Sizing of nozzle outlets

Nozzle outlets, as in the case of slot diffuser outlets, can be regarded as a standard permeable outlet, fitted with optional amount of nozzle. The nozzle itself is a long extrusion, Ø18 mm opening. A special long extrusion was chosen as this geometry assures that the air will always leave at a perfect right angle to the outlet. Here the nozzle has small advantage over the inject outlets, where a high velocity inside the outlet can cause the air from the orifices to "cling to the outlet", i.e. not leaving the outlet in a perfect right angle.

The most interesting feature of the nozzle is the wide field of applications this product can address. By changing the nozzle configuration, in particular the distance between nozzles when arranged in a row, the air flow patterns can be tailor made to suit the project at hand.

When nozzles are placed with the minimal distance centre-centre (100mm being the shortest distance possible, i.e. 10 nozzles per running meter of nozzle row) the result will be a very powerful trajectory, useful for heating when outlets are mounted at great height. For this kind of application, you will normally try to get as much air as possible through the nozzles, and as little as possible through the textile, i.e. choose a low permeability like 50 or 150 m3/m2/h and add the needed number of nozzle rows to carry the air flow. A set-up like this will offer very little in terms of induction.

The opposite scenario could be a slaughter house. Here, you will often need the outlet to act as a standard diffuse outlet, but with a few nozzles orientated towards the ceiling (typically 1 nozzle per 500mm per row, 2 rows). Here, the sole purpose of the nozzles is to keep the ceiling free of condensation, which it will do using only a marginal percentage of the total air flow.

These are the two extremes when it comes to nozzle applications, in between are a myriad of possibilities and special applications. For instance, nozzles can be used to target a very localized area, for example a glazed area where condensation of humid room air could be a problem. Again, this problem can be solved using only a small percentage of the total airflow.

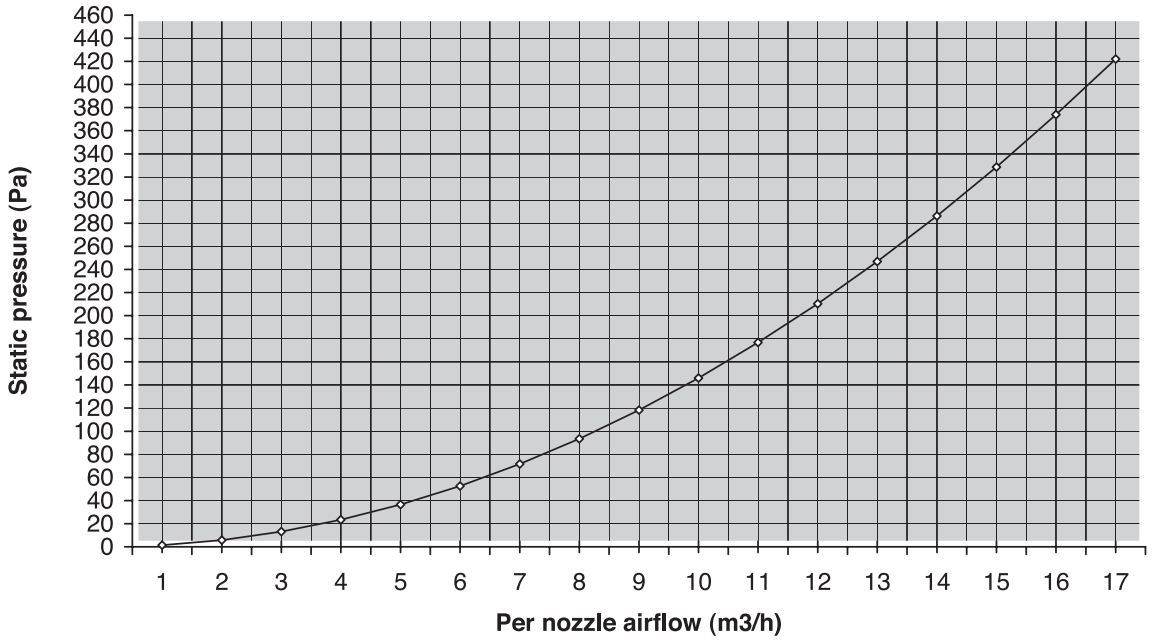
When sizing nozzle outlet (round- or half round), first determine the diameter needed to carry the entire air flow, using charts 3,4 or 5 (if round) or 10,11 or 12 (if half round). Then determine the nozzle to textile split, with regards to air flow percentage. Size the outlet as you would for a diffuse outlet, so:

Use the textile part of the air flow in conjunction with the surface area of the outlet and the pressure available to find the permeability best suited (using chart 6 to find permeability). Then turn to chart 19, and using the pressure available, find the "per nozzle" airflow. Then determine distance between nozzles, i.e. how many nozzles per running meter, and how many nozzle rows needed.

As said before, dealing with air pattern behaviour is not always as easy as one could wish. We strongly recommend that you contact your local Euro Air office for assistance in sizing nozzle outlets, we are happy to help.

The special service of supplying computer simulations also applies for this product.

Chart 19


Static pressure (Pa)
460
440
420
400
380
360
340
320
300
280
260
240
220
200
180
160
140
120
100
80
60
40
20
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
Per nozzle airflow (m3/h)