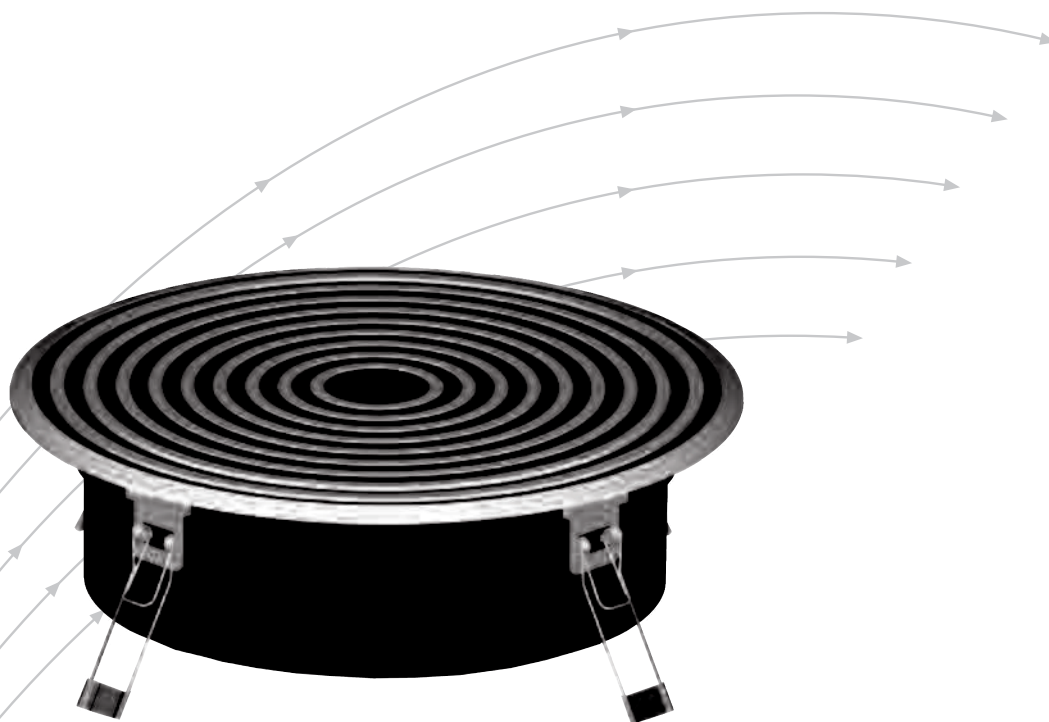


# Floor diffusers

- Type FB
- In aluminium and plastic



**TROX<sup>®</sup> TECHNIK**

The art of handling air

# Contents · Description

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**Floor diffuser FBA**



**Diffuser core FBA**



Floor diffusers type FB can provide comfortable and energy-efficient air discharge into the space, by complementing existing upward convection streams present in the occupied zone. This principle allows the local heat loads to be targeted directly. They are suitable for all types of false floors. The diffusers form attractive design elements for architects and building owners due to the excellent range of surface finishes and colours available.

## Special characteristics

- Diffuser core made of aluminium or plastic
- High mechanical rigidity / tensile strength
- Additional swirl element for optimum control of air discharge direction
- Short installation times for floor diffusers with a trim ring and spring clip fixing
- An additional dirt trap prevents contamination of the false floor and facilitates easy flow rate control

All variations of the type FB are designed so that installation and removal for cleaning purposes can be performed quickly and easily.

Single or multiple diffusers can have plenum boxes with side entry circular spigots for duct connection.

Our “Easy Product Finder” online design programme is also available on the Internet for the design and selection of our floor diffusers.

# Installation examples

## Positive pressure plenum floors

Positive plenums are preferred for large floor areas. Here, plenum boxes are not required due to the uniform under floor pressure distribution. It is not necessary to balance the air flow to individual diffusers.

## Individual rooms

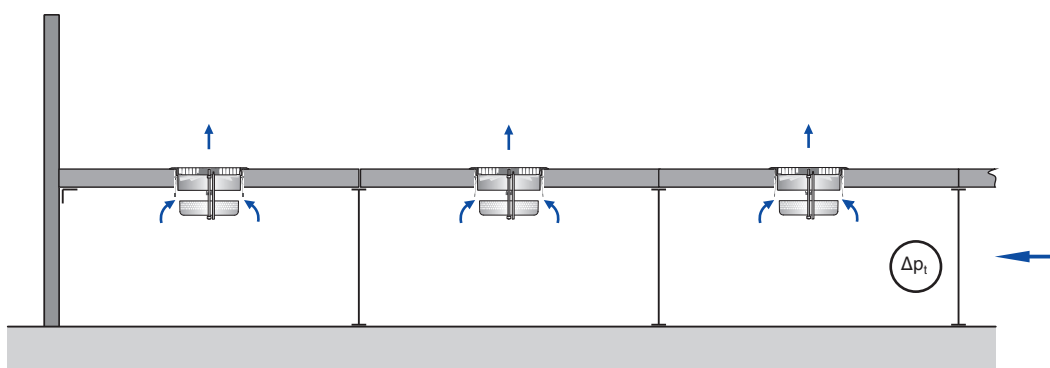
The use of plenum boxes is recommended for individual room temperature control. This guarantees that the air flow rate to each room can be controlled separately, e.g. by room thermostats.

## Positive pressure plenum floors and individual rooms

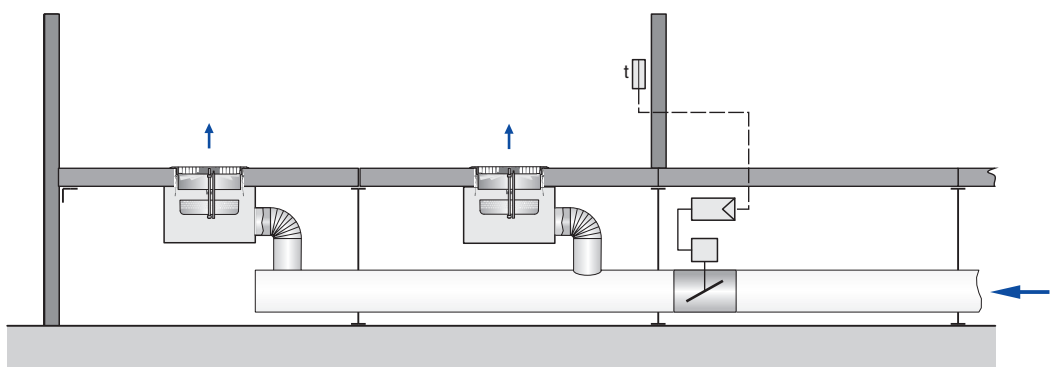
For a combination of zone and individual room control, the floor diffusers for the room should have a ducted supply to the plenum boxes. Individual rooms can then be controlled, e.g. by room thermostats. The air is distributed over the zone via a pressurised floor void and hence the floor diffusers will be nominally self balancing. For the individual room a number of multiple diffuser plenum boxes are shown.

## Comment

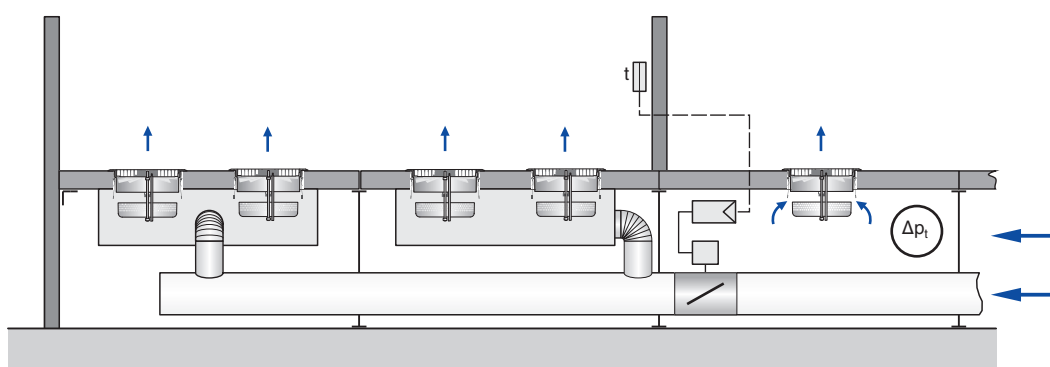
The use of the dirt trap is not absolutely necessary, dependent on the condition within the room or how the room is used. The aerodynamic performance of the diffuser is not influenced by the dirt trap.



Positive pressure plenum floors



Individual rooms



Positive pressure plenum floors and individual rooms

# Construction · Dimensions

## Characteristics

- Horizontal or vertical air discharge
- Radially arranged air control elements for optimum air discharge
- High tensile strength, even subject to an offset load

## Construction features

### Trim ring

- With an anti-twist facility for the diffuser core
- Spring clips accommodates large cutout tolerances and large floor tile thicknesses

### Swirl element

- Fixed for vertical air discharge
- Adjustable for horizontal or vertical discharge

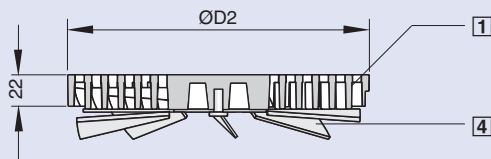
### Dirt trap

- To control air flow rate the height of the dirt trap is adjustable either from the face of the diffuser or from the underside

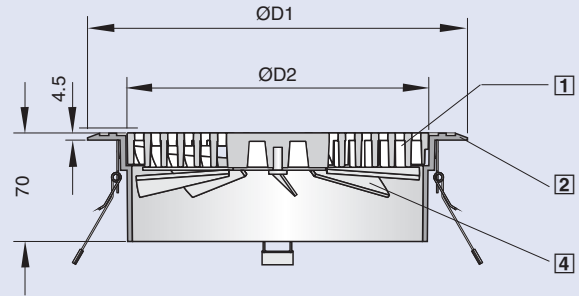
Diffuser core and trim ring		Order code
Materials	Surface	
Aluminium die cast, deburred and shot blasted	-	FBA-1
	painting black, visible face skimmed	FBA-3
	visible face skimmed	FBA-4
Polyamide	dusty grey, similar to RAL 7037	FBK-1//0
	black, similar to RAL 9005	FBK-2//0
Polyamide flame retardant to UL 94	dusty grey, similar to RAL 7037	FBK-1//V00
	black, similar to RAL 9005	FBK-2//V00

- Spring clips made of stainless steel
- Swirl element and spacing ring made of polyamide (PA 6- V0) flame retardant according to UL 94
- Dirt trap made of plastic (ABS) flame retardant according to UL 94
- Adjustment device and stabilising rod made of galvanised steel

**Type FBA/FBK**

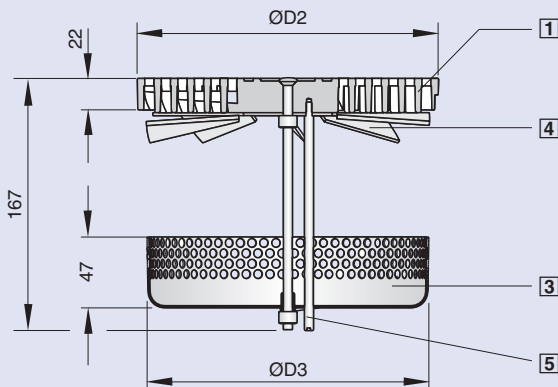


**Type FBA/FBK...-KF**



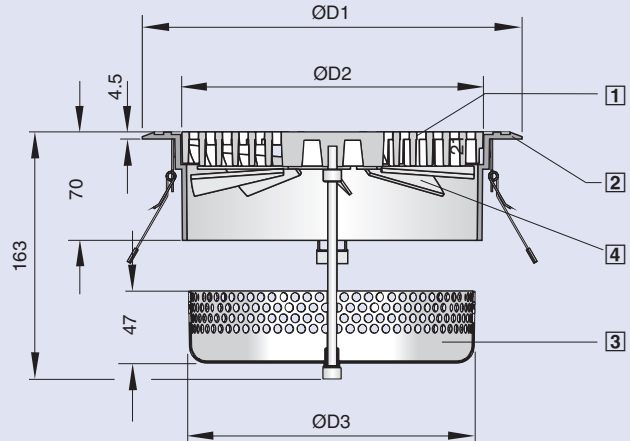
**Type FBA/FBK...-SV**

With flow rate control adjustment from diffuser face



**Type FBA/FBK...-KF-SM**

With flow rate control adjustment from the rear



- 1 Diffuser core, ring spacing 6 mm
- 2 Trim ring with spring clips
- 3 Height adjustable dirt trap
- 4 Swirl element
- 5 Stabilising rod

**Dimensions in mm**

Nominal size	ØD1	ØD2	ØD3
150	200	149	137
200	250	199	187

### Plenum boxes for installation in floors that are not designed as positive pressure plenum

#### Type A, GA/GAM

They consist of the casing with a side entry spigot and are available as single plenum boxes (type A) or as multiple diffuser plenum boxes (type GA/GAM).

The plenum box is installed on the underside of the floor tile. The sealing between the plenum box flange and floor tile must be provided by the customer.

#### Type GA/GAM

The multiple diffuser plenum box is suitable for installation of 4 diffusers nominal size 150 in the layout shown below.

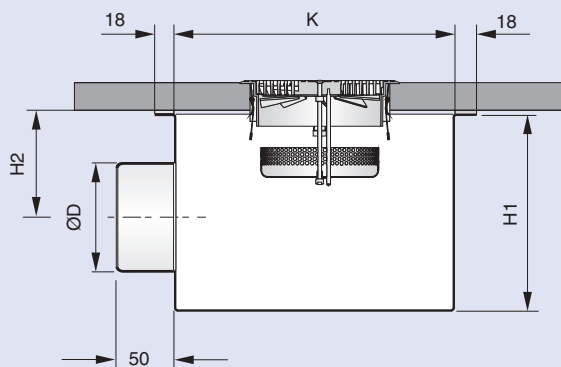
As it is not normally necessary to balance individual diffusers a damper is provided in the side entry spigot of the plenum box.

Plenum box	Order code
Single diffuser	FB.-A
Multiple diffusers	GA
Multiple diffusers with a spigot mounted damper for flow rate control	GAM

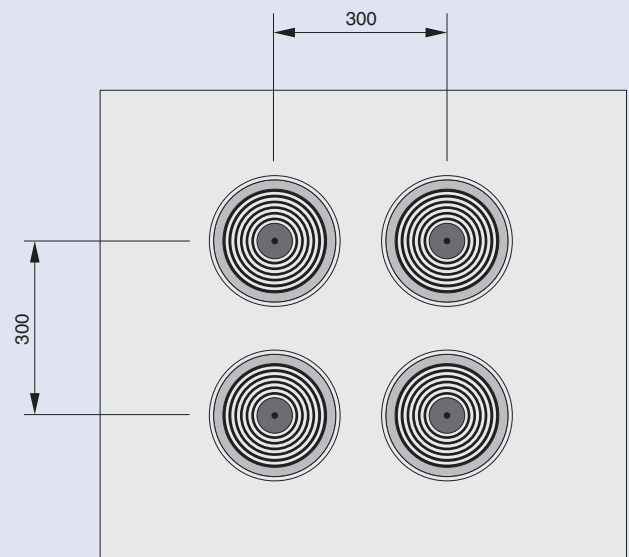
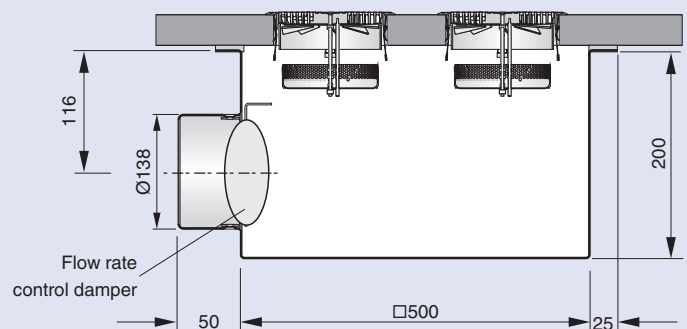
#### Materials

- Plenum box made of galvanised sheet steel, painted black RAL 9005

Plenum box type A



Plenum box type GA/GAM

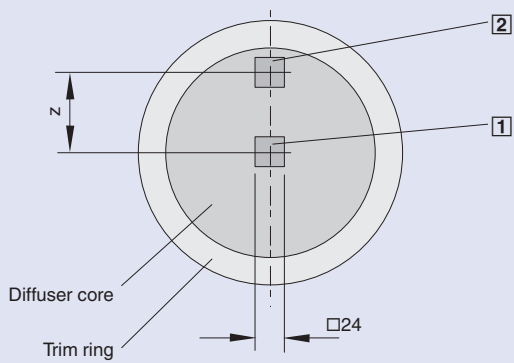
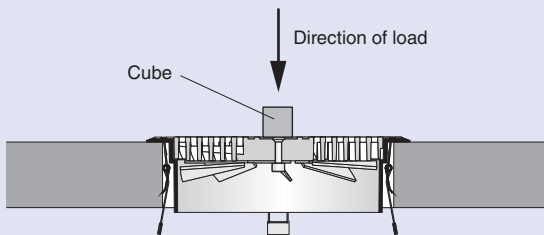


Dimensions in mm				
Nominal size	ØD	□K	H1	H2
150	98	200	125	72
200	123	250	150	84

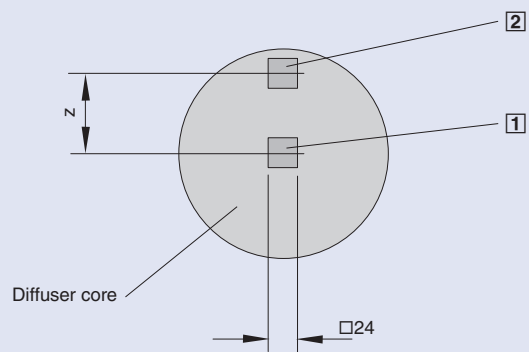
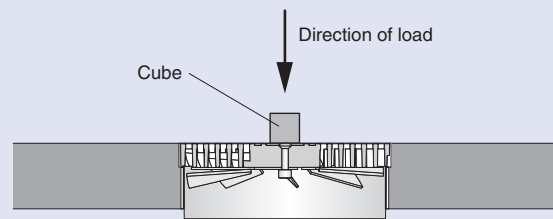
# Load capacity

Construction		Rupture load in kN		Spacing z in mm
		Position of cube 1	Position of cube 2	
<b>FBA</b> Aluminium	Nominal size 150 without trim ring	27	15	52
	Nominal size 200 without trim ring	25	8	77
	Nominal size 150 with trim ring	28	14	52
	Nominal size 200 with trim ring	20	9	77
<b>FBK</b> Plastic	Nominal size 150 without trim ring	15	6	52
	Nominal size 200 without trim ring	6	3	77
	Nominal size 150 with trim ring	12	5	52
	Nominal size 200 with trim ring	6	2	77

**Load application  
with trim ring**



**Load application  
without trim ring**



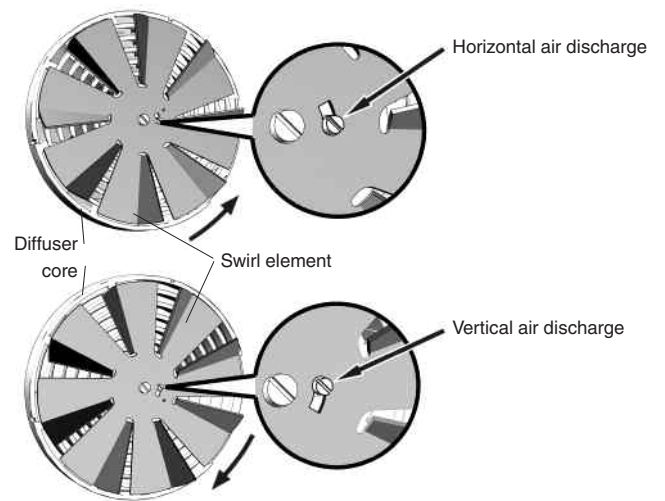
## Installation

The use of trim rings is recommended for installation in false floors with carpeting due to the better edge protection. They can be used for all tile thickness  $\geq 10$  mm.

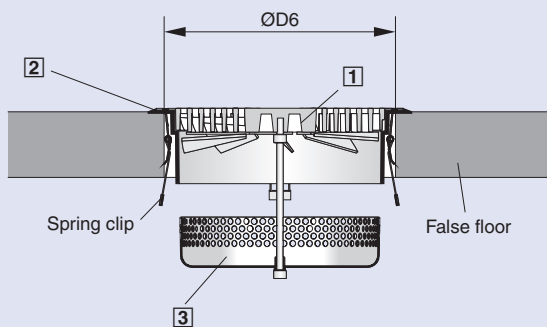
A trim ring [2] is not required for installation in false floors with hard floor covering. If installed without a trim ring, the spacing ring supplied [4] has to be used for functional reasons and for height correction. A stepped hole is required for this.

The installation openings required for the versions with or without a trim ring are shown in the illustrations below.

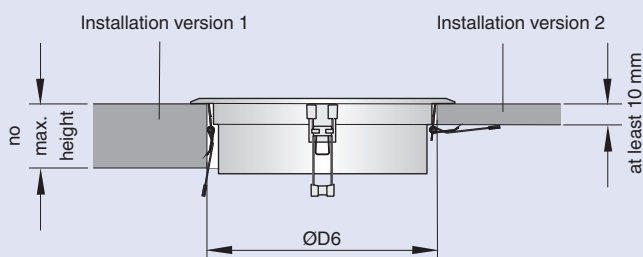
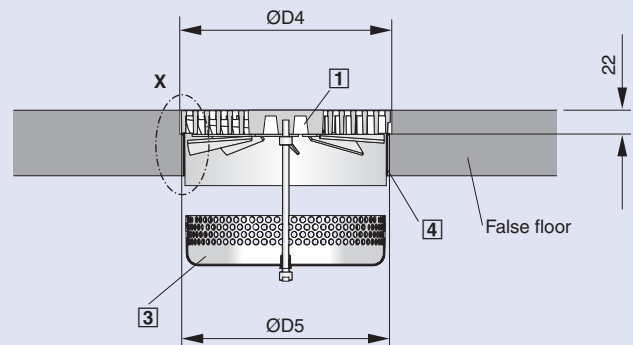
## Adjustment of the swirl element



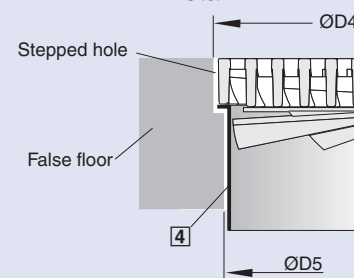
### Installation with trim ring



### Installation without trim ring



### Detail X



- [1] Diffuser core with swirl element
- [2] Trim ring with spring clips
- [3] Dirt trap with height adjustable from the rear to control the air flow rate
- [4] Spacing ring (supplied for floor diffusers without a trim ring for functional reasons and for height correction)

Dimensions in mm				Weight in kg					
Nominal size	ØD4	ØD5	ØD6	FBK			FBA		
				Diffuser core	Trim ring	SM / SV	Diffuser core	Trim ring	SM / SV
150	151	143	170 – 180	0.3	0.2	0.1	0.5	0.5	0.1
200	201	193	220 – 230	0.4	0.2	0.1	1	0.6	0.1

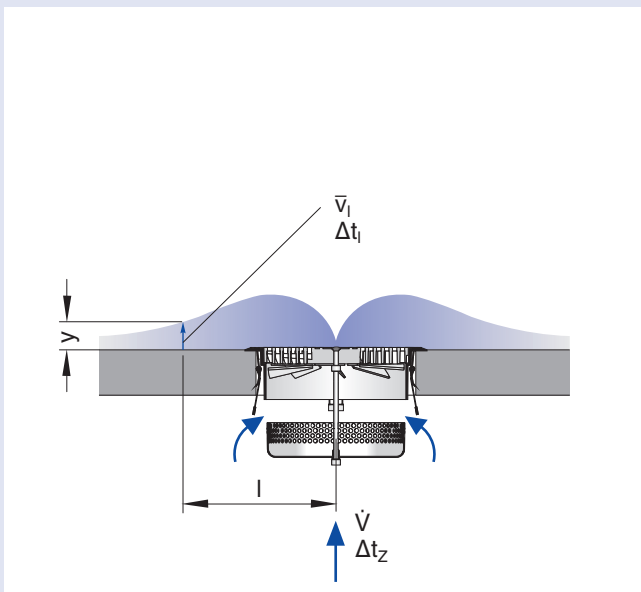
# Nomenclature · Technical Data

## Nomenclature

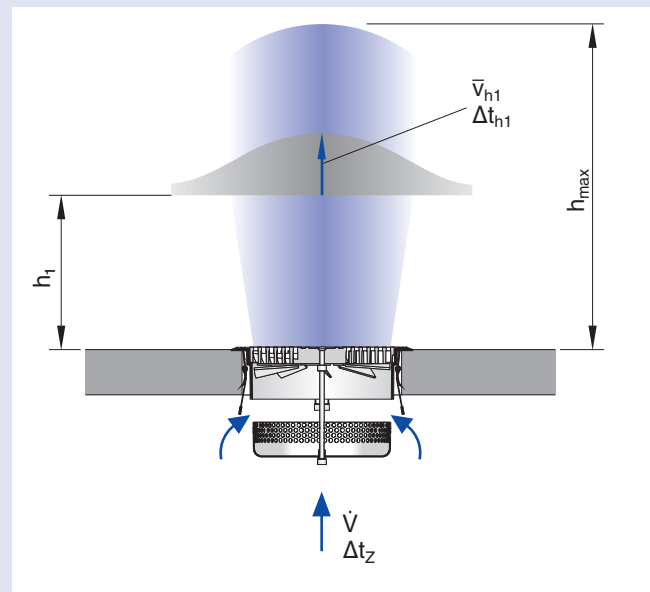
$\dot{V}$	in l/s and m <sup>3</sup> /h	: Flow rate per diffuser
$A_{\text{eff}}$	in m <sup>2</sup>	: Effective outlet area
$l$	in m	: Distance from centre of diffuser
$y$	in m	: Height of measuring point 10 – 50 mm above floor level
$h_1$	in m	: Height above diffuser
$h_{\text{max}}$	in m	: Maximum penetration height of supply air jet depending on $\Delta t_z$ and $\dot{V}$
$\bar{v}_l$	in m/s	: Maximum time average air velocity within 10 – 50 mm above floor level
$\bar{v}_{h1}$	in m/s	: Maximum time average air velocity at height $h_1$ above floor level
$\Delta t_z$	in K	: Temperature difference between supply air and room air
$\Delta t_{h1}$	in K	: Temperature difference between room air and core at height $h_1$
$\Delta t_l$	in K	: Temperature difference between room air and core at distance $l$

$\Delta p_t$	in Pa	: Total differential pressure
$L_{\text{WA}}$	in dB(A)	: A-weighted sound power level
$L_{\text{WNC}}$		: NC rating of the sound power level

### Horizontal air discharge



### Vertical air discharge



Effective outlet area  $A_{\text{eff}}$  in m<sup>2</sup>

Nominal size		150	200
Vertical air discharge	(V)	0.00394	0.00560
Horizontal air discharge	(H)	0.00334	0.00560
Vertical fixed	(VF)	–	0.00820



# Acoustic data

Nominal size 150, horizontal air discharge (H)

## Correction to diagram 1

Flow rate control using the dirt trap

open	$\Delta p_t$		$L_{WA}/L_{WNC}$	
	without AK	with AK	without AK	with AK
100%	× 1.0	× 1.0	–	–
40%	× 1.1	× 1.1	+1	+1
20%	× 1.8	× 1.4	+10	+6

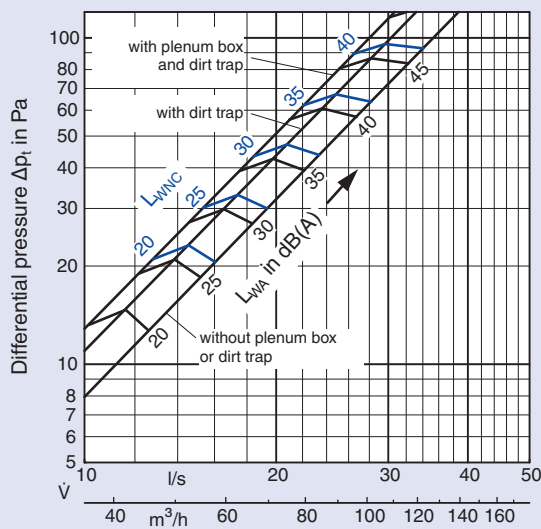
## Correction to diagram 2

Flow rate control using the dirt trap

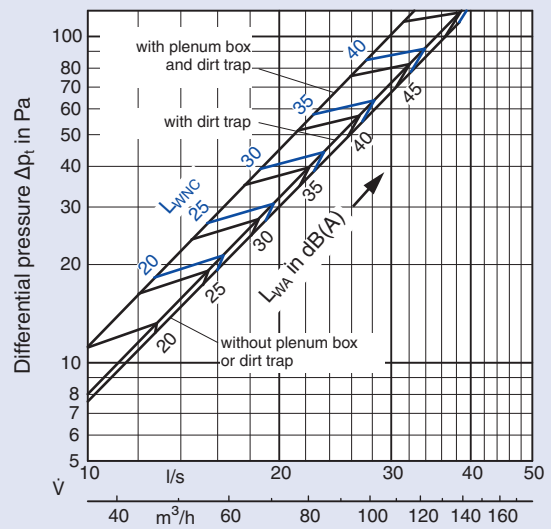
open	$\Delta p_t$		$L_{WA}/L_{WNC}$	
	without AK	with AK	without AK	with AK
100%	× 1.0	× 1.0	–	–
40%	× 1.1	× 1.1	+2	0
20%	× 1.4	× 1.6	+5	+10

## Sound power level and differential pressure

1 FBA...-H/nominal size 150



2 FBK...-H/nominal size 150



The technical data for variants with a dirt trap (... SM/SV) is valid for floor tiles of up to 70 mm in thickness.

# Acoustic data

Nominal size 200, horizontal air discharge (H)

## Example

Given:

Type **FBA ... - H - SM / 200**

Flow rate control 40% open

Flow rate  $\dot{V} = 35 \text{ l/s}$

Required: Sound power level and differential pressure

Diagram 3:

$$L_{WA} = 35 + 1 = 36 \text{ dB(A)}$$

$$\Delta p_t = 30 \times 1.1 = 33 \text{ Pa}$$

## Correction to diagram 3

Flow rate control using the dirt trap

open	$\Delta p_t$		$L_{WA}/L_{WNC}$	
	without AK	with AK	without AK	with AK
100%	$\times 1.0$	$\times 1.0$	-	-
40%	$\times 1.1$	$\times 1.2$	+ 1	+ 1
20%	$\times 3.8$	$\times 1.6$	+ 8	+ 6

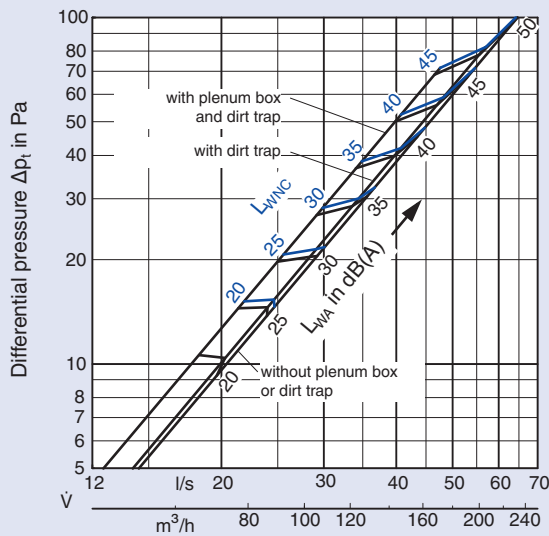
## Correction to diagram 4

Flow rate control using the dirt trap

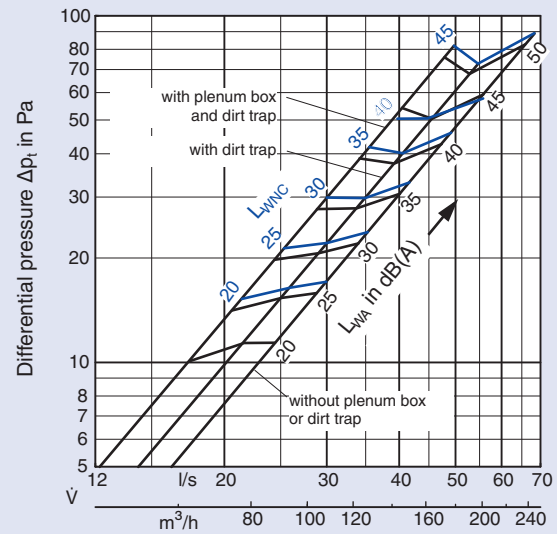
open	$\Delta p_t$		$L_{WA}/L_{WNC}$	
	without AK	with AK	without AK	with AK
100%	$\times 1.0$	$\times 1.0$	-	-
40%	$\times 1.3$	$\times 1.3$	+ 2	+ 1
20%	$\times 2.1$	$\times 1.8$	+ 9	+ 7

## Sound power level and differential pressure

3 FBA...-H/nominal size 200



4 FBK...-H/nominal size 200



The technical data for variants with a dirt trap (... SM/SV) is valid for floor tiles of up to 70 mm in thickness.

# Acoustic data

Nominal size 150 and 200, vertical air discharge (V)

## Correction to diagram 5

Flow rate control using the dirt trap

open	$\Delta p_t$		$L_{WA}/L_{WNC}$	
	without AK	with AK	without AK	with AK
100%	× 1.0	× 1.0	–	–
40%	× 1.2	× 1.2	+1	+1
20%	× 1.8	× 1.8	+8	+7

## Correction to diagram 6

Flow rate control using the dirt trap

open	$\Delta p_t$		$L_{WA}/L_{WNC}$	
	without AK	with AK	without AK	with AK
100%	× 1.0	× 1.0	–	–
40%	× 1.2	× 1.2	+3	0
20%	× 1.7	× 1.7	+7	+5

## Correction to diagram 7

Flow rate control using the dirt trap

open	$\Delta p_t$		$L_{WA}/L_{WNC}$	
	without AK	with AK	without AK	with AK
100%	× 1.0	× 1.0	–	–
40%	× 1.3	× 1.3	+4	0
20%	× 1.8	× 1.9	+8	+5

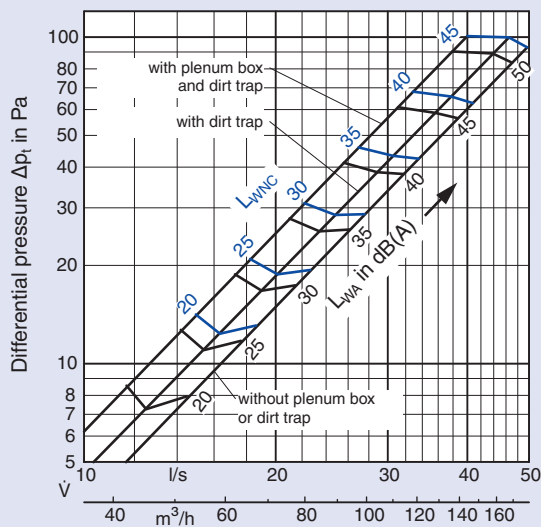
## Correction to diagram 8

Flow rate control using the dirt trap

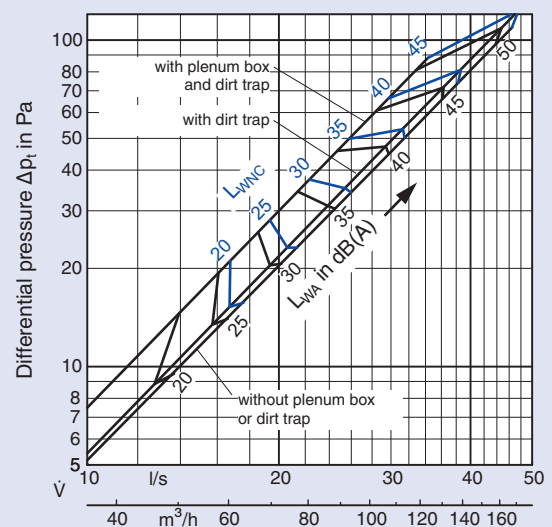
open	$\Delta p_t$		$L_{WA}/L_{WNC}$	
	without AK	with AK	without AK	with AK
100%	× 1.0	× 1.0	–	–
40%	× 1.1	× 1.3	+3	+2
20%	× 1.6	× 1.9	+8	+8

## Sound power level and differential pressure

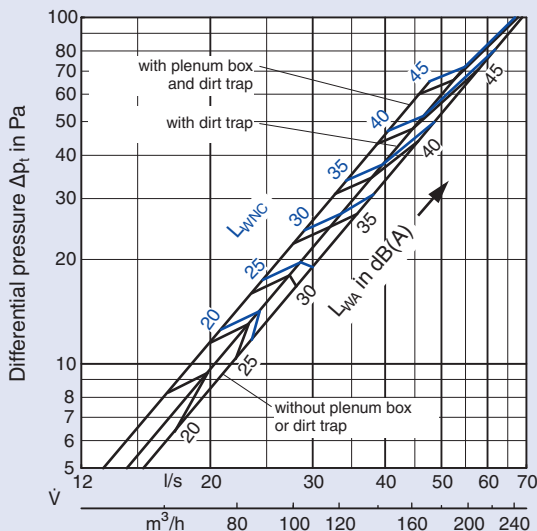
5 FBA...-V/nominal size 150



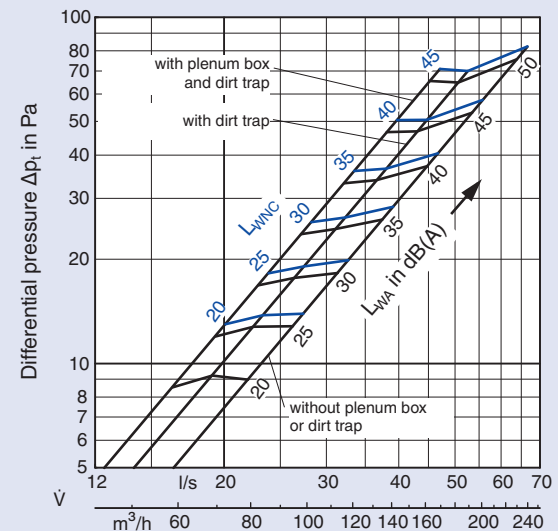
6 FBK...-V/nominal size 150



7 FBA...-V/nominal size 200



8 FBK...-V/nominal size 200



The technical data for variants with a dirt trap (... SM/SV) is valid for floor tiles of up to 70 mm in thickness.

# Acoustic data

Nominal size 200, vertical discharge (VF)

## Correction to diagram 9

Flow rate control using the dirt trap

open	$\Delta p_t$		$L_{WA}/L_{WNC}$	
	without AK	with AK	without AK	with AK
100%	× 1.0	× 1.0	–	–
40%	× 1.6	× 1.6	+ 3	+ 4
20%	× 1.9	× 2.9	+ 4	+ 8

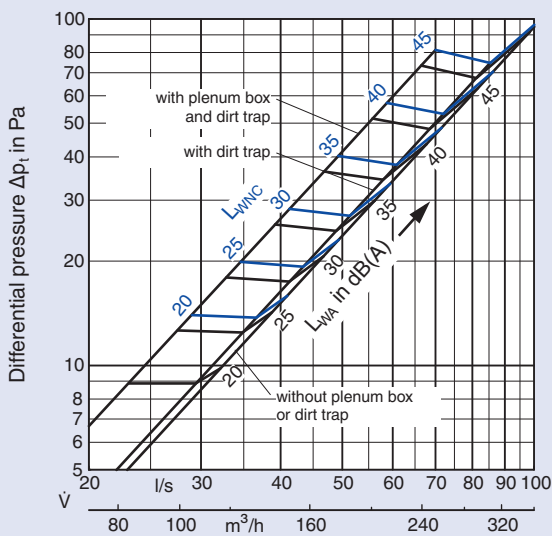
## Correction to diagram 10

Flow rate control using the dirt trap

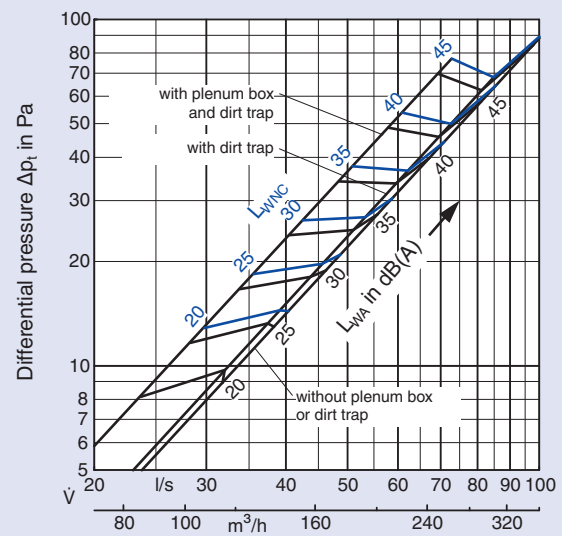
open	$\Delta p_t$		$L_{WA}/L_{WNC}$	
	without AK	with AK	without AK	with AK
100%	× 1.0	× 1.0	–	–
40%	× 1.9	× 1.6	+ 7	+ 4
20%	× 4.7	× 3.2	+ 10	+ 9

## Sound power level and differential pressure

9 FBA...-VF/nominal size 200



10 FBK...-VF/nominal size 200



The technical data for variants with a dirt trap (... SM/SV) is valid for floor tiles of up to 70 mm in thickness.

# Aerodynamic data

Horizontal air discharge (H)

## Example

Given:

Type FBA ... - H - SM / 200

Flow rate  $\dot{V} = 30 \text{ l/s}$

Supply air temperature differential  $\Delta t_z = -6 \text{ K}$

Distance from centre of diffuser  $l = 0.7 \text{ m}$

Diagram 3, page 10:

$L_{WA} = 30 \text{ dB(A)}$ , ( $L_{WNC} = 24 \text{ dB}$ )

$\Delta p_t = 20 \text{ Pa}$

Diagram 13:

max. air velocity  $\bar{v}_l = 0.26 \text{ m/s}$

Diagram 14:

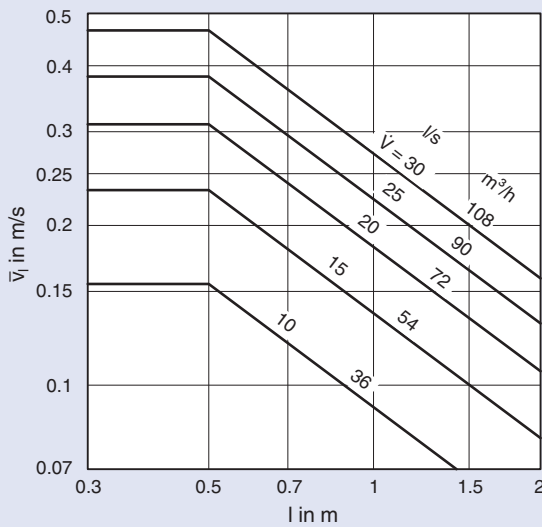
Temperature quotient

$\Delta t_l / \Delta t_z = 0.23$

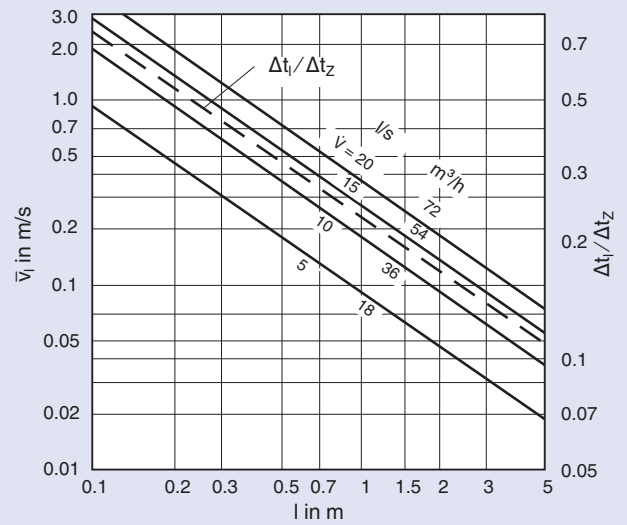
$\Delta t_l = 0.23 \times (-6 \text{ K}) = -1.4 \text{ K}$

## Air velocity

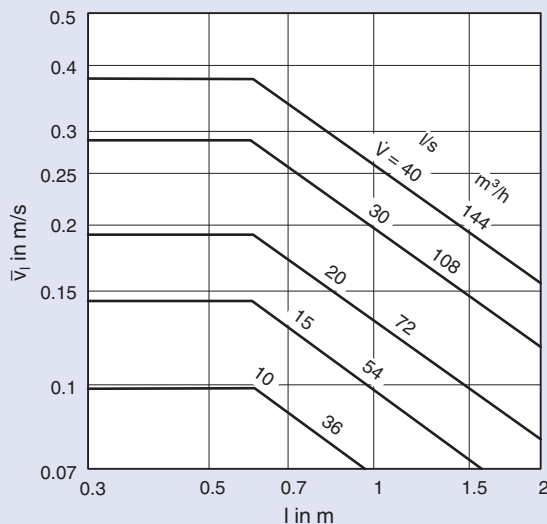
11 FBA...-H/nominal size 150



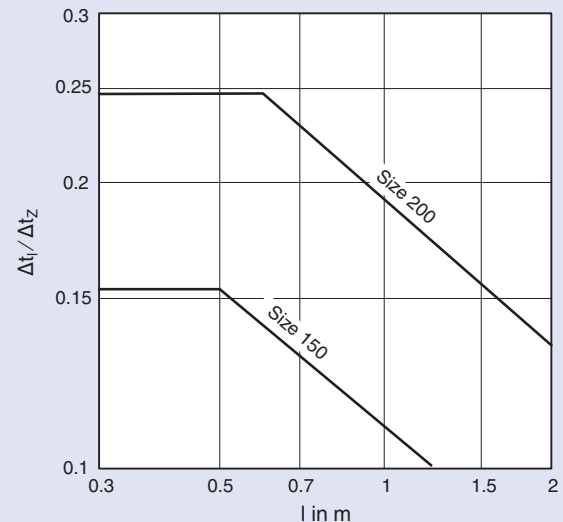
12 FBK...-H/nominal size 150



13 FBA/FBK...-H/nominal size 200



14 Temperature quotient



The technical data for variants with a dirt trap (... SM/SV) is valid for floor tiles of up to 70 mm in thickness.

# Aerodynamic data

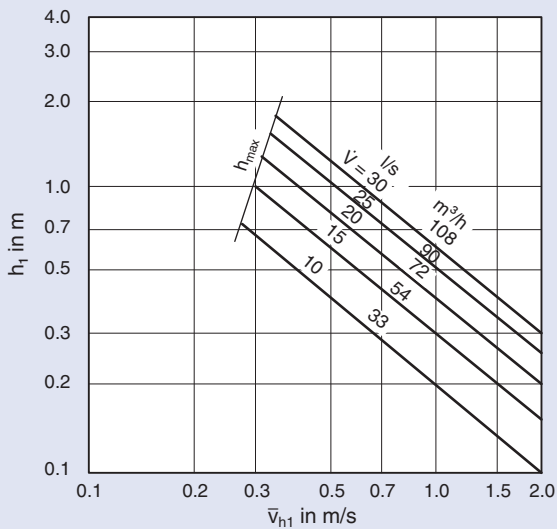
## Vertical air discharge (V)

Diagrams 15, 16 and 17 refer to  $\Delta t_z = -6K$   
Correction values for other supply air temperature differentials

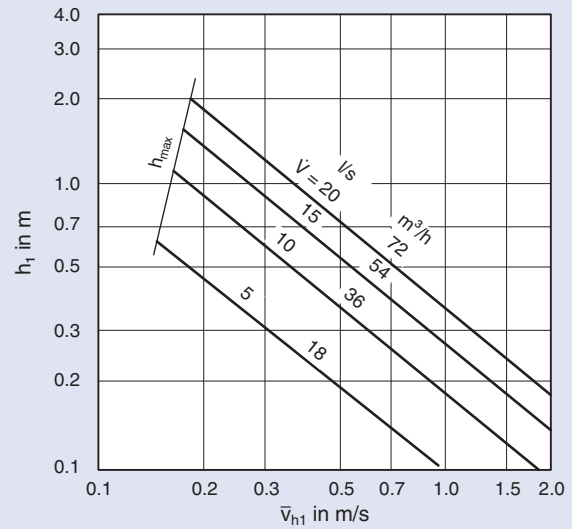
$\Delta t_z$	-4	-6	-8	-10
$h_{max}$	× 1.2	× 1.0	× 0.85	× 0.75
$\bar{v}_{h1}$	× 1.2	× 1.0	× 0.85	× 0.75

### Air velocity

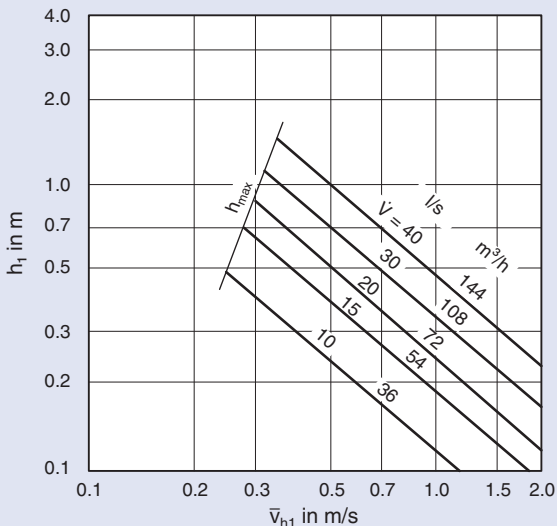
15 FBA...-V/nominal size 150



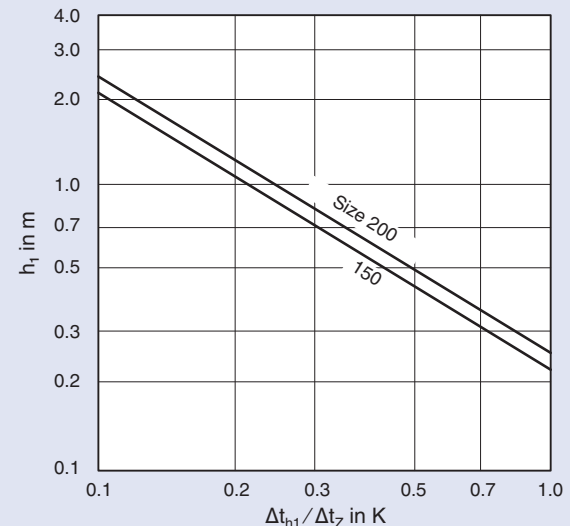
16 FBK...-V/nominal size 150



17 FBA/FBK...-V/nominal size 200



18 Temperature quotient



The technical data for variants with a dirt trap (... SM/SV) is valid for floor tiles of up to 70 mm in thickness.

### Correction to diagram 19

Flow rate control using the dirt trap

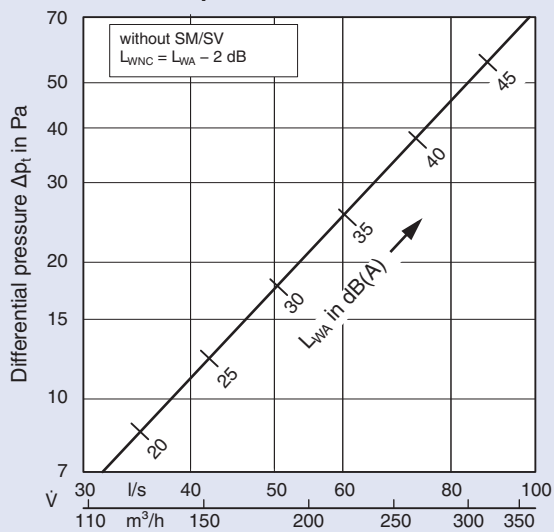
Flow rate balancing "open"	$\Delta p_t$	$L_{WA}/L_{WNC}$
90°	× 1.0	0
45°	× 1.6	2
0°	× 4.1	5

### Diagram 20 refers to $\Delta t_z = -6K$

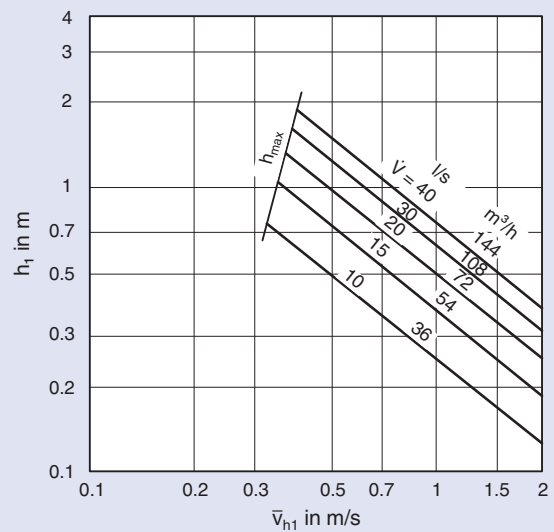
Correction values for other supply air temperature differentials

$\Delta t_z$	-4	-6	-8	-10
$h_{max}$	× 1.2	× 1.0	× 0.85	× 0.75
$\bar{v}_{h1}$	× 1.2	× 1.0	× 0.85	× 0.75

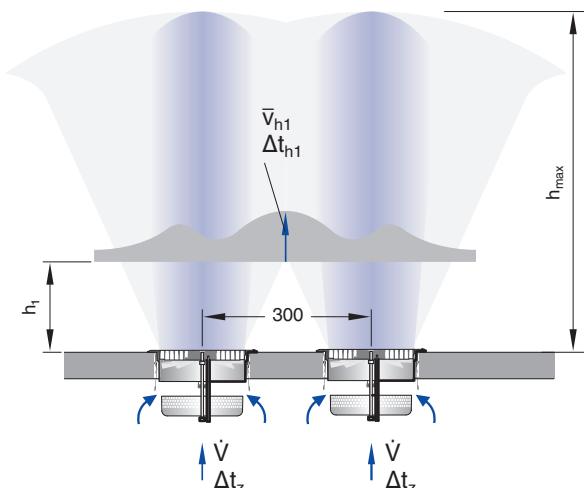
### 19 Sound power level and differential pressure



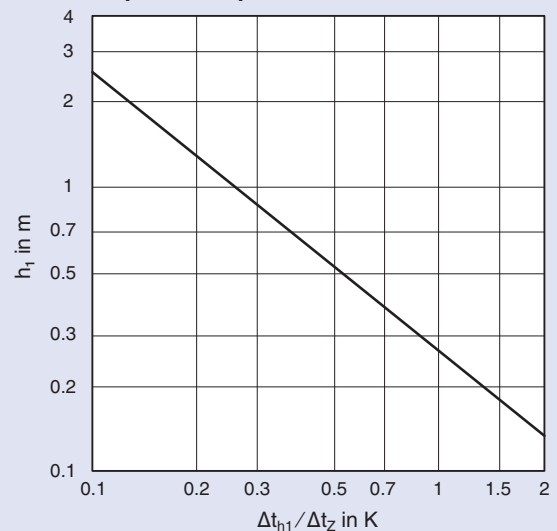
### 20 Air velocity



### Vertical discharge, multiple diffusers



### 21 Temperature quotient



The technical data for variants with a dirt trap (... SM/SV) is valid for floor tiles of up to 70 mm in thickness.

# Order Details

## Specification text \*

Floor diffuser made of aluminium with radially arranged ribs to provide optimum horizontal or vertical air discharge. Due to the high induction the core jet velocity and the supply air temperature differential rapidly reduce.

Special characteristics:

- Diffuser core made of aluminium
- High mechanical rigidity
- Additional swirl element for optimum control of air discharge direction
- Short installation times due to trim ring and spring clip fixing
- Dirt trap prevents contamination of the false floor and makes easy flow rate control possible

Trim ring with spring clips for easy installation; with anti-twist facility for the diffuser core, suitable for large floor tile thicknesses. Large cutout tolerances due to the spring clamping technique.

Sound power level of the air-regenerated noise measured in accordance with EN ISO 5135.

## Materials:

Floor diffuser and trim ring made of die cast aluminium, surface deburred and shot blasted, spring clips made of stainless steel. Swirl element and spacing ring made of polyamide (PA 6-V0), flame retardant according to UL 94. Dirt trap made of plastic (ABS), flame retardant according to UL 94. Adjustment device and stabilising rod made of galvanised steel.

## Floor diffuser option:

Floor diffuser with plenum box for a single connection, made of galvanised sheet steel, powder-coated black (RAL 9005).

\* Text for an FBA with swirl element and trim ring with spring clip fixings, dirt trap and plenum box for single diffuser  
Text for construction variants and multiple diffuser plenum boxes see our design programme or our home page

## Order code

FBA - 1 - V - KF - SM - A	/	150	/	V00
1 2 3 4 5 6		7		8

<p><b>1 Type</b> FBA Aluminium diffuser core FBK Plastic diffuser core</p> <p><b>2 Surface of diffuser core and trim ring</b> <b>FBA:</b> -1 Die cast, deburred -3 Die cast, deburred, painted black, visible face skimmed -4 Die cast, deburred, visible face skimmed <b>FBK:</b> -1 Dusty grey (similar to RAL 7037) -2 Black (similar to RAL 9005)</p>	<p><b>3 Swirl element, discharge direction<sup>1</sup></b> -V Vertical, adjustable -H Horizontal, adjustable -VF Vertical, fixed<sup>2</sup></p> <p><b>4 Trim ring with spring clips<sup>3</sup></b> None, no entry required -KF With trim ring</p> <p><b>5 Dirt trap</b> None, no entry required -SM Flow rate control adjustment from rear -SV Flow rate control adjustment from diffuser face</p>	<p><b>6 Plenum box</b> None, no entry required -A With plenum box</p> <p><b>7 Nominal size</b> 150 200</p> <p><b>8 Diffuser core and trim ring Only for FBK:</b> Polyamide (PA 6), no entry required V00 Polyamide (PA 6-V0), flame retardant in accordance with UL 94</p>
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## Accessories for type FBA and FBK nominal size 150

- GA Multiple diffuser plenum box for 4 diffusers
- GAM As GA, with flow rate control damper in side entry spigot

<sup>1</sup> Floor diffusers without swirl element only have vertical air discharge

<sup>2</sup> Available only for the nominal size 200

<sup>3</sup> Floor diffusers without a trim ring are supplied with a spacing ring for functional reasons and for height correction

## Order example

Make: TROX  
Type: FBA-3-V-KF-SM-A/150