

## Turbulence Modules for Silicon Carbide Shell & Tube and Block Heat Exchangers

## Technical Information

Silicon carbide shell & tube and block heat exchangers are designed with comparatively small tube or bore diameters. When being operated at small mass flow conditions in combination with specific media characteristics, this results in relatively laminar flow conditions. Potentially critical conditions might be, for example:

- Higher viscosity of the media processed, the negative impact could start at  $\nu$  values of 2 to 3 mPas
- Unfavorable proportions of wide temperature differences during small mass flow: The respectively high heat load results in a large transfer area which requires a significant number of tubes and bores. This results in the flow conditions' becoming even more unfavorable, they reach the hydro-dynamic threshold or even go into the laminar area.

In this case, the heat exchanger's effectiveness drops drastically. This may result in the need for sequencing of two or multiple units.

Using turbulence modules is a way to compensate for these effects. These modules allow for operation under turbulent conditions, and even during critical process conditions. They are advantageous in that they can significantly increase Reynolds number results and improve overall heat transfer numbers. Numbers can even be increased even three- to fivefold. Afterwards, the required transfer area is decreased inversely (e.g. PTFE, Hastelloy, Tantalum).

Turbulence modules are a type of static mixer. The material used is derived from the processed corrosive media. Their dimensions are fitted to the respective tube and bore IDs. The design of the modules impact their effectiveness and the pressure drop .

For CORRESIC® Heat exchangers, we recommend twisted tapes or hiTran®-modules .



hiTran®-module



Twisted tape

