



Pharma-line

Sanitary shell & tube heat exchanger

The 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. The documentation on a heat exchanger in the pharmaceutical industry is equally important as the hardware so the Pharma-line comes together with a high quality documentation package as standard and most specials are available upon request.

Applications

The Pharma-line is designed to work under highest hygienic conditions in applications such as WFI, PW and heating/cooling of pharmaceutical products.

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 the 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.

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. Thermal fatigue caused by large temperature changes is taken up by the U-bend in two-pass units and by a welded-in bellow in straight units.

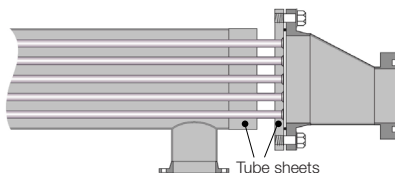


Fig. 1. Double tube sheets prevents cross-contamination between the product and the heating/cooling media.



Special features

- Seamless tubes
- Double tube-sheets to protect against service media leaking into the product
- Completely drainable on product side
- No dead spots in the tubes
- Designed according to FDA and cGMP requirements
- Flexibility in design

Standard range

A standard range of U-tube designed Pharma-line that suit most applications is available.

Technical data of standard units

Heat transfer area: 0-5 m²
 Design temperature: 180 °C
 Design pressure: 10 barg/FV
 Materials: 316L and FDA approved gaskets, USP class VI
 Connections: Tri-clamp on tube side and flanges on utility side
 PV codes: PED and ASME VIII (U-stamp on request)
 Welding according to ASME IX and EN-288-3, EN 287-1
 Surface finish, product wetted parts: Ra <0.4, 0.5 or 0.8 µm
 Insulation available in mineral wool (ASTM C 975)

Standard documentation

- Technical drawing
- List of welders and weld license
- Material certificate
- Liquid penetration test report
- Surface treatment report, dimension control report
- Installation, operation and maintenance manual
- CE-conformity documentation
- Component list
- Pressure test report
- PV documents

Custom-made units

Special designs and more documentation of Pharma-line are available on request.

Standard units, measurements (approximate)

| Type | No of U-tubes | Tube OD (mm) | Shell OD (mm) | A (mm) | B (mm) | C (mm) | D (mm) |
|---------|---------------|--------------|---------------|--------|--------|--------|--------|
| 8-7-1 | 7 | 8 | 88,9 | 800 | 1200 | 190 | 860 |
| 8-7-2 | 7 | 8 | 88,9 | 1800 | 2200 | 190 | 1860 |
| 8-7-3 | 7 | 8 | 88,9 | 2800 | 3200 | 190 | 2860 |
| 8-11-1 | 11 | 8 | 101,6 | 800 | 1200 | 190 | 860 |
| 8-11-2 | 11 | 8 | 101,6 | 1800 | 2200 | 190 | 1860 |
| 8-11-3 | 11 | 8 | 101,6 | 2800 | 3200 | 190 | 2860 |
| 8-19-1 | 19 | 8 | 114,3 | 800 | 1200 | 200 | 860 |
| 8-19-2 | 19 | 8 | 114,3 | 1800 | 2200 | 200 | 1860 |
| 8-19-3 | 19 | 8 | 114,3 | 2800 | 3200 | 200 | 2860 |
| 10-11-1 | 11 | 10 | 114,3 | 800 | 1200 | 200 | 860 |
| 10-11-2 | 11 | 10 | 114,3 | 1800 | 2200 | 200 | 1860 |
| 10-11-3 | 11 | 10 | 114,3 | 2800 | 3200 | 200 | 2860 |
| 10-21-1 | 21 | 10 | 139,7 | 800 | 1200 | 210 | 860 |
| 10-21-2 | 21 | 10 | 139,7 | 1800 | 2200 | 210 | 1860 |
| 10-21-3 | 21 | 10 | 139,7 | 2800 | 3200 | 210 | 2860 |
| 14-9-1 | 9 | 14 | 139,7 | 800 | 1200 | 210 | 860 |
| 14-9-2 | 9 | 14 | 139,7 | 1800 | 2200 | 210 | 1860 |
| 14-9-3 | 9 | 14 | 139,7 | 2800 | 3200 | 210 | 2860 |
| 14-16-1 | 16 | 14 | 168,3 | 800 | 1200 | 220 | 860 |
| 14-16-2 | 16 | 14 | 168,3 | 1800 | 2200 | 220 | 1860 |
| 14-16-3 | 16 | 14 | 168,3 | 2800 | 3200 | 220 | 2860 |

Nozzle schedule

| Item | Service | Facing | Standard&Dimension |
|------|--------------|------------------|--------------------|
| T1 | Tube inlet | Tri-Clamp | Free |
| T2 | Tube outlet | Tri-Clamp | Free |
| M1 | Shell inlet | Weld neck flange | Free |
| M2 | Shell outlet | Weld neck flange | Free |



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Alfa Laval reserves the right to change specifications without prior notification.

How to contact Alfa Laval

Contact details for all countries are continually updated on our website. Please visit www.alfalaval.com to access the information direct.