

INDEX

	page
- General	E1
- Dimensions	E2
- Grille selection	E3
- Performances	E5 - E9
- Conversion table	E10
- Special types	E11
- Order guidelines / technical description	E12



GENERAL

Air terminal devices of group E are linear light type air grilles (diffusers) with rectangular cross sections. Series E grilles have fixed horizontal series of blades. Series BT grilles are special heavy-duty linear grilles mounted on floors. Series E grilles may be equipped with interior adjustable series of vertical blades, allowing for air jet direction manipulation.

E series grilles are manufactured in the following types, each type addressing different cooling-heating applications :

- E12 : Dense series of blades, usually mounted on walls, ceilings or inclined surfaces
- E17 : Sparse series of blades, usually mounted on walls, ceilings or inclined surfaces
- E15 : Inclined series of blades with a 15° inclination angle (either E12 or E17)

Air grilles of series E are mainly used for air supply from vertical planes, e.g. walls, sides of air ducts, etc. or ceilings. They can also be mounted on inclined surfaces. They may be equipped with volume flow regulating dampers of D series, and/or air filter of series FA. They are manufactured at any size, however their usual dimensions are shown in the table of p. E2.

Anodized aluminum profile of 12 μm width is used for their construction providing long life. Electrostatic painting at numerous colors is also an option.

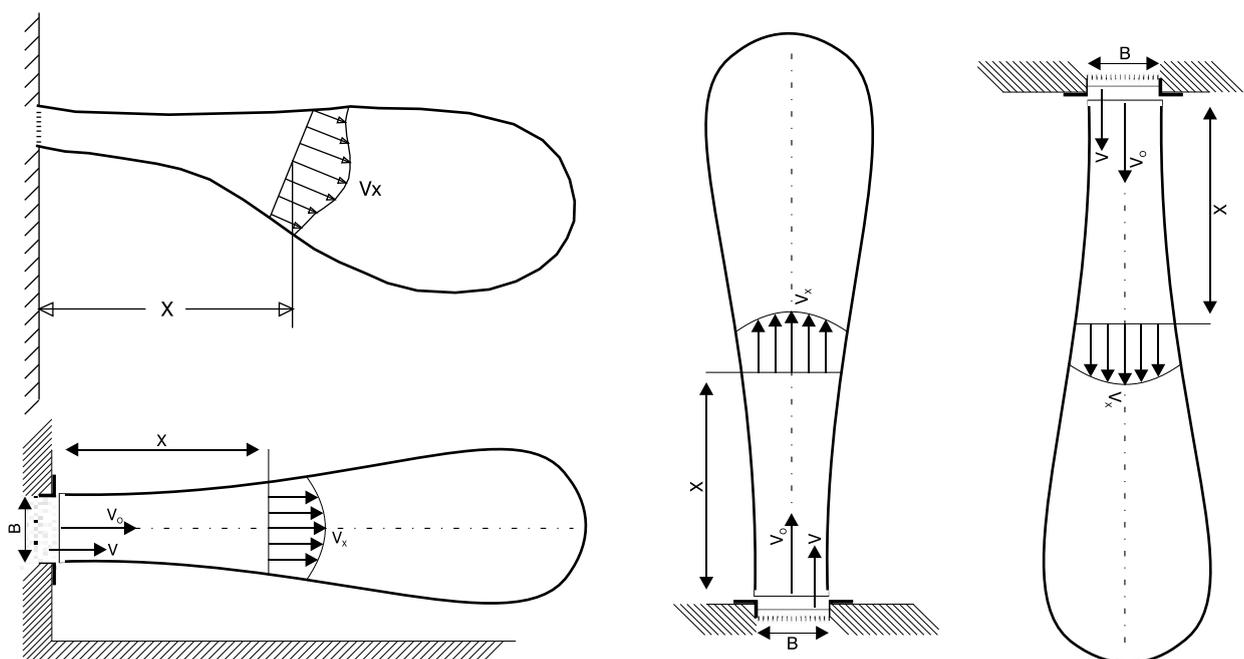


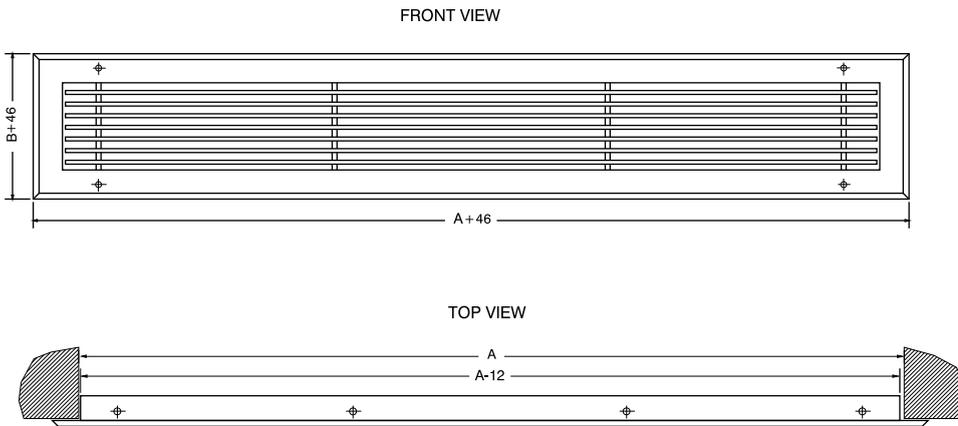
Figure E1: Possible air jet morphologies using linear grilles of E or BT series

Due to continuous development of its products, AERGRAMMI reserves the right of modifications without prior notice.

LINEAR GRILLES - SERIES E & BT - Dimensions



The dimensions of the grilles of series E are shown below. The dimensions of the grilles of series BT are shown in the Figure E3. For selection and ordering purposes their nominal opening dimensions AXB are used.



SIDE VIEW Figure E2

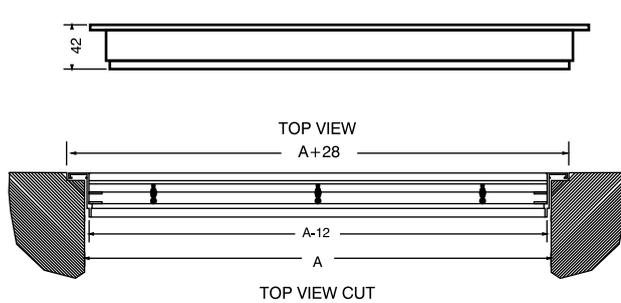
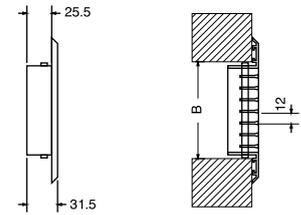


Figure E3

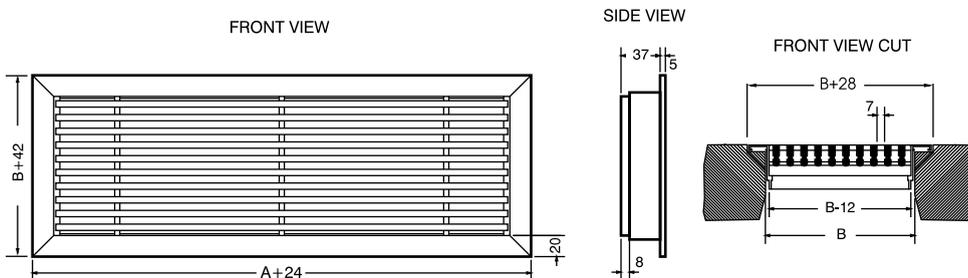


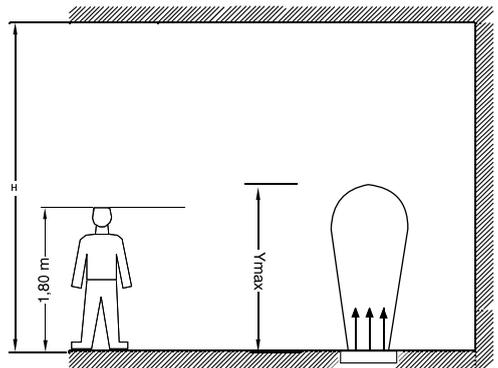
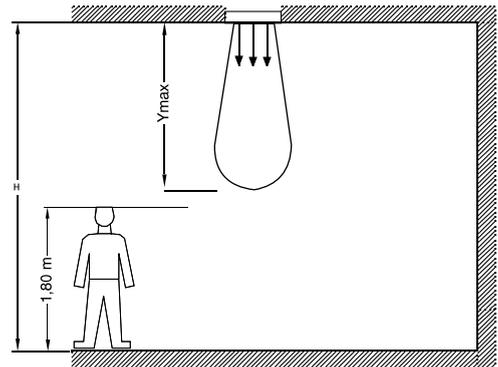
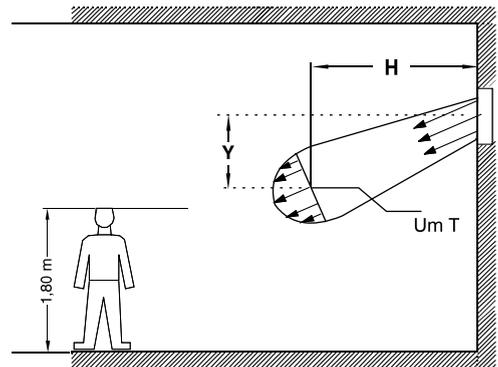
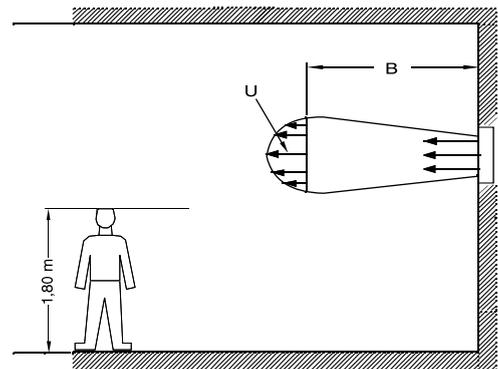
Table of the most common nominal dimensions of series E and BT grilles. The table shows also the appropriate diagrams to be used for the estimation of the grilles' characteristics.

Diagrams of page E5
Diagrams of page E6
Diagrams of page E7
Diagrams of page E8
Diagrams of page E9

		B [cm]																		
		10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
A [cm]	10	11	14	16	18	20	21	23	24	25	26	28	29	30	31	32	33	34	35	36
	15	14	17	20	22	24	26	28	29	31	32	34	35	37	38	39	40	41	43	44
	20	16	20	23	25	28	30	32	34	36	37	39	41	42	44	45	47	48	49	50
	25	18	22	25	28	31	33	36	38	40	42	44	45	47	49	50	52	54	55	56
	30	20	24	28	31	34	37	39	41	44	46	48	50	52	54	55	57	59	60	62
	35	21	26	30	33	37	40	42	45	47	50	52	54	56	58	60	62	63	65	67
	40	23	28	32	36	39	42	45	48	50	53	55	58	60	62	64	66	68	70	71
	45	24	29	34	38	41	45	48	51	54	56	59	61	63	66	68	70	72	74	76
	50	25	31	36	40	44	47	50	54	56	59	62	64	67	69	71	74	76	78	80
	55	26	32	37	42	46	50	53	56	59	62	65	67	70	72	75	77	79	82	84
	60	28	34	39	44	48	52	55	59	62	65	68	70	73	76	78	81	83	85	87
65	29	35	41	45	50	54	58	61	64	67	70	73	76	79	81	84	86	89	91	
70	30	37	42	47	52	56	60	63	67	70	73	76	79	82	84	87	90	92	94	
75	31	38	44	49	54	58	62	66	69	72	76	79	82	85	87	90	93	95	98	
80	32	39	45	50	55	60	64	68	71	75	78	81	84	87	90	93	96	98	101	
85	33	40	47	52	57	62	66	70	74	77	81	84	87	90	93	96	99	101	104	
90	34	41	48	54	59	63	68	72	76	79	83	86	90	93	96	99	102	104	107	
95	35	43	49	55	60	65	70	74	78	82	85	89	92	95	98	101	104	107	110	
100	36	44	50	56	62	67	71	76	80	84	87	91	94	98	101	104	107	110	113	

Shape of the air jet

Possible air jet configurations using E series grilles are shown in the adjacent figures. Different grille types are used for different applications. For example, for jet projection having an inclination angle with the wall the 15° E grilles are used. For cooling applications heavy-duty floor BT grilles are used. For heating purposes the E series grilles may also be mounted on ceilings.



Selection of E and BT series grilles

While selecting grilles of E and BT series it is important that the air jet conditions, i.e temperatures and velocities in the occupied zone are within specifications (e.g. CEN-CR-1752). For the selection of E and BT series grilles with dense blades the diagrams of pages E5 to E9 are used. The grilles' selection is based on their equivalent diameter. The equivalent diameter can be found for each grille type from the corresponding table. The equivalent diameter table may be used for identifying the diagrams to be used for the estimation of the grille's characteristics

The selection diagrams provide data for the following parameters:

- Throw of horizontal air jets (isothermal jet and 0,5 m/s final velocity)
- Pressure drop
- Mean air velocity at the grille
- Noise
- Drop/rise of an non-isothermal horizontal air jet
- Maximum throw of vertical non-isothermal air jets

For return air applications using E or BT series grilles the diagrams of pages E5 to E9 may be used for the estimation of the required pressure drop. The resulting noise should be reduced by 3 dBA.

All characteristics estimated using diagrams on pages E5 to E9 concern E12 grilles. To find the values for E17, inclined blades, or BT use the conversions of table in page E10.

The recommended noise levels to be used for grille selection are shown in the next table:

Nomenclature

Vo[m³/h]: Air volume flow

Uo [m/s]: Air velocity at the grille

D_{eq} [m]: Grille equivalent diameter

B [m]: Horizontal air throw (distance from the grille where the air jet has a velocity of 0,5 m/s)

X [m]: Horizontal distance from the grille

Y [m]: Vertical air throw or drop/rise

ΔP [Pa]: Pressure drop

Θ [dBA]: Noise level

ΔT [°C]: Temperature difference (air jet temperature - return air temperature)

Sound rooms, libraries, studios	under 30dBA
Offices, homes, hospital rooms, churches, hotel rooms, theaters	25 to 35dBA
Public buildings, restaurants, public places, banks	30 to 40dBA
Factories, gyms, shops, etc	35 to 50dBA

* The values are indicative and may not represent every case

Selection examples

For a space to be properly ventilated 3000 m³/h of air are required. The acceptable noise level is 30 dBA. What is the appropriate size and number of identical type E12 grilles mounted on the walls to cover the previous need? The grille horizontal dimension should be twice the vertical one. What are their operational characteristics?

From the equivalent diameter table of page E2 and for the dimensions specified, the corresponding diagrams are found to be the ones on page E6. From the noise level diagram E6.2 one may find that by using six identical E12 grilles with 500 m³/h air flow each, the equivalent diameter of the grilles should be around $D_{eq} = 0,31$ m. Thus, from the equivalent diameter table one may select grilles of dimensions 450x200mm.

The operation data for these grilles are :

Pressure drop around $\Delta P = 10$ Pa (Diagram E6.2),

Air velocity at the grille around $U_o = 2,2$ m/s (Diagram E6.1),

Air throw of around $B = 9,6$ m (Diagram E6.1).

What would be the operational characteristics of E17 grilles of the same dimensions ?

Using E17 grilles instead of the E12 means that according to the table on page E10, the pressure drop ΔP would have been $0,775 * 10 = 7,8$ Pa, the air velocity at the grille $U_o = 1,8$ m/s, air throw B of 8,4 m and noise level around 25 dBA.

What is the appropriate height for the above E12 grilles to be mounted on the sidewalls, when they operate with cool air of 500m³/h each and with $\Delta T = 10^{\circ}C$, so that the air jet would not enter the occupied zone for a distance less than 6 m from the walls? The room height exceeds 5 m.

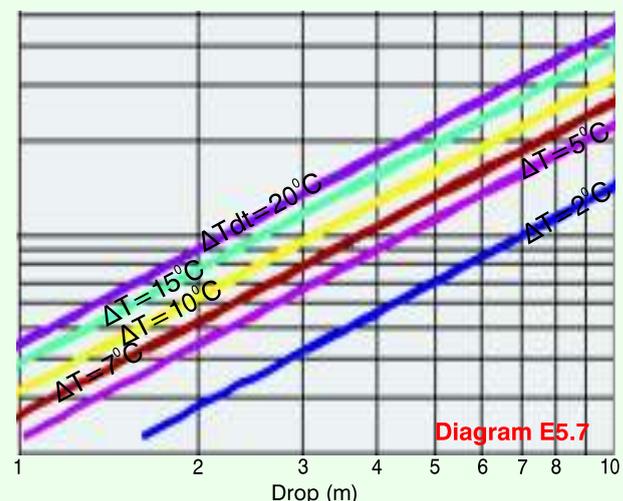
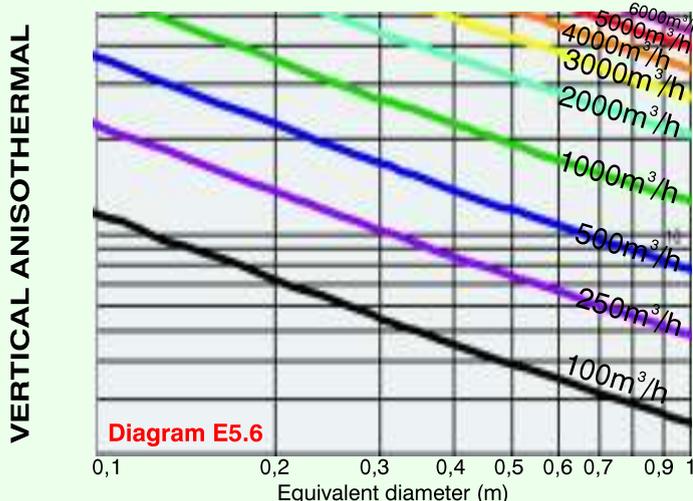
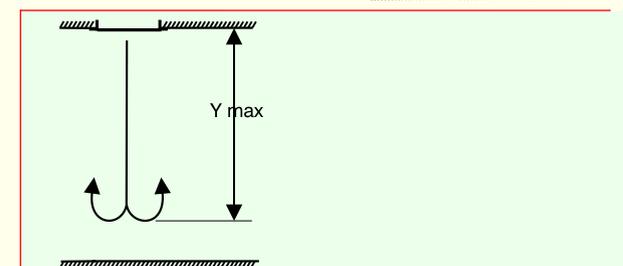
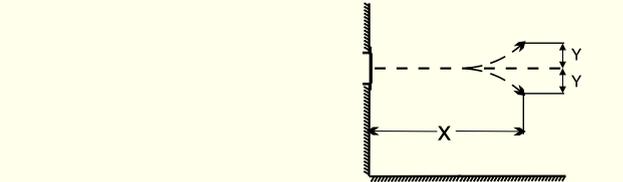
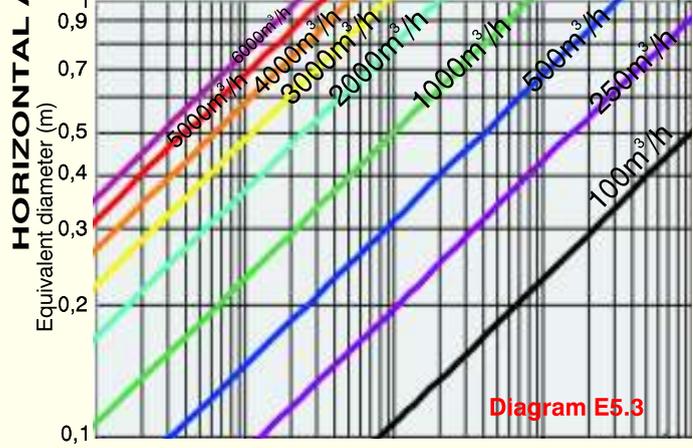
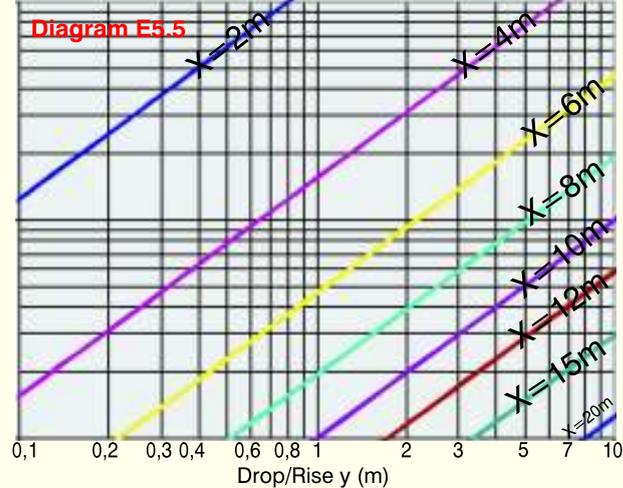
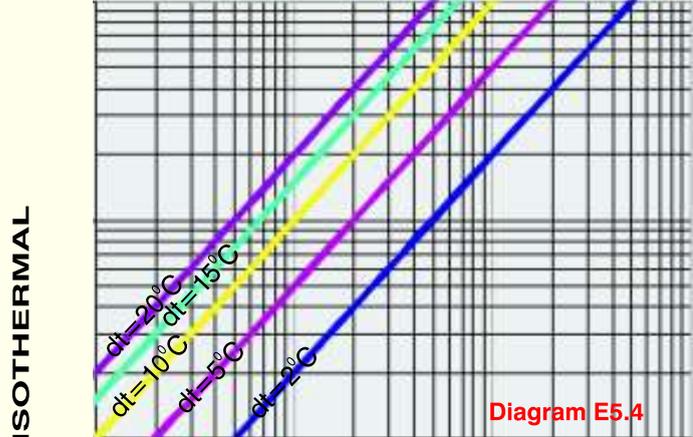
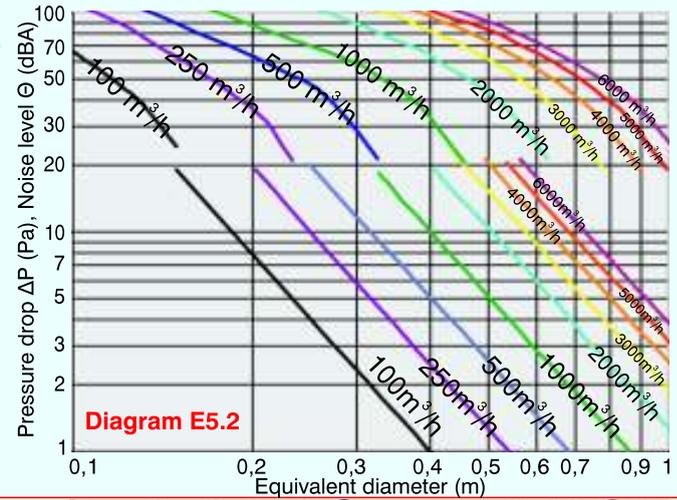
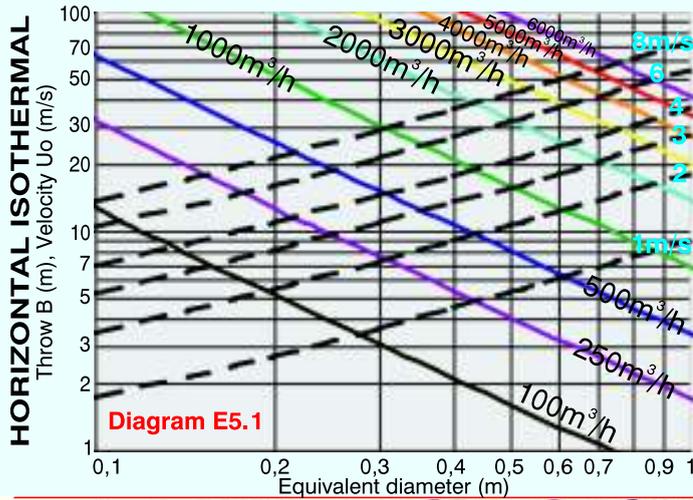
From Diagram E6.3 and for $D_{eq} = 0,31$ m and 500m³/h, moving first vertically to Diagram E6.4 and curve corresponding to $\Delta T = 10^{\circ}C$, and then horizontally to Diagram E6.5 and curve corresponding to distance 6 m from the sidewall, one reads a drop of about 1,4 m. This means that since the occupied zone is 1,8 m from the floor, the grilles should be mounted at a height greater than $H = 1,8 + 1,4 = 3,2$ m. At this height there is no possibility of Coanda effect, since the room height is large enough.

For heating the same space E17 linear grilles of size 550x150 have been selected to be mounted on the ceiling. Which is the appropriate air flow rate for supplying hot air of a $\Delta T = 10^{\circ}C$, keeping the maximum throw below 5 m?

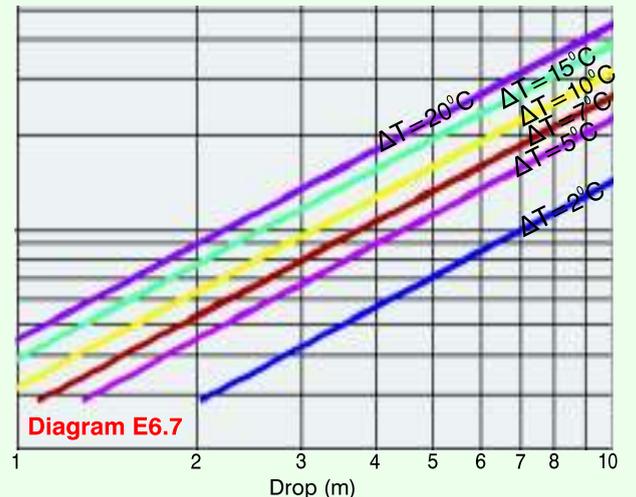
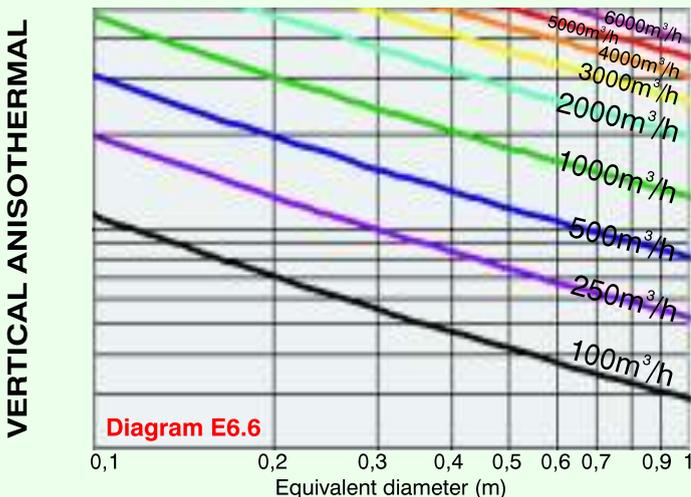
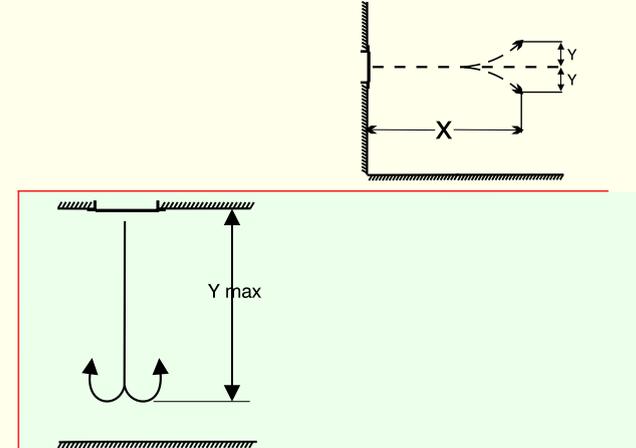
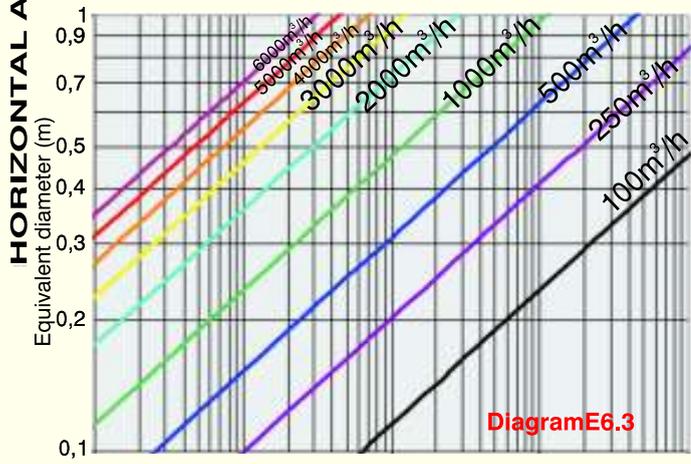
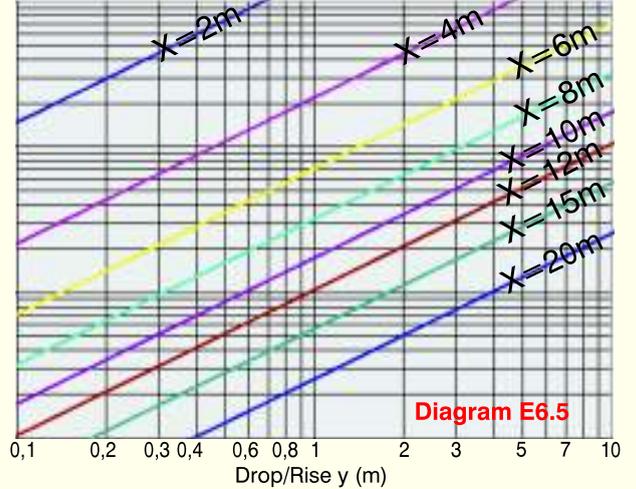
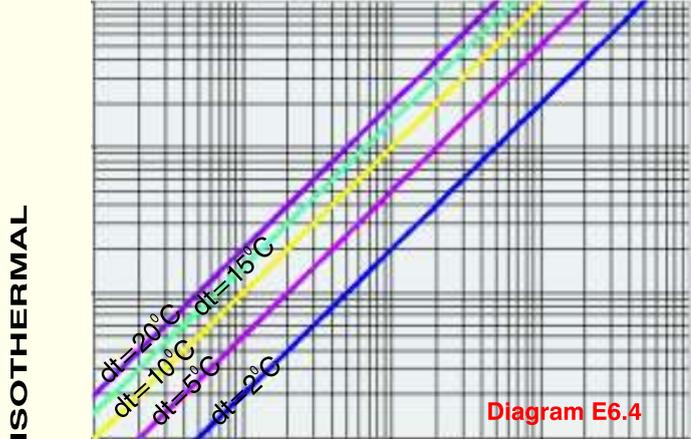
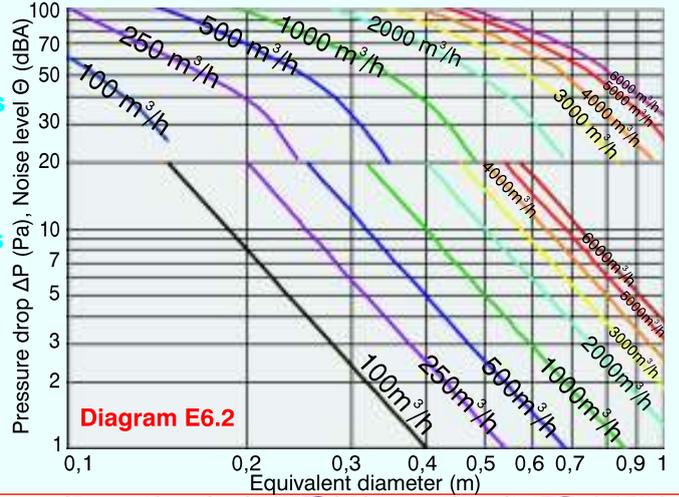
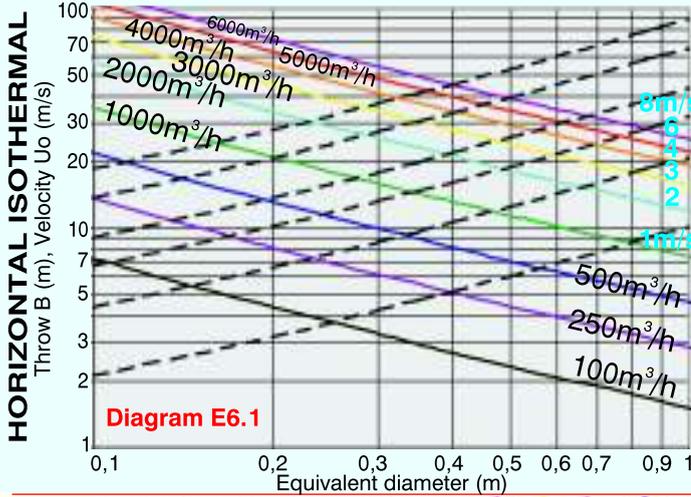
From the equivalent diameter table of page E2 the equivalent diameter is found to be $D_{eq} = 0,3$ m while the corresponding diagrams are the ones on page E7. From Diagrams E7.6 and E7.7 it can be found that for $D_{eq} = 0,3$ m and 500 m³/h the maximum throw is around 5,1 m. Thus, from the table on page E10, the maximum throw is around $Y_{max} = 5,1 * 0.875 = 4,5$ m. From Diagram E7.2 the resulting noise is around 32 dBA. Thus, for the E17 grilles the noise level raises to 27 dBA.

The following selection diagrams may be used for grille selection as good approximation.
For more accurate grille selection please refer to Breezmaster software program
at www.aerogrammi.gr

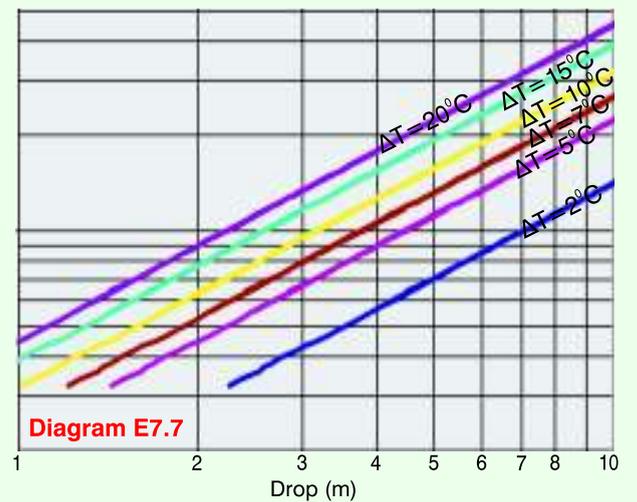
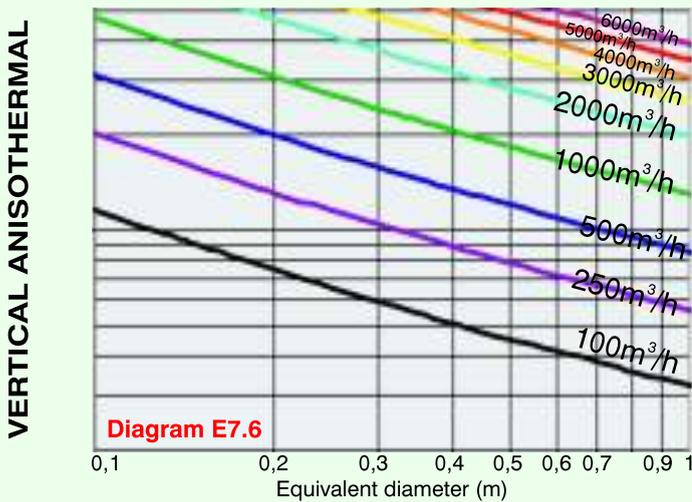
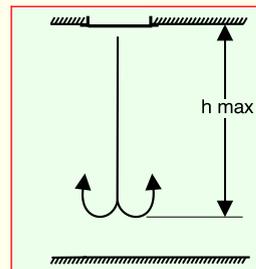
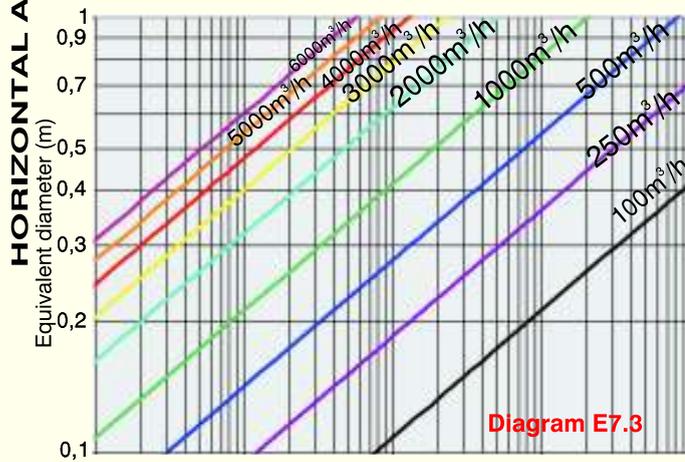
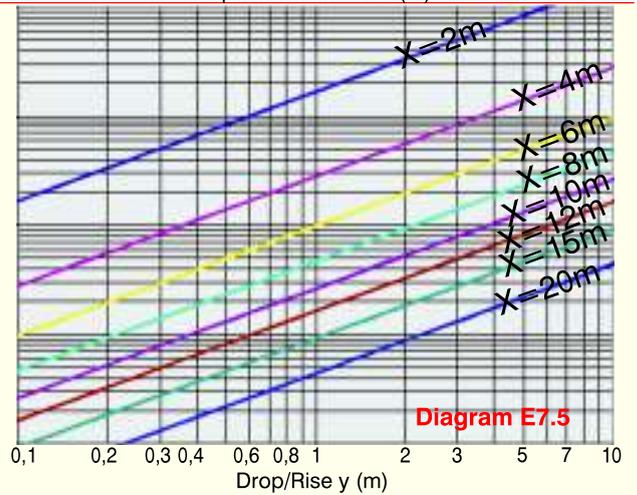
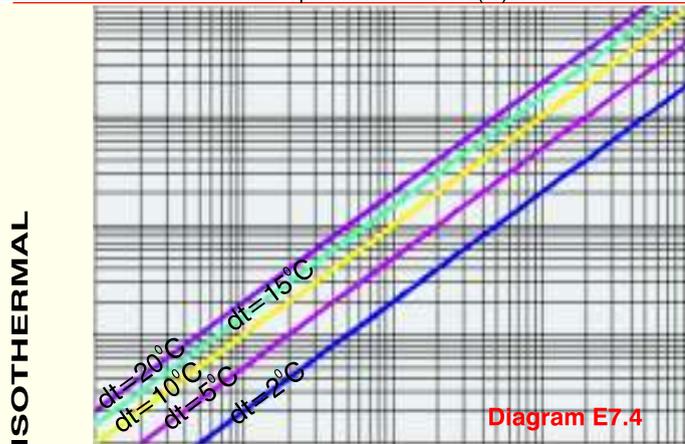
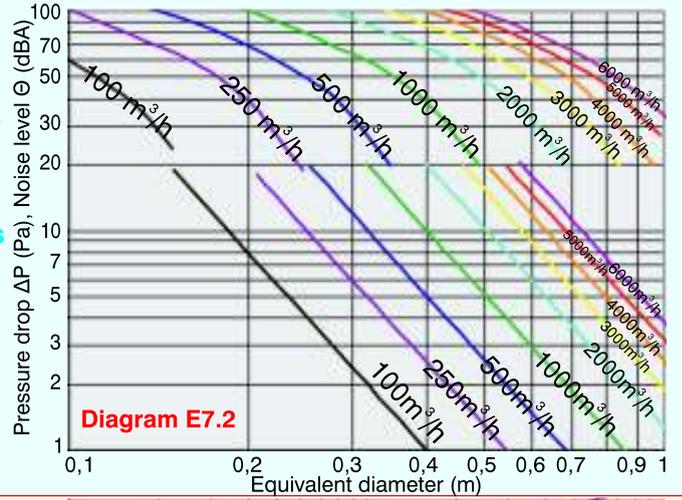
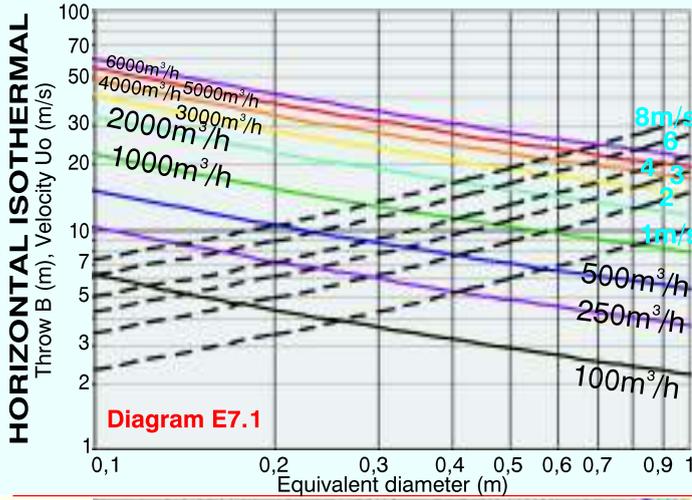
LINEAR GRILLES - SERIES E & BT - Performances



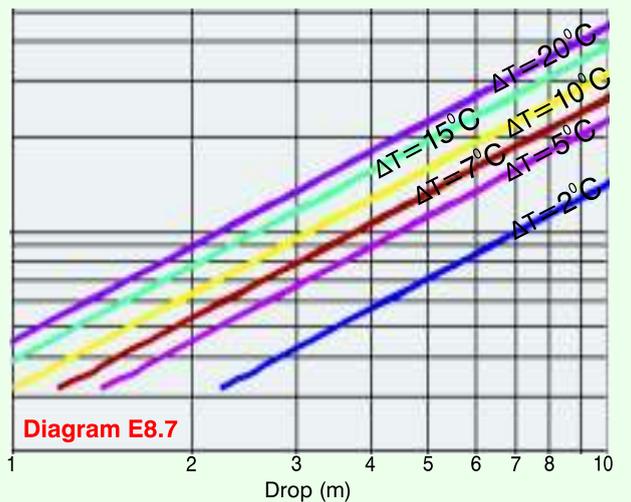
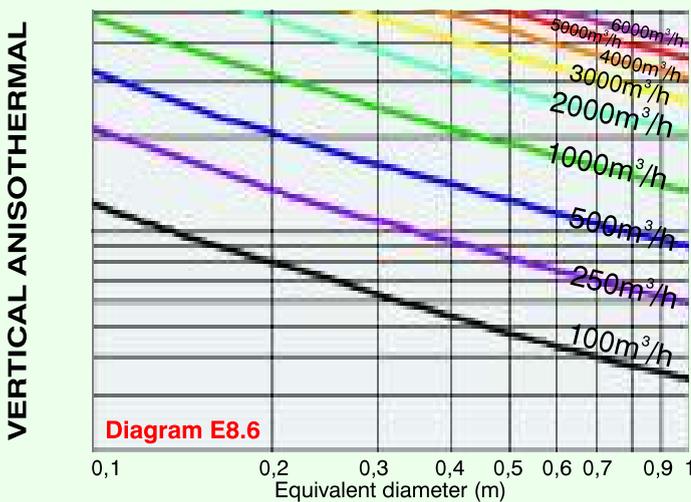
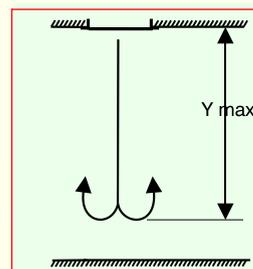
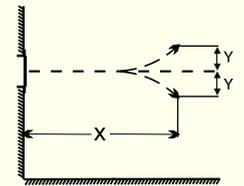
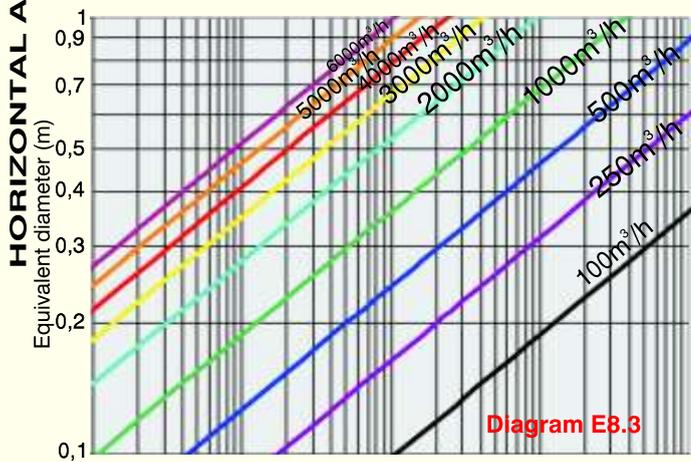
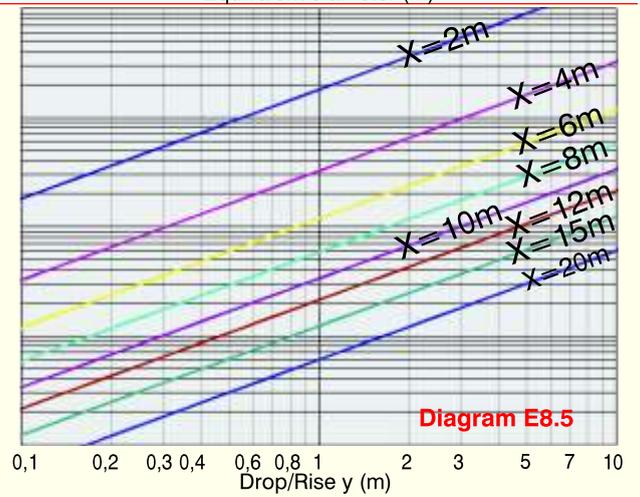
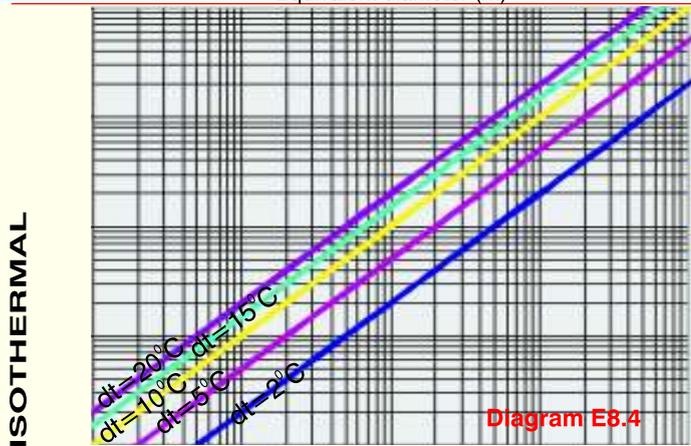
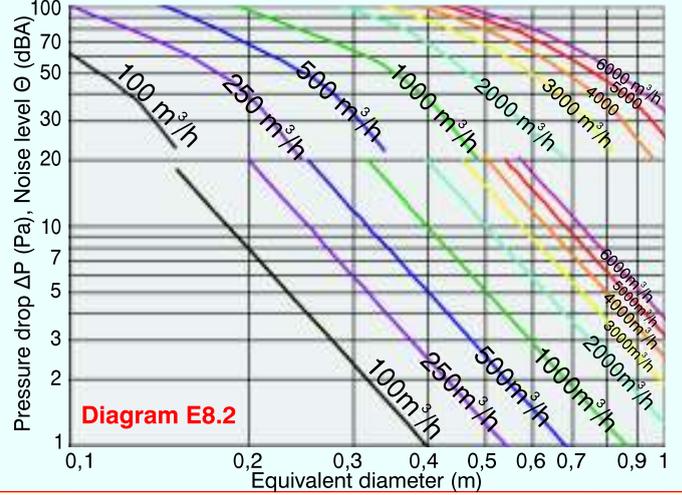
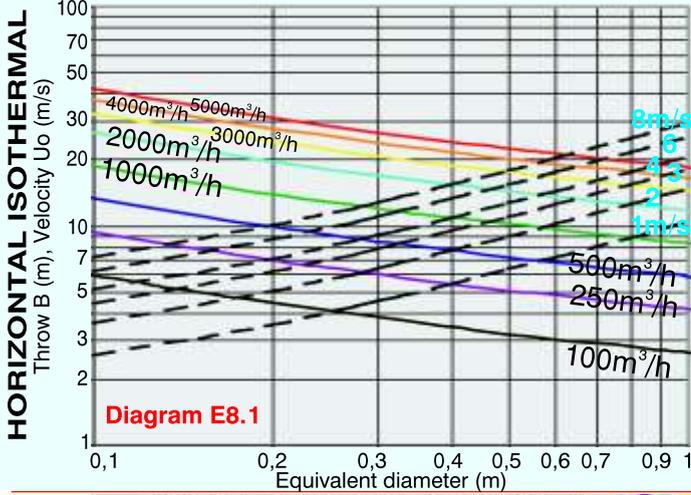
LINEAR GRILLES - SERIES E & BT - Performances



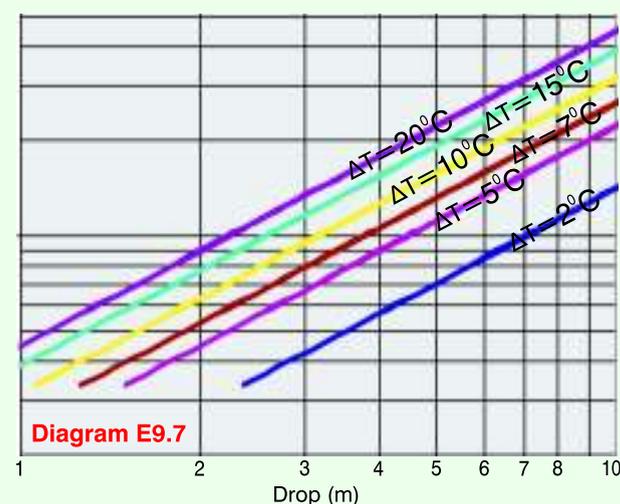
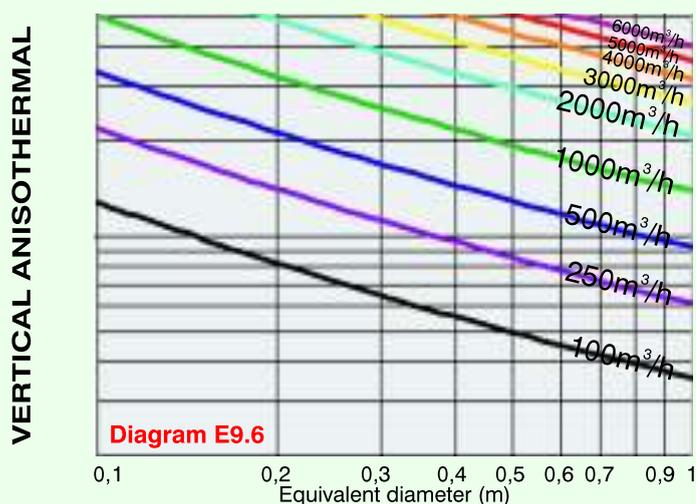
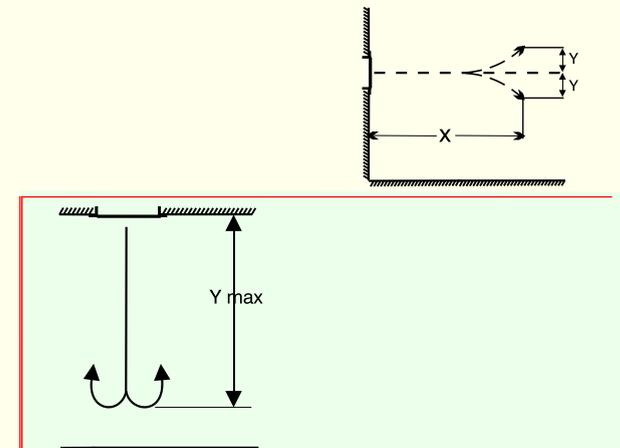
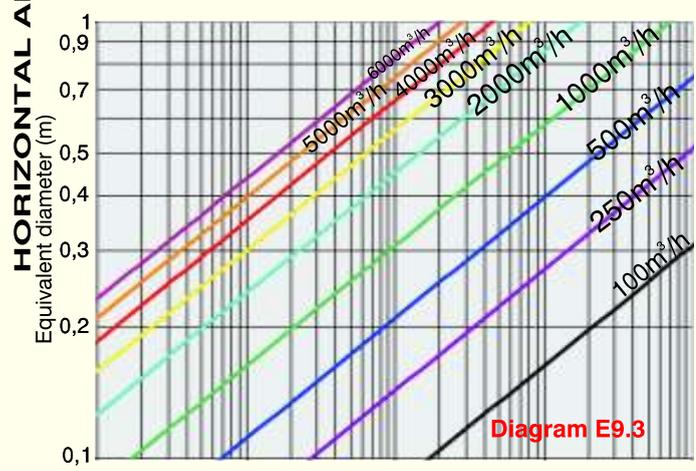
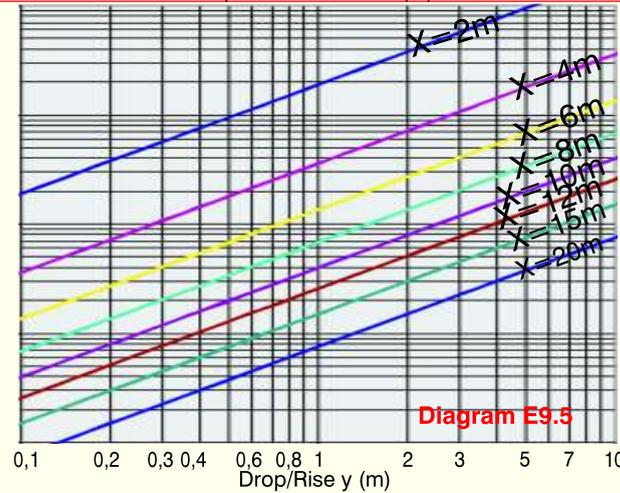
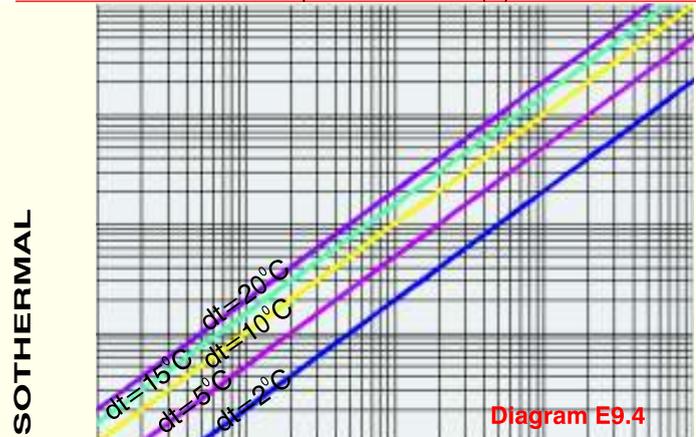
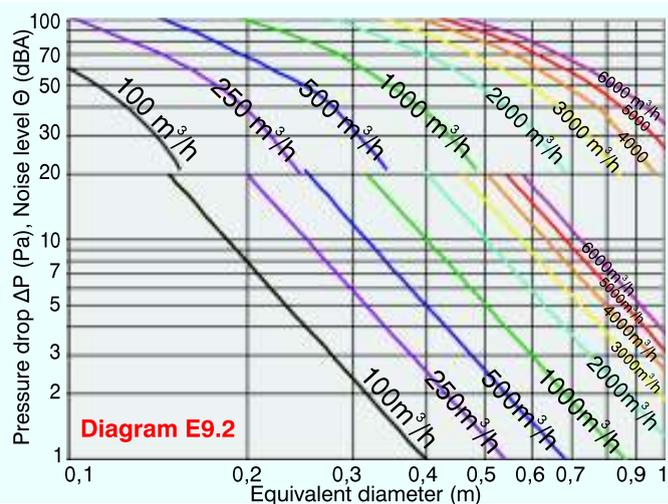
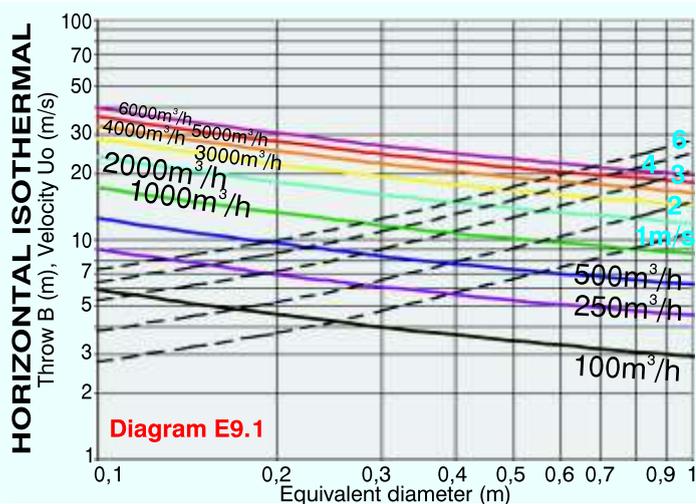
LINEAR GRILLES - SERIES E & BT - Performances



LINEAR GRILLES -SERIES E & BT- Performances



LINEAR GRILLES -SERIES E & BT- Performances



In case that linear grilles other than the E12 type are to be used in ventilation applications, then their operational characteristics values ought to be corrected. Conversions are presented in the following table. From the values calculated using the selection diagrams on pages E5 through E9, that correspond to E12 grilles, the characteristics of E17, E15 or BT types of linear grilles may be calculated using the following table:

The conversions for E15 correspond to an E12 grille with inclined blades by 15°. To estimate the values for an E17 grille with inclined blades, the values from the diagrams should first be corrected by the factors for E17 and then for E15 as well.

Conversion factors for :	E17	E15	BT
Pressure Drop ΔP [Pa]	x 0,775	x 1,9	x 1,375
Noise level Θ [dBA]	- 5	+ 1	+ 2,4
Velocity at the grille U_0 [m/s]	x 0,83	x 1,05	x 1,1
Throw B or Y_{max} [m]	x 0,875	x 0,846	x 0,897
Drop/Rise $Y(at\ x)$ [m]	x 1	$Y_{12} - 0,9xX$	x 1

Table E10 : Conversion factors for E17, E15 and BT type grilles

Working example

What are the operational characteristics of linear grilles of types E17, E15 and BT, when the derived values from the selection diagrams gave the following characteristics (corresponding to a E12 grille):

Velocity at the grille $U_0 = 3$ m/s
 Horizontal throw $B = 11$ m (at 0,5 m/s final velocity)
 Pressure Drop $\Delta P = 9$ Pa
 Noise level $\Theta = 25$ dBA
 Rise $Y = 2$ m at distance $x = 5$ m from the grille for $\Delta T = 10^\circ C$.

Using the conversion factors of table E10, and for each of the grille types one gets:

E17 Grille

Velocity at the grille $U_0 = 3 * 0,83 \approx 2,5$ m/s
 Horizontal throw $B = 11 * 0,875 = 9,6$ m (at 0,5 m/s final velocity)
 Pressure Drop $\Delta P = 9 * 0,775 \approx 7$ Pa
 Noise level $\Theta = 25 - 5 = 20$ dBA
 Rise $Y = 2 * 1 = 2$ m at distance $x = 5$ m from the grille for $\Delta T = 10^\circ C$.

E15 Grille

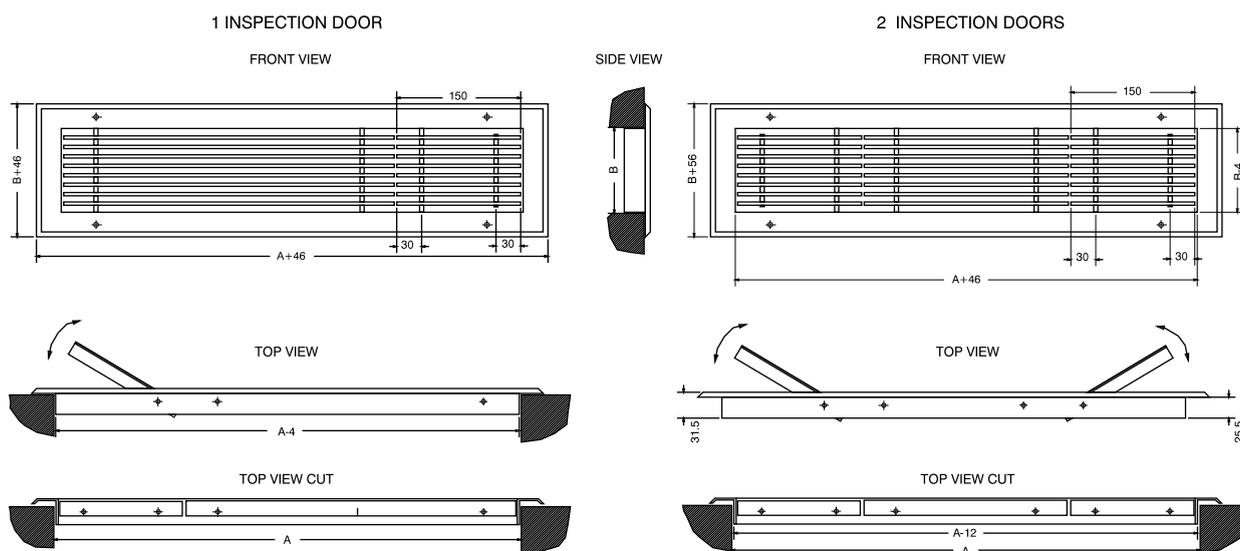
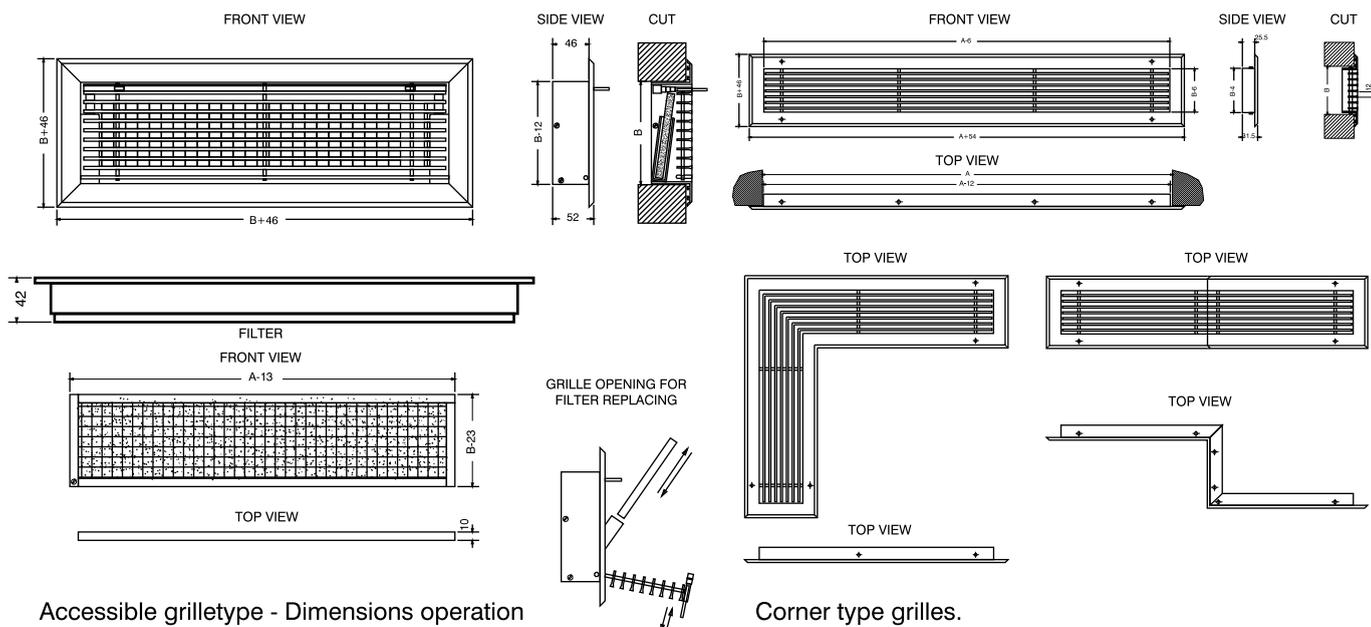
Velocity at the grille $U_0 \approx 3 * 1,05 \approx 3,15$ m/s
 Horizontal throw $B = 11 * 0,846 = 9,3$ m (at 0,5 m/s final velocity)
 Pressure Drop $\Delta P = 9 * 1,9 = 17$ Pa
 Noise level $\Theta = 25 + 1 = 26$ dBA
 Rise $Y = 2 * - 0,9 * 5 = - 2,5$ m (drop of 2,5m) at distance $x = 5$ m from the grille for $\Delta T = 10^\circ C$.

BT Grille

Velocity at the grille $U_0 = 3 * 1,1 = 3,3$ m/s
 Horizontal throw $B = 11 * 0,897 = 9,9$ m (at 0,5 m/s final velocity)
 Pressure Drop $\Delta P = 9 * 1,375 = 12,4$ Pa
 Noise level $\Theta = 25 + 2,4 = 27,4$ dBA
 Rise $Y = 2 * 1 = 2$ m at distance $x = 5$ m from the grille for $\Delta T = 10^\circ C$.

Special air grilles can be constructed :

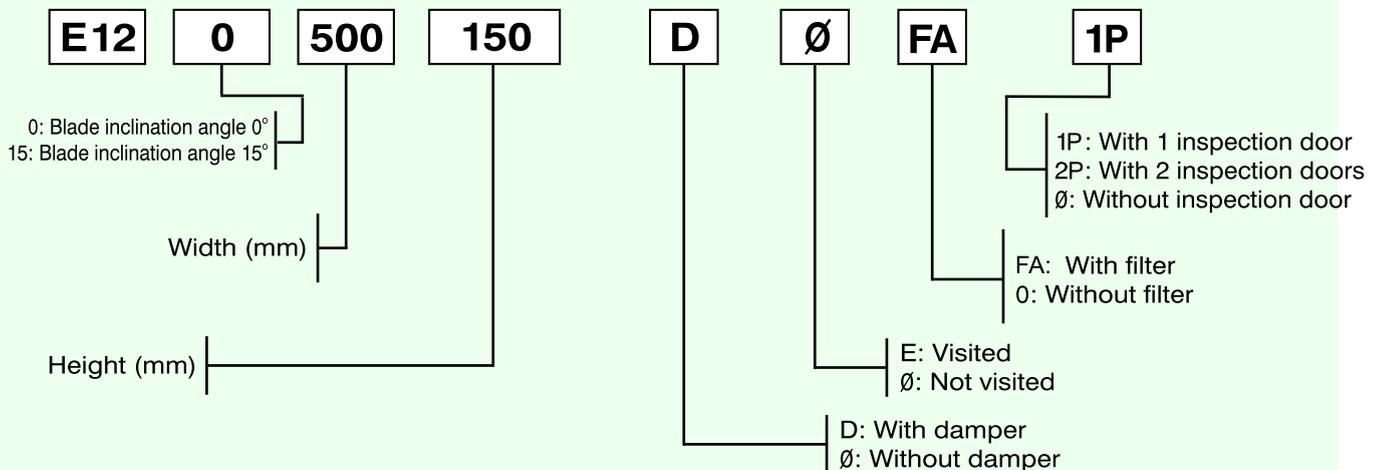
- Accessible: We can check the condition of the filter as well as the air duct through a little window
- Corner: For special, esthetic and functional installations
- Construction with control doors: An aluminum profile with anodic depth of 12 μm is used in their construction. That leads to a long-lasting operation life. Alternatively, electrostatic painting is feasible in a variety of colors.



Due to continuous development of its products, AERGRAMMI reserves the right of modifications without prior notice.

ORDER GUIDELINES

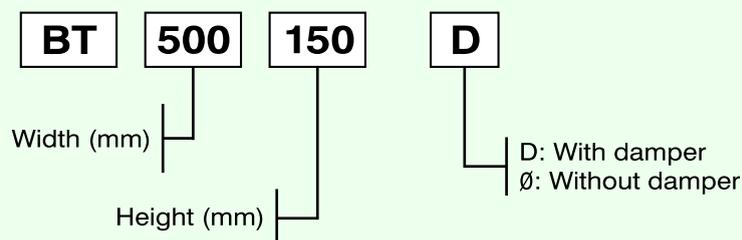
A series of numbers and letters is used to order E a series grilles. The characteristics of the air grille are defined according to the following code:



Order example

Air grille type E12, dimensions 500X150 mm, equipped with damper, air filter and one inspection door, not visited : **E12 0° 500X500 D FAP O**

For BT series of grilles the characteristics may be defined by the following code:



Technical description

Manufactured by anodized aluminum profile wall or ceiling mounted grilles. Able to be mounted on the floor for cooling applications (BT series). With fixed horizontal series of blades, may be equipped with an adjustable vertical series, adequate for jet span manipulation. Could be optionally accompanied with flow regulating dampers and air filters. They may be equipped with an inspection door. May be manufactured in special types, i.e. with one or two inspection doors, with easily removable filters, for corners, etc. Their operational characteristics should be :

SUPPLY AIR

Air supply : [m³/h]
 Pressure drop (total) : [Pa]
 Air throw : [m]
 Temperature difference : [°C]
 Noise level : [dBA]

RETURN AIR

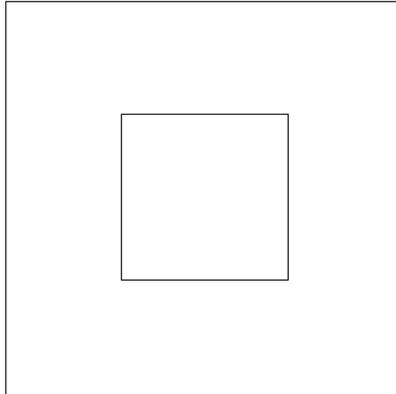
Air supply : [m³/h]
 Pressure drop (total) : [Pa]
 Noise level : [dBA]



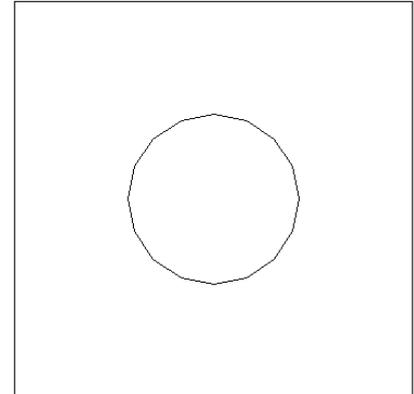
ΠΛΑΚΕΣ – TILES 595X595mm ΓΙΑ ΤΟΠΟΘΕΤΗΣΗ ΣΤΟΜΙΩΝ – FOR DIFFUSER INSTALLATION



RF-SPR



SPQ



SPR

- Χαλύβδινη πλάκα πάχους 1mm εξωτερικών διαστάσεων 595X595mm με οπή για τοποθέτηση στομίου. Το στόμια και η πλάκα είναι βαμμένα ηλεκτροστατικά σε χρώμα RAL. Κατασκευάζεται σε δύο τύπους: με τετράγωνη οπή (SPQ) και με στρογγυλή οπή (SPR).
- Steel plate with thickness 1mm and outside dimensions 595X595mm for diffuser installation. The plate and the diffuser are electrostatically painted in RAL color. Manufactured in two types: with square hole (SPQ) with round hole (SPR).

Δυνατές ονομαστικές διαστάσεις στομίων για εγκατάσταση σε SPQ:

- Για T1Π/ΤΕΠ/Τ2Π/Ε12/Ε17/ΟΚ: 100X100, 125X125, 150X150, 200X200, 250X250, 300X300, 350X350, 400X400, 450X450, 500X500mm.

- Για Ο: 150X150, 200X200, 230X230, 250X250, 300X300, 350X350, 380X380, 400X400, 450X450mm.

Δυνατές ονομαστικές διαστάσεις στομίων για εγκατάσταση σε SPR:

- Για RF: 150, 200, 250, 300, 350, 400, 450.

- Για MLD: 200, 250, 300, 350, 400, 450.

- Για MLD-DW: 200, 250, 300, 350, 400.

- Για AMB-KO: 80, 90, 110, 125, 120, 160, 180, 195.

Possible nominal grille dimensions for installation in SPQ:

- For T1P/TEP/T2P/E12/E17/OK: 100X100, 125X125, 150X150, 200X200, 250X250, 300X300, 350X350, 400X400, 450X450, 500X500mm.

- For O: 150X150, 200X200, 230X230, 250X250, 300X300, 350X350, 380X380, 400X400, 450X450mm.

Possible nominal diffuser dimensions for installation in SPR:

-For RF: 150, 200, 250, 300, 350, 400, 450.

-For MLD: 200, 250, 300, 350, 400, 450.

-For MLD-DW: 200, 250, 300, 350, 400.

-AMB-KO: 80, 90, 110, 125, 120, 160, 180, 195.

Ονομαστικές διαστάσεις στομίων (AXA ή ΦΑ) για / Nominal grilles dimensions (AXA or ΦΑ) for:

α) T1Π, T2Π, ΤΕΠ, ΟΚ, Ε12/17

β) Ο

γ) RF, MLD

α) T1P, T2P, TEP, OK, E12/17

b) O

c) RF, MLD

