

Sizing of outlets with sewn-in slot diffusers

Principles of Air Dispersion

To facilitate both heating and cooling using the same outlet, Euro Air has developed a ventilation outlet that incorporates sewn-in slot diffusers to combine the advantages of both displacement ventilation and induced circulation. Ventilation outlets with slot diffusers are excellent for air conditioning work stations. At least 95% of the outlets surface area is used to supply air at low velocity to utilise the advantage of displacement ventilation. The slot injects air at a high velocity in the chosen direction, to facilitate mixing and circulation. This high speed air stream prevents stratification under the ceiling, when Air handling unit is in heating mode.

Outlets with slot diffusers above the centreline

When cooling (chart 13, upper left corner), the slot diffuser above the centreline of the outlet directs cold air horizontally away from the outlet. This spreads the cold air over a larger area in the room. A particular advantage is that the cooling capacity per linear meter can be increased compared to the Euro Air room categories (see page 4.1.3) – please call your nearest Euro Air office for guidance on this issue. When heating a high ceiling room (chart 13, lower right corner) with a low ΔT of $+3^{\circ}\text{C}$ or less, this slot configuration works very well to create adequate room circulation.

Socks with Diffusers Below the Centerline

The sock with diffusers orientated downwards (chart 13, upper right corner) is the proven method of delivering air with a high ΔT of more than 3°C during the heating season. This slot orientation forces the air downwards and outwards along the whole length of the outlet, creating more uniform and thorough circulation than conventional diffusers. While heating is the primary application for this configuration, it is also suitable for light cooling (Chart 13, lower left corner)

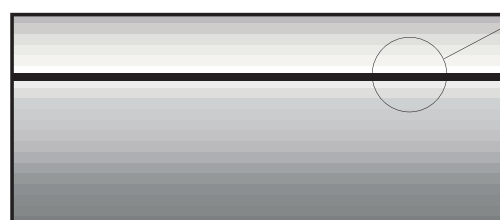
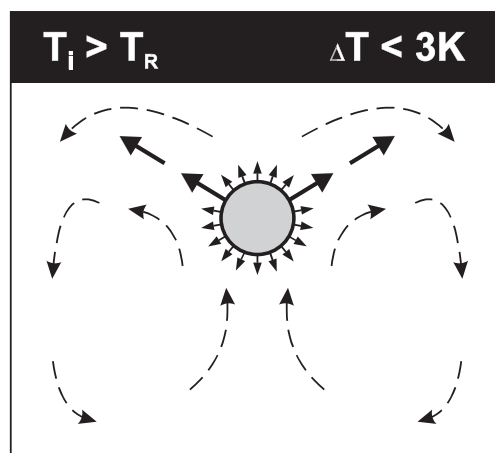
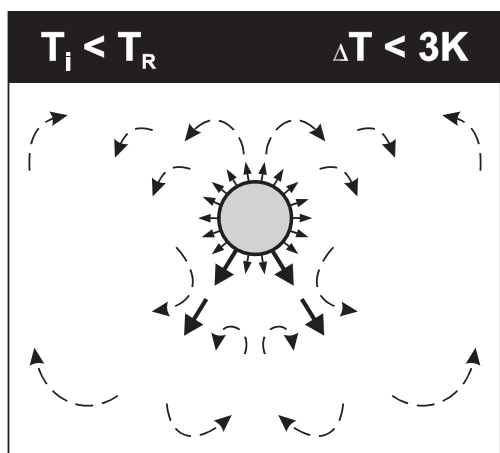
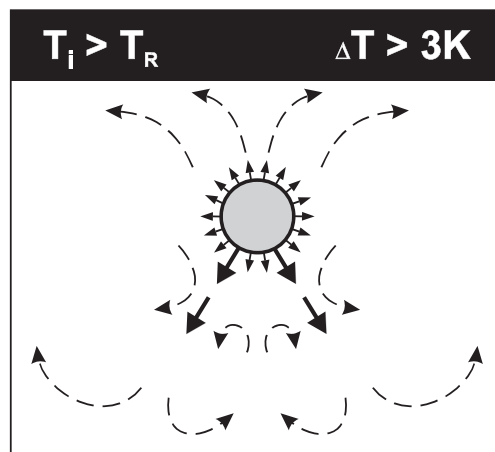
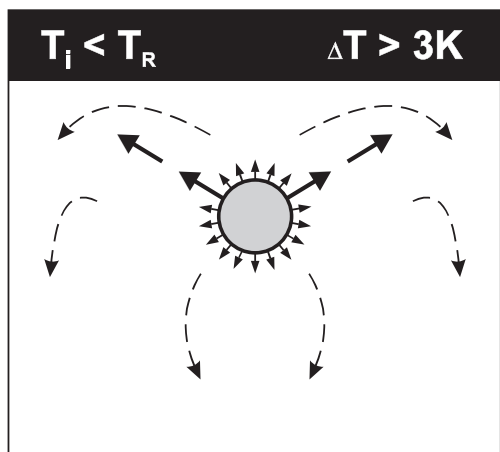
Euro Air slot diffusers are not identical in function to conventional diffusers or slot outlets, which deliver the entire airflow through their orifice. The Euro Air slot diffusers are used to trim the direction and velocity of a specific percentage of the airflow, while the remainder of the air is delivered through the available surface area of the fabric. This increases the range of applications for draft-free air delivery with socks.

Sizing with slot diffusers

Consider the slot diffuser as an option, on top of the standard diffuse outlet. First determine the split between "textile air flow" and "slot diffuser air flow". Optimum size of diameter is found as for the diffuse outlet, i.e. please turn to charts 3,4 or 5 (for round outlets) or charts 10,11 or 12 (for half round outlets) to determine suitable diameter. Then, using the textile air flow only, calculate the best suited permeability as described on pages 4.1.4 and 4.1.5. Take the remaining air flow (the slot diffuser airflow) and divide with length of outlets and number of slot diffusers, to find the slot diffuser air flow / running meter of outlet. Using the same pressure you applied when finding the permeability of the textile, turn to chart 14 to find the slot diffuser width best suited (minimum slot width is 2 mm, maximum is 30 mm, increments of 2 mm possible in between). As an extra service Euro Air will provide accurate simulations of throw and velocities in the occupied zone, please do not hesitate to call us for this service (see example of this, chart 15).

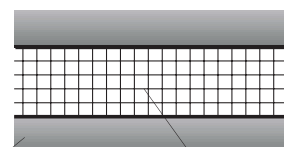
Sizing, Chart 13

Airflow patterns, outlet with dual slot diffusers



Slotrow diffuser

Sock material



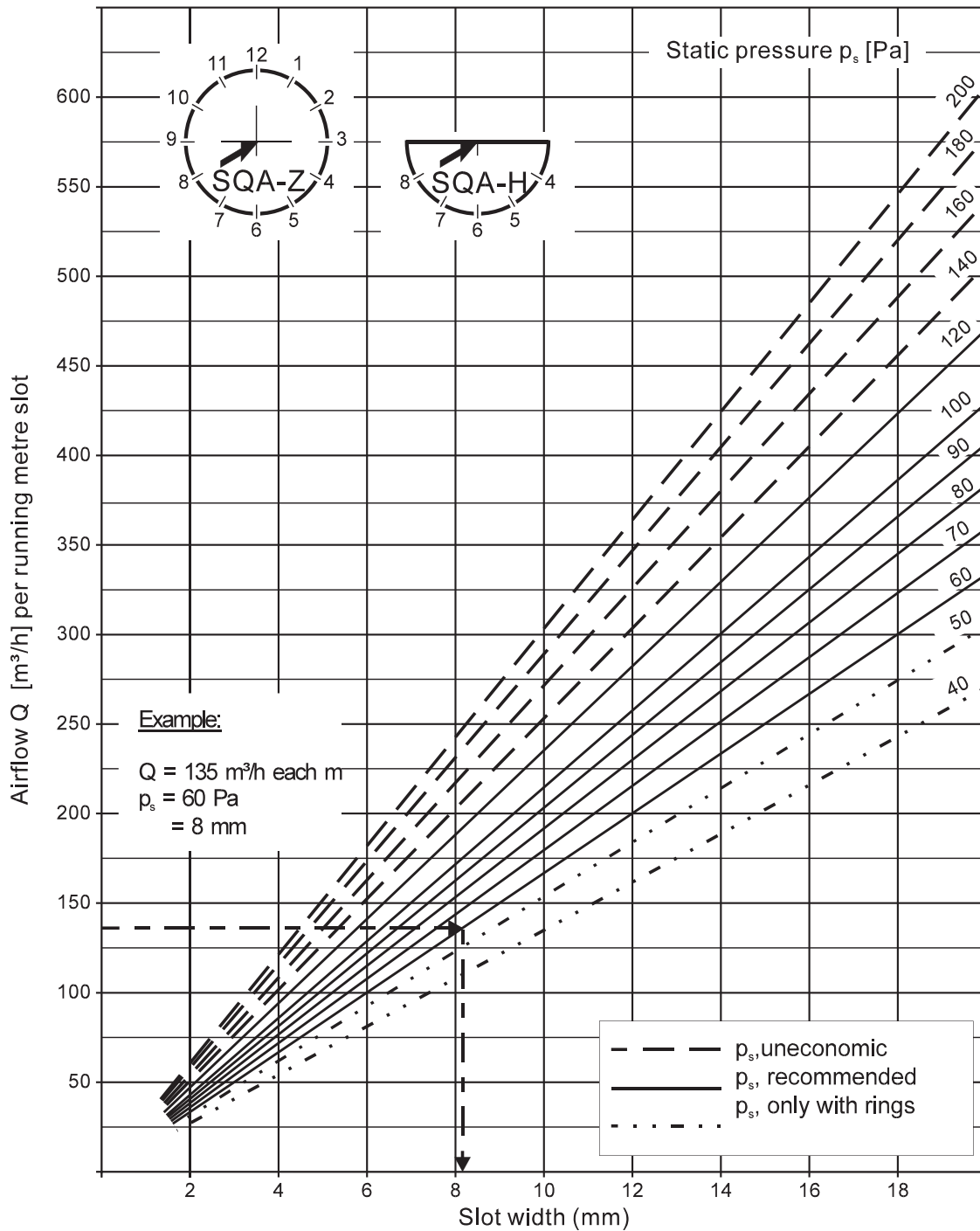
With sewn in slotrow that has a variable width

from 2 mm, in jumps of 2 mm

Sizing, Chart 14

Selection of slot width

$Q = 0 - 650 \text{ [m}^3/\text{h]}$



Sizing, Chart 15

Simulation of air velocity (V_y) & temperature (T_y) in distance Y from slot diffuser

Width:	4							
Q:	3000							
L:	39							
Rows:	1							
Tinlett:	26							
Troom:	20							
Y:	1,5	2	2,5	3	3,5	4	4,5	
Vo:	10,7							
Vy:	0,39	0,31	0,26	0,22	0,19	0,16	0,14	
Ty:	20,2	20,2	20,1	20,1	20,1	20,1	20,1	
Pstat	80							

Width	Width of slot (mm)
Q:	Air flow (m ³ /h)
L:	Length of outlet (m)
Rows:	Number of slot diffusers (pcs.)
Tinlett:	Inlet temperature (°C)
Troom:	Room temperature (°C)
Y:	Distance from outlet (m)
Vo:	Exit velocity through slot (m/s)
Pstat:	Static pressure, center outlet (Pa)

Air velocity as function of distance to slot diffuser

