Heat Exchanger

MARSHAL
TECH LTD UK

Products : **SHELLTUBE Smooth Tube Heat Exchangers (STHE)**

WARREN TECHNOLOGIES LTD,UK, also designs and manufactures Smooth Tube Heat Exchanger for various industrial application like heating, cooling, condensing and reboiling in our world class manufacturing facility to cater to Customer's heat transfer requirement. We manufacture units presently to working pressure of 80 bar for process / service plant and with 0 temperature upto 400 C. For specific design we can manufacture units with 150 bar pressure at 500 C.

Our manufacturing facility is equipped to fabricate STHE with diameter of 2000 mm and tube length upto 9000 mm. For special equipment we can make heat exchanger with 12000 mm tube length. These are customised units based on specific industry application. The units can be fabricated based on customer drawings. We can design and manufacture units to customer specifications too.

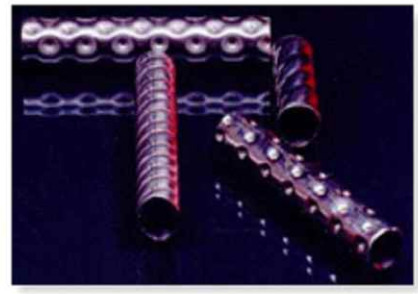
Heat exchangers are manufactured in Stainless Steel AISI 304/316, depending upon the application. Material like SS304L, SS316L, Hastelloy, Copper, Cu-Ni alloys, Titanium, AL6XN can also be offered.

Features:

- Flexible in design, customised solution
- Suitable for high temperature & presure applications
- Thermal design in HTRI and Chemcad Software
- Mechanical design in PVD and PV Elite Software
- TEMA configurations available like BEM, BET, BKU, AES, AEL, etc.
- Wide choice of Material of Construction

Products : **CORTUBE Corrugated Tube Heat Exchanger**

Development of Corrugated Tube



CORTUBE Corrugated Tube Heat Exchangers (**CTHE**) use corrugated tubes instead of smooth tubes. The corrugations induce turbulence in the media and ensure high Reynolds number even at low velocity. The development of corrugated tube is perhaps the most exciting advancement in heat transfer technology.

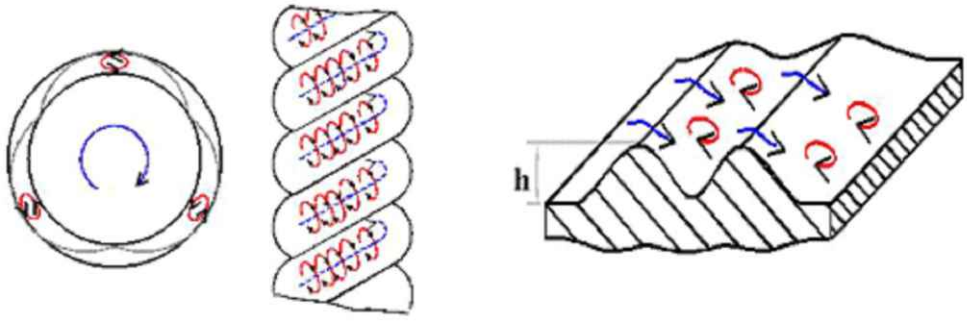
Corrugated tube is produced by indenting a plain tube with a spiral pattern. No tube wall thinning takes place & no strength is lost.

Features

- A smooth indented inner profile ensures easy cleaning
- Turbulence is created at low fluid velocities to enhance the heat transfer in the tube
- Fouling on the tube surface is minimised
- A wide range of diameters & styles are available

Technology:

Corrugated tube is produced by indenting a plain tube with a spiral pattern. This imparts different flow regimes - spiral in the core and eddy's at the periphery.

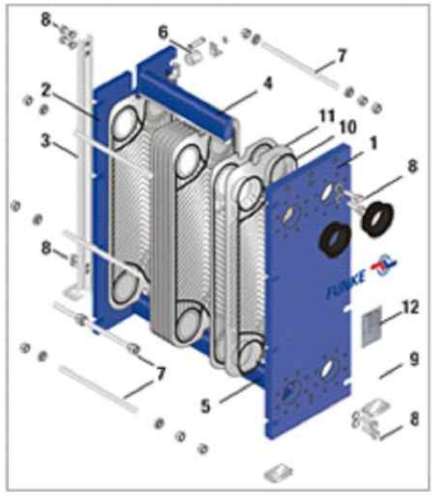


The helical flow contributes to the situation that the fluid particles are alternatively in the vicinity of the tube wall and then in the main flow. Between the helical impressions, around the circumference of the tube, secondary flow, typically in the form of eddies occur.

Products > **Plate Heat Exchangers**

Design:

Design of a Plate Heat Exchanger



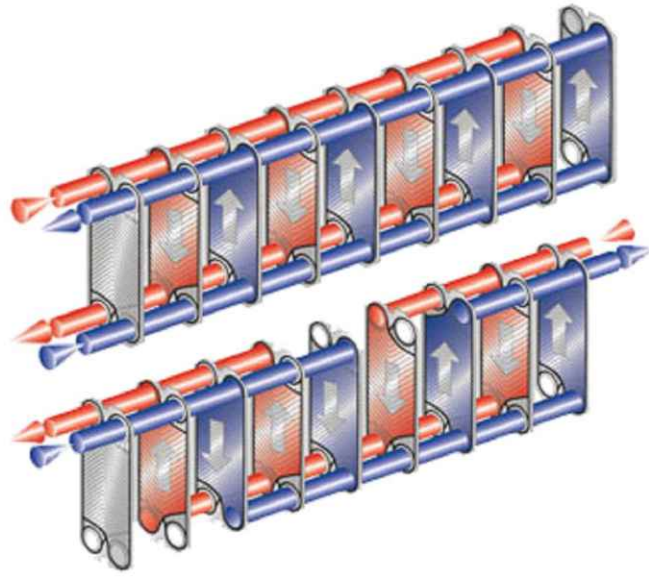
1. Fixed plate
2. Movable plate
3. Support column
4. Carrying bar
5. Lower plate guide bar
6. Carrier roller
7. Tightening bolt and nuts
8. Fixing bolts
9. Rubber liner
10. Gaskets
11. Heat transfer plates
12. Name plate

Technical Key Data (depending on design)

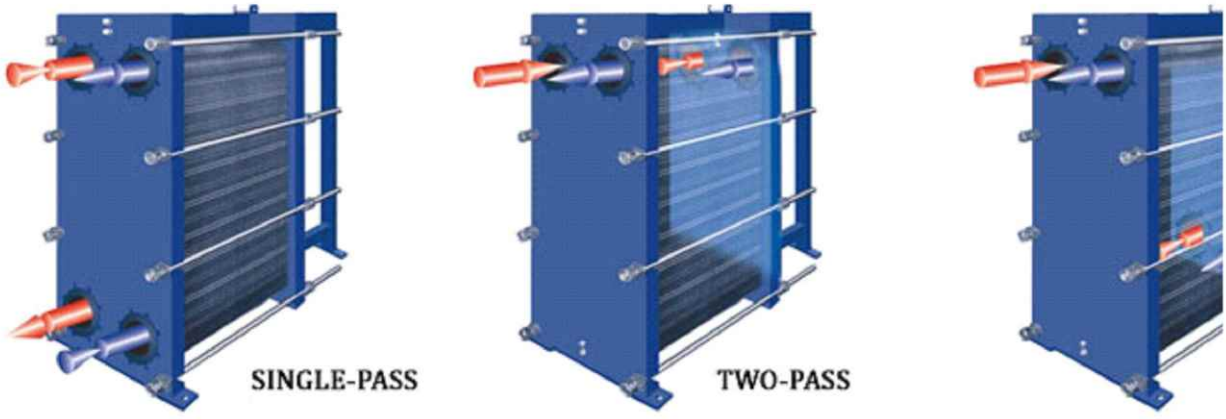
Capacity	1KW - 30MW
Volume Flow	5 m - 4500m
Surface/Plate	0,04 m - 3,0 m
Nominal connection Diameter	DN 25 - 500
Operating temperature	-20 C° - +180 C°
Working pressure max.	25 bar

Design and Functions of Plate Heat Exchanger

The heart of a PHE is a pack of embossed plates with apertures. The plates are assembled in a 180° angle to each other, resulting in flow gaps on each side. Each plate is provided with a gasket, which securely seals the flow gaps from the atmosphere and separates the two media used in the heat exchange.
The gasketed plate pack is mounted in a rack and is compressed with tightening bolts between the fixed plate and the movable plate. To guarantee maximum heat transfer, warm and cold media are normally fed through the PHE in one-pass or multi-pass counter flow. Connections are on the fixed plate, but can also be on the movable plate for multipass flow.



Connection Positions



Plates Materials

WARREN heat transfer plates are always produced in 1.4401 / AISI 316 as this material is generally more corrosion –resistant and more resistant to chloride damage than 1.4301/AISI 304. Depending on the design, Titanium is also available in serial production.

As an option, the following additional material may be used:

- 1.4301/AISI 304 (cost-effective in the case of uncritical media)
- 1.4539/AISI 904L (with high nickel content against stress corrosion cracking, good price/performance ratio in the case of media with the low acid and chloride content).
- 1.4529/254 SMO (higher chloride and acid - resistance than 1.4401/ AISI 316)
- Hastelloy (highly resistant against acids and chlorides, e.g. for concentrated sulphuric acid)
- Titanium ASTM B 265
- Titanium - Palladium (highest material quantity, suitable e.g. for chlorides at higher temperatures)

Products > **SSHE Scraped Surface Heat Exchanger**

WARREN has developed the SSHE heat exchanger for difficult and critical processes where other types of heat exchangers such as rotary scraped surface heat exchanger, shell and tube or plain type are incapable of offering an adequate solution. SSHE is capable of generating high levels of turbulence in products of high viscosity increasing substantially the overall heat transfer coefficient. In addition it does not allow the formation of any fouling layers on the inner tube surfaces and always stays clean enabling the unit to work in the optimum condition for efficient heat transfer at all times.

The SSHE range of non-fouling scraped surface heat exchangers was developed over a three-year period, which included type-testing 50 units in production facilities throughout Europe for 12-months. Designed to handle viscous and heat sensitive products, which have a tendency to foul the heat transfer surfaces, SSHE has a number of advantages over more conventional heat exchanger units.

Technology:

SSHE is a new generation scraped surface heat exchanger that is specially designed for high viscosity products with or without particulates, for fouling applications, crystallization and evaporation.

The heat exchanger is formed by a tube bundle inside a shell. The product flows inside the tubes of the tube bundle and the service fluid outside. Product flow can be in single or multiple pass. The Inner tubes are smooth and seamless with good internal surface finish. All inner tubes include moving bars that support the scraping and mixing elements, which keep all the heat exchanger surface clean of fouling and agitate the flow to boost the overall heat transfer coefficient by reciprocating (unlike conventional scraped surface heat exchangers that move in rotation). The heat exchanger can be drained after use.

The unit is kept pressure tight by means of hydraulic seals. Units are 6 or 3 meters long and it has very few spare parts (there are no mechanical seals, etc.) .

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