HEATEX
QUALITY & COMPETENCE

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Technical Information Crossflow Heat Exchangers

Performance of built-in cross flow heat exchangers

Calculated performance

All heat transfer and pressure drop calculations are done with the actual heat exchanger geometry and based on correlation from scientifically well renowned sources such as VDI Wärmeatlas and International Hand Book of Heat Exchanger Design. This means that the calculations are made in accordance with the European norm EN 308 and its sub documents.

The accuracy and correctness of the calculated data has been proven in numerous tests performed at various independent accredited test institutes and Heatex cross flow heat exchangers model H are approved by several different certifying bodies.

Applications with uneven air velocity or temperatures over the heat exchanger may adversely affect both calculated efficiency and pressure drop and are to be evaluated at given occasions. Uneven air distribution in the heat exchanger can be caused by the following examples:

- Fans located close to the heat exchanger inlet.
- Fans located close to the heat exchanger outlet.
- Curved air flow before or after heat exchanger.
- Diagonally mounted heat exchanger with top and bottom walls very close to the heat exchanger.
- Heat exchanger inlets shadowed by sheeting or other components.

Design guidelines

In order to be able to utilise all the performance potential of the heat exchanger it is very important that the design of the air handling unit takes the uniformity of the air flow profiles entering and leaving the heat exchanger into account. This is best achieved if it is possible to have all fans on the exit side, sucking air through the heat exchanger. The fans should also be located some distance downstream of the heat exchanger (ideally at least 10xfandiameter if performance of fan and heat exchanger should be unaffected).

For a diagonally mounted heat exchanger (which in it self will create some non-uniformity of the air flows) it is very important to have enough room above and below the heat exchanger so that the air flows have a chance to distribute evenly and perpendicular to the inlets. A recommended distance to make sure that the heat exchanger is not affected by a too narrow enclosure is to have half the diagonal dimension of the heat exchanger between the heat exchanger corner and the top or bottom wall respectively (i.e. the internal height of the enclosure should be twice the heat exchanger diagonal).

Should it not be possible for different reasons to allow enough space around the heat exchanger and/or a favourable location of the fans, a performance reduction (i.e. lower efficiency and higher pressure drop) could be the result. The size of the reduction will depend on several parameters and their interacting with each other and may be calculated using CFD methods or estimated from measurements in tests.

It is in most cases possible to reclaim some of the performance loss by introducing sheet metal guides or other arrangements in the unit which will deflect and distribute the air flows more uniformly at the heat exchanger inlets.