Slot Diffusers

Type ESD

ESD Slot Diffuser can be provided

- With multiple slots, ranging from 1 to 8 slots
- Ultilised for either supply or return air application
- Suitable for cooling with a temperature differential of -10K.
- Fitted with an air control blade that is manually adjusted to discharge the supply air either to the right or the left

General Information

Description

This Type ESD slot diffuser is made from extruded aluminum sections with multiple slots ranging from 1 to 8 slots. Each slot is fitted with an adjustable air control blade to direct the supply air either to the left or right of the slot diffuser. The face of the diffuser will be powder coated in matt white to RAL 9010 as standard supply and the sir control blade will be in black to RAL 9005. If required, the plenum box can be supplied with this slot diffuser. The plenum is made from galvanized sheet steel.

As optional extras, the following options can be provided with the plenum box:

a. Internal Thermal Insulation:
Two available options for fire retardant thermal insulation materials are either;

- 6 mm thk. rubber foam lining
- 25 mm thk. fibre glass lining
- 6mm thick PE foam

b. Volume control damper that is adjustable from the diffuser face and is designed to minimize regenerated noise The plenum box will be fitted with supporting brackets to allow the plenum box to be hung from the ceiling together with the slot diffuser.

Description

Air discharge options

When there are more than four (4) slots on the diffuser, it is recommended that to set only a maximum of four (4) slots to discharge air in one direction and, the remaining slot(s) should discharge in the opposite direction

Figure 1: Horizontal discharge to the right

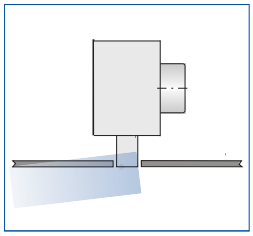


Figure 2 : Horizontal discharge to the left

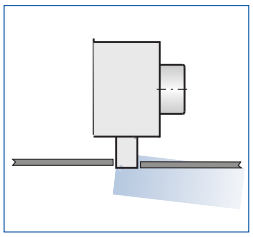
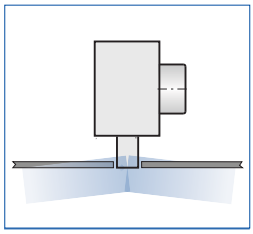


Figure 3 : Horizontal discharge to the left and right



Construction

The Type ESD Slot Diffuser is made from extruded aluminium sections with adjustable air control blade to each slot to direct the supply air to either side of the diffuser face.
As optional extras, this slot diffuser can be supplied with;

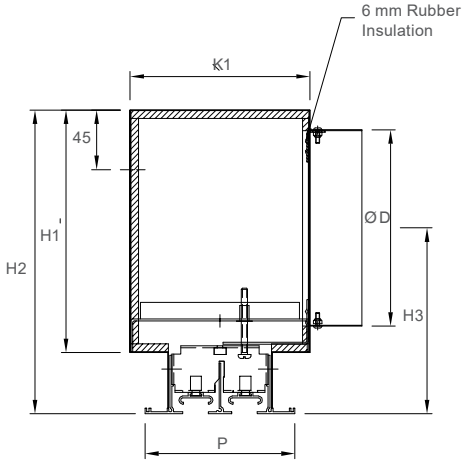
- Plenum box with circular inlet spigot(s) mounted to the rear of the diffuser or,
- Plenum box with volume control damper to each inlet spigot.

Refer to the Table 1 below for further details. The air control blades in the diffuser can manually and individually set to discharge air horizontally either to the left, the right, or in both directions, as shown page 3.

Table 1 : Number and size of the Inlet Spigot Connections

Length of Slof Diffuser, L1	No. of Inlet Spigot and Spigot Diameter, Ø D (mm)							
	ESD-1	ESD-2	ESD-3	ESD-4	ESD-5	ESD-6	ESD-7	ESD-8
600	1 x 123 Ø	1 x 148 Ø		1 x 198 Ø	1 x 248 Ø			
900								
1200								
1500								
2000	2 x 123 Ø	2 x 148 Ø		2 x 198 Ø	2 x 248 Ø			

Type ESD-1….8–AK-M-I1



Type ESD-1….8–AK-M-I2

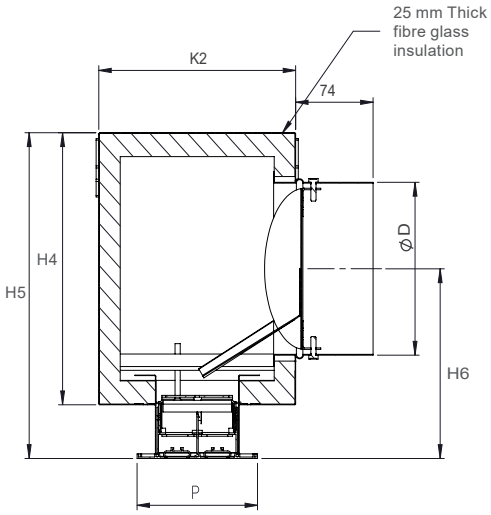


Table 2 : Dimensions

No. of slots 'n'	E	H_1	H_2	H_3	H_4	H_5	H_6	K_1	K_2	P
1	38	158	204	127.5	208	254	152.5	100	150	77
2	76	183	229	140	233	279	165	138	188	115
3	114	200	246	148.5	250	296	173.5	176	226	153
4	152	233	279	165	283	329	190	214	264	192
5	190	283	329	190	333	379	215	235	285	230
6	228							273	323	268
7	266							312	362	306
8	304							350	400	344

Installation and fixing details

This slot diffuser is designed to be installed to suspended ceiling. It is also suitable to be used as a linear slot diffuser.

Support brackets will be provided to the plenum box to allow the plenum box and the diffuser, to be hung from the ceiling with drop rods fitted to structural members in the ceiling by others.

Materials

The face of the diffuser and the air control blades are made from extruded aluminum sections. The face will be powder coated in matt white to RAL 9010 and, the air control blades will be in black to RAL 9005

Figure 5: Type ESD-1….8

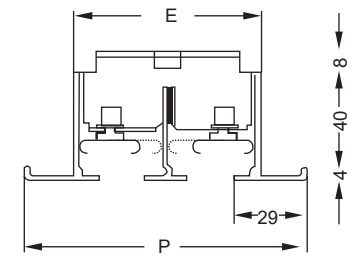
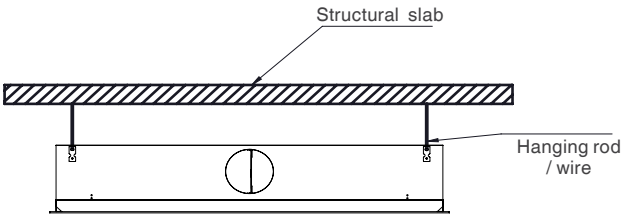
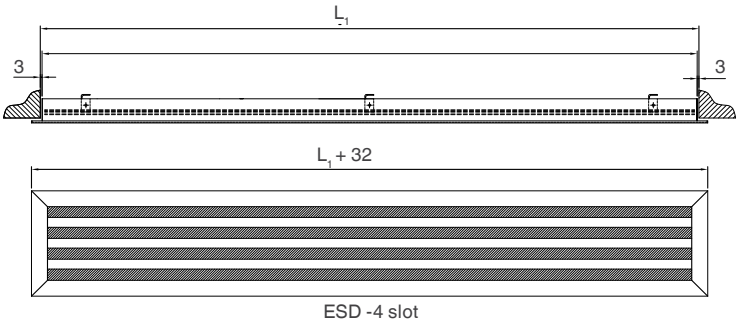
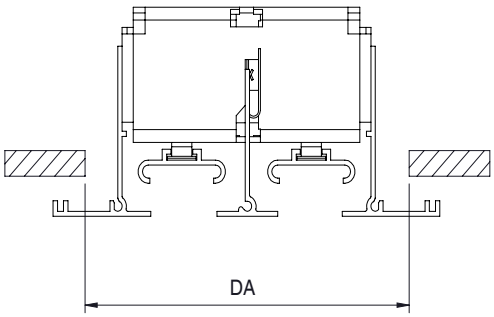


Figure 6: Installation of Slot Diffuser







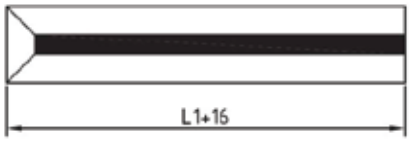
Nominal Length

L1	600	900	1200	1500	2000

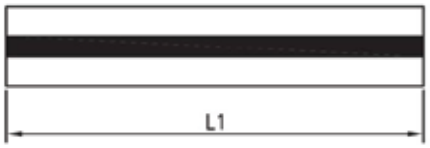
N	1	2	3	4	5	6	7	8
DA	50	88	126	164	202	240	279	317

Detail for linear slot sections

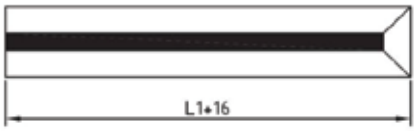
End section on the left



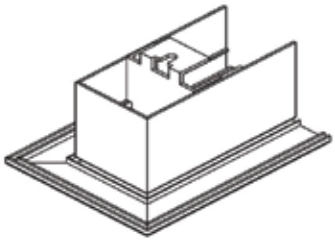
Without end section (intermediate section)



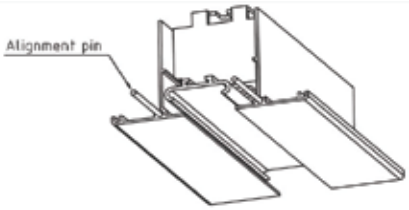
End section on the right



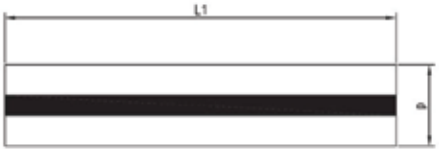
End section



Applications of alignment pin to join two or more linear section together



Intermediate section
L1: Standard length of 600, 900, 1500, 1800 and 2100 mm



90° Mitre

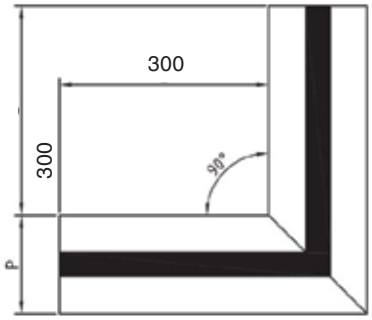


Figure 7: Joining linear section

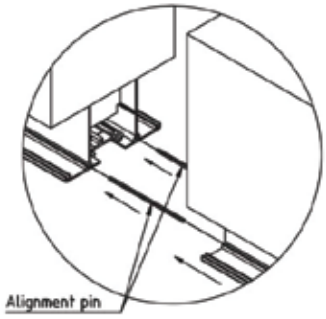


Figure 8: Installing the diffuser face

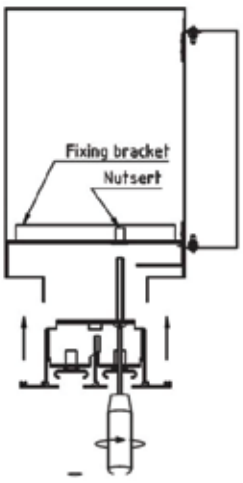
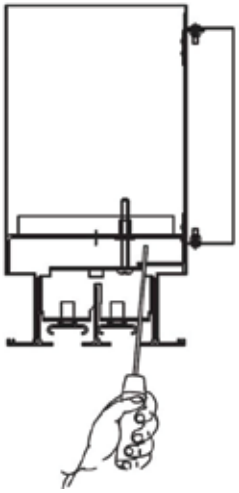


Figure 9: Damper adjustment



Note
Selection is based on NC 35, assuming 8dB room attenuation.

Table 1: Quick selection for ESD Slot Diffuser with plenum box

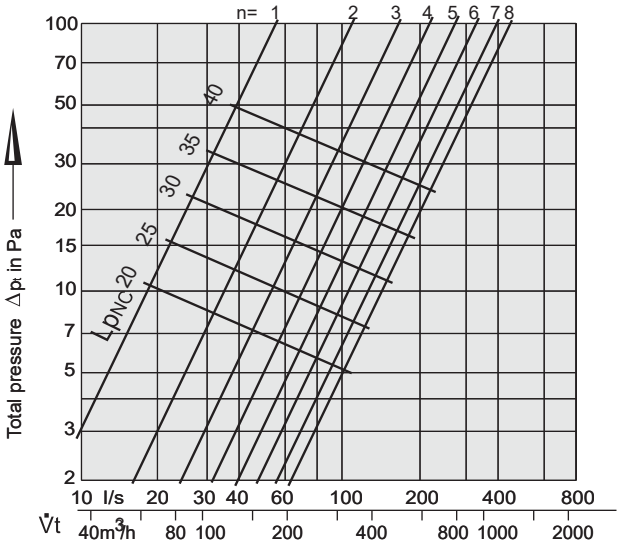
Product Code	Length (m)	Air flow (l/s)	△ P (Pa)	Throw (m) @ 0.75 m/s
ESD-1-AK-M	600	30	45	4.8
	900	45	48	4.8
	1200	55	50	4.8
	1500	70	55	4.8
	2000	100	56	4.8
ESD-2-AK-M	600	42	27	4.8
	900	63	33	4.8
	1200	80	44	4.8
	1500	100	48	4.8
	2000	140	35	4.8
ESD-3-AK-M	600	51	22	4.8
	900	76	29	4.8
	1200	100	43	4.8
	1500	127	61	4.8
	2000	170	32	4.8
ESD-4-AK-M	600	60	15	4.8
	900	90	18	4.8
	1200	120	23	4.8
	1500	150	30	4.8
	2000	200	20	4.8

Note
The noise and pressure drop data derived from the graphs below. The appropriate correction factors should be applied to the noise and pressure drop data if plenum boxes are required.
Refer to Tables 5 and 6 for the correction factors.

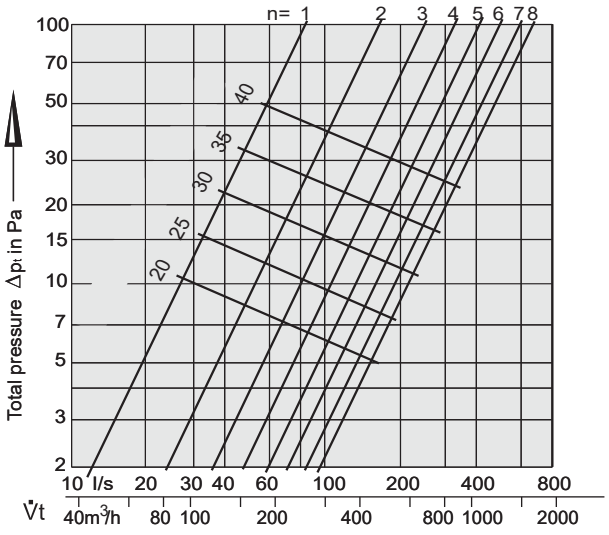
Table 5 : Correction factors for Slot Diffuser with plenum boxes .

D	No. of slots 'n'	L1 = 600 mm		L1 = 900 mm	
		Δpt	Δlp	Δpt	Δlp
123	1	x 1.5	+ 0.0	x 1.8	+ 2.5
	2	x 1.8	+ 1.5	x 2.2	+ 5.0
148	3	x 2.2	+ 5.0	x 3.2	+ 9.0
	4	x 1.9	+ 2.5	x 2.5	+ 6.0
198	5	x 1.7	+ 0.5	x 2.1	+ 4.0
	6	x 1.8	+ 2.0	x 2.4	+ 6.0
248	7	x 2.0	+ 3.5	x 2.7	+ 7.0
	8	x 2.2	+ 5.0	x 3.1	+ 8.5

Graph 1 : ESD-1...8/600
Noise criteria and pressure drop



Graph 2 : ESD-1...8/900
Noise criteria and pressure drop



Nomenclature

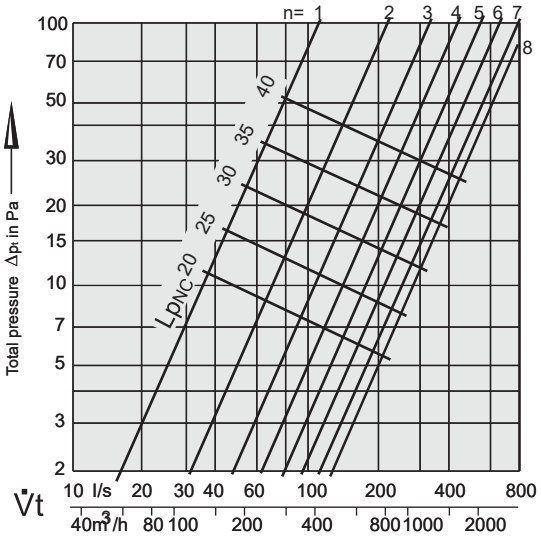
$\dot{V}'$	l/s/m	Volume flow per metre length
$\dot{V}'$	m³/h/m	Volume flow per metre length
$\dot{V}t$	l/s	Total volume flow
$\dot{V}t$	m³/h	Total volume flow
L	m	Throw
$\bar{v}L$	m/s	Terminal velocity
Δtz	K	Temperature difference between supply air and room temperature
ΔtL	K	Temperature difference between supply core and room temperature at distance, L
Δpt	Pa	Total pressure drop
LpNC		Noise Criteria rating with 8 dB room attenuation
Δlp	dB	Difference in sound pressure level

Note
The noise and pressure drop data derived from the graphs below are meant for the slot diffusers alone. The appropriate correction factors should be applied to the noise and pressure drop data for each diffuser unit size if plenim boxes are required. Refer to Tables 5 and 6 for the appropriate correction factors.

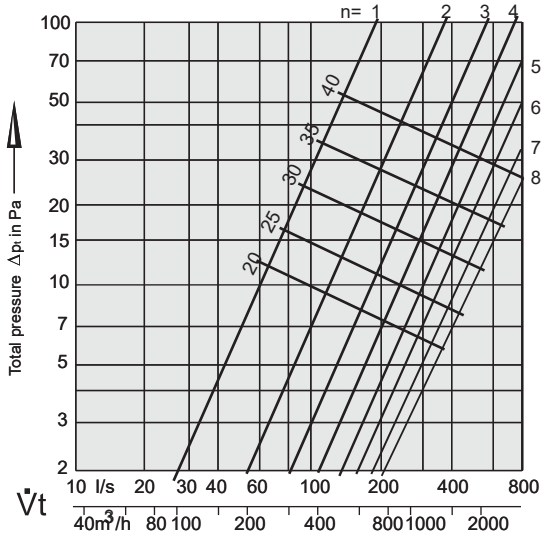
Table 5 : Correction factors for Slot Diffuser with plenum boxes

D	No. of slots 'n'	L1 = 600 mm		L1 = 900 mm		L1 = 900 mm	
		Δpt	Δlp	Δpt	Δlp	Δpt	Δlp
123	1	x 1.5	+ 0.0	x 1.8	+ 2.5	x 1.8	+ 2.5
	2	x 1.8	+ 1.5	x 2.2	+ 5.0	x 2.2	+ 5.0
148	3	x 2.2	+ 5.0	x 3.2	+ 9.0	x 3.2	+ 9.0
	4	x 1.9	+ 2.5	x 2.5	+ 6.0	x 2.5	+ 6.0
198	5	x 1.7	+ 0.5	x 2.1	+ 4.0	x 2.1	+ 4.0
	6	x 1.8	+ 2.0	x 2.4	+ 6.0	x 2.4	+ 6.0
248	7	x 2.0	+ 3.5	x 2.7	+ 7.0	x 2.7	+ 7.0
	8	x 2.2	+ 5.0	x 3.1	+ 8.5	x 3.1	+ 8.5

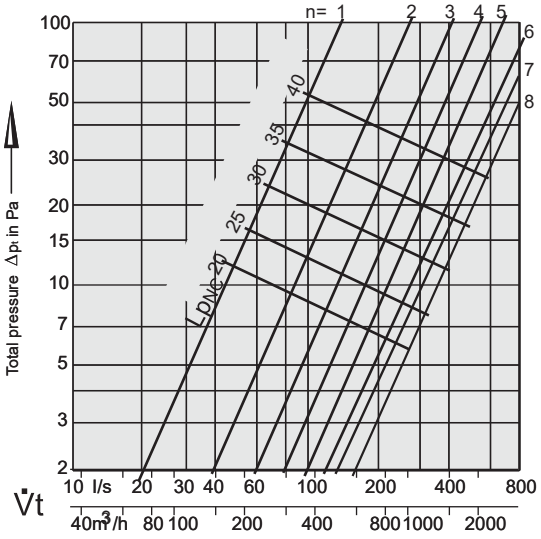
Graph 3 : ESD-1...8/1200
Noise criteria and pressure drop



Graph 5 : ESD-1...8/2000
Noise criteria and pressure drop



Graph 4 : ESD-1...8/1500
Noise criteria and pressure drop



Selection Examplie

Data given:
V_t = 75 l/s; throw
L = 5 m
Δtz = -6K.
Slot diffuers: type ESD - 3-AK/1500
$\dot{V}$ = 75 l/s / 1.5 m
= 50 l/s/m
From Graph 6, terminal velocity, V_L is 0.45 m/s
Graph 7, the temperature quotient is 0.22.
Hence $\Delta t_L = 0.22 \times -6$
Δt_L = -1.32 K

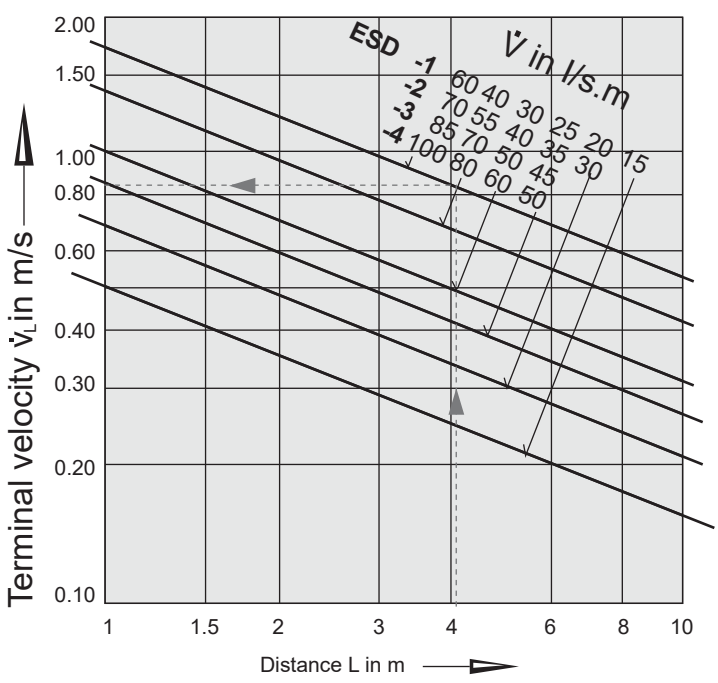
From Graph 4
L_{pnc} is NC15 and Δpt = 3.5 Pa

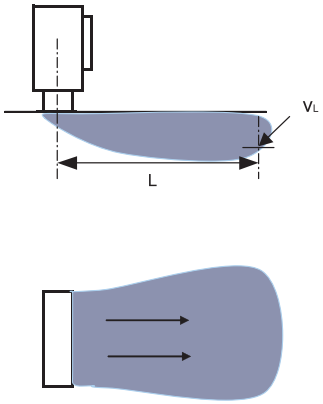
From table 6, the correction factors to be applied to noise level and pressure drop are as follow:

L_{pnc} = 15 + 13.5 = NC 28

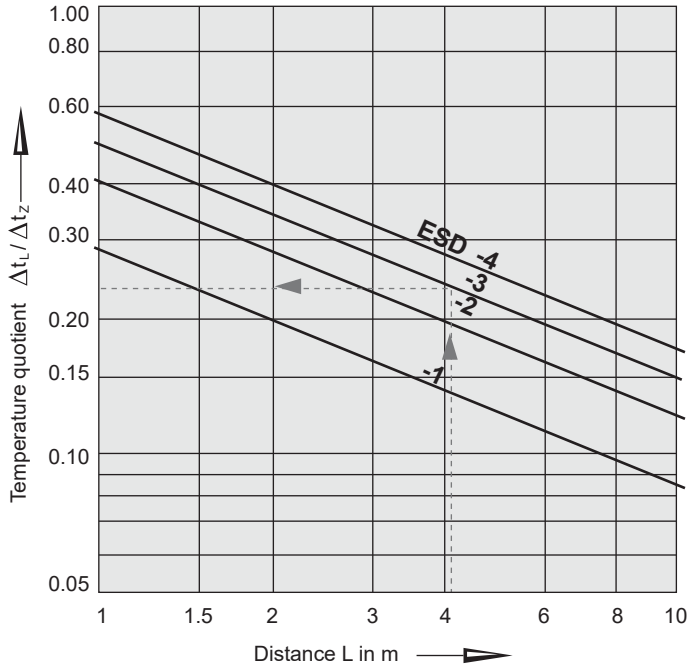
Δpt = 3.5 x 6.8 = 24 Pa

Graph 6: Terminal Velocity and Throw





Graph 7: Temperature Quotient



ESD

ESD – 1 – AK – M – L1 / 1200 / P1- RAL…
1 2 3 4 5 6 7

1 Type

ESD Swirl diffuser
ESD-EL End section on the left
ESD-ER End section on the right
ESD-IS Intermediate section
ESD-MI 90^0 mitre

2 No of slots

Ranging from 1 to 8

3 Rear assemblies

0 Without plenum box
AK With plenum box

4 Damper blade fro volume flow rate balancing

No entry: without damper blade
M With

5 Internal Lining

No entry: No Internal insulation (Standard)
I1 6mm thick rubber foam
I2 25mm fibre glass insulation
I3 6mm thick PE foam

6 Nominal size (mm)

600
900
1200
1500
2000

7 Exposed surface

No entry: powder-coated RAL 9010, pure white (Standard)
P1 Powder coated, specify RAL CLASSIC color

Order example : ESD-1-AK-M-L1/1200/P1-RAL9006

No. of slots	1
Rear assemblies	Wth plenum
Damper blade for volume flow rate balancing	with damper blade
Internal lining	6mm thick rubber foam lining
Nominal size	600
Exposed surface	RAL 9006, white aluminium