

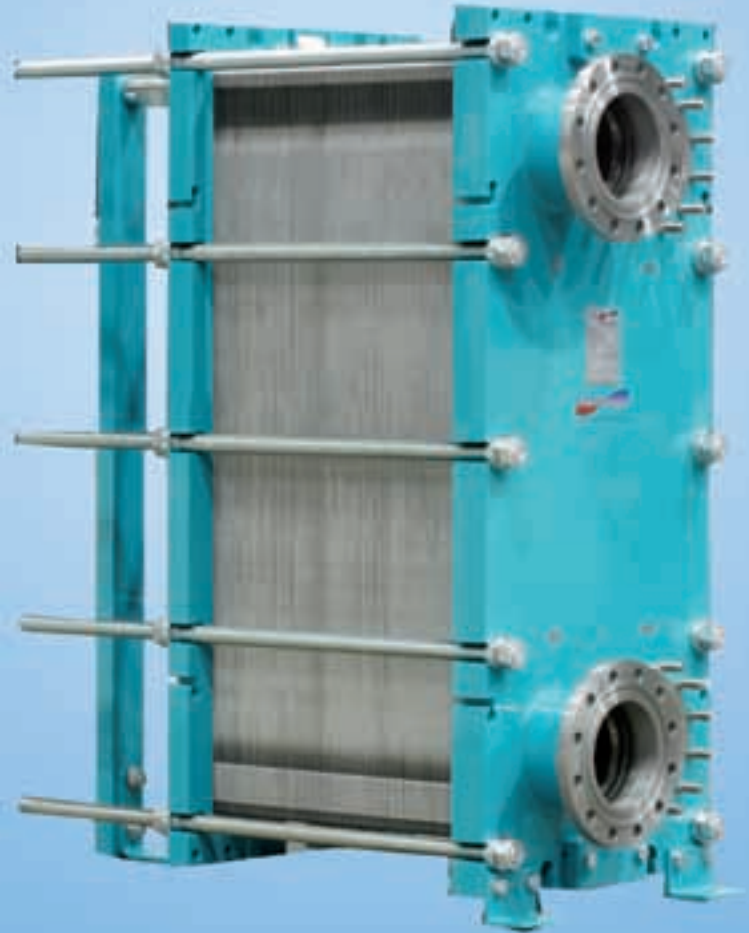
## Laser welded modules – for safety

### **thermowave** Welded modules:

In the past no satisfying solution was offered using gasketed plate heat exchangers for special process conditions or aggressive media. The limitation was always the gasket material.

For this reason, the complete thermoline plate heat exchanger program was also made available in a laser welded configuration.

Thus, a new field of application was opened for special process conditions, also taking into account environmental safety requirements.



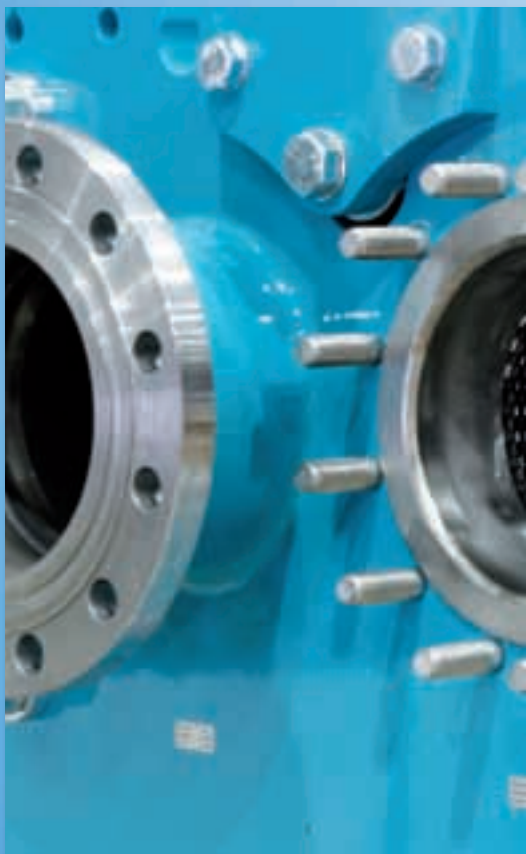
## TL 90 - 1500 M

Laser welded modules for critical media



Powerful plate heat exchangers - worldwide.

plate type	dimensions (mm)						connections	max. operating pressure bar	max. heat transfer surface m <sup>2</sup>	total dead weight kg	max. volume per side dm <sup>3</sup>
	TL	H	B	L	h1	h2					
90	887	335	250-2000	194	565	125	DN 25/40	-1 to 25	33	120-600	36
	845	335	250-2000	152	565	125					
150	1147	335	250-2000	194	825	125	DN 25/40	-1 to 25	53	160-830	57
	1105	335	250-2000	152	825	125					
200	1124	475	500-2500	318	619	212	DN 80	-1 to 25	70	215-1100	190
	1012	475	500-2500	206	619	215					
250	1265	550	500-2500	316	774	256	DN 100	-1 to 25	82	510-1820	120
	1140	550	500-2500	192	774	256					
400	1712	475	500-2500	318	1207	212	DN 80	-1 to 25	115	390-2100	230
	1600	475	500-2500	206	1207	212					
500	1745	550	500-2500	316	1255	256	DN 100	-1 to 25	280	690-4160	370
	1620	550	500-2500	192	1255	256					
650	1750	730	500-4000	323	1153	305	DN 150/200	-1 to 25	300	700-4700	470
850	2290	730	500-4000	323	1693	305	DN 150/200	-1 to 25	500	1000-7000	700
1100	2290	940	500-4000	335	1670	450	DN 250	-1 to 25	661	1900-9500	1125
1500	2844	940	500-4000	335	2214	450	DN 250	-1 to 25	750	2400-11780	1505



## Your advantages

- compact design
- low weight
- high flexibility
- gasketed heat transfer surface easy to clean
- quick and low cost installation
- low hold-up volume
- excellent heat transfer coefficient
- high corrosion resistance
- minimum risk for leakages
- low price in relation to capacity

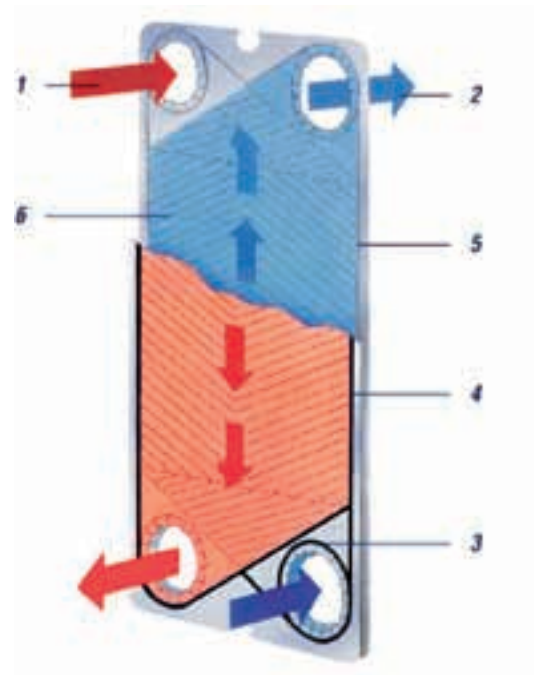
## Working principle

Two heat exchanger plates are welded together to a gas-tight module by means of laser technology. By doing this, a flow channel for the aggressive (or the gasket attacking medium) is built, which is hermetically closed to the outside. Only two ring gaskets, made between two welded modules, are in contact with the aggressive medium.

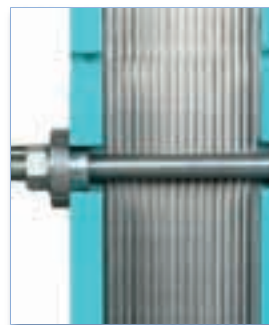
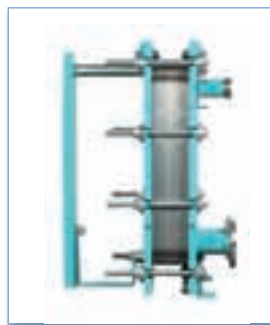
The other flow channel for the non-aggressive medium is sealed by various elastomer gaskets, depending on the individual application. The gaskets are normally fixed without the need for glue but are also available in the glued-on-version.

Interleakage between the two media is prevented by a double weld, and a double ring gasket in the port holes. If a leakage occurs for any reason, the leak will be external and easily detected. In spite of the use of welded modules, the proven flexibility of plate heat exchangers is maintained. By adding or changing modules, the heat exchanger capacity can be adjusted to the individual requirements.

The laser welded modules can be used for temperatures from  $-40^{\circ}\text{C}$  to  $+170^{\circ}\text{C}$ , and for pressures up to 25 bar.



- |                     |                              |
|---------------------|------------------------------|
| 1 – service medium  | 4 – plate gasket             |
| 2 – critical medium | 5 – laser weld               |
| 3 – ring gasket     | 6 – closed gap by laser weld |



## Description of plate heat exchanger

thermoline<sup>®</sup> plate heat exchangers consist of a number of laser welded modules. The module pack is mounted between a fixed and a movable pressure plate, positioned by an upper and a lower carrying bar, and compressed by several tightening bolts. Laser welded modules with various patterns are available for a wide range of applications. The media can pass the heat exchanger either in cocurrent or countercurrent flow.

Depending on the operating conditions, medium and temperature-resistant gaskets of the glued-on or clip-on version are used.

The laser welded module, forms a hermetically sealed flow channel to the outside. The transition from one module to another is sealed by a ring gasket made of special materials.

## Range of products

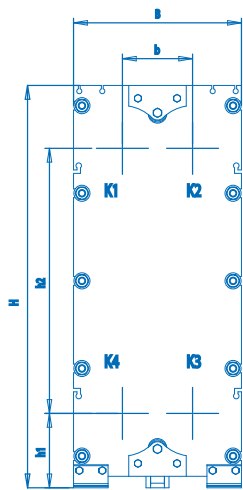
Modules with a variety of patterns, variable depths of stamping and different sizes are available.

### StandardLine plates

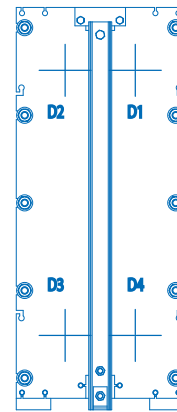
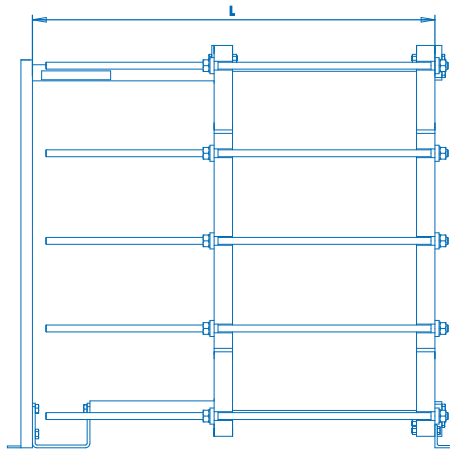
- thermodynamically soft pattern
- high flow rate
- low pressure drop
- wide range of applications
- suitable for viscous fluids and sensitive to shearing
- gentle treatment of products
- corrugation depths from 3,5 to 4,0 mm

### PowerLine plates

- thermodynamically hard pattern
- high heat transfer coefficients
- high thermal efficiency
- low hold-up volume
- suitable for homogeneous and low viscous fluids
- corrugation depths from 2,0 to 2,5 mm

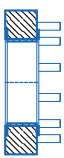


K1...K4:  
Inlet / outlet  
connections at  
fixed pressure  
plate

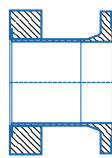


D1...D4:  
Inlet / outlet  
connections at  
movable pres-  
sure plate

## Connections



stud bolts with lining



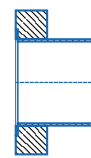
welding neck flange  
DIN 2631 (PN6),  
DIN 2632 (PN 10),  
DIN 2633 (PN16),  
DIN 2634 (PN 25),  
DIN 2635 (PN40)



lapped flange  
DIN 2641 (PN6),  
DIN 2642 (PN10)



lapped flange  
with plain collar  
DIN 2655 (PN 25),  
DIN 2656 (PN 40)



threaded coupling  
(BSPM)  
DIN 2999

## Materials

**Frame:** carbon steel, massive or clad stainless steel

**Connections:** stainless steel, carbon steel, Titanium, Hastelloy, PTFE, elastomers

**Plates:** 1.4301, 1.4404, 1.4529, 1.4539, 1.4547, Hastelloy, Titanium

**Gaskets:** NBR, EPDM, Chloroprene, Butyl, Viton, PTFE covered, elastomers  
Other materials on request.

## Operating parameters

**Design temperature:** -40° C to 170° C

**Design pressure:** vacuum to 25 barg

**Connections:** DN 25 to DN 250

## Tests / Standards

thermoline® plate heat exchangers can be supplied in accordance with both local and foreign regulations.