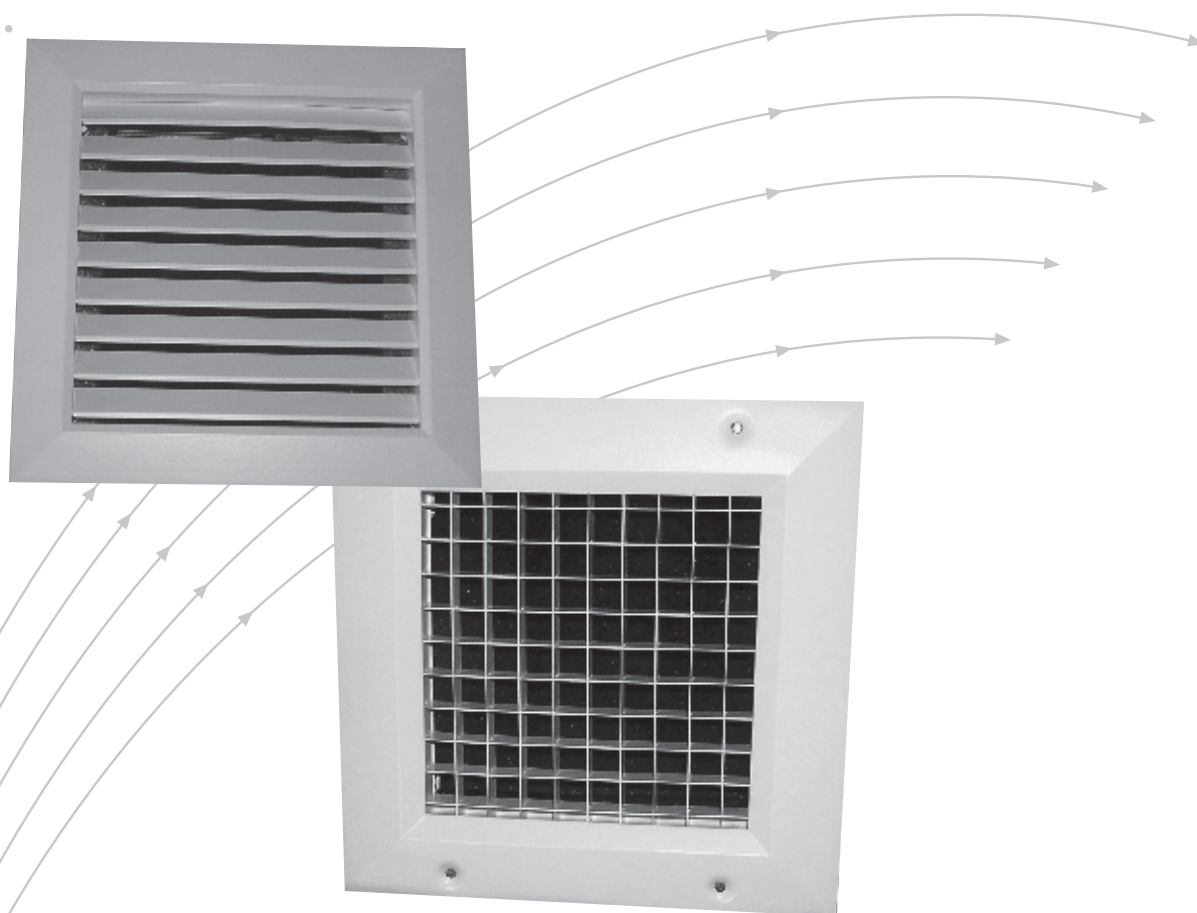


Return Air Grilles

Type AR • AE



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Description:

These Type 'AR' and 'AE' grilles are suitable for installation to walls or directly to ductwork for return air application only.

Construction:

Type AR

This type of return air grille has fixed horizontal blades with angled profile and a 32 mm wide border complete with counter punched holes for front screw fixing (i.e., visible).

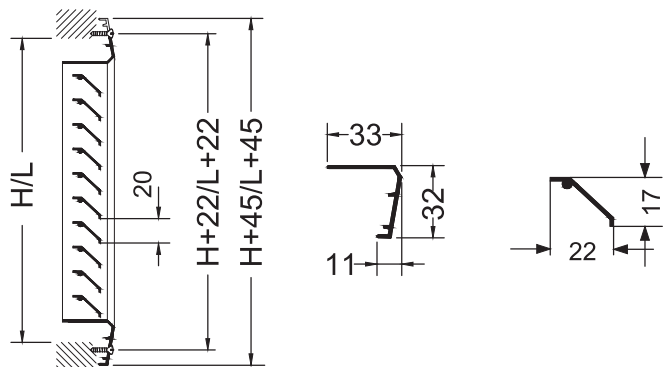


Type AE

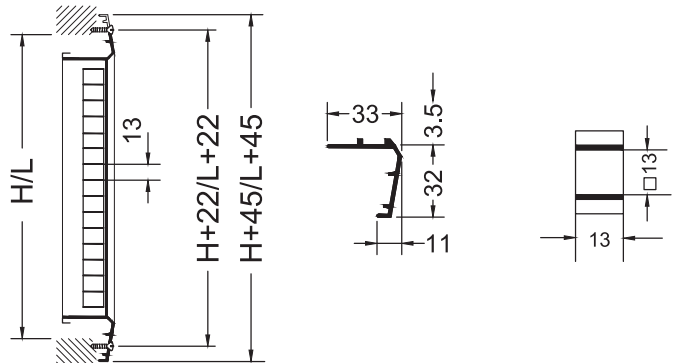
This type of return air grille has fixed square pattern core with a 32 mm wide border complete with counter punched holes for front screw fixing (i.e., visible).

Note: Flat border identical to TROX Type 'AH' grille can be provided for the Type 'AR' and 'AE' grilles if required. These derivative grilles are known as Type 'F- AR and F- AE' grilles respectively.

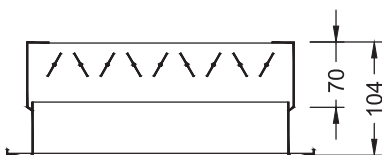
Type AR



Type AE



Rear Assembly



...-AG

Duct Opening with Sub-frame (for spring clip and latch fixings only).

The required duct opening with sub-frame, for spring clip (P11) or latch fixing (S11) is: $L + 6$ mm and $H + 6$ mm.

For detail, refer to Catalogue (Ref. M 1/1.1/EN/2) for "Grilles / Linear Grilles" on page 27.

Materials · Standard Sizes

Materials:

Both types of 'AR' and 'AE' grilles are made from extruded aluminium sections in matt white powder coating to RAL 9010 as standard supply. The rear assembly for both types of grilles is made from formed sheet steel and, painted in black to RAL 9005. The installation sub-frame is made from galvanized sheet steel. This will be provided in loose sections to be installed by others.

Table 1: Standard Sizes, L x H (mm)

H (mm) \ L (mm)	100	150	200	250	300	350	400	450	500	550	600
150	•	•									
200	•	•	•								
250	•	•	•	•							
300	•	•	•	•	•						
350	•	•	•	•	•	•					
400	•	•	•	•	•	•	•				
450	•	•	•	•	•	•	•	•			
500	•	•	•	•	•	•	•	•	•		
550	•	•	•	•	•	•	•	•	•	•	
600	•	•	•	•	•	•	•	•	•	•	•
650	•	•	•	•	•	•	•	•	•	•	•
700	•	•	•	•	•	•	•	•	•	•	•
750	•	•	•	•	•	•	•	•	•	•	•
800	•	•	•	•	•	•	•	•	•	•	•
850	•	•	•	•	•	•	•	•	•	•	•
900	•	•	•	•	•	•	•	•	•	•	•
950	•	•	•	•	•	•	•	•	•	•	•
1000	•	•	•	•	•	•	•	•	•	•	•
1050	•	•	•	•	•	•	•	•	•	•	•
1100	•	•	•	•	•	•	•	•	•	•	•
1150	•	•	•	•	•	•	•	•	•	•	•
1200	•	•	•	•	•	•	•	•	•	•	•
1250	•	•	•	•	•	•	•	•	•	•	•

Note: The 'L' and 'H' dimensions as given above represent the connecting duct size or opening size in the wall where the grille is intended to be installed.

Technical Data

Table 2: Effective Inlet Area, A_{eff} (m²)

L x H (mm)	A _{eff} (m ²)	
	AR	AE
150 x 100	0.002	0.006
200	0.003	0.009
300	0.006	0.014
400	0.008	0.019
500	0.010	0.024
600	0.012	0.029
700	0.014	0.034
800	0.016	0.039
900	0.018	0.044
1000	0.020	0.049
1100	0.022	0.054
1200	0.024	0.059
150 x 150	0.004	0.010
200	0.006	0.015
300	0.010	0.023
400	0.014	0.032
500	0.017	0.040
600	0.021	0.049
700	0.025	0.057
800	0.029	0.066
900	0.033	0.074
1000	0.036	0.083
1100	0.040	0.092
1200	0.044	0.100
200 x 200	0.009	0.021
300	0.014	0.033
400	0.019	0.045
500	0.025	0.057
600	0.031	0.069
700	0.035	0.081
800	0.041	0.093
900	0.047	0.105
1000	0.051	0.117
1100	0.057	0.129
1200	0.063	0.141
250 x 250	0.015	0.034
300	0.019	0.042
400	0.025	0.057
500	0.032	0.073
600	0.040	0.088
700	0.046	0.104
800	0.053	0.120
900	0.060	0.135
1000	0.067	0.150
1100	0.074	0.166
1200	0.081	0.181
300 x 300	0.023	0.052
400	0.031	0.071
500	0.040	0.089
600	0.049	0.108
700	0.057	0.128
800	0.066	0.142
900	0.072	0.165
1000	0.083	0.184
1100	0.092	0.203
1200	0.101	0.222
350 x 350	0.031	0.072
400	0.037	0.084
500	0.048	0.106
600	0.058	0.128
700	0.068	0.151
800	0.078	0.173
900	0.089	0.195
1000	0.098	0.217
1100	0.109	0.240
1200	0.119	0.262

L x H (mm)	A _{eff} (m ²)	
	AR	AE
400 x 400	0.043	0.096
400	0.055	0.122
600	0.067	0.148
700	0.078	0.174
800	0.091	0.200
900	0.103	0.225
1000	0.113	0.251
1100	0.126	0.277
1200	0.142	0.303
450 x 450	0.056	0.124
500	0.063	0.142
600	0.077	0.168
700	0.089	0.197
800	0.103	0.226
900	0.117	0.256
1000	0.130	0.285
1100	0.143	0.314
1200	0.158	0.343
500 x 500	0.070	0.155
600	0.086	0.188
700	0.100	0.229
800	0.115	0.253
900	0.131	0.286
1000	0.145	0.319
1100	0.160	0.351
1200	0.176	0.385
600 x 600	0.104	0.227
700	0.127	0.267
800	0.140	0.306
900	0.159	0.346
1000	0.176	0.386
1100	0.195	0.425
1200	0.214	0.464

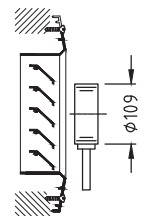
Determination of Volume Flow Rate:

Volume flow rate can be determined by measuring the air velocity using a rotating vane anemometer. Velocity measurement should be taken across the grille face, using the vane anemometer, placed at equidistance to cover the entire face area of the grille. Then sum up the velocity measurements and determine the mean velocity (i.e., V_{mean}) across the grille face.

The flow rate can be calculated using either one of the formulae below;

$$\dot{V} \text{ (l/s)} = v_{\text{mean}} \text{ (m/s)} \times A_{\text{eff}} \text{ (m}^2\text{)} \times f \times 1000$$

$$\dot{V} \text{ (m}^3\text{/h)} = v_{\text{mean}} \text{ (m/s)} \times A_{\text{eff}} \text{ (m}^2\text{)} \times f \times 3600$$



*Note: Where 'f' is the correction factor (Refer to Table 4 below).

Table 3: Correction for A_{eff}

A _{eff}	0.005	0.01	0.02	0.05	0.1	0.2	0.4
LWA/LWNC	-13	-10	-7	-3	-	+3	+6

Table 4: Correction Factor, f

Type	f
AR	3.2
AE	1.6

Technical Data · Nomenclature

Type 'AR' Grille

Example:

Data given as;

Volume flow rate - 195 l/s
 Grille selected: Type AR-AG/ 800 x 150
 Effective inlet area, A_{eff} : 0.029m² (see Table 2)

Assuming that damper setting is 100% (i.e., fully open);

Effective velocity, $v_{eff} = \dot{V} / (A_{eff} \times 1000)$
 $v_{eff} = 195 / (0.029 \times 1000)$
 $v_{eff} = 6.7 \text{ m/s.}$

From Graph 1 below;

$L_{WA} = 37 \text{ dB (A)}$; $L_{WNC} = \text{NC } 31$ and;
 $\Delta p_t = 21 \text{ Pa}$

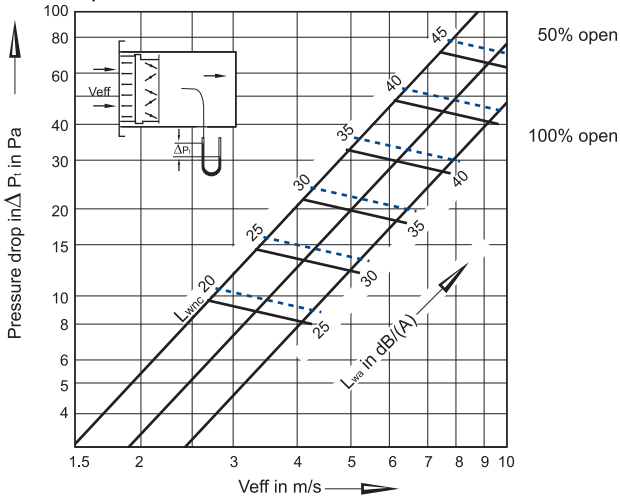
Using the correction for A_{eff} in Table 3 on page 4;

L_{WA} : $37 - 6 = 31 \text{ dB (A)}$
 L_{WNC} : $31 - 6 = \text{NC } 25$

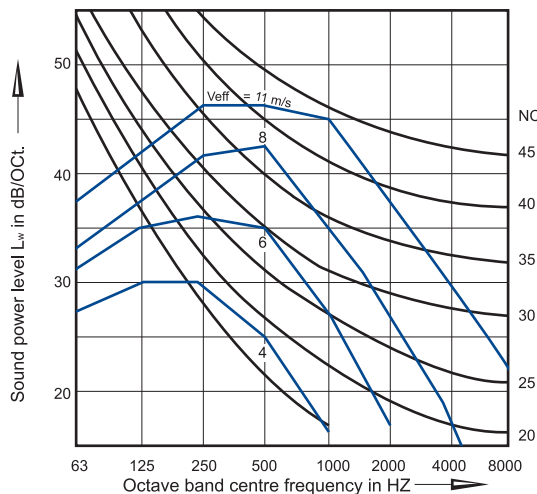
Nomenclature:

Symbol	Unit	Description
\dot{V}	l/s	Volume flow rate.
\dot{V}	m ³ /h	Volume flow rate.
v_{eff}	m/s	Effective jet velocity.
A_{eff}	m ²	Effective inlet area.
L_{WA}	dB(A)	A-weighted sound power level (SWL), based on $A_{eff} = 0.1 \text{ m}^2$ (refer to Table 3).
L_{WNC}		NC rating of SWL.
L_W	dB/Oct	Octave SWL of regenerated noise based on $A_{eff} = 0.1 \text{ m}^2$ (Refer to Table 3 for correction).
L_{pA}, L_{pNC}		Room sound pressure level (L_p) for A-weighting or NC rating respectively. $L_{pA} \approx L_{WA} - 8 \text{ dB}$ $L_{pNC} \approx L_{WNC} - 8 \text{ dB}$
Δp_t	Pa	Pressure drop.

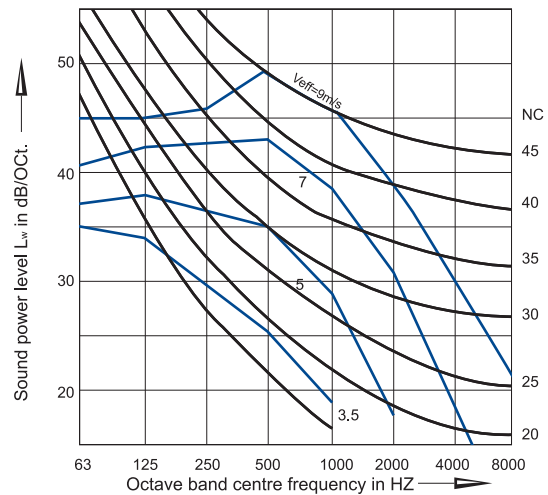
Graph 1: Sound Power Levels and Pressure Drop



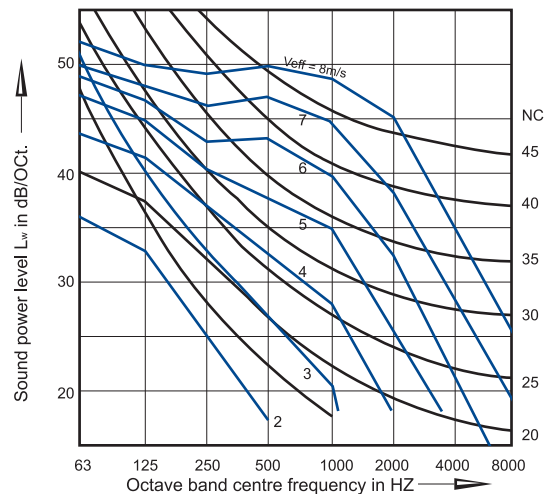
Graph 2: Octave Band Sound Power Levels (Damper setting at 100% open)



Graph 3: Octave Band Sound Power Levels (Damper setting at 50% open)



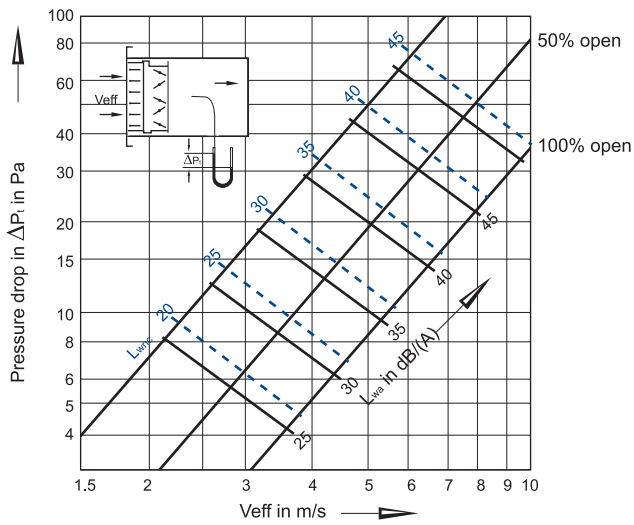
Graph 4: Octave Band Sound Power Levels (Damper setting at 25% open)



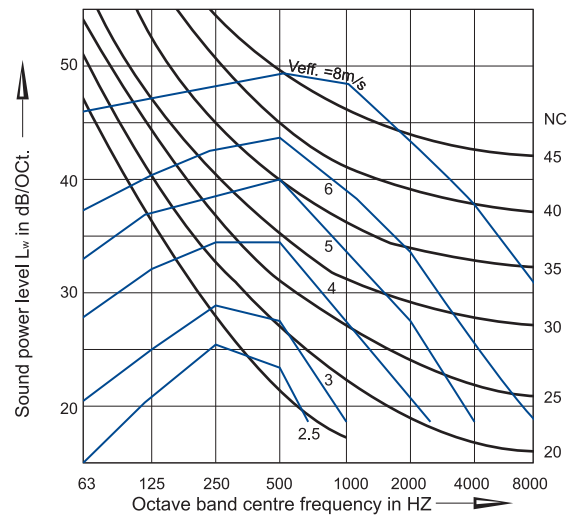
Technical Data

Type 'AE' Grille

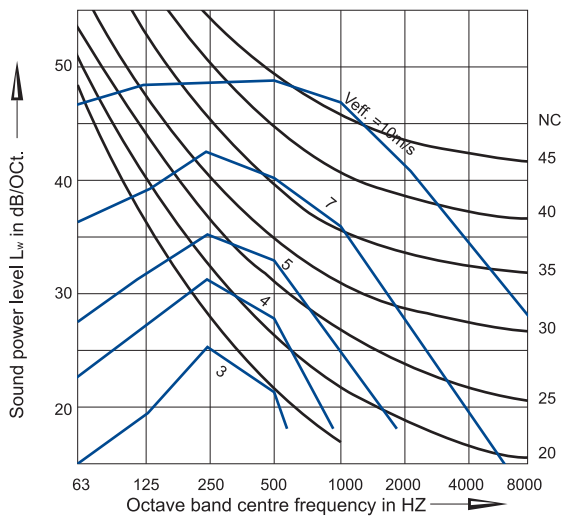
Graph 5: Sound Power Levels and Pressure Drop



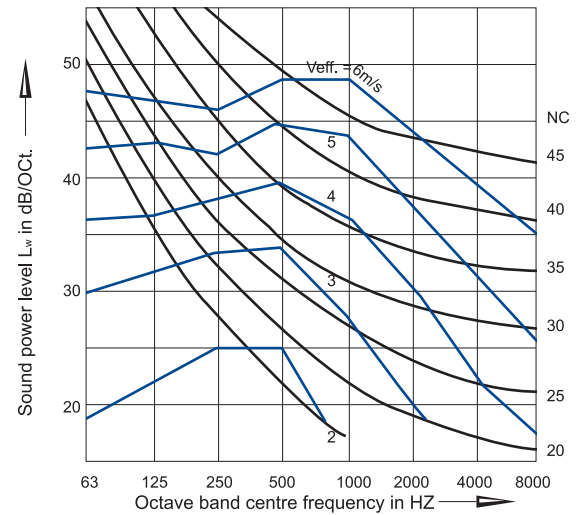
Graph 7: Octave Band Sound Power Levels (Damper setting at 50% open)



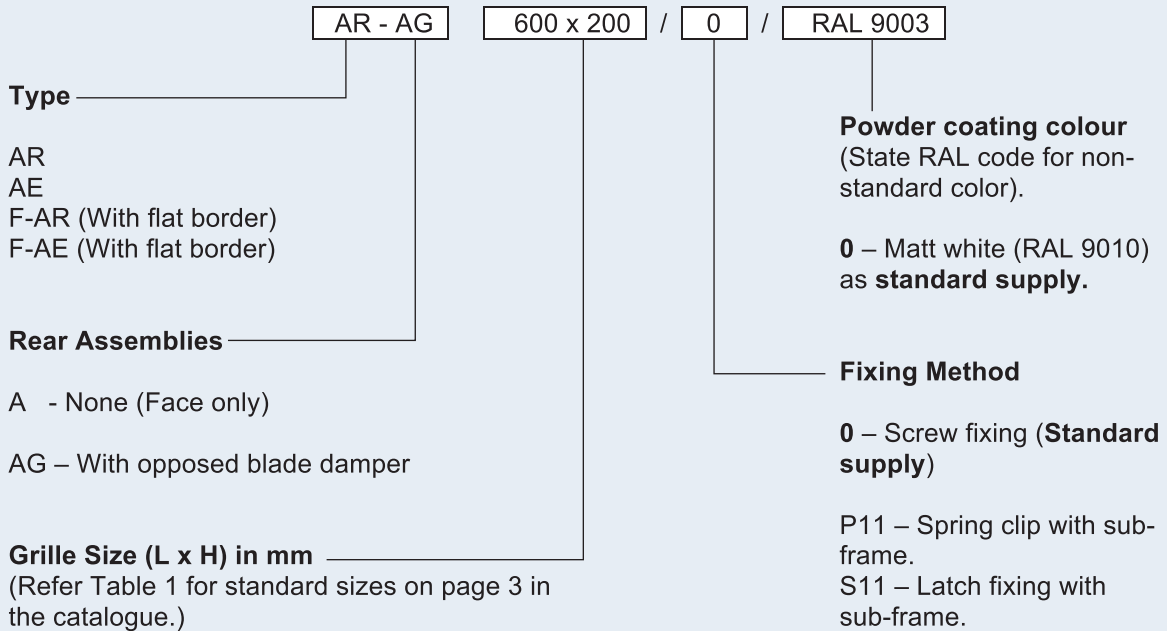
Graph 6: Octave Band Sound Power Levels (Damper setting at 100% open)



Graph 8: Octave Band Sound Power Levels (Damper setting at 25% open)



Order Code:



General Specification

The 'AR' and 'AE' Type grilles are designed for return air application only, suitable for wall or duct mounting. The AR grille have fixed angled blade and AE grille has an eggcrate core. Both standard grilles have a border with counter punched holes for screw fixings, which are visible.

If concealed fixings are required, these grilles can be supplied with either;

- Spring-clip fixings with installation sub-frame or,
- Latch fixings with installation sub-frame.

Both concealed fixings are optional extras.

To ensure that the correct amount of air is flowing into a room through each grille for good air distribution, it is advisable to have an opposed blade damper fitted to the back of each grille for air flow regulation.

Materials

The grilles are made from extruded aluminium sections. The Type 'AE' grille has an aluminium eggcrate core. The face for both types of grilles will be powder coated matt white to RAL 9010 as standard supply.

The rear assemblies are made from formed sheet steel and, are painted black to RAL 9005.

The installation sub-frame is made from formed galvanized sheet steel. This will only be supplied if spring clip or latch fastenings are required. The sub-frame will be supplied in loose sections, to be installed on site by others.

Order Example

Make: TROX
Type: AR-AG/ 500 x 150/ P11/ 0
Quantity: 35 nos.

