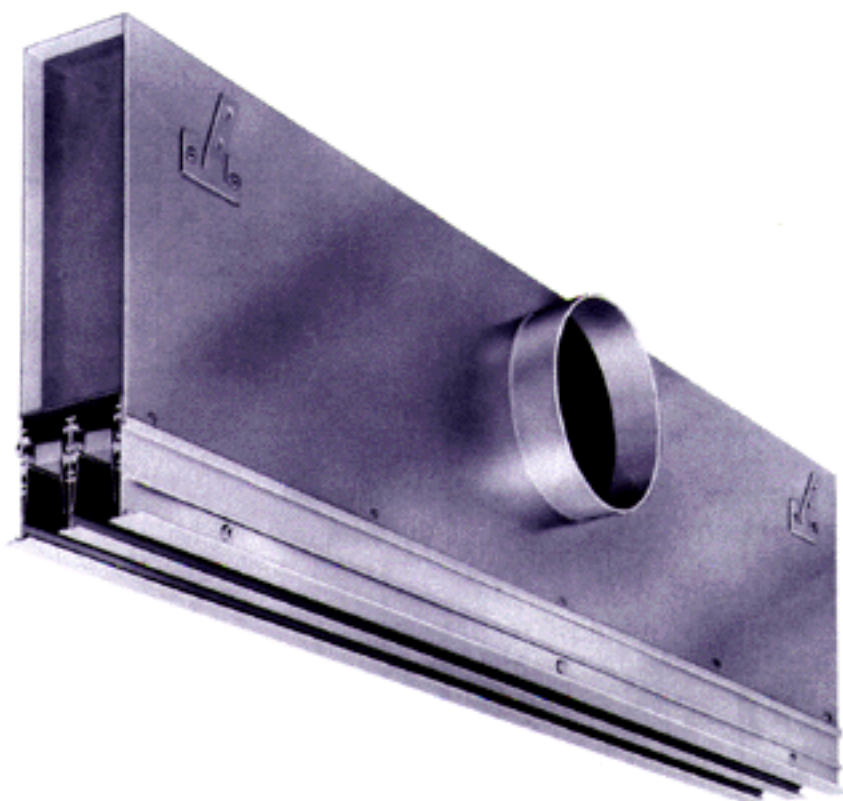


Slot Diffuser

Type ALS



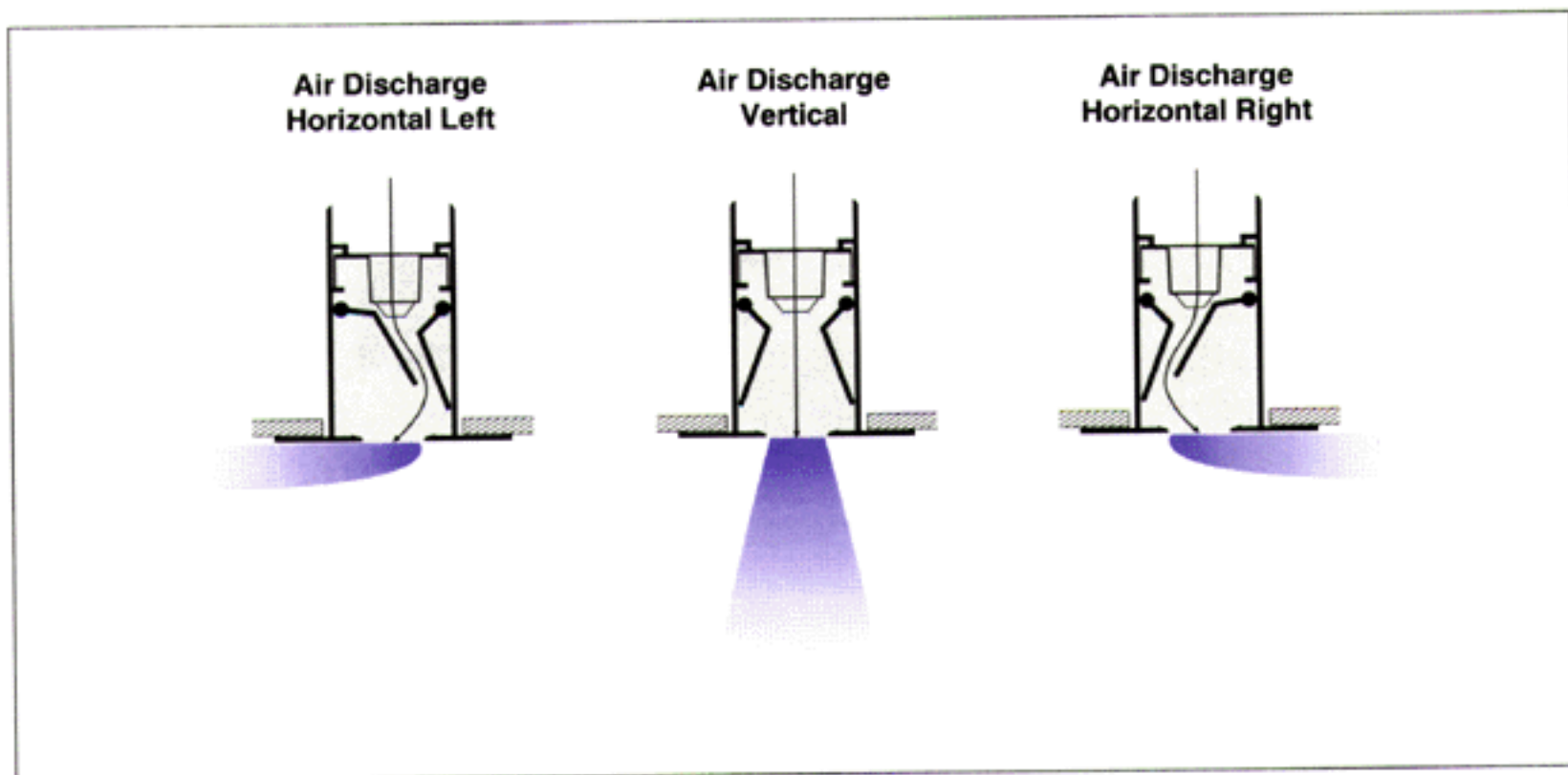
TROX[®] TECHNİK

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Contents · Description

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The Type ALS Slot Diffuser is available with 1-6 slots. The diffuser face is attractively designed with extruded aluminium sections. The ALS can be used in rooms with heights from approximately 2.60m to 4.00m for supply or extract air. Maximum recommended supply air temperature differential is 10K. The slot diffuser provides a stable discharge and can be used for constant or variable volume air flows.

Air flow rate control is provided by an integral flow straightener and hit and miss damper adjustable from the diffuser face. In the supply mode the discharge can either be set to horizontal or vertical directions by adjustment of the air deflection blades. For stable horizontal discharge a continuous flat ceiling is normally required.

Construction · Dimensions

Construction

Type ALS-DS

Supply slot diffuser with integral air straightener and hit and miss volume control damper ② and complete with air deflection blades ①. The damper is adjustable from the diffuser face to min 25% setting.

Type ALS-NA

Non-active section as type ALS-S but with a blanking plate replacing the volume control.

Type ALS-S

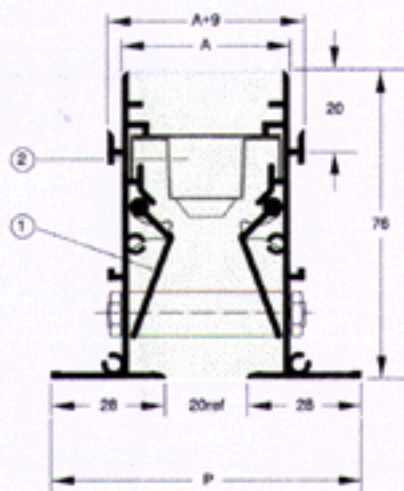
Extract slot diffuser with hit and miss volume control damper ② only no air deflection blades. The damper is adjustable from the diffuser face.

	No. of Slots (n)					
	1	2	3	4	5	6
A (mm)	41.0	80.5	120.0	159.5	199.0	238.5
P (mm)	76.0	115.5	155.0	194.5	234.0	273.5

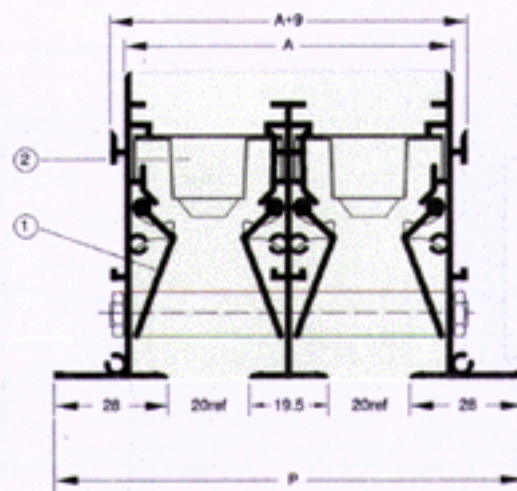
*P' dimension tolerances ± 1.5

Standard Lengths L_1
1200
1500
1800
2100

Type ALS-DS-1

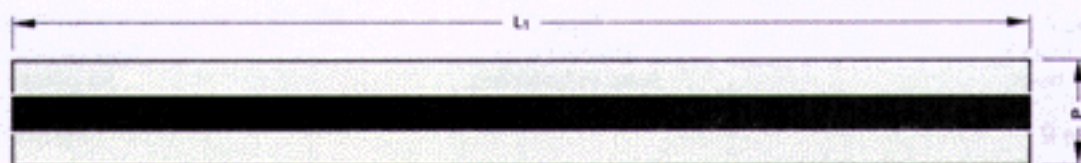


Type ALS-DS2-2...-6



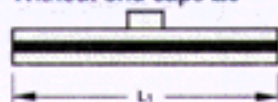
- ① Air deflection blades.
- ② Integral air straightener and hit and miss damper.

Front Face

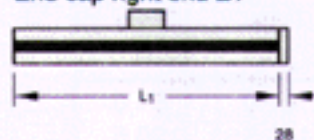


End Caps:

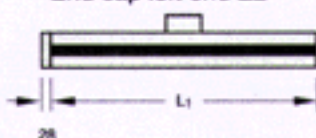
Without end caps Z0



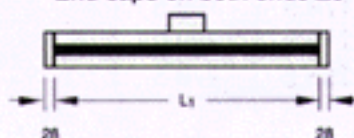
End cap right end Z1



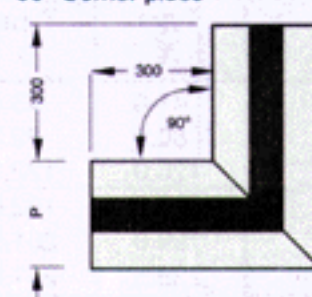
End cap left end Z2



End caps on both ends Z3



90° Corner piece



Construction · Dimensions

Plenum Boxes

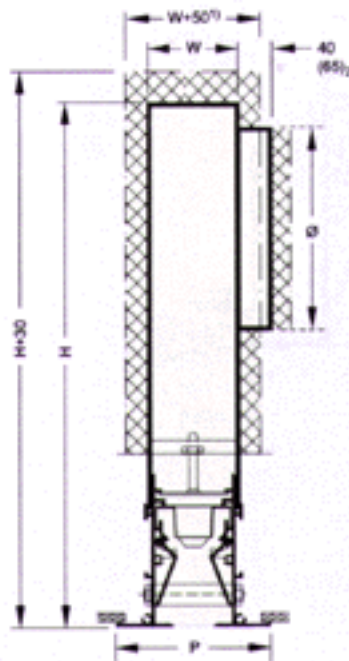
Plenum boxes with alternative types of fixing. Depending on the fixing requested slot diffusers and plenum boxes are either installed as an assembly Type A, or for Type B, C and D the plenum box is firstly installed with the slot diffuser being fitted as a second fix. See page 5 for details of installation, details of

slot / plenum assemblies. Note, all plenum boxes are supplied with hanging brackets.

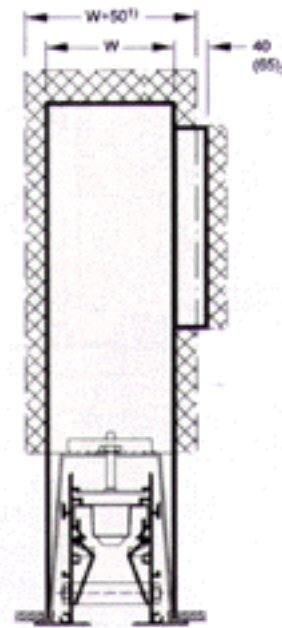
Plenum boxes can as an option be fitted with internal acoustic lining. Type designation becomes A1....D1.

Number of Slots	Up to Length L ₁ (mm)							
	1200		1500		1800		2100	
	Ø	H	Ø	H	Ø	H	Ø	H
1	158	300	158	300	198	300	198	300
2	198	300	198	300	248	350	248	350
3	248	350	248	350	313	450	313	450
4	313	350	313	450	398	500	398	500
5	313	500	313	500	398	500	398	500
6	398	500	398	500	398	500	398	500

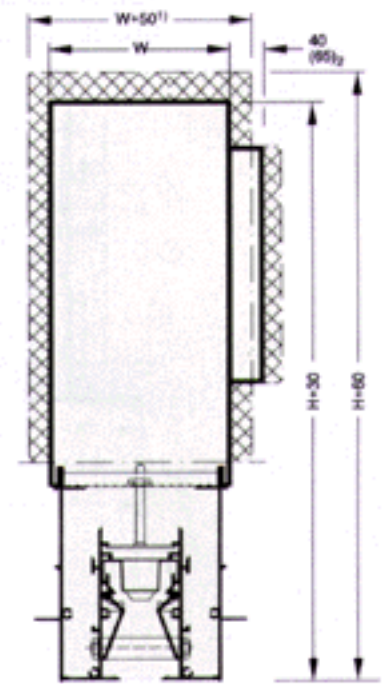
Plenum Boxes



Type A
Plenum fixed to diffuser neck.



Type C
Bracket type snap-in fastening.



Type D
Special fixing sub-frame for plaster ceilings.

Type B
Removable diffuser with screw fix to bridge piece.

Slots	Plenum Width W (mm)			
	Type A	Type B	Type C	Type D
1	41.0	43.0	61.0	81.0
2	80.5	82.5	100.5	120.5
3	120.0	122.0	140.0	160.0
4	159.5	162.0	179.5	199.5
5	199.0	201.5	219.0	239.0
6	238.5	241.0	258.5	278.5

Note : Outline shows optional plenum

1) Width of plenum with 25mm lining

2) Spigot length = 65mm to D₁ construction

Installation

ALS Slot Diffuser can be supplied for continuous linear runs. Face alignment of individual slot sections is achieved by fitting alignment pins ⑤ in the locations at the rear of the face flanges.

Standard Supply

For slots without endcaps (Z0, Z1 and Z2) items ④ and ⑤ are provided.

Note :

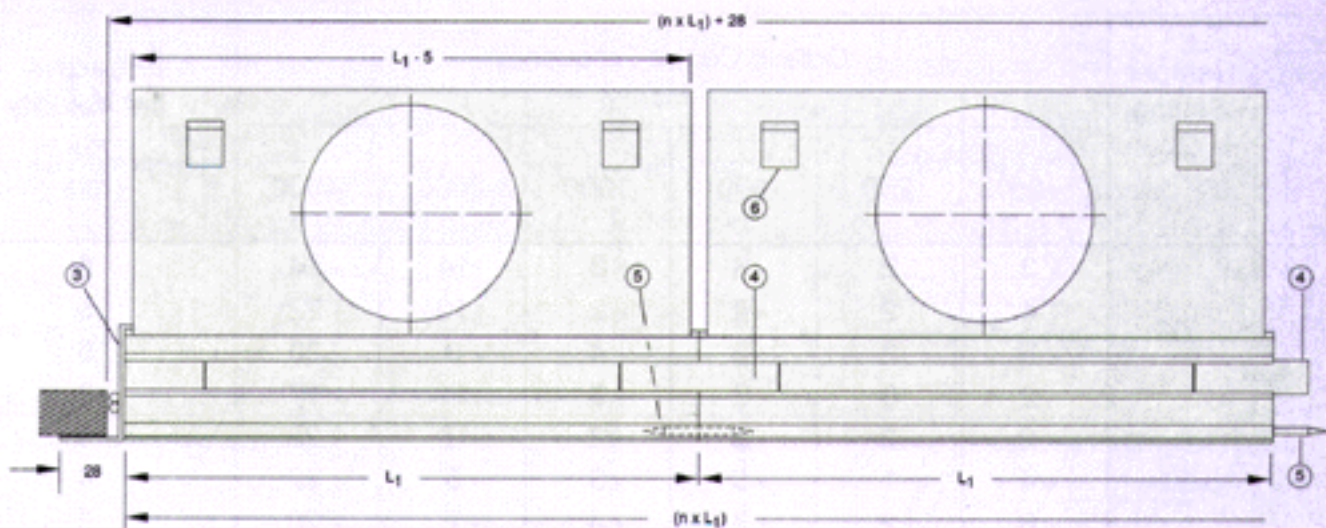
Slot only hanging bracket ⑦ supplied only on request

Dimensions

Number of Slots	A	B	C	D
1	41.0	76.0	58.0	61.0
2	80.5	115.5	97.5	100.5
3	120.0	155.0	137.0	140.0
4	159.5	194.5	176.5	179.5
5	199.0	234.0	216.0	219.0
6	238.5	273.5	255.5	258.5

Continuous Installation

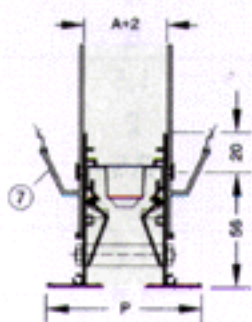
Without end caps and plenum boxes



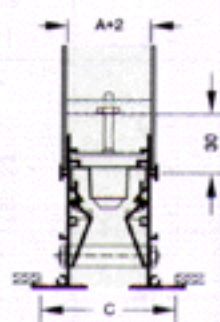
- ③ End Caps
- ⑥ Plenum Hanging brackets
- ⑦ Slot Hanging Brackets (Z4)
- ④ Top alignment piece
- ⑤ Border alignment pins

n = number of individual sections of length L₁

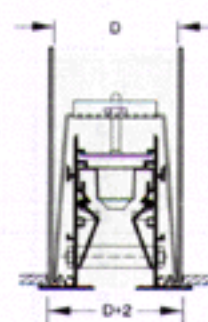
Slot Plenum Fixings



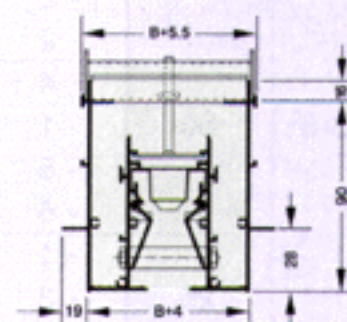
Type A
Standard fixing arrangement.



Type B
Bridge type screw fastening



Type C
Bracket type snap-in fastening



Type D
Special fixing sub-frame for plastered ceilings.

Acoustic Data : Spectra

Example

Data given : -

ALS-DS2 Horizontal Discharge

Slot Length $L_1 = 1500\text{mm}$

Total volume flow $V_T = 84 \text{ l/s}$

Required :

- Room NC level L_{pNC} of regenerated noise damper 100% open.
- Octave band sound power level of regenerated noise L_W damper 50% open.

$$V_s = 28 \text{ l/s} \cdot \text{m} \cdot \text{slot}$$

Diagram 1 : Sound Power Level and Pressure Drop.

- $\Delta p_t = 15\text{Pa}$
 $L_{WNC} = 26 + 3 = 29$
 Take 8dB room attenuation
 $L_{pNC} = 29 - 8 = 21$
- $\Delta p_t = 30\text{Pa}$
 $L_{WA} = 38 + 3 = 41$
 Effective Jet Velocity v_{eff}

$$v_{eff} = \frac{v_t}{n \cdot S_{eff} \cdot L_1 \cdot 1000} = \frac{84}{2.007 \cdot 1.5 \cdot 1000} = 4 \text{ m/s}$$

Octave Band Centre Frequency in Hz	125	250	500	1000	2000	4000
L_{WA} in dB (A)	41	41	41	41	41	41
ΔL in dB	-4	1	-3	-3	-8	-22
L_W in dB damper 50% open	37	42	38	38	33	19

Relative Spectra ΔL

Type	Damper Setting % Open	Octave Centre Frequency Hz						Effective Jet Velocity v_{eff} m/s
		125	250	500	1000	2000	4000	
ALS-DS	100	-3	2	-3	-3	-14	-24	4
		-4	2	-2	-2	-10	-22	5
		-5	2	-3	-4	-9	-20	6
		-2	0	-2	-3	-11	-17	8
	50	-2	2	-3	-2	-10	-22	3
		-4	1	-3	-3	-8	-22	4
		-6	-2	-4	-4	-7	-20	5
		-7	-1	-4	-4	-5	-15	6
	25	-2	1	-4	-2	-10	-24	2.5
		-4	0	-4	-3	-8	-22	3
		-5	-1	-4	-3	-7	-18	4
		-8	-2	-5	-4	-4	-16	5
ALS-S	100	4	4	-4	-12	-	-	2
		-2	2	-5	-11	-18	-	3
		-2	4	-2	-6	-11	-21	4
		2	5	1	-3	-5	-16	5
	50	4	4	-1	-11	-	-	1.5
		-1	3	-3	-8	-17	-	2
		-5	2	-2	-5	-11	-23	2.5
		-6	1	-2	-4	-9	-20	3
	25	-1	-1	-3	-4	-15	-	1.2
		-3	-1	-4	-4	-14	-	1.4
		-5	-3	-4	-4	-13	-23	1.6
		-6	-2	-4	-5	-9	-22	1.8

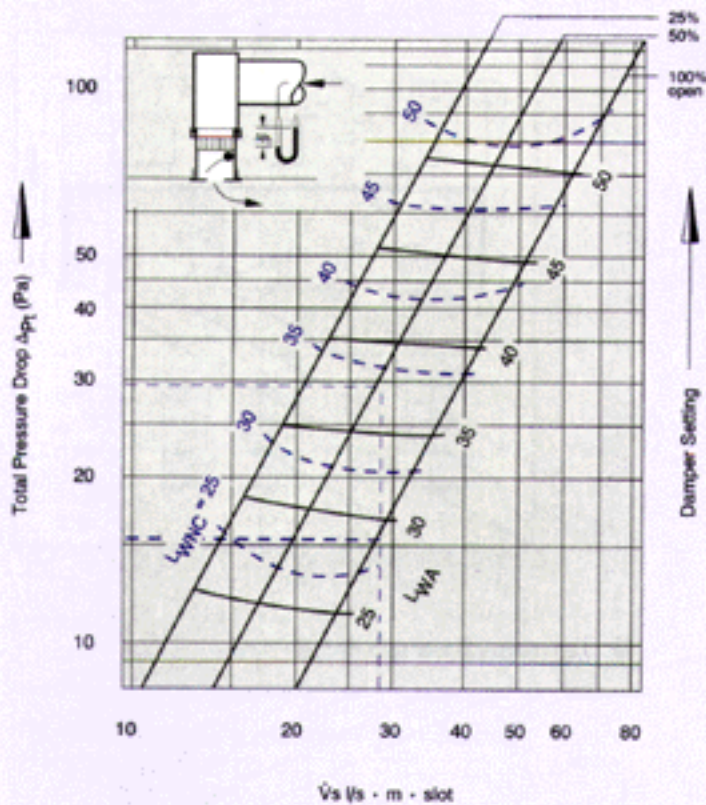
Acoustic Data

Acoustic Data

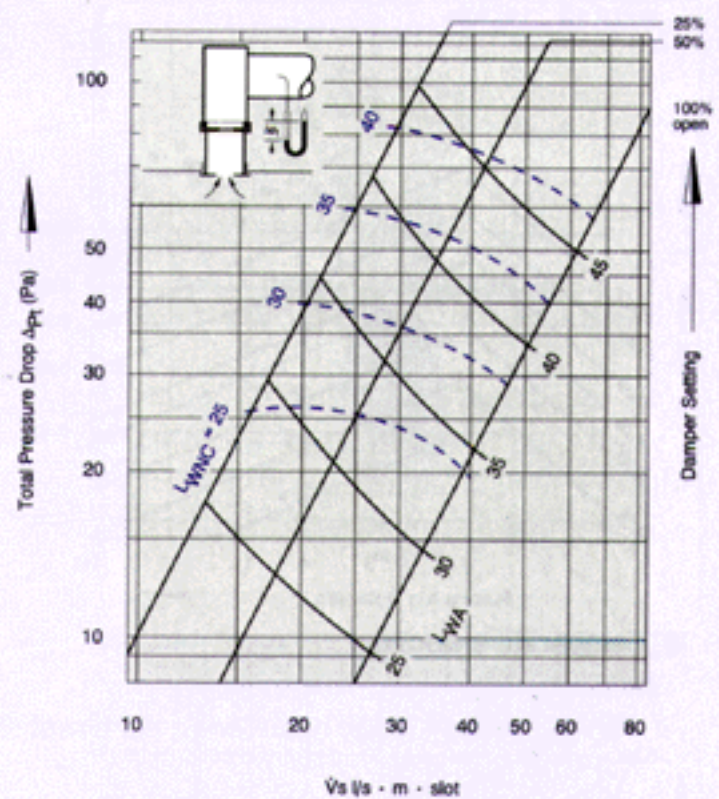
All acoustic data has been referred to a single slot 1500mm long plenum. Corrections for other configurations are tabulated.

Number of Slots n	Plenum Box Length			
	1200	1500	1800	2100
1	- 1	0	+ 1	+ 2
2	+ 2	+ 3	+ 4	+ 5
3	+ 4	+ 5	+ 6	+ 7
4	+ 5	+ 6	+ 7	+ 8
5	+ 6	+ 7	+ 8	+ 9
6	+ 7	+ 8	+ 9	+ 10

1 ALS-DS Supply



2 ALS-S Extract



Nomenclature · Aerodynamic Data

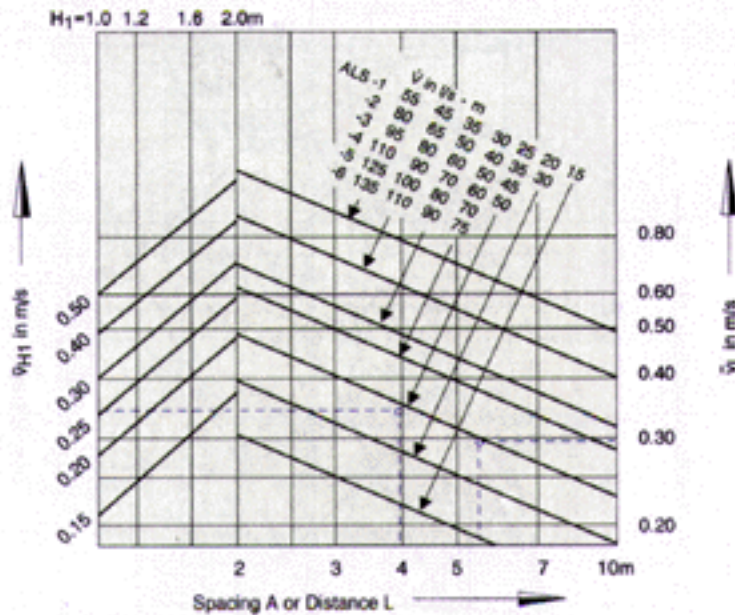
Air Discharge : Horizontal

Nomenclature

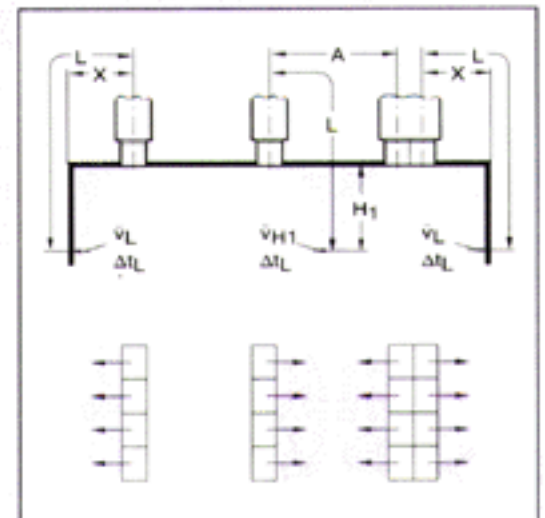
V_T	in l/s	: Total volume flow per diffuser.
V	in l/s m	: Volume flow per unit length.
V_S	in l/s.m.slot	: Volume flow per slot per unit length.
A	in m	: Spacing between two diffusers.
H_1	in m	: Distance between ceiling and occupied zone.
$H_1 \text{ max}$	in m	: Maximum penetration depth when heating.
L	in m	: Distance from diffuser $L = A/2 + H_1$ $L = X + H_1$
n		: Number of slots.
S_{eff}		: Effective slot width.
\bar{v}_{H1}	in m/s	: Time average air velocity between two diffusers at distance H_1 from the ceiling.
\bar{v}_L	in m/s	: Time average air velocity at the wall at distance L .
v_{eff}	in m/s	: Effective jet velocity.
Δt_z	in K	: Temperature difference between supply air and room air.

Δt_L	in K	: Difference between core temperature and room temperature at distance L .
Δt_{H1}	in K	: Difference between core temperature at distance H_1 and room temperature.
Δp_t	in Pa	: Total Pressure Drop.
L_{WA}	in dB(A)	: A weighted sound power level.
L_{WNC}		: NC rating of sound power level.
L_{WNR}		: NR rating of sound power level $L_{WNR} = L_{WNC} + 2$.
L_{PA}, L_{PNC}		: A weighting and NC rating respectively of room sound pressure level $L_{PA} \approx L_{WA} - 8\text{dB}$ $L_{PNC} \approx L_{WNC} - 8\text{dB}$
ΔL	in dB/Oct	: Relative level with respect to L_W .
L_W	in dB/Oct	: Octave band sound power level of regenerated noise $L_W = L_{WA} + \Delta L$.

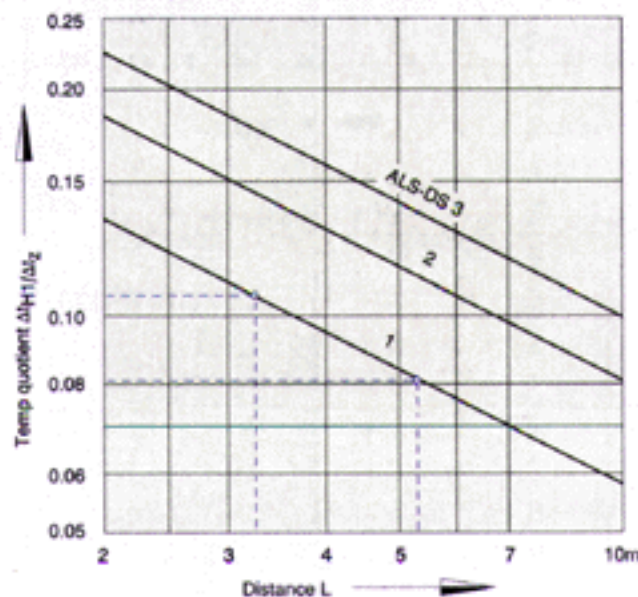
3 Air Velocity between two diffusers and at the wall



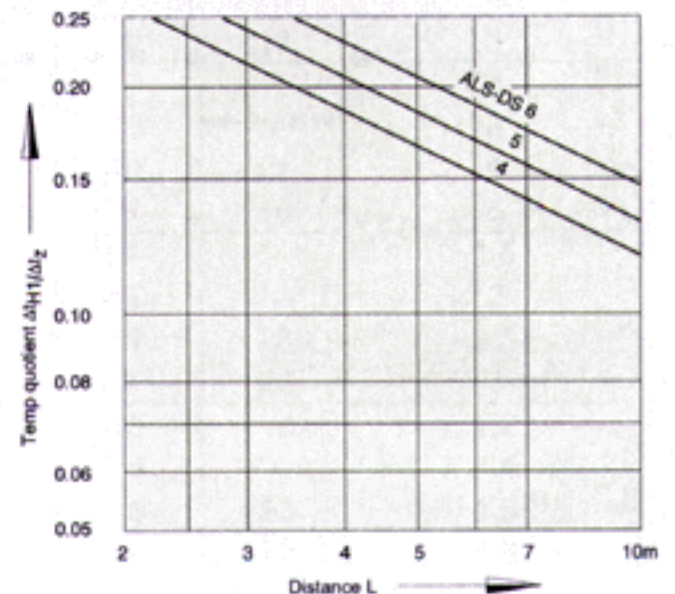
Diffuser Layout



4 Temperature quotient



5 Temperature quotient



Aerodynamic Data

Air Discharge : Vertical

Example

Data Given :-

Type ALS-DS1 and ALS-DS2, horizontal discharge.

Volume flow per slot $V_S = 25 \text{ l/s} \cdot \text{m}$

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

Spacing between diffusers $A = 4\text{m}$

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

Distance between diffuser centre line and wall $X = 4\text{m}$

Diagram 3 : Air Velocity between the two diffusers.

$$\bar{V}_{H1} = 0.21 \text{ m/s}$$

Diagram 3 : Air Velocity at the wall.

$$L = X + H_1 = 4 + 1.2 = 5.2\text{m}$$

$$\bar{V}_L = 0.3 \text{ m/s}$$

Diagram 4 : Temperature quotient.

$$L = A/2 + H_1 = 2 + 1.2 = 3.2\text{m}$$

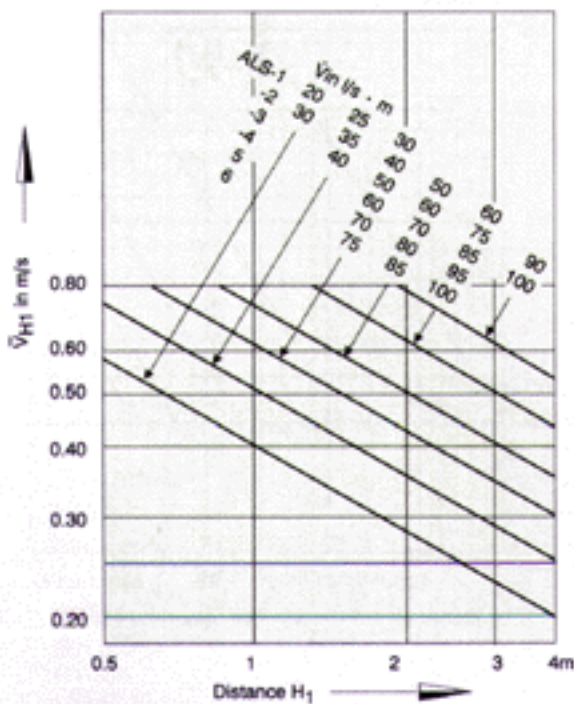
$$\Delta t_L / \Delta t_z = 0.11$$

$$\Delta t_L = 0.11(-10)$$

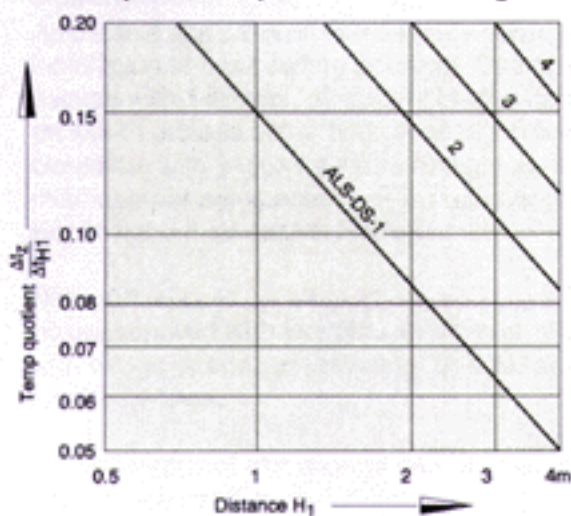
$$\Delta t_L = -1.1\text{K}$$

$$L = X + H_1 = 5.2\text{m}; \Delta t_L / \Delta t_z = 0.080; \Delta t_L = 0.8\text{K}$$

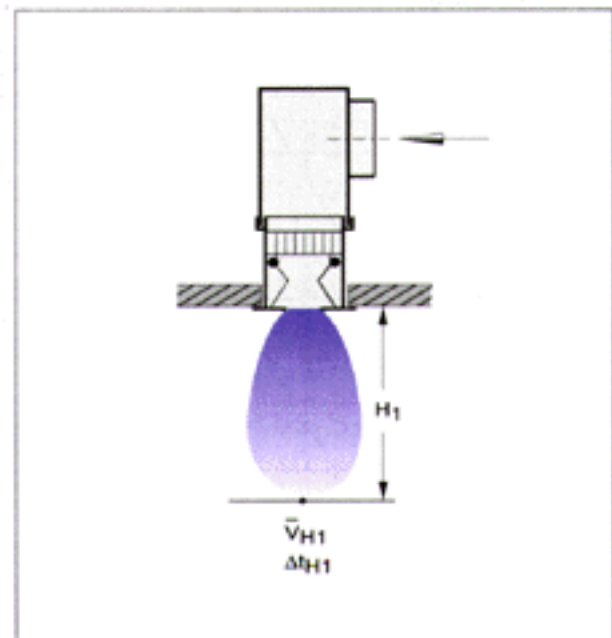
6 Air Velocity below diffuser Isothermal and $\Delta t_z = -5\text{K}$



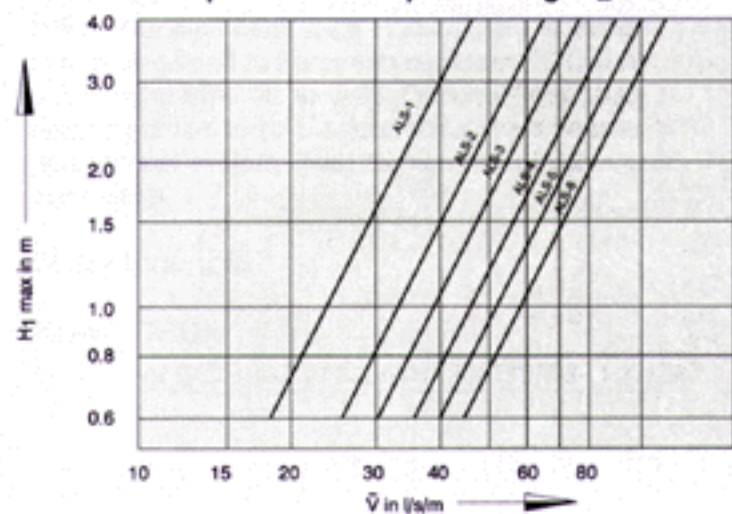
7 Temperature quotient for cooling



Diffuser Layout



8 Maximum penetration depth heating $\Delta t_z + 5\text{K}$



Aerodynamic Data

Effective Jet Velocity

V_t in l/s

$$v_{\text{eff}} = \frac{V_t}{S_{\text{eff}} \cdot L \cdot n \cdot 1000}$$

Volume Flow Measurement

The volume flow can be determined by measuring the air velocity using a pitot tube.

The measurement of air velocity should be made as indicated in figures 1 or 2 at a number of positions along the slot length to determine a value of $v_{\text{eff mean}}$.

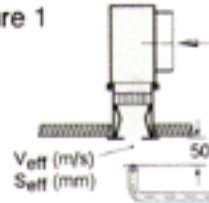
The volume flow is then calculated as follows

$$V_t \text{ (l/s)} = v_{\text{eff mean}} \cdot S_{\text{eff}} \cdot L \cdot n \cdot 1000$$

Effective Slot Width S_{eff}

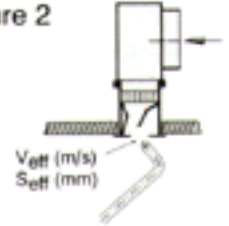
	Air Discharge Horizontal	Air Discharge Vertical
S_{eff} mm	0.007	0.016

Figure 1



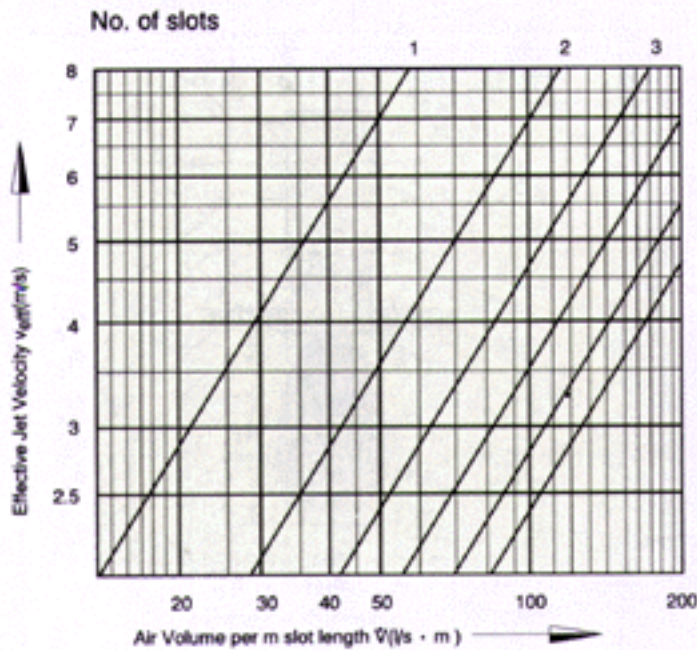
Vertical Air Discharge

Figure 2

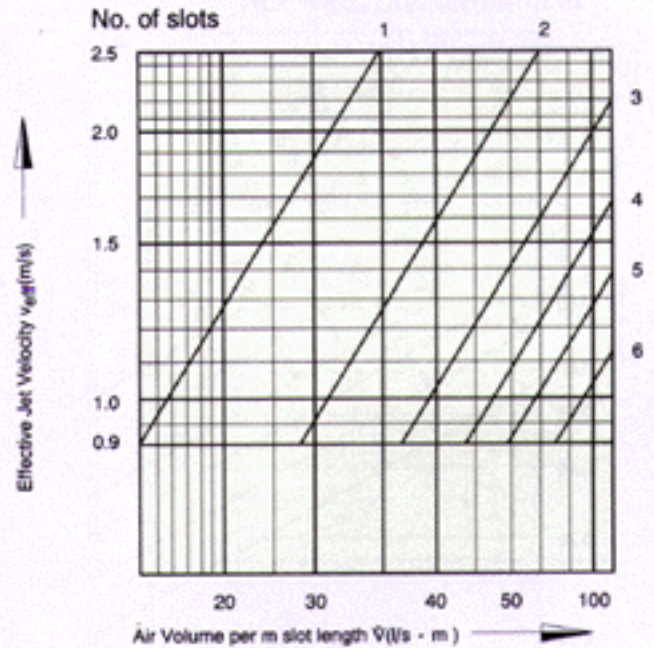


Horizontal Air Discharge

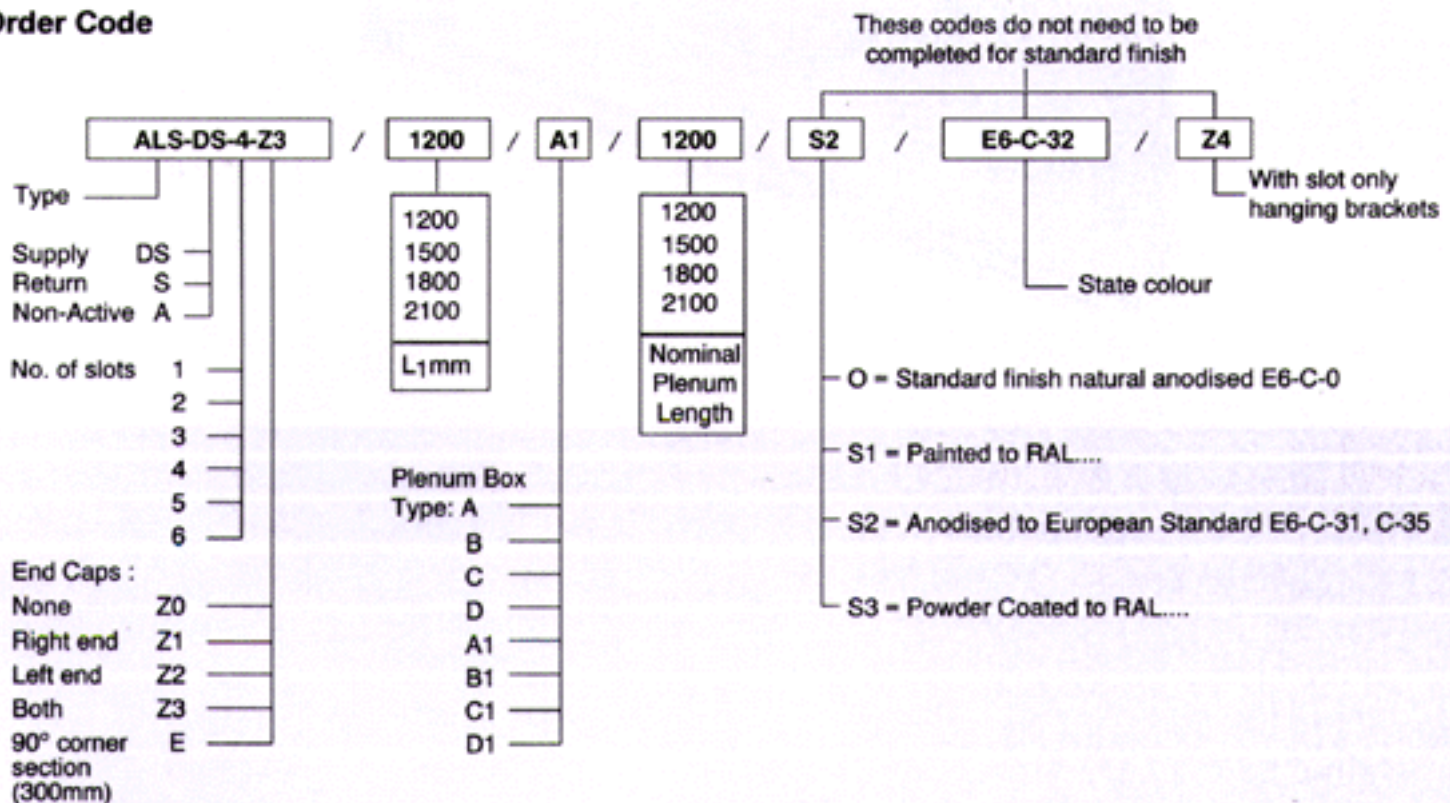
9 Horizontal Air Discharge



10 Vertical Air Discharge



Order Code



Specification Text

Adjustable slot diffuser with flat face suitable for installation in false ceiling systems. Comprising face section with 1-6 slots, air control blades can be adjusted on site to provide either horizontal or vertical discharge. Complete with integral air flow straightener and hit and miss damper adjustable from the diffuser face. Extract slot is without air control blades.

Slots diffusers to be with/without end caps. Plenum boxes supplied with slot diffuser fitted or supplied loose with bridge or snap in fastening. Special assembly for plaster ceilings.

Linear lengths of slot aligned with special fixing fitted to rear of face section.

Materials

Diffuser face and end caps in aluminium extrusion natural anodised to European standard E6-C-0 or anodised to E6-C-31 to C-35. Optional finish, face section painted to RAL colour using stove enamel or powder coat system. Rear plenum box of galvanised sheet steel.

Order Example

Make : TROX

Type : ALS-DS-4-Z3/1200/A1/1200/S2/E6-C-32/Z4