

Swirl Diffusers

Type FD

Recommended room heights from 2.60 to 4.00 m



TROX[®] TECHNİK

TROX South Africa (Pty) Ltd.
10 Wigford Road
Masons Mill
Pietermaritzburg

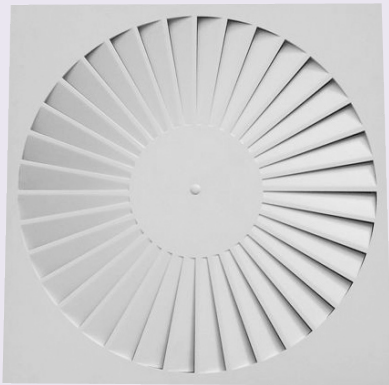
Tel. +27 (0)33 398 1006
Fax. +27 (0)33 398 1100
email : pmb@troxsa.co.za
Website: www.troxsa.co.za



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FD-Q Construction



FD-R Construction



Flow Visualisation



The diffuser face of the type FD consists of fixed, radially arranged air control blades. The supply air design has specially arranged internal air guidance elements which are not required on the extract version.

Due to the rotary swirling motion of the air discharge, induction of room air occurs very quickly, resulting in rapid decay of supply air velocity and temperature differential. Air change rates of 30 per hour can be achieved with supply air temperature differentials of +10K to -10K.

To stabilise horizontal discharge, all sizes must be mounted flush with a ceiling.

The minimum mounting height between floor and diffuser face is 2.60 m.

Construction • Dimensions

Construction

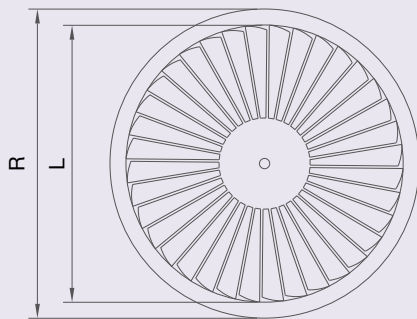
Depending on the architectural requirements, the face plate can be circular or square. The fixed air control blades on the diffuser face are arranged radially.

The diffuser face can be attached or removed via a centre fix screw into the plenum box.

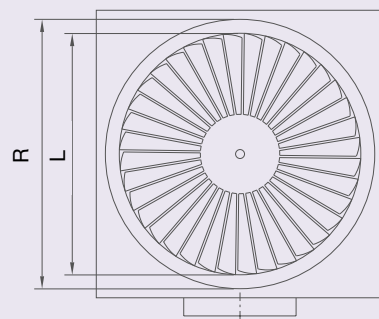
The screw head is covered with a decorative cap. The plenum box can be supplied with either top or side entry spigots with volume control damper.

If a circular diffuser face is ordered, the plenum box with side entry spigot has a 35mm collar fitted to the plenum.

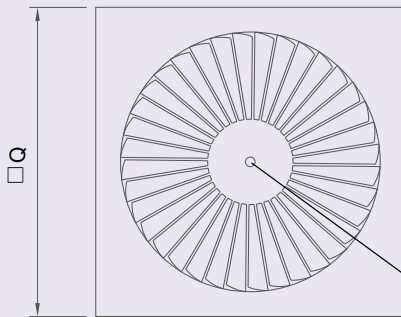
SIZE	B	D	L	Q	R	H ₂	□ K	Ø P
600	549	248	538	593	600	345	567	557



FD-R....-V

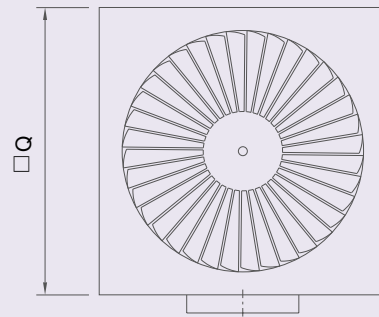


FD-R....-H



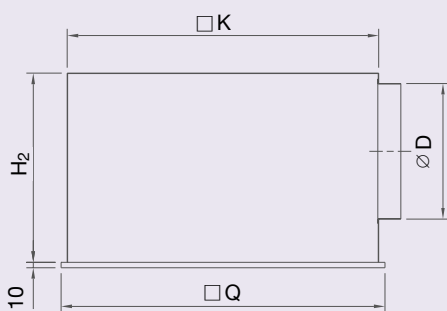
FD-Q....-V

FIXING SCREW FOR DIFFUSER FACE

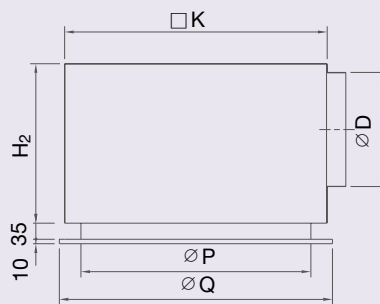


FD-Q....-H

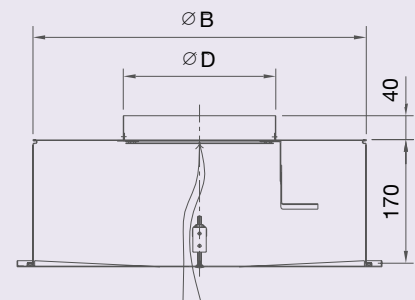
Plenum Boxes



FD-Q....-H



FD-R....-H



FD....-V

Materials • Installation • Assembly

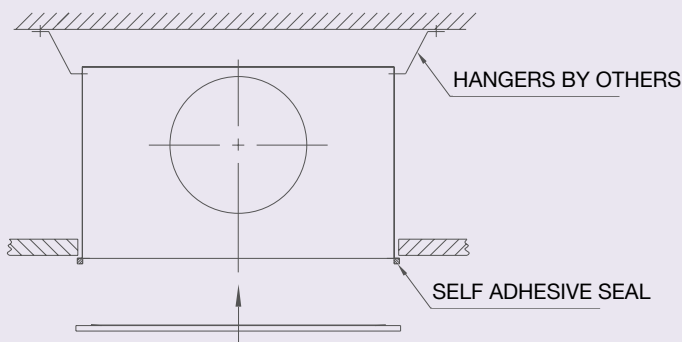
Materials

The diffuser face is made of galvanised sheet steel. The surface is pre-treated and powder coated textured white VEP 1595. The plenum boxes are from galvanised sheet steel.

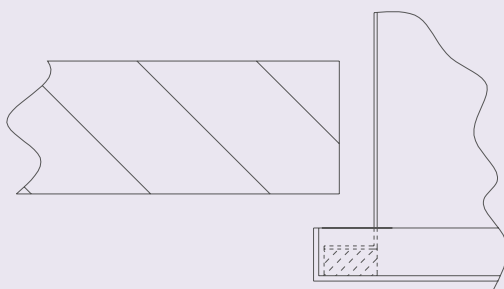
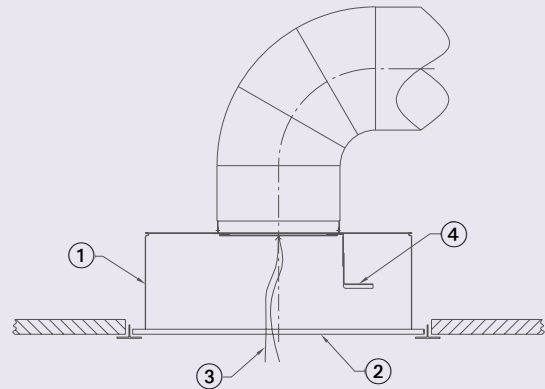
Assembly

The plenum box is suspended by wires or slotted strips using hanging brackets, where provided. The diffuser face is fitted to the plenum box by means of centre fix screw locating in cross channel in the plenum box, with a self adhesive sponge seal between the plenum and face plate

Surface mounting on ceiling

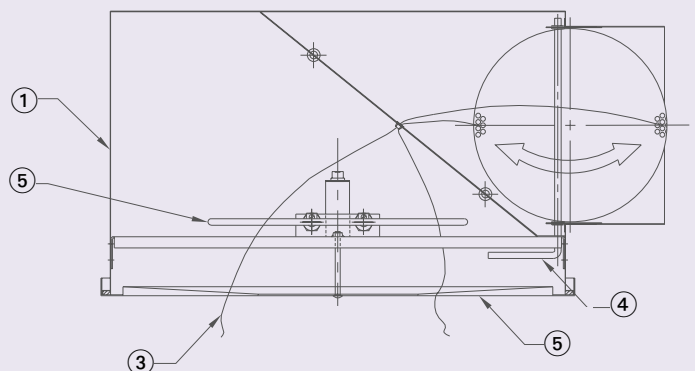


Freely suspended



Fixing of diffuser face using centre screw

Installation using hangers



1. Plenum
2. Diffuser face
3. Line for damper adjustment
4. Lever for damper adjustment
5. Heater (optional-results in increased spigot length)

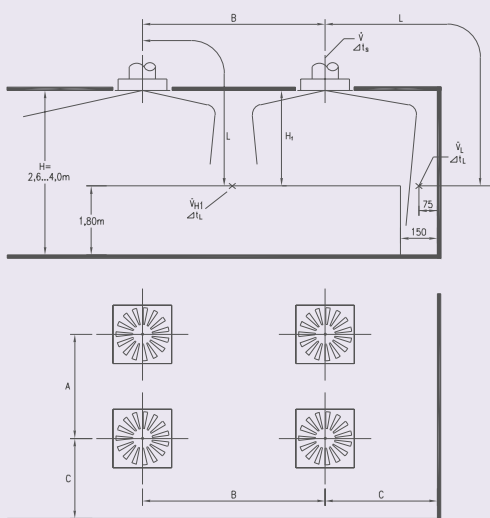
Nomenclature

ΔP	Q	Throw	Sound power
Pa	l/s	m	NC
10	108	1.7	17
20	150	3.8	28
30	180	4.7	35
45	206	5.0	40
50	232	5.5	46
60	251	6.0	51

Spigot Diameter	Heater Capacity (Watts)			
	750	1000	1500	2500
150	●			
175		●		
200			●	
250				●

All technical data refers to a 250mm spigot
 Throw is the distance from the diffuser centre at which the average velocity reaches 0.5 m/s

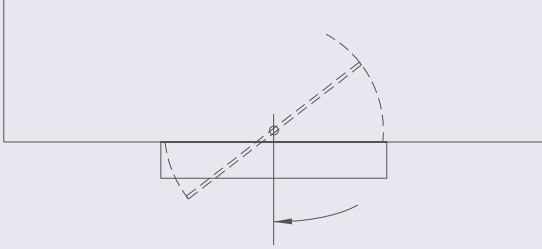
Nomenclature



- V in l/s : Volume flow per diffuser
- V in m³/h : Volume flow per diffuser
- A, B in m : Spacing between two diffusers
- C in m : Distance from centre of diffuser to wall
- X in m : Distance between diffuser centre and wall
- H₁ in m : Distance between ceiling and occupied zone
- V_{H1} in m/s : Time average air velocity between 2 diffusers at distance from ceiling H₁
- L in m : (Horizontal + vertical) distance (C + H₁) discharge to the wall
- V_L in m/s : Time average air velocity at the wall
- Δt_z in K : Temperature difference between supply air & room air
- Δt_L in K : Difference between core & room air temperature at distance L = A/2 + H₁ or L = B/2 + H₁ or L = C + H₁
- A_{eff} in m² : Effective outlet area
- ΔP_t in Pa : Total pressure drop (supply air)
- L_{WA} in dB(A) : A-weighted sound power level
- L_{WNC} : NC rating of sound power level
- L_{WNR} : L_{WNR} = L_{WNC} + 2
- L_{PA}, L_{PNC} : A-weighting and NC rating respectively of room sound pressure level L_{PA} ≈ L_{WA} - 8 dB L_{PNC} ≈ L_{WNC} - 8 Db
- a in ° : Damper angle

Acoustic Data

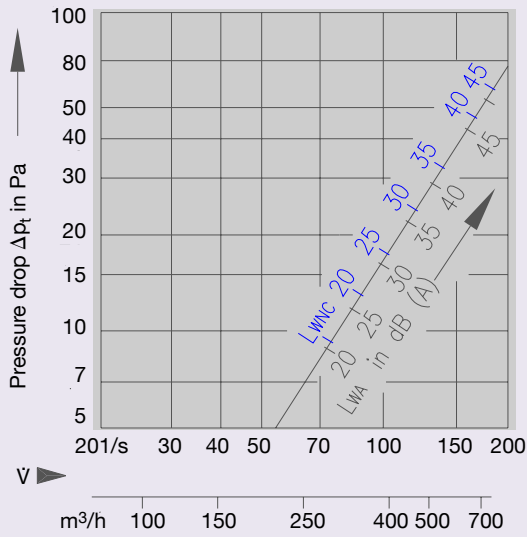
Correction to diagram 2 : Volume control damper setting



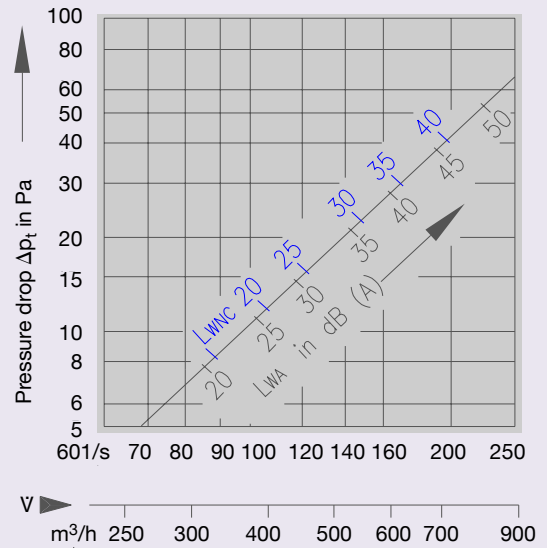
Damper angle α	0°	45°	90°
Δp_t	x 1.0	x 1.1	x 2.2
L_{WA}	-	+ 1	+ 4
L_{WNC}	-	+ 1	+ 4

Sound power level and pressure drop FD-...-V

1. Extract Air

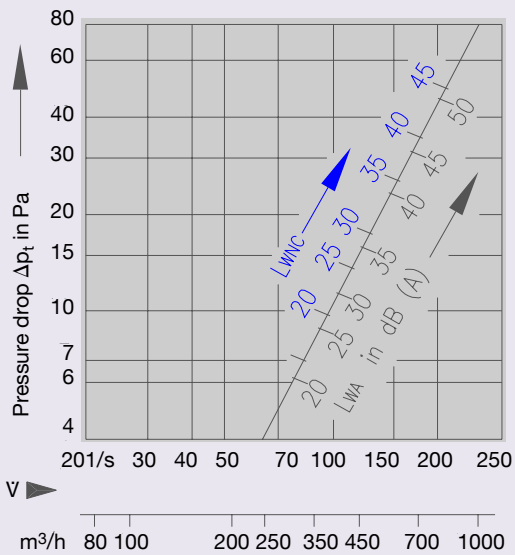


2. Supply Air

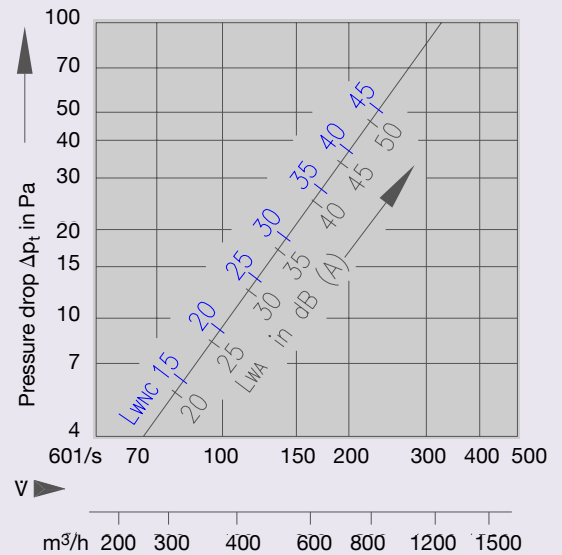


Sound power level and pressure drop FD-...-H

3. Extract Air



4. Supply Air



Aerodynamic Data FD 600

Example
Data given:

4 off type FD-Q-Z-H/600

Volume flow per diffuser $V = 100 \text{ l/s}$
Spacing between two diffusers $A = B = 2.00 \text{ m}$
Distance between ceiling and occupied zone $H_1 = 1.60 \text{ m}$

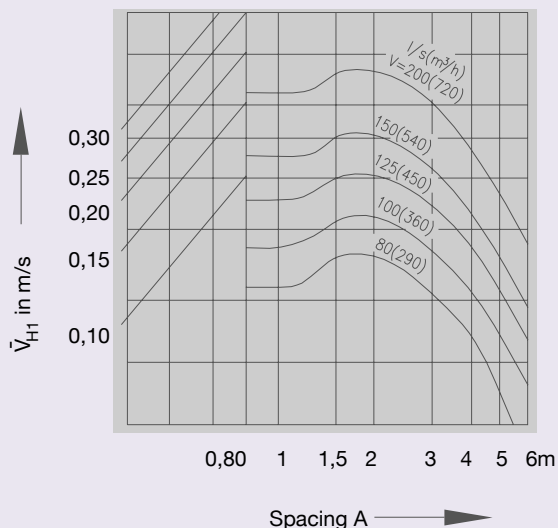
Required: air velocity in occupied zone

Diagram 8: Square array of diffusers
 $V_{H1} = 0.22 \text{ m/s}$

Correction!
For an installation below the ceiling line, the values V_{H1} , V_L and $\Delta t_L / \Delta t_z$ must be multiplied by a factor of 0.71!

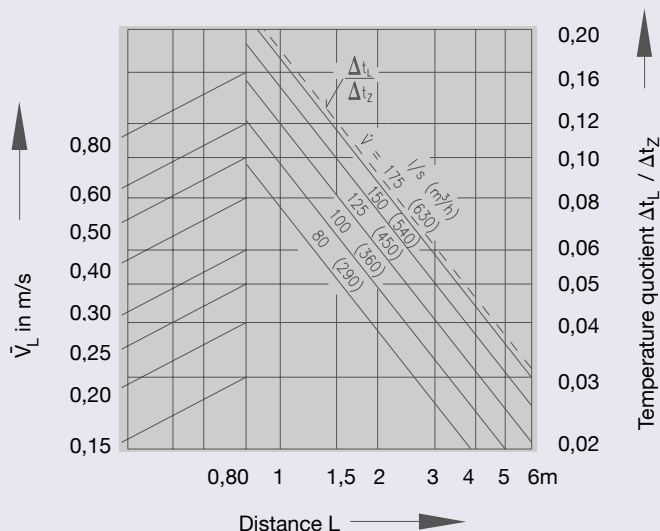
5. Diffuser arrangement: single or more than one row if B C 4.00m

$H_1 = 0,9 \quad 1,2 \quad 1,6 \quad 2\text{m}$



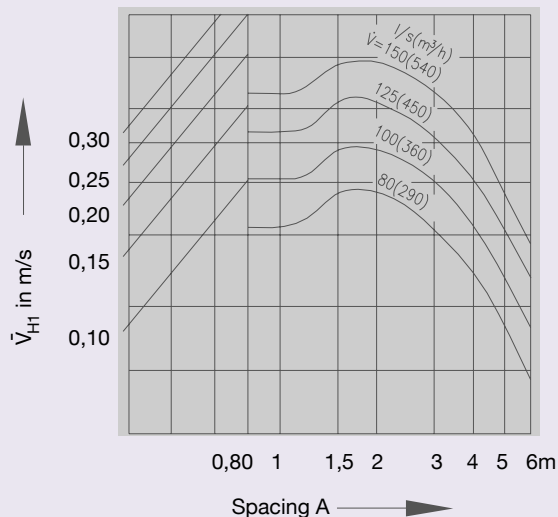
6. Temperature Quotient

$A = 1 \quad 1,5 \quad 2 \quad 3\text{m}$



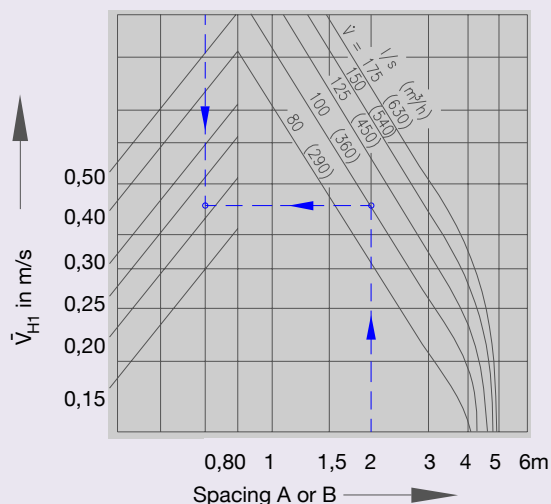
7. Diffuser arrangement more than one row if B = 3.00m

$H_1 = 0,9 \quad 1,2 \quad 1,6 \quad 2\text{m}$



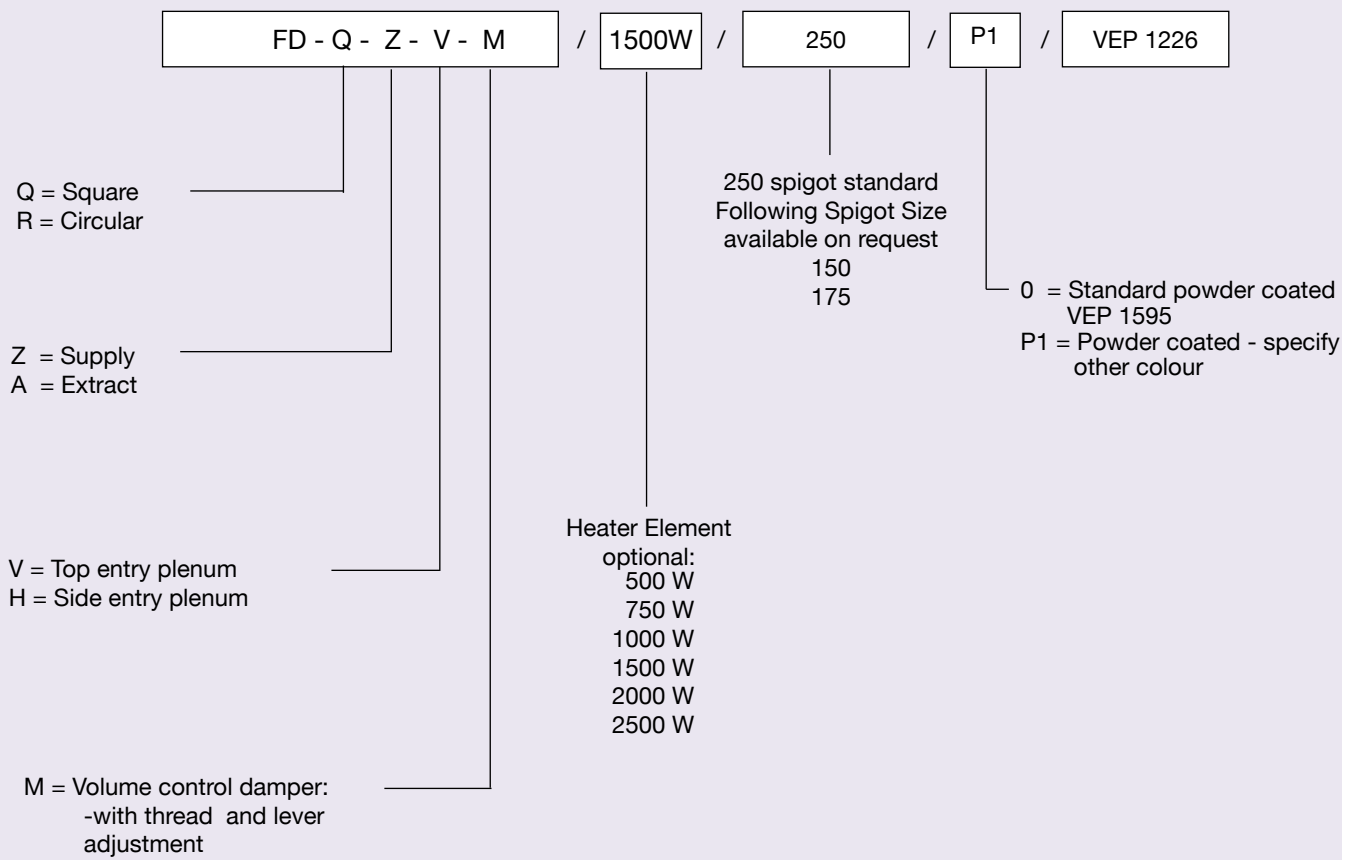
8. Square Array of Diffusers

$H_1 = 0,9 \quad 1,2 \quad 1,6 \quad 2\text{m}$



Order Details

Order Code FD



Specification Text

Fixed swirl diffusers in square and circular construction for swirling, horizontal air discharge with high induction, for air change rates up to 30 per hour, comprising the diffuser face with top or side entry spigot, with volume control damper.

Materials

Diffuser face is in galvanised sheet steel. The surfaces are pre-treated and powder coated textured white VEP 1595. The plenum box is also of galvanised sheet steel.

Order Example:

Make: TROX
Type: FD-Q-Z-V-M / 250 / P1 / RAL9010