

## Pharma-line

### Sanitary shell & tube heat exchanger



Pharma-line is a high-quality shell & tube heat exchanger especially developed to meet the high hygienic demands of the pharmaceutical industry. The design of the Pharma-line makes it easy to drain and clean, and there is no risk of cross contamination associated with conventional heat exchangers.

#### Applications

Since the unit is so flexible, both in design, size and material, it could be used for any sanitary application with high demands, such as:

- point of use cooling on WFI (Water For Injection) ring mains
- heating of WFI
- product cooling
- condensing

#### Design and working principles

The product media flows through a bundle of seamless, electropolished tubes. The service media flows outside the tubes in cross flow. At each end the tubes are fastened by two tube

sheets (see Fig. 1) acting as leakage indicators and prevent cross contamination between the product and the service media. A bellow welded into the shell takes up any thermal fatigue caused by large temperature changes.

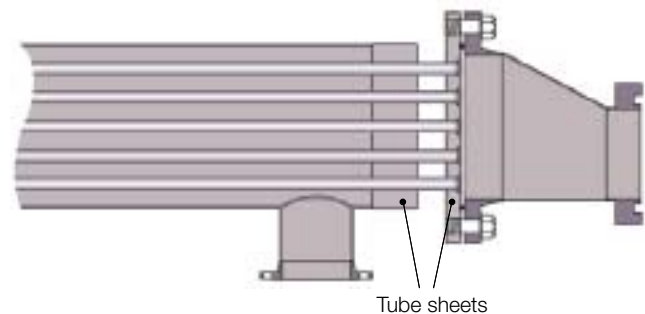


Fig. 1. Double tube sheets prevents cross contamination between the product and the heating/cooling media.

**Special features**

- No internal welds.
- All product contact surfaces are electropolished to have an Ra value of less than 0,5 µm.
- Complete protection against service media leaking into the product.
- Completely drainable.
- No dead spots in the tubes.
- Designed according to FDA and cGMP.
- Flexible design.
- Conical heads assuring a constant velocity all over the unit.

**Installation**

The Pharma-line can be installed either horizontally or vertically depending on the duty or space. For an easy installation, lifting and mounting devices are welded on the unit.

**Technical data**

Heat transfer area	< 30 m <sup>2</sup>
Max. temperature	200 °C
Max. pressure	15 barg
Materials	316L* and FDA approved EPDM (O-ring)
Connections	Tri-clamp**)
PV codes	ASME VIII or PED
Welding according to	ASME IX or EN-288-3, EN 287-1
Surface finish, product wetted parts	Ra < 0,5 µm

\* Other materials on request

\*\* Flanged connections on request