Sizing of half round outlets, diffusion type

Half round outlets are sized following the same guidelines given for round diffusion outlets. However, due to the half round profile a few adjustments must be made to the formulas involved with calculating the effective surface area of the outlet (as air is only going through the arched section on the half round outlets).

Thus, effective surface area (A) for half round outlets can be found as:

A = Length of outlet x diameter (diameter = width of outlet) x π x 0.5 (SI units)

Other than that, the following charts applies for sizing half round outlets:

Chart 8:
Characteristic flow diagram, half round outlets

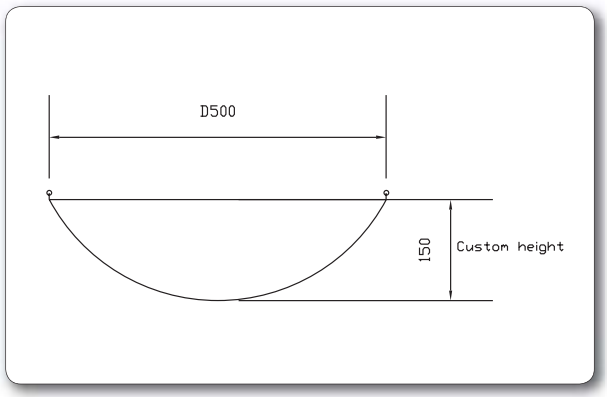
Chart 9:
Air flow patterns, half round outlets

Chart 10,11 & 12:
Selection of diameter, various air flow rates

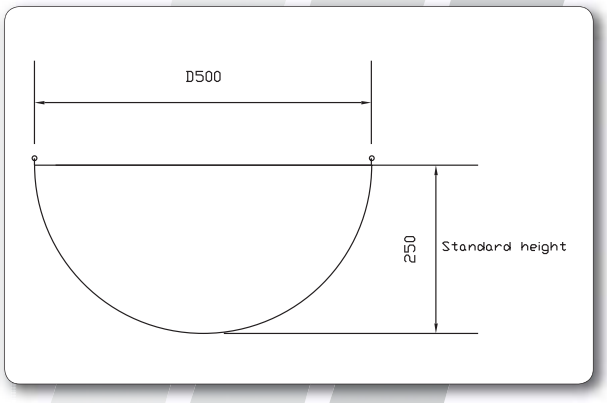
Half round outlets are typically used in office- or sales areas, where aesthetics is of great importance, and where the ceiling height would typically not allow for a round outlet to be mounted.

In extension of this, it is worth mentioning that we can also offer outlets "less than half round" i.e. an outlet with a height of less than diameter x 0.5 (see below). If you should have a project calling for such outlets, please contact your local Euro Air representative for correct sizing (surface area formula and diameter selection chart does not apply for this kind of outlet).

Half round outlets have another inherent advantage, due to the half round profile: The outlets will retain their profile even when fan or air handling unit is turned off. This of course also means that half round outlets are eminently suited for Variable Air Volume systems.



Section view



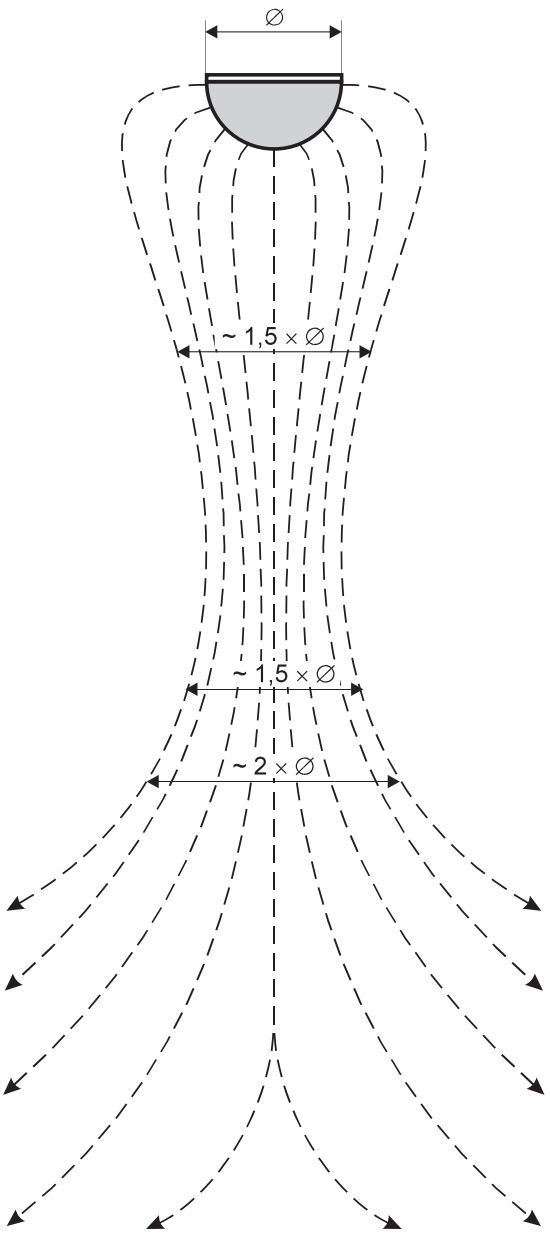
Section view

Sizing, Chart 8

Characteristic flow diagram, half round outlet

The illustration below depicts the typical air movement found directly under a Euro Air textile outlet. The air velocity under the outlet, as well as the flow pattern, is highly dependant upon the chosen room catagory, i.e. the inlet air temperature, and the cooling capacity per running meter of outlet.

$$v_B = v_{QA} \times F \quad [\text{ m/s }]$$

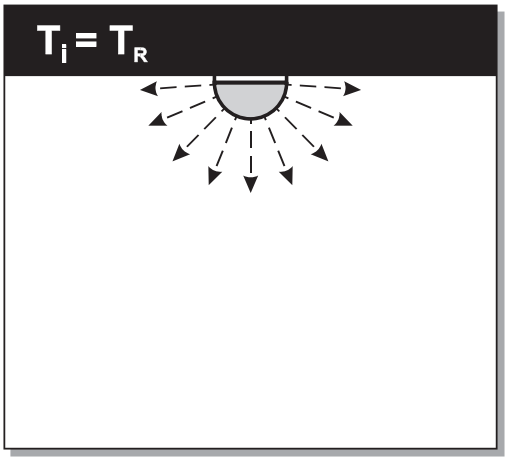


Helght	Area	Air velocity factor F Room type		
		I	II	III
~ 0,5 × ∅	Displacement area	1 to 1,25	1 to 1,5	1 to 2
~ 1,5 × ∅				
~ 2,5 × ∅	Main area	1,25 to 1,5	1,5 to 2,5	2 to 4
~ 4 × ∅	Occupied area	1,5 to 2	2,5 to 3	>4

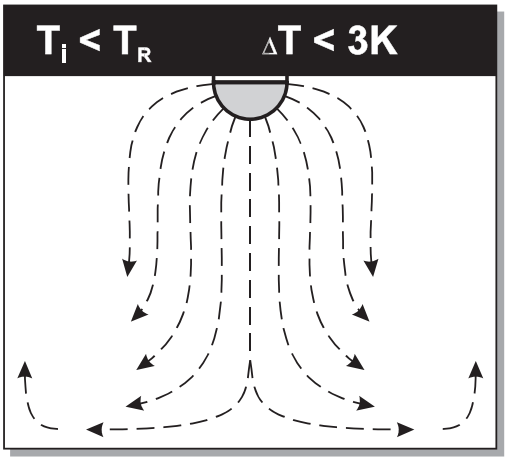
v_B = Flow velocity in the occupied area
v_{QA} = Velocity out of textile
F = Air velocity factor

Sizing, Chart 9

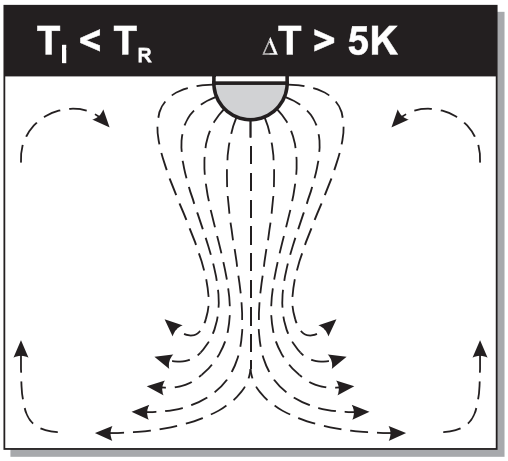
Air flow patterns, diffuse half round outlets



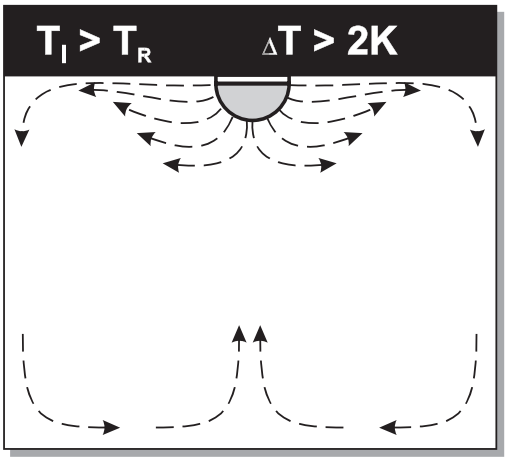
Picture 1



Picture 2



Picture 3

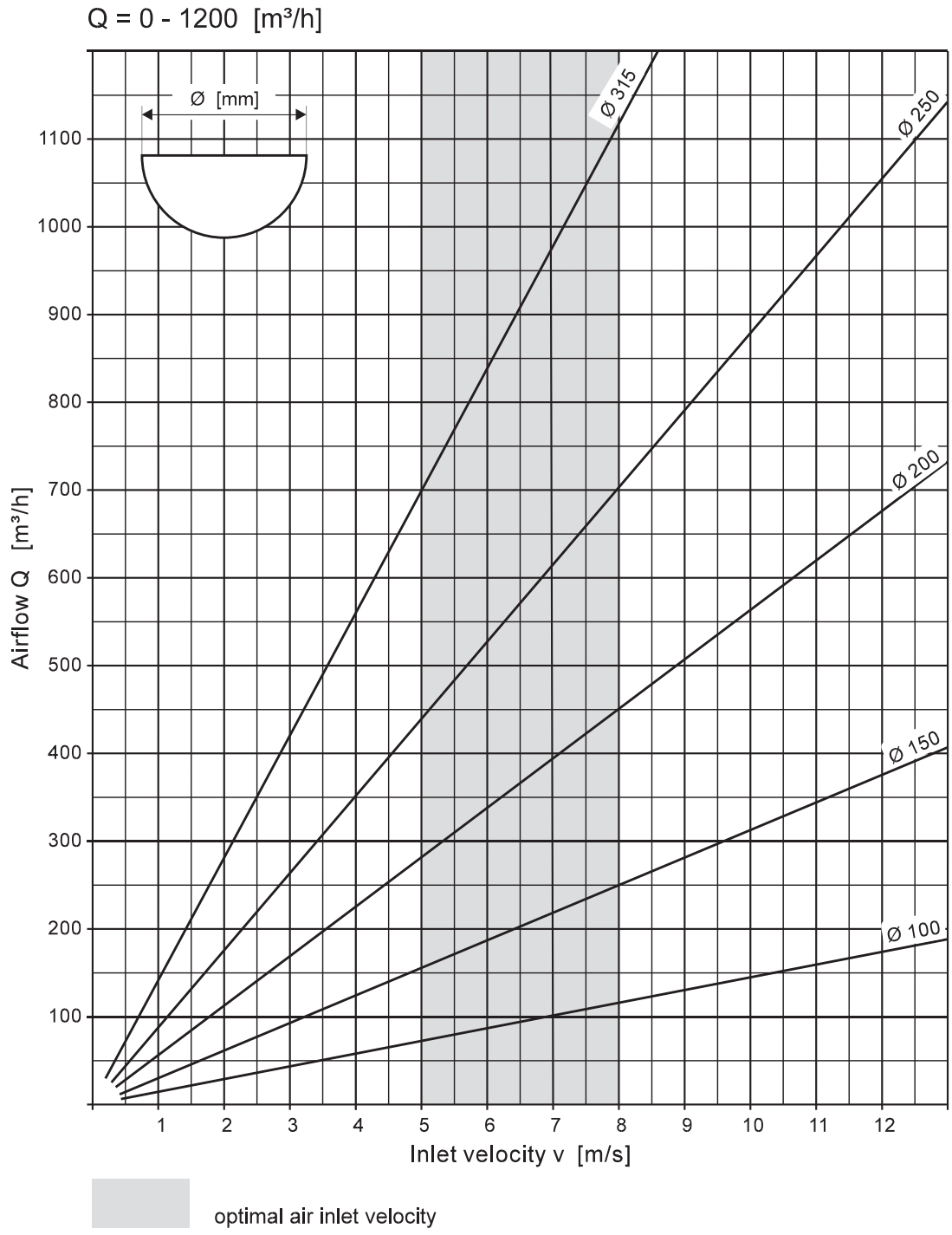


Picture 4

T_i = Temperature inlet
T_R = Temperature room

Sizing, Chart 10

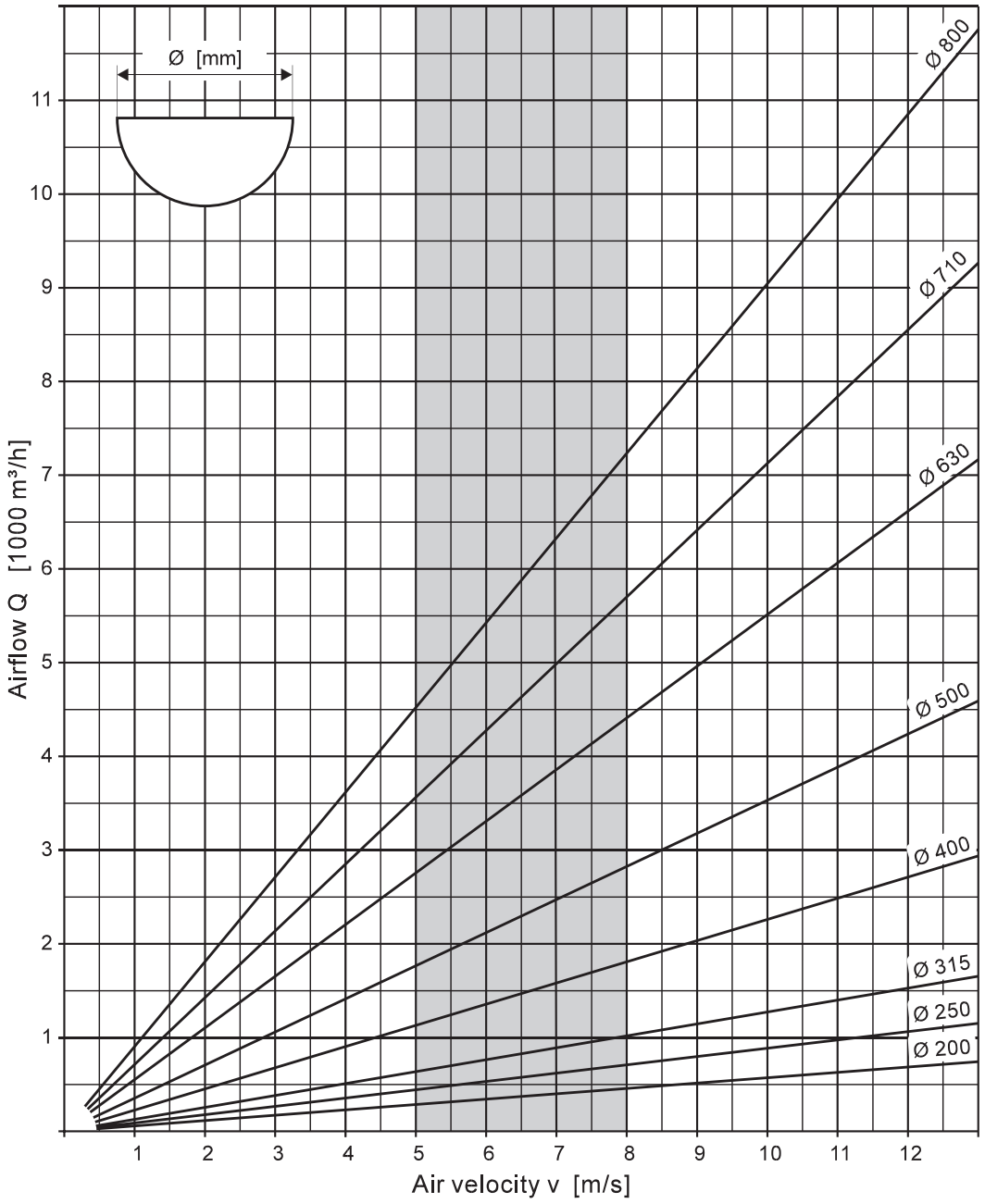
Selection of diameter, half round outlets (end fed)



Sizing, Chart 11

Selection of diameter, half round outlets (end fed)

Q = 0 - 12000 [m³/h]



optimal air inlet velocity

Sizing, Chart 12

Selection of diameter, half round outlets (end fed)