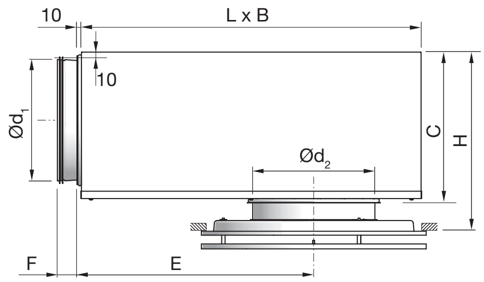
For the following MBB sizes, the MBZ extension piece must be used to ensure full movement of motor-rack.

Size: MBB-100-160-S
MBB-125-160-S
MBB-125-200-S

For other LCV accessories, see the section on Formo ceiling diffusers, LCA.

MBB - Plenum box

LCV+MBB-S



LCV + MBB							
Duct	LCV	B	C	E	F	H*	L
$Ød_1$ mm	$Ød_2$ mm	mm	mm	mm	mm	mm	mm
100	160	260	159	216	50	200 - 240	310
125	160	310	184	262	50	225 - 265	376
125	200	310	184	262	50	225 - 265	376
160	160	380	220	323	50	259 - 299	459
160	200	380	220	323	50	259 - 299	459
160	250	380	220	323	50	259 - 299	459
200	200	460	259	396	70	300 - 340	565
200	250	460	259	396	70	300 - 340	565
200	315	460	259	396	70	300 - 340	565
250	250	540	309	486	70	350 - 390	698
250	315	540	309	486	70	350 - 390	698
315	315	540	373	646	70	415 - 455	858

* Using accessory MBZ, the H-dimension will increase:
$Ød_2$ = 160 - 200 mm => H + 40 mm
$Ød_2$ = 250 - 315 mm => H + 60 mm

Order code

Product	MBB	aaa	bbb	S
Type				
MBB				
Duct connection $Ød_1$				
Ø100-315				
Diffuser dimension $Ød_2$				
Ø160-315				
Function				
S = Supply air				

Example: MBB-160-200-S

VAV diffuser

LCV

Technical data

Diagrams on this page apply to LCV supply. For exhaust air and supplementary technical exhaust data, see the section on Formo ceiling diffusers.

Capacity

Max. volume flow [l/s], [m^3/h], total pressure drop p_t [Pa], throw l_{02} [m] and sound effect level L_{WA} [dB(A)] can be seen in the diagrams.

Quick selection, supply air

Quick selection 30 dB(A)

LCV + MBB		30 dB(A)					
		30 Pa		35 Pa		40 Pa	
Duct	LCV	q_v		q_v		q_v	
Ød1	Ød2	l/s	m^3/h	l/s	m^3/h	l/s	m^3/h
100	160	27	97	29	104	30	108
125	160	37	133	39	140	40	144
125	200	46	165	49	176	51	183
160	160	42	151	42	151	42	151
160	200	63	226	62	223	61	219
160	250	74	302	77	277	77	277
200	200	65	234	65	234	65	234
200	250	84	302	84	302	84	302
200	315	106	381	101	363	102	367
250	250	90	324	90	324	90	324
250	315	110	396	111	399	112	403
315	315	115	414	115	414	114	410

Quick selection 35 dB(A)

LCV + MBB		35 dB(A)					
		30 Pa		35 Pa		40 Pa	
Duct	LCV	q_v		q_v		q_v	
Ød1	Ød2	l/s	m^3/h	l/s	m^3/h	l/s	m^3/h
100	160	27	97	29	104	31	111
125	160	37	133	40	144	43	154
125	200	46	165	49	176	53	190
160	160	49	176	50	180	50	180
160	200	63	226	68	244	73	262
160	250	74	266	80	288	85	306
200	200	74	266	76	273	77	277
200	250	93	334	101	363	100	360
200	315	106	381	115	414	121	435
250	250	105	378	106	381	106	381
250	315	122	439	127	457	129	464
315	315	135	486	135	486	136	489

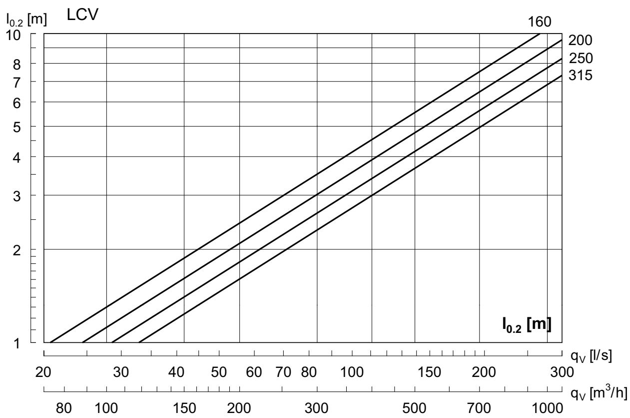
Sound attenuation

Sound attenuation of the diffuser ΔL from duct to room, including end reflection, see table below.

LCV + MBB									
Duct	LCV	Centre frequency Hz							
Ød1	Ød2	63	125	250	500	1K	2K	4K	8K
100	160	21	17	5	12	19	20	18	21
125	160	13	13	9	18	18	18	18	20
125	200	14	12	7	15	16	18	17	19
160	160	18	17	11	16	21	19	20	21
160	200	15	14	9	20	21	20	20	20
160	250	16	16	7	17	13	18	19	20
200	200	14	11	8	15	21	18	20	18
200	250	13	10	8	16	20	17	19	17
200	315	15	9	6	14	17	17	18	17
250	250	16	9	9	17	20	19	19	19
250	315	15	8	9	16	18	16	18	18
315	315	8	10	10	16	20	19	18	23

Throw

The throw is specified at a terminal velocity of 0.2 m/s.

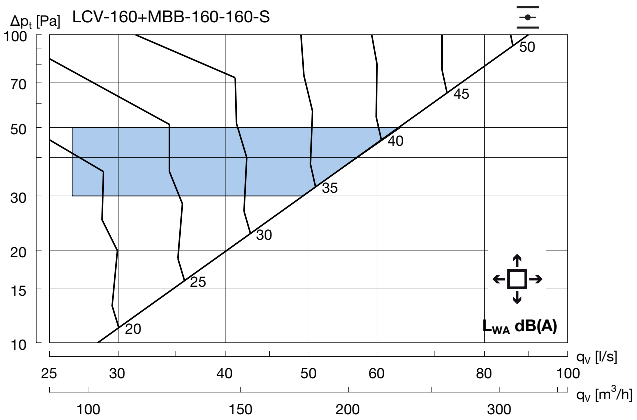


VAV diffuser LCV

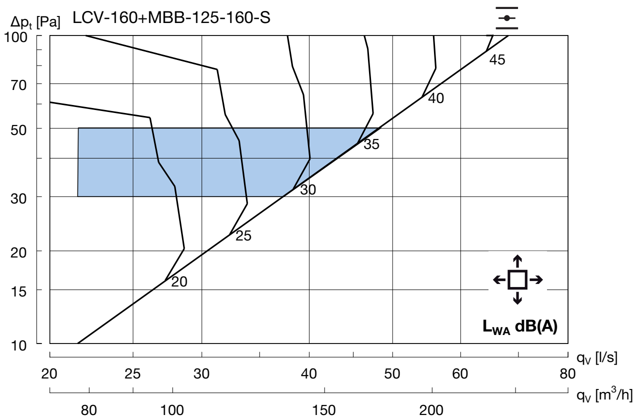
Technical data

Setting range for max. volume flow.

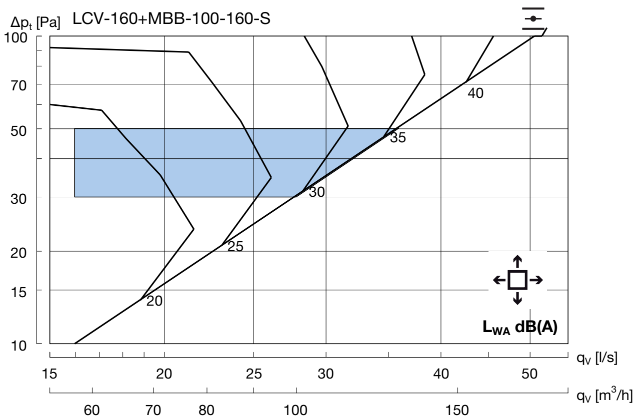
LCV-160 + MBB - Supply air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	12	9	-1	-2	-5	-14	-22	-32

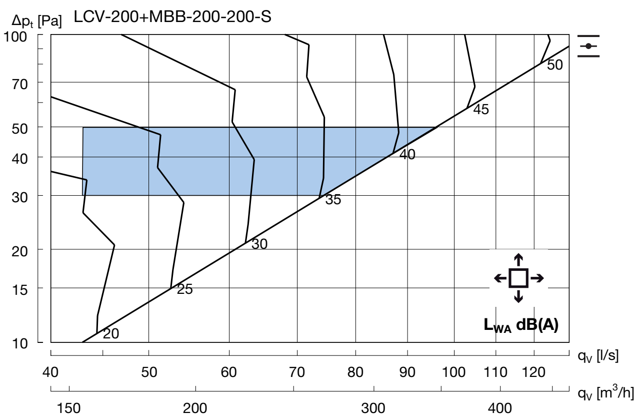


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	10	6	-1	-1	-5	-12	-21	-29

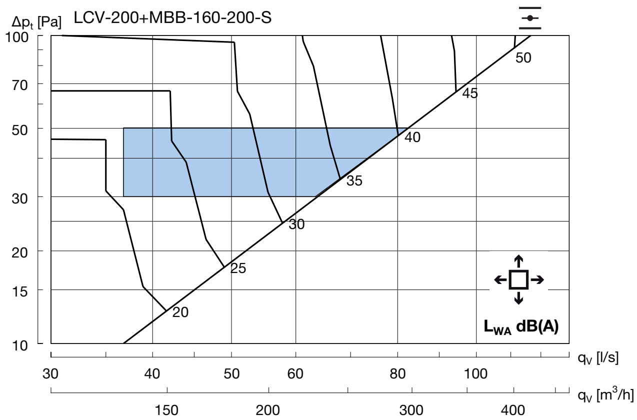


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	6	6	0	-1	-6	-10	-19	-26

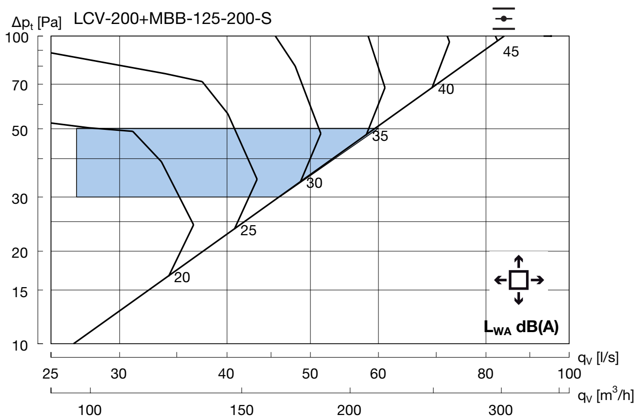
LCV-200 + MBB - Supply air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	10	8	-1	-1	-5	-15	-24	-32



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	11	9	-1	-2	-5	-15	-20	-26



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	9	8	0	-2	-5	-13	-16	-22

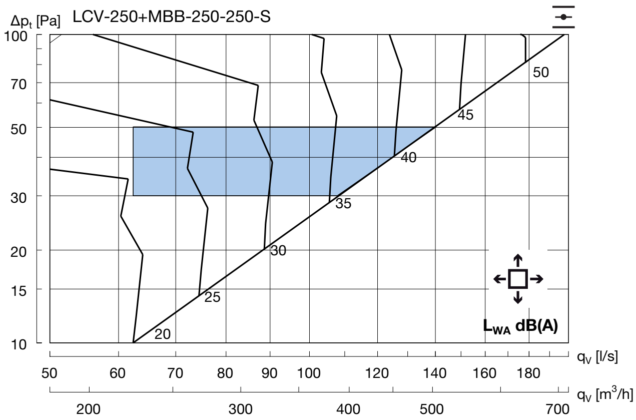
VAV diffuser

LCV

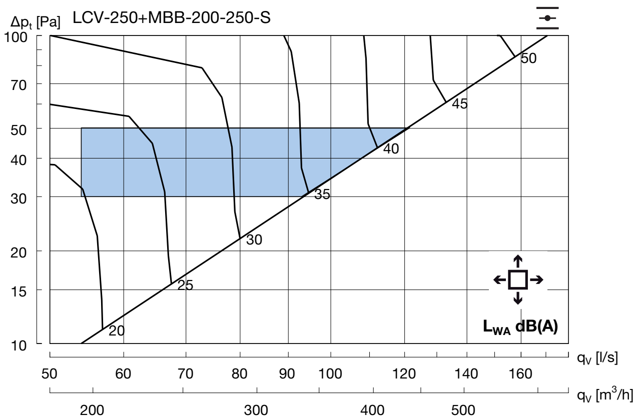
Technical data

Setting range for max. volume flow.

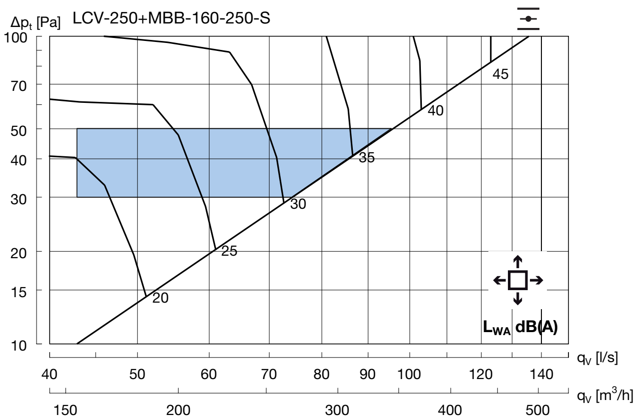
LCV-250 + MBB - Supply air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	12	6	-3	-2	-4	-17	-24	-30

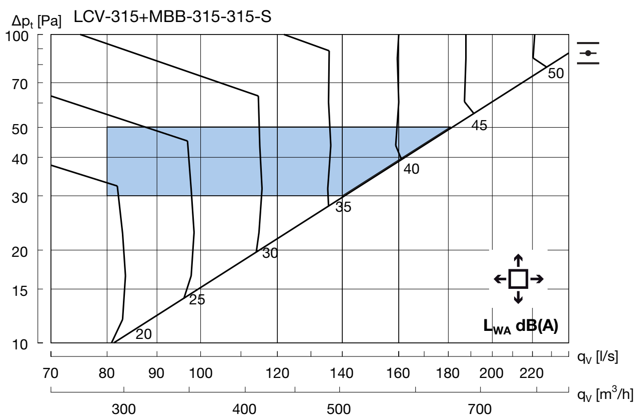


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	11	7	-2	-2	-4	-16	-21	-27

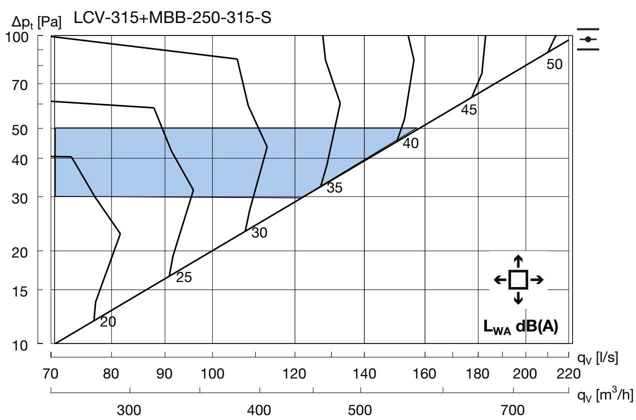


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	10	8	-1	-3	-4	-13	-17	-20

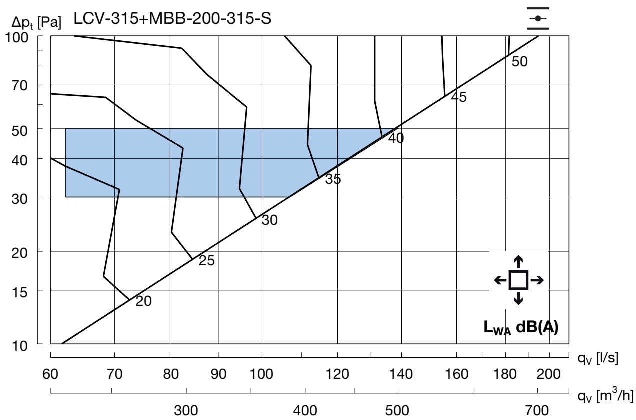
LCV-315 + MBB - Supply air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	12	4	-2	0	-5	-18	-25	-33



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	12	6	-3	-1	-5	-18	-23	-27



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	12	8	-2	-2	-5	-14	-20	-25

VAV diffuser

LKPV

Description

LKPV is an unperforated flush-mounted LKP type diffuser with integrated motor for supply air of variable air volume (VAV). The integrated motorized damper ensures a constant throw so the Coanda effect always is maintained. The damper setting can be controlled by a room regulator, BMS or other 2-10 V control signal.

- Can vary the volume flow between 0-100 %
- Min. flow preset from factory *)
- Max. flow to be set in MBB box based on k-value
- Settings can be changed with ZTH-GEN or Belimo PC-tool
- VAV zone pressure must be controlled
- The diffuser must be installed together with a MBB-S type plenum box
- For exhaust LKP can be used

*) Min. settings and k-value are made from a pre-defined, available constant pressure in the air duct immediately before the diffuser. The diffuser is typically used at a constant pressure of 30-50 Pa.

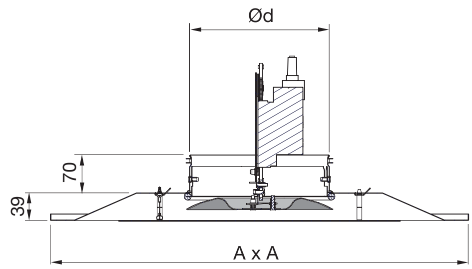
Order code

Product	LKPV	aaa	bbb	cc	dd	ee
Type LKPV						
Dimension Ø160-315						
Flow settings Min. airflow						
Max. airflow						
Pressure						
Ceiling system 1 - 14						

Example: LKPV-200 - 15 l/s - 60 l/s - 40 Pa -1

When ordering, MBB plenum type must be specified.

Dimensions



LKPV Ød mm	A * mm	Weight (kg) (with Motor)
160	595	6,8
200	595	6,8
250	595	6,8
315	595	6,8

* Ceiling system 1, other ceiling systems, see Integra chapter page 122 - 123.
No moduleplate, upper part adapted to ceiling systems.

Maintenance

The face plate and damper insert can be removed to enable cleaning of internal parts or to gain access to the duct or box. The visible parts of the diffuser can be wiped with a damp cloth.

Materials and finish

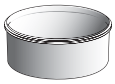
Diffuser:	Galvanised steel
Diffuser finish:	Powder-coated
Standard colour:	RAL 9010, gloss 30
Motor:	Manufact. Belimo type LH24A-MF

Other colours are available. Please contact Lindab's sales department for further information.

VAV diffuser LKPV

Accessories

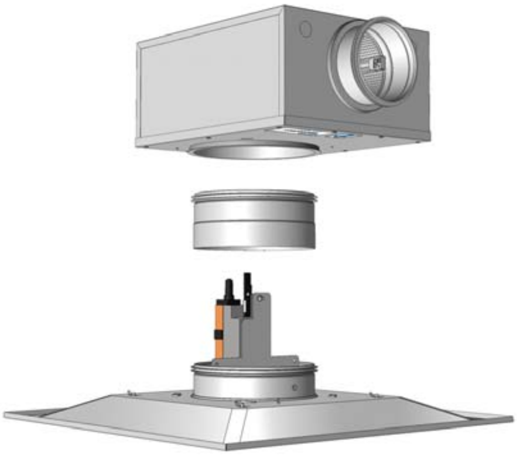
MBZ - Extension piece



Order code MBZ

Product	MBZ	aaa
Type		
MBZ		
Dimension		
Ø160-315		

Example: MBZ-200



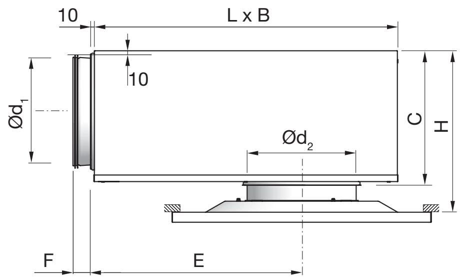
When LKPV is used with small MBB plenums:

For the following MBB sizes, the MBZ extension piece must be used to ensure full movement of motor-rack.

Size: MBB-100-160-S
MBB-125-160-S
MBB-125-200-S

MBB - Plenum box

LKPV+MBB-S



LKPV + MBB							
Duct $Ød_1$ mm	LKPV $Ød_2$ mm	B mm	C mm	E mm	F mm	H* mm	L mm
100	160	260	159	216	50	230 - 270	310
125	160	310	184	262	50	255 - 295	376
125	200	310	184	262	50	255 - 295	376
160	160	380	220	323	50	289 - 329	459
160	200	380	220	322	50	289 - 329	459
160	250	380	220	323	50	289 - 329	459
200	200	460	259	396	70	330 - 370	565
200	250	460	259	396	70	330 - 370	565
200	315	460	259	396	70	330 - 370	565
250	250	540	309	486	70	380 - 420	698
250	315	540	309	486	70	380 - 420	698
315	315	540	376	646	70	445 - 485	858

* Using accessory MBZ the H dimension will increase:
$Ød_2$ = 160 - 200 mm => H + 40 mm
$Ød_2$ = 250 - 315 mm => H + 60 mm

Order code

Product	MBB	aaa	bbb	S
Type				
MBB				
Duct connection $Ød_1$				
Ø100-315				
Diffuser dimension $Ød_2$				
Ø160-315				
Function				
S = Supply air				

Example: MBB-160-200-S

VAV diffuser LKPV

Technical data

Diagrams on this page apply to LKV supply. For exhaust air and supplementary technical exhaust data, see the section on Integra ceiling diffusers.

Capacity

Max. volume flow [l/s], [m³/h], total pressure drop p_t [Pa], throw l_{02} [m] and sound effect level L_{WA} [dB(A)] can be seen in the diagrams.

Quick selection, supply air

Quick selection 30 dB(A)

LKPV + MBB		30 dB(A)					
		30 Pa		35 Pa		40 Pa	
Duct	LKPV	q_v		q_v		q_v	
Ød1	Ød2	l/s	m³/h	l/s	m³/h	l/s	m³/h
100	160	26	93	28	100	29	104
125	160	31	111	31	111	31	111
125	200	40	144	41	147	41	147
160	160	31	111	31	111	31	111
160	200	46	165	45	162	45	162
160	250	56	201	53	190	52	187
200	200	46	165	45	162	45	162
200	250	63	226	63	226	63	226
200	315	74	266	74	266	74	266
250	250	64	230	63	226	62	223
250	315	77	277	75	270	73	262
315	315	80	288	80	288	79	284

Quick selection 35 dB(A)

LKPV + MBB		35 dB(A)					
		30 Pa		35 Pa		40 Pa	
Duct	LKPV	q_v		q_v		q_v	
Ød1	Ød2	l/s	m³/h	l/s	m³/h	l/s	m³/h
100	160	26	93	28	100	30	108
125	160	32	115	35	126	36	129
125	200	40	144	43	154	46	165
160	160	37	133	37	133	37	133
160	200	50	180	54	194	54	194
160	250	58	208	63	226	68	244
200	200	54	194	54	194	54	194
200	250	67	241	72	259	75	270
200	315	81	291	88	316	88	316
250	250	71	255	76	273	76	273
250	315	87	313	93	334	91	327
315	315	91	327	94	338	94	338

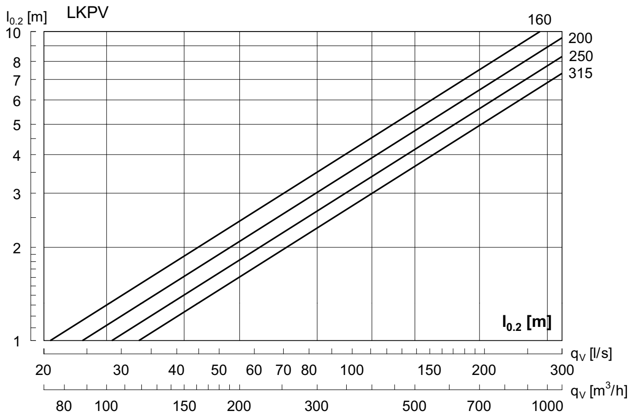
Sound attenuation

Sound attenuation of the diffuser ΔL from duct to room, including end reflection, see table below.

LKPV + MBB									
Duct	LKPV	Centre frequency Hz							
Ød1	Ød2	63	125	250	500	1K	2K	4K	8K
100	160	18	13	9	20	16	24	22	24
125	160	18	13	9	20	16	24	22	24
125	200	20	15	8	18	14	19	20	23
160	160	18	13	9	20	16	24	22	24
160	200	18	13	9	16	20	17	20	22
160	250	18	13	7	15	20	15	18	21
200	200	19	15	11	18	18	17	20	21
200	250	18	14	9	17	15	15	19	21
200	315	16	12	6	16	14	14	18	19
250	250	15	11	8	17	15	19	22	22
250	315	10	7	7	15	8	14	17	21
315	315	10	7	7	15	8	14	17	21

Throw

The throw is specified at a terminal velocity of 0.2 m/s.

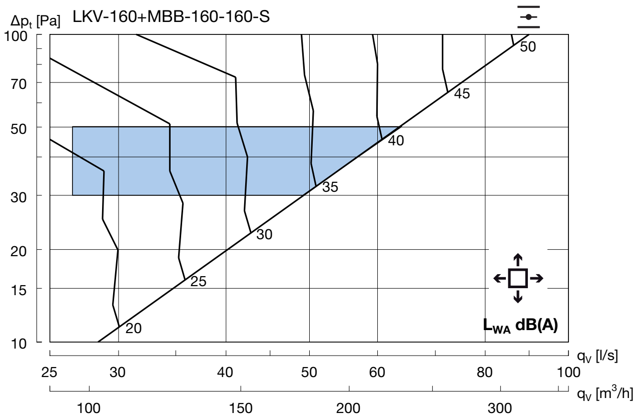


VAV diffuser LKPV

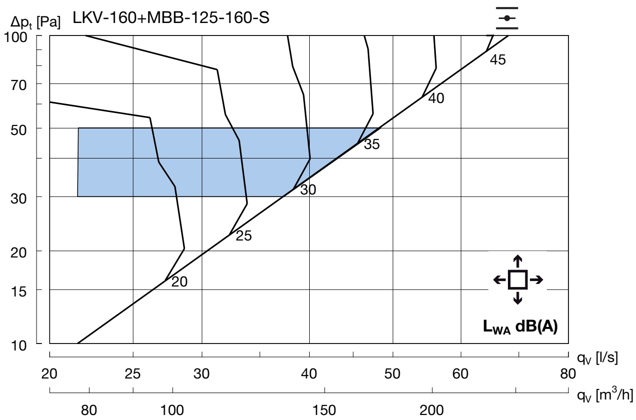
Technical data

Setting range for max. volume flow.

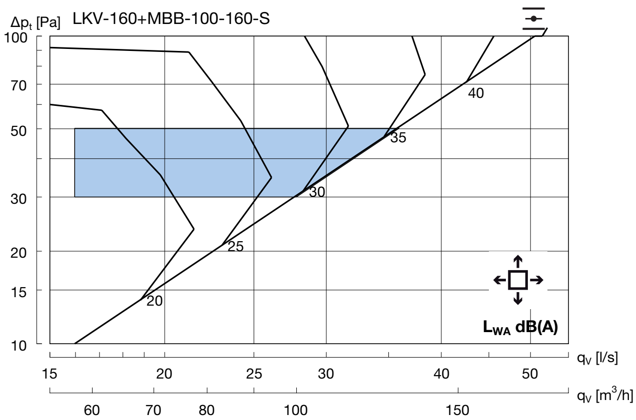
LKPV-160 + MBB - Supply air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	10	8	0	-5	-4	-11	-26	-34

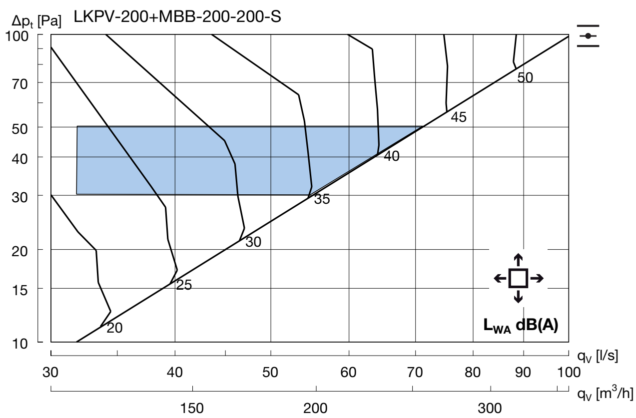


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	8	5	-1	-5	-3	-11	-23	-29

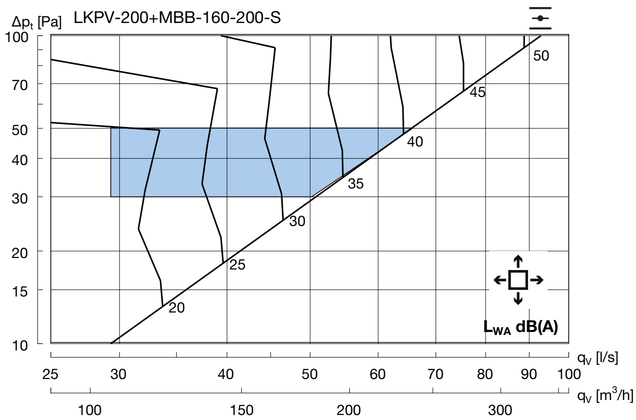


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	9	4	-2	-2	-5	-9	-19	-26

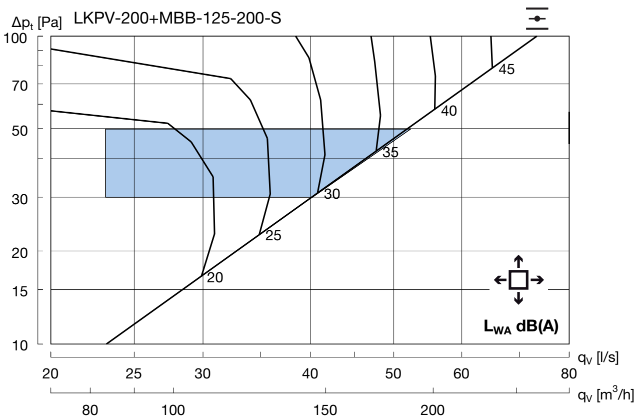
LKPV-200 + MBB - Supply air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	9	5	-2	-4	-2	-16	-24	-29



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	7	8	-1	-4	-3	-16	-24	-28



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	9	5	-2	-5	-2	-15	-20	-26

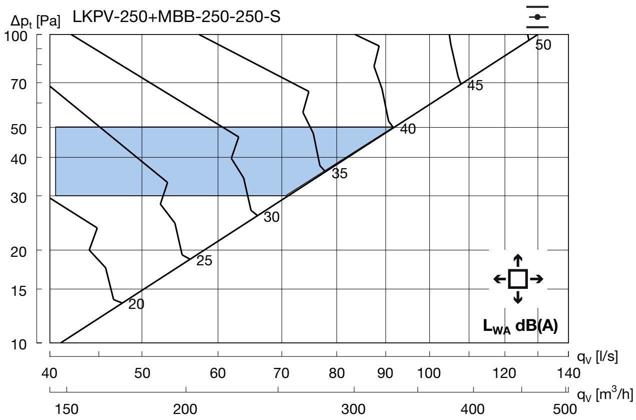
VAV diffuser

LKPV

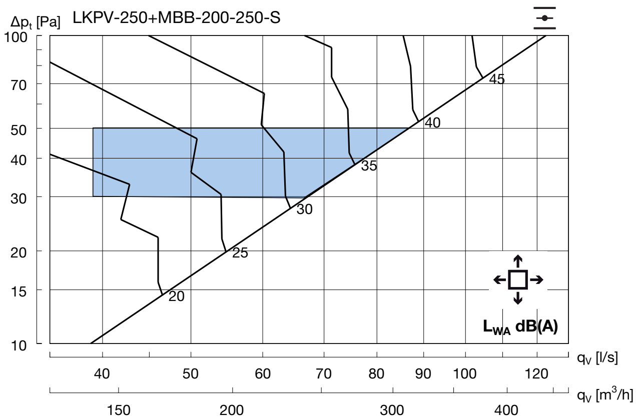
Technical data

Setting range for max. volume flow.

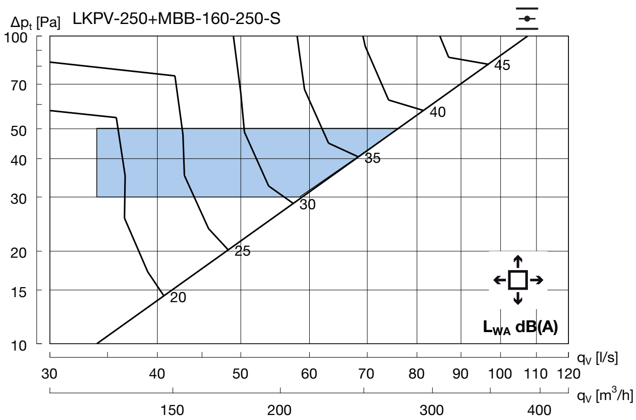
LKPV-250 + MBB - Supply air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	12	7	-1	-2	-4	-18	-33	-47

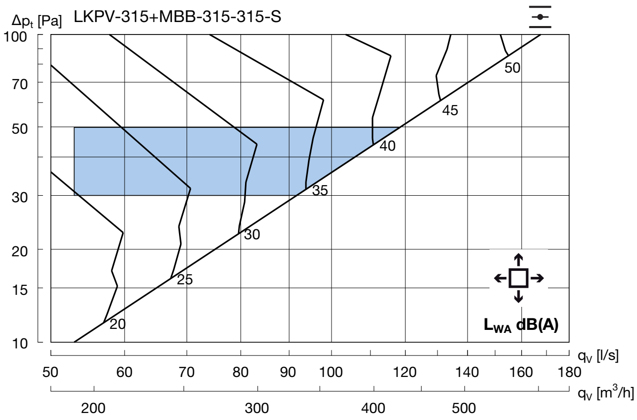


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	7	8	-1	-4	-3	-15	-24	-31

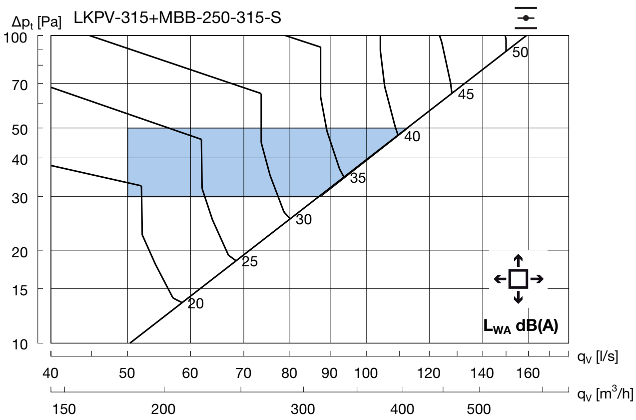


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	9	6	-3	-5	-2	-15	-23	-29

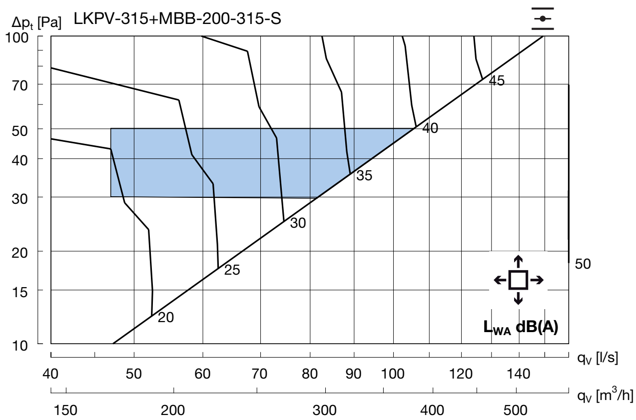
LKPV-315 + MBB - Supply air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	11	8	1	-3	-4	-14	-25	-34



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	11	8	1	-3	-5	-14	-25	-31



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	10	8	1	-4	-4	-13	-23	-32

VAV diffuser LCPV

Description

LCPV is an unperforated flush-mounted LCP type diffuser with integrated motor for supply air of variable air volume (VAV). The integrated motorized damper ensures a constant throw so the Coanda effect always is maintained. The damper setting can be controlled by a room regulator, BMS or other 2-10 V control signal.

- Can vary the volume flow between 0-100 %
- Min. flow preset from factory *)
- Max. flow to be set in MBB box based on k-value
- Settings can be changed with ZTH-GEN or Belimo PC-tool
- VAV zone pressure must be controlled
- The diffuser must be installed together with a MBB-S type plenum box
- For exhaust LCP can be used

*) Min. settings and k-value are made from a pre-defined, available constant pressure in the air duct immediately before the diffuser. The diffuser is typically used at a constant pressure of 30-50 Pa.

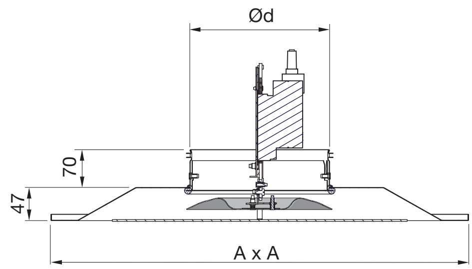
Order code

Product	LCPV	aaa	bbb	cc	dd	ee
Type						
LCPV	✓					
Dimension						
Ø160-315		✓				
Flow settings						
Min. airflow			✓			
Max. airflow				✓		
Pressure					✓	
Ceiling system						
1 - 14						✓

Example: LCPV-200 - 15 l/s - 60 l/s - 40 Pa -1

When ordering, MBB plenum type must be specified.

Dimensions



LCPV Ød mm	A * mm	Weight (kg) (with Motor)
160	595	6,8
200	595	6,8
250	595	6,8
315	595	6,8

* Ceiling system 1, other ceiling systems, see Integra chapter page 122 - 123.
No moduleplate, upper part adapted to ceiling systems.

Maintenance

The face plate and damper insert can be removed to enable cleaning of internal parts or to gain access to the duct or box. The visible parts of the diffuser can be wiped with a damp cloth.

Materials and finish

Upper part:	Galvanised steel
Face plate:	Aluminium
Face plate finish:	Powder-coated
Standard colour:	RAL 9010, gloss 30
Motor:	Manufact. Belimo type LH24A-MF

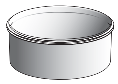
Other colours are available. Please contact Lindab's sales department for further information.

VAV diffuser LCPV

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

Accessories

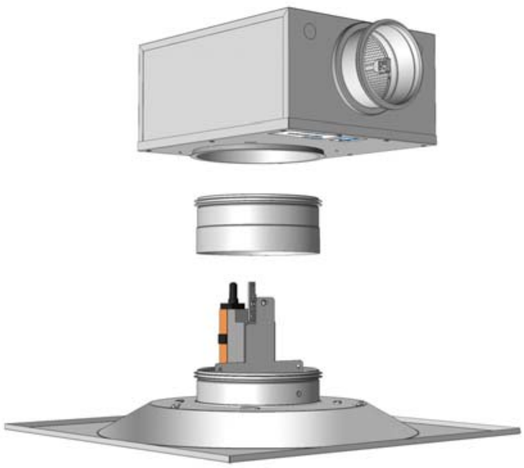
MBZ - Extension piece



Order code MBZ

Product	MBZ	aaa
Type		
MBZ		
Dimension		
Ø160-315		

Example: MBZ-200



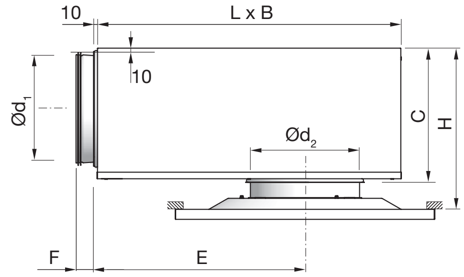
When LCPV is used with small MBB plenums:

For the following MBB sizes, the MBZ extension piece must be used to ensure full movement of motor-rack.

Size: MBB-100-160-S
MBB-125-160-S
MBB-125-200-S

MBB - Plenum box

LCPV+MBB-S



LCPV + MBB		B	C	E	F	H*	L
Duct $Ød_1$ mm	LCPV $Ød_2$ mm	mm	mm	mm	mm	mm	mm
100	160	260	159	216	50	230 - 270	310
125	160	310	184	262	50	255 - 295	376
125	200	310	184	262	50	255 - 295	376
160	160	380	220	323	50	289 - 329	459
160	200	380	220	323	50	289 - 329	459
160	250	380	220	323	50	289 - 329	459
200	200	460	259	396	70	330 - 370	565
200	250	460	259	396	70	330 - 370	565
200	315	460	259	396	70	330 - 370	565
250	250	540	309	486	70	380 - 420	698
250	315	540	309	486	70	380 - 420	698
315	315	540	373	646	70	445 - 485	858

* Using accessory MBZ the H dimension will increase:
$Ød_2$ = 160 - 200 mm => H + 40 mm
$Ød_2$ = 250 - 315 mm => H + 60 mm

Order code

Product	MBB	aaa	bbb	S
Type				
MBB				
Duct connection $Ød_1$				
Ø100-315				
Diffuser dimension $Ød_2$				
Ø160-315				
Function				
S = Supply air				

Example: MBB-160-200-S

VAV diffuser

LCPV

Technical data

Diagrams on this page apply to LCPV supply. For exhaust air and supplementary technical exhaust data, see the section on Integra ceiling diffusers.

Capacity

Max. volume flow [l/s], [m^3/h], total pressure drop p_t [Pa], throw l_{02} [m] and sound effect level L_{WA} [dB(A)] can be seen in the diagrams.

Quick selection, supply air

Quick selection 30 dB(A)

LCPV + MBB		35 dB(A)					
		30 Pa		35 Pa		40 Pa	
Duct	LCPV	q_v		q_v		q_v	
Ød$_1$	Ød$_2$	l/s	m^3/h	l/s	m^3/h	l/s	m^3/h
100	160	26	93	28	100	29	104
125	160	36	129	36	129	36	129
125	200	42	151	44	158	45	162
160	160	39	140	39	140	39	140
160	200	53	190	55	198	54	194
160	250	64	230	69	248	69	248
200	200	53	190	53	190	52	187
200	250	75	270	74	266	74	266
200	315	91	327	91	327	90	324
250	250	79	284	80	288	80	288
250	315	99	356	97	349	96	345
315	315	105	378	106	381	106	381

Quick selection 35 dB(A)

LCPV + MBB		35 dB(A)					
		30 Pa		35 Pa		40 Pa	
Duct	LCPV	q_v		q_v		q_v	
Ød$_1$	Ød$_2$	l/s	m^3/h	l/s	m^3/h	l/s	m^3/h
100	160	26	93	28	100	30	108
125	160	36	129	39	140	41	147
125	200	42	151	46	165	49	176
160	160	42	151	46	165	46	165
160	200	53	190	57	205	61	219
160	250	64	230	69	248	74	266
200	200	64	230	64	230	64	230
200	250	78	280	84	302	89	320
200	315	91	327	98	352	105	378
250	250	84	302	91	327	93	334
250	315	99	356	107	385	115	414
315	315	109	392	118	424	124	446

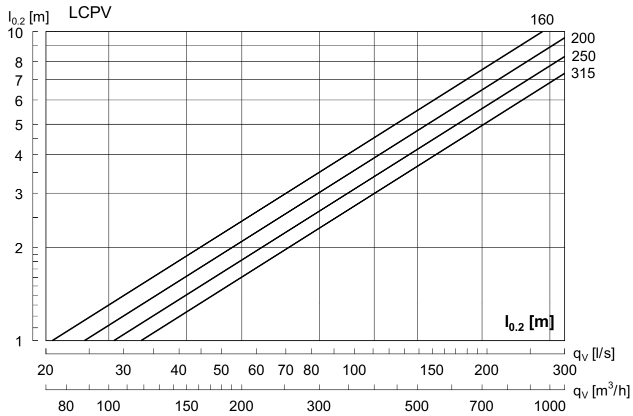
Sound attenuation

Sound attenuation of the diffuser ΔL from duct to room, including end reflection, see table below.

LCPV + MBB									
Duct	LCPV	Centre frequency Hz							
Ød$_1$	Ød$_2$	63	125	250	500	1K	2K	4K	8K
100	160	17	16	6	10	18	18	18	21
125	160	15	14	10	17	16	17	18	21
125	200	13	12	7	13	13	16	17	18
160	160	17	15	12	21	19	19	21	21
160	200	17	16	10	20	17	17	19	20
160	250	16	14	7	17	15	16	19	20
200	200	13	11	10	17	18	15	19	18
200	250	14	11	8	15	19	15	18	17
200	315	14	9	7	13	18	14	17	17
250	250	15	10	9	17	18	18	19	19
250	315	15	8	9	16	18	16	18	18
315	315	8	10	10	17	18	17	18	24

Throw

The throw is specified at a terminal velocity of 0.2 m/s.

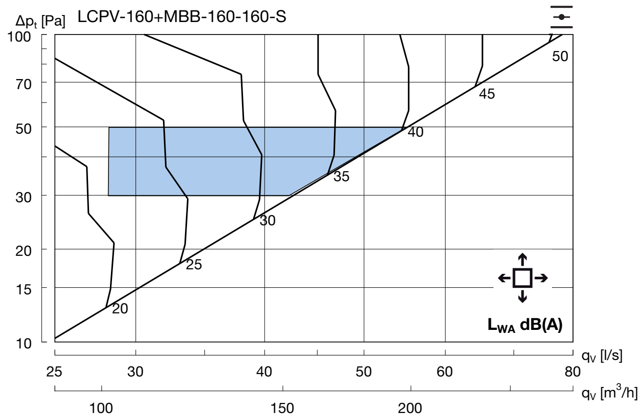


VAV diffuser LCPV

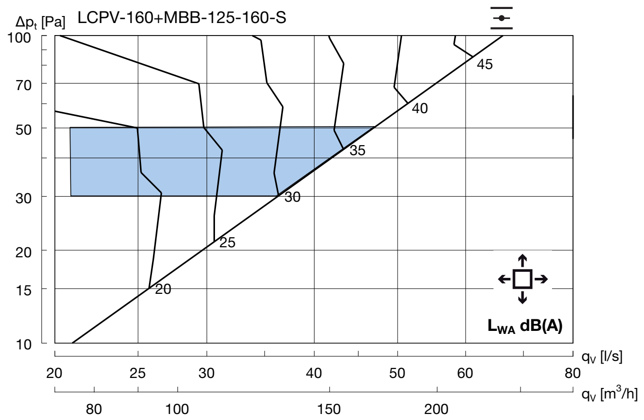
Technical data

Setting range for max. volume flow.

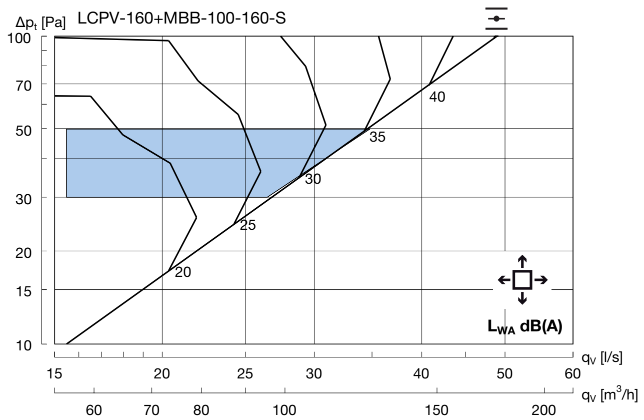
LCPV-160 + MBB - Supply air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	11	10	1	-4	-5	-13	-22	-28

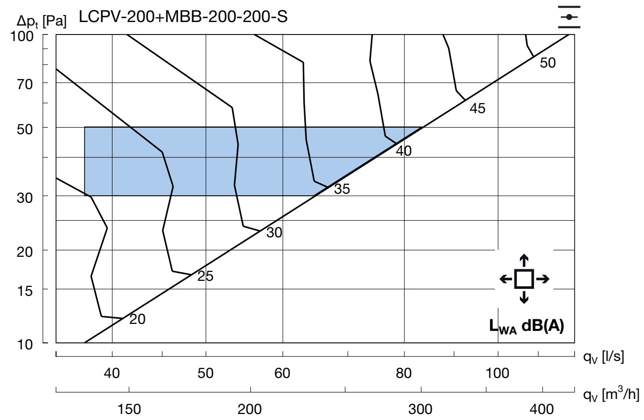


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	7	6	0	-3	-4	-12	-23	-30

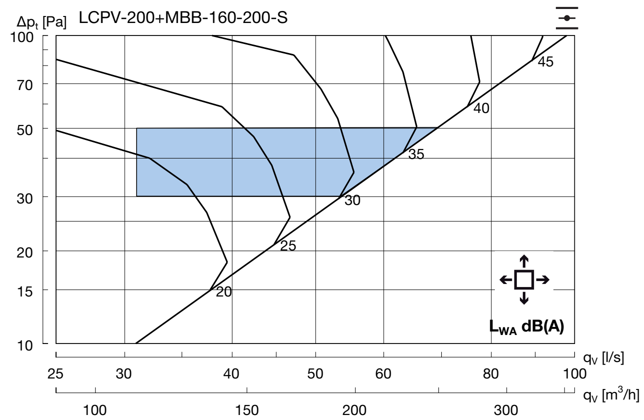


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	7	5	-1	-1	-5	-11	-20	-26

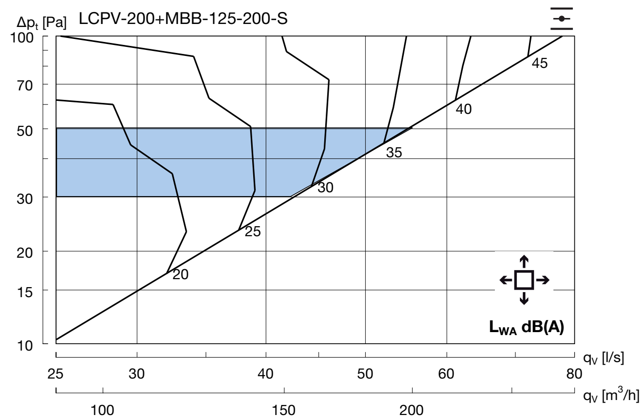
LCPV-200 + MBB - Supply air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	8	6	-2	-4	-2	-16	-26	-31



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	13	10	0	-4	-5	-14	-22	-29



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	9	6	-2	-4	-3	-13	-18	-24

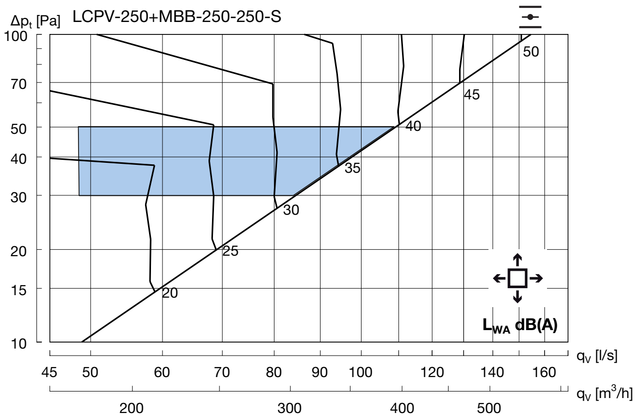
VAV diffuser

LCPV

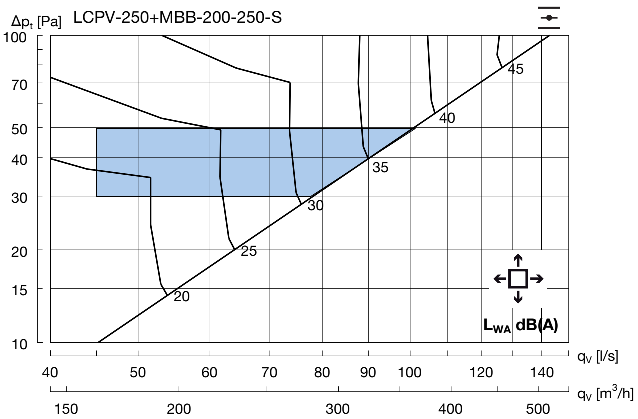
Technical data

Setting range for max. volume flow.

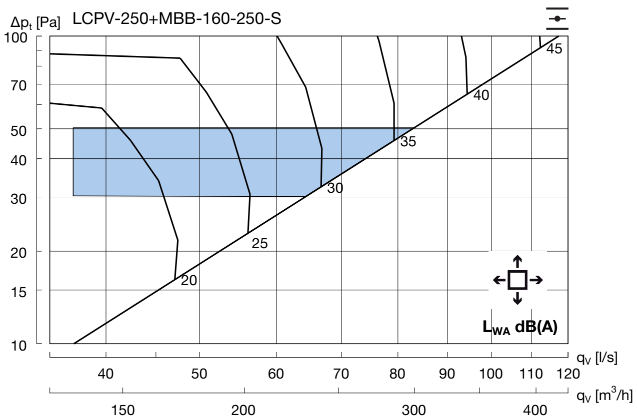
LCPV-250 + MBB - Supply air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	11	7	0	-3	-4	-15	-26	-31

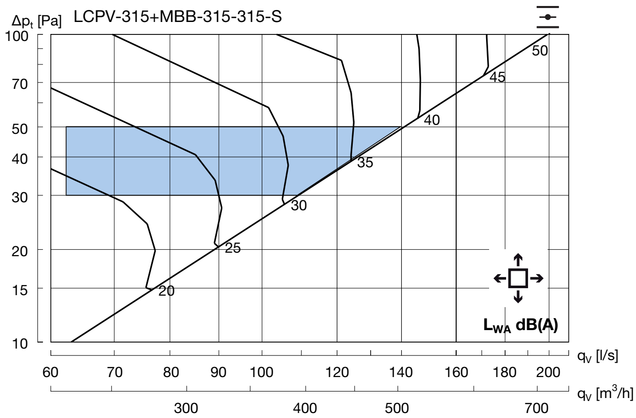


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	11	10	1	-3	-5	-16	-25	-32

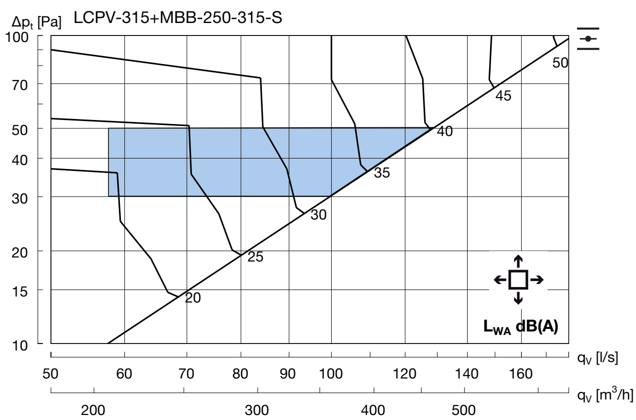


Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	10	9	0	-4	-4	-13	-18	-22

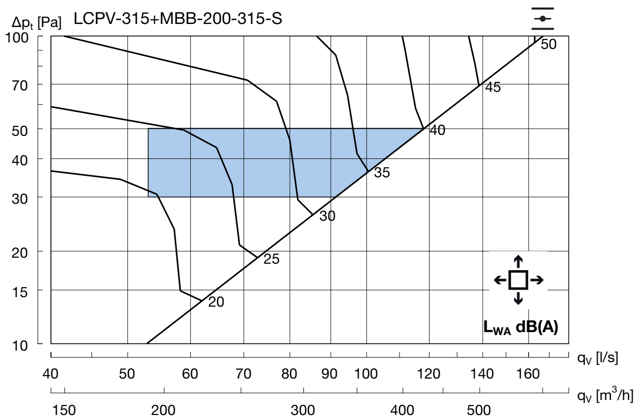
LCPV-315 + MBB - Supply air



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	9	6	1	-1	-5	-14	-25	-32



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	10	9	1	-2	-5	-13	-24	-32



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	10	9	0	-3	-5	-13	-20	-25

VAV diffuser

PCSV/LCSV

Description

PCSV/LCSV is a circular PCS/LCS type diffuser with integrated motor for supply air of varying volume flow (VAV). The integrated motorized damper ensures a constant throw so the Coanda effect always is maintained. The damper setting can be controlled by a room regulator, BMS or other 2-10 V control signal.

- Can vary the volume flow between 0-100 %
- Pre-set min. and max. volume flow *)
- Settings can be changed with ZTH-GEN or Belimo PC-tool
- VAV zone pressure must be controlled
- For exhaust PCS / LCS can be used

*) Settings are made from a pre-defined, available constant pressure in the air duct immediately before the diffuser. The diffuser is typically used at a constant pressure of 30-50 Pa.

Order code

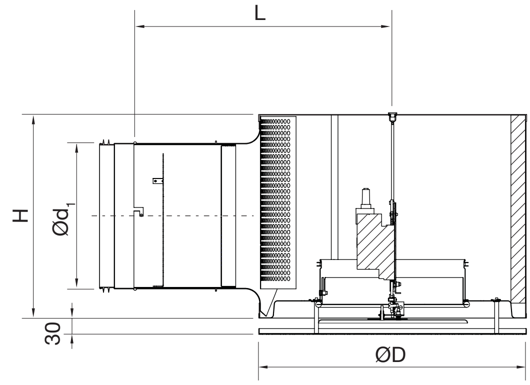
Product	**PCSV/LCSV**	**aaa**	**bb**	**cc**	**dd**
Type PCSV/LCSV	x				
Dimension Ø160-315		x			
Flow settings Min. airflow			x		
Max. airflow				x	
Pressure					x

Example: PCSV-200-60-15-40

PCSV/LCSV is supplied as standard with a 2-10 V modulating motor. Can be supplied with another form of control on request.

Dimensions

LCSV / PCSV



PCSV/LCSV Ød mm	ØD mm	$Ød_1$ mm	L mm	H mm	Weight (kg) (with Motor)
160	300	160	372	260	6.1
200	360	200	415	300	8.4
250	460	250	445	350	11.1
315	540	315	445	420	12.9

Maintenance

The face plate and damper insert can be removed to enable cleaning of internal parts or to gain access to the duct or box. The visible parts of the diffuser can be wiped with a damp cloth.

Materials and finish

Material:	Galvanised steel
Standard finish:	Powder-coated
Standard colour:	RAL 9010, gloss 30
Motor:	Manufact. Belimo type LH24A-MF

Other colours are available. Please contact Lindab's sales department for further information.

VAV diffuser

PCSV/LCSV

Technical data

Diagrams on this page apply to PCSV / LCSV supply air. For exhaust air and supplementary technical exhaust data, see the section on ceiling diffusers -visible, PCS and LCS.

Capacity

Volume flow [l/s], [m³/h], total pressure drop p_t [Pa], throw l_{02} [m] and sound effect level L_{WA} [dB(A)] can be seen in the diagrams.

Quick selection

PCSV/ LCSV Ød$_1$ Size mm	30 Pa			35 Pa			40 Pa		
	q_v		L_{WA}	q_v		L_{WA}	q_v		L_{WA}
	l/s	m³/h	dB(A)	l/s	m³/h	dB(A)	l/s	m³/h	dB(A)
160	35	128	28	38	138	31	41	148	33
200	55	199	29	59	215	31	63	230	33
250	91	327	29	98	354	31	105	378	33
315	127	457	32	137	494	34	146	528	36

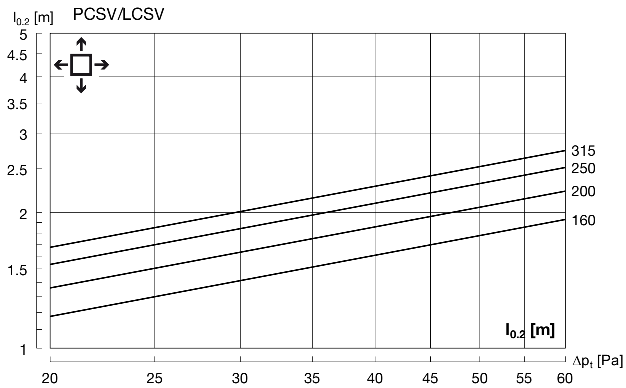
Sound attenuation

Sound attenuation of the diffuser ∆L from duct to room, including end reflection, see table below.

PCSV/LCSV	Centre frequency Hz							
Ød$_1$	63	125	250	500	1K	2K	4K	8K
160	15	11	9	21	15	12	13	16
200	12	8	6	15	15	9	11	14
250	19	15	12	17	12	9	11	14
315	16	13	11	14	12	9	12	13

Throw

The throw is specified at a terminal velocity of 0.2 m/s as a function of the total pressure drop.



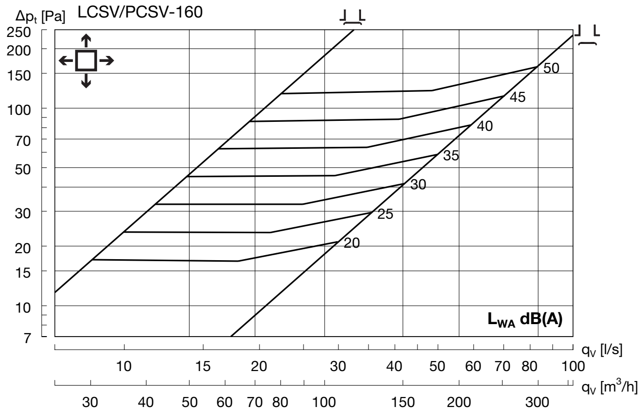
Lindab

VAV diffuser

PCSV/LCSV

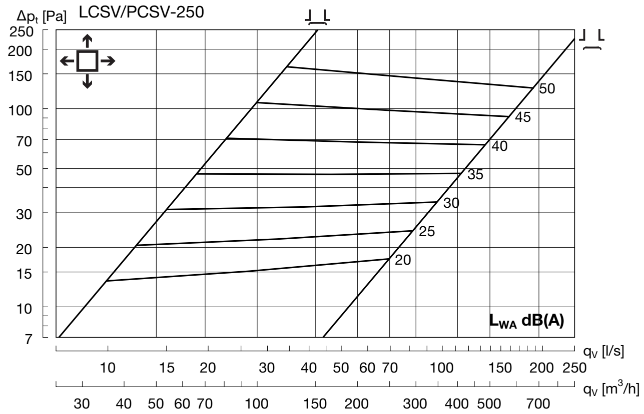
Technical data

LCSV / PCSV-160



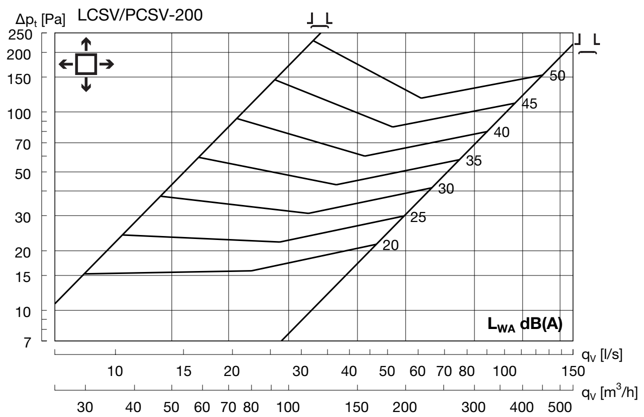
Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	0	4	0	-1	-5	-14	-22	-27

LCSV / PCSV-250



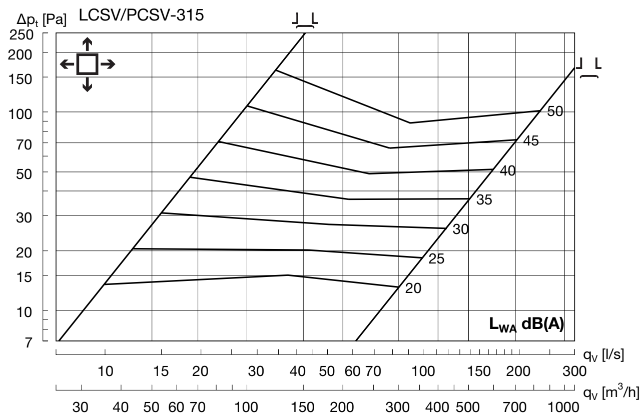
Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	2	0	-4	-2	-2	-15	-22	-37

LCSV / PCSV-200



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	7	3	-1	-1	-4	-13	-23	-28

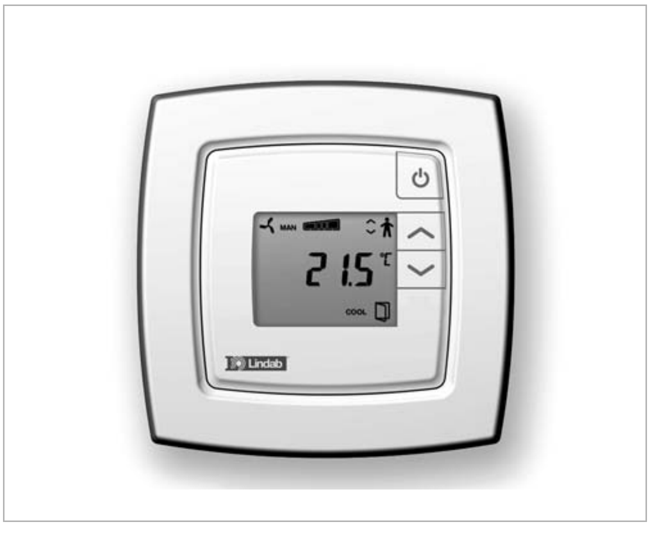
LCSV / PCSV-315



Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	3	-1	-5	-1	-3	-15	-28	-41

Controller

Regula Combi



Description

Regula Combi is a microprocessor-based controller with 5 predefined programs.

The controller can control both water and air-borne indoor climate systems. One of the programs have been specially designed for air systems with VAV.

PI regulation with either 24 V on/off or 0-10 V control.

Internal temperature sensor and three inputs for controlling the indoor climate, with external sensors for:

- Temperature
- CO_2
- Movement (PIR)

Technical data

The regulation of temperature takes place in sequences with heating and cooling by signals from the universal outputs UO1 (heating) and UO2 (cooling). The universal output UO3 (forced cooling ventilation) will be activated with 100% signal by pressing the Occupancy button (Bypass operating mode).
As default the UO2 signal will also change to 100% when pressing the Occupancy button.

The basic airflow is set to 20% (default), so the cooling sequence will result in signals from 20-100%. By pressing the Occupancy button for more than 5 seconds operating mode Off will occur, that will change the UO2 signal to 0% regardless of cooling or heating demands. This match-Lindab volume flow regulator functions.

A heating function for UO2 can be activated (by changing parameter 11 to value 5 instead of 4). This will allow UO2 to follow the heating signal UO1 to a free chosen max level (parameter 49) when there is heating demand. This should only be used when having heated air (above room temperature) in the duct e.g. by connecting UO1 to a duct heater. If the heating function on UO2 is activated forced cooling ventilation by pressing the Occupancy button will not lead to 100% signal on UO2.

Operating mode Standby occurs after 30 min (adjustable) if a presence sensor is connected and signal is given, then the neutral zone increases with +/- 2°C (to heating set point 19°C and cooling set point 24°C).

If a CO2 sensor is connected the universal output signal UO2 will be affected according to the CO2 sequence. The major requirement from the cooling sequence and the CO2 sequence will control the UO2 signal.

Bypass operating mode with UO2 and UO3 = 100% signal will be activated for 45 min (changeable) by pressing the occupancy button once (for less than 5 seconds).

Regula Combi in detail, go to:

www.lindQST.com

-> documentfinder -> Regulation -> Regula Combi

Volume flow regulator VRU/FRU

VRU-0 / FRU

Description

FRU is a measuring diffuser with a measuring cross, which is used for measuring volume flow in circular ducts. FRU is equipped with Belimo VRD3, which provides an output signal that is proportional to the volume flow.
VRU consists of an FRU measuring diffuser and a DCT type damper put together to form a complete diffuser. VRU is used for volume flow regulation of circular ducts, either for constant volume flow with step control, e.g. controlled by a switch or clock, or for variable volume flow, where the volume flow varies between a defined minimum and maximum limit. The current volume flow is determined by a control signal from, for example, Regula Combi, CTS or another FRU/VRU.
VRU-0 consists of a regulator (Belimo VRD3) with manual setting and a motor. VRU-2 is equipped with a regulator and motor in one unit (Belimo L/NMV-D2-MP), which is programmable and has an MP bus. VRU-3 consists of a regulator (Belimo VRD3) with manual setting and a motor with a spring return. Further documentation on the regulator can be requested from Lindab.
VRU/FRU are equipped with Lindab Safe seals at both ends for connection to the duct and are ready for insulation up to 50 mm.
VRU/FRU can be installed in any position without requiring adjustment. To avoid dirtying the measuring cross and sensor, VRU/FRU should only be used for clean air.

Ordering example

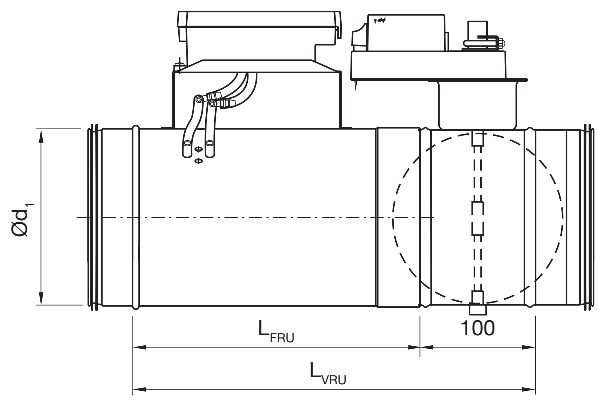
Product	**VRU**	**a**	**bbb**
Type			
Standard	0		
Compact model (VRU only)	2		
With spring return (VRU only)	3		
Size $Ød_1$			

VRU-2 can be supplied with an attenuation shield on request.

Advantages of VRU/FRU

- Requires minimum pressure (20 Pa)
- Has large regulation range
- Simple adjustment of volume flow
- Parallel or slave operation of several terminals
- Shut-off to damper tightness class 3 (VRU only)
- Establishment of over/underpressure or pressure balance in the ventilated zones
- Output signal indicates current volume flow
- Can communicate with all makes of automatic equipment with control voltage 2-10 V or 0-10 V
- Can communicate with CTS systems

Dimensions



$Ød_1$ nom	L FRU	L VRU
125	300	400
160	300	400
200	300	400
250	400	500
315	400	500
400	400	500
500	510	610
630	560	660

Motor summary

Type	Motor
VRU-0	NM24-V-F
VRU-2	L/NMV-D2-MP
VRU-3	AF24-V

Technical data, go to page 569

Volume flow regulator VRA/FRA

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

VRA-0 / FRA

Description

FRA is a flow regulator with a measuring cross, which is used for measuring volume flow in rectangular ducts. FRA is equipped with Belimo VRD3, which provides an output signal that is proportional to the volume flow.
VRA consists of an FRA measuring unit and a DJP type damper put together to form a complete regulator. VRA is used for volume flow regulation of rectangular ducts, either for constant volume flow with step control, e.g. controlled by a switch or clock, or for variable volume flow, where the volume flow varies between a defined minimum and maximum limit. The current volume flow is determined by a control signal from, for example, Regula Combi, CTS or another FRA/VRA.
VRA-0 consists of a regulator (Belimo VRD3) with a manual setting and motor.
VRA-2 is equipped with a regulator and motor in one unit (Belimo NMV-D2-MP), which is programmable and has an MP bus.
VRA-3 consists of a regulator (Belimo VRD3) with a manual setting and motor with a spring return. Further documentation on the diffusers can be requested from Lindab.
VRA/FRA is equipped with LS flanges and is supplied ready for insulation up to 50 mm.
VRA/FRA can be installed in any position without requiring adjustment.
To avoid dirtying the measuring cross and sensor, VRA/FRA should only be used for clean air.

Ordering example

Product **VRA / FRA** **a** **bbb** **ccc**

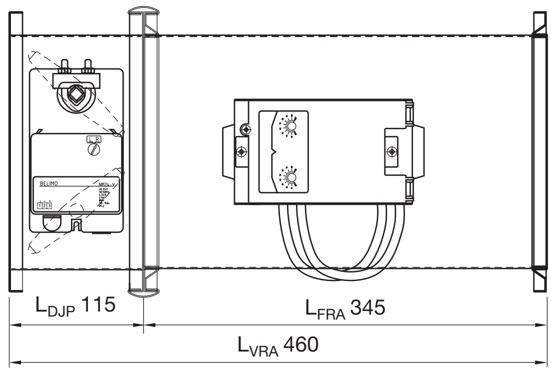
Type

Standard 0
Compact model (VRA only) 2
With spring return (VRA only) 3
A (width in mm)
B (width in mm)

Advantages of VRA/FRA

- Requires minimum pressure (20 Pa)
- Has large regulation range
- Simple adjustment of volume flow
- Parallel or slave operation of several terminals
- Shut-off to damper tightness class 3 (VRA only)
- Establishment of over/underpressure or pressure balance in the ventilated zones
- Output signal indicates current volume flow
- Can communicate with all makes of automatic equipment with control voltage 2-10 V or 0-10 V
- Can communicate with CTS systems

Dimensions



Motor overview

Type	Motor
VRA-0	NM24-V
VRA-2	NMV-D2-MP
VRA-3	AF24-V

Standard sizes

400 x 200
500 x 200
600 x 200
600 x 300
800 x 300

Other sizes are available on request. Please contact Lindab's sales department for further information.

Volume flow regulator

VRA/FRA VRU/FRU

Technical data

Sizes and volume flows
VRU/FRU and VRA/FRA are calibrated and set as standard to a nominal volume flow (V_{nom}) of 7 m/s according to the tables below. In special circumstances they can be set to a higher V_{nom}, e.g. 10 m/s. Vnom indicates the measuring range for the regulator, and the linear output signal (2-10 V or 0-10 V) is an expression of the volume flow between 0 – V_{nom}.

For VRU/VRA, V_{max} and V_{min} indicate the limits for the regulator's working range. Similarly there is a linear connection between V_{min} - V_{max} and the input signal (2-10 V or 0-10V). V_{max} can be set in the range 30-100% of V_{nom}, V_{min} in the range 0-80% of V_{max}; however, V_{min} must not be less than 25% of Vnom due to the measurement pressure. This measurement limit, which is 1.75 m/s, is stated below for rapid dimensioning of VRU/VRA.

V_{max}, V_{min} and mode (2-10 V / 0-10 V) for VRU/VRA and mode (2-10 V / 0-10 V) for FRU/FRA can be set using the adjustment tool Belimo ZTH-VAV. For VRU-2 (with L/NMV-D2-MP) there are several programming options for using Belimo PC-Tool or Belimo MFT-H. See the Belimo documentation for further details.
VRU/VRA works with almost no prepressure. Pressure loss over VRU/VRA at nominal volume flow and with a fully open damper is less than 20 Pa.

VRU/VRA or FRU+DCT/FRA+DJP
The choice between VRU/VRA or FRU+DCT/FRA+DJP depends on the installation features of the duct system. VRU/VRA should be used where it can be positioned so that the flow to the measuring cross ensures a good volume flow measurement. If you wish to position the damper close to a joint or bend, a DCT type duct damper should be used. In that case, volume flow regulator FRU with measuring cross is positioned after the damper with a suitably straight section of duct in front of it.

Volume flow measurement
The accuracy of volume flow measurement depends on the flow conditions in front of the measuring cross. It is preferable to have a long straight stretch of ducting in front of the measuring point, according to the table below.

obstacle	Recommended straight duct section in front of measuring cross
Bend	3 x d
Tee-piece	2 x d
Damper	6 x d

In poor flow conditions the absolute volume flow measurement will be less accurate (i.e. min. and max. volume flow with greater inaccuracy), while the VAV function will not normally change (i.e. any temperature control in the room will still function).

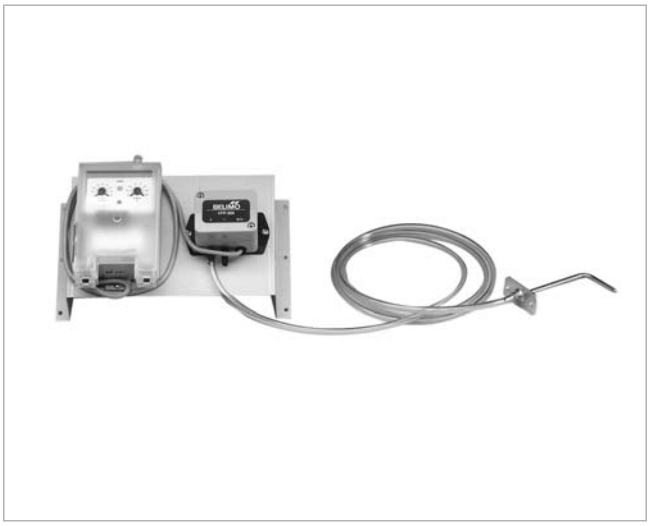
VRU capacity, min - max.

Size ød1 mm	V-measure limit (1.75m/s)		V_{nom} (7m/s)		V_{nom} (10m/s)	
	m³/h	l/s	m³/h	l/s	m³/h	l/s
125	77	21	309	86	442	123
160	127	35	506	141	723	201
200	198	55	791	220	1130	314
250	309	86	1236	343	1766	491
315	491	136	1963	545	2804	779
400	791	220	3165	879	4522	1256
500	1236	343	4946	1374	7065	1963
630	1963	545	7851	2181	11216	3116

VRA capacity, min - max.

Size ød1 mm A	Size ød1 mm B	V-measure limit (1.75m/s)		V_{nom} (7m/s)		V_{nom} (10m/s)	
		m³/h	l/s	m³/h	l/s	m³/h	l/s
400	200	504	140	2016	560	2880	800
500	200	630	175	2520	700	3600	1000
600	200	756	210	3024	840	4320	1200
600	300	1134	315	4536	1260	6480	1800
800	300	1512	420	6048	1680	8640	2400

Pressure regulator PR



Description

Pressure regulator PR consists of a static pressure probe for installation in circular or square ducts, a pressure sensor (Belimo VFP) and a regulator (Belimo VRP-STP).

The regulator has an outlet for measuring static pressure and controls a damper of type DCT or DJP with damper motors type NM24-V, LF24-V or AF24-V and programmable motors.

Pressure regulator PR is used together with an adjustment damper type DCT or DJP to maintain a constant static pressure in distribution ducts to a VAV zone.

The pressure regulator is supplied with a 2 m long pressure hose for the pressure probe.

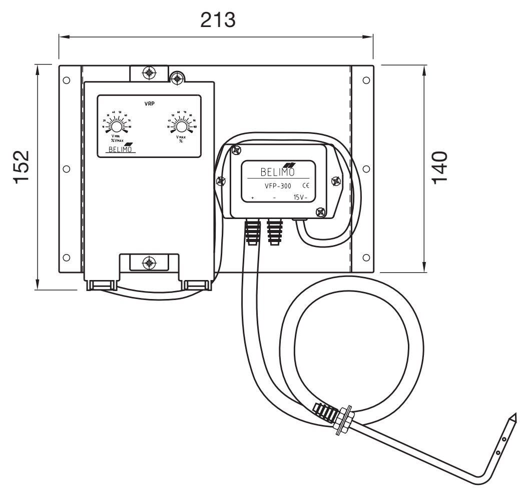
PR can be supplied with the following pressure ranges (Pa): 100 - 300 - 600 – 1,000 – 1,500 – 3,000.

- Has large regulation range
- Simple adjustment of set point

Ordering example

Product	PR	aaaa
Type		
Pressure range		

Dimensions



Damper - circular DCT

Description

DCT is a circular control and shut-off damper, which meets the air tightness requirements of DS 447 class 3.

The damper can be used for pressure or volume flow regulation with external control options (open, closed, min., max.) depending on the form of control/regulation.

DCT is available with a spring return motor, so the damper can be used as a smoke damper. The damper can be controlled by an FRU (as a VRU) or a PR regulator, by a CTS system or Regula Combi (with modulating signal) or as a slave for another damper (mechanical slave operation with the same damper position).

When ordering, it is important to specify the form of control, and whether the damper motor must be programmable. All DCT dampers are supplied with Belimo motors.

Ordering example

Product **DCT** a bbb c d

Type

Standard 0

Spring return 3

Size $Ød_1$

Form of control

R: Regulator-controlled

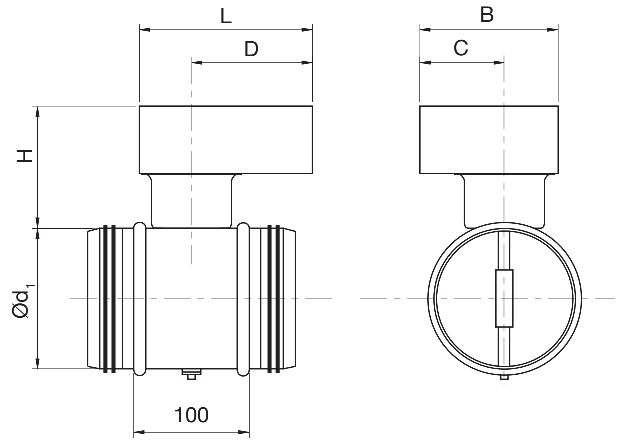
S: Parallel signal (modulating)

Programming

U: Without programming

P: Programmable

Dimensions



Type	B mm	C mm	D mm	H mm	L mm
DCT-0-RU/SU	90	45	130	110	160
DCT-0-RP/SP	80	40	170	110	200
DCT-3	100	50	210	150	260

Motor overview

Type	ø100-ø250 Motor 0 (Standard)	ø315-ø630 Motor 0 (Standard)
DCT-RU	NM24-V	NM-24V
DCT-RP	LM24A-MF-F	NM24A-MF-F
DCT-SU	LM24A-SR-F	NM24A-SR-F
DCT-SP	LM24A-MF-F	NM24A-MF-F

Type	ø100-ø250 Motor 3 (Spring-return)	ø315-ø630 Motor 3 (Spring-return)
DCT-RU	LF24-V	AF24-V
DCT-RP	LF24-MFT	AF24-MFT
DCT-SU	LF24-SR	AF24-SR
DCT-SP	LF24-MFT	AF24-MFT

RU Used only with PR (and FRU) and is preset to a VAV input signal: 6 ± V,

RP Has a programmable motor, is used together with PR and is preprogrammed for a VAV input signal: 6 ± V. Has modulating output signal indicating damper position for mechanical control of a slave damper.

SU Has a motor, which is controlled by modulating input signal (2-10V). Also has a modulating output signal indicating damper position.

SP Has a programmble motor, which can be controlled by optional input signal (Standard modulating). Also has a modulating output signal indicating damper position for mechanical control of a slave damper.

Damper - circular

DCT

Technical data

Pressure drop diagram and sound data for dimensioning
The solid curves indicate the total pressure drop over the damper as a function of the volume flow q and the blade angle.

The broken curves indicate the A-weighted sound effect level L_{WA} , in dB to the duct.

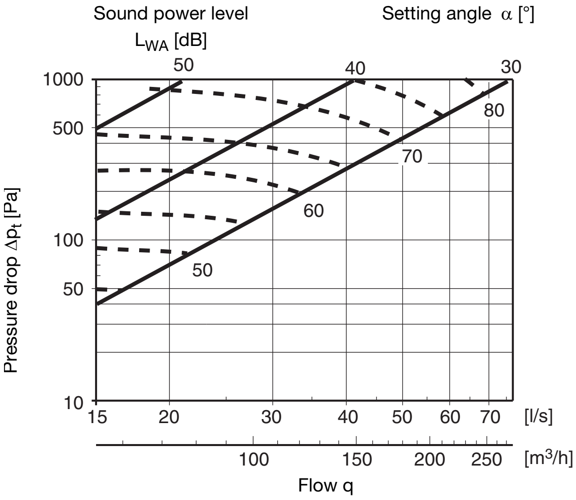
Example:
Dimension: Ø100
Volume flow: 60 l/s
Pressure drop: 200 Pa

The following can be obtained from the diagram:
Blade angle: 40°
Sound effect level: 62 dB(A)

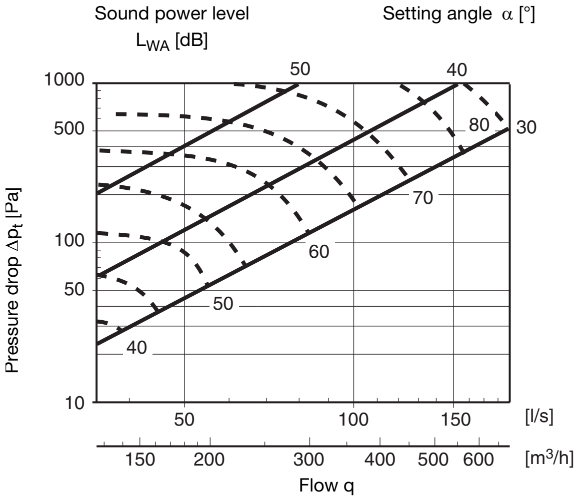
Measuring method for sound:
Sound data has been measured by the Swedish National Testing and Research Institute (SP) with reference to ISO 5135 and EN/ISO 3741.

Blade angle:
0° = open damper.
90° = closed damper.

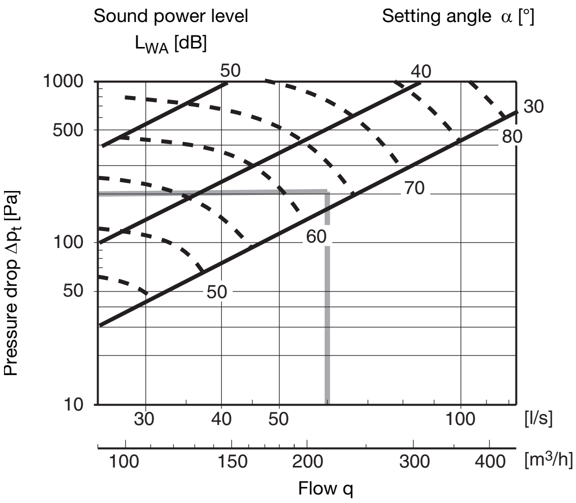
Ø80



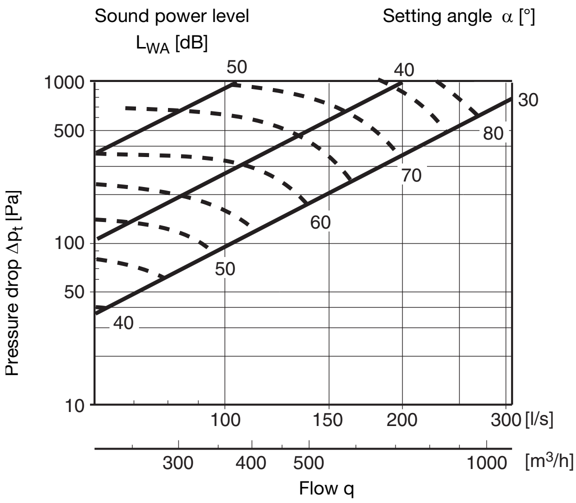
Ø125



Ø100



Ø160

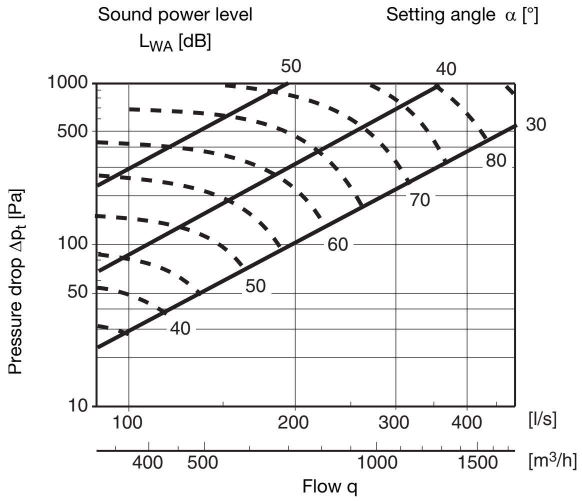


Damper - circular

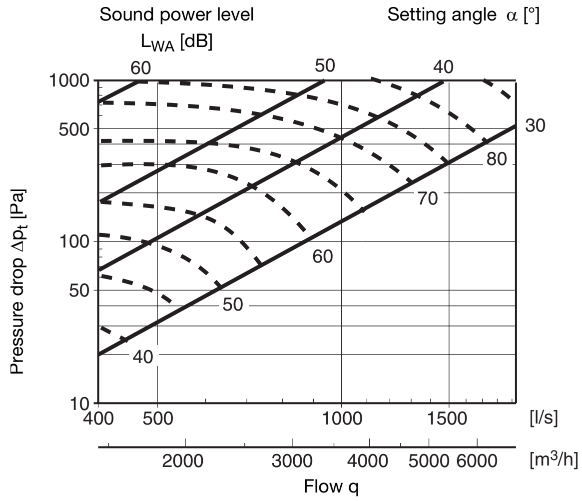
DCT

Technical data

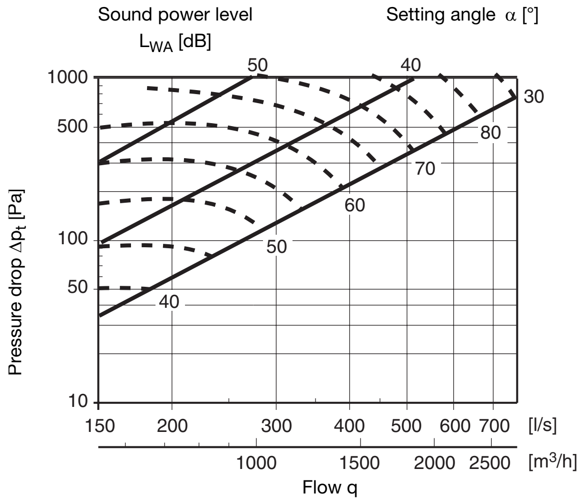
Ø200



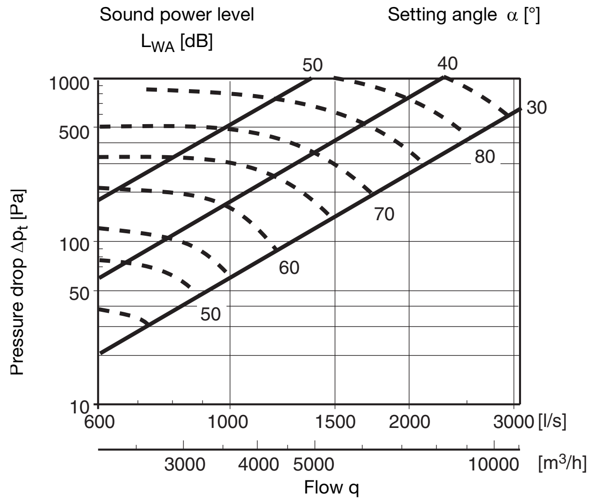
Ø400



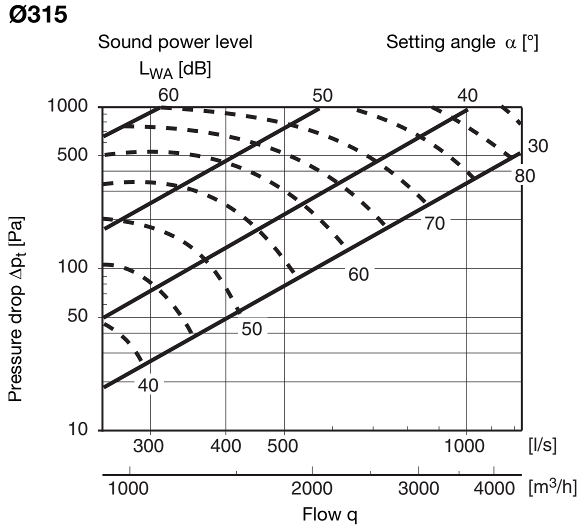
Ø250



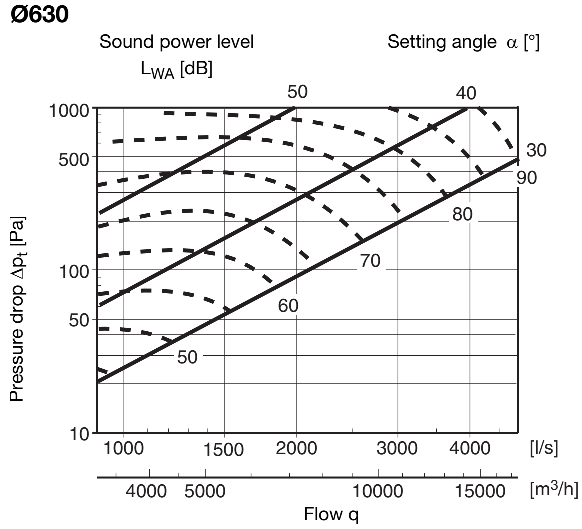
Ø500



Ø315



Ø630



Damper - circular DCT

Technical data

Sound data

The following pages give sound effect levels for ducts (flow noise) with reference to ISO 5135 as a function of volume flow and pressure difference. The necessary minimum pre-pressure difference is 20 Pa for all sizes, equivalent to the pressure loss over VRU at nominal volume flow and with a fully open damper.

Go to page 577 for further technical data.

Dimension $Ød_1$	Pressure drop [Pa]	app. 3 [m/s]								app. 6 [m/s]								app. 9 [m/s]							
		Mean frequency [Hz]								Mean frequency [Hz]								Mean frequency [Hz]							
		63	125	250	500	1k	2k	4k	8k	63	125	250	500	1k	2k	4k	8k	63	125	250	500	1k	2k	4k	8k
100		Air volume 25 [l/s] / 90 [m³/h]								Air volume 50 [l/s] / 180 [m³/h]								Air volume 75 [l/s] / 270 [m³/h]							
	500	67	64	64	57	54	48	48	48	72	68	68	62	59	52	52	52	78	75	75	67	64	57	57	57
	300	62	61	60	54	51	45	42	42	68	68	68	59	56	50	47	47	75	74	73	65	61	54	51	51
	200	58	58	58	50	48	40	37	37	65	65	64	57	54	45	42	42	74	73	73	64	59	50	47	46
	100	58	55	53	46	41	34	26	24	68	66	62	54	48	40	31	29	79	75	71	62	56	46	36	33
	50	55	53	48	42	35	26	22	18	69	67	60	53	44	33	28	22	-	-	-	-	-	-	-	-
125		Air volume 40 [l/s] / 144 [m³/h]								Air volume 80 [l/s] / 288 [m³/h]								Air volume 120 [l/s] 432 [m³/h]							
	500	71	68	65	59	56	50	50	47	76	73	70	63	60	53	53	50	83	79	76	68	65	58	58	54
	300	66	66	60	55	52	46	43	40	73	73	67	60	57	51	48	44	79	79	72	66	62	55	52	48
	200	65	62	57	51	46	41	38	38	74	71	65	59	53	47	43	43	82	78	71	65	58	51	48	48
	100	64	59	53	47	39	34	29	27	77	70	63	55	47	40	35	32	84	78	70	61	51	45	39	35
	50	63	54	50	41	36	27	25	20	80	68	60	51	43	34	32	26	-	-	-	-	-	-	-	-
160		Air volume 60 [l/s] / 216 [m³/h]								Air volume 120 [l/s] / 432 [m³/h]								Air volume 180 [l/s] / 648 [m³/h]							
	500	68	67	64	59	55	53	52	51	72	71	68	62	59	55	54	53	78	77	74	67	63	60	59	58
	300	63	62	59	55	52	49	46	45	67	66	64	58	55	52	49	48	75	75	71	65	61	58	54	54
	200	61	58	56	50	48	42	40	40	68	65	62	56	53	47	44	44	76	73	69	63	59	53	50	50
	100	59	54	50	45	40	35	33	31	70	64	60	53	48	42	39	38	77	73	69	61	54	48	45	44
	50	54	50	46	37	33	29	25	25	69	64	58	48	42	37	32	32	-	-	-	-	-	-	-	-
200		Air volume 100 [l/s] / 360 [m³/h]								Air volume 200 [l/s] / 720 [m³/h]								Air volume 300 [l/s] / 1080 [m³/h]							
	500	70	64	61	55	52	52	55	55	75	68	65	59	55	55	59	59	83	76	72	65	61	61	65	65
	300	67	62	56	50	48	45	48	48	74	68	62	55	52	51	53	52	84	78	71	64	61	57	60	60
	200	62	57	55	47	44	42	42	42	71	65	62	53	50	48	47	47	83	76	71	62	58	55	54	54
	100	57	52	48	41	39	36	34	34	69	64	58	50	47	44	42	42	83	76	69	59	56	53	50	50
	50	51	45	41	36	32	32	28	28	63	56	51	44	39	39	34	34	-	-	-	-	-	-	-	-
250		Air volume 150 [l/s / 540 [m³/h]]								Air volume 300 [l/s] / 1080 [m³/h]								Air volume 450 [l/s] / 1620 [m³/h]							
	500	69	66	59	53	50	54	53	52	71	67	61	56	53	56	55	54	78	75	68	61	58	61	60	59
	300	63	61	55	50	47	46	48	47	66	63	57	51	48	47	51	48	75	72	65	59	55	55	59	55
	200	59	57	52	46	44	41	44	44	63	60	55	49	46	44	46	46	72	69	63	57	55	54	54	53
	100	56	52	45	41	38	36	34	31	63	57	51	45	43	40	38	35	75	69	60	56	52	49	45	42
	50	52	48	40	38	34	30	28	24	61	56	47	45	40	38	33	28	-	-	-	-	-	-	-	-
315		Air volume 250 [l/s] / 900 [m³/h]								Air volume 500 [l/s] / 1800 [m³/h]								Air volume 750 [l/s] / 2700 [m³/h]							
	500	68	65	59	53	50	50	53	50	74	71	65	58	55	55	58	55	82	78	71	64	60	60	54	60
	300	62	59	54	49	46	45	49	43	69	66	60	54	51	51	54	48	78	74	68	61	57	57	61	54
	200	60	55	50	45	43	40	43	40	70	64	58	52	49	48	49	46	79	72	66	59	58	57	56	52
	100	54	52	45	41	38	36	36	31	66	63	55	50	47	46	44	39	76	72	64	57	54	52	50	44
	50	49	49	43	38	34	32	30	24	64	64	56	49	45	42	40	32	-	-	-	-	-	-	-	-
400		Air volume 400 [l/s] / 1440 [m³/h]								Air volume 800 [l/s] / 2880 [m³/h]								Air volume 1200 [l/s] / 4320 [m³/h]							
	500	79	73	67	62	57	60	59	58	82	75	68	65	59	62	61	60	88	81	74	70	62	66	65	64
	300	72	66	60	54	51	51	51	51	77	70	64	58	56	55	54	54	84	77	70	63	62	61	60	60
	200	67	62	56	50	48	48	48	45	74	68	62	56	53	52	52	49	82	75	68	61	60	59	58	54
	100	61	56	49	44	42	39	39	34	72	66	58	53	49	47	46	40	83	76	67	60	58	55	53	47
	50	57	52	44	39	37	35	34	26	72	67	56	50	47	44	44	33	-	-	-	-	-	-	-	-
500		Air volume 600 [l/s] / 2160 [m³/h]								Air volume 1200 [l/s] / 4320 [m³/h]								Air volume 1800 [l/s] / 6480 [m³/h]							
	500	84	77	70	64	63	62	61	60	85	78	71	65	64	63	62	61	91	84	76	68	67	68	68	67
	300	77	70	64	58	54	54	58	58	80	74	67	60	57	57	60	60	88	80	73	66	62	62	66	66
	200	71	65	59	53	50	50	50	47	77	70	64	58	56	55	54	51	85	78	72	65	63	61	60	57
	100	63	58	53	47	46	44	42	37	72	66	60	55	53	51	49	43	82	75	70	63	60	57	55	50
	50	59	52	47	44	42	38	38	31	71	63	57	54	51	46	46	37	-	-	-	-	-	-	-	-
630		Air volume 1000 [l/s] 3600 [m³/h]								Air volume 2000 [l/s] / 7200 [m³/h]								Air volume 3000 [l/s] / 10800 [m³/h]							
	500	88	80	73	69	66	64	63	62	90	83	75	71	68	67	65	64	96	88	80	76	72	72	70	68
	300	82	75	69	65	62	61	58	55	84	77	70	67	63	62	61	56	92	84	77	73	69	68	68	61
	200	78	72	65	62	59	55	55	49	80	74	67	64	60	57	57	50	89	82	75	71	67	63	63	56
	100	71	66	59	54	50	46	45	40	78	71	66	59	56	49	47	44	90	82	76	68	63	58	55	50
	50	66	58	53	48	43	40	39	30	77	68	62	57	51	45	48	36	-	-	-	-	-	-	-	-

Damper - rectangular

DJP

Description

DJP is a rectangular control and shut-off damper, which meets the requirements of DS 447 class 3.

DJP has opposing aerodynamic damper blades that are rotated via a lever device. The damper is supplied with an LS connection system for rectangular ducts. The damper can be used for pressure or volume flow regulation with external control options (open, closed, min., max.) depending on the form of control/regulation.

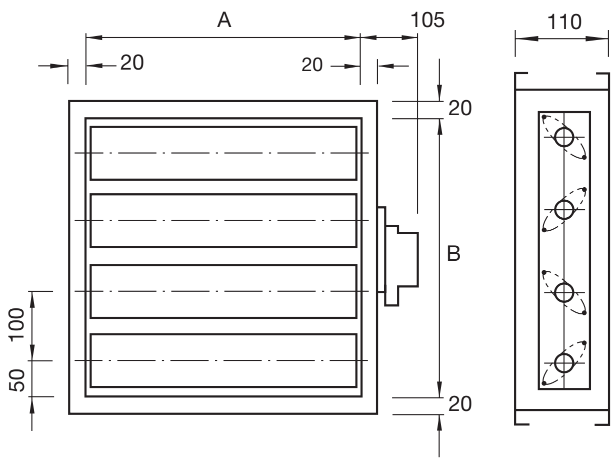
DJP is available with a spring return motor, so the damper can be used as a smoke damper. The damper can be controlled by an FRA (as a VRA) or a PR regulator, directly by a temperature sensor or CTS system (2–10 V modulating) or as a slave for another damper (mechanical slave operation with the same damper position).

When ordering, it is important to specify the form of control, and whether the damper motor must be programmable. All DJP dampers have Belimo motors installed.

Ordering example

Product	**DJP**	**a**	**bbb**	**c**	**d**
Type					
Standard	0				
Spring return	3				
Size					
A (Width)					
B (Height)					
Form of control					
R: Regulator-controlled					
S: Slave or sensor-controlled					
Programming					
U: Without programming					
P: Programmable					

Dimensions



Motor overview

Type	Motor 0	Motor 3
DJP-RU	NM24-V	AF24-V
DJP-RP	NM24A-MF	AF24-MFT
DJP-SU	NM24A-SR	AF24-SR
DJP-SP	NM24A-MF	AF24-MFT

RU Used only with PR (and FRU) and is preset to a VAV input signal: 6 ± 4 V.

RP Has a programmable motor, is used together with PR and is preprogrammed for a VAV input signal: 6 ± 4 V.

Has a modulating output signal indicating damper position for mechanical control of a slave damper.

SU Has a motor, which is controlled by a modulating input signal (2-10 V).
Also has a modulating output signal indicating damper position.

SP Has a programmable motor, which can be controlled by an optional input signal (standard modulating).
Also has a modulating output signal indicating damper position for mechanical control of a slave damper.

Damper - rectangular DJP

Technical data

Frequency-related sound effect level

DJP-1m^2		Sound power level [$L_{w]}$ [dB]							
Duct velocity	Pressure difference [Pa]	Centre frequency [Hz] 125	250	500	1000	2000	4000	8000	[L_{WA} (A)] [dB(A)]
2m/s	50	62	60	59	53	50	45	42	60
	100	66	64	62	59	57	54	52	65
	200	71	65	63	65	65	61	58	70
	400	81	80	79	81	81	78	76	86
4m/s	50	65	63	62	56	53	48	45	63
	100	69	67	65	62	60	57	54	68
	200	74	68	67	68	68	64	60	73
	400	84	83	82	84	84	81	79	89
6m/s	50	67	65	63	57	54	49	45	64
	100	72	68	67	65	63	58	49	70
	200	75	69	68	70	71	66	63	76
	400	85	84	83	86	85	83	80	91
8m/s	50	68	66	63	59	56	51	48	65
	100	74	73	71	67	65	59	56	73
	200	80	80	79	75	75	70	65	82
	400	87	86	85	87	87	84	81	92

Correction of sound effect level for other damper sizes

Area [m²]	0,1	0,2	0,4	0,6	0,8	1,0	1,5	2,0
dB correction	-10	-7	-4	-2	-1	0	+2	+3

Damper - rectangular DCT/DJP

Technical data

Dimensioning
When dimensioning the dampers inherent noise from the dampers and their regulating properties (damper characteristics) must be taken into consideration.
If excessively large dampers are used, the working area (angle of rotation) at given Vmin and Vmax may be so limited that regulation does not function satisfactorily. Efforts must be made to use damper dimensions that result in the largest possible working areas (angles of rotation).
Due to regulation accuracy, working areas with damper angles > 75° should be avoided. The diagram shows the damper position at given pressure losses and volume flows.

Example
The example shows the working area for a Ø250 mm damper, which works between

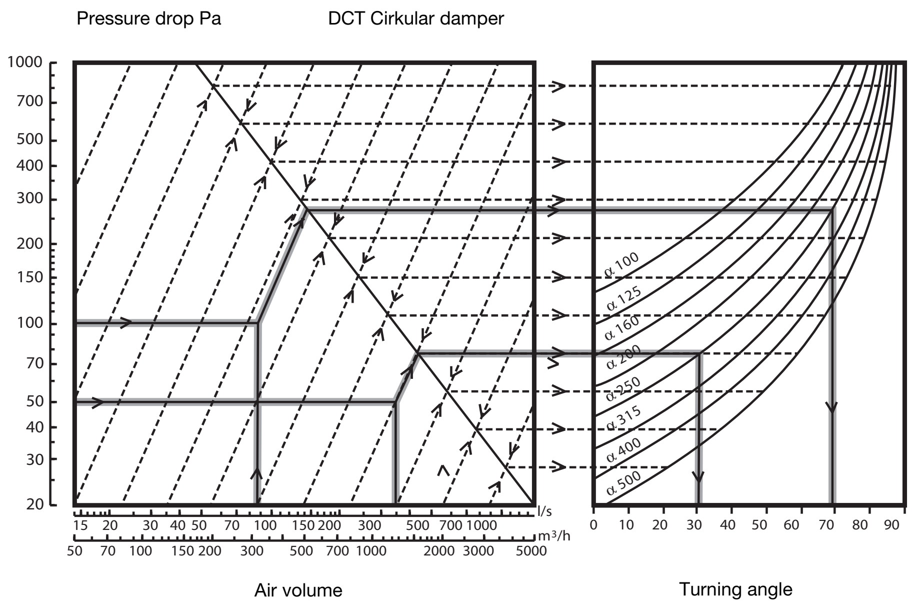
V_{max} =1,236 m^3/h; ∆p = 50 Pa

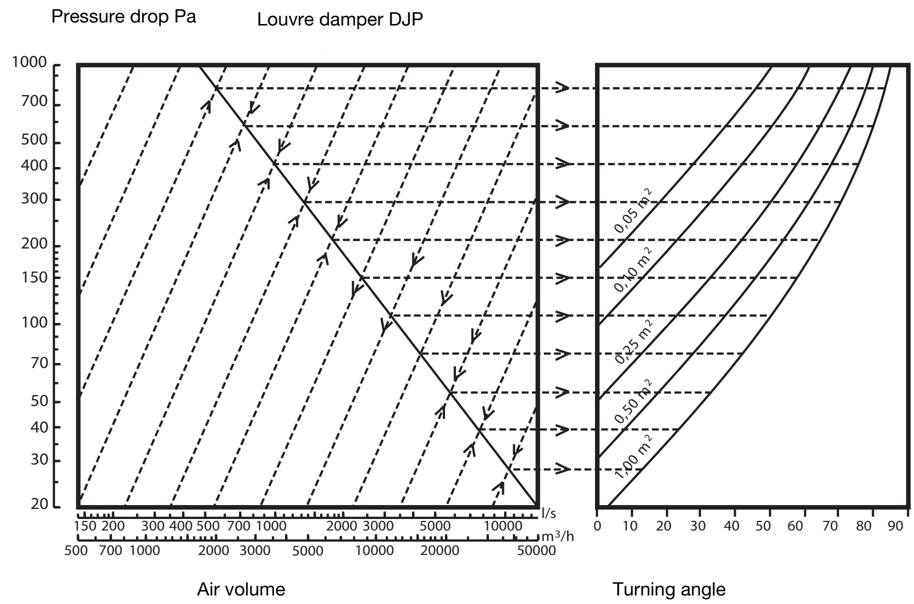
and

V_{min} =309 m^3/h ; ∆p = 100 Pa.

The diagram shows damper positions 31° and 69°.

Correction of sound effect level for other damper sizes





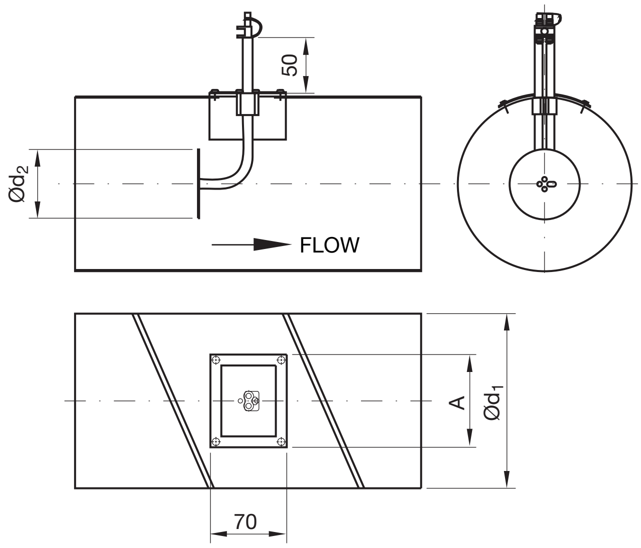
Insert flow gauge FMI

Description

Insert flow gauge FMI is a calibrated measuring plate that can be installed in circular ducts where it is necessary to measure the volume flow. The pressure over the gauge is taken from the two nipples, and the volume flow is determined using the diagram or the accompanying curve constants.

FMI can be installed after duct installation and also in existing systems.

Dimensions



$Ød_1$ mm	$Ød_2$ mm	A mm
80	35	90
100	43	90
125	53	90
160	63	90
200	83	145
250	103	145
315	116	145
400	151	180
500	191	265
630	241	265

Ordering example

Product	**FMI**	**250**
Type		
Dimension $Ød_1$		

Materials and finish:

Materials: Galvanised steel and aluminium

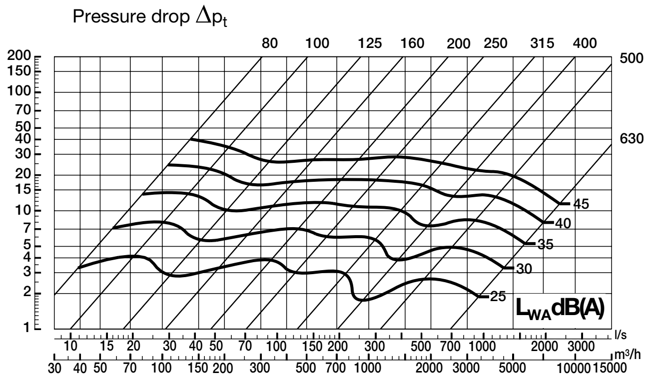
Other colours are available. Please contact Lindab's sales department for further information.

Insert flow gauge FMI

Technical data

Pressure loss – Sound effect

The diagram shows the current pressure loss as a function of the volume flow and A-weighted sound effect level L_{WA} dB(A) at duct. Frequency-related sound effect at duct is shown in the table below.



Measurement accuracy

The length of the straight section of ducting required as a minimum to limit the method error to 5% or 10% respectively is shown in the chart, (d_1 is nom. duct dimension).

obstacle:	5%	10%
Bend	6 x d_1	0 x d_1
Tee-piece *	5 x d_1	0 x d_1
Damper	6 x d_1	4 x d_1

*) "Tee-Piece" here means a circular joint consisting of a Tee-piece or an attachment.

dim	Velocity app. 5 m/s							Velocity app. 7,5 m/s							Velocity app. 10 m/s						
$Ød_1$	Centre frequency [Hz]							Centre frequency [Hz]							Centre frequency [Hz]						
	125	250	500	1K	2K	4K	8K	125	250	500	1K	2K	4K	8K	125	250	500	1K	2K	4K	8K
	Flow 90 m^3/h (25 l/s)							Flow 135 m^3/h (37,5 l/s)							Flow 180 m^3/h (50 l/s)						
80	45	42	37	28	18	13	12	53	48	44	37	27	21	19	59	53	50	44	36	31	27
	Flow 140 m^3/h (39 l/s)							Flow 210 m^3/h (58 l/s)							Flow 280 m^3/h (78 l/s)						
100	43	40	35	27	19	14	9	53	48	44	36	28	23	18	62	55	51	44	37	33	30
	Flow 220 m^3/h (61 l/s)							Flow 330 m^3/h (92 l/s)							Flow 440 m^3/h (122 l/s)						
125	47	41	34	27	20	15	13	55	50	44	36	30	26	21	62	57	52	45	41	38	31
	Flow 360 m^3/h (100 l/s)							Flow 540 m^3/h (150 l/s)							Flow 720 m^3/h (200 l/s)						
160	46	39	33	27	21	16	13	55	48	42	36	31	26	21	62	56	51	44	40	37	30
	Flow 540 m^3/h (150 l/s)							Flow 810 m^3/h (225 l/s)							Flow 1080 m^3/h (300 l/s)						
200	42	36	31	24	18	20	12	49	46	41	34	29	29	23	55	55	49	44	40	37	35
	Flow 880 m^3/h (244 l/s)							Flow 1320 m^3/h (367 l/s)							Flow 1760 m^3/h (488 l/s)						
250	47	38	31	28	24	22	18	51	46	40	37	34	32	29	57	52	47	45	43	42	42
	Flow 1400 m^3/h (389 l/s)							Flow 2100 m^3/h (583 l/s)							Flow 2800 m^3/h (778 l/s)						
315	42	35	31	28	24	22	15	50	43	39	37	33	32	26	55	50	46	45	42	42	39
	Flow 2200 m^3/h (610 l/s)							Flow 3300 m^3/h (920 l/s)							Flow 4400 m^3/h (1220 l/s)						
400	45	41	34	33	30	26	16	54	48	43	41	39	36	28	61	53	50	48	46	45	42
	Flow 3500 m^3/h (792 l/s)							Flow 5200 m^3/h (1444 l/s)							Flow 7000 m^3/h (1944 l/s)						
500	38	34	31	30	28	25	17	48	44	41	40	38	35	27	58	54	51	50	48	45	37
	Flow 5600 m^3/h (1556 l/s)							Flow 8400 m^3/h (2333 l/s)							Flow 11200 m^3/h (3111 l/s)						
630	38	33	31	31	28	26	22	48	43	41	41	38	36	32	58	53	51	51	48	46	42

Air flow regulators

Air flow regulators

Air flow regulators

Air flow regulators

DAU, air flow regulator

Lindab air flow regulators

In many instances it will be necessary to maintain a constant air flow in a room, a zone etc. In normal ventilation units, pressure variations usually for one reason or another makes it necessary to regulate the air duct system, in order to achieve the desired air flow in the right room. In a proportional ventilation system, the slightest pressure variation will influence the air flow coming into the room.
Requirements of minimum air volume/flow in individual rooms, in order to comply with public authority requirements or law requirements are often in place. With Lindabs series of mechanical air flow regulators, the desired air volume/flow is ensured, despite the variety of pressure in the ventilation system itself.

Functions

DAU is a mechanical air flow regulator which automatically sustains a given air flow, that is manually set on the regulation handle. DA2EU has a mounted electrical motor, which is able to switch between two previously chosen air volumes/flows.
DAVU has a mounted electrical motor so that a modulating regulation is possible within the full scale.

DAU, air flow regulator

Air flow regulators

Short facts
- DAU - manual one-step air flow regulator
- DA2EU – motorized two-step air flow regulator
- DAVU – motorized continuous air flow regulator
- Diameter Ø 80-315
- Regulating area 15 – 830 l/s (54-2988 m^3/h
- Pressure area 50 – 1000 Pa (measured over the air flow regulator)
- Completely independent from the mounting position
- Adapted air duct system with 50 mm isolation
- Available with pre-isolation

Function
Constant air flow regulator is an automatic damper, which by flexible pressure completely independently from outer operating conditions maintains the set air flow. The power used to regulate comes from the passing air volume/flow. The air movement past the damper blade causes a turning moment on the damper axle which closes the damper. This "closed" moment is balanced by the spring-force attempting to keep the damper open. The bigger the pressure difference on the blade the faster it will close. A attenuation cylinder records the vibrations, that arise at unwanted operating conditions.

Types
The following types exist :
- DAU – one-step air flow regulator supplied with a handle for manual alterations of the air volume/flow.
- DA2EU – two-step air flow regulator with an electrical motor with a changer for choice between the two air volumes/flows.
- DAVU – continuous air flow regulator with an electrical motor.

Material
Damper and damper blade are made in galvanized steel plate and with an axle in stainless steel.

Temperature
Work area: +5 til +70 ° C

Isolation
The regulator is available with 50 mm air duct isolation without box and motor being weakened.
Upon request the regulators can be delivered with an outside isolation and a thicker plate for dampening noise to the surroundings.

Tolerance
The regulator has been calibrated to fit its work area before leaving the factory. Within this area the regulator keeps a constant air flow within ±5 til ±10 % of the set air volume/flow. Larger deviations may occur at lower air volumes/flow and especially when using the smaller duct sizes.

Built-in conditions
In order to comply with the required tolerances for the set air volume/flow, a straight air duct of at least 3xd before - and 1,5xd after the regulator is a must. If this is not complied with, and the distance to ex. a curb is shorter, the flow will be more in-accurate.

Directional changes / mounting positions
The regulator is completely independent of the chosen mounting position, which makes mounting possible in all directions, without the set tolerances being affected.

Combinations
The regulator can be mounted with ex. a motorized shut-off damper DTBU, see *Lindabs catalogue "Air duct systems"*. Constant air flow regulator combined with shut-off dampers can be used with advantage as a group in installations, where the following is wanted:

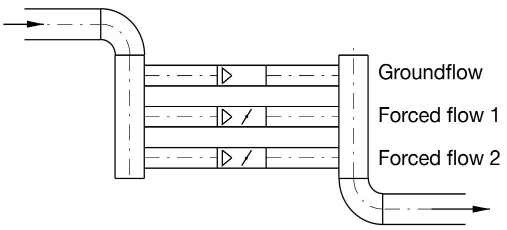
- an air flow outside the individual regulators working area

or

- more than two different air flows.

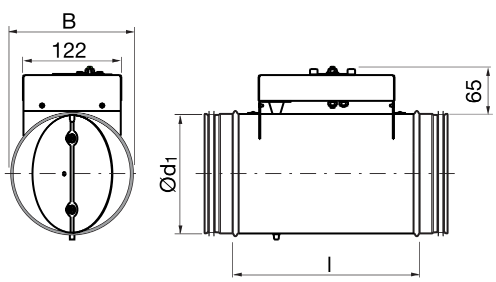
Suppose:	Ground flow	= 80 l/s
	Forced flow	= 100 l/s
	Forced flow	= 150 l/s

Four different air flows are then possible: 80, 180, 230 og 330 l/s



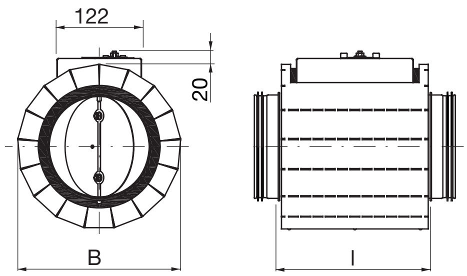
Volume flow regulator DAU

Dimensions



Ød$_1$ nom	l mm	B mm	m kg	Tightness class across closed blade
80	240	122	1,35	0
100	240	122	1,40	0
125	240	135	1,65	0
160	250	170	1,85	0
200	268	210	2,26	0
250	290	260	3,35	0

DAU is available with an 45 mm external insulation and an outer sheet metal shell for lower sound radiation to the surroundings. Is then called DALU.



Ød$_1$ nom	l mm	B mm	m kg	Tightness class across closed blade
80	240	170	2,35	0
100	240	190	2,50	0
125	240	215	2,90	0
160	250	250	3,45	0
200	268	290	4,06	0
250	290	340	6,05	0
315	332	405	8,60	0

Description

Constant flow damper with manual setting of one flow

DAU is a constant flow damper, which facilitates balancing of ventilation systems and gives correct flow from the start.

The unit compensates for e.g. connection and disconnection of system parts, clogging of filters and ducts, thermal lift forces, wind effects, window opening etc.

Ø 80–315 fullfills pressure class A in closed position.

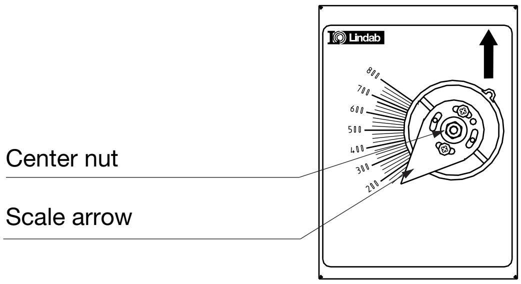
Fulfils tightness class C.

There is a separate assembly, measuring, balancing and maintenance instruction for this product.

Technical data

Flow setting

The flow is set by loosing the center nut and via the knob turning the scale arrow so it points at the wanted flow on the scale. Then the center nut is tightened.

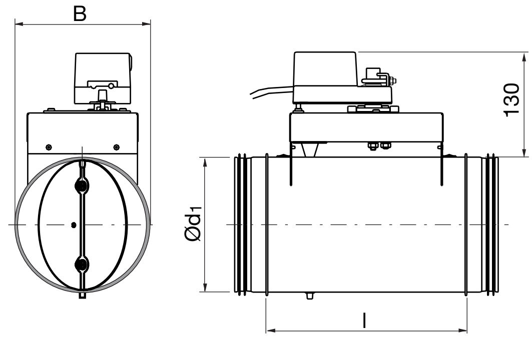


Order code

	DAU	aaa
Product	DAU	
Dimension Ød$_1$		aaa

Volume flow regulator DA2EU

Dimensions



Ød1 nom	l mm	B mm	m kg	Tightness class across closed blade
80	250	122	1,95	0
100	250	122	2,00	0
125	250	135	2,25	0
160	250	170	2,45	0
200	250	210	2,86	0
250	290	260	3,95	0
315	332	325	5,35	0

Description

Constant flow damper with electric motor for switching between two flows

DA2EU is a constant flow damper, which facilitates balancing of ventilation systems and gives correct flow from the start. The unit compensates for e.g. connection and disconnection of system parts, clogging of filters and ducts, thermal lift forces, wind effects, window opening etc. The motors shall be completed with a switch. The switch can in turn be controlled either manually with timer, with on/off-thermostat, with attendance transmitter or similar.
Ø 80–315 fullfills pressure class A in closed position.
Fulfils tightness class C.
There is a separate assembly, measuring, balancing and maintenance instruction for this product.

Ordering example

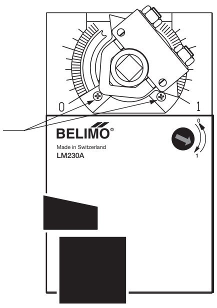
Product	DA2EU	aaa	24/230	LM
Type	DA2EU			
Dimension Ød1		aaa		
Voltage			24/230	
Motor type				LM

Flow setting

The two flows are set by moving the end stoppers screws.

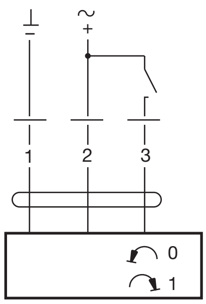
At delivery the screws are set at largest possible distance.

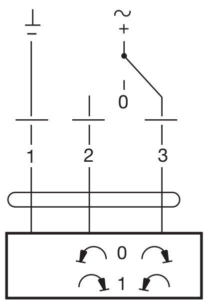
End stop screws



Technical data for the motors

	LM 24 A	LM 230 A
Power supply	AC 19,2–28,8 V, 50/60 Hz DC 19,2–28,8 V	AC 85–265 V, 50/60 Hz
Power consumption	1 W	1,5 W
For wire sizing	2 VA	4 VA
Connection	Cable 1 m, 3×0,75 mm²	Cable 1 m, 3×0,75 mm²
Operating angle	Max. 95°, adjustable 0–100%	Max. 95°, adjustable 0–100%
Torque at rated voltage	Min. 5 Nm	Min. 5 Nm
Direction of rotation	Switch selectable 0 or 1	Switch selectable 0 or 1
Position indication	Mechanical	Mechanical
Running time for 95°	150 s	150 s
Sound power level	Max. 35 dB (A)	Max. 35 dB (A)
Protection class	III Safety extra-low voltage	II Safety insulated
Protection type	IP 54	IP 54
Ambient temperature range	-30 to +50°C	-30 to +50°C
Ambient moisture	95 % RH	95 % RH





Lindab

Volume flow regulator DAVU

Description

Constant flow damper with electric motor for continuous setting of one flow
DAVU is a constant flow damper, which facilitates balancing of ventilation systems and gives correct flow from the start.

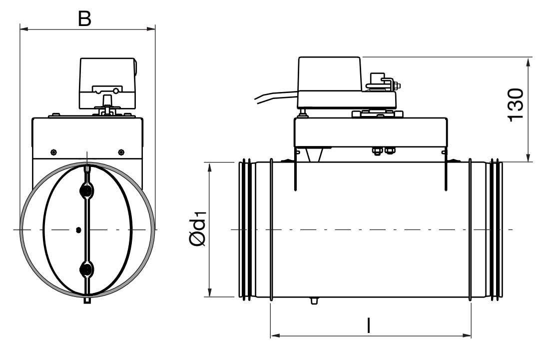
The unit compensates for e.g. connection and disconnection of system parts, clogging of filters and ducts, thermal lift forces, wind effects, window opening etc.

The motor shall be completed with control signal transmitter e.g. an external potentiometer or a proportionally regulating thermostat.

Ø 80–315 fullfills pressure class A in closed position. Fulfils tightness class C.

There is a separate assembly, measuring, balancing and maintenance instruction for this product.

Dimensions



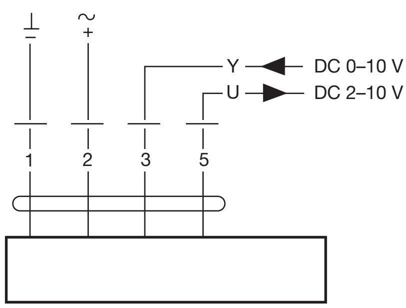
$Ød_1$ nom	l mm	B mm	m kg	Tightness class across closed blade
80	250	122	1,95	0
100	250	122	2,00	0
125	250	135	2,25	0
160	250	170	2,45	0
200	250	210	2,86	0
250	290	260	3,95	0
315	332	325	5,35	0

Order code

	DAVU	125	24	LMSX
Product	DAVU			
Dimension $Ød_1$		125		
Voltage			24	
Motor type				LMSX

Technical data for the motors

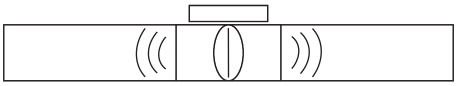
	LM 24 A-SX
Power supply	AC 19,2–28,8 V, 50/60 Hz DC 21,6–28,8 V
Power consumption	2 W
For wire sizing	4 VA
Connection	Cable 1 m, 4×0,75 mm^2
Operating angle	Max. 95°, adjustable 0–100 %
Torque at nominal voltage	Min. 5 Nm
Direction of rotation	Switch selectable 0/1
Position at Y=0 V	Switch selectable 0 or 1
Position indication	Mechanical
Running time for 90°	150 s
Sound power level	35 dB (A)
Protection class	III Safety extra-low voltage
Protection type	IP 54
Ambient temperature range	-30 to +50 °C
Ambient humidity	95 % RH



Technical data DAU, DA2EU, DAVU

Technical data

Pressure and flow ranges and sound to duct



The graphs show A-weighted sound **power** level, L_{WA} [dB], to duct. These curvs are intended for brief comparision. For more accurate calculation, please use the tables.

Example

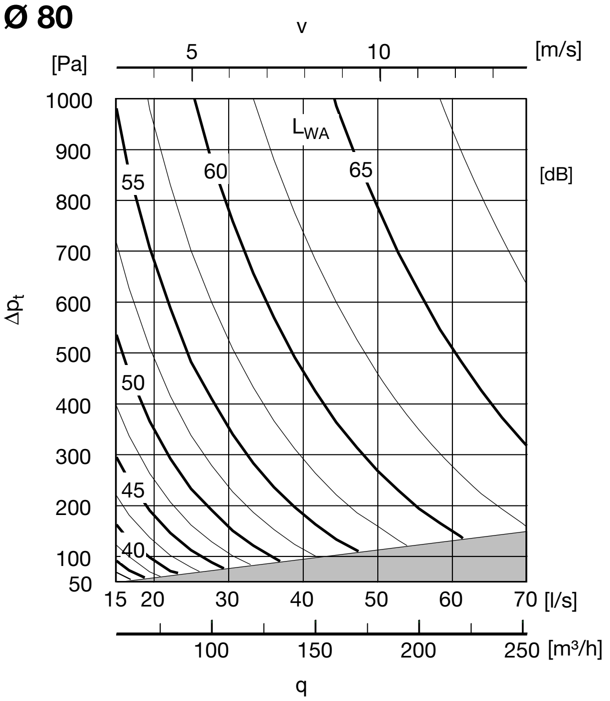
Given: Diameter 125 mm
Flow 70 l/s
Pressure drop 200 Pa

The graph gives:
A-weighted sound power level approx. 57 dB

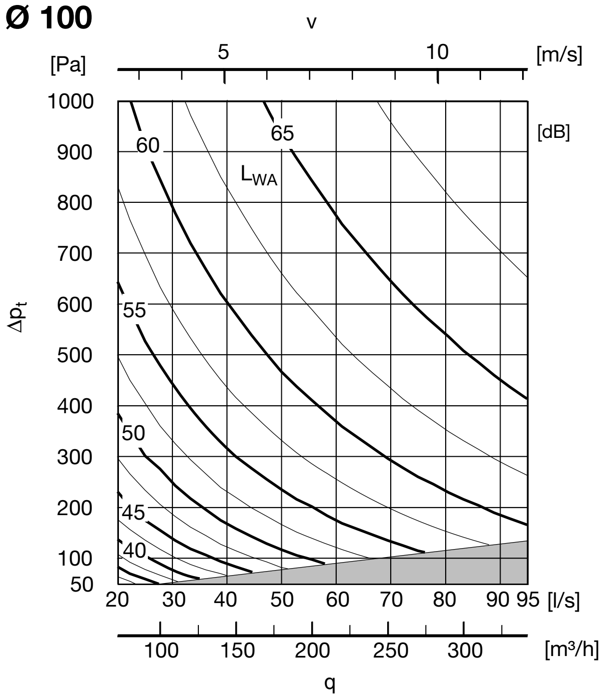
The table gives:
Sound power level as below

Centre fre-quency [Hz]	63	125	250	500	1 k	2 k	4 k	8 k
Sound power level [dB]	52	52	49	49	49	51	51	46

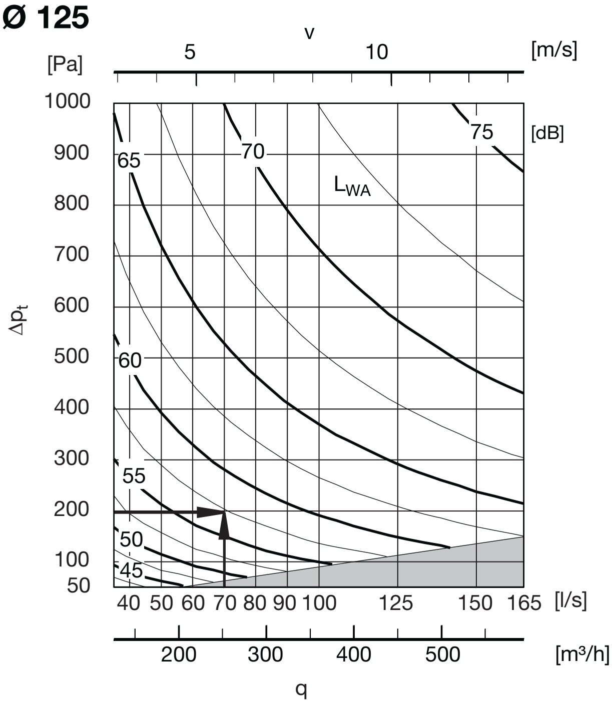
Ø 80



Ø 100



Ø 125



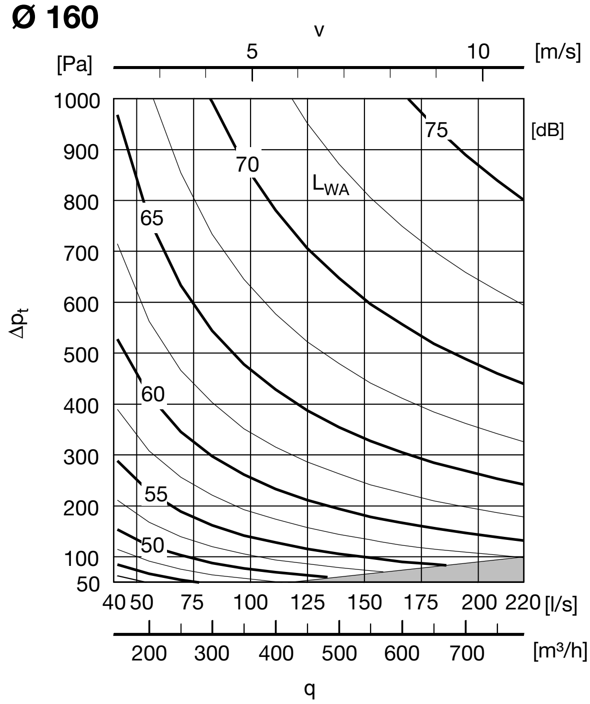
Technical data

DAU, DA2EU, DAVU

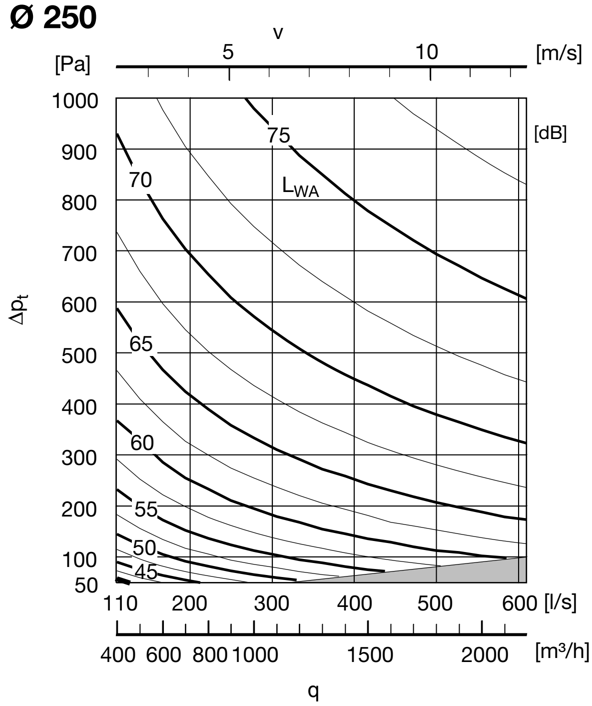
Technical data

Pressure and flow ranges and sound to duct

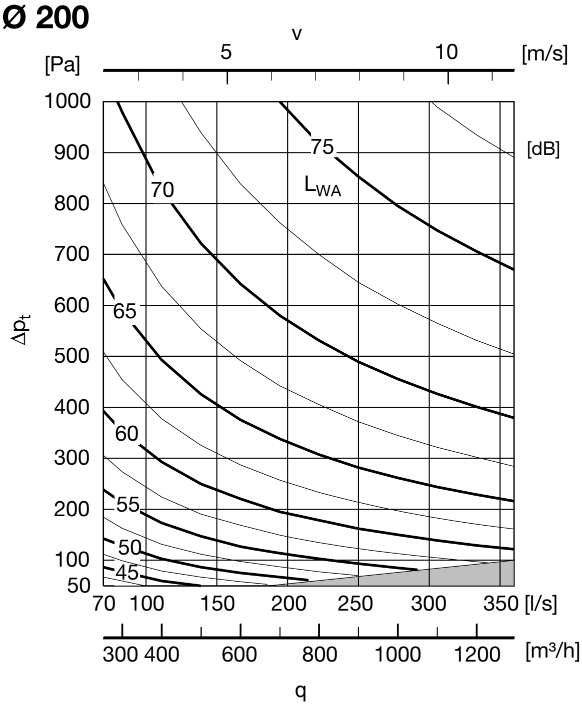
Ø 160



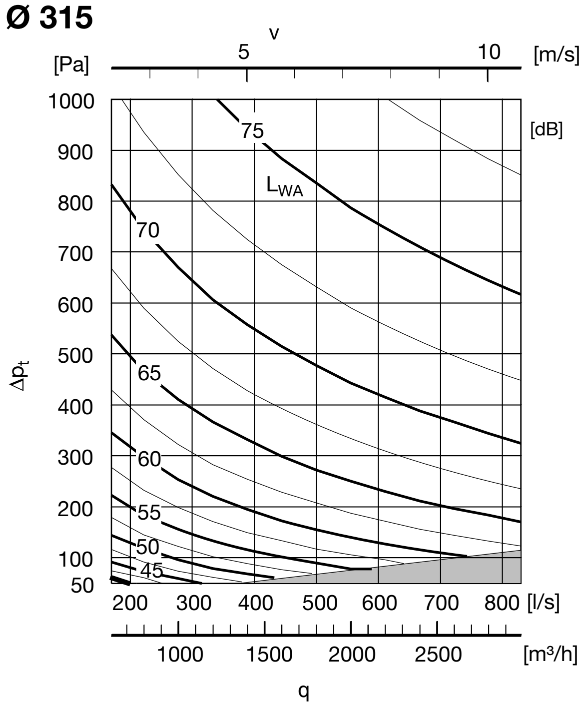
Ø 250



Ø 200



Ø 315



Technical data DAU, DA2EU, DAVU

Technical data

Sound to duct

Sound power level, L_W [dB], to duct in octave bands 1–8, 63–8000 Hz, as function of diameter, pressure drop and flow.

$Ød_1$	Pressure drop [Pa]	Velocity app. 2,5 [m/s]								Velocity app. 6 [m/s]							
		Centre frequency [Hz]								Centre frequency [Hz]							
		63	125	250	500	1k	2k	4k	8k	63	125	250	500	1k	2k	4k	8k
		flow 15 [l/s]								flow 30 [l/s]							
	1000	51	49	44	44	46	49	49	44	56	56	53	53	53	55	55	50
	500	45	43	38	38	40	43	43	38	51	51	49	49	49	51	50	46
80	200	37	35	30	30	32	35	35	30	45	45	43	43	43	45	44	40
	100	32	30	25	25	27	30	30	25	41	41	39	39	39	41	40	35
	50	26	24	19	19	21	24	24	19	–	–	–	–	–	–	–	–
		flow 20 [l/s]								flow 45 [l/s]							
	1000	56	53	48	48	50	53	54	48	59	59	57	57	57	59	58	53
	500	49	46	41	41	43	47	47	42	54	54	51	51	51	53	53	48
100	200	39	37	31	31	33	37	37	32	47	47	44	44	45	47	46	41
	100	34	31	26	26	28	32	32	27	42	42	39	39	40	42	41	36
	50	26	24	18	18	20	24	24	19	–	–	–	–	–	–	–	–
		flow 30 [l/s]								flow 70 [l/s]							
	1000	60	58	52	52	54	58	58	53	64	64	62	62	62	64	63	59
	500	54	52	46	46	48	52	52	47	59	59	56	57	57	59	58	53
125	200	46	44	38	38	40	44	44	39	52	52	49	49	49	51	51	46
	100	40	38	32	32	34	38	38	33	46	46	44	44	44	46	45	40
	50	34	32	26	26	28	32	32	27	–	–	–	–	–	–	–	–
		flow 40 [l/s]								flow 120 [l/s]							
	1000	62	59	52	52	55	59	60	54	67	67	65	65	65	67	66	61
	500	56	53	47	47	49	53	54	48	61	61	59	59	59	61	60	55
160	200	49	46	39	39	42	46	47	41	53	53	51	51	51	53	52	47
	100	43	40	33	33	36	40	41	35	48	48	46	46	46	48	47	42
	50	37	34	27	27	30	34	35	29	–	–	–	–	–	–	–	–
		flow 70 [l/s]								flow 180 [l/s]							
	1000	66	63	57	57	59	63	63	58	69	69	66	66	66	68	68	63
	500	59	56	50	50	53	57	57	52	62	62	60	60	60	62	61	57
200	200	50	47	41	41	43	47	47	42	54	54	51	51	52	54	53	48
	100	43	40	34	34	36	40	40	35	47	47	45	45	45	47	46	42
	50	37	34	28	28	30	34	34	29	–	–	–	–	–	–	–	–
		flow 110 [l/s]								flow 300 [l/s]							
	1000	67	64	59	59	61	65	65	60	70	70	67	68	67	69	69	64
	500	60	57	51	51	53	57	57	52	63	63	61	61	61	63	62	57
250	200	50	47	41	41	43	47	47	42	55	55	53	53	53	54	54	49
	100	43	40	34	34	36	40	40	35	49	49	47	47	47	48	48	43
	50	35	32	26	26	28	32	33	27	43	43	40	41	40	42	42	37
		flow 170 [l/s]								flow 470 [l/s]							
	1000	69	66	60	60	62	66	67	61	70	70	68	68	68	70	69	65
	500	61	58	52	52	54	58	59	53	64	64	62	62	62	64	63	59
315	200	50	47	41	41	44	48	48	43	56	56	54	54	54	56	55	50
	100	42	40	34	34	36	40	40	35	50	50	47	47	47	49	49	44
	50	35	32	26	26	29	33	33	28	–	–	–	–	–	–	–	–

Technical data DAU, DA2EU, DAVU

Technical data

Sound to duct

Sound power level, L_W [dB], to duct in octave bands 1–8, 63–8000 Hz, as function of diameter, pressure drop and flow.

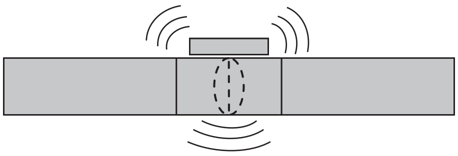
$Ød_1$	Pressure drop [Pa]	Velocity app. 9 [m/s]								Velocity app. 12 [m/s]							
		Centre frequency [Hz]								Centre frequency [Hz]							
		63	125	250	500	1k	2k	4k	8k	63	125	250	500	1k	2k	4k	8k
		flow 45 [l/s]								flow 70 [l/s]							
80	1000	58	59	59	59	58	59	58	53	61	64	65	65	63	63	61	57
	500	55	56	55	55	54	55	54	50	59	61	62	62	60	60	59	55
	200	50	51	51	51	50	51	50	45	55	58	59	59	57	57	55	51
	100	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	50	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
		flow 70 [l/s]								flow 95 [l/s]							
100	1000	61	62	61	62	61	62	61	56	62	64	65	65	63	63	62	58
	500	56	58	57	57	56	57	56	51	59	60	61	61	59	60	58	54
	200	51	52	51	51	50	51	50	46	53	55	56	56	54	54	53	49
	100	47	48	47	47	46	47	46	42	–	–	–	–	–	–	–	–
	50	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
		flow 110 [l/s]								flow 165 [l/s]							
125	1000	66	67	67	67	66	67	66	61	68	71	71	72	70	70	68	64
	500	61	62	62	62	61	62	61	56	63	66	66	67	65	65	63	59
	200	54	55	55	55	54	55	54	49	57	59	60	60	58	58	57	52
	100	50	51	50	50	49	50	49	45	–	–	–	–	–	–	–	–
	50	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
		flow 180 [l/s]								flow 220 [l/s]							
160	1000	69	70	69	69	68	69	68	64	70	71	71	71	70	71	69	65
	500	63	64	63	63	62	63	62	58	64	66	66	66	64	65	64	59
	200	55	56	56	56	55	56	55	50	56	58	58	58	57	57	56	52
	100	50	51	50	50	49	50	49	45	51	52	52	52	51	52	50	46
	50	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
		flow 280 [l/s]								flow 360 [l/s]							
200	1000	70	71	71	71	70	71	70	65	71	73	73	73	72	72	71	67
	500	64	65	64	64	63	64	63	59	65	67	67	67	65	66	65	60
	200	56	57	56	56	55	56	55	51	57	58	59	59	57	58	56	52
	100	50	51	50	50	49	50	49	45	51	53	53	53	52	52	51	47
	50	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
		flow 450 [l/s]								flow 600 [l/s]							
250	1000	71	72	71	71	70	71	70	66	72	73	74	74	72	73	71	67
	500	65	66	65	65	64	65	64	60	66	68	69	69	67	67	66	62
	200	57	58	57	57	56	57	56	52	58	60	61	61	59	59	58	54
	100	51	52	52	52	51	52	51	46	54	55	56	56	54	55	53	49
	50	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
		flow 700 [l/s]								flow 830 [l/s]							
315	1000	71	72	72	72	71	72	71	66	72	73	73	73	72	73	71	67
	500	66	67	66	66	65	66	65	61	66	67	67	68	66	67	66	61
	200	58	59	59	59	58	59	58	53	59	60	60	60	59	60	58	54
	100	52	53	53	53	52	53	52	47	–	–	–	–	–	–	–	–
	50	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–

Technical data

DAU, DA2EU, DAVU

Technical data

Pressure and flow ranges and sound to the surroundings



The graphs show A-weighted sound **power** level, L_{WA} [dB], to the surroundings.

Example:

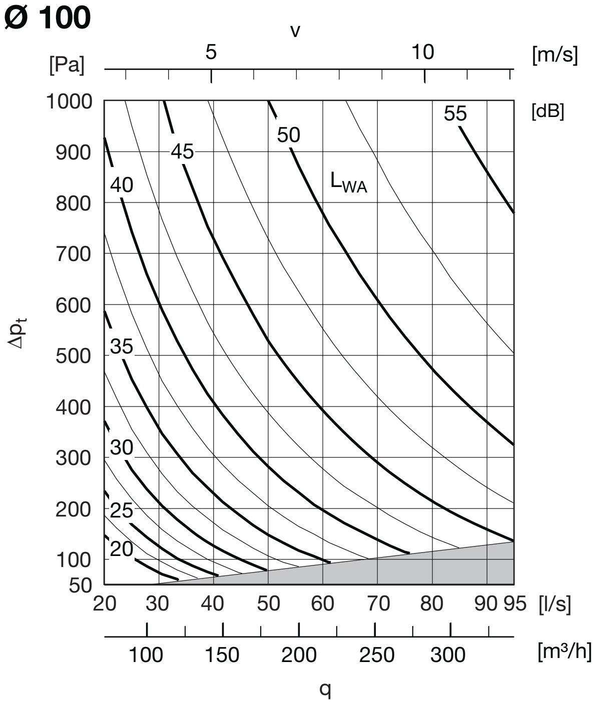
Given:	Diameter	125 mm
	Flow	70 l/s
	Pressure drop	200 Pa
The graph gives:		
	A-weighted sound power level approx.	40 dB

The A-weighted sound **pressure** level in the middle of the room becomes approx. 8 dB lower than these graph values.

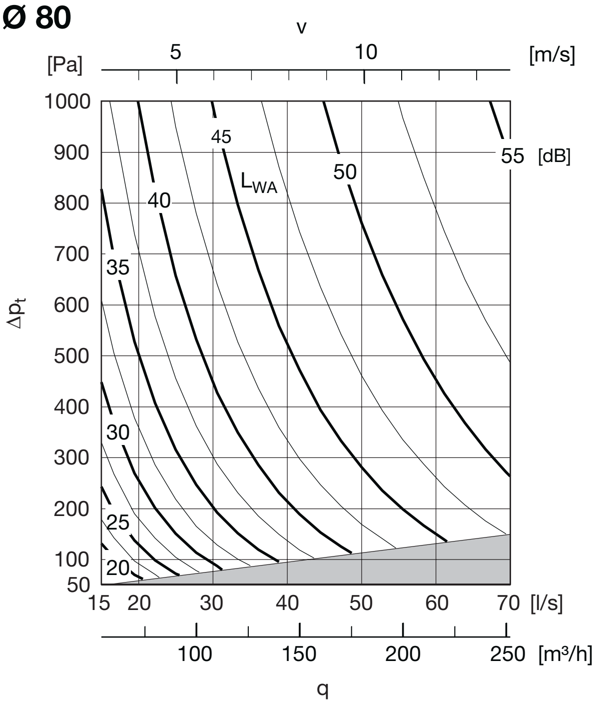
With insulation shell around the unit (the DALU unit) the A-weighted sound **pressure** level in the middle of the room becomes appox. 26 dB lower than the graph values on condition that also the connected ducts are attenuated (insulated) to the same extent.

Still lower sound **pressure** level can be achieved with additional constructional sound attension measures (false ceiling, high room attenuation).

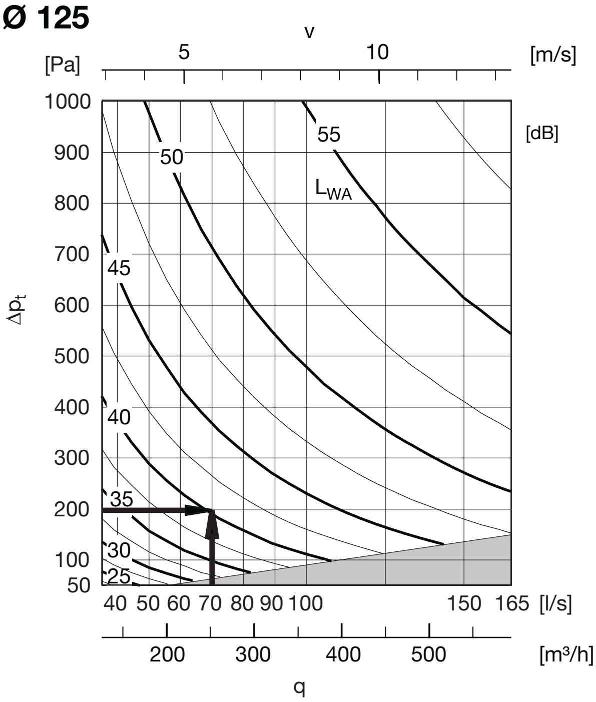
Ø 100



Ø 80



Ø 125

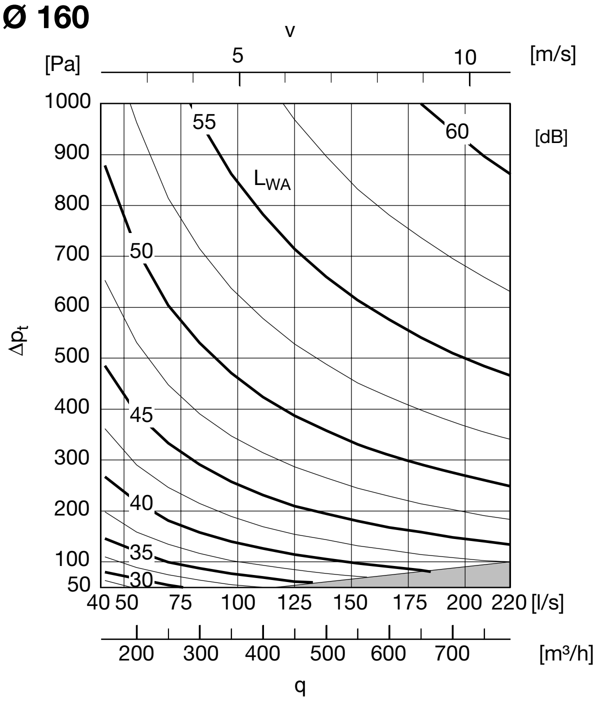


Technical data DAU, DA2EU, DAVU

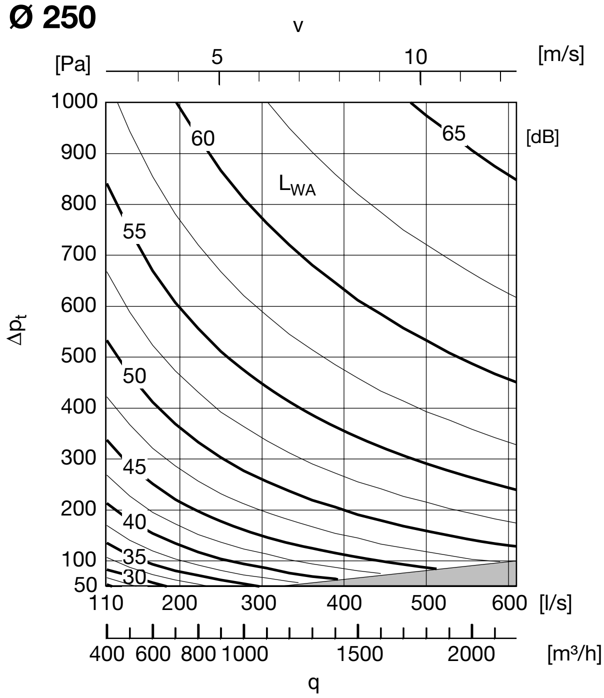
Technical data

Pressure and flow ranges and sound to the surroundings

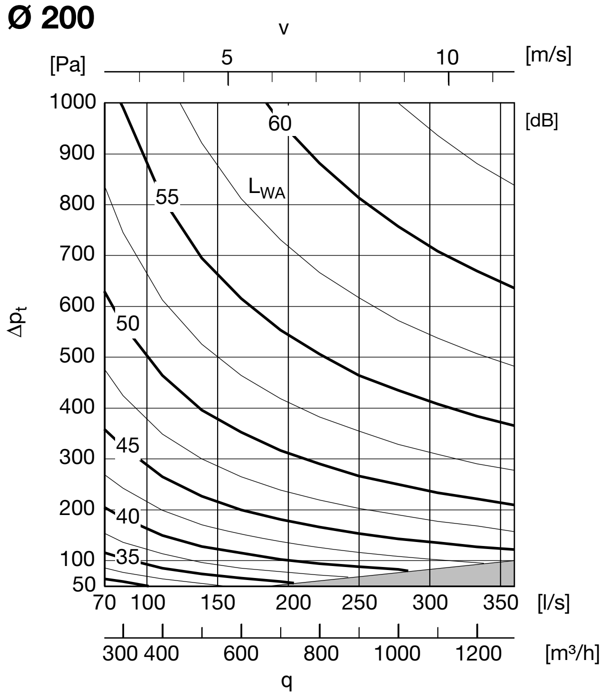
Ø 160



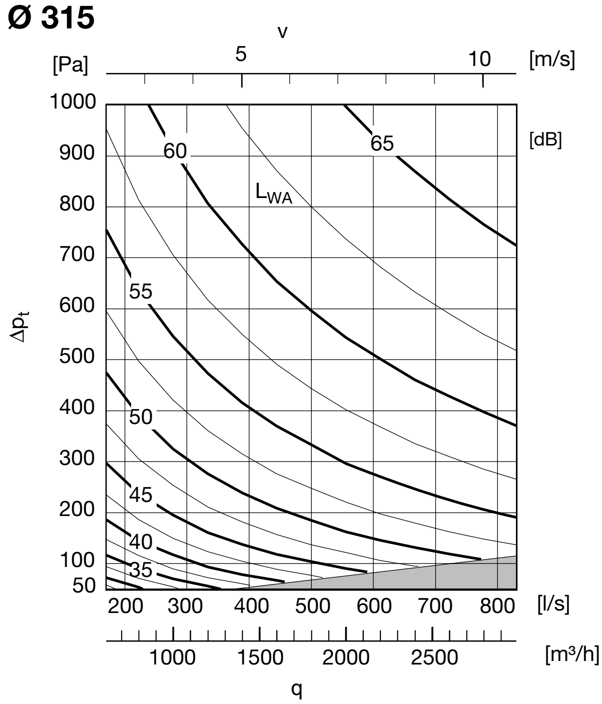
Ø 250



Ø 200



Ø 315



Air valves

KSU, Air valve

Air valves

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

Air valves

KSU, Air valve

Control and function

Air valves are used for supply of air, and exhaust of rather small quantities of air. Air valves are often used in housing, and in office bathrooms, schools etc., where there is no need for an advanced ventilation solution.

The air valves are usurally mounted directly in the air-duct system without use of a plenum box.

In the middle of the Air valve is an adjustable cone, so it is possible to regulate the quantity of air by simply turning the cone.

Lindab air valves

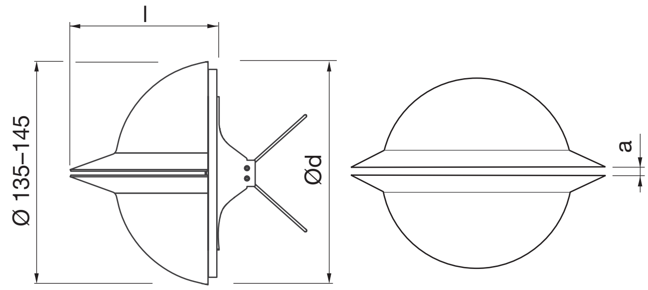
Lindabs programme of air valves contain both valves for supply of air and exhaust air.

URH, Control valve

Diffuser - supply air

VVTK

Dimensions



Ød nom	l mm	m kg
100	90	0,31
125 *	90	0,31

Description

Diffuser for supply air.
Designed for wall mounting.
Spring holders connect to socket VRFU, VRFM or VRR.

* For Ø125 the outer part of the brim of the socket is visible. If this is not acceptable the cover plate VVTKR can be used to hide the brim.

Materials and Finish

Material
Painted galvanized sheet metal.

Colour
White RAL 9010, gloss 70, equivalent to NCS S 0502 Y.

Order code

	VVTK	100
Product	VVTK	
Dimension Ød		100

Diffuser - supply air

VVTK

Technical data

Air flow, q [l/s] and [m^3/h],
total pressure drop, Δp_t [Pa],
throw length, $l_{0,2}$ [m], and
A-weighted sound power level, L_{WA} [dB(A)],
for different settings, a [mm], are shown in the graph.

Note! The A-weighted sound power level, L_{WA}, will increase by 3 dB when the valve is mounted in a bend.

Sound power level in octave bands, L_{Wok} [dB],
is calculated as $L_{Wok} = L_{WA} + K_{ok}$.
K_{ok} is found in the table below.

Ød nom	Diffuser mounted in	Centre frequency [Hz] 63	125	250	500	1K	2K	4K	8K
100	Duct	-2	-7	-7	-4	-4	-7	-10	-14
125	Duct	-2	-7	-7	-4	-4	-7	-10	-14

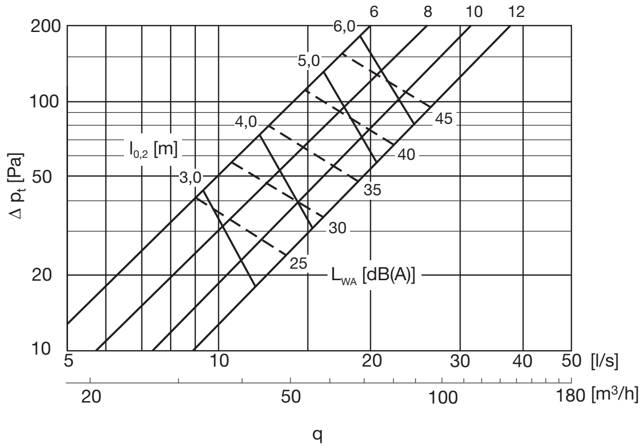
Sound attenuation ΔL, [dB]

Ød nom	Diffuser mounted in	Centre frequency [Hz] 63	125	250	500	1K	2K	4K	8K
100	Duct	24	20	18	12	10	10	10	10
125	Duct	24	20	18	12	10	10	10	10

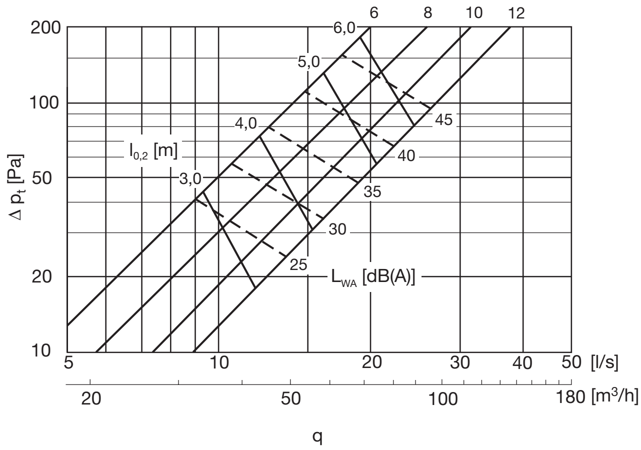
Air jet diffusion pattern
Maximum vertical height, $b_v = 0,1 \times l_{0,2}$ m
Maximum horizontal width, $b_h = 0,6 \times l_{0,2}$ m

Measurement of air flow
Data is available in a separate brochure.

Ø 100



Ø 125



Cover plate

VVTKR

Description

Plate to cover the outer part of the brim of the socket.

Materials and finish

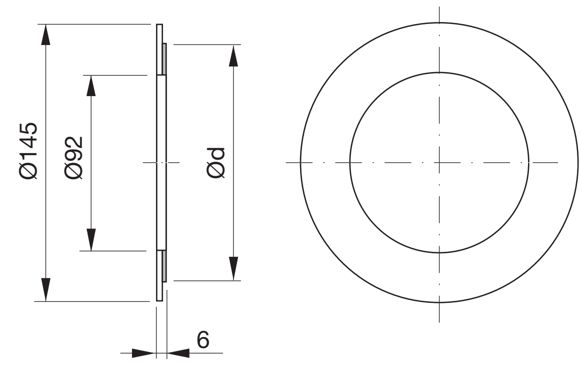
Material
Painted galvanized sheet metal.

Colour
White RAL 9010, gloss 70, equivalent to NCS S 0502 Y.

Maintenance

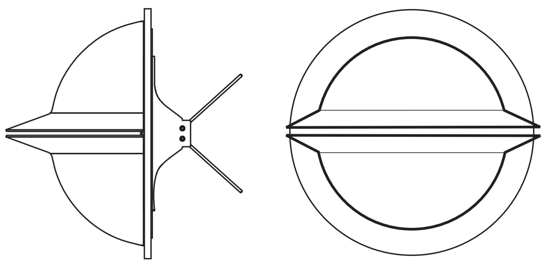
The visible parts can be wiped with a damp cloth.

Dimensions



Ød nom	m kg
125	0,07

Cover plate together with valve VVTK Ø125



Order code

	VVTKR	125
Product	VVTKR	
Dimension Ød		125

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

Diffuser

VTTB

Description

Diffuser for supply air.
Designed with a prolonged neck for ceiling mounting. Is equipped with a fixed blanking-off segment for preventing the air flow in a desired direction.
Spring holders connect to socket VRFU, VRFM or VRR.

Materials and Finish

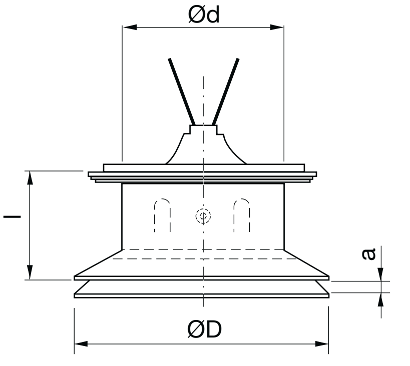
Material
Painted galvanized sheet metal.

Colour
White RAL 9010, gloss 70, equivalent to NCS S 0502 Y.

Order code

	VTTB	125
Product		
Dimension Ød		

Dimensions



Ød nom	ØD mm	l mm	m kg
100	155	70	0,44
125	185	76	0,60
160	226	83	0,85

Diffuser

VTTB

Technical data

Air flow, q [l/s] and [m³/h],
total pressure drop, Δp_t [Pa],
throw length, $l_{0,2}$ [m], and
A-weighted sound power level, L_{WA} [dB(A)], for different settings, a [mm], are shown in the graphs.

Note! The A-weighted sound power level, L_{WA}, will increase by 3 dB when the valve is mounted in a bend.

Sound power level in octave bands, L_{Wok} [dB],
is calculated as $L_{Wok} = L_{WA} + K_{ok}$.
K_{ok} is found in the table below.

Ød nom	Diffuser mounted in	Centre frequency [Hz] 63	125	250	500	1K	2K	4K	8K
100	Duct	-2	-7	-7	-4	-5	-5	-13	-20
125	Duct	-1	-2	-3	-3	-4	-7	-13	-16
160	Duct	1	2	-2	-2	-4	-9	-14	-9

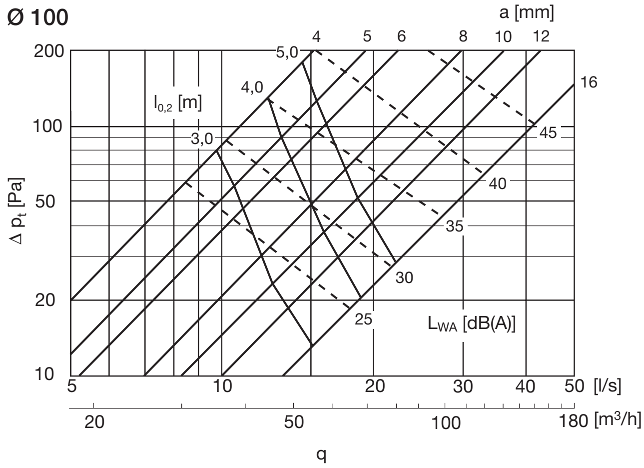
Sound attenuation ΔL, [dB]

Ød nom	Diffuser mounted in	Centre frequency [Hz] 63	125	250	500	1K	2K	4K	8K
100	Duct	25	22	17	13	12	11	11	11
125	Duct	25	20	15	12	11	9	9	9
160	Duct	26	17	13	12	11	7	7	8

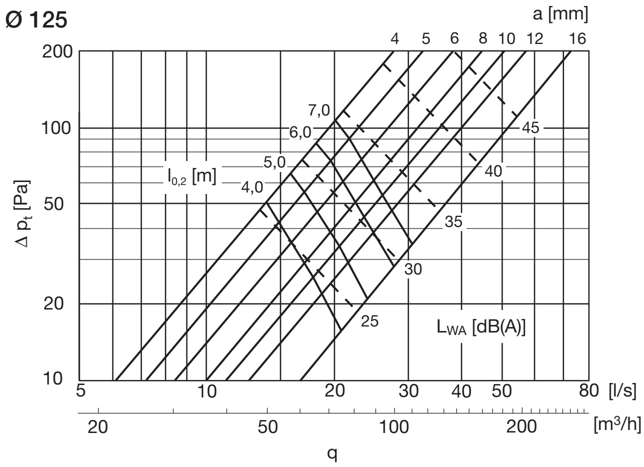
Air jet diffusion pattern
Maximum vertical width, $b_v = 0{,}1 \times l_{0,2}$ m

Measurement of air flow
Data is available in a separate brochure.

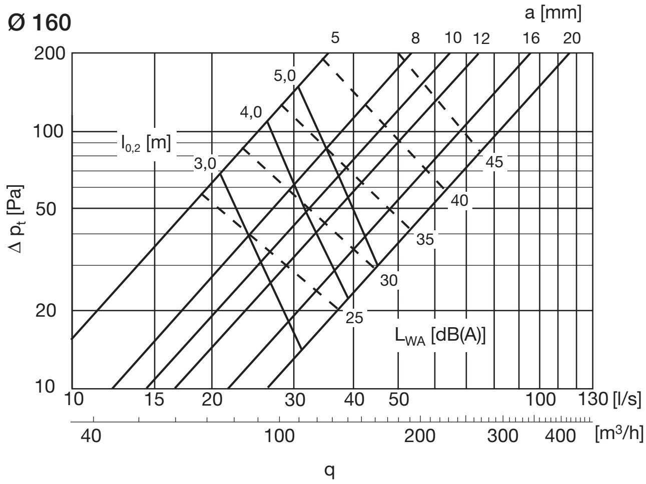
Ø 100



Ø 125



Ø 160



Diffuser

SHH

Description

Diffuser for supply air.
Designed for wall mounting.
Fits in duct. Equipped with a single lip rubber gasket.

Materials and finish

Material
Painted sheet metal.

Colour
White RAL 9010, gloss 30.

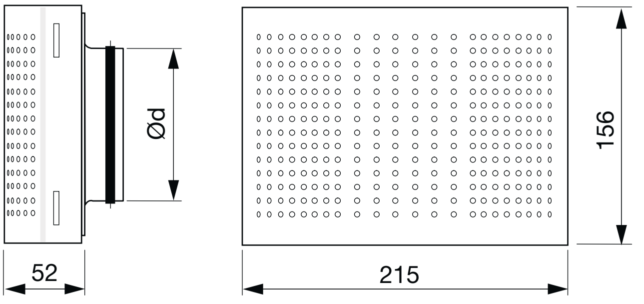
Maintenance

The visible parts can be wiped with a damp cloth.

Order code

	SHH	100
Product		
Dimension Ød		

Dimensions



Ød nom	m kg
100	0,60
125	0,60

Diffuser

SHH

Technical data

Air flow, q [l/s] and [m³/h],
total pressure drop, Δp_t [Pa],
throw length, $l_{0,2}$ [m], and
A-weighted sound power level, L_{WA} [dB], for different settings, n [number of open rows],
are shown in the graph.

The setting is made by sealing off rows of holes with tape on the front's inside.

Sound power level, L_W [dB], in octave bands
is calculated as $L_{WA} + K_{ok}$.
K_{ok} is found in the table below.

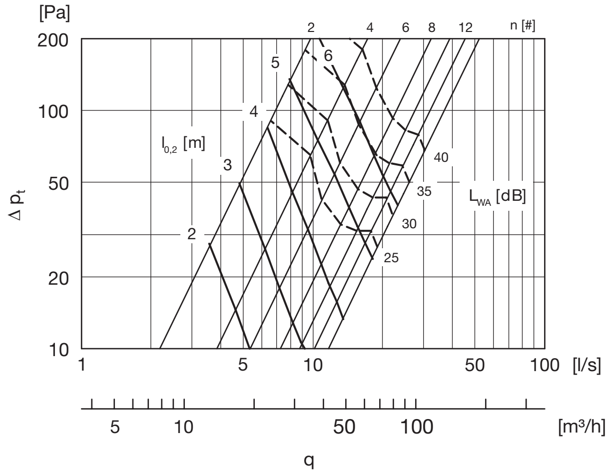
Ød nom	Diffuser mounted in	Centre frequency [Hz]							
		63	125	250	500	1K	2K	4K	8K
100	Duct	-2	-2	-1	1	0	-4	-13	-14
125	Duct	-4	-4	-3	-2	-2	-2	-1	-7

Sound attenuation, ∆L, [dB]

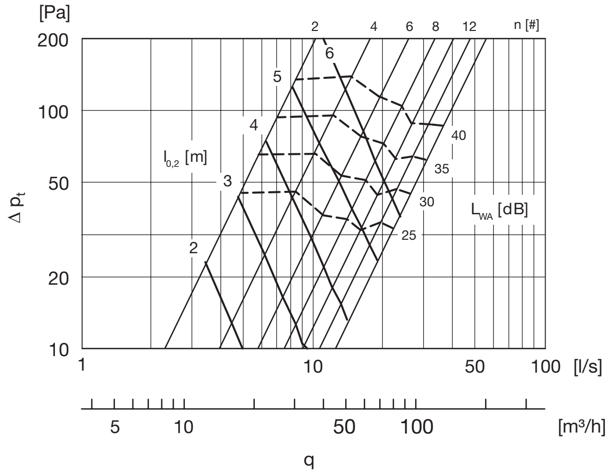
Ød nom	Diffuser mounted in	n [#]	Centre frequency [Hz]							
			63	125	250	500	1K	2K	4K	8K
100	Duct	14	14	14	9	4	0	1	1	3
		10	15	15	9	5	2	4	3	5
		6	15	15	9	4	4	6	4	7
125	Duct	14	14	14	8	4	0	1	2	4
		10	13	13	8	4	1	4	3	5
		6	13	13	8	5	3	6	5	7

Measurement of air flow
Data is available in a separate brochure.

Ø 100



Ø 125



Valve

KPT

Description

Valve for supply air.
Designed for ceiling mounting.
Flat spring holders connect to duct.

Materials and finish

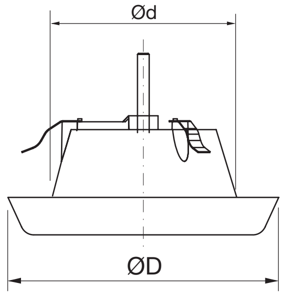
Material
Plastic.

Colour
White RAL 9010.

Order code

	KPT	**125**
Product	✓	
Dimension Ød		✓

Dimensions



Ød nom	ØD mm	m kg
80	118	0,08
100	148	0,10
125	180	0,16
160	203	0,22
200	246	0,55

Valve KPT

Technical data

Air flow, q [l/s] and [m³/h],
total pressure drop, Δp_t [Pa], and
A-weighted sound power level, L_{WA} [dB], for different settings, n [number of opening turns],
are shown in the graphs.

Sound power level, L_{WA} [dB], A-weighted
is shown in the graphs.

Sound attenuation, ΔL_A, [dB]

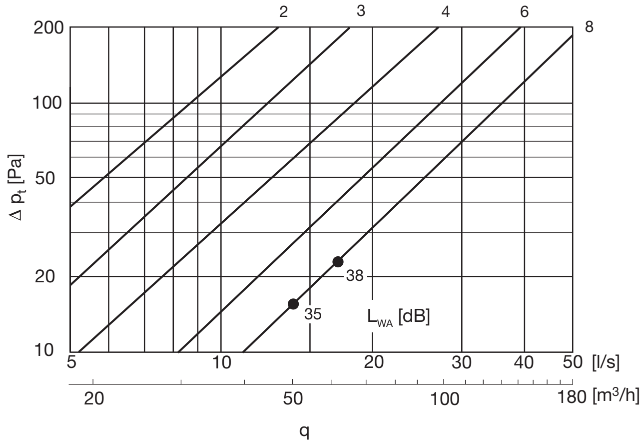
Ød nom	Valve mounted in	Setting n [number of turns]	ΔL_A [dB]
100	Duct	0	8,5
		2	8,5
		3	8,5
		4	8
		6	8
		8	8
		10	8
125	Duct	0	14
		4	8
		5	8
		6	7,5
		7	7
		8	6,5
		9	6
160	Duct	0	14,5
		6	6,5
		8	6
		10	6
		12	6
200	Duct	0	15,5
		7	6,5
		9	6
		11	5,5
		13	5,5
		15	5,5

Tolerance	±1

Measurement of air flow
Data is available in a separate brochure.

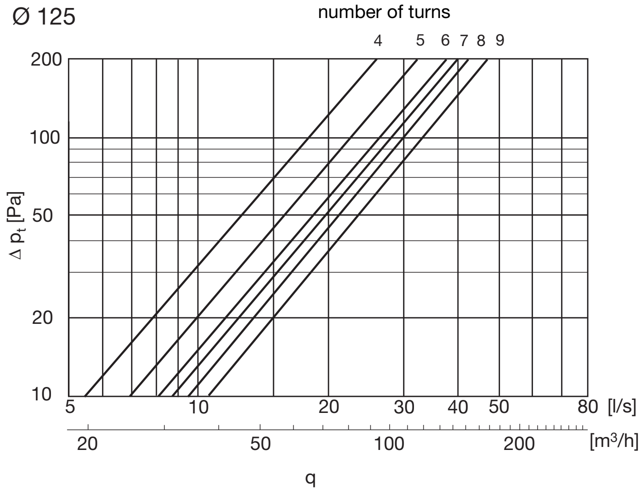
Ø 100

number of turns



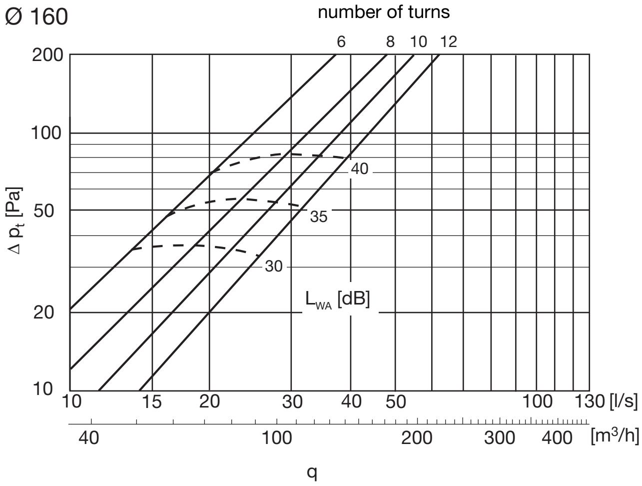
Ø 125

number of turns



Ø 160

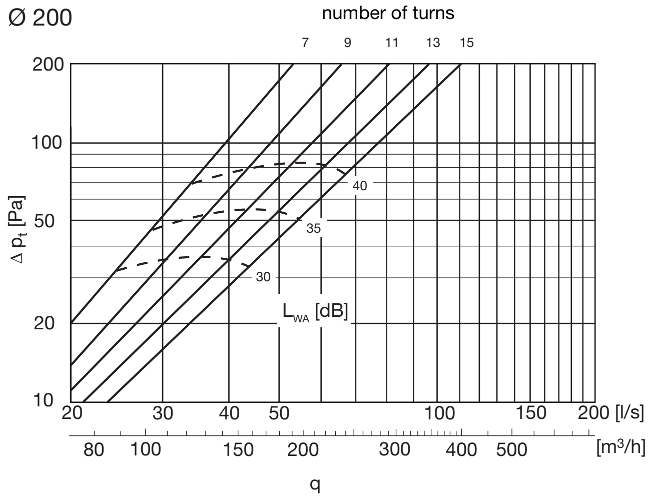
number of turns



Valve

KPT

Ø 200



Valve - supply air

KI

Description

Valve for supply air.
Designed for ceiling mounting.
Bayonet holders connect to socket VRGU, VRGL or VRGM.

Materials and finish

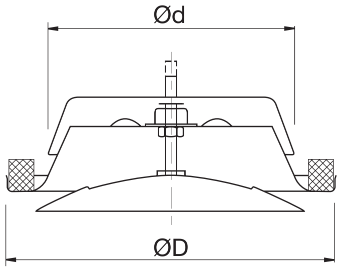
Material
Painted galvanized sheet metal.

Colour
White RAL 9010, gloss 70, equivalent to NCS S 0502 Y.

Order code

	KI	125
Product	└	
Dimension Ød		└

Dimensions



Ød nom	ØD mm	m kg
80	111	0,14
100	130	0,21
125	160	0,30
160	190	0,41
200	245	0,65

Valve - supply air KI

Technical data

Air flow, q [l/s] and [m^3/h],
total pressure drop, Δp_t [Pa],
throw length, $l_{0,2}$ [m], and
A-weighted sound power level, L_{WA} [dB(A)],
for different settings, a [mm],
are shown in the graphs.

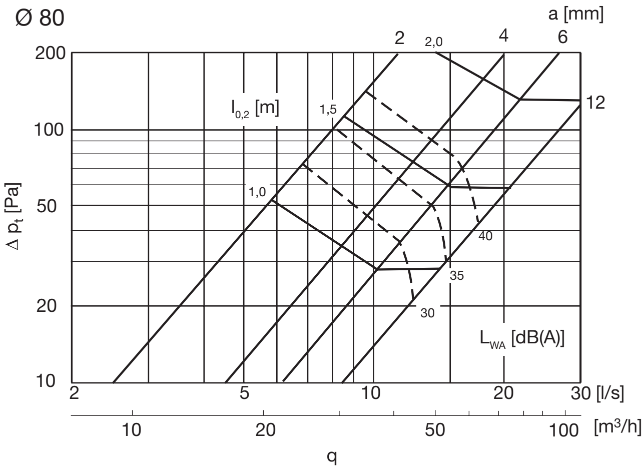
Sound power level in octave bands, L_{Wok} [dB],
is calculated as $L_{Wok} = L_{WA} + K_{ok}$.
K_{ok} is found in the table below.

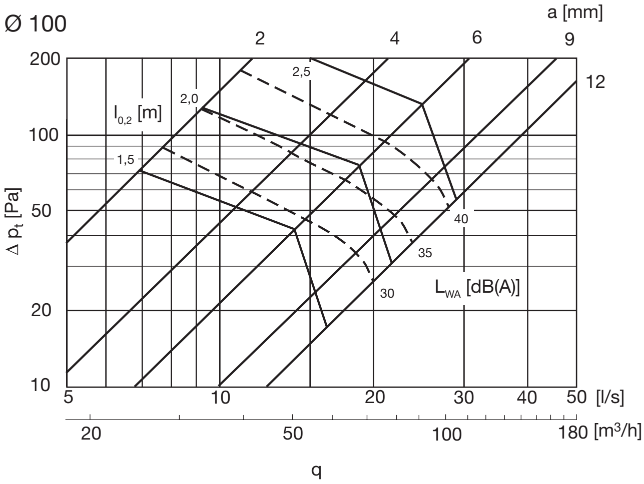
Ød nom	Valve mounted in	Centre frequency [Hz] 63	125	250	500	1K	2K	4K	8K
80	Duct	–	2	2	-1	-6	-14	-25	-37
100	Duct	–	2	2	-1	-6	-14	-25	-37
125	Duct	–	2	4	-2	-7	-14	-25	-37
160	Duct	–	6	5	-3	-9	-14	-26	-36
200	Duct	–	5	5	-2	-8	-16	-24	-36
	Tolerance	–	±3	±2	±2	±2	±2	±2	±3

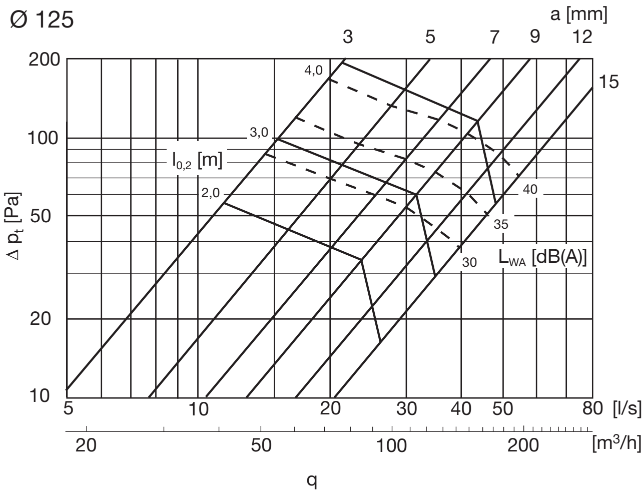
Sound attenuation, ΔL, [dB]

Ød nom	Valve mounted in	Setting a [mm]	Centre frequency [Hz] 63	125	250	500	1K	2K	4K	8K
80	Duct	2	26	20	15	14	11	8	10	9
		6	24	19	13	11	8	5	8	6
		12	24	19	13	10	6	4	5	6
100	Duct	2	22	19	14	12	11	12	10	12
		6	22	17	11	9	8	9	6	9
		12	22	17	11	8	6	7	4	7
125	Duct	3	20	17	12	11	9	9	8	8
		7	19	15	10	8	7	7	5	5
		12	19	15	9	7	5	5	4	4
160	Duct	4	18	14	10	10	10	10	8	8
		9	18	13	9	8	7	7	6	6
		20	18	13	8	7	6	5	5	5
200	Duct	5	17	13	10	9	11	10	9	9
		9	16	12	8	8	9	9	8	7
		20	15	11	7	6	7	6	7	6
	Tolerance		±6	±3	±2	±2	±2	±2	±2	±3

Measurement of air flow
Data is available in a separate brochure.

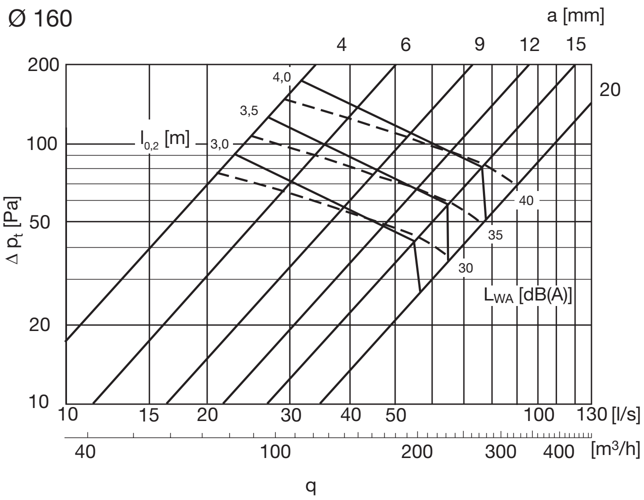


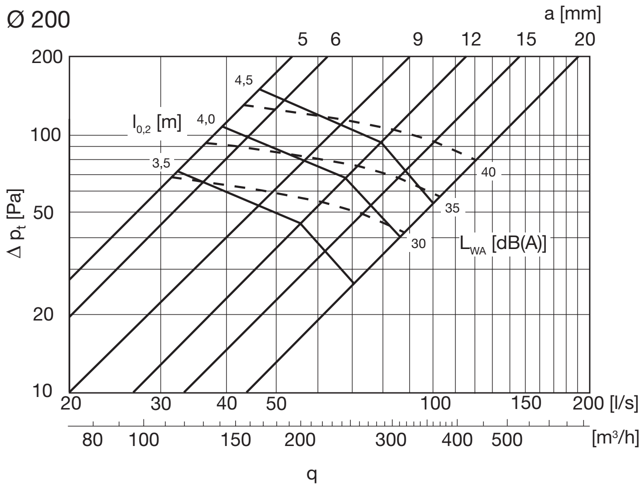




Valve - supply air

KI





Valve supply air KIR

Description

Valve for supply air.
Designed for ceiling mounting.
Equipped with a removable blanking-off sector plate for preventing the air flow in a desired direction.
Bayonet holders connect to socket VRGU, VRGL or VRGM.

Materials and finish

Material
Painted galvanized sheet metal.

Colour
White RAL 9010, gloss 70, equivalent to NCS S 0502 Y.

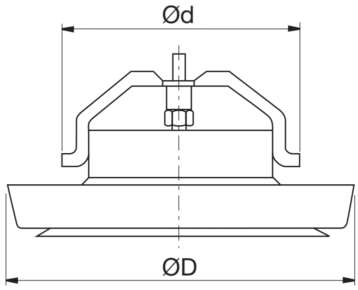
Maintenance

The visible parts can be wiped with a damp cloth.

Order code

	KIR	100
Product	KIR	
Dimension Ød		100

Dimensions



Ød nom	**ØD mm**	**m kg**
100	135	0,28
125	165	0,44
160	205	0,62

Valve supply air KIR

Technical data

Without sector plate

Air flow, q [l/s] and [m^3/h], total pressure loss, Δp_t [Pa], throw length, $l_{0,2}$ [m], and A-weighted sound power level, L_{WA} [dB(A)],
for different settings, a [mm], are shown in the graphs.
Maximal vertical height, b_v [m] and
Maximal horisontal width, b_h [m],
are shown in the tables.

Sound power level in octave bands, L_{Wok} [dB],
is calculated as $L_{Wok} = L_{WA} + K_{ok}$.
K_{ok} is found in the table below.

Ød nom	Valve mounted in	Centre frequency [Hz] 63	125	250	500	1K	2K	4K	8K
100	Duct	–	-6	-2	-3	-5	-8	-9	-15
125	Duct	–	0	1	-1	-5	-15	-21	-33
160	Duct	–	3	2	-1	-6	-15	-23	-36
	Tolerance	–	±3	±2	±2	±2	±2	±2	±3

Sound attenuation ΔL, [dB]

Ød nom	Valve mounted in	Centre frequency [Hz] 63	125	250	500	1K	2K	4K	8K
100	Duct	22	18	13	11	9	8	7	8
125	Duct	20	16	11	9	9	7	6	5
160	Duct	18	14	10	9	9	7	6	6
	Tolerance	±6	±3	±2	±2	±2	±2	±2	±3

Measurement of air flow
Data is available in a separate brochure.

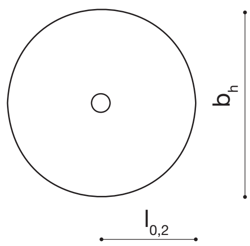
Air jet diffusion pattern

Maximal vertical height, b_v [m]:

Setting a [mm]	Supply air temperature difference Δt ±0 °C	-10 °C
4	$b_v = 0{,}04 \cdot l_{02}$	$b_v = 0{,}064 \cdot l_{02}$
12	$b_v = 0{,}04 \cdot l_{02}$	$b_v = 0{,}075 \cdot l_{02}$

Maximal horisontal width, b_h [m]:

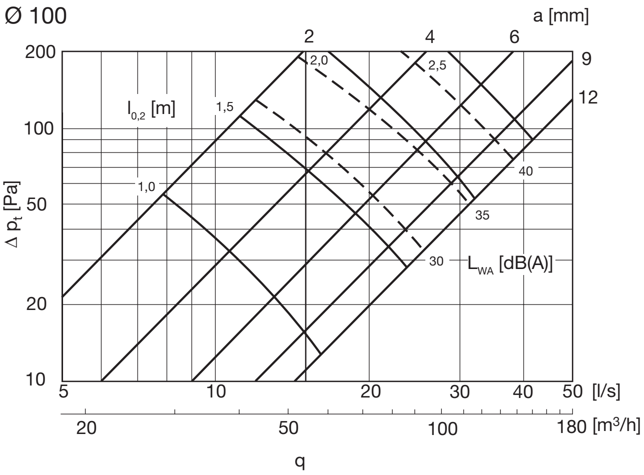
Setting a [mm]	Supply air temperature difference Δt ±0 °C	-10 °C
4	$b_h = 2 \cdot l_{02}$	$b_h = 2 \cdot l_{02}$
12	$b_h = 2 \cdot l_{02}$	$b_h = 2 \cdot l_{02}$

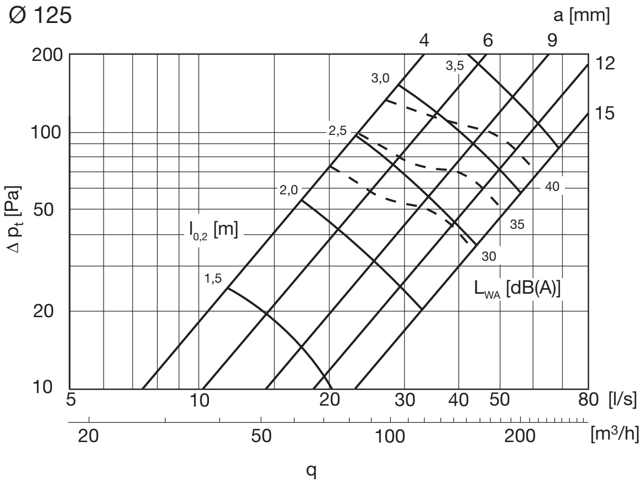


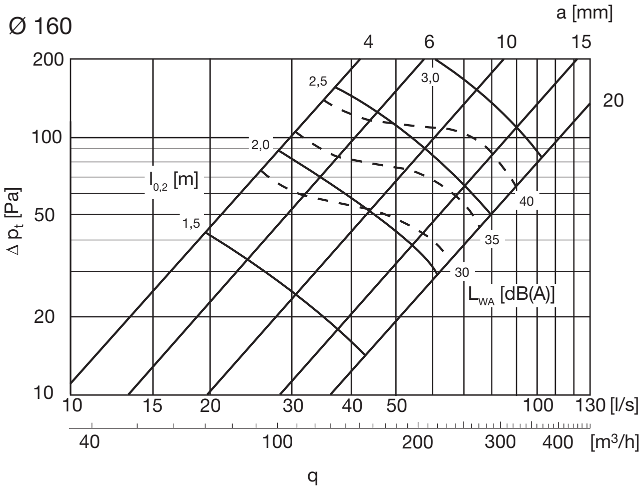
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

Valve supply air

KIR







Valve supply air KIR

Technical data

With sector plate

Air flow, q [l/s] and [m^3/h], total pressure drop, Δp_t [Pa], throw length, $l_{0,2}$ [m], and A-weighted sound power level, L_{WA} [dB(A)],
for different settings, a [mm], are shown in the graphs.
Maximal vertical height, b_v [m] and
Maximal horisontal width, b_h [m],
are shown in the tables.

Sound power level in octave bands, L_{Wok} [dB],

is calculated as $L_{Wok} = L_{WA} + K_{ok}$.
K_{ok} is found in the table below

Ød nom	Valve mounted in	Centre frequency [Hz]							
		63	125	250	500	1K	2K	4K	8K
100	Duct	–	-2	-2	-4	-6	-8	-8	-16
125	Duct	–	-1	-1	-1	-4	-12	-19	-33
160	Duct	–	3	0	-2	-5	-10	-21	-35

Tolerance	–	±3	±2	±2	±2	±2	±2	±3

Sound attenuation ΔL, [dB]

Ød nom	Valve mounted in	Centre frequency [Hz]							
		63	125	250	500	1K	2K	4K	8K
100	Duct	22	18	13	11	9	8	7	8
125	Duct	20	16	11	9	9	7	6	5
160	Duct	18	14	10	9	9	7	6	6

Tolerance	±6	±3	±2	±2	±2	±2	±2	±3

Measurement of air flow
Data is available in a separate brochure.

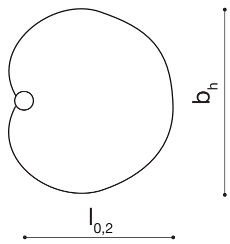
Air jet diffusion pattern

Maximal vertical height, b_v [m]:

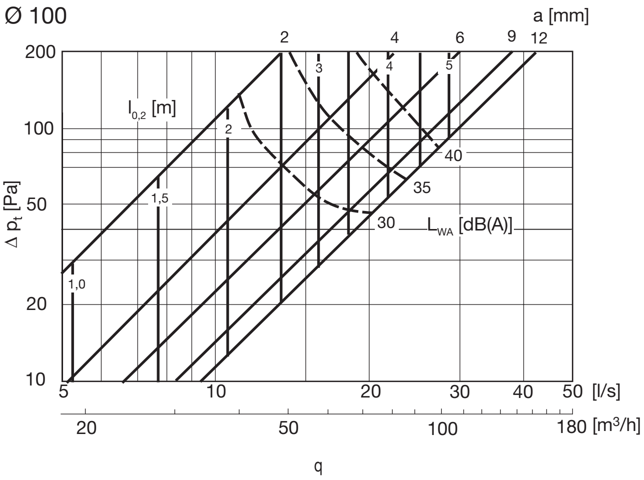
Setting a [mm]	Supply air temperature difference Δt ±0 °C	Supply air temperature difference Δt -10 °C
4	$b_v = 0{,}04 \cdot l_{02}$	$b_v = 0{,}064 \cdot l_{02}$
12	$b_v = 0{,}04 \cdot l_{02}$	$b_v = 0{,}075 \cdot l_{02}$

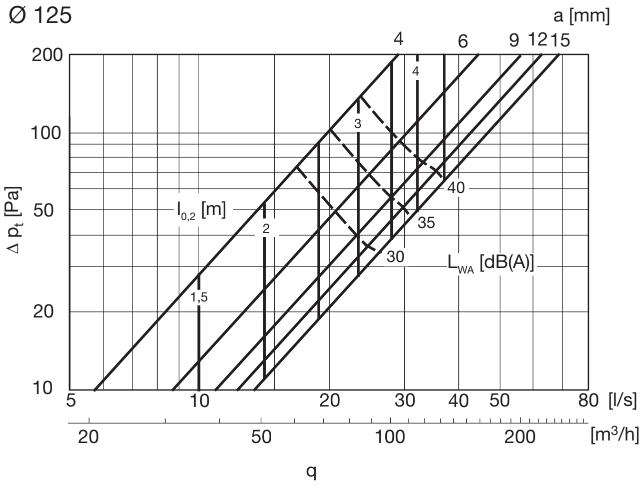
Maximal horisontal width, b_h [m]:

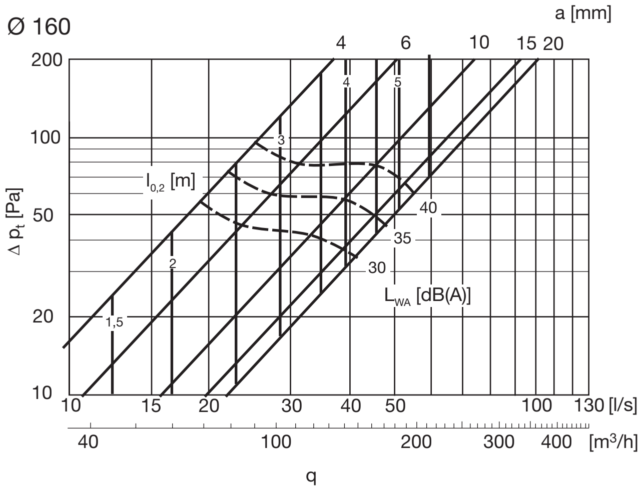
Setting a [mm]	Supply air temperature difference Δt ±0 °C	Supply air temperature difference Δt -10 °C
4	$b_h = 1{,}45 \cdot l_{02}$	$b_h = 1{,}15 \cdot l_{02}$
12	$b_h = 1{,}45 \cdot l_{02}$	$b_h = 1{,}09 \cdot l_{02}$



Valve supply air KIR







Valve - supply & exhaust air TAV

Description

Valve for supply and exhaust air.
Designed for natural ventilation. Can also be used as an outdoor air valve.
Screws connect to a duct.

Materials and finish

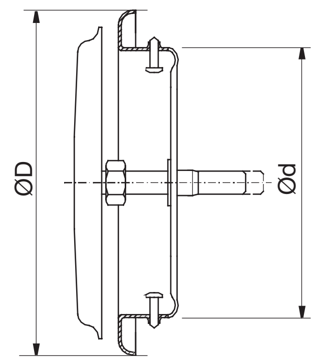
Material
Painted galvanized sheet metal.

Colour
White RAL 9010, gloss 70, equivalent to NCS S 0502 Y.

Order code

	TAV	160
Product	TAV	
Dimension Ød		160

Dimensions



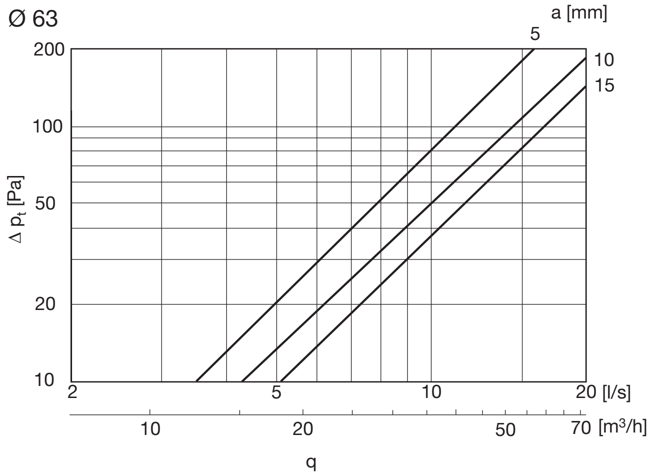
Ød nom	ØD mm	m kg
63	92	0,10
80	105	0,12
100	140	0,19
125	155	0,26
160	200	0,39
200	235	0,53
250	270	0,70
315	330	0,90

Valve - supply & exhaust air TAV

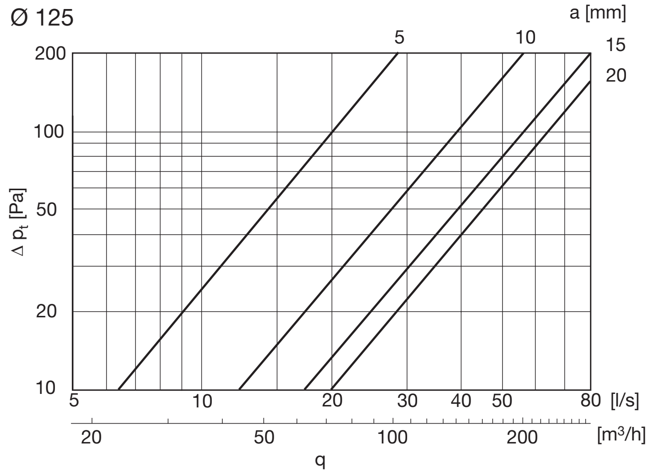
Technical data

Air flow, q [l/s] and [m³/h] and total pressure drop, Δp_t [Pa], for different settings, a [mm], are shown in the graphs.

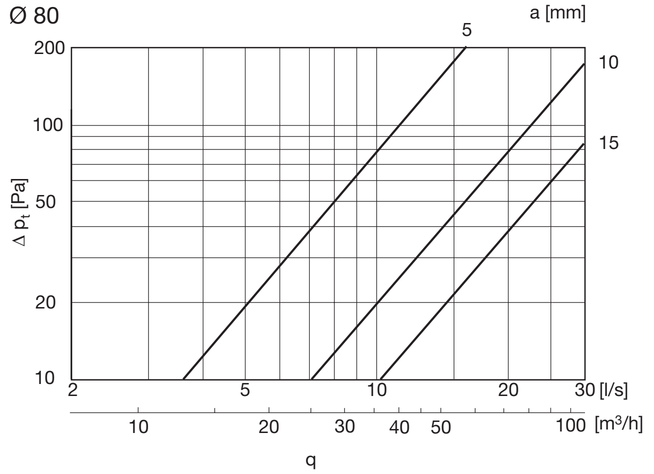
Ø 63



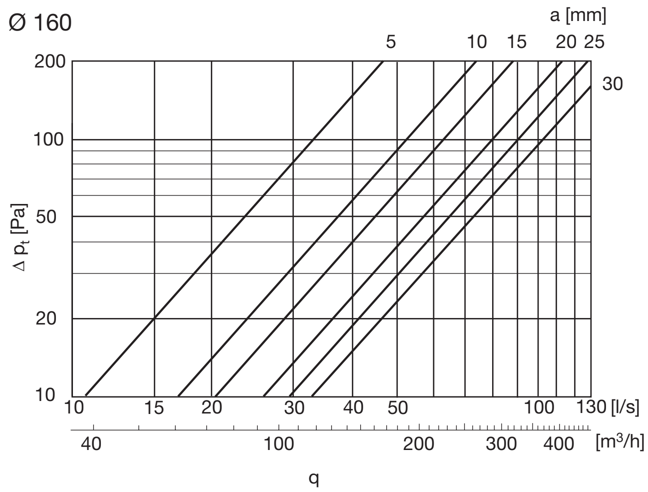
Ø 125



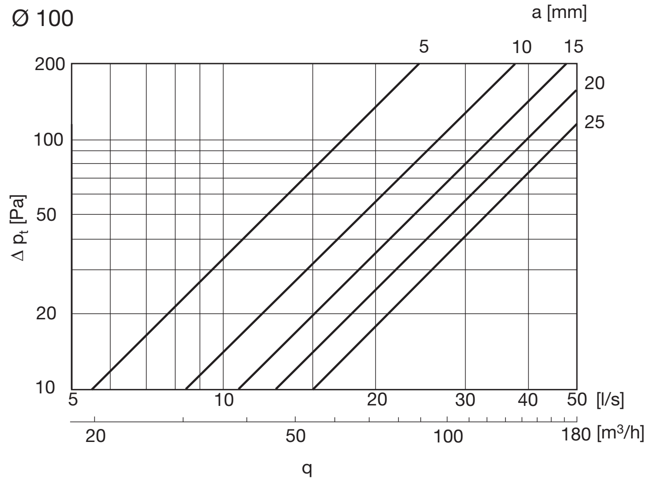
Ø 80



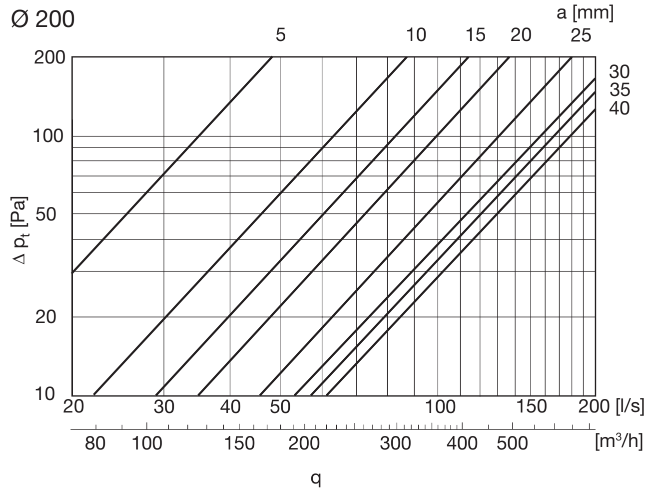
Ø 160



Ø 100



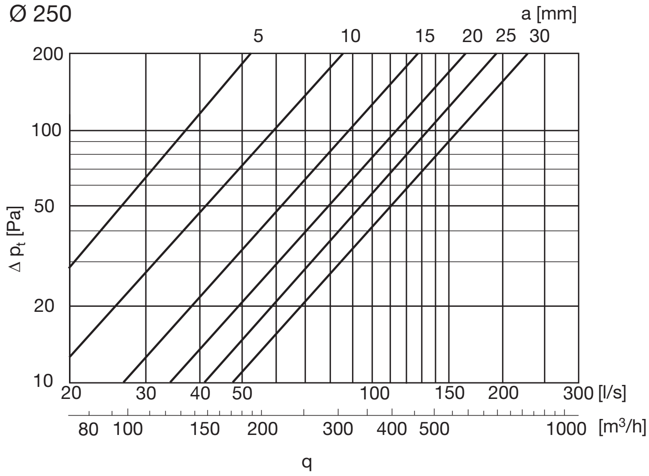
Ø 200



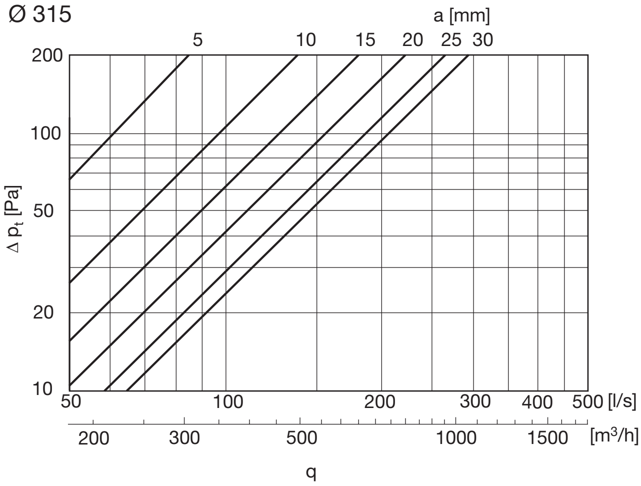
Valve - supply & exhaust air

TAV

Ø 250



Ø 315



Exhaust valve KVB

Description

Valve for exhaust air.
Designed for wall or ceiling mounting.
Spring holders connect to socket VRFU or VRFM.

Materials and finish

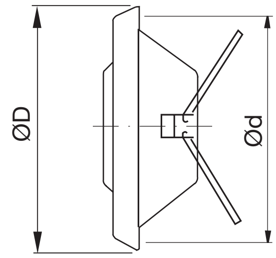
Material
Painted galvanized sheet metal.

Colour
White RAL 9010, gloss 70, equivalent to NCS S 0502 Y.

Order code

	KVB	125
Product	✓	
Dimension Ød		✓

Dimensions



Ød nom	ØD mm	m kg
100	125	0,27
125	150	0,36
160	190	0,54

Exhaust valve KVB

Technical data

Air flow, q [l/s] and [m³/h],
total pressure drop, Δp_t [Pa], and
A-weighted sound power level, L_{WA} [dB(A)],
for different settings, a [mm],
are shown in the graphs.

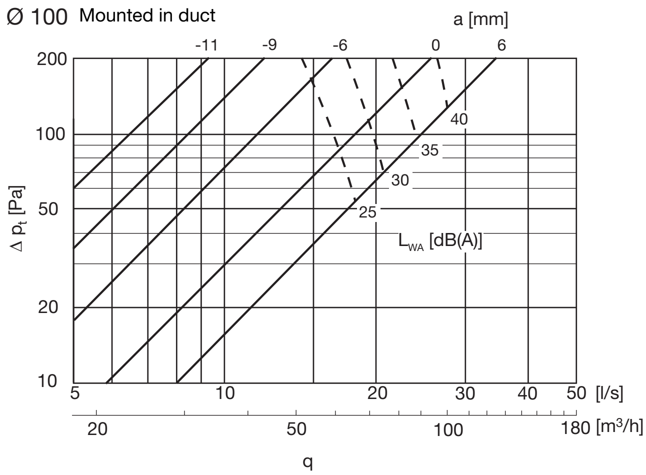
Sound power level in octave bands, L_{Wok} [dB],
is calculated as $L_{Wok} = L_{WA} + K_{ok}$.
K_{ok} is found in the table below.

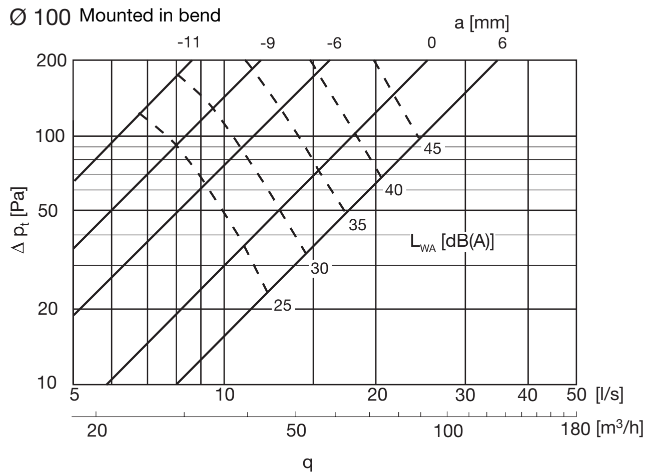
Ød nom	Valve mounted in	Centre frequency [Hz] 63	125	250	500	1K	2K	4K	8K
100	Duct	6	2	1	-3	-6	-8	-11	-16
	bend 90	6	2	1	-3	-6	-8	-11	-16
	T-piece	6	2	1	-3	-6	-8	-11	-16
125	Duct	13	-2	-1	-5	-5	-8	-12	-16
	bend 90	13	-2	-1	-5	-5	-8	-12	-16
	T-piece	13	-2	-1	-5	-5	-8	-12	-16
160	Duct	14	0	-1	-4	-3	-8	-16	-18
	T-piece	14	0	-1	-4	-3	-8	-16	-18

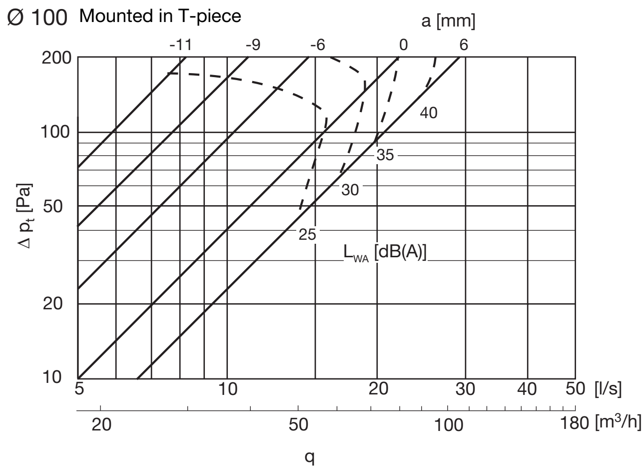
Sound attenuation ΔL, [dB]

Ød nom	Valve mounted in	Centre frequency [Hz] 63	125	250	500	1K	2K	4K	8K
100	Duct	25	22	21	20	14	18	9	10
	bend 90	30	27	23	17	16	19	12	13
	T-piece	25	22	21	20	14	18	9	10
125	Duct	24	20	17	15	11	12	7	7
	bend 90	29	25	19	12	13	13	10	10
	T-piece	24	20	17	15	11	12	7	7
160	Duct	22	18	16	12	14	10	9	8
	T-piece	22	18	16	12	14	10	9	8

Measurement of air flow
Data is available in a separate brochure.



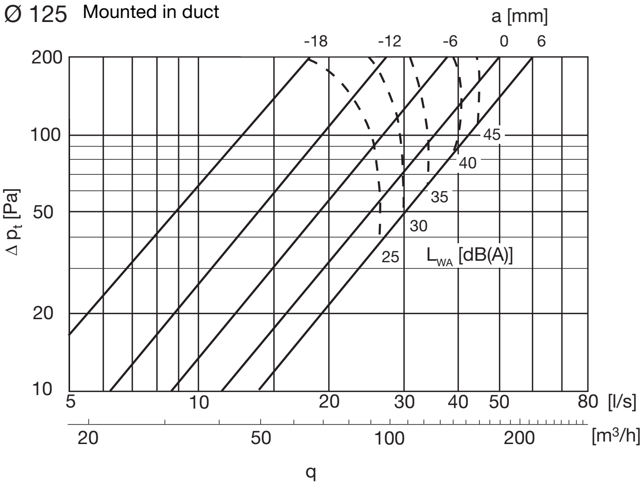




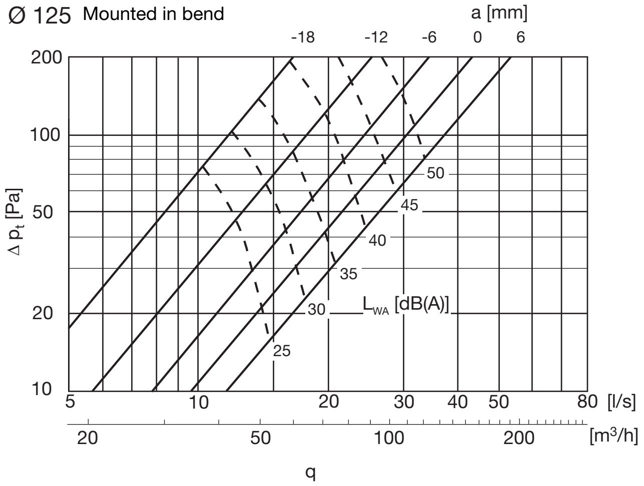
Exhaust valve

KVB

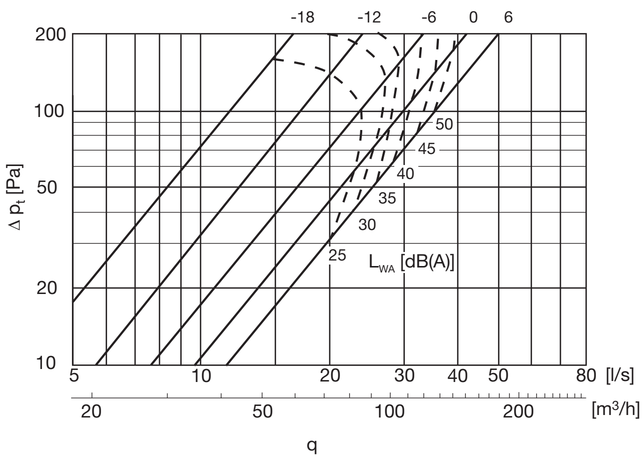
Ø 125 Mounted in duct



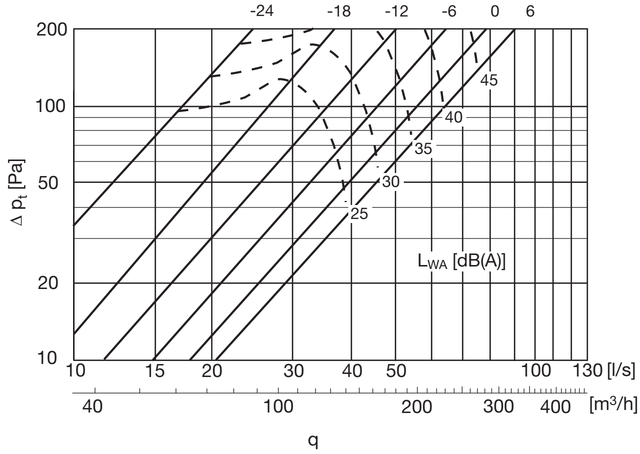
Ø 125 Mounted in bend



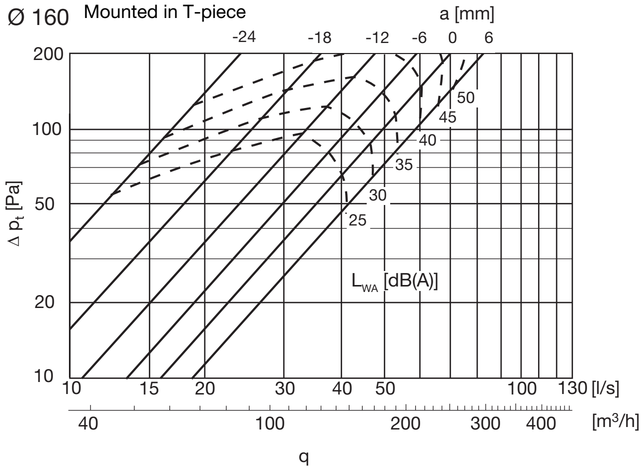
Ø 125 Mounted in T-piece



Ø 160 Mounted in duct

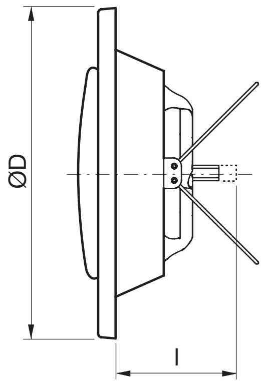


Ø 160 Mounted in T-piece



Exhaust valve KVG

Dimensions



Ød nom	ØD mm	m kg
100	132	0,18
125	162	0,25
160	192	0,37
200	243	0,59

Description

Valve for exhaust air.
Designed for wall or ceiling mounting.
Ø 100–160 have spring holders which connect to socket VRFU or VRFM.
Ø 200 has bayonet holders which connect to socket VRGU, VRGL or VRGM.

Materials and finish

Material
Painted galvanized sheet metal.

Colour
White RAL 9010, gloss 70, equivalent to NCS S 0502 Y.

Order code

	KVG	100
Product	KVG	
Dimension Ød		100

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

Exhaust valve KVG

Technical data

Air flow, q [l/s] and [m³/h],
total pressure drop, Δp_t [Pa], and
A-weighted sound power level, L_{WA} [dB(A)],
for different settings, a [mm],
are shown in the graphs.

Sound power level in octave bands, L_{Wok} [dB],
is calculated as $L_{Wok} = L_{WA} + K_{ok}$.
K_{ok} is found in the table below.

Ød nom	Valve mounted in	Centre frequency [Hz]							
		63	125	250	500	1K	2K	4K	8K
100	Duct	4	-4	-6	-7	-6	-4	-13	-18
	bend 90	-1	-1	-3	-3	-5	-7	-16	-27
	T-piece	7	0	-2	-7	-6	-5	-11	-21
125	Duct	6	-1	-3	-6	-7	-4	-16	-27
	T-piece	7	0	-2	-7	-6	-5	-13	-24
160	Duct	5	-5	-4	-6	-3	-7	-18	-30
	T-piece	5	1	-5	-8	-6	-4	-18	-29
200	Duct	3	-2	-5	-6	-2	-9	-16	-26

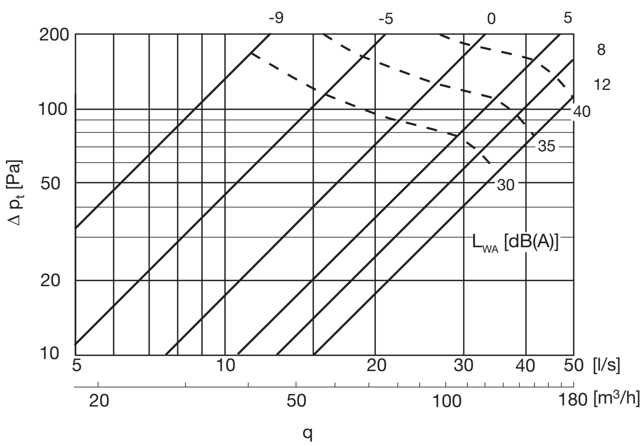
Tolerance	±6	±3	±2	±2	±2	±2	±2	±3

Sound attenuation ΔL, [dB]

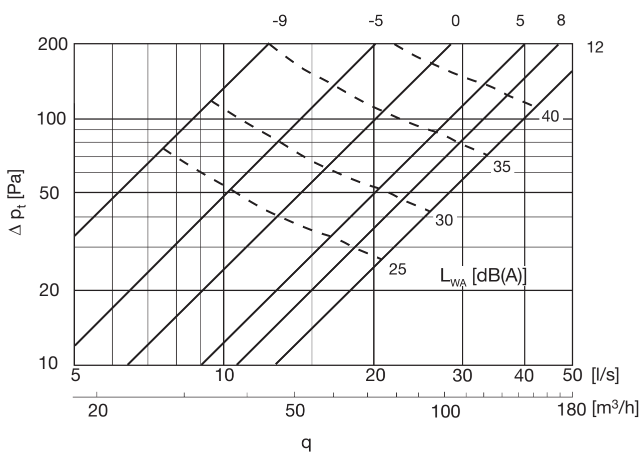
Ød nom	Valve mounted in	Setting a [mm]	Centre frequency [Hz]							
			63	125	250	500	1K	2K	4K	8K
100	Duct	-12	23	19	14	14	12	11	13	16
		0	22	16	9	8	6	6	6	10
		8	22	16	9	7	5	5	4	8
	bend 90	-12	25	20	15	13	12	12	12	15
		0	24	17	11	7	6	7	6	11
		8	24	17	11	6	5	5	5	11
	T-piece	-12	23	19	14	14	12	11	13	16
		0	22	16	9	8	6	6	6	10
		8	22	16	9	7	5	5	4	8
125	Duct	-17	21	15	12	10	8	8	11	14
		-6	20	14	10	7	5	5	6	7
		5	19	14	9	6	4	4	4	8
160	Duct	-18	19	14	10	8	7	9	13	13
		5	18	13	8	6	5	5	10	8
		6	18	12	7	5	4	4	10	6
200	Duct	-20	17	14	9	8	8	10	11	12
		0	17	12	7	5	5	6	8	8
		20	15	12	6	5	3	4	8	7

Measurement of air flow
Data is available in a separate brochure.

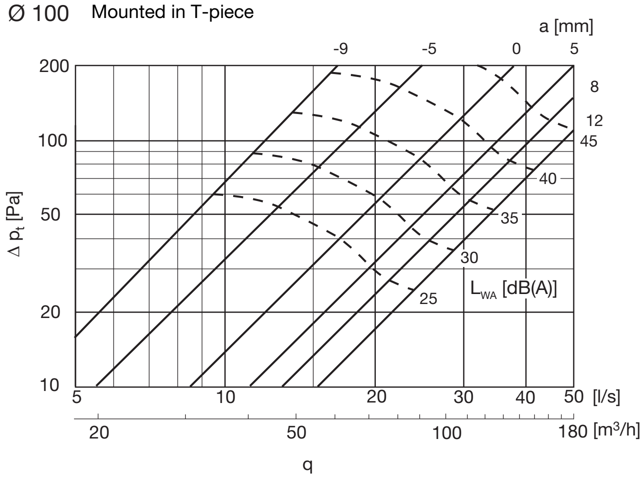
Ø 100 Mounted in duct



Ø 100 Mounted in bend

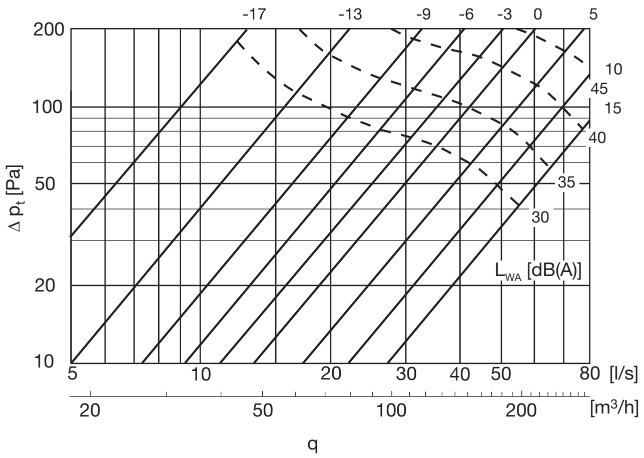


Ø 100 Mounted in T-piece

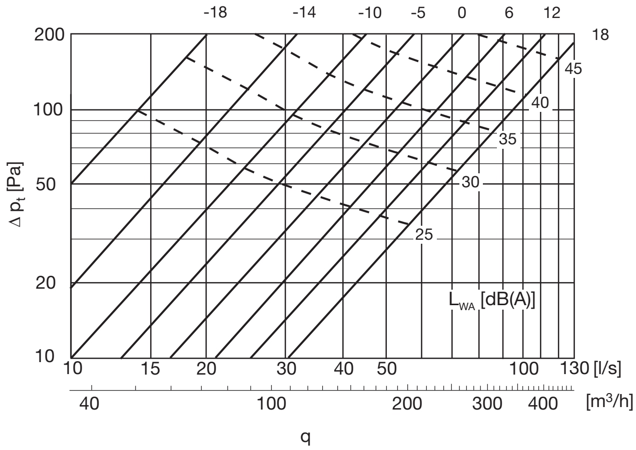


Exhaust valve KVG

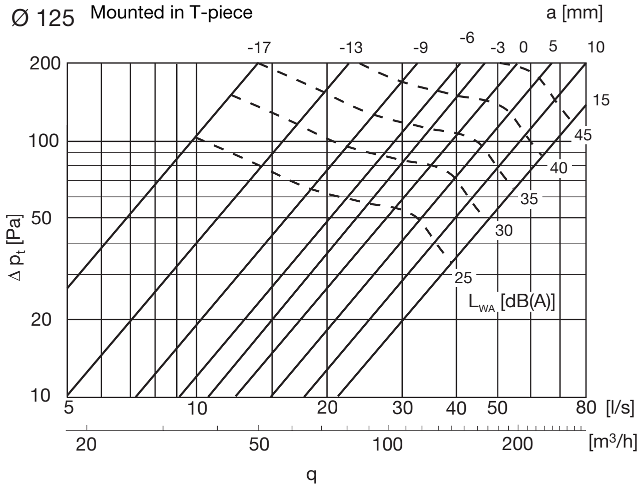
Ø 125 Mounted in duct



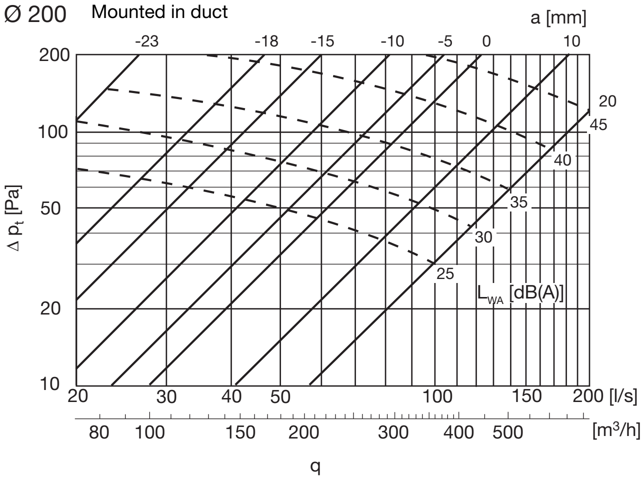
Ø 160 Mounted in T-piece



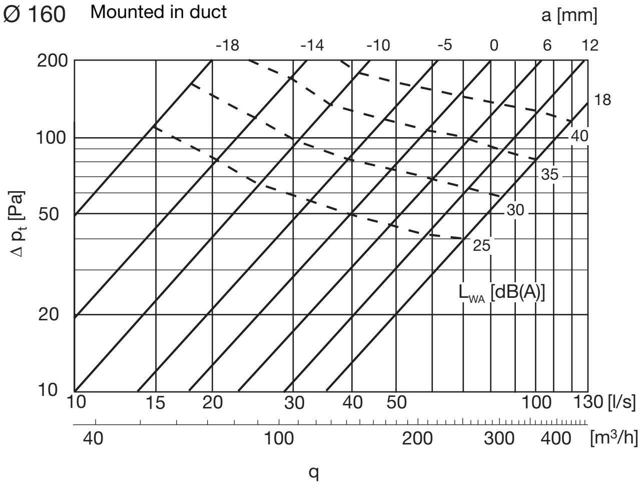
Ø 125 Mounted in T-piece



Ø 200 Mounted in duct



Ø 160 Mounted in duct



Exhaust valve

KU

Description

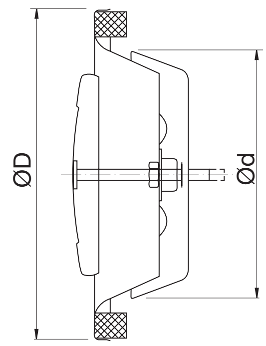
Valve for exhaust air.
Designed for wall or ceiling mounting.
Bayonet holders connect to socket VRGU, VRGL or VRGM.

Materials and finish

Material
Painted galvanized sheet metal.

Colour
White RAL 9010, gloss 70, equivalent to NCS S 0502 Y.

Dimensions



Ød nom	ØD mm	m kg
80	110	0,13
100	130	0,19
125	160	0,27
150	188	0,36
160	190	0,38
200	245	0,58

Order code

KU 125

Product — KU
Dimension Ød — 125

Exhaust valve

KU

Technical data

Air flow, q [l/s] and [m^3/h],
total pressure drop, Δp_t [Pa], and
A-weighted sound power level, L_{WA} [dB(A)],
for different settings, a [mm],
are shown in the graphs.

Sound power level in octave-bands, L_{Wok} [dB],
is calculated as $L_{Wok} = L_{WA} + K_{ok}$.
K_{ok} is found in the table below.

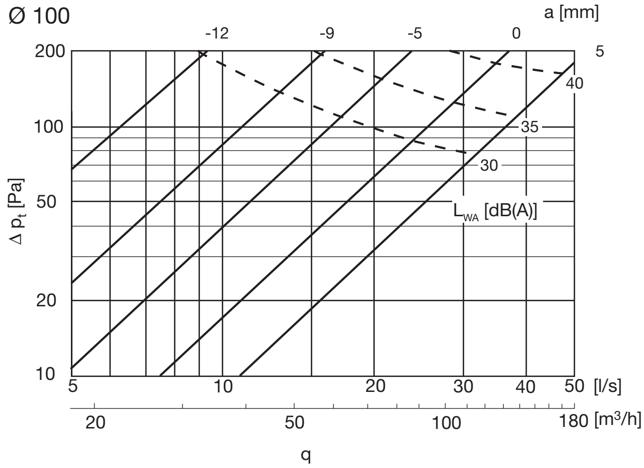
Ød nom	Valve mounted in	Centre frequency [Hz] 63	125	250	500	1K	2K	4K	8K
100	Duct	–	-8	-5	-6	-6	-4	-12	-21
125	Duct	–	-11	-4	-6	-7	-3	-16	-25
160	Duct	–	-7	-4	-6	-3	-6	-18	-31
200	Duct	–	-7	-6	-7	-2	-9	-18	-27
	Tolerance	–	±3	±2	±2	±2	±2	±2	±3

Sound attenuation, ΔL, [dB]

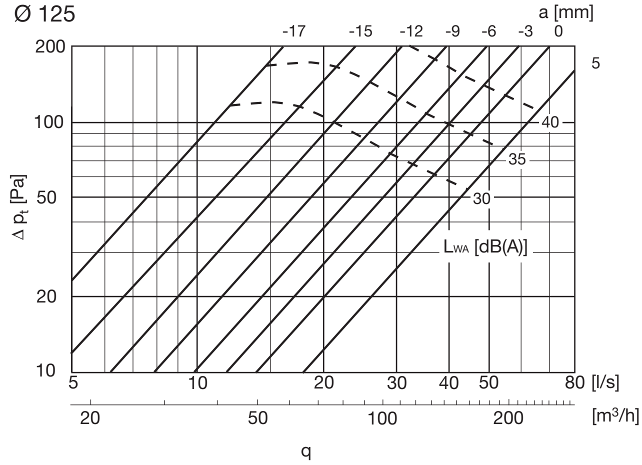
Ød nom	Valve mounted in	Setting a [mm]	Centre frequency [Hz] 63	125	250	500	1K	2K	4K	8K
100	Duct	-12	21	18	12	14	12	11	12	15
		-5	21	16	9	11	9	8	8	12
		5	21	16	8	10	8	7	5	11
125	Duct	-17	22	16	11	9	7	7	9	12
		-9	21	16	9	8	5	5	7	8
		5	20	15	9	6	4	3	4	7
160	Duct	-15	19	14	9	8	6	7	9	10
		-5	19	13	9	6	5	4	6	8
		5	18	13	8	5	4	3	6	6
200	Duct	-25	17	12	10	9	9	12	14	12
		0	16	10	7	6	6	6	10	7
		20	16	10	6	4	4	5	9	6
	Tolerance		±6	±3	±2	±2	±2	±2	±2	±3

Measurement of air flow
Data is available in a separate brochure.

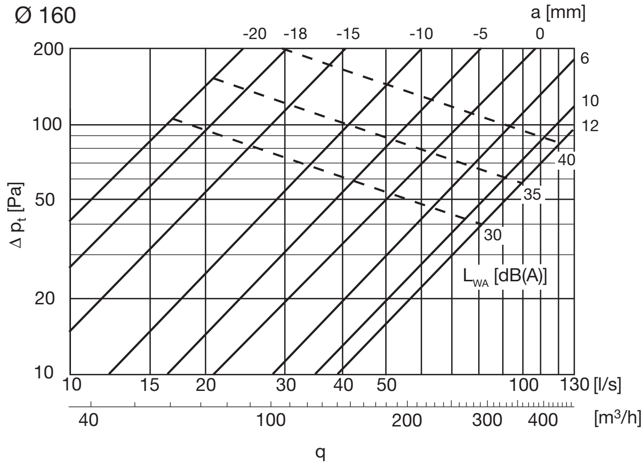
Ø 100



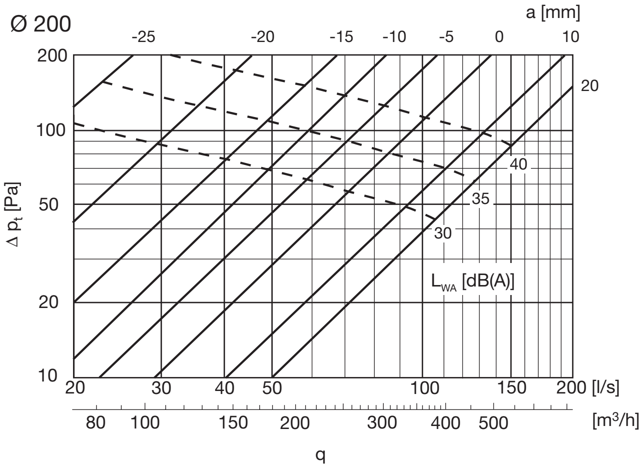
Ø 125



Ø 160



Exhaust valve KU



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Exhaust valve KSU

Description

Valve for exhaust air.
Designed for wall or ceiling mounting.
Bayonet holders connect to socket VRGU, VRGL, or VRGM.

Materials and finish

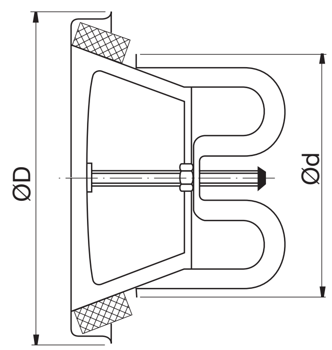
Material
Painted galvanized sheet metal.

Colour
White RAL 9010, gloss 70, equivalent to NCS S 0502 Y.

Order code

	KSU	160
Product	KSU	
Dimension Ød		160

Dimensions



Ød nom	ØD mm	m kg
100	130	0,30
125	160	0,39
160	190	0,52
200	235	0,78

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

Exhaust valve KSU

Technical data

Air flow, q [l/s] and [m^3/h],
total pressure drop, Δpt [Pa], and
A-weighted sound power level, L_{WA} [dB(A)],
for different settings, a [mm],
is shown in the graphs.

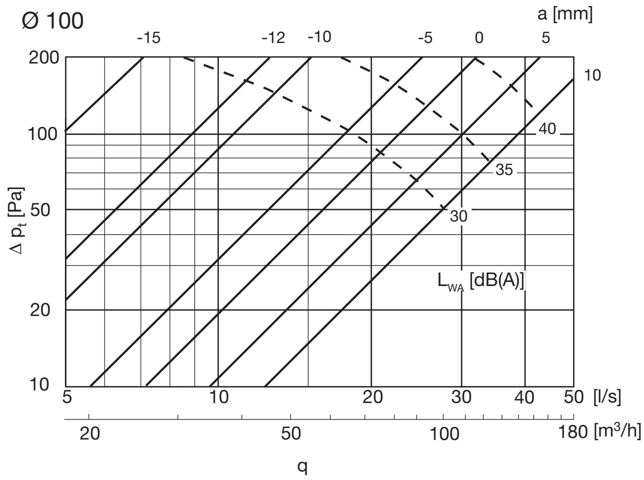
Sound power level in octave-bands, L_{Wok} [dB],
is calculated as $L_{Wok} = L_{WA} + K_{ok}$.
K_{ok} is found in the table below.

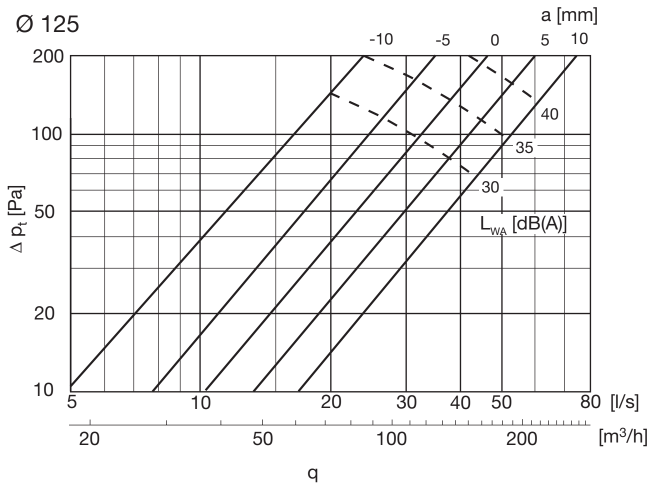
Ød nom	Valve mounted in	Centre frequency [Hz]							
		63	125	250	500	1K	2K	4K	8K
100	Duct	-6	-6	-3	-3	-4	-9	-13	-27
125	Duct	-7	-7	-6	-5	-8	-4	-12	-28
160	Duct	-3	-3	-7	-5	-2	-12	-16	-29
200	Duct	-5	-5	-7	-8	-2	-9	-13	-30
	Tolerance	±3	±2	±2	±2	±2	±2	±2	±3

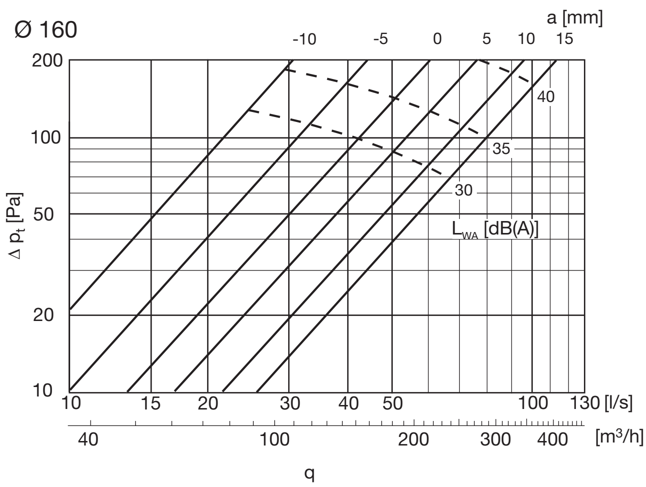
Sound attenuation, ΔL, [dB]

Ød nom	Valve mounted in	Centre frequency [Hz]							
		63	125	250	500	1K	2K	4K	8K
100	Duct	23	18	14	12	12	14	5	6
125	Duct	21	17	12	11	12	11	7	6
160	Duct	19	14	12	11	11	14	5	7
200	Duct	15	13	11	11	13	12	7	7
	Tolerance	±6	±3	±2	±2	±2	±2	±2	±3

Measurement of air flow
Data is available in a separate brochure.

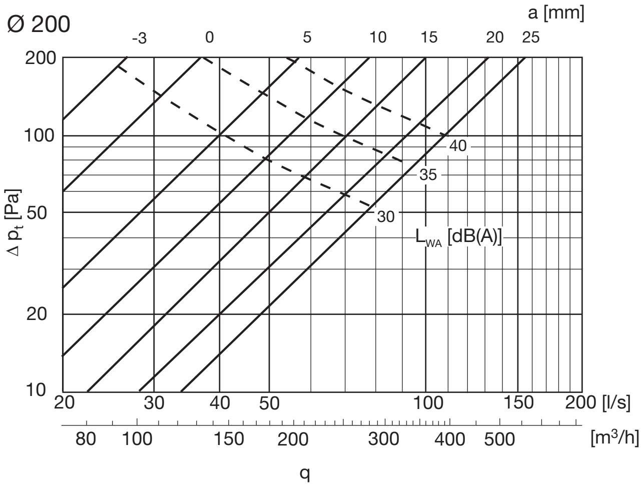






Exhaust valve

KSU



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Valve KSUL

Description

Valve for exhaust air.
Has built-in silencer for extra noise attenuation.
Designed for wall or ceiling mounting.
Bayonet holders connect to socket VRGU, VRGL or VRGM.

Materials and finish

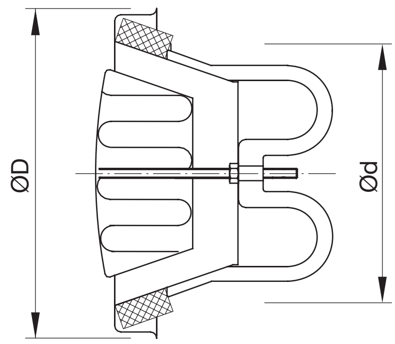
Material
Painted galvanized sheet metal.

Colour
White RAL 9010, gloss 70, equivalent to NCS S 0502 Y.

Order code

	KSUL	100
Product	KSUL	
Dimension Ød		100

Dimensions



Ød nom	ØD mm	m kg
100	130	0,30
125	160	0,32
160	190	0,48
200	235	0,71

Valve KSUL

Technical data

Air flow, q [l/s] and [m/h],
total pressure drop, Δp_t [Pa], and
A-weighted sound power level, L_{WA} [dB], for different settings, a [mm],
is shown in the graphs.

Measurement of air flow
Data is available in a separate brochure.

Sound power level, L_{WA} [dB], A-weighted
is shown in the graphs.

Sound power level, L_W [dB], in octave bands
is calculated as $L_{WA} + K_{ok}$.
K_{ok} is found in the table below.

Ød nom	Valve mounted in	Centre frequency [Hz] 63	125	250	500	1K	2K	4K	8K
100	Duct	–	2	2	-2	-7	10	-13	-31
125	Duct	–	3	4	-2	-8	-12	-17	-33
160	Duct	–	4	1	-4	-8	-7	-10	-28
200	Duct	–	-2	-1	-5	-7	-7	-9	-28

Tolerance	–	±3	±2	±2	±2	±2	±2	±3

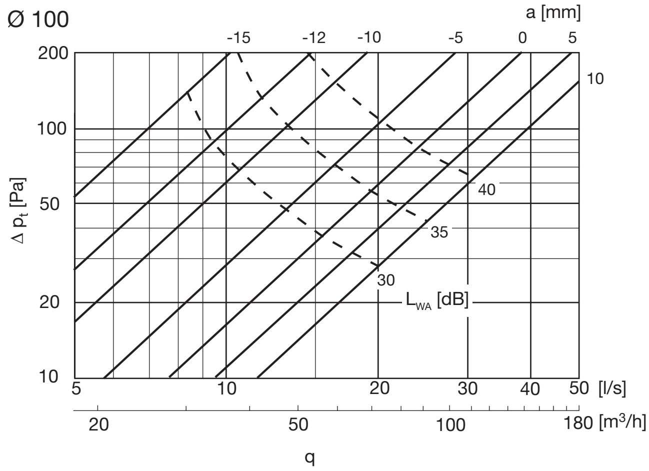
Sound attenuation, ΔL, [dB]

Ød nom	Valve mounted in	Setting a [mm]	Centre frequency [Hz] 63	125	250	500	1K	2K	4K	8K
100	Duct	0	22	18	14	14	13	12	5	8
125	Duct	0	20	16	12	13	12	9	6	8
160	Duct	0	19	14	11	12	13	12	6	8
200	Duct	10	14	12	10	13	14	12	8	9

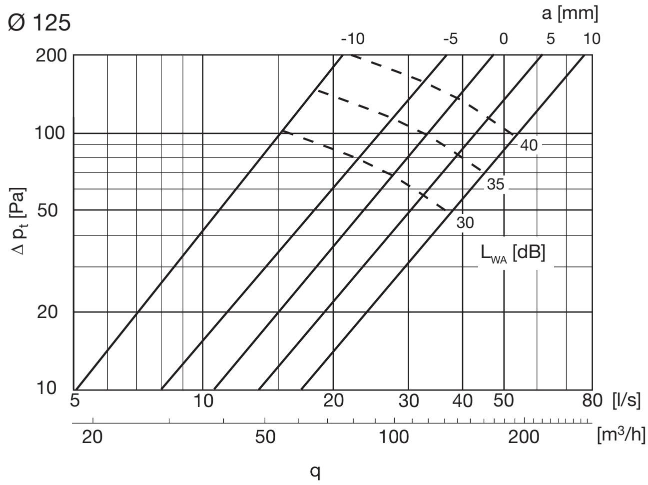
Tolerance	±6	±3	±2	±2	±2	±2	±2	±3

Measurement of air flow
Data is available in a separate brochure.

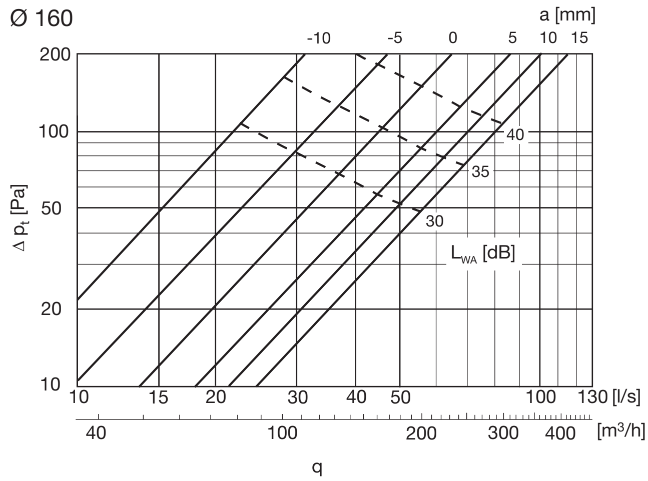
Ø 100



Ø 125



Ø 160



Valve

KSUL

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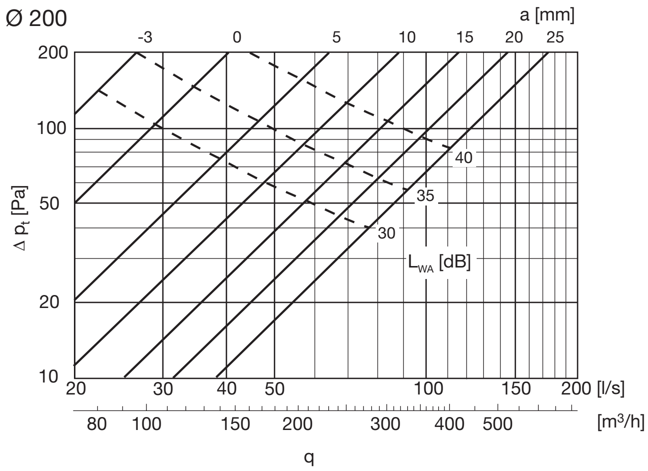


Valve and fire damper KSUB

Description
Valve and fire damper for exhaust air.
Is used to prevent spreading of fire and smoke into duct systems. A spring loaded melting fuse shuts the valve when the temperature exceeds +70 °C.
Bayonet holders connect to socket VRGU, VRGL or VRGM.
Socket VRGL is as standard delivered together with KSUB.
This case is shown in the ordering example below.
If socket VRGU or VRGM is wanted instead this socket has to be specified in the type field.

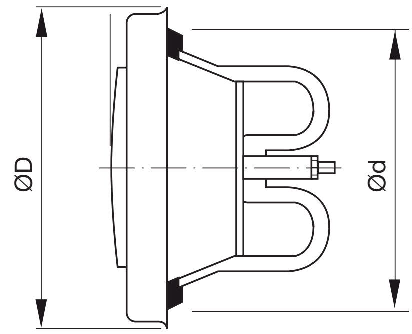
Material
Painted galvanized sheet metal.

Colour
White RAL 9010, gloss 70, equivalent to NCS S 0502 Y.

Order code

	KSUB	125
Product	KSUB	
Dimension Ød		125

Dimensions



Ød nom	ØD mm	m kg
100	130	0,32
125	160	0,42
160	190	0,56
200	235	0,81

Valve and fire damper KSUB

Technical data

Air flow, q [l/s] and [m^3/h],
total pressure loss, Δp_t [Pa], and
A-weighted sound power level, L_{WA} [dB(A)], for different settings, a [mm],
are shown in the graphs.

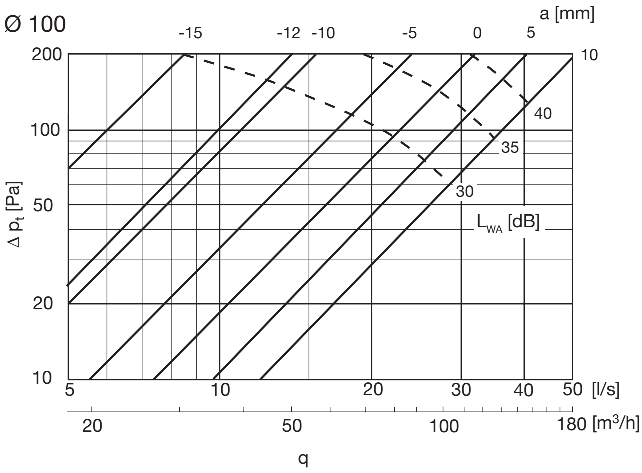
Sound power level in octave bands, L_{Wok} [dB],
is calculated as $L_{Wok} = L_{WA} + K_{ok}$.
K_{ok} is found in the table below.

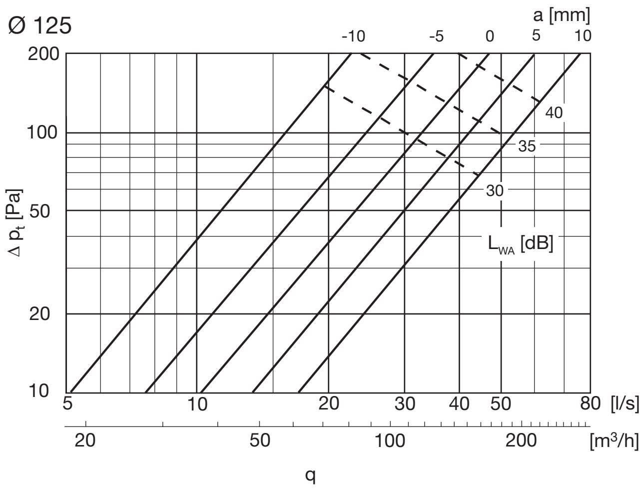
Ød nom	Valve mounted in	Centre frequency [Hz] 63	125	250	500	1K	2K	4K	8K
100	Duct	–	-2	-5	-5	-3	-8	-12	-26
125	Duct	–	-7	-7	-7	-6	-4	-11	-28
160	Duct	–	-4	-7	-5	-2	-11	-15	-29
200	Duct	–	-3	-7	-8	-1	-12	-16	-33
Tolerance		–	±3	±2	±2	±2	±2	±2	±3

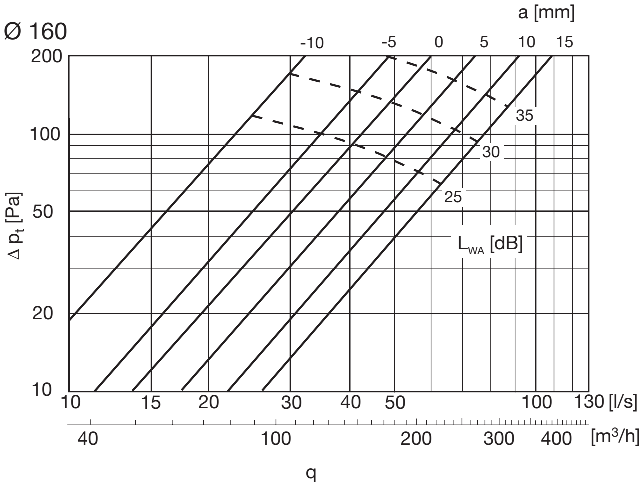
Sound attenuation, ΔL, [dB]

Ød nom	Valve mounted in	Setting a [mm]	Centre frequency [Hz] 63	125	250	500	1K	2K	4K	8K
100	Duct	-10	22	19	16	16	16	18	9	9
		0	22	18	13	12	12	13	6	7
		10	22	17	12	9	8	11	4	6
125	Duct	-10	21	18	15	14	15	14	10	7
		0	19	17	12	11	11	10	6	5
		10	20	16	10	9	9	8	5	5
160	Duct	-10	19	16	14	14	14	16	8	8
		0	18	14	11	11	11	13	5	7
		10	18	14	10	9	9	11	4	6
200	Duct	0	14	12	11	10	12	12	7	7
		10	13	11	8	8	9	10	6	6
Tolerance			±6	±3	±2	±2	±2	±2	±2	±3

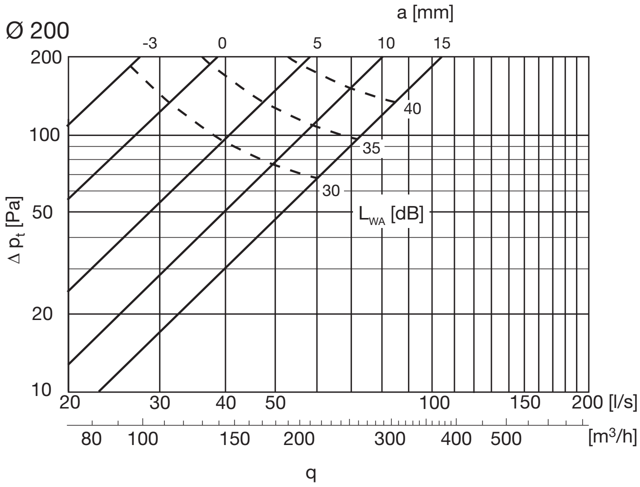
Measurement of air flow
Data is available in a separate brochure.







Valve and fire damper KSUB



Valve - exhaust air

KPF

Description

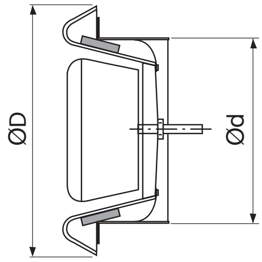
Valve for exhaust air.
Designed for wall or ceiling mounting.
Flat spring holders connect to duct.

Materials and finish

Material
Plastic.

Colour
White RAL 9010.

Dimensions



Ød nom	ØD mm	m kg
80	114	0,07
100	138	0,09
125	164	0,11
160	190	0,24
200	246	0,33

Order code

KPF **100**

Product
Dimension Ød

Valve - exhaust air

KPF

Technical data

Air flow, q [l/s] and [m^3/h],
total pressure drop, Δp_t [Pa], and
A-weighted sound power level, L_{WA} [dB(A)],
for different settings, n [number of opening turns],
are shown in the graphs.

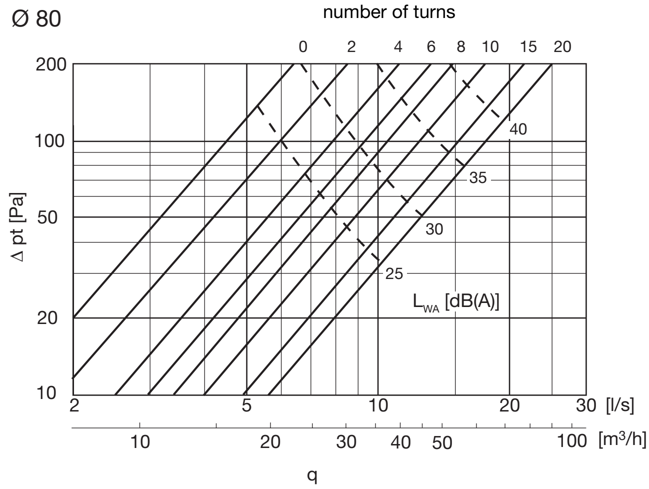
Sound power level in octave bands, L_{Wok} [dB],
is calculated as $L_{Wok} = L_{WA} + K_{ok}$.
K_{ok} is found in the table below.

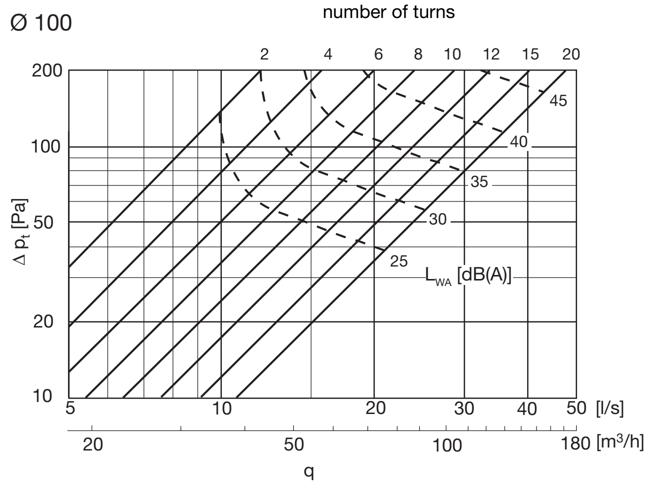
Ød nom	Valve mounted in	Centre frequency [Hz] 63	125	250	500	1K	2K	4K	8K
80	Duct	-12	-11	-9	-8	-5	-6	-9	-16
100	Duct	-11	-10	-10	-8	-6	-5	-8	-15
125	Duct	-10	-9	-7	-8	-6	-5	-8	-17
160	Duct	-3	-2	-3	-5	-3	-8	-13	-22
200	Duct	-3	-2	0	-4	-5	-8	-14	-22

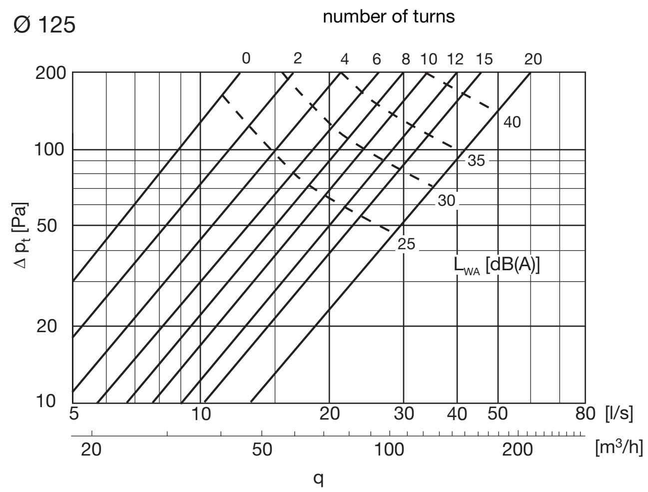
Sound attenuation ΔL, [dB]

Ød nom	Valve mounted in	Centre frequency [Hz] 63	125	250	500	1K	2K	4K	8K
80	Duct	23	23	16	15	13	10	6	9
100	Duct	22	21	15	13	11	10	6	9
125	Duct	21	19	13	11	10	10	7	9
160	Duct	20	16	12	10	9	10	8	8
200	Duct	17	12	7	5	4	4	7	5

Measurement of air flow
Data is available in a separate brochure.

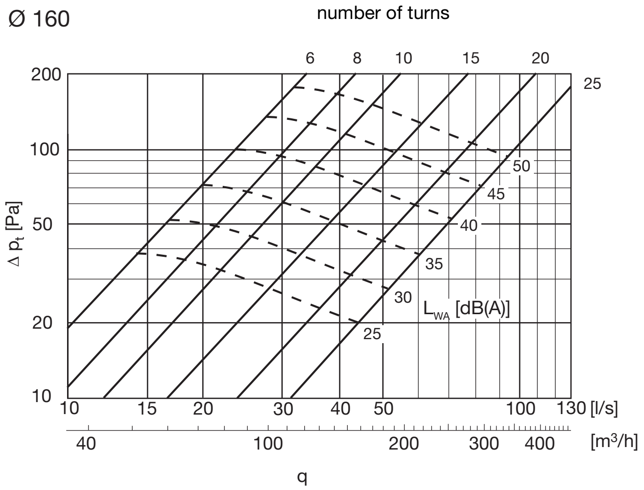


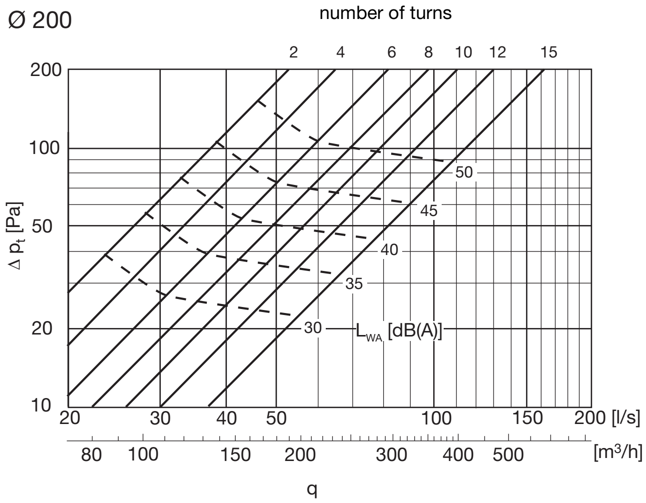




Valve - exhaust air

KPF





Valve

KDPF

Description

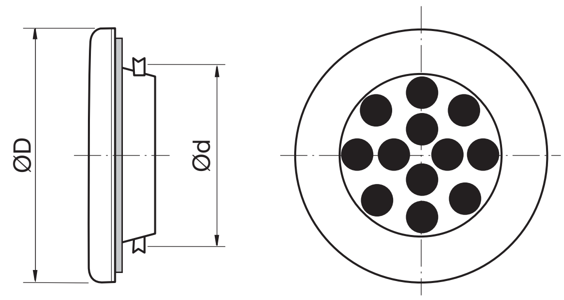
Valve for exhaust air.
Designed for wall or ceiling mounting.
Flat spring holders connect to socket VRGU, VRGL, VRGM; VRFU or VRFM.

Materials and finish

Material
Plastic.

Colour
White RAL 9010

Dimensions



Ød nom	ØD mm	m kg
100	133	0,06

Order code

	KDPF	100
Product	✓	
Dimension Ød		✓

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

Valve

KDPF

Technical data

Air flow, q [l/s] and [m^3/h],
total pressure drop, Δp_t [Pa], and
A-weighted sound power level, L_{WA} [dB], for different settings, n [number of open holes],
are shown in the graphs.

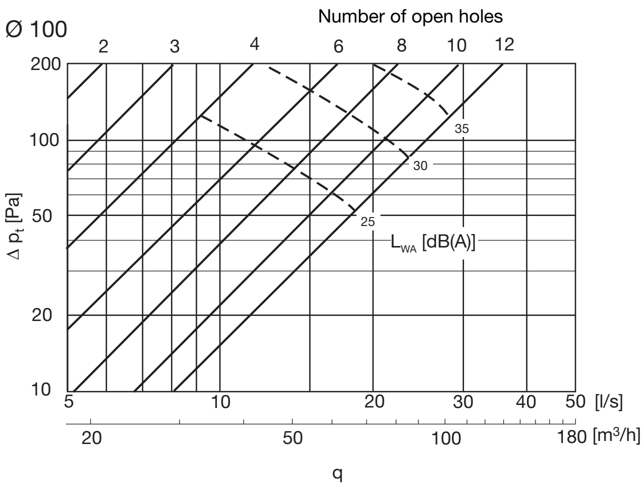
Measurement of air flow
Data is available in a separate brochure.

Sound power level, L_W [dB], in octave bands
is calculated as $L_{WA} + K_{ok}$.
K_{ok} is found in the table below.

Ød nom	Diffuser mounted in	Centre frequency [Hz]							
		63	125	250	500	1K	2K	4K	8K
100	Duct	–	-5	-4	-3	-3	-8	-13	-16

Sound attenuation, ΔL, [dB]

Ød nom	Valve mounted in	Number of open holes	Centre frequency [Hz]							
			63	125	250	500	1K	2K	4K	8K
100	Duct	2	–	23	22	24	18	16	15	10
		6	–	19	16	15	12	8	10	7
		12	–	19	15	12	9	5	5	3



Exhaust valve URH

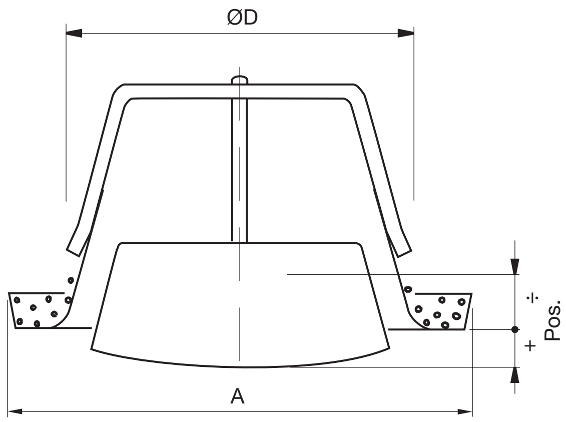
Description

The URH valve is used for air exhaust. In special cases the URH valve can be used as an supply air valve for installation in a wall (relatively long throw).

The valve has a low sound power level even at a relatively large pressure loss. URH is supplied in four standard sizes: 100, 125, 160 and 200 mm.

The URH valve fits directly into Lindab pipes by means of a standard VRGL type bayonet fitting or VRGU or VRGM type valve bushing.

Dimensions



ØD mm	A mm	Weight kg
100	140	0,30
125	165	0,40
160	200	0,60
200	250	0,90

Order code

Product	aaa
Type	
Size	

Materials

Materials: Steel

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

Exhaust valve URH

Technical data

Capacity

Volume flow q_v [l/s] and [m³/h], total pressure drop Δp_t [Pa], and A-balanced sound pressure level L_A [dB(A)] can be seen in the diagrams at various cone settings.

Pressure drop Δp_t

The diagrams specify the pressure drop Δp_t [Pa] as total pressure drop.

A-balanced sound pressure level L_A

The diagrams specify the A-balanced sound pressure level L_A [dB(A)] at a room attenuation of 4 dB.

Sound power level in octave bands L_{Wok}

Sound power level in octave bands L_{Wok} [dB] = L_A + K_{ok} - see table below.

Size	Centre frequency Hz 63	125	250	500	1K	2K	4K	8K
100	-	-2	-2	-2	-1	-1	-12	-
125	-	2	0	-1	-3	0	-9	-
160	-	2	0	-1	1	-5	-10	-
200	-	2	-2	-1	1	-4	-13	-

tolerance	-	+/-3	+/-4	+/-3	+/-2	+/-2	+/-4	-

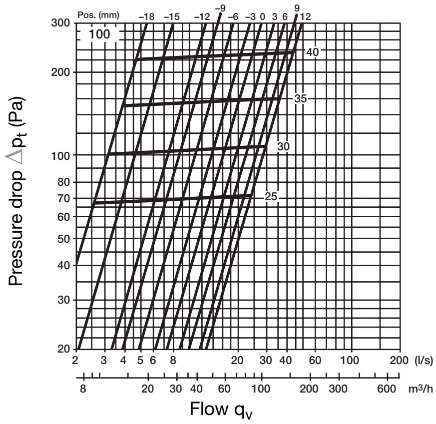
Sound attenuation ΔL

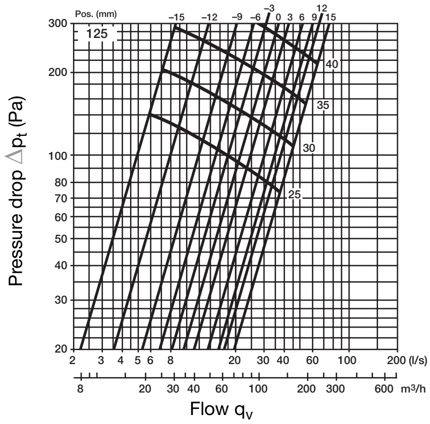
Sound attenuation of the diffuser ΔL (dB) including the end reflection, corresponding to the inlet diameter - see table below.

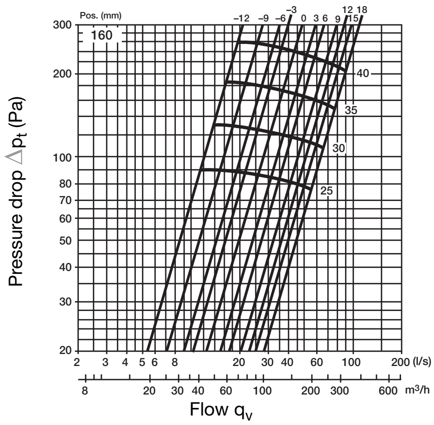
Size	Centre frequency Hz 63	125	250	500	1K	2K	4K	8K
100	-	23	18	15	13	11	6	-
125	-	18	16	13	11	9	6	-
160	-	18	14	10	11	8	7	-
200	-	13	12	9	9	8	5	-

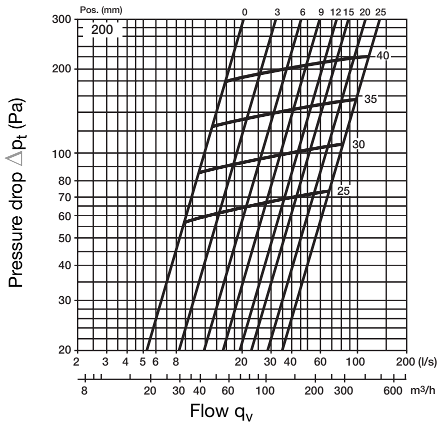
Adjustment

Adjustment data for control of air volume is available in a separate brochure.









Cover

TLO

Description
Cover or access door.
Designed for wall or ceiling mounting.
Spring holders connect to socket VRFU, VRFM or VRR.

Materials and finish
Material
Painted galvanized sheet metal.

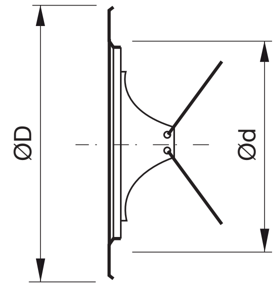
Colour
White RAL 9010, gloss 70, equivalent to NCS S 0502 Y.

Maintenance
The visible parts can be wiped with a damp cloth.

Order code

	TLO	100
Product	TLO	
Dimension Ød		100

Dimensions



Ød nom	ØD mm	m kg
100	140	0,13
125	170	0,20
160	200	0,28

Socket

VRFU

Description

Socket with groove for unit with spring holder.
Supplied with Safe gasket in the far end.
Connects to duct.

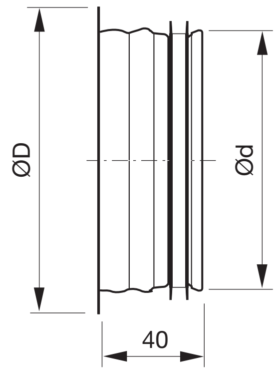
Materials and finish

Galvanized sheet metal.

Maintenance

The visible parts can be wiped with a damp cloth.

Dimensions



Ød nom	ØD mm	m kg
100	125	0,09
125	150	0,11
160	185	0,14

Order code

VRFU 100

Product
Dimension Ød

Socket

VRFM

Description

Socket with groove for unit with spring holder.
Has female connection in the far end.
Connects to fitting.

Materials and finish

Galvanized sheet metal.

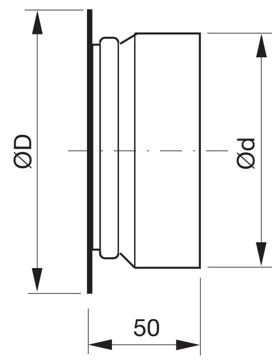
Maintenance

The visible parts can be wiped with a damp cloth.

Order code

	VRFM	100
Product		
Dimension Ød		

Dimensions



Ød nom	ØD mm	m kg
100	125	0,09
125	150	0,12
160	185	0,16

Socket

VRGU

Description

Socket with thread for unit with bayonet holder.
Supplied with Safe gasket in the far end.
Connects to duct.

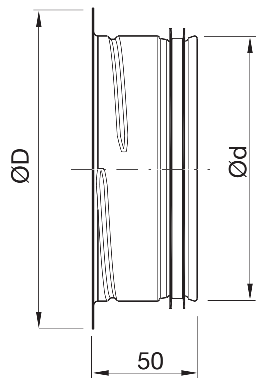
Materials and finish

Galvanized sheet metal.

Maintenance

The visible parts can be wiped with a damp cloth.

Dimensions



Ød nom	ØD mm	m kg
80	105	0,08
100	125	0,10
125	150	0,12
150	175	0,15
160	185	0,16
200	225	0,22

Order code

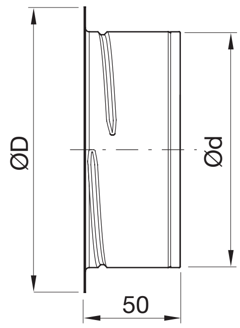
VRGU 160

Product — VRGU
Dimension Ød — 160

Socket

VRGL

Dimensions



Ød nom	ØD mm	m kg
80	105	0,07
100	125	0,09
125	150	0,11
150	175	0,14
160	185	0,15
200	225	0,18

Description

Socket with thread for unit with bayonet holder.
Supplied without any gasket.
Connects to duct.

Materials and finish

Galvanized sheet metal.

Maintenance

The visible parts can be wiped with a damp cloth.

Order code

VRGL 100

Product: VRGL
Dimension Ød: 100

Socket

VRGM

Description

Socket with thread for unit with bayonet holder.
Has female connection in the far end.
Connects to fitting.

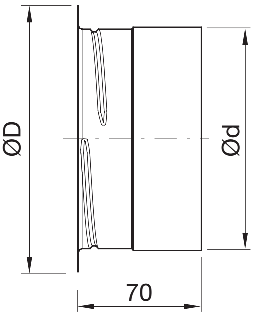
Materials and finish

Galvanized sheet metal.

Maintenance

The visible parts can be wiped with a damp cloth.

Dimensions



Ød nom	ØD mm	m kg
100	125	0,11
125	150	0,14
150	175	0,17
160	185	0,19
200	225	0,25

Order code

VRGM 125

Product
Dimension Ød

Cover socket

VRR

Description
Cover socket with groove for unit with spring holder. Are used where older valve types are replaced.

Materials and finish
Material
Painted sheet metal.

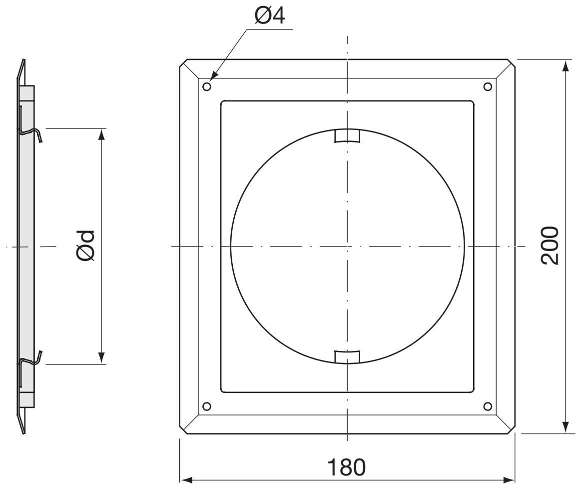
Colour
White RAL 9010, gloss 70, equivalent to NCS S 0502 Y.

Maintenance
The visible parts can be wiped with a damp cloth.

Order code

	VRR	125
Product	┘	
Dimension Ød		┘

Dimensions



Ød nom	m kg
100	0,23
125	0,20

Valve adjustment kit VAK

Description

VAK is a kit of three tools for adjustment of valves.

The kit consists of:

a a bent pipe for measurning of adjustment pressure for valves with a cone,

b a straight lance for measurning of adjustment pressure for valves with a gap and

c an adjustable combination tool for measuring the position of the cone or the size of the gap.

Order code

	VAK
Product	

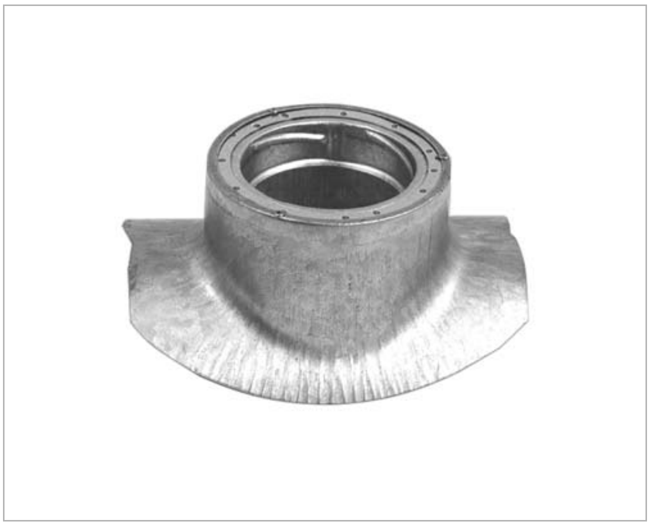
Advantages

The combination tool is adjustable to fit valves Ø100-200

The position of the cone (-25 to +25 mm) or the size of the gap (0 to 20 mm) is directly readable.

Saddle collar

VPS



Description

The VPS is an extra saddle piece eqquipped by the factory with a short bayonet socket. This means that the valve can be screwed directly into the saddle piece, ensuring a good finish between the saddle piece and the valve.
The VPS can be used with the following valves: KI, KIR, KU and KSU.

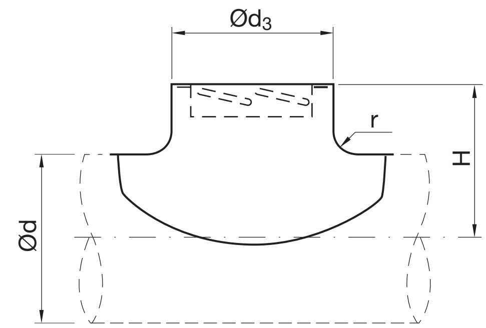
Choice of valve size
Ød3 = 140 : use valvesize 100
Ød3 = 160 : use valvesize 125
Ød3 = 200 : use valvesize 160
Ød3 = 250 : use valvesize 200

(Go to dimensiontable in next column. When ordering, please state the dimensions of the main duct (Ød) as well as the valve type and size)

Order code

Product	VPS	aaa	bbb
Type			
Duct dimension Ød			
Valve size			

Dimensions



$Ød_3$ mm	Ød mm	r mm	H mm	Weight kg
140	140	20	125	0,4
140	150	20	130	0,4
140	160	20	135	0,4
140	180	20	145	0,4
140	200	20	155	0,4
140	224	20	167	0,4
140	250	20	180	0,4
140	280	20	195	0,4
140	300	20	205	0,4
140	315	20	213	0,4
160	160	25	140	0,5
160	180	25	150	0,5
160	200	25	160	0,5
160	224	25	172	0,5
160	250	25	185	0,5
160	280	25	200	0,4
160	300	25	210	0,4
160	315	25	217	0,4
160	355	25	238	0,4
160	400	25	260	0,4
160	450	25	285	0,4
160	500	25	310	0,4
200	200	25	160	0,8
200	224	25	172	0,7
200	250	25	185	0,7
200	280	25	200	0,7
200	300	25	217	0,7
200	315	25	238	0,7
200	355	25	260	0,7
200	400	25	285	0,7
200	500	25	310	0,7
200	560	25	340	0,7
200	630	25	340	0,7
250	250	25	205	1,1
250	280	25	220	0,9
250	300	25	237	0,9
250	315	25	258	0,9
250	355	25	280	0,9
250	400	25	305	0,9
250	450	25	330	0,9
250	500	25	360	0,9
250	560	25	395	0,7
250	630	25	340	0,7

Fresh air valves / overflow units

Fresh air valves / overflow units

Fresh air valves

Overflow units

Fresh air valves / overflow units

ULA, summerhouse, Dronningmoelle.

Lindab fresh air valves

Fresh air valves are usually used in residences where mechanical supply air is not available, but there is still a need to ensure an air-change in the room.

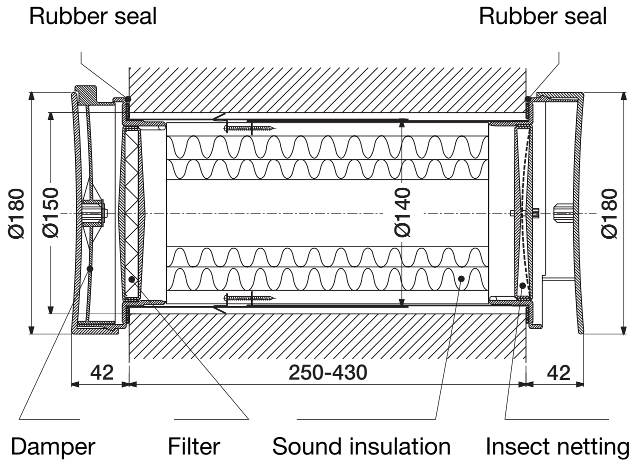
The fresh air valve usually functions with a mechanical exhaust unit, where the volume of the exhaust air is replaced through the fresh air valve.

Lindab overflow units

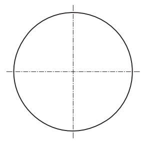
Overflow units are usually used in connection with the transfer of air between rooms. The overflow unit is able to balance two rooms, in connection with the supply of air in one room and exhaust air in a connecting room.

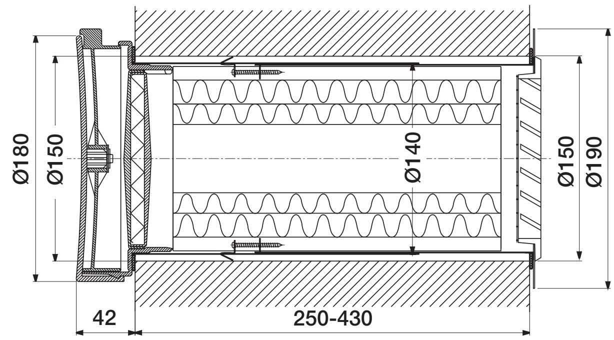
ULA

Fresh air valve ULA

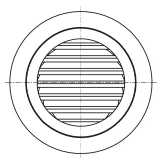


External grille type 1





External grille type 2



Description

ULA is a circular fresh air valve with telescopic wall sleeve for installation in an external wall close to the roof. ULA has an integral damper that can be operated using a pull-cord. The special telescopic wall sleeve makes it possible to install the valve in the wall without screws. The two telescopic parts are screwed together through the wall. ULA can be supplied with two types of external grille, and type 1 is also equipped with detachable insect netting.
ULA is supplied with sound insulation inserts in two thicknesses. The material is fibre-free, washable and easy to remove.
ULA is supplied with an EU-3 filter. The insect netting and sound insulation can be easily removed from inside.

- Easy to clean
- Fits wall thicknesses from 250 mm to 430 mm
- Can be supplied with sound insulation inserts in two thicknesses
- External casing in several colours and materials

Maintenance

Front plate, filter and insulation can be removed to enable cleaning.

Accessories

ULZ-1: Extra sound insulation (wall thickness > 300 mm)
ULZ-2: Cover flange Ø 241 mm, galvanised steel, white/grey
ULZ-3: Filter
ULZ-4: Insect netting
ULAK: Type 1, with copper casing
ULAK: Type 1, with aluminium casing
ULAG: Type 1, with galvanised casing

Order code

Product	ULA	a
Type		
Outside grille 1,2		

ULA is supplied with 2-part sound insulation insert Ø140/Ø50 mm. If greater capacity is required, remove the inner section of the insulation. Sound reduction will decrease by 3 dB (see tech. data). Valves with a shorter design for installation in lightweight structures can be supplied on request. However, this will result in reduced sound insulation.

Materials and finish

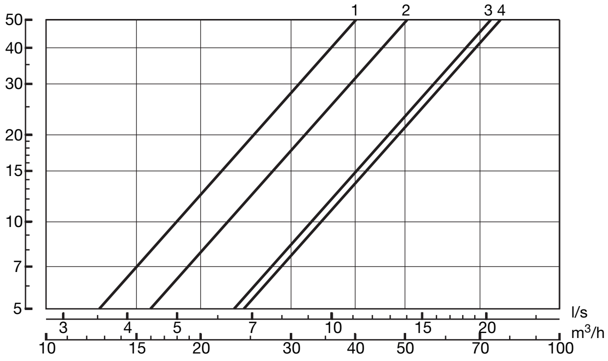
Internal section:	Colourfast plastic
Standard colour:	White
External grille type 1:	Colourfast plastic, grey
External grille type 2:	Aluminium
Standard finish:	Powder-coated, Grey RAL 7040
Telescopic tube:	Galvanised steel
Sound insulation:	Foam plastic

Fresh air valve ULA

Technical data

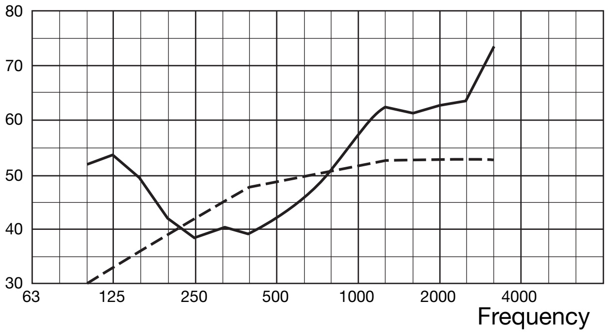
Capacity

Underpressure (Pa)



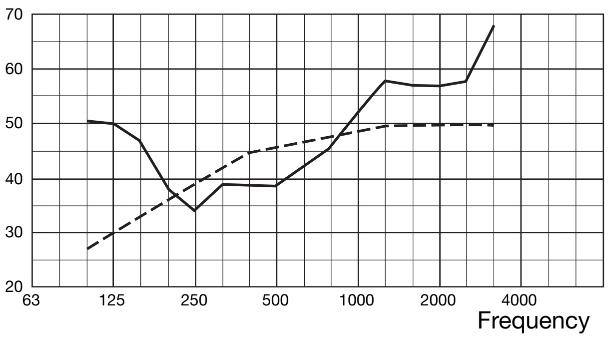
Curve	Filter	Sound-Insulation mm	free opening cm²	Equivalent area cm²
1	EU-3	Ø140 / Ø50	20	21
2	EU-3	Ø140 / Ø80	50	26
2	-	Ø140 / Ø50	20	26
3	-	Ø140 / Ø80	50	38
4	-	-	50	39

Dn,e (dB) Sound reduction



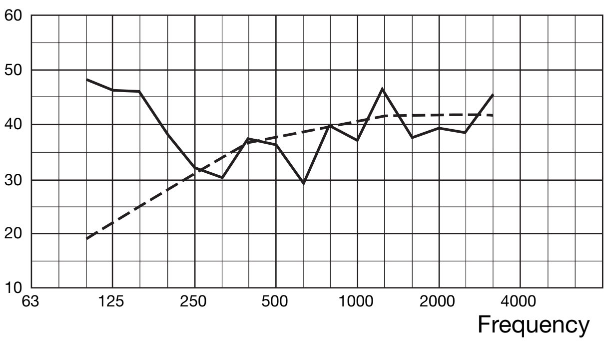
ULA with sound insulation Ø140/Ø50
wall thickness: 300 mm
Weighted element-normalised level difference
Dn,e,w = 49 dB, Δmax = 8.3 dB

Dn,e (dB) Sound reduction



ULA with sound insulation Ø140/Ø80
wall thickness: 300 mm
Weighted element-normalised level difference
Dn,e,w = 46 dB, Δmax = 7.6 dB

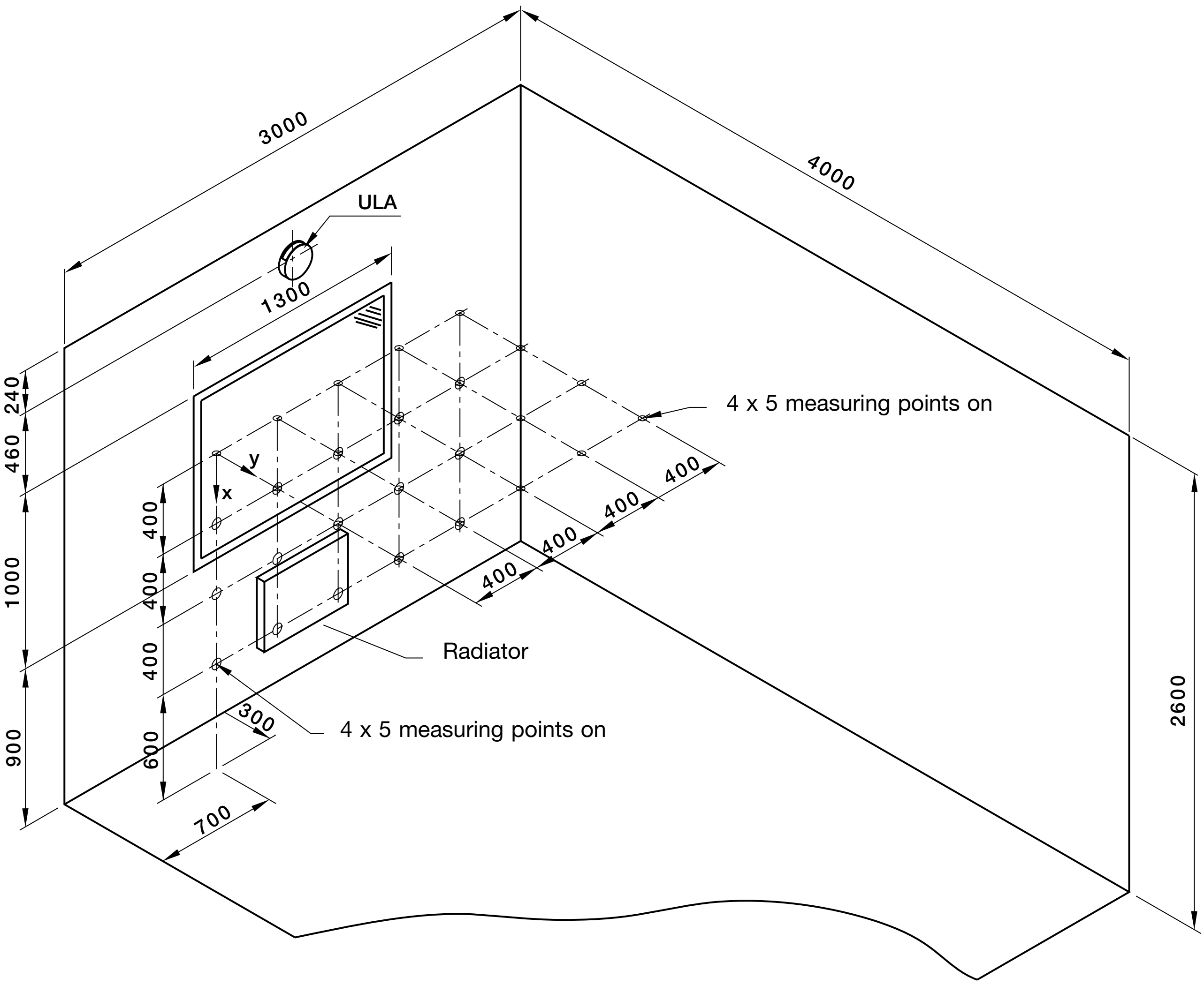
Dn,e (dB) Sound reduction



ULA without sound insulation
wall thickness: 300 mm
Weighted element-normalised level difference
Dn,e,w = 38 dB, Δmax = 10.2 dB

Fresh air valve ULA

Technical data

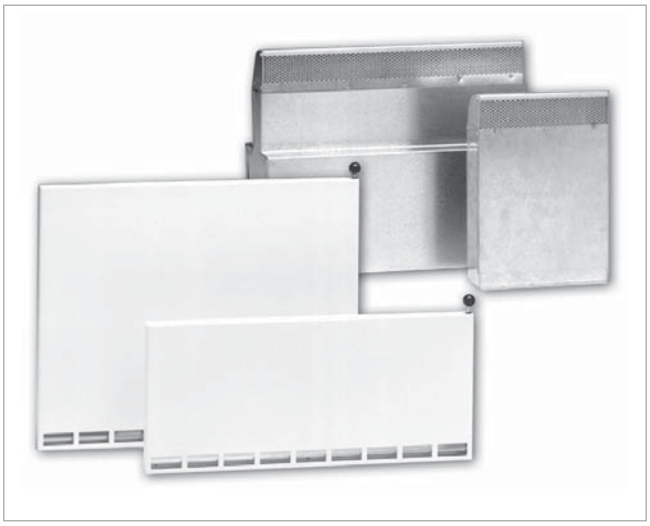


Air Flow		Without radiator (500W) Δt (K)			radiator (500W) Δt (K)	
m³/h	l/s	0	-20	-40	-20	-40
20	5,6	<0,10	0,15	0,21	<0,10	0,10
30	8,3	<0,10	0,15	0,22	<0,10	0,17
40	11,1	0,10	0,15	0,22	0,10	0,18
50	13,9	0,13	0,15	-	0,11	-
60	16,7	0,14	0,15	-	0,11	-
70	19,4	0,14	0,15	-	0,13	-
100	28,0	0,15	0,23	-	0,13	-

The drawing above shows a trial set-up for determination of speeds in the occupied zone for different volumes of air and temperature differences.

For trials with Δt = -40 K, a window with U = 1.5 W/m^2 was used. At -20 K was U = 2.6 W/m^2.

Fresh air valve ULV



Description

ULV is a rectangular fresh air valve for installation in external walls behind radiators. The valve is equipped with a damper that is opened and closed by means of a handle on the top. In order to achieve a good seal against the wall, the back of the valve is equipped with a sealing strip made of synthetic foam rubber. Three telescopic wall sleeve are available as accessories to the valves, including the sound-attenuated version. The valve can also be supplied with an extended damper arm. ULV is used for the intake of fresh air in connection with a mechanical exhaust system, whereby good utilisation of air jet and convection heat is achieved. ULV is typically used in homes and premises where there are requirements for a solution that is simple and economical to install. Valve type ULV2 should be selected where maximum heating is required.

- Excellent utilisation of air jet and convection heating
- Fits wall thicknesses from 230 mm to 440 mm
- Can be supplied with sound-insulated telescope
- Wall sleeve in brick dimensions

Maintenance

The front panel can be removed from the wall rail to make cleaning possible. The visible parts of the diffuser can be wiped with a damp cloth.

Order code

Product	ULV	a	b
Type			
Height			

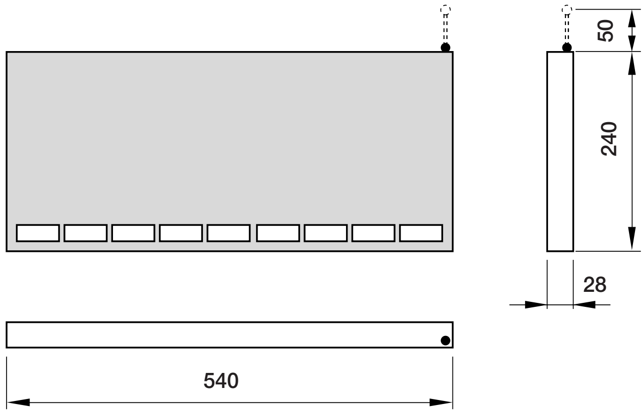
Accessories:

Without accessories	0
Telescopic wall sleeve 230 mm	1
Telescopic wall sleeve 470 mm	2
Sound-attenuated telescopic wall sleeve	3

Dimensions

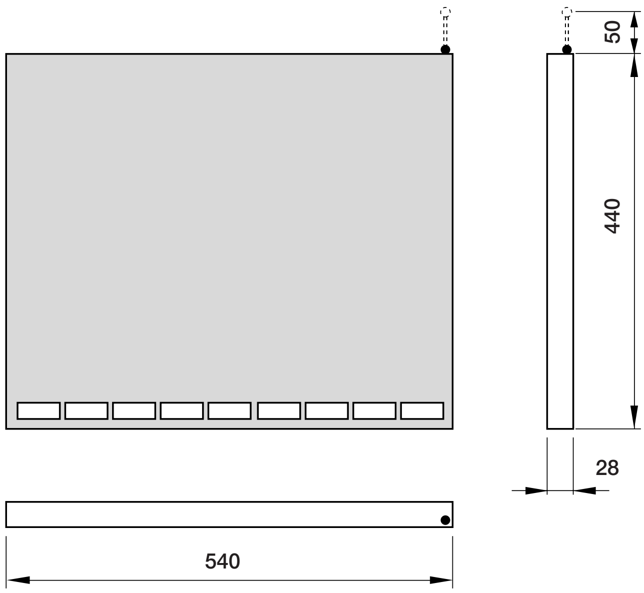
ULV-1

Weight 1.9 kg



ULV-2

Weight 3.2 kg



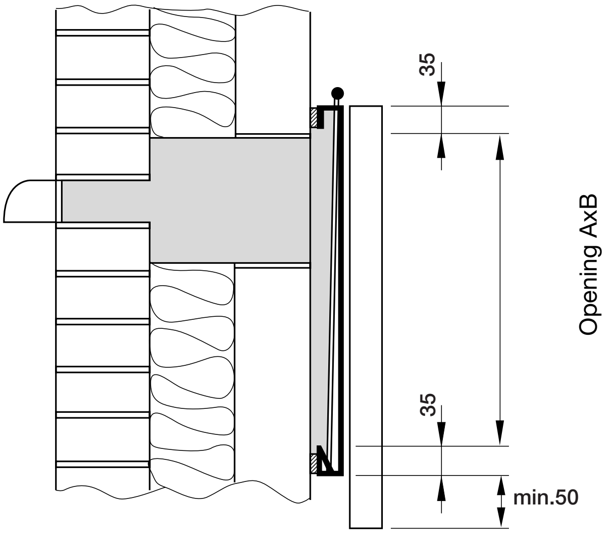
Materials and finish:

Valve:	Galvanised steel plate with aluminium damper
Wall sleeve:	Galvanised steel plate with aluminium insert
Sound insulation:	Melamine foam plastic
Standard colour:	Powder-coated RAL 9010 white

The diffuser is available in other colours. Please contact Lindab's sales department for further information.

Fresh air valve ULV

Mounting



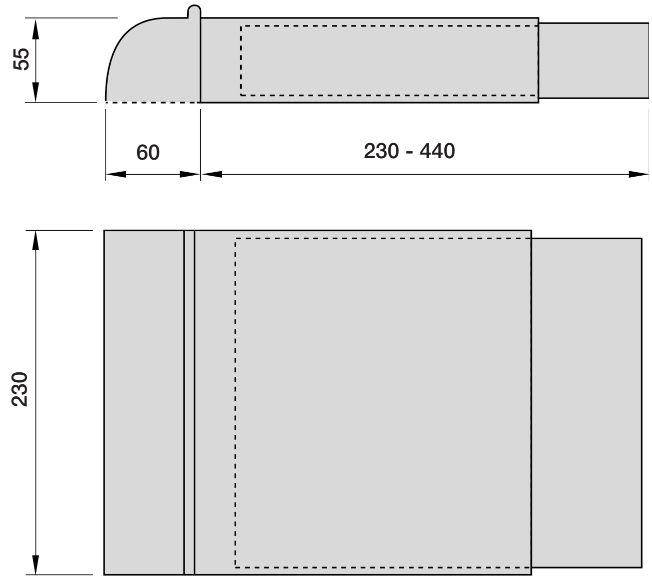
The accompanying installation rail should be fastened to the wall. The fresh air valve is suspended from the rail and fastened to it by means of screws through the lower edge of the front plate.

	A mm	B mm
ULV-1	170	510
ULV-2	370	510

Width of wall sleeve:
230 mm corresponds to one brick
470 mm corresponds to two bricks

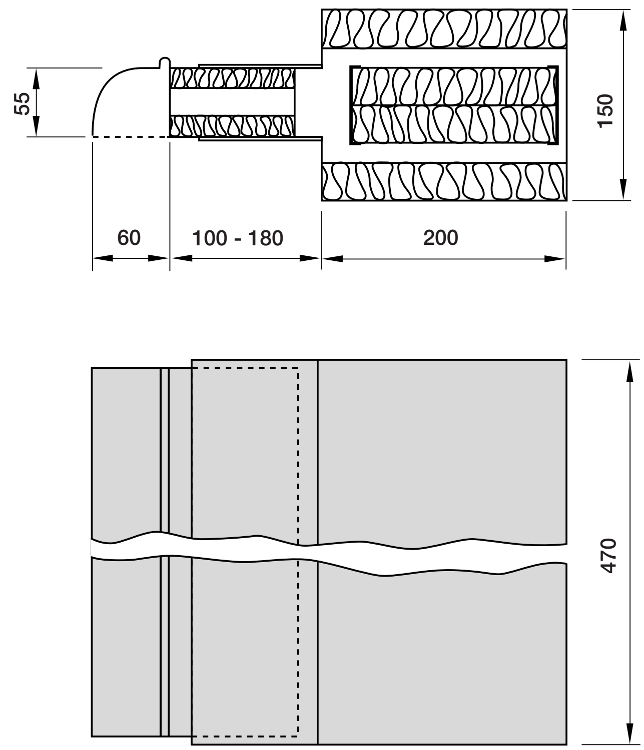
Accessories

1) Telescopic wall sleeve
Width 230 mm. Weight 2.0 kg

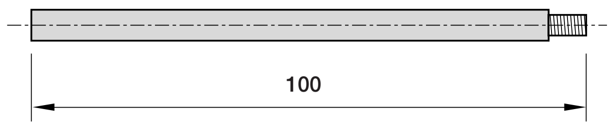


2) Telescopic wall sleeve
Width 470 mm. Weight 3.8 kg

3) Sound-attenuated telescopic wall sleeve
Weight: 4.7 kg



Extended damper arm.



Fresh air valve ULV

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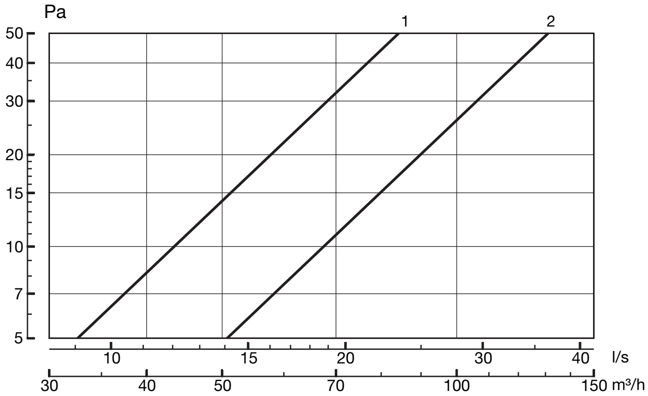
Technical data

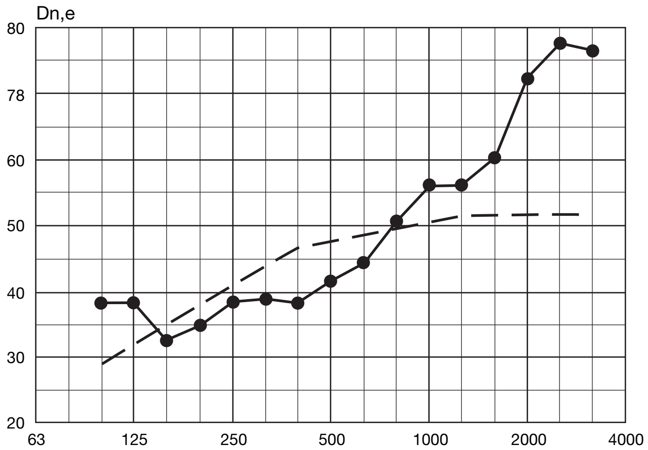
Capacity



1. ULV with wall sleeve type 1.
2. ULV with wall sleeve types 2 and 3.

Sound reduction

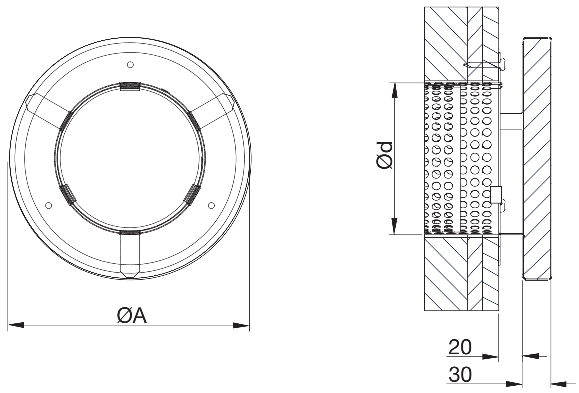
ULV with wall sleeve type 3
Weighted element-normalised level difference
Dn,e,w = 48 dB, ∆max = 8.6 dB



The sound insulation measurements were undertaken by DELTA & Vibration, in accordance with the testing instructions in DS/ISO 140-3:1978

Pressure control valve OLC

Dimensions



Size	ØA mm	Ød mm
100	160	100
125	200	125
160	250	160

Hole dimension = Ød + 10 mm

Description

OLC is a circular pressure control valve for installation directly onto a wall. OLC consists of two sound-attenuating baffles, which are mounted either side of the wall and are connected by means of the accompanying perforated wall sleeve, which ensures excellent noise reduction.

- Discrete design
- Sound-attenuating baffles
- Can be installed in wall thicknesses from 90-170 mm

Maintenance

Front plate can be removed to enable cleaning of internal parts. The visible parts of the diffuser can be wiped with a damp cloth.

Order code

Product	OLC	aaa	A
Type			
Size			
Version			

Materials and finish

Installation bracket: Galvanised steel
Front plate: Galvanised steel
Standard finish: Powder-coated
Standard colour: RAL 9010, Gloss 30

The diffuser is available in other colours. Please contact Lindab's sales department for further information.

Pressure control valve OLC

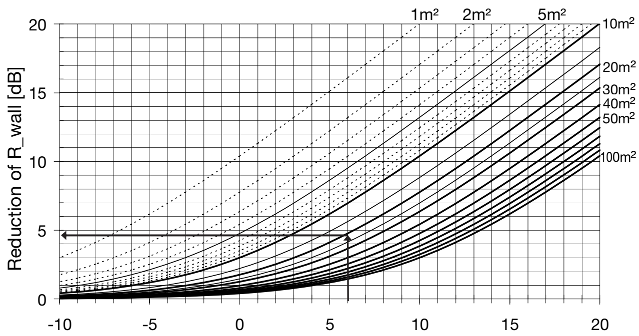
Technical data

Sample calculation

When dimensioning an overflow diffuser, calculate the decrease in the wall's noise-reducing properties. For these calculations, the area of the wall and sound reduction figure R must be known. This is adjusted in relation to the diffuser's $D_{n,e}$ value. $D_{n,e}$ is the diffuser's R value given at a transmission area of 10 m^2, as specified in ISO 140-10. The $D_{n,e}$ value can be converted into the R value for other transmission areas using the table below.

area [m^2]	10	2	1
correction [dB]	0	-7	-10

The diagram below indicates the decrease in the wall's reduction figure, based on the diffuser, in a given octave band:



As a rough estimate the calculation can be performed directly using the wall's R_w value.

Example:

R_w (wall)	50 dB	
$D_{n,e,w}$ (diffuser)	44 dB	$R_w - D_{n,e,w} = 6$ dB
Area of wall	20 m^2	
Number of diffusers	1	20 m^2/1 = 20 m^2

Indicated reduction of R_w (wall): 5

R_w value for wall with diffuser ~50-5 = <u>45 dB</u>

The calculation can also be performed using the following formula:

$$R_{res} = 10 \bullet \text{Log} \left(\frac{S}{(10m^2 \bullet 10^{-0,1 \bullet D_{n,e}}) + (S \bullet 10^{-0,1 \bullet R_{wall}})} \right)$$

where:

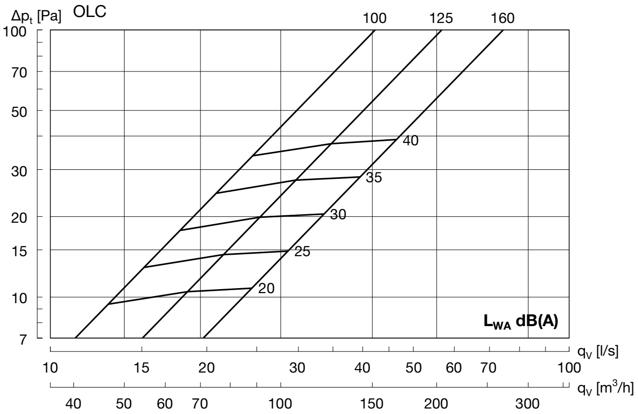
- R_{res} is the resulting reduction figure for wall and diffuser.
- S is wall area.
- $D_{n,e}$ is the diffuser's $D_{n,e}$ value.
- R_{wall} is the wall's R value without diffuser.

Technical data

Capacity

Volume flow q[l/s] and [m^3/h], total pressure drop p_t [Pa] and sound effect level L_{WA} [dB(A)] are specified for a diffuser on either side of the wall.

Dimensioning diagram



Element-normalised reduction figure $D_{n,e}$

Table 1: Cavity wall with 120 mm insulation

Size	Centre frequency Hz 125	250	500	1K	2K	Dn,e,w
100	*29	*35	40	*44	*50	44
125	*29	*35	40	*43	*52	44
160	*29	*35	38	43	52	43

Table 2: Cavity wall with 35-70 mm insulation

Size	Centre frequency Hz 125	250	500	1K	2K	Dn,e,w
100	*29	*35	40	*40	*51	43
125	*29	*35	37	*40	*50	42
160	*29	*35	35	40	49	41

Table 3: Solid wall without insulation

Size	Centre frequency Hz 125	250	500	1K	2K	Dn,e,w
100	*29	*35	30	35	46	36
125	*29	*35	30	36	45	36
160	*29	*35	28	38	45	36

* minimum values

Pressure control valve OLR

Description

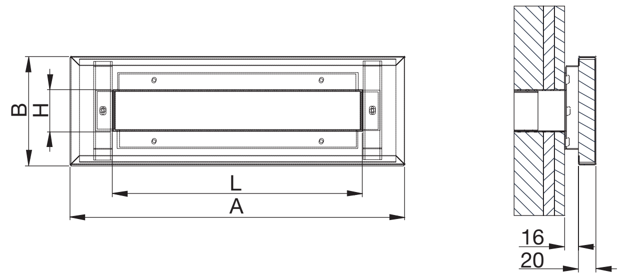
OLR is a rectangular pressure control valve for installation directly onto a wall. OLR consists of two sound-attenuating baffles, which are mounted either side of the wall and connected by means of the accompanying perforated wall sleeve, which ensures excellent noise reduction.

- High capacity
- Sound-attenuating baffles
- Can be installed in wall thicknesses from 90-170 mm

Maintenance

Front plate can be removed to enable cleaning of internal parts. The visible parts of the diffuser can be wiped with a damp cloth.

Dimensions



Size	A mm	B mm	L mm	H mm
400	400	130	300	50
600	600	130	500	50
800	800	130	700	50
1000	1000	130	900	50

Hole dimension = L + 5 mm x H + 5 mm

Order code

Product	OLR	aaa	A
Type			
Size			
Version			

Materials and finish

Installation bracket:	Galvanised steel
Front plate:	Galvanised steel
Standard finish:	Powder-coated
Standard colour:	RAL 9010, Gloss 30

The diffuser is available in other colours. Please contact Lindab's sales department for further information.

Pressure control valve OLR

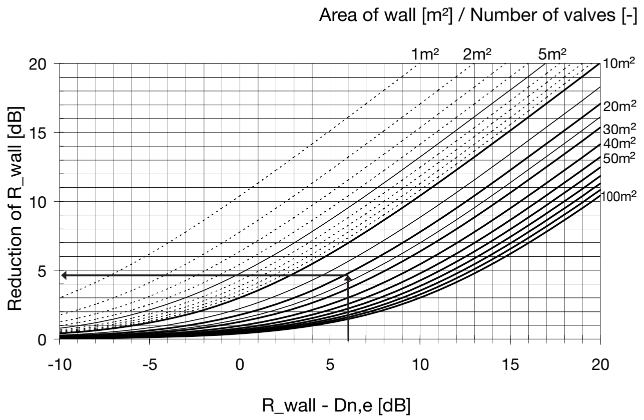
Technical data

Sample calculation

When dimensioning an overflow diffuser, calculate the decrease in the wall's noise-reducing properties. For these calculations, the area of the wall and sound reduction figure R must be known. This is adjusted in relation to the diffuser's $D_{n,e}$ value. $D_{n,e}$ is the diffuser's R value given at a transmission area of 10 m^2, as specified in ISO 140-10. The $D_{n,e}$ value can be converted into the R value for other transmission areas using the table below.

area [m^2]	10	2	1
correction [dB]	0	-7	-10

The diagram below indicates the decrease in the wall's reduction figure, based on the diffuser, in a given octave band:



As a rough estimate the calculation can be performed directly using the wall's R_w value.

Example:
R_w (wall) 50 dB
$D_{n,e,w}$ (diffuser) 44 dB $R_w - D_{n,e,w}$ = 6 dB
Area of wall 20 m^2
Number of diffusers 1 20 m^2/1 = 20 m^2

Indicated reduction of R_w (wall): 5
R_w value for wall with diffuser ~50-5 = 45 dB

The calculation can also be performed using the following formula:

$$R_{res} = 10 \cdot \text{Log}\left(\frac{S}{(10m^2 \cdot 10^{-0,1 \cdot D_{n,e}}) + (S \cdot 10^{-0,1 \cdot R_{wall}})}\right)$$

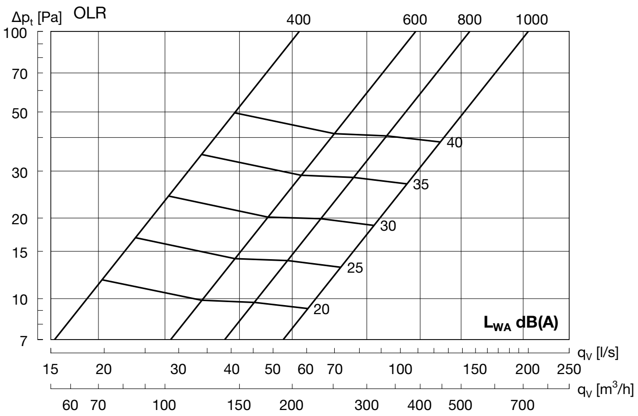
where:

- R_{res} is the resulting reduction figure for wall and diffuser.
- S is wall area.
- $D_{n,e}$ is the diffuser's $D_{n,e}$ value.
- R_{wall} is the wall's R value without diffuser.

Technical data

Capacity

Volume flow q[l/s] and [m^3/h], total pressure drop p_t [Pa] and sound effect level L_{WA} [dB(A)] are specified for a diffuser on either side of the wall.



Element-normalised reduction figure $D_{n,e}$

Table 1: Cavity wall with 120 mm insulation

	Centre frequency Hz					
Size	**125**	**250**	**500**	**1K**	**2K**	**Dn,e,w**
400	*31	37	41	46	55	46
600	*29	35	38	43	52	43
800	*28	34	37	42	51	42
1000	*26	33	36	41	50	41

Table 2: Cavity wall with 35-70 mm insulation

	Centre frequency Hz					
Size	**125**	**250**	**500**	**1K**	**2K**	**Dn,e,w**
400	*31	37	39	42	52	44
600	*29	35	37	40	49	42
800	*28	34	35	39	48	40
1000	*26	33	34	38	47	39

Table 3: Positioning over a frame in a cavity wall with 70 mm insulation

	Centre frequency Hz					
Size	**125**	**250**	**500**	**1K**	**2K**	**Dn,e,w**
400	*31	37	36	41	52	42
600	*29	35	33	39	49	39
800	*28	34	32	38	48	38
1000	*26	33	31	37	47	37

Table 4: Solid wall without insulation

	Centre frequency Hz					
Size	**125**	**250**	**500**	**1K**	**2K**	**Dn,e,w**
400	*31	37	32	37	45	38
600	*29	35	30	35	43	36
800	*28	34	28	33	42	34
1000	*26	33	27	32	41	33

* minimum values

Cleanroom diffusers

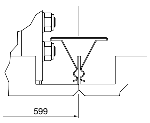
Cleanroom diffusers, Dako Cytomation, Glostrup.

Cleanroom diffusers

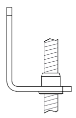
Cleanroom diffusers
Diffusers

	Product	Functions	Page
	LCR 1		655
	LCR 2		662
	LCR 3		664
	LCR 4		666

LCR
Ceiling adaption

	Product	Functions	Page
	LCR		668

LCRZ
Accessories

	Product	Functions	Page
	LCRZ		669

LCRF
Filter

	Product	Functions	Page
	LCRF		670

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

Cleanroom diffusers

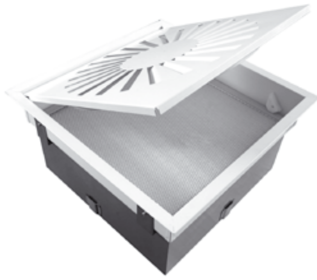
Cleanroom diffusers

Cleanroom is traditionally used within the pharmaceutical and bio-technical industry, but also producers of food and electronics are often forced to comply with demands which require a cleanroom. We have found it natural to co-operate with some of the countrys leading companies within the pharmaceutical industry to create an optimal solution. Using their knowledge about the daily use of cleanrooms as a work place, we have developed solutions closely tuned to the high demands made on cleanrooms with regards to both installation and operation.

Lindab offers the broadest selection on the market, with cleanroom diffusers with many adaption possibilities. Lindab is also able to both deliver and advise on special solutions. While developing the diffuser programme, the emphasis has been placed on designing a construction, which has a number of advantages with regards to user-friendliness. We have made sure it is easy to clean, maintain, and test the diffusers.

Our solutions are in use

Lindabs cleanroom diffusers are used in many companies and within many different industrial sectors.
Among our references are: Novo Nordisk, GEA Niro, DakoCytomation, Grundfos, Forskningscenter Risø and Chr. Hansen.
When it comes to cleanroom ventilation, the quality of the solution is the deciding factor. We know, that our customers have chosen our cleanroom diffusers because the solutions are sure to meet the important requirements made on cleanrooms.



Clean-room diffuser

Ceiling diffuser LCR1

Description

The LCR1 diffuser is a clean room diffuser that can be equipped with a HEPA filter, for installation in ceilings. It is typically used in premises where there are stringent requirements concerning the amount of particles and germs in the air. The diffuser can be used both to supply and exhaust air. LCR1 is available in two sizes and with three different types of duct connection. The diffuser can be adapted for the most popular ceiling systems with reference to the order code. It is normally supplied with a rotating front plate, which ensures good mixing and distribution of air throughout the premises. The supply air pattern can be adjusted in size to suit the volume flow rate. The diffuser is also available with a fully-perforated front plate for vertical supply air or exhaust. The diffuser excels by having a hinged front plate and extremely simple and easy filter installation. Filters are supplied by Camfil Farr with a PU or Gel seal.

- Airtight all-welded box in stainless steel
- Hinged drop-down front plate
- Simple and easy filter installation
- Supplied adapted for the most popular ceiling systems
- Pattern of airflow adapted for actual volume flow rate
- Detachable duct connection (circular side connection)
- Mounting brackets for threaded bolts are supplied as accessories
- Low net weight
- Equipped with outlet for pressure measurement and DOP testing
- The lower section can be supplied in stainless steel

Materials and finish

Upper section:
Material: Stainless steel

Lower section:
Material: Galvanised steel, powder-coated
Standard colour: RAL 9010, gloss 30

The diffuser is available in other colours. Please contact Lindab's sales department for further information.

Order (size 400)

Product **LCR1** **a** **b** **c** **ddd** **400** **F**

Type (LCR1)

Duct connection (a)
S = Side, Ø.
T = Top, Ø.

Filter type (b)
P = PU seal
G = Gel seal

Front plate (c)
H = High impulse (rot.)
L = Low impulse (perf.)

Air pattern (ddd)
300 = 300 (rot.)
400 = 400 (rot./perf.)

Size
400

Ceiling/type (F)
F = Fixed ceiling

Order (size 600)

Product **LCR1** **a** **b** **c** **ddd** **600** **f**

Type (LCR1)

Duct connection (a)
S = Side, Ø.
T = Top, Ø.
R = Rect. side

Filter type (b)
P = PU seal
G = Gel seal

Front plate (c)
H = High impulse (rot.)
L = Low impulse (perf.)

Air pattern (ddd)
300 = 300 (rot.)
400 = 400 (rot.)
500 = 500 (rot.)
600 = 600 (rot./perf.)

Size
600

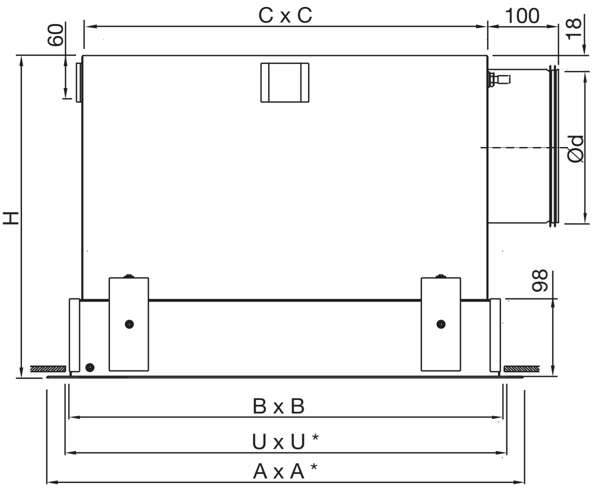
Ceiling/type (f)
F = Fixed ceiling
T = Visible T-rail
C = Clip-In (bevelled)
A = Other ceiling type*

* To be stated in plain text

Ceiling diffuser LCR1

Dimensions

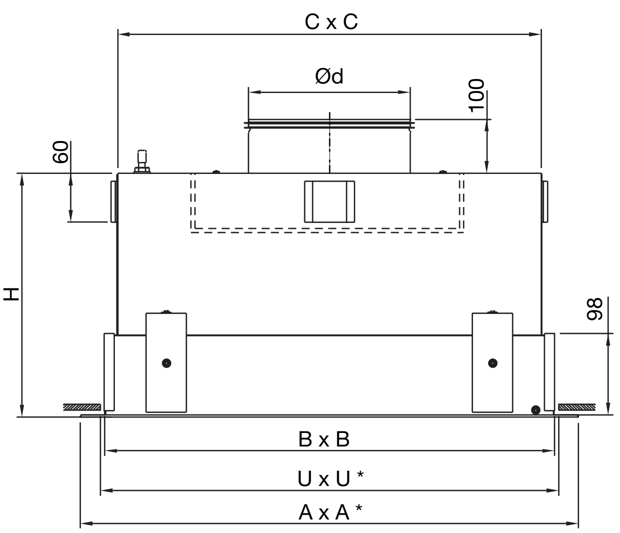
Circular side connection



U x U = Min. cutting dimension

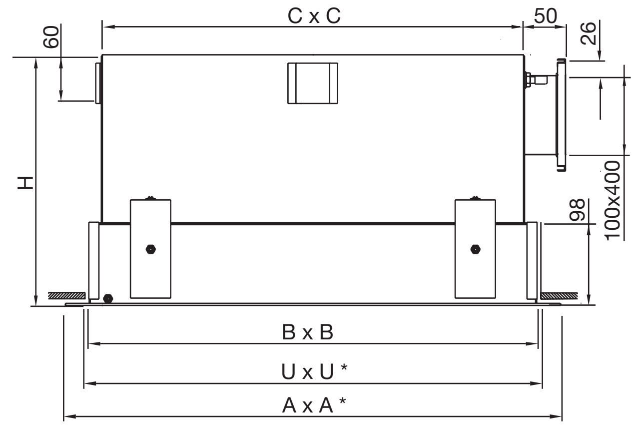
Size mm	Ød mm	H mm	A mm	B mm	C mm	U mm	m kg
400	125	325	415	360	325	365	5.2
600	200	420	615	560	525	565	14.6

Circular top connection



Size mm	Ød mm	H mm	A mm	B mm	C mm	U mm	m kg
400	125	300	415	360	325	365	5
600	200	300	615	560	525	565	12.8

Rectangular side connection



U x U = Min. cutting dimension

Size mm	H mm	A mm	B mm	C mm	U mm	m kg
600	310	615	560	525	565	12.4

Variant with increased capacity

The diffuser range can also be supplied in a different design for fixed ceilings, where the diffuser has an increased capacity of up to approx. 900 m^3/h. However, the physical dimensions differ from the standard range. This version is made entirely of stainless steel.

A x A dimension: 698 x 698
The diffuser is supplied with a filter with the dimensions 610 x 610 x 110 mm.

*) Dimensioning applies for fixed ceiling diffusers. Dimensions for other ceiling types (size 600) are given in the ceiling adjustment section.
(Go to chapter: “ Ceiling tile adaption”)

U x U = Min. cutting dimension

Ceiling diffuser LCR1

Technical data

All meassurements include the class H-14 filter, manufactured by Camfil Farr.

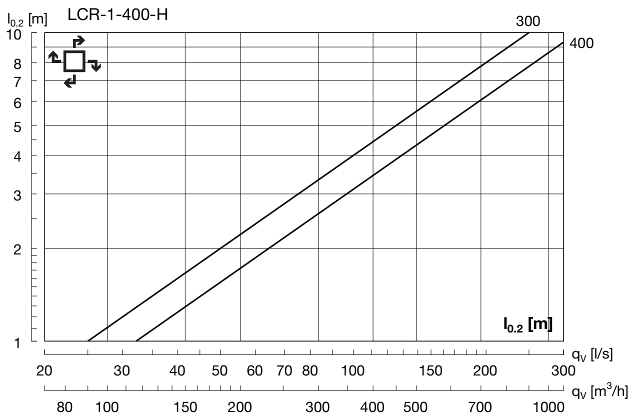
Capacity

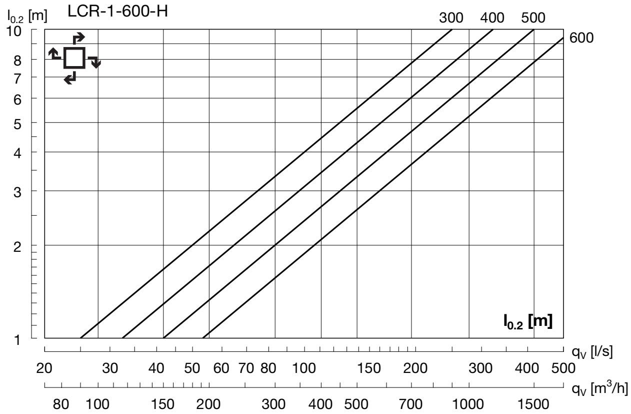
Volume flow q[l/s] and [m^3/h], total pressure p_t [Pa], throw $l_{0.2}$ [m] and sound power level L_{WA} [dB(A)] can be seen in the diagrams. below

Frequency-related sound effect level

The sound effect level in the frequency band is defined as L_{WA}+K_{ok}. K_{ok} values are specified in charts beneath the diagrams on the following pages.

Throw length





Sound attenuation

The diffuser's sound attenuation function from duct to room, including end reflection.

	Mean frequency Hz							
Size	**63**	**125**	**250**	**500**	**1K**	**2K**	**4K**	**8K**
400	20	13	7	9	12	11	12	18
600	16	10	12	7	8	9	12	18

Ceiling adjustment

LCR1 in size 600 is suitable for installation in several different types of ceiling system. Read more about this in the ceiling adjustment section.

Parts

Filter clip

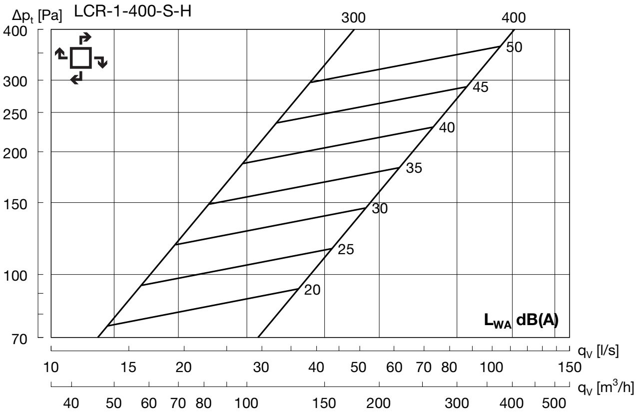
Hinged drop-down front plate

Magnetic lock for front plate

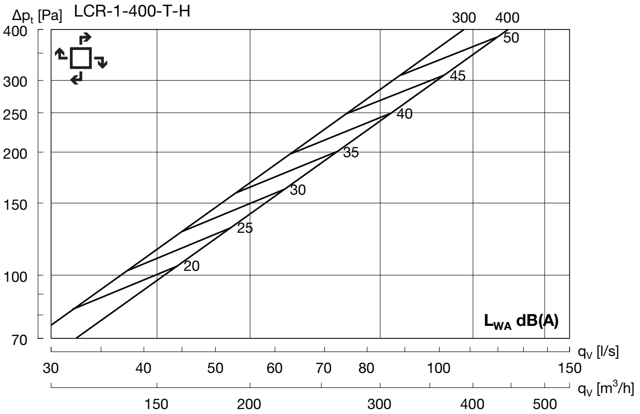
Detachable circular duct connection (side only, Ø)

Ceiling diffuser LCR1

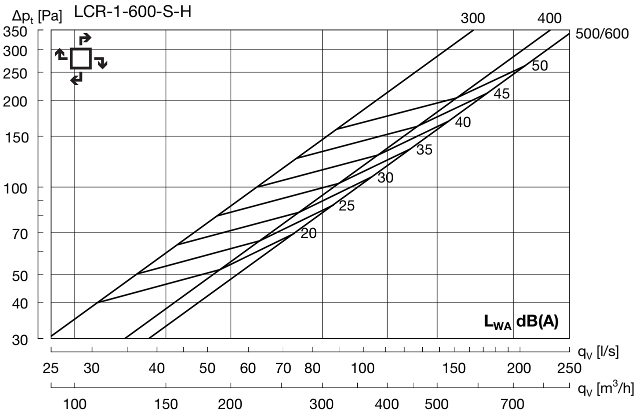
Technical data (rotation - supply)



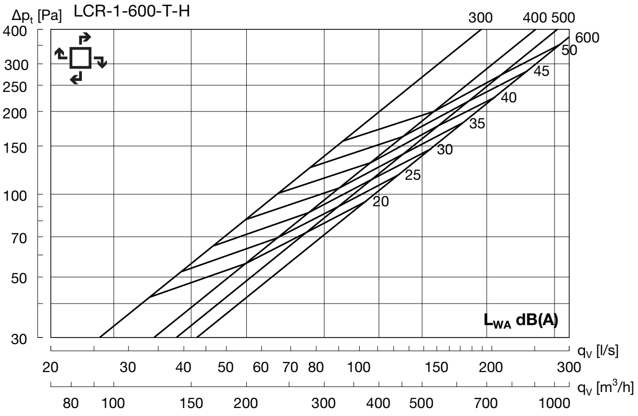
Size	63	125	250	500	1K	2K	4K	8K
400-300	0	3	1	-1	-5	-13	-23	-36
400-400	5	2	0	-1	-5	-10	-21	-25



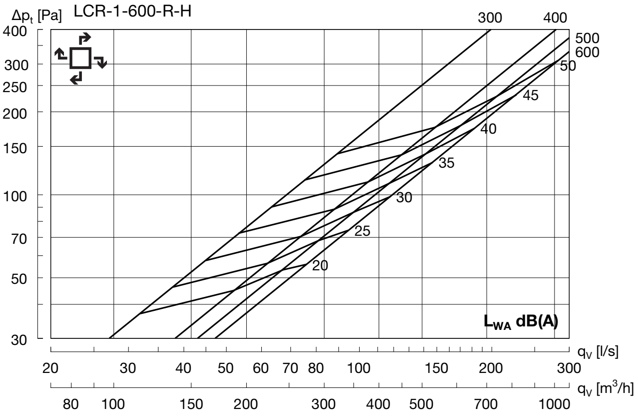
Size	63	125	250	500	1K	2K	4K	8K
400-300	6	4	1	-1	-5	-13	-22	-29
400-400	3	-1	-3	0	-5	-10	-22	-26



Size	63	125	250	500	1K	2K	4K	8K
600-300	1	7	1	-1	-6	-15	-24	-34
600-400	2	8	0	-2	-5	-12	-22	-34
600-500	2	5	-1	-1	-5	-12	-17	-28
600-600	1	-2	-4	0	-4	-12	-21	-28



Size	63	125	250	500	1K	2K	4K	8K
600-300	4	7	2	-2	-5	-14	-25	-34
600-400	4	5	2	-2	-5	-12	-20	-33
600-500	5	5	1	-3	-4	-10	-24	-34
600-600	8	0	1	-1	-5	-12	-22	-28



Size	63	125	250	500	1K	2K	4K	8K
600-300	7	7	1	-2	-6	-14	-22	-32
600-400	5	7	1	-2	-6	-10	-19	-28
600-500	3	5	-1	-4	-5	-7	-13	-25
600-600	2	-3	-4	-4	-4	-6	-16	-21

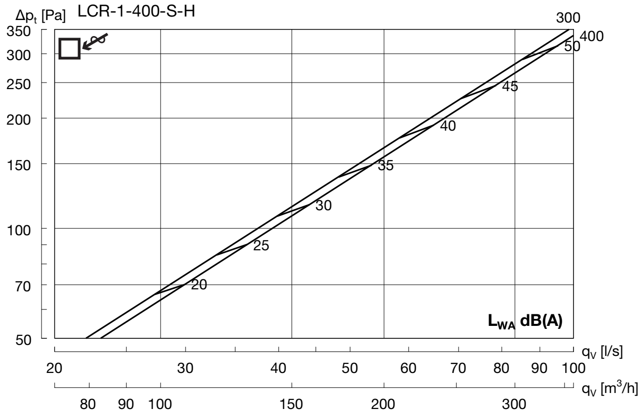
Code key

S-H = Circular side connection
T-H = Circular top connection
R-H = Rectangular side connection

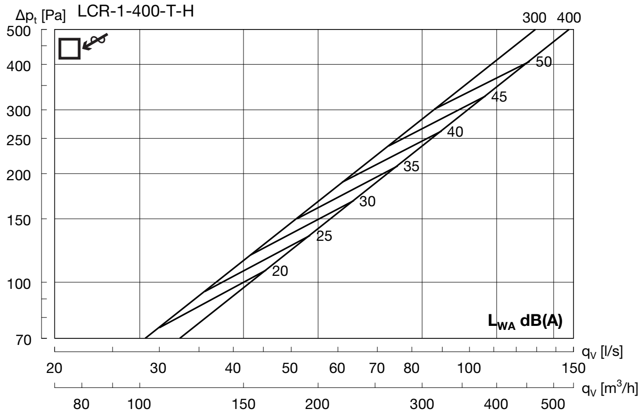
All measurements include the class H-14 filter manufactured by Camfil Farr.

Ceiling diffuser LCR1

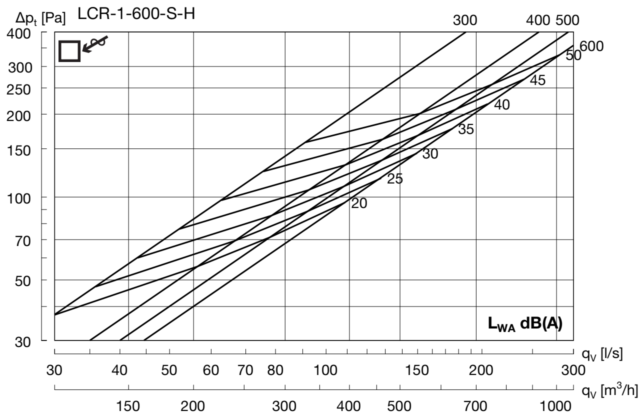
Technical data (rotation - exhaust)



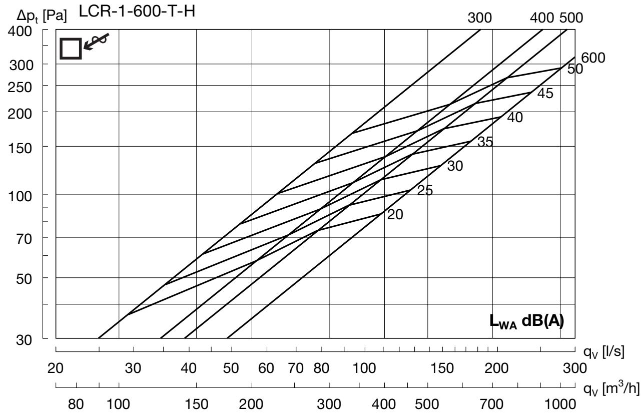
Size	63	125	250	500	1K	2K	4K	8K
400-300	-3	5	2	-1	-5	-14	-22	-25
400-400	4	4	3	-2	-6	-10	-19	-24



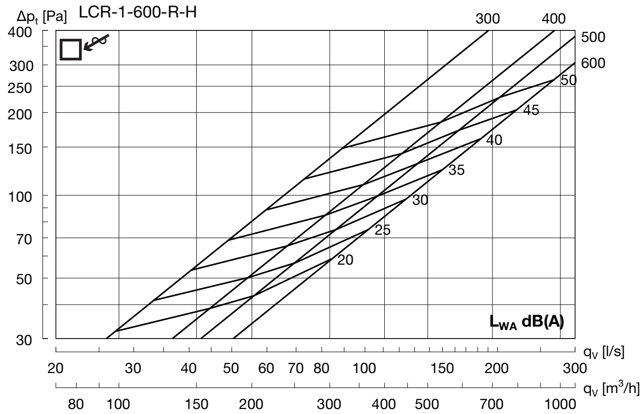
Size	63	125	250	500	1K	2K	4K	8K
400-300	9	3	2	-2	-5	-12	-20	-24
400-400	6	8	4	-2	-8	-16	-19	-22



Size	63	125	250	500	1K	2K	4K	8K
600-300	1	3	-2	-2	-3	-12	-19	-25
600-400	3	7	1	-2	-5	-15	-20	-30
600-500	3	8	0	-1	-5	-15	-22	-32
600-600	4	5	1	-1	-5	-17	-28	-40



Size	63	125	250	500	1K	2K	4K	8K
600-300	7	7	1	-2	-6	-14	-22	-32
600-400	5	7	1	-2	-6	-10	-19	-28
600-500	3	5	-1	-4	-5	-7	-13	-25
600-600	2	-3	-4	-4	-4	-6	-16	-21



Size	63	125	250	500	1K	2K	4K	8K
600-300	0	3	-1	-2	-4	-11	-18	-26
600-400	6	5	0	-3	-4	-9	-18	-26
600-500	6	3	-3	-5	-5	-7	-12	-21
600-600	2	1	-3	-3	-5	-7	-13	-22

Code key

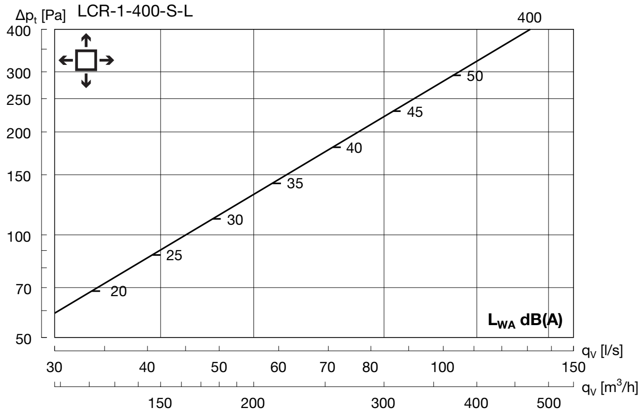
S-H = Circular side connection
T-H = Circular top connection
R-H = Rectangular side connection

All measurements include the class H-14 filter manufactured by Camfil Farr.

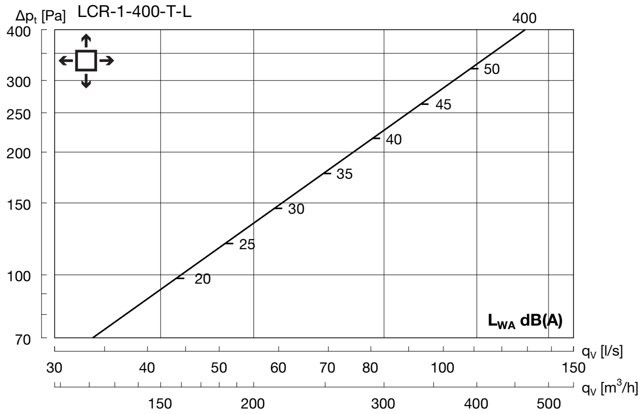
Ceiling diffuser LCR1

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

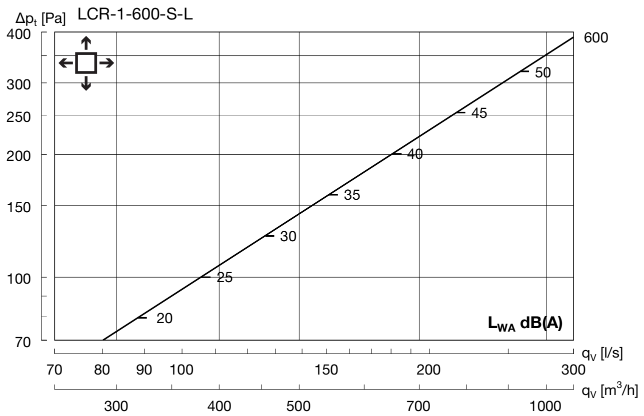
Technical data (perforated - supply)



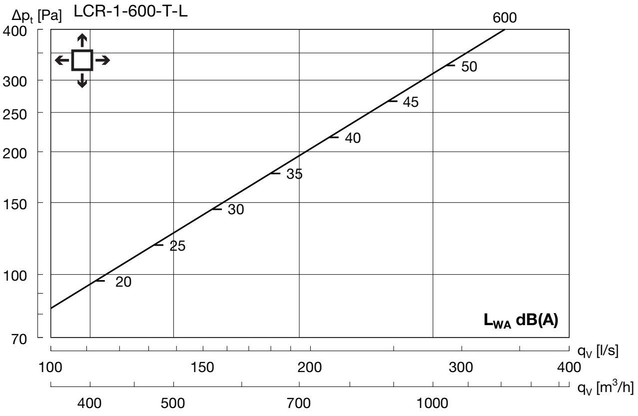
Size	63	125	250	500	1K	2K	4K	8K
400	5	-9	-10	-4	-2	-10	-22	-31



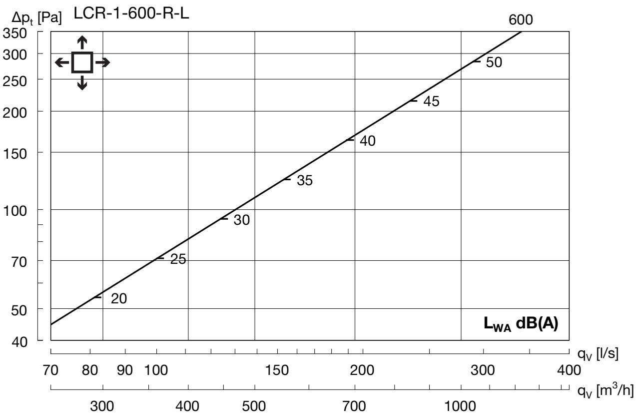
Size	63	125	250	500	1K	2K	4K	8K
400	10	10	3	-4	-11	-12	-13	-14



Size	63	125	250	500	1K	2K	4K	8K
600	9	-6	-8	0	-4	-12	-25	-35



Size	63	125	250	500	1K	2K	4K	8K
600	5	-3	-7	-5	-2	-8	-22	-29



Size	63	125	250	500	1K	2K	4K	8K
600	7	-9	-6	-3	-5	-7	-12	-19

Code key

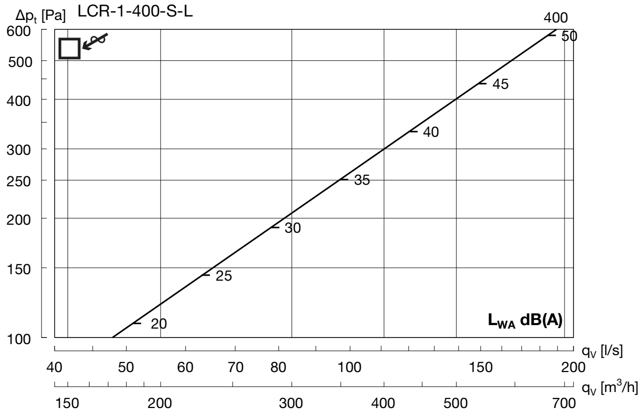
S-L = Circular side connection
T-L = Circular top connection
R-L = Rectangular side connection

All measurements include the class H-14 filter manufactured by Camfil Farr.

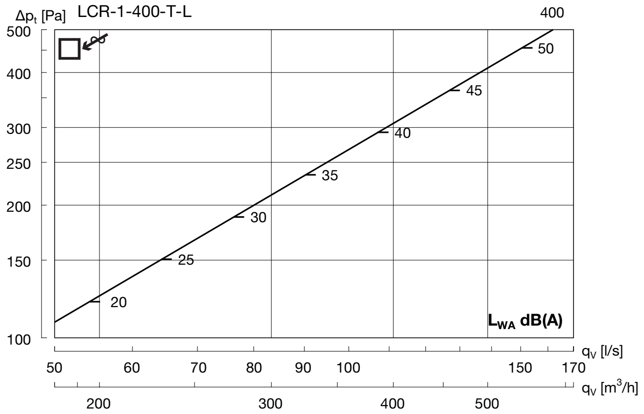
Ceiling diffuser

LCR1

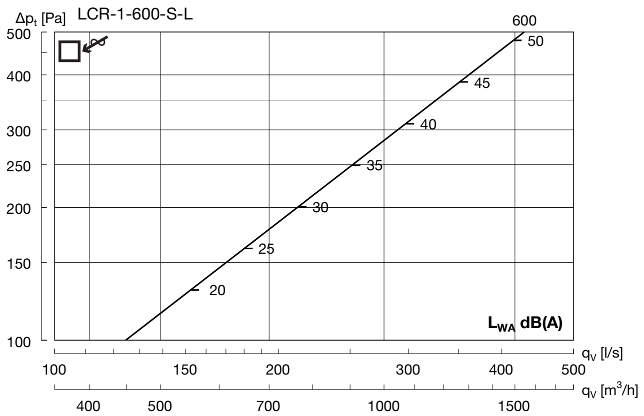
Technical data (perforated - exhaust)



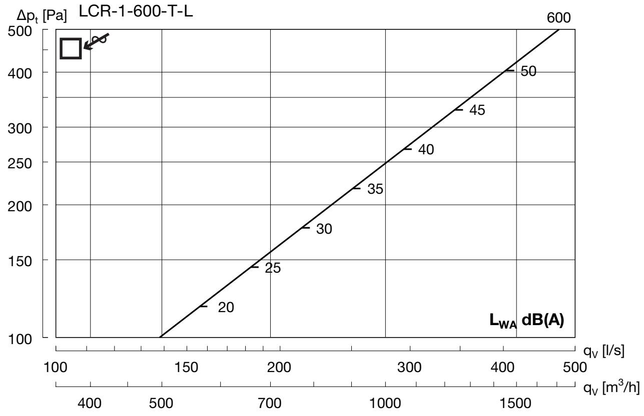
Size	63	125	250	500	1K	2K	4K	8K
400	8	8	2	-4	-7	-10	-15	-19



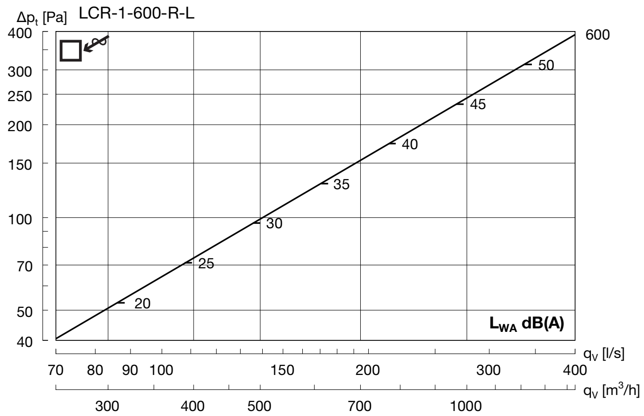
Size	63	125	250	500	1K	2K	4K	8K
400	10	10	3	-4	-11	-12	-13	-14



Size	63	125	250	500	1K	2K	4K	8K
600	13	9	0	-2	-7	-11	-16	-23



Size	63	125	250	500	1K	2K	4K	8K
600	13	11	4	-4	-11	-15	-19	-27



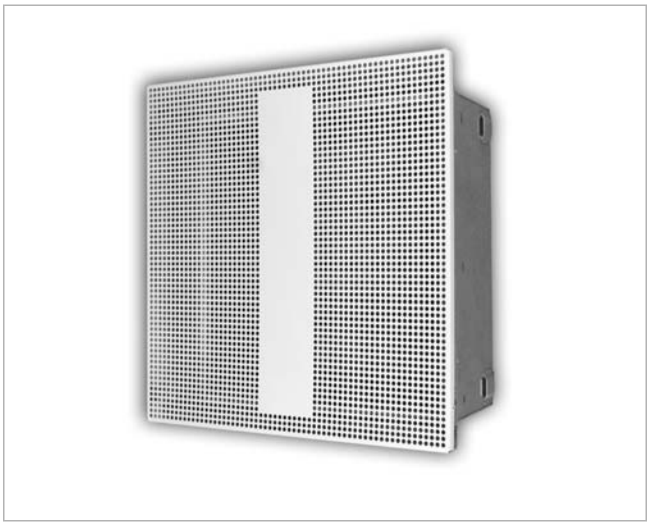
Size	63	125	250	500	1K	2K	4K	8K
600	2	-4	-6	-4	-5	-6	-10	-21

Code key

S-L = Circular side connection
T-L = Circular top connection
R-L = Rectangular side connection

All measurements include the class H-14 filter manufactured by Camfil Farr.

Perforated wall diffuser LCR2



Description

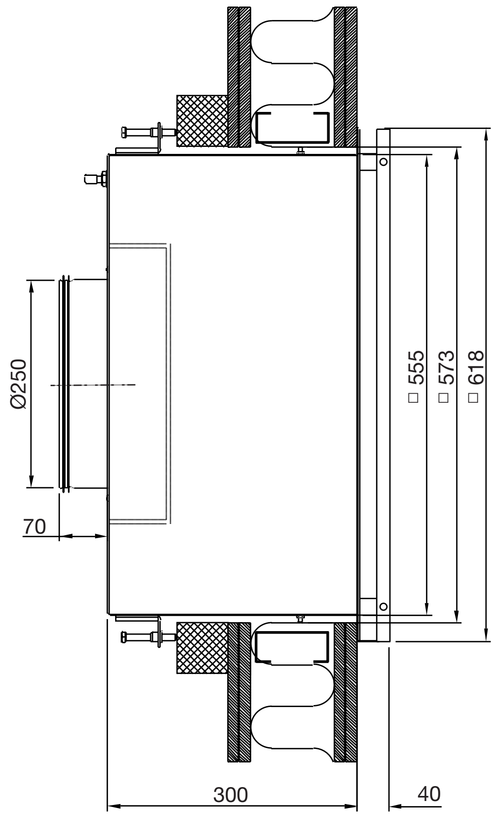
LCR2 is a clean room diffuser that can be equipped with a HEPA filter, for installation in walls. It is typically used in premises where there are stringent requirements concerning the amount of particles and germs in the air. The diffuser can be used both to supply and exhaust air. It is supplied with a front-mounted, partially perforated and easy-to-detach front plate that ensures good air distribution and moderate flow rates throughout the premises. The diffuser excels when used with the very simple and easy filter installation function.
The pattern of airflow is illustrated on the following page.
Filters are supplied by Camfil Farr with a PU seal.

- Airtight all-welded box in stainless steel
- Simple and easy filter installation
- Mounting brackets are supplied as accessories
- Hinged front plate on diffuser – easy to detach
- Low net weight
- The front plate can be supplied in stainless steel upon request.

Ordering example

Product	**LCR2**
Type	

Dimensions



- Weight 16.9 kg.

- The diffuser can also be supplied with circular or rectangular side connections. However, this requires an increased box depth.

Materials and finish

Box:
Material: Stainless steel
Standard finish: Powder-coated
Standard colour: RAL 9010, gloss 30

Front plate:
Material: Galvanised steel
Standard finish: Powder-coated
Standard colour: RAL 9010, gloss 30

The diffuser is available in other colours. Please contact Lindab's sales department for further information.

Perforated wall diffuser LCR2

Technical data

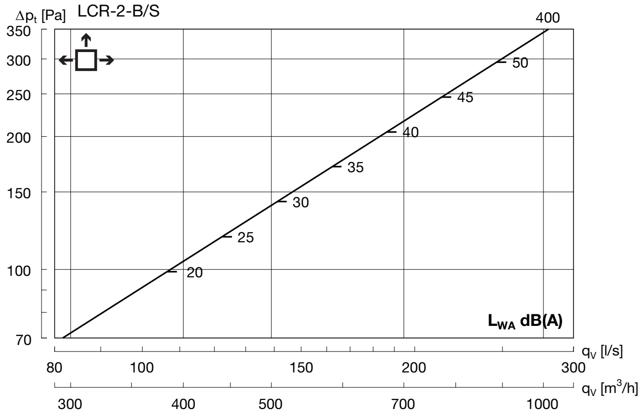
All measurements include the class H-14 filter manufactured by Camfil Farr.

Capacity

Volume flow [l/s], [m^3/h], total pressure drop p_t [Pa] and sound effect level L_{WA} [dB(A)] can be seen in the diagram below.

Frequency-related sound effect level

The sound effect level in the frequency band is defined as $L_{wok} = L_{WA} + K_{ok}$. The values for K_{ok} are specified in charts beneath the diagram below.



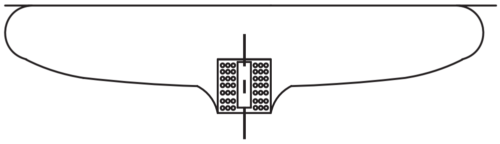
Hz	63	125	250	500	1K	2K	4K	8K
K_{ok}	4	-3	-5	0	-5	-9	-23	-32

Sound attenuation

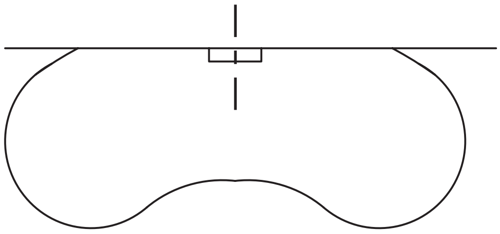
The diffuser's sound attenuation function from duct to room, including end reflection.

	Mean frequency Hz							
Hz	63	125	250	500	1K	2K	4K	8K
	17	11	3	5	5	4	5	13

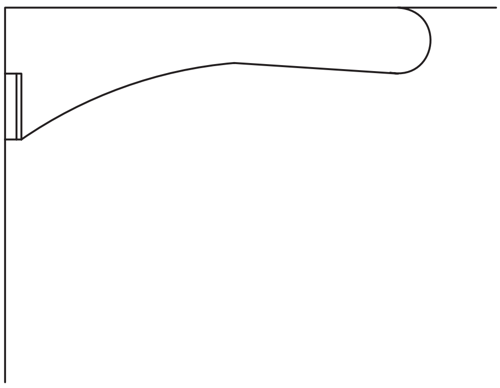
Dispersal diagram – viewed from the front



Dispersal diagram – viewed from above



Dispersal diagram – viewed from the side



Parts

Filter clip

Perforated ceiling diffuser LCR3

Description

LCR3 is a ceiling-mounted air exhaust diffuser, which can be used to advantage in clean rooms where you don't want to equip exhaust diffusers with HEPA filters. In addition, the diffuser can be used to supply air in connection with a central duct-mounted HEPA filter. LCR3 ensures a sealed ceiling and diffuser solution for the pressure regulation of rooms.

If you want to use the diffuser alongside plenum box MBA, then the box should be supplied without sound-attenuating insulation, so that the risk of particles being transferred from the MBA box's soundproofing to rooms is eliminated.

LCR3 is available in two sizes and with different duct connections. The diffuser can also be adapted for the most popular ceiling systems with reference to the order code. Visually, the diffuser looks like type LCR1. The diffuser is equipped with a fully perforated front plate, which is attached by wire springs, ensuring easy installation and removal of the base plate for cleaning purposes.

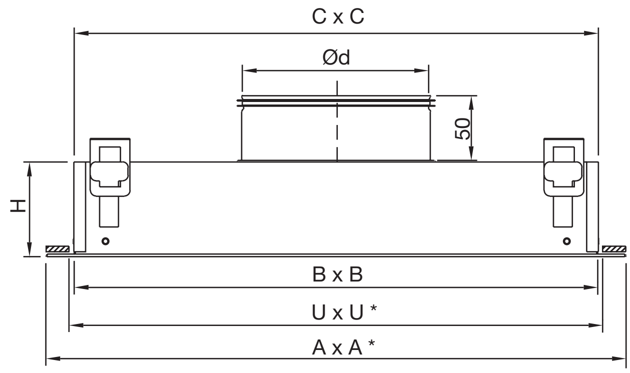
- Can be supplied adapted for ceilings with reference to the order code
- Visually identical to LCR1
- Airtight box with sealed design
- Mounting brackets supplied as standard
- Can be attached using a wire mounting (pendants) for standard ceiling systems
- The front plate can be swung downwards without having to be removed.

Materials and finish

Material: Galvanised steel
Standard finish: Powder-coated
Standard colour: RAL 9010, gloss 30

The diffuser is available in other colours. Please contact Lindab's sales department for further information.

Dimensions



*) Dimensioning applies for fixed ceiling diffusers. Dimensions for other ceiling types (size 600) are given in the ceiling adjustment section. (see chapter "Ceiling tile adaption").

U x U = Min. cutting dimension

Size mm	Ød mm	H mm	A mm	B mm	C mm	U mm	m kg
400	125-200	100	415	360	325	365	2.4
600	160-400	100	615	560	525	565	4.8

Order (size 400)

Product	LCR3	400	F	aaa
Type				
Size				
Fixed ceiling				
Connection Ød (125, 160, 200)				

Order (size 600)

Product	LCR3	600	a	bbb
Type				
Size				
ceiling				
F = Fixed ceiling				
T = Visible T-rail				
C = Clip-In (bevelled)				
A = Other ceiling type*				
Connection Ød (160, 200, 250, 315, 400)				

Perforated ceiling diffuser LCR3

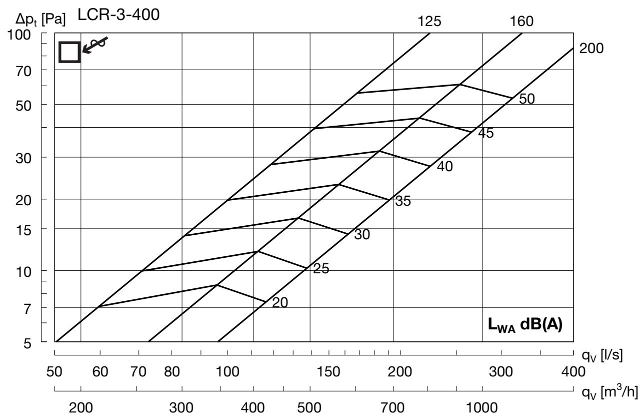
Technical data

Capacity

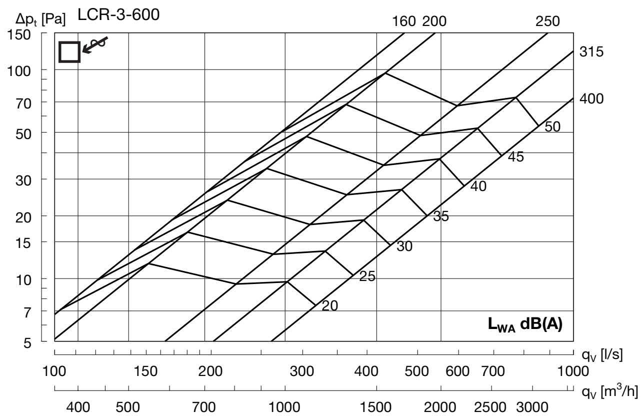
Volume flow [l/s], [m³/h], total pressure drop p_t [Pa] and sound effect level L_{WA} [dB(A)] can be seen in the diagram below.

Frequency-related sound effect level

The sound effect level in the frequency band is defined as $L_{wok} = L_{WA} + K_{ok}$. The values for K_{ok} are specified in charts beneath the diagrams below.



Size	63	125	250	500	1K	2K	4K	8K
125	8	6	3	-2	-9	-10	-19	-25
160	8	9	2	-3	-7	-11	-20	-28
200	7	5	-2	-3	-3	-14	-25	-40



Size	63	125	250	500	1K	2K	4K	8K
160	2	9	3	-3	-7	-12	-20	-27
200	2	10	1	-2	-7	-12	-17	-22
250	1	11	1	-2	-7	-14	-21	-28
315	9	4	-2	-1	-4	-17	-24	-33
400	1	3	-5	-1	-3	-14	-23	-34

Sound attenuation

The diffuser's sound attenuation function from duct to room, including end reflection.

	Mean frequency Hz							
Size	63	125	250	500	1K	2K	4K	8K
400-125	20	14	9	10	5	1	1	3
400-160	16	13	7	0	5	1	1	3
400-200	16	10	4	1	4	0	0	2
600-160	18	12	7	2	1	0	0	1
600-200	15	10	4	2	0	0	1	2
600-250	15	9	3	3	0	0	1	1
600-315	12	7	2	1	0	1	1	2
600-400	9	6	1	3	0	0	0	1

Ceiling adjustment

LCR3 in size 600 is suitable for installation in several different types of ceiling system. Read more about this in the ceiling adjustment section.

Rotating ceiling diffuser LCR4

Description

LCR4 is a ceiling-mounted air exhaust diffuser, which can be used to advantage in clean rooms where you don't want to equip exhaust diffusers with HEPA filters. In addition, the diffuser can be used to supply air in connection with centrally-located HEPA filters. LCR4 ensures a sealed ceiling and diffuser solution for the pressure regulation of rooms.
If you want to use the diffuser alongside plenum box MBA, then the box should be supplied without sound-attenuating insulation, so that the risk of particles being transferred from the MBA box's soundproofing to rooms is eliminated.
LCR4 is available in two sizes and with different duct connections. The diffuser can also be adapted for the most popular ceiling systems with reference to the order code. Visually, the diffuser looks like type LCR1. The diffuser is equipped with a rotating front plate, which is attached by wire springs, ensuring easy installation and removal of the base plate for cleaning purposes.

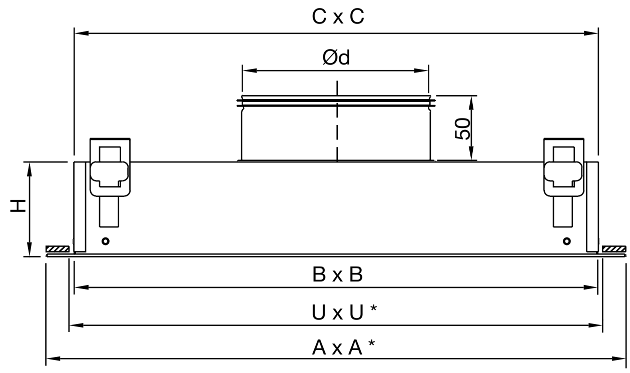
- Can be supplied adapted for ceilings with reference to the order code
- Visually identical to LCR1
- Airtight box with sealed design
- Mounting brackets supplied as standard
- Can be attached using a wire mounting (pendants) for standard ceiling systems
- The front plate can be swung downwards without having to be removed.

Materials and finish

Material: Galvanised steel
Standard finish: Powder-coated
Standard colour: RAL 9010, gloss 30

The diffuser is available in other colours. Please contact Lindab's sales department for further information.

Dimensions



*) Dimensioning applies for fixed ceiling diffusers. Dimensions for other ceiling types (size 600) are given in the ceiling adjustment section. (see chapter "Ceiling tile adaption").

U x U = Min. cutting dimension

Size mm	H mm	A mm	B mm	C mm	U mm	m kg
400	100	415	360	325	365	3.1
600	100	615	560	525	565	6.0

Duct connection

Air pattern mm	Ød mm
400-300	160
400-400	200
600-400	200
600-500	250
600-600	315

Order (size 400)

Product **LCR4 400 F aaa**

- Type (LCR4)
- Size (400)
- Fixed ceiling (F)
- Air pattern (300, 400) (aaa)

Order (size 600)

Product **LCR4 600 a bbb**

- Type (LCR4)
- Size (600)
- **ceiling** (a)
  - F = Fixed ceiling
  - T = Visible T-rail
  - C = Clip-In (bevelled)
  - A = Other ceiling type*
- Air pattern (400, 500, 600) (bbb)

Rotating ceiling diffuser LCR4

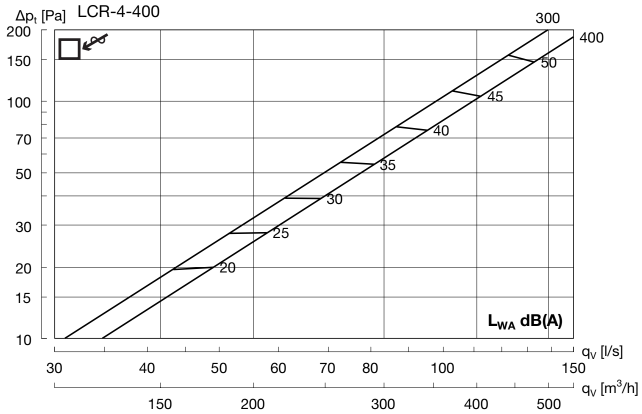
Technical data

Capacity

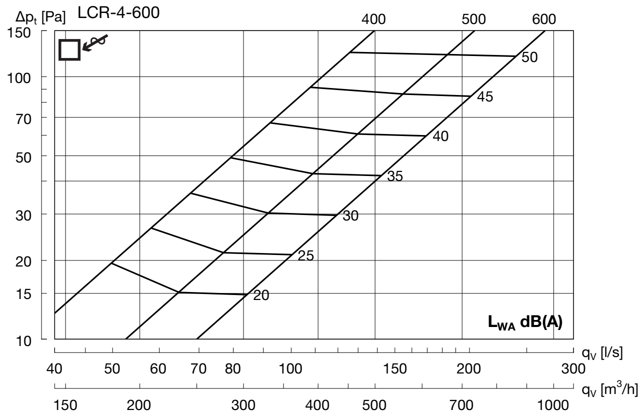
Volume flow [l/s], [m³/h], total pressure drop p_t [Pa] and sound effect level L_{WA} [dB(A)] can be seen in the diagram below.

Frequency-related sound effect level

The sound effect level in the frequency band is defined as $L_{wok} = L_{WA} + K_{ok}$. The values for K_{ok} are specified in charts beneath the diagrams below.



Size	63	125	250	500	1K	2K	4K	8K
300	4	3	-1	-2	-5	-9	-20	-28
400	6	0	0	-2	-5	-8	-20	-31



Size	63	125	250	500	1K	2K	4K	8K
400	6	0	3	-3	-5	-11	-19	-30
500	5	1	3	-2	-6	-11	-22	-32
600	3	1	-1	-1	-5	-10	-20	-35

Sound attenuation

The diffuser's sound attenuation function from duct to room, including end reflection.

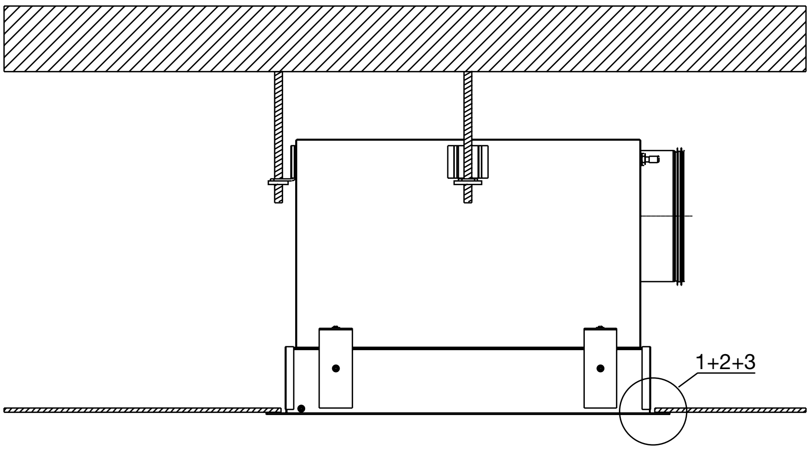
	Mean frequency Hz							
Size	63	125	250	500	1K	2K	4K	8K
400-300	19	12	7	1	6	2	4	5
400-400	16	9	4	4	6	2	3	5
600-400	15	10	3	3	2	1	4	6
600-500	14	9	2	6	1	2	4	5
600-600	13	9	2	4	2	3	4	7

Ceiling adjustment

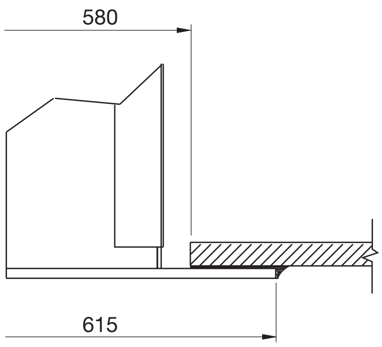
LCR4 in size 600 is suitable for installation in several different types of ceiling system. Read more about this in the ceiling adjustment section.

Ceiling adjustment LCR

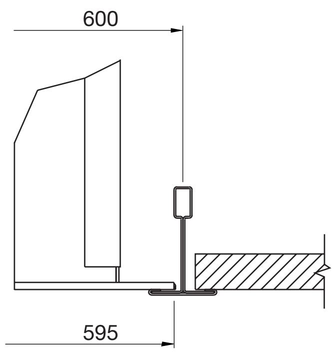
Diffusers LCR1, LCR3 and LCR4 in size 600 are suitable for installation in different types of ceiling. The various options for adjusting the diffuser range for ceilings are shown below.
To achieve maximum tightness between the diffuser and ceiling/wall, it is recommended that a seal be used around the diffuser.
To ensure that the LCR diffuser can be easily fed into the ceiling recess/rail system, the diffuser with circular side connection is equipped with a detachable connection.



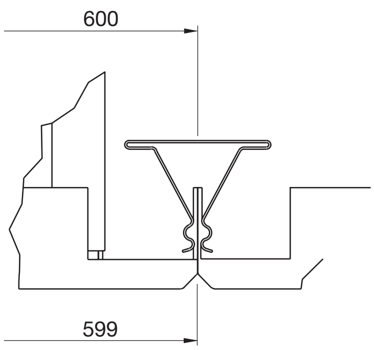
1. Fixed ceiling



2. 15/24 mm visible T-rail

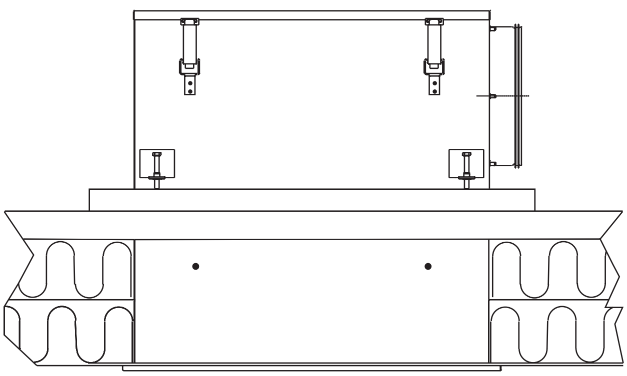


3. Clip-In ceiling



Other ceiling types (walkable ceiling)

A diffuser solution can be supplied for installation in walkable ceilings with filter replacement from above, although this is not a standard solution. For installation and removal of a filter, it is possible to use filter installation tool LCRZ4.



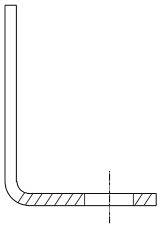
Lindab

Accessories

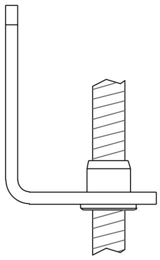
LCRZ

Mounting brackets

LCR1 and LCR2 can be secured during construction using a 6 or 8 mm threaded bolt and suspension brackets LCRZ1 or LCRZ2, which are available as accessories.



LCRZ-1
- mounting bracket with Ø 10 mm smooth hole (in stainless steel).

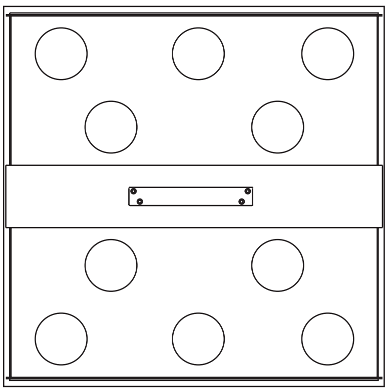


LCRZ-2
- mounting bracket with 8 mm thread (in stainless steel).

Mounting

LCR3 and LCR4 can be installed to advantage using the traditional wire mountings that are used when installing ceiling rails. Wire mountings can be supplied on order stating the desired length.

Filter installation tool

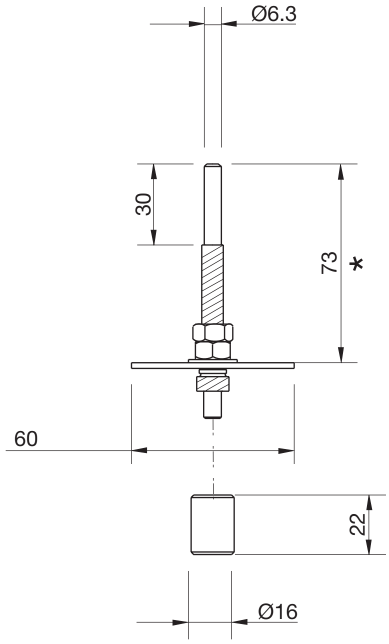


LCRZ-3
- filter installation from below (shown above).
LCRZ-4
- filter installation from above.
LCRZ-5
- fixture for correct installation of filters with a gel seal in the diffuser.
For LCRZ-3-5, state diffuser dimension.

Ordering example

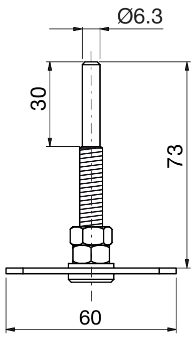
Product **LCRZ** **a**
Type
Accessories (1-7)

Pressure connection for ceiling and wall



LCRZ-6
Pressure connection for ceiling mounting which is used for registration of pressure before filter in the diffuser. It is connected via a plastic hose to an outlet in the diffuser box. Pressure loss above the filter can then be found in the ventilated room.
LCRZ-6 comes standard painted RAL 9010.

- Upon request, LCRZ-6 can be delivered in other lengths, (for example adapted to cleanroom elements), and can also be delivered as a double measuring connection with 2 outlets

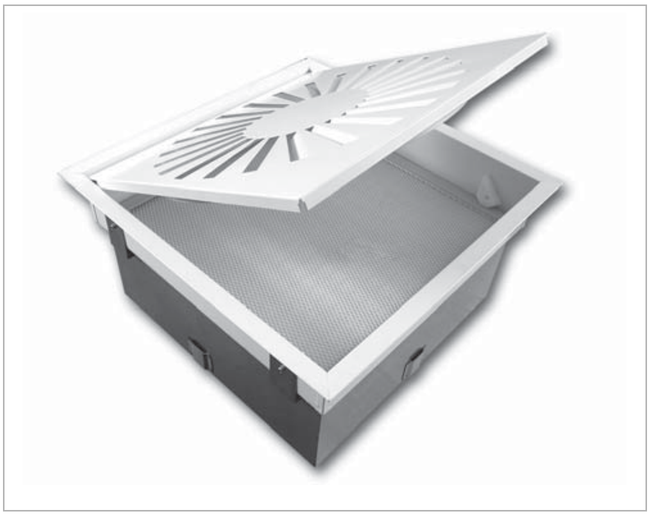


LCRZ-7
Pressure connection for wall or ceiling mounting which is used in connection with room-pressure regulation. It is connected via a plastic hose to a room-pressure regulator and the common reference (Pressure neutral). LCRZ-7 comes standard painted RAL 9010

- Upon request, LCRZ-7 comes with thread in full length

Filter

LCRF



Description

HEPA filters in class H14 have a large area of filter material and are of a very high quality that ensures a long service life, low pressure drops and excellent filtration. Choose between gel or solid seals without joints. The seal around the filter is replaced when the filter is changed to guarantee hassle-free operation and installation. Other filter classes are available on agreement. The filter is equipped as standard with powder-coated protective mesh on both sides of the filter material.

- Easy filter replacement without the need for tools
- Filter cell with PU or gel seal
- Individual Scantest certificate supplied with the filter

Filter – brief facts: The filter is intended for installation in clean rooms.

Frame: Aluminium extrusion 86 mm

Filter material: Fibreglass

Separators: Hot-melt adhesive

Sealant: Polyurethane

Diffuser seal: PU (Polyurethane without joints) or gel

Temperature/humidity, max.: 70°C/RH 100%

Filter class as perDS/EN 1822: H14 (99.995% at MPPS)

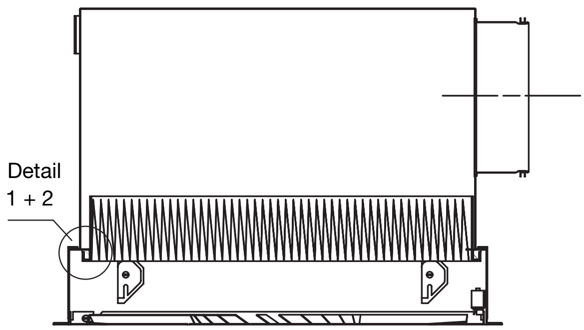
Recommended max. end pressure drop: 450 Pa.

Volume flow/pressure drop:
Size 400 : 153 m3/h / 112 Pa (0.45 m/s)
Size 600 : 418 m3/h / 112 Pa (0.45 m/s)

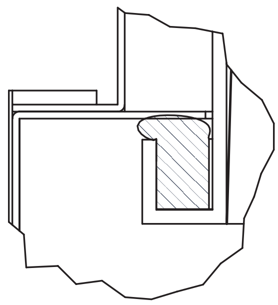
Recommended max. volume flow/pressure drop:
Size 400 : 200 m3/h / 140 Pa
Size 600 : 550 m3/h / 140 Pa

Manufacturer: Camfil Farr

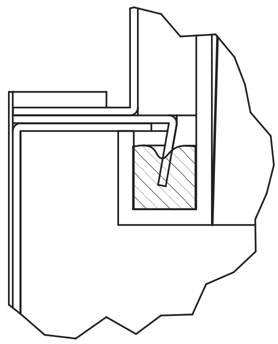
Type af gasket



Part 1: PU seal



Part 2: GEL seal



Ordering example

Product	**LCRF**	**aaa**	**b**	**H14**
Type				
Size				
400				
600				
Sealing				
P = PU seal				
G = Gel seal				
Filter class				

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