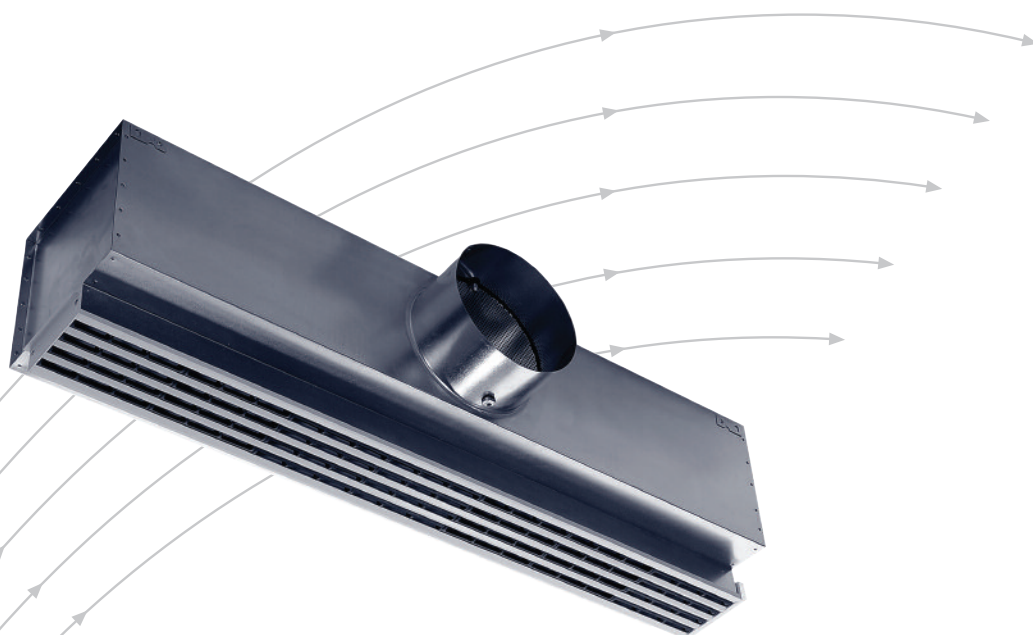


# Slot Diffuser

- Type VSD50
- with 50 mm wide diffuser face



**TROX<sup>®</sup> TECHNIK**

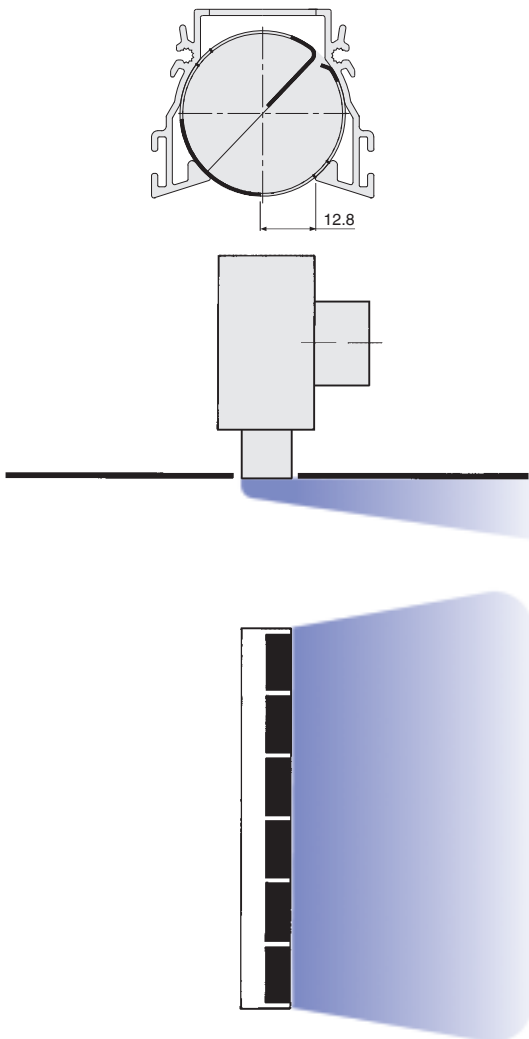
TROX UK Ltd  
Caxton Way  
Thetford  
Norfolk IP24 3SQ

Telephone +44 (0) 1842 754545  
Telefax +44 (0) 1842 763051  
e-mail [trox@troxuk.co.uk](mailto:trox@troxuk.co.uk)  
[www.troxuk.co.uk](http://www.troxuk.co.uk)

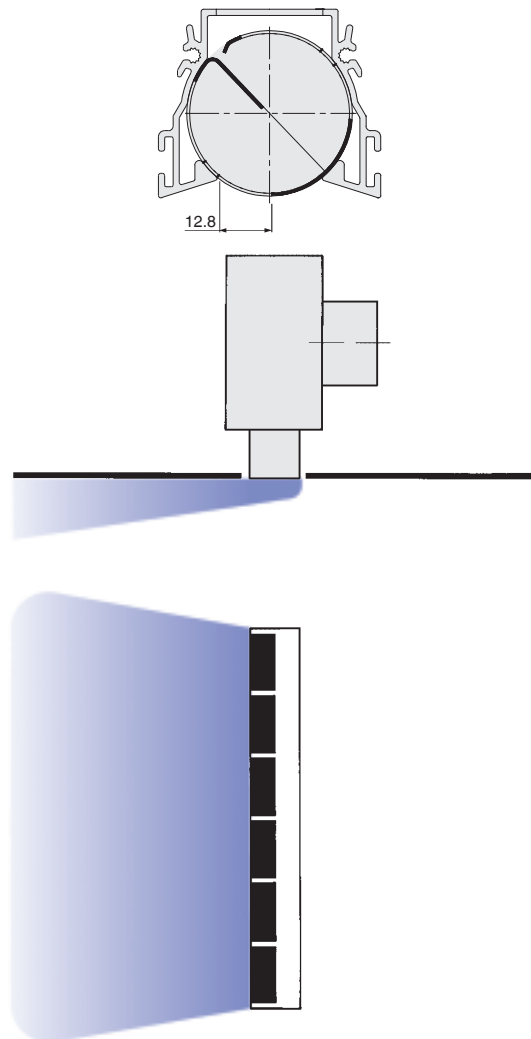
# Contents · Air Diffuser Discharge

|                                 |   |                        |    |
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**Air Discharge  
Horizontal Right**



**Air Discharge  
Horizontal Left**



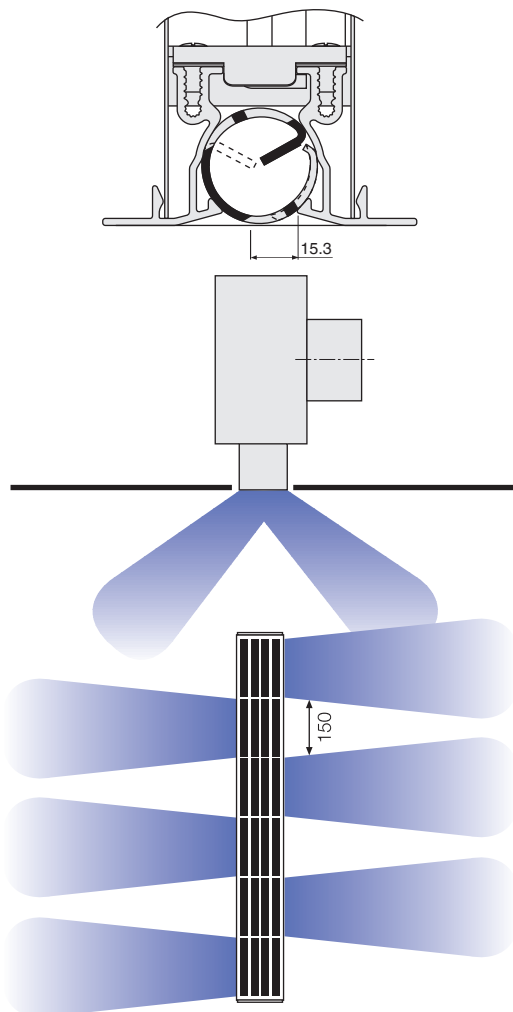
# Description · Air Discharge

The type VSD50 slot diffuser is available with 1-4 slots. The diffuser face is a one piece extrusion, so there are no visible joints. The Type VSD50 can be used in rooms with heights from approx. 2.6 m to 4.0 m. The low overall height means that the slot diffusers are particularly suitable for use in restricted ceiling voids and in suspended ceiling systems. They are characterised by high induction which results in a rapid decrease in supply air temperature differential and jet velocity.

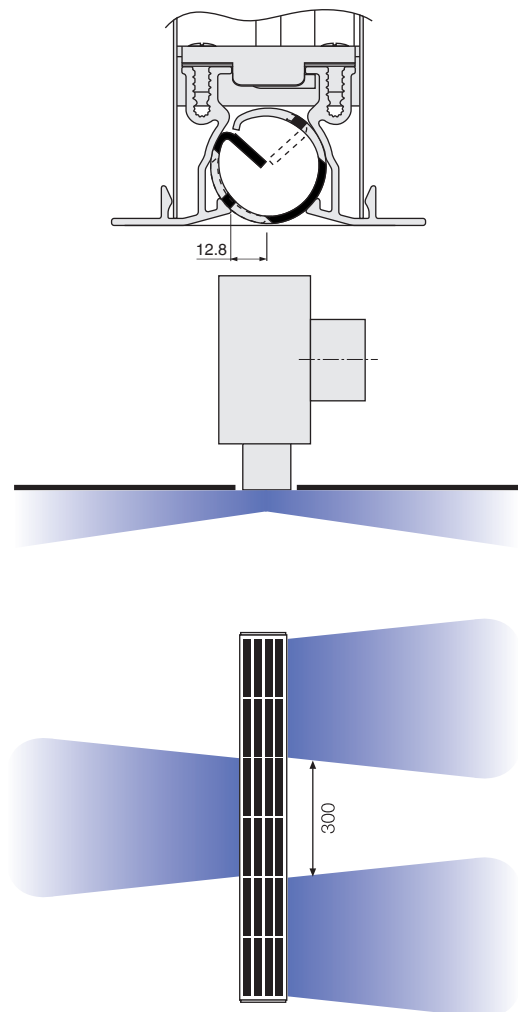
The recommended supply air temperature differential range is  $\pm 10$  K. Because of their stable discharge characteristics, the slot diffusers are suitable for use in systems with constant and variable volume flows.

The direction of air discharge can be adapted to the required room conditions. The air control blades are set at the factory to the customer's requirements as stated on the order. If the discharge directions have to be subsequently changed, this can easily be done on site by rotating the air control blades.

**Air Discharge  
Alternating Angled**



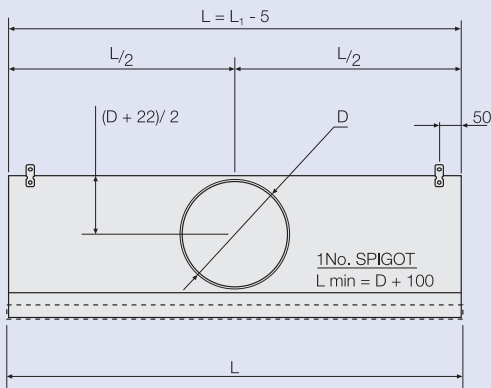
**Air Discharge  
Alternating Horizontal**



# Construction · Dimensions

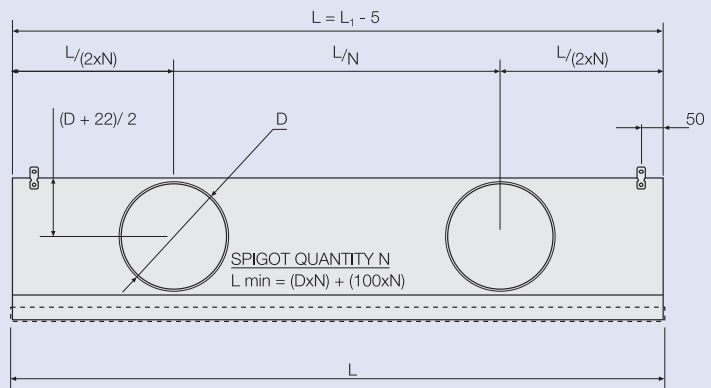
|       |                | AKV-VSD50 plenum details |      | AKV-VSD50 extended height plenum details |      |
|-------|----------------|--------------------------|------|--|------|
| Slots | Ø D            | W                        | B    | W  | B    |
| 1     | 98, 123, 148,  | 138                      | 52.0 | 102                                      | 52.0 |
| 2     | 158, 198, 248, | 176                      | 94.0 | 144                                      | 94.0 |
| 3     | 298, 313, 348  | 238                      | 136  | 186                                      | 136  |
| 4     |                | 310                      | 178  | 228                                      | 178  |

## AKV-VSD50



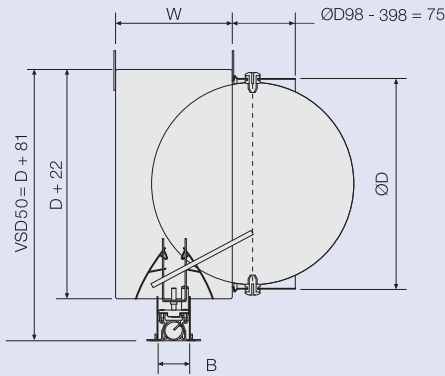
Plenum Length L - 300mm to 1500mm  
(150mm increments)

## AKV-VSD50



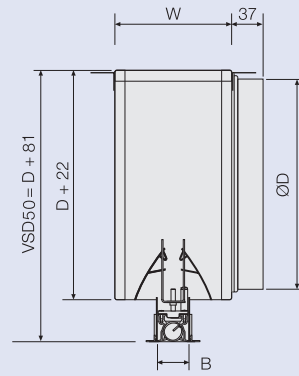
Plenum Length L - 1650mm, 1800mm (2 Spigots)

## AKV-VSD....M/



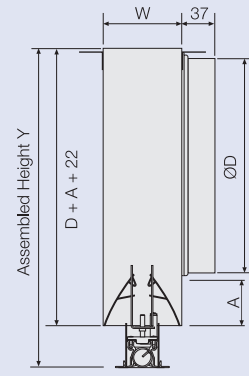
Plenum to slot fixing detail

## AKV-VSD....D12-O/

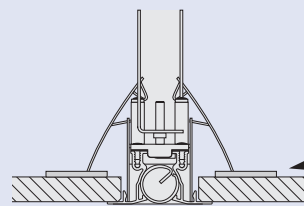
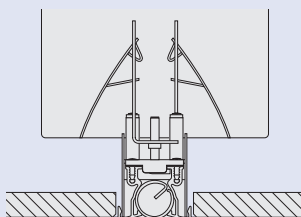


Slot installed in board detail

## Extended Height Plenum



Assembled Height Y = VSD50 (D+A+81)  
Extension A = 125, 150, 200



NOTE: Suitable support battens (by others) should be used at each spring clip location to distribute the weight of the diffuser and to prevent penetration of the substrate.

Minimum Board Thickness  
VSD50 = 20.0mm

# Construction · Dimensions

## Slot Width Dimensions VSD50

| Slots      | 'P'   |       |     |
|------------|-------|-------|-----|
|            | FL    | NF    | PL  |
| 1          | 79.5  | 59.5  | -   |
| 2          | 121.5 | 101.5 | -   |
| 3          | 163.5 | 143.5 | 299 |
| 4          | 205.5 | 185.5 | 299 |
| O/A Height | 47*   | 47*   | 47* |

\*Overall height excludes 'FK' fixing kit

Tolerance Length 'L<sub>1</sub>' +/- 1  
Width 'P' +/- 1

VSD50 slot diffusers are supplied separate from the plenum box which is fitted to the rear of the diffuser on site by others. Lined plenums are available as an option. The supply air is connected via the circular side entry spigot which is optionally available with a volume control damper. The face sections are available without flanges type NF or with integral edge flanges type FL, or with flange profiles types PL or TZ to suit various ceiling requirements. Matching end caps are available for the diffuser faces, in the form of end angles or end plates. The alignment pins used at the joints are also included in the scope of supply, to enable the alignment and interconnection of individual L<sub>1</sub> sections. Mitre corners pieces are for aesthetic reasons not fitted with air control blades.

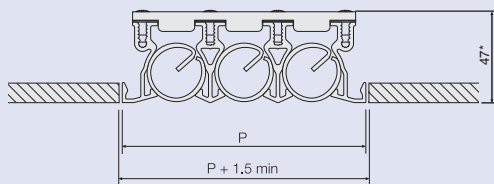
NF = No Flange. The flangeless VSD slot diffuser is suited to installing in apertures in ceiling tiles where the slot diffuser face can sit flush with the tile. It is combined with the L02 end angle for levelling.

FL = Flanged. The flanged VSD can be used to lay on a ceiling T bar or be pulled up and cover an opening in the ceiling.

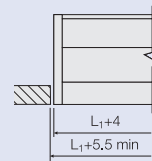
PL = Plank Ceiling. VSD50 3 & 4 slot diffusers with extended flanges to replace a 300mm plank ceiling tile. It is combined with the PL02 end angle for levelling.

## Ceiling Integration/Sections

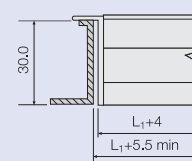
### NF



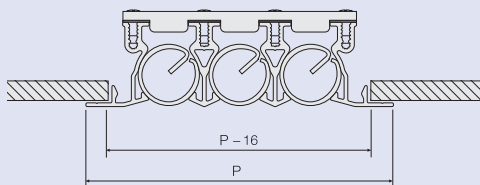
### Type 'P' end cap



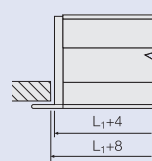
### Type 'L' end cap



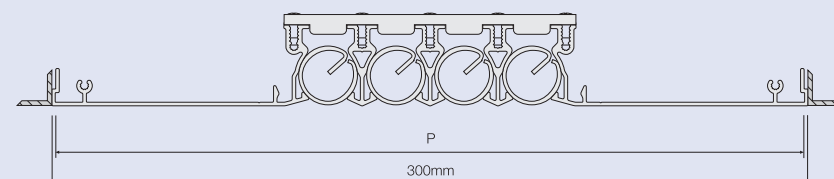
### FL



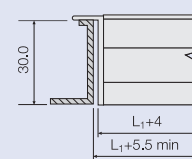
### Type 'A' end cap



### PL



### Type 'PL' end cap



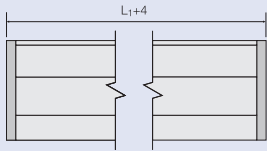
**NOTE:** 'PL' diffuser type only available as finite section L<sub>1</sub> = 300 min / 1800 max  
Must be specified with PL02 (end cap at each end of diffuser).

# Construction · Dimensions

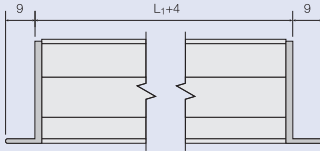
| End Caps |                                 |        |    |    |
|----------|---------------------------------|--------|----|----|
| End Cap  | Description                     | Border |    |    |
|          |                                 | NF     | FL | PL |
| PO1      | 'P' type fitted on one end only | ✓      |    |    |
| PO2      | 'P' type fitted on both ends    | ✓      |    |    |
| AO1      | 'A' type fitted on one end only |        | ✓  |    |
| AO2      | 'A' type fitted on both ends    |        | ✓  |    |
| LO2      | 'L' type fitted on both ends    | ✓      |    |    |
| PLO2     | 'PL' type fitted on both ends   |        |    | ✓  |

## End Caps

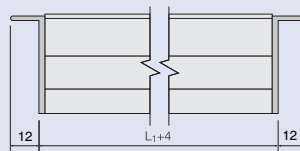
### Type P



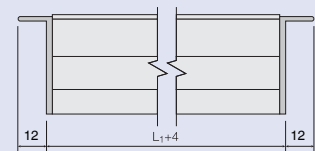
### Type A



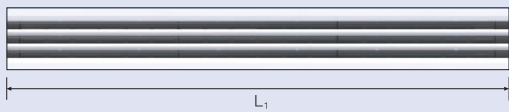
### Type L



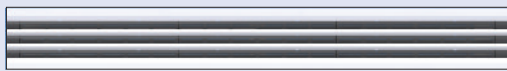
### Type PL



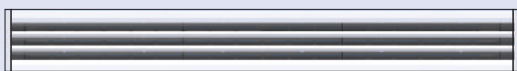
### Without end caps ('0')



### End caps on one end ('XX01')



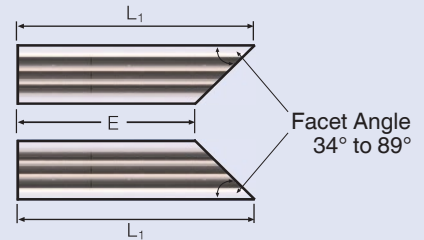
### End caps on both ends ('XX02')



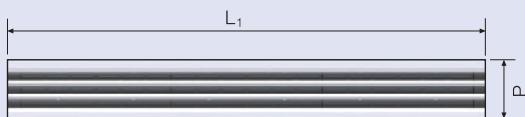
### Faceted Ends

**Non Standard**  
E = 300 minimum  
Angle = 34° to 89° in 1 degree increments

Tolerance +/- 1°



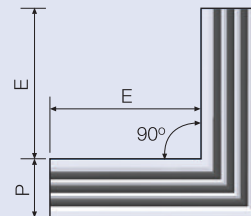
### Front face



### Mitred Corners

**Standard**  
E = 200 : Angle = 90° or 135°  
**Non Standard**  
E = 200 : Angle = 68° to 179° in 1 degree increments

Tolerance +/- 1°



**Figure 1**

Standard method of installing slot diffuser assemblies is to use the four suspension points on the plenum box. Suitable support rods/wires and fixing accessories by others on site.

**Figure 2**

If there are linear runs of slot diffusers, the alignment pins supplied can be used to keep the face of the diffuser aligned. The alignment pins (2 per slot) are initially fitted on one side and then inserted approx. halfway into the other section.

**Figure 3**

Installation spring clip is supplied with 8 pre-set notch positions to suit variable ceiling types. The required notch should be selected on each spring clip prior to installation within the ceiling. **NOTE** - When used in conjunction with type AKV plenums, notch position 1 should be used.

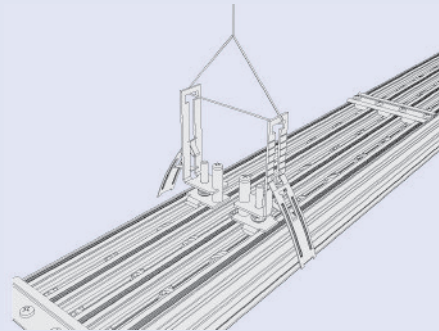
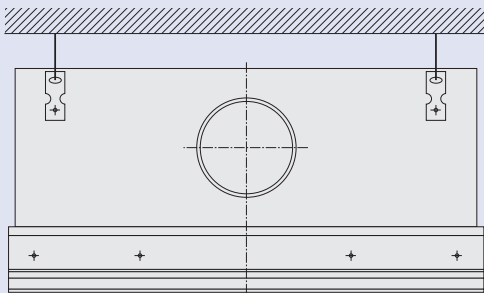
**Figure 4**

In order to fit the diffuser to the plenum box, the air control blades below the fixing points must be adjusted so that the screw can be reached with a screw driver. Push the diffuser into the neck of the plenum compressing the spring clips. Once inside the plenum the spring clips will spring out preventing the diffuser from coming out. Then turn the screw so the diffuser pulls up tight into the plenum.

**Figure 5**

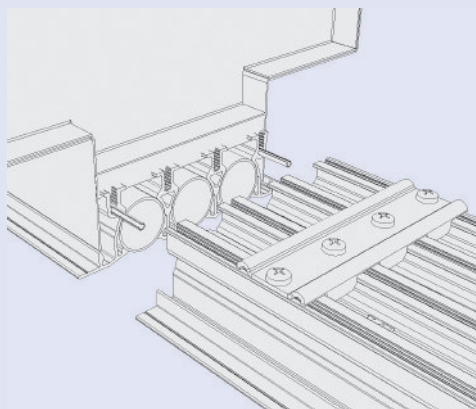
The airflow rate can be adjusted from the front face of the diffuser. To do this, the air control blade below the spigot must be adjusted until the damper can be moved using a screwdriver or round bar (max. dia. 3.5mm, length depending on the neck extension).

**Figure 1**

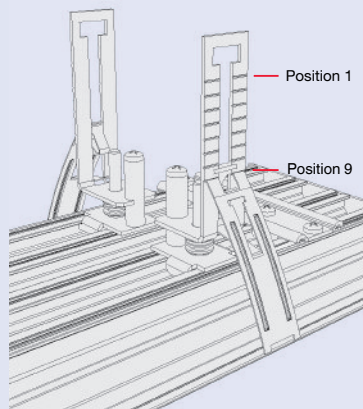


For diffusers without plenums the use of a safety wire by others attached to the slab provides an extra level of safety.

**Figure 2**



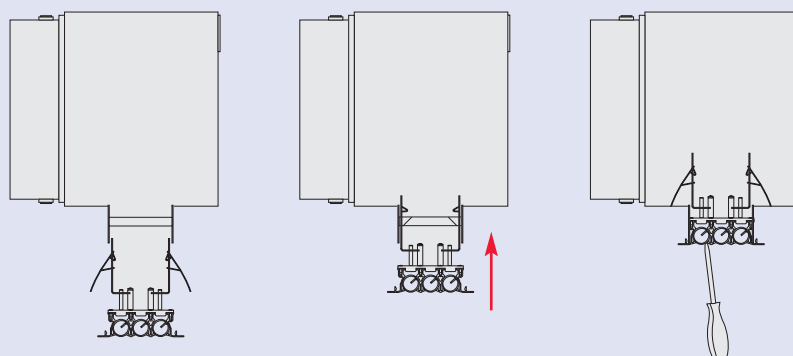
**Figure 3**



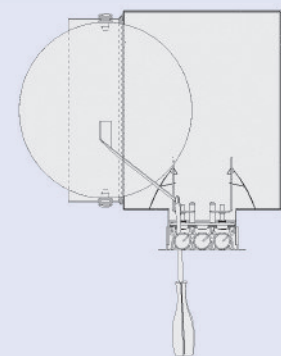
**Notch Positions**

| Notch Position | Min board thickness mm | Max board thickness mm |
|----------------|------------------------|------------------------|
| 1              | 60                     | 67                     |
| 2              | 55                     | 62                     |
| 3              | 50                     | 57                     |
| 4              | 45                     | 52                     |
| 5              | 40                     | 47                     |
| 6              | 35                     | 42                     |
| 7              | 30                     | 37                     |
| 8              | 25                     | 32                     |
| 9              | 20                     | 27                     |

**Figure 4**



**Figure 5**



## Nomenclature

|                                    |                           |  |
|------------------------------------|---------------------------|--|
| $\dot{V}$                          | in l/s · m:               | Volume flow per unit length  |
| $\dot{V}$                          | in m <sup>3</sup> /h · m: | Volume flow per unit length  |
| $\dot{V}_t$                        | in l/s:                   | Total volume flow  |
| $\dot{V}_t$                        | in m <sup>3</sup> /h:     | Total volume flow  |
| A                                  | in m:                     | Spacing between two diffusers  |
| H <sub>1</sub>                     | in m:                     | Spacing between ceiling and occupied zone  |
| H <sub>1 max</sub>                 | in m:                     | Maximum penetration depth when heating   |
| L                                  | in m:                     | Distance from diffuser L = A/2 + H <sub>1</sub><br>or L = X + H <sub>1</sub>   |
| $\bar{v}_{H1}$                     | in m/s:                   | Time average air velocity between two diffusers at distance H <sub>1</sub>   |
| $\bar{v}_L$                        | in m/s:                   | Time average air velocity at wall at distance L  |
| v <sub>eff</sub>                   | in m/s:                   | Effective jet velocity   |
| Δ t <sub>Z</sub>                   | in K:                     | Temperature difference between supply air and room air   |
| Δ t <sub>L</sub>                   | in K:                     | Difference between room temperature and core temperature at distance L   |
| Δ t <sub>H1</sub>                  | in K:                     | Difference between core temperature and room temperature at distance H <sub>1</sub>  |
| Δ p <sub>t</sub>                   | in Pa:                    | Total pressure drop  |
| L <sub>WA</sub>                    | in dB(A):                 | A-weighted sound power level   |
| L <sub>W NC</sub>                  | :                         | NC rating of sound power level   |
| L <sub>W NR</sub>                  | :                         | L <sub>W NR</sub> = L <sub>W NC</sub> + 2  |
| L <sub>pA</sub> , L <sub>pNC</sub> | :                         | A weighting and NC rating respectively of room sound pressure level<br>L <sub>pA</sub> ≈ L <sub>WA</sub> - 8 dB<br>L <sub>pNC</sub> ≈ L <sub>W NC</sub> - 8 dB |
| Δ L                                | in dB/oct.:               | Relative sound power level with respect to L <sub>WA</sub>   |
| L <sub>W</sub>                     | in dB/oct.:               | Octave band sound power level of flow generated noise L <sub>W</sub> = L <sub>WA</sub> + Δ L   |

## Effective Jet Velocity

$\dot{V}_t$  in l/s

$$v_{\text{eff}} = \frac{\dot{V}_t}{s_{\text{eff}} \cdot L_1 \cdot 1000} \quad [\text{m/s}]$$

L<sub>1</sub> = Length of slot diffuser in m

$\dot{V}_t$  in m<sup>3</sup>/h

$$v_{\text{eff}} = \frac{\dot{V}_t}{s_{\text{eff}} \cdot L_1 \cdot 3600} \quad [\text{m/s}]$$

## Effective slot width

| Air discharge         | Horizontal | Angled |
|-----------------------|------------|--------|
| s <sub>eff</sub> in m | 0.0092     | 0.0061 |



## Example

Data given:

VSD50-1; Air discharge alternating angled

Slot length  $L_1 = 1500$  mm

Total volume flow  $\dot{V}_t = 45$  l/s

Spigot diameter  $D = 158$  mm

Required: Sound power level of flow generated noise  $L_w$

| Octave band centre frequency in Hz | 63 | 125 | 250 | 500 | 1000 | 2000 | 4000 | 8000 |
|------------------------------------|----|-----|-----|-----|------|------|------|------|
| $L_{WA}$ in dB                     | 33 | 33  | 33  | 33  | 33   | 33   | 33   | 33   |
| $L$ in dB                          | 0  | 2   | 7   | -4  | -11  | -18  | -29  | -36  |
| $L_w$ in dB                        | 33 | 35  | 40  | 29  | 22   | 15   | 4    | -3   |

Diagram 2: Sound power level and pressure drop

$$\Delta p_t = 10 \text{ Pa} \cdot 1.5 = 15 \text{ Pa}$$

$$L_{WA} = 25 \text{ dB(A)} + 5 = 33 \text{ dB(A)}$$

Effective jet velocity  $v_{\text{eff}}$ :

$$v_{\text{eff}} = \frac{\dot{V}_t}{s_{\text{eff}} \cdot L_1 \cdot 1000} = \frac{45}{0.0061 \cdot 1.5 \cdot 1000} = 4.9 \text{ m/s}$$

Relative Spectra  $\Delta L$  for Damper Angle  $0^\circ$

| Type    | Length mm | Effective jet velocity $v_{\text{eff}}$ m/s | Octave band centre frequency in Hz |     |     |     |      |      |      |      |
|---------|-----------|---|------------------------------------|-----|-----|-----|------|------|------|------|
|         |           |   | 63                                 | 125 | 250 | 500 | 1000 | 2000 | 4000 | 8000 |
| VSD50-1 | 600       | 2   | 12                                 | 7   | 7   | -6  | -26  | -44  | -46  | -50  |
|         | 1050      |   | 10                                 | 3   | 8   | -10 | -26  | -38  | -43  | -47  |
|         | 1500      |   | 9                                  | 3   | 8   | -7  | -23  | -37  | -42  | -48  |
|         | 600       | 3   | 8                                  | 7   | 7   | -4  | -20  | -34  | -35  | -38  |
|         | 1050      |   | 5                                  | 3   | 8   | -7  | -20  | -29  | -33  | -38  |
|         | 1500      |   | 6                                  | 3   | 7   | -5  | -17  | -28  | -33  | -43  |
|         | 600       | 5   | 1                                  | 6   | 6   | -3  | -13  | -22  | -28  | -32  |
|         | 1050      |   | -1                                 | 3   | 7   | -5  | -12  | -19  | -28  | -34  |
|         | 1500      |   | 0                                  | 2   | 7   | -4  | -11  | -18  | -29  | -36  |
|         | 600       | 7   | -4                                 | 5   | 5   | -2  | -9   | -14  | -26  | -29  |
|         | 1050      |   | -6                                 | 2   | 6   | -4  | -8   | -14  | -30  | -36  |
|         | 1500      |   | -4                                 | 0   | 5   | -3  | -8   | -13  | -30  | -33  |
| VSD50-2 | 600       | 2   | 12                                 | 7   | 7   | -6  | -25  | -42  | -44  | -47  |
|         | 1050      |   | 10                                 | 3   | 8   | -9  | -25  | -37  | -42  | -47  |
|         | 1500      |   | 10                                 | 4   | 7   | -6  | -21  | -34  | -40  | -47  |
|         | 600       | 3   | 8                                  | 7   | 7   | -4  | -19  | -32  | -34  | -38  |
|         | 1050      |   | 5                                  | 4   | 8   | -7  | -18  | -28  | -32  | -37  |
|         | 1500      |   | 6                                  | 3   | 7   | -5  | -16  | -26  | -31  | -40  |
|         | 600       | 5   | 1                                  | 6   | 6   | -3  | -12  | -20  | -27  | -33  |
|         | 1050      |   | -2                                 | 3   | 7   | -4  | -11  | -18  | -29  | -34  |
|         | 1500      |   | 0                                  | 2   | 6   | -3  | -10  | -16  | -28  | -35  |
|         | 600       | 7   | -4                                 | 5   | 5   | -2  | -8   | -13  | -25  | -29  |
|         | 1050      |   | -7                                 | 2   | 5   | -4  | -7   | -13  | -30  | -34  |
|         | 1500      |   | -4                                 | 0   | 5   | -3  | -7   | -11  | -30  | -33  |

# Acoustic Data

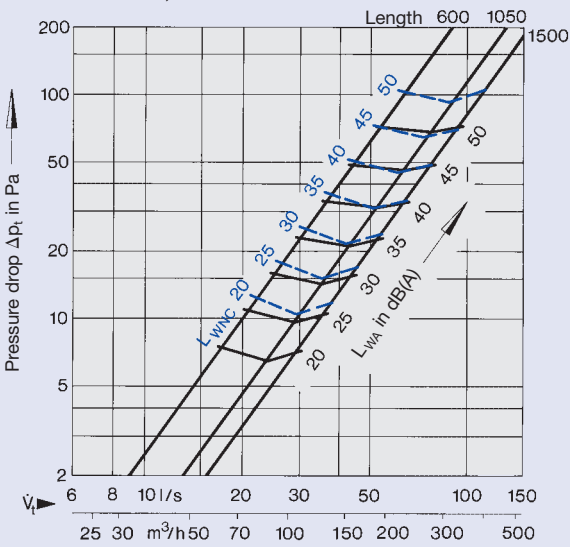
| Correction to diagram 1: Damper setting |                  |                          |       |       |                      |       |       |
|---|------------------|--------------------------|-------|-------|----------------------|-------|-------|
| D = 123 mm                              |                  | Air discharge horizontal |       |       | Air discharge angled |       |       |
| Damper angle                            |                  | 0°                       | 45°   | 90°   | 0°                   | 45°   | 90°   |
| L <sub>1</sub> = 600                    | Δp <sub>t</sub>  | x 1                      | x 1.2 | x 1.8 | x 1.7                | x 1.8 | x 2.6 |
|   | L <sub>WA</sub>  | -                        | + 1.0 | -     | + 7.0                | + 6.0 | -     |
|   | L <sub>WNC</sub> | -                        | + 1.0 | -     | + 8.0                | + 6.0 | -     |
| L <sub>1</sub> = 1050                   | Δp <sub>t</sub>  | x 1                      | x 1.4 | x 3.1 | x 1.6                | x 1.9 | x 3.6 |
|   | L <sub>WA</sub>  | -                        | + 1.0 | -     | + 5.0                | + 5.0 | -     |
|   | L <sub>WNC</sub> | -                        | + 1.0 | -     | + 6.0                | + 6.0 | -     |
| L <sub>1</sub> = 1500                   | Δp <sub>t</sub>  | x 1                      | x 1.5 | x 4.1 | x 1.4                | x 1.8 | x 4.3 |
|   | L <sub>WA</sub>  | -                        | + 1.0 | -     | + 4.0                | + 3.0 | -     |
|   | L <sub>WNC</sub> | -                        | + 1.0 | -     | + 5.0                | + 4.0 | -     |

| Correction to diagram 3: Damper setting |                  |                          |       |       |                      |       |       |
|---|------------------|--------------------------|-------|-------|----------------------|-------|-------|
| D = 158 mm                              |                  | Air discharge horizontal |       |       | Air discharge angled |       |       |
| Damper angle                            |                  | 0°                       | 45°   | 90°   | 0°                   | 45°   | 90°   |
| L <sub>1</sub> = 600                    | Δp <sub>t</sub>  | x 1                      | x 1.3 | x 2.0 | x 1.7                | x 2.0 | x 2.5 |
|   | L <sub>WA</sub>  | -                        | + 1.0 | -     | + 7.0                | + 7.0 | -     |
|   | L <sub>WNC</sub> | -                        | + 1.0 | -     | + 8.0                | + 8.0 | -     |
| L <sub>1</sub> = 1050                   | Δp <sub>t</sub>  | x 1                      | x 1.4 | x 3.2 | x 1.5                | x 1.8 | x 3.8 |
|   | L <sub>WA</sub>  | -                        | + 1.0 | -     | + 4.0                | + 4.0 | -     |
|   | L <sub>WNC</sub> | -                        | + 1.0 | -     | + 5.0                | + 5.0 | -     |
| L <sub>1</sub> = 1500                   | Δp <sub>t</sub>  | x 1                      | x 1.6 | x 4.4 | x 1.4                | x 1.9 | x 4.7 |
|   | L <sub>WA</sub>  | -                        | + 1.0 | -     | + 3.0                | + 3.0 | -     |
|   | L <sub>WNC</sub> | -                        | + 1.0 | -     | + 4.0                | + 4.0 | -     |

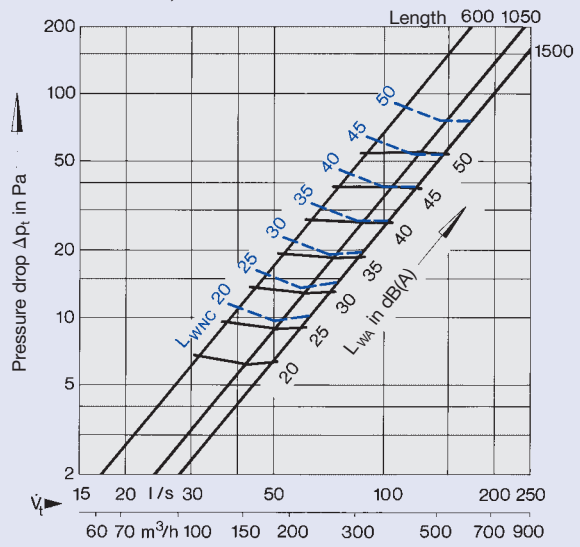
| Correction to diagram 2: Damper setting |                  |                          |       |       |                      |       |       |
|---|------------------|--------------------------|-------|-------|----------------------|-------|-------|
| D = 158 mm                              |                  | Air discharge horizontal |       |       | Air discharge angled |       |       |
| Damper angle                            |                  | 0°                       | 45°   | 90°   | 0°                   | 45°   | 90°   |
| L <sub>1</sub> = 600                    | Δp <sub>t</sub>  | x 1                      | x 1.1 | x 1.4 | x 1.6                | x 1.7 | x 1.9 |
|   | L <sub>WA</sub>  | -                        | -     | -     | + 6.0                | + 6.0 | -     |
|   | L <sub>WNC</sub> | -                        | -     | -     | + 5.0                | + 5.0 | -     |
| L <sub>1</sub> = 1050                   | Δp <sub>t</sub>  | x 1                      | x 1.3 | x 2.1 | x 1.7                | x 1.8 | x 2.5 |
|   | L <sub>WA</sub>  | -                        | + 1.0 | -     | + 6.0                | + 5.0 | -     |
|   | L <sub>WNC</sub> | -                        | -     | -     | + 6.0                | + 6.0 | -     |
| L <sub>1</sub> = 1500                   | Δp <sub>t</sub>  | x 1                      | x 1.3 | x 2.8 | x 1.5                | x 1.8 | x 3.2 |
|   | L <sub>WA</sub>  | -                        | + 1.0 | -     | + 5.0                | + 4.0 | -     |
|   | L <sub>WNC</sub> | -                        | + 1.0 | -     | + 5.0                | + 4.0 | -     |

| Correction to diagram 4: Damper setting |                  |                          |       |       |                      |       |       |
|---|------------------|--------------------------|-------|-------|----------------------|-------|-------|
| D = 198 mm                              |                  | Air discharge horizontal |       |       | Air discharge angled |       |       |
| Damper angle                            |                  | 0°                       | 45°   | 90°   | 0°                   | 45°   | 90°   |
| L <sub>1</sub> = 600                    | Δp <sub>t</sub>  | x 1                      | x 1.2 | x 1.8 | x 1.8                | x 1.9 | x 2.4 |
|   | L <sub>WA</sub>  | -                        | + 1.0 | -     | + 6.0                | + 7.0 | -     |
|   | L <sub>WNC</sub> | -                        | -     | -     | + 7.0                | + 8.0 | -     |
| L <sub>1</sub> = 1050                   | Δp <sub>t</sub>  | x 1                      | x 1.3 | x 2.8 | x 1.6                | x 1.8 | x 3.4 |
|   | L <sub>WA</sub>  | -                        | + 1.0 | -     | + 5.0                | + 5.0 | -     |
|   | L <sub>WNC</sub> | -                        | + 1.0 | -     | + 6.0                | + 6.0 | -     |
| L <sub>1</sub> = 1500                   | Δp <sub>t</sub>  | x 1                      | x 1.4 | x 3.6 | x 1.5                | x 1.8 | x 4.2 |
|   | L <sub>WA</sub>  | -                        | + 2.0 | -     | + 5.0                | + 4.0 | -     |
|   | L <sub>WNC</sub> | -                        | + 2.0 | -     | + 6.0                | + 5.0 | -     |

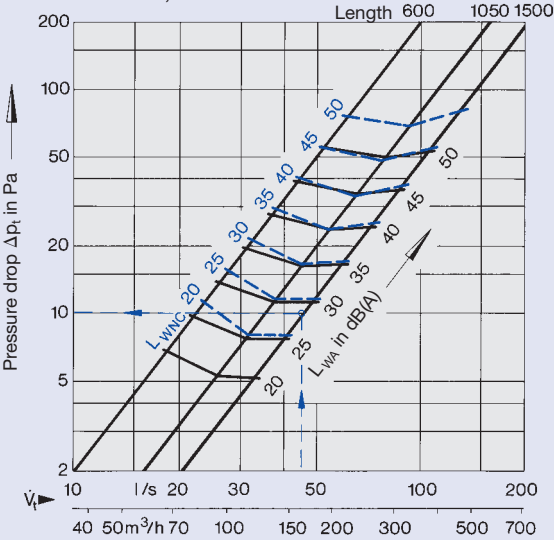
1 Sound power level and pressure drop VSD50-1; D = 123 mm



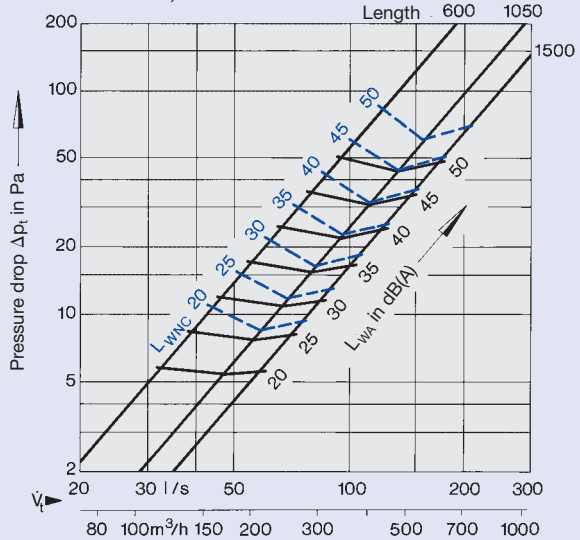
3 Sound power level and pressure drop VSD50-2; D = 158 mm



2 Sound power level and pressure drop VSD50-1; D = 158 mm



4 Sound power level and pressure drop VSD50-2; D = 198 mm

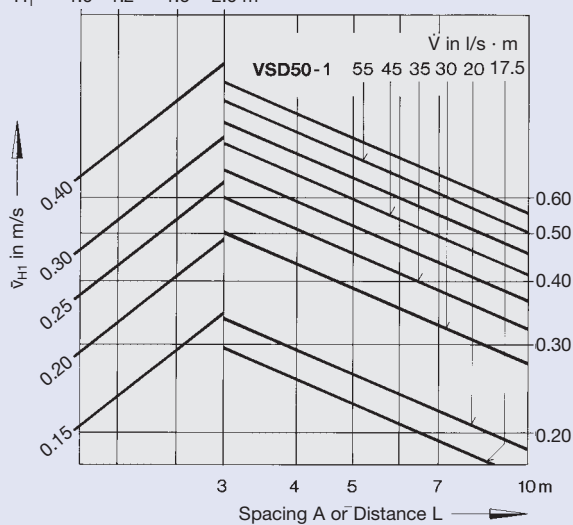


# Aerodynamic Data

Air Discharge: Horizontal, One or Two Directions

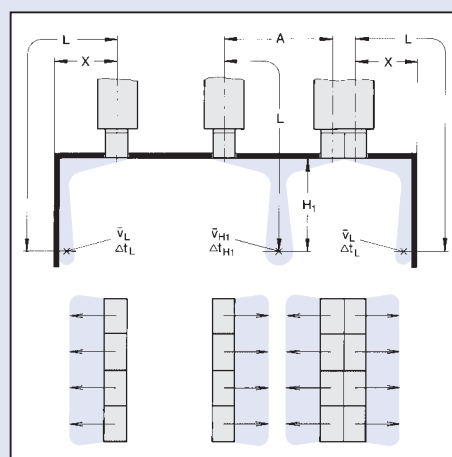
## 5 Air velocity between two diffusers and at wall

$H_1 = 1.0 \ 1.2 \ 1.6 \ 2.0 \text{ m}$



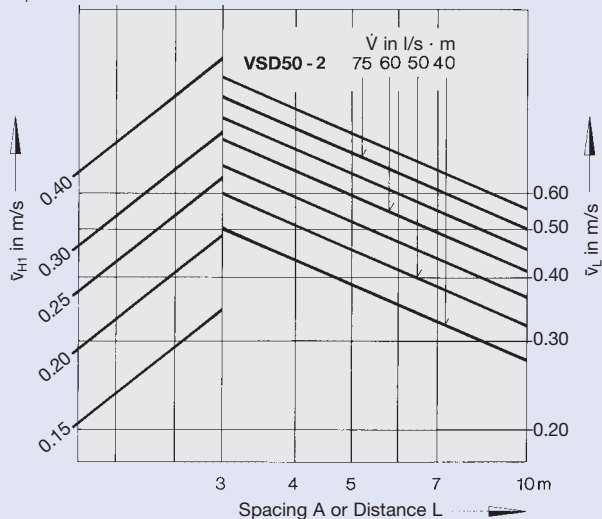
$$\dot{V} \text{ [m}^3\text{/h]} = \dot{V} \text{ [l/s]} \times 3.6$$

## Diffuser Layout

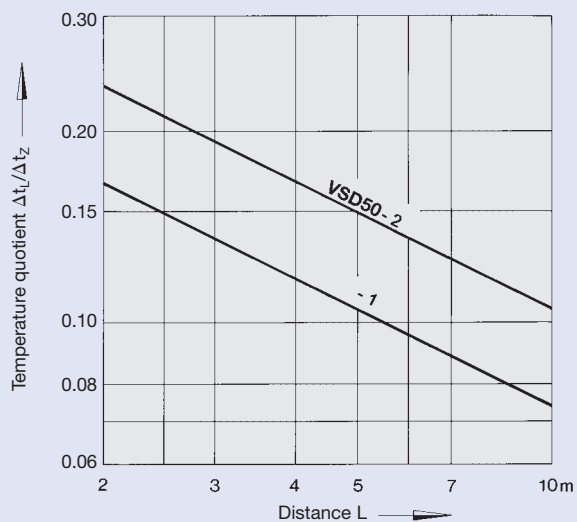


## 6 Air velocity between two diffusers and at wall

$H_1 = 1.0 \ 1.2 \ 1.6 \ 2.0 \text{ m}$



## 7 Temperature quotient



# Aerodynamic Data

## Air Discharge: Alternating Horizontal

### Example

Data given:

VSD50-1; air discharge: alternating horizontal

Volume flow per unit length  $\dot{V} = 30 \text{ l/s} \cdot \text{m}$

Supply air temperature differential horizontal, cooling  $\Delta t_z = -10 \text{ K}$

Spacing between diffusers  $A = 1.8 \text{ m}$

Distance between ceiling and occupied zone  $H_1 = 1.2 \text{ m}$

Distance between diffuser centre line and wall  $X = 2.4 \text{ m}$

Diagram 8:

$$\bar{v}_{H1} = 0.11 \text{ m/s}$$

Diagram 9:

$$L = X + H_1 = 2.4 + 1.2 = 3.6 \text{ m}$$

$$\bar{v}_L = 0.23 \text{ m/s}$$

Diagram 10:

$$L = A/2 + H_1 = 0.9 + 1.2 = 2.1 \text{ m}$$

$$\Delta t_L / \Delta t_z = 0.082$$

$$\Delta t_L = 0.082 \times (-10) \text{ K}$$

$$\Delta t_L = -0.82 \text{ K}$$

$$\text{At } L = X + H_1 = 3.6 \text{ m; } \Delta t_L / \Delta t_z = 0.062;$$

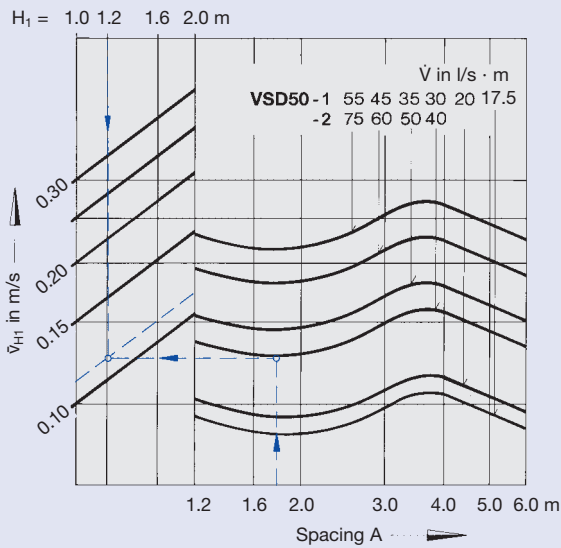
$$\Delta t_L \approx -0.6 \text{ K}$$

Air velocity between two diffusers

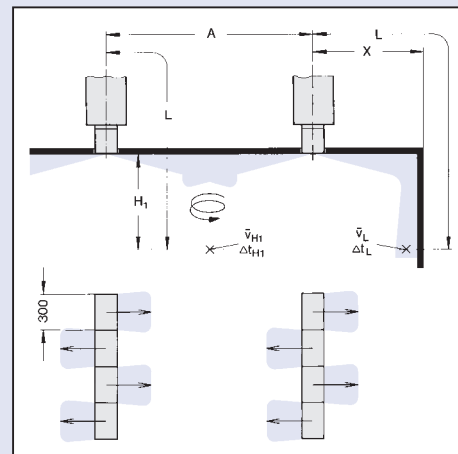
Air velocity at the wall

Temperature quotient

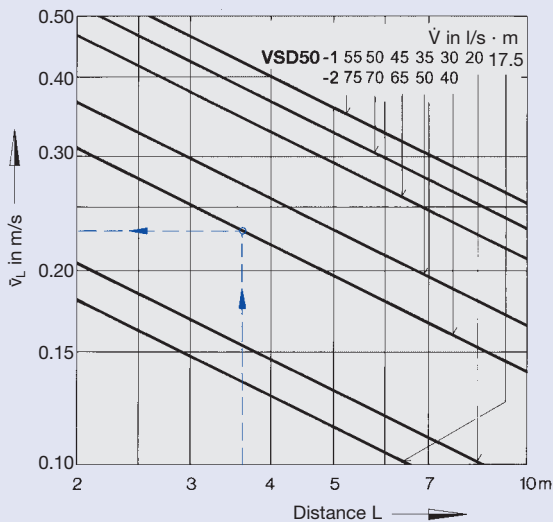
8 Air velocity between two diffusers



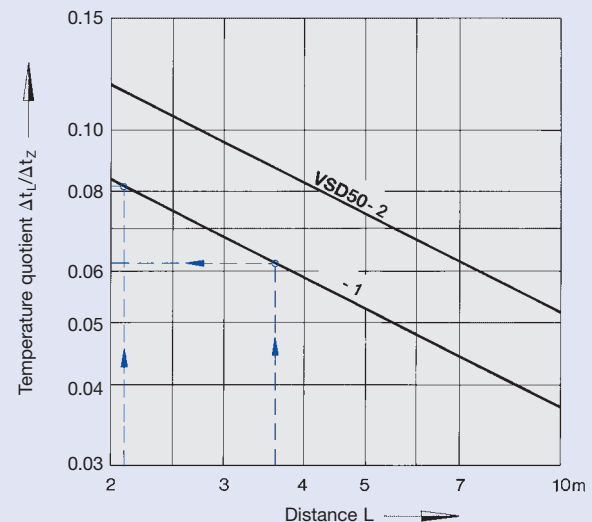
Diffuser Layout



9 Air velocity at the wall



10 Temperature quotient



# Aerodynamic Data

## Air Discharge: Alternating Angled

### Example

Data given:

VSD50-1; air discharge: alternating angled

Volume flow per unit length  $\dot{V} = 30 \text{ l/s} \cdot \text{m}$

Supply air temperature differential  $\Delta t_z = -8 \text{ K}$   
approx.  $+8 \text{ K}$

Spacing between diffusers  $A = 2.4 \text{ m}$

Distance between ceiling and occupied zone  $H_1 = 1.0 \text{ m}$

Diagram 11:  
 $\bar{v}_{H1} = 0.22 \text{ m/s}$

Air velocity

Diagram 12:  
Temperature quotient cooling

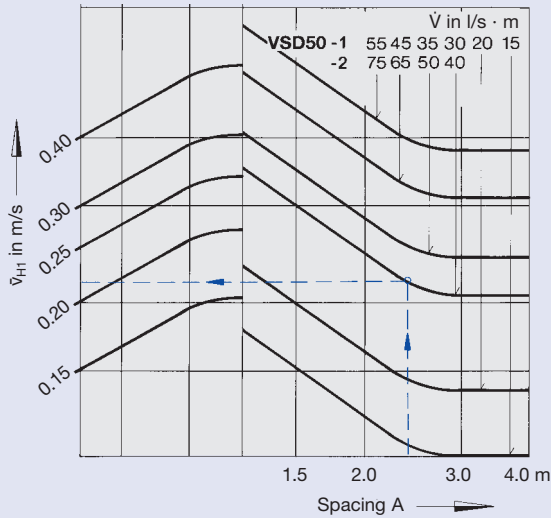
$\Delta t_{H1}/\Delta t_z = 0.057$   
 $\Delta t_{H1} = 0.057 \times (-8 \text{ K}) \approx -0.5 \text{ K}$   
For heating  $\Delta t_z = +8 \text{ K}$

Diagram 13:  
Maximum penetration depth for heating

$H_{1\text{max}} \approx 1.2 \text{ m}$

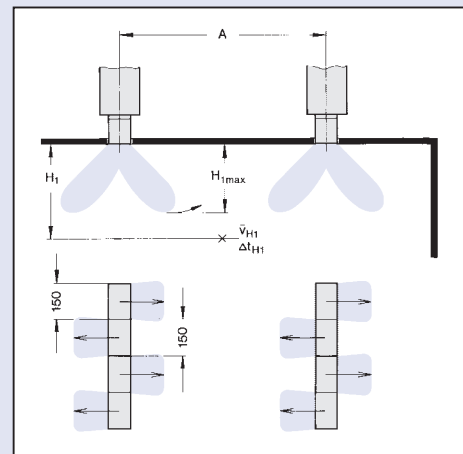
### 11 Air velocity

$H_1 = 1.0 \quad 1.2 \quad 1.6 \quad 2.0 \text{ m}$

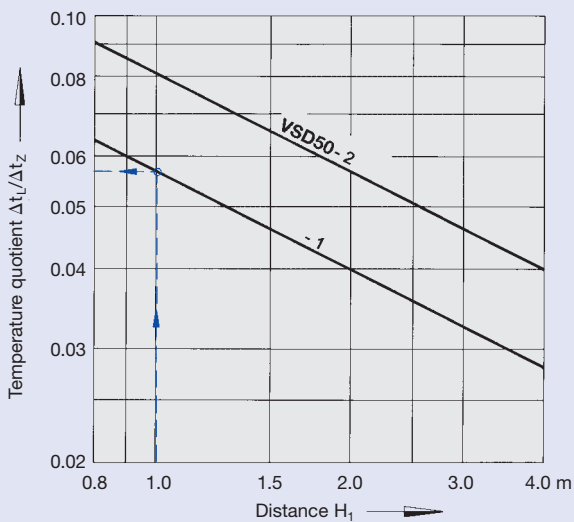


$$\dot{V} [\text{m}^3/\text{h}] = \dot{V} [\text{l/s}] \times 3.6$$

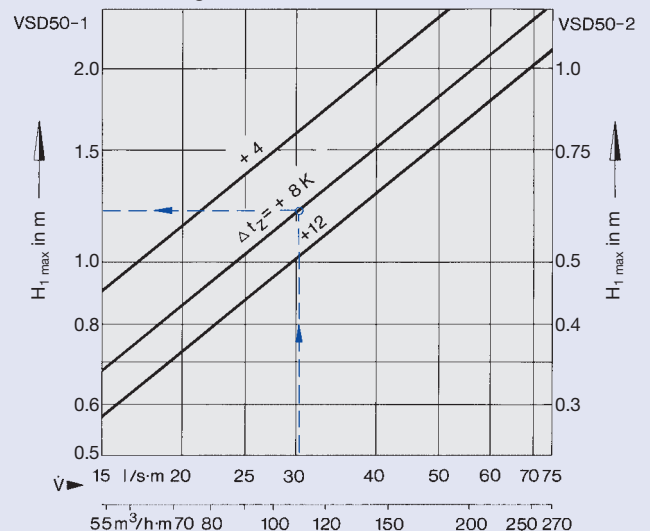
### Diffuser Layout



### 12 Temperature quotient – Cooling



### 13 Maximum penetration depth for heating



# Order Details

## Specification

Adjustable slot diffuser with aesthetically designed face section, suitable for installation in suspended ceiling systems, comprising the diffuser face in 1 to 4-slot configuration, optionally without edge flange NF or with integral edge flange FL. End caps either as end plates or end angles, with incorporated air control blades, which are set at the factory but can be adjusted by the user at any time to enable adaptation to the prevailing conditions. The slot diffuser has a variable neck length and the diffuser face can optionally be fitted to the plenum box on site.

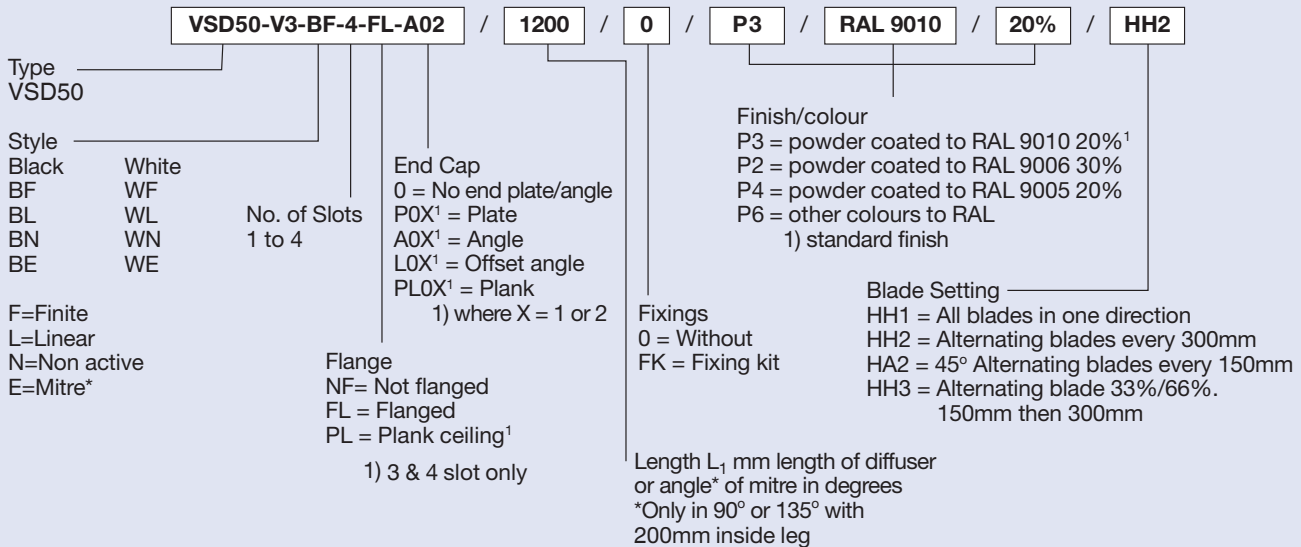
The plenum box is optionally available with an inner lining of 12 mm in thickness, with circular side entry spigot and four suspension points for suspension of the complete

assembly from the ceiling slab, optionally with volume control damper which is adjustable on the face of the diffuser.

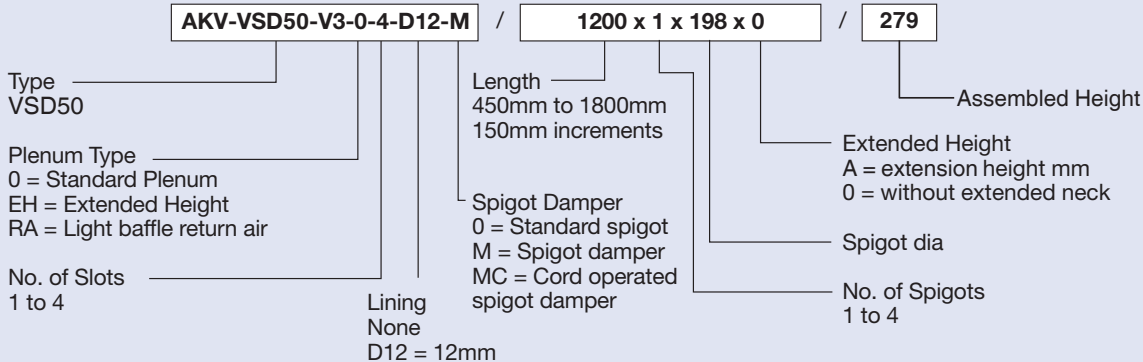
### Materials:

Diffuser face and end caps consist of extruded aluminium sections powder coated in RAL colours. The air control blades are produced in black plastic (polystyrene) as standard, similar to RAL 9005, or on request in white (similar to RAL9010). Plenum boxes are from formed pre galvanised sheet steel, optional spigot damper is pre galvanised perforated sheet steel. Plenum boxes can be internally lined with 12mm black faced foam with a class O rating.

## Order Code



## Order Code



## Order Example

Make: TROX  
 Diffuser Type: VSD50-V3-BF-4-FL-P02/1200/0/P3/RAL9010/20%/HH2  
 Plenum Type: AKV-VSD50-V3-0-4-D12-M/1200x1x198x0/0