

TECHNICAL PRODUCT INFORMATION AND INSTRUCTIONS
FOR THE TT RANGE (STANDARD UNITS)



This document contains general safety and technical data and instructions to installation, maintenance and operation. This document must be thoroughly read and understood before operating or servicing the products described. Unit specific information is included in the technical layout, created during the calculation of the heat exchanger for the relevant application. Only suitably qualified, competent engineers and technicians may install and maintain the products as described in this document.

Table of Content

Table of Content	2
Safety and Legal Information	3
Usage	3
Technical Data	4
Installation and Removal	5
Commissioning	6
Operation	6
Water Quality	7
Accessories & Contact	8

Safety & Legal Information

⚠ Attention

- Read this installation guide prior to installation
- The installation of and work on heat exchangers may only be carried out by qualified specialists, in accordance with all relevant health and safety regulations.
- Prior to installation and commissioning ensure that you have thoroughly read and understand these instructions.
- Warranty claims can only be considered when these instructions have been fully followed.

⚠ Please note – when handling an SPX heat exchanger:

- Edges of the heat exchanger could be sharp
- The heat exchanger could be heavy
- The heat exchanger could be extremely hot or cold
- Contained liquids could be dangerous or poisonous
- Suitable Personal Protective Equipment must always be used

i Any claims regarding transport & delivery of goods must be reported immediately, in writing, to the driver. Failure to do so will result in a transport claim being rejected by the transport company. All heat exchangers covered as pressure vessels as defined by the European Pressure Equipment Directive (PED) 97/23/EC are designed and built accordingly. ParaBrazed heat exchangers are designed for use with PED fluid groups as shown on the name plate.

Usage

Description

Standard SPX ParaBrazed plate heat exchangers, type TT consist of a pack of pressed stainless steel plates which are brazed together in a vacuum furnace. During the pack assembly every second plate is turned 180° in the plane creating flow channels between the plates, which will later become the primary and secondary sides of the heat exchanger.

Standard ParaBrazed exchangers are made of 1.4404 (316L) stainless steel plates and copper or nickel brazing material.

ParaBrazed heat exchangers are designed as compact and efficient units, requiring minimal maintenance, as long as the working conditions described in this manual are adhered to. This type of exchanger is used throughout the world in a wide range of buildings and equipment from boiler to air-conditioning, pharmaceutical to petro-chemical, office complex to factory building, district heating networks to under floor heating, refrigerant plants to heat pumps, apartments to hospitals, heat recovery to snow melts, water heating to oil cooling... ParaBrazed heat exchangers are overall.

To ensure the optimum performance of each unit for the application required a technical calculation should have been made to select the correct unit was selected, according to the physical demands to fulfil the application.

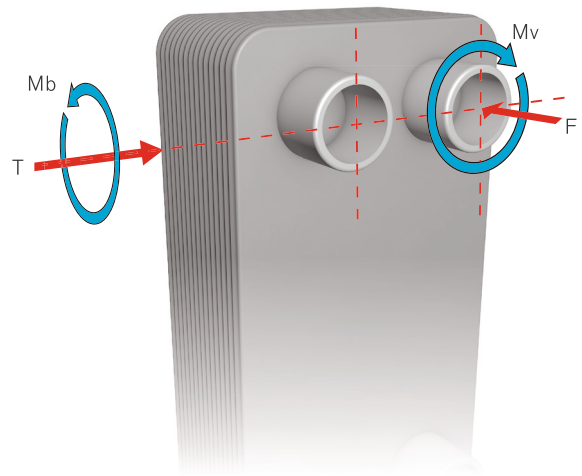
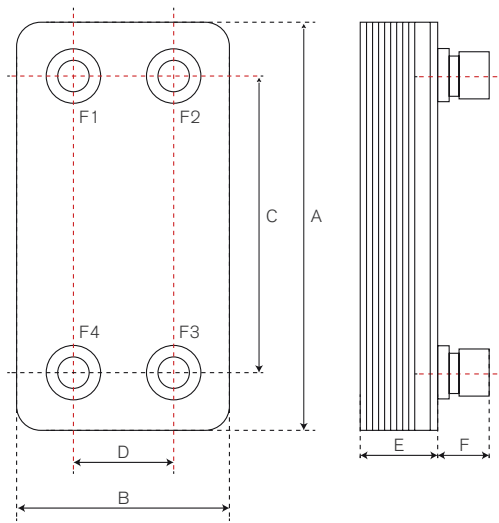
Every heat exchanger has a name plate giving details of:

- Type
- Serial number
- Other unit specific safety and technical data.

⚠ The parameters given on the name plate must not be exceeded when either in operation or not.

i If covering the heat exchanger with permanent insulation, please ensure that the information from the name plate is recorded and accessible for future reference.

Dimensions & Physical Properties



Maximum torque and moment for connections

Connection	T (kN)	F (kN)	Mb (Nm)	Mv (Nm)
¾"	1.5	8	40	170
1"	2.5	10	65	385
2", 2½", 3"	11.5	30	740	1000

*, **	CHANNEL VOLUME			OPERATING MAXIMUMS		DIMENSIONS							
	primary (l)	secondary (l)	Empty weight (kg)	Pmax (bar)	Tmax (°C)	Height (mm)	Width (mm)	Con Height (mm)	Con Width (mm)	Plate Pack (mm)	Standard Con Length (mm)	Standard Connection Type	Max N° Plates
TYPE:						A	B	C	D	E	F		
TT4H	0.025	0.025	0.7 + n * 0.05	30	-0/+200	204	74	170	40	8 + n * 2.23	20	G ¾"	50
TTU10H	0.064	0.064	1.51 + n * 0.112	30	-195/+195	296	125	243	72	9 + n * 2.3	28	G 1"	150
TTU11H	0.073	0.073	1.54 + n * 0.112	30	-195/+195	334	125	281	72	9 + n * 2.3	28	G 1"	150
TTU20H	0.11	0.11	2.54 + n * 0.112	30	-195/+195	532	125	479	72	9 + n * 2.3	28	G 1"	150
TT24H	0.12	0.12	3 + n * 0.25	25	-10/+180	625	118	571	65	7 + n * 2.3	50	G 1"	120
TT34M	0.16	0.16	4.7 + n * 0.29	25	-10/+180	613	186	519	92	11 + n * 1.75	52	G 2"	200
TT35L/H	0.21	0.21	8 + n * 0.38	25	-10/+180	466	256	380	170	10.5 + n * 2.5	50	G 2"	140
TT44H	0.31	0.31	10 + n * 0.54	30	-196/+200	532	271	421	161	11.5 + n * 2.34	65	G 2 1/2"	260
TTG45 L/M/H	0.31	0.31	13.2 + n * 0.5	30	-196/+200	543	281	460	198	11.5 + n * 2.65	37	G 2"	160
TT56H	0.219	0.219	13.6 + n * 0.43	25	-10/+180	706	296	583	180	13 + n * 1.4	80	DN65 (Comp)	200
TT67H	0.399	0.399	11.5 + n * 0.8	30	-196/+200	802	271	690	161	11.3 + n * 2.31	65	G 2 1/2"	260
TT88H	0.6	0.6	39.5 + n * 1.25	30	-196/+200	875	386	723	237	23 + n * 2.31	90	DN100	360
TT97 L/M/H	0.55	0.7	40 + n * 1.5	25/16**	-10/+180	990	365	861/816**	214	10 + n * 2.7	90	DN65/100**	200

* Volumes, weights and dimensions of finished product may vary slightly

** Primary side / Secondary side

*** Other sizes also available with Cu or Cu-Free brazing - please consult your sales partner

**** Excluding stands and lifting rings where fitted - download technical drawings for further detail

Installation

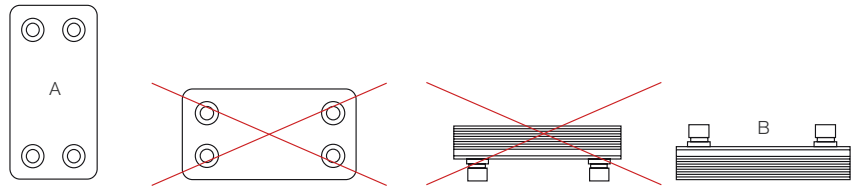
SPX ParaBrazed heat exchangers should be installed allowing adequate access for future service. Access for bleeding air and draining the heat exchanger should also be planned for. For use in heating systems the vertical positioning of the heat exchanger is the most efficient. Horizontal positioning is possible but can lead to a reduction in performance. For use in cooling and condensation systems the heat exchanger must be positioned vertically.

⚠ Never position the heat exchanger with the connections downwards.

A suitable mounting bracket should be used to mount the heat exchanger. Mounting using the connections is only permissible with a SPX ParaMount wall bracket, according to the specific instructions provided with the bracket. The maximum torque and moment for connections must not be exceeded. (See chart on page 4)

Connection to pipework

- A) Vertical positioning
- B) Horizontal positioning



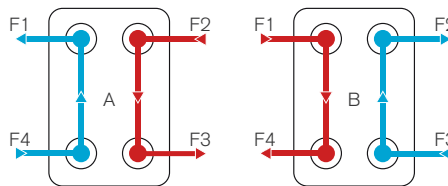
⚠ Attention

The hydraulic system and pipework must be designed and fitted to prevent any pulsation, shock, tension, vibration or similar effect reaching the heat-exchanger.

The working life of the heat-exchanger will be reduced through false / inadequate system design. Such conditions are not covered by the product guarantee.

The most efficient exchange of heat occurs when the primary and secondary circuits are connected to provide a counter current.

- A) Heating, Evaporator
- B) Condenser



Connections using solder or weld

⚠ Attention

Mechanical strain on the connections must be prevented. To avoid premature corrosion, connection processes using heat must not result in a colour change darker than "Straw Yellow". Severe over-heating during connection could lead to delamination and destruction of the heat exchanger, this is not covered under guarantee.

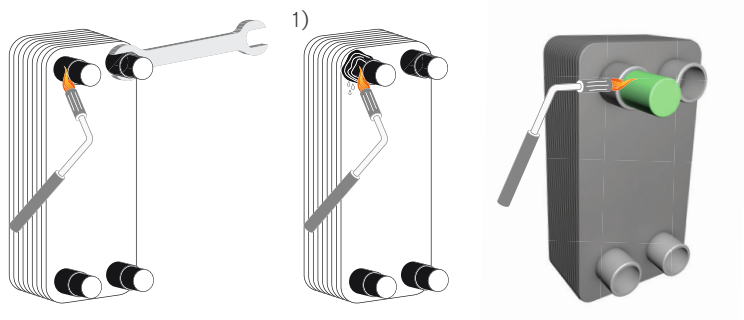
Soldered connections

Clean, degrease and polish the surface of the connections. The flame jet must point away from the body of the heat exchanger (Max flame temp. 650°C). Flux quality 45-55% silver-solder.

- 1) Use of a wet cloth to help prevent over-heating in the heat-exchanger.

Welded connections

Use TIG welding. To avoid oxidation, the heat-exchanger and pipework should be flooded internally with nitrogen.



Removal

⚠ Removal is the reverse procedure to installation.

Attention

The system may not be opened if under pressure. Appropriate Personal Protective Equipment should be worn. Special caution should be used to avoid escape of content into the environment

Commissioning

⚠ Attention

- Prior to final commissioning the specifications given on the heat exchanger name-plate and the final system build requirements must be compared to ensure conformity.
- Always flush pipework in new and altered systems before installing the heat exchanger.
- Check that no Zinc or galvanised components (or other materials that could create an electrical cell) are included in the system.
- Dirt, rust, foreign bodies, weld splatter and other debris in the system can lead to blockage, corrosion and freezing in the heat exchanger. Such conditions are not covered by the product guarantee. Where appropriate a filter with a maximum mesh of 1mm should be integrated before the exchanger.
- Check all connections and mounting brackets
- The system should be filled slowly
- Ensure that all air is bled from the heat exchanger
- During testing of the system check that:
 - The operational specifications are not exceeded
 - The connections are all leak-free
 - Hydraulic-hammering cannot reach the heat exchanger

Operation

If used according to design specifications and fitted and maintained as layed out in this manual, the ParaBrazed plate heat exchanger should provide years of service.

Hydraulic-hammering, pressure-pulsation and temperature changes can lead to leakage in the heat exchanger and must be avoided.

Secondary side boiling can create hydraulic-hammering and must be avoided. Particular attention should be paid to systems eg. District heating or steam applications where pressure in the secondary side must be maintained at a level to prevent boiling and vaporisation.

A temperature difference of over 100°C between the primary and secondary side is not permissible. If a temperature difference greater than 100°C exists, please consult your SPX partner for an alternative solution.

Protection from frost

Formation of ice on and in the heat exchanger could damage it. An anti-freeze agent (eg. Glycol) must be used at temperatures near or below freezing point and a vapour tight insulation should prevent external moisture freezing on the outside.

Attention must be paid that the contents of the secondary channel cannot freeze, even if the primary channel near or below freezing point. (eg. Where sub-zero antifreeze agent in the primary channel freezes standing water in the secondary.) The anti-freeze manufacturer's concentration must be followed to ensure inhibition of corrosion.

Cleaning

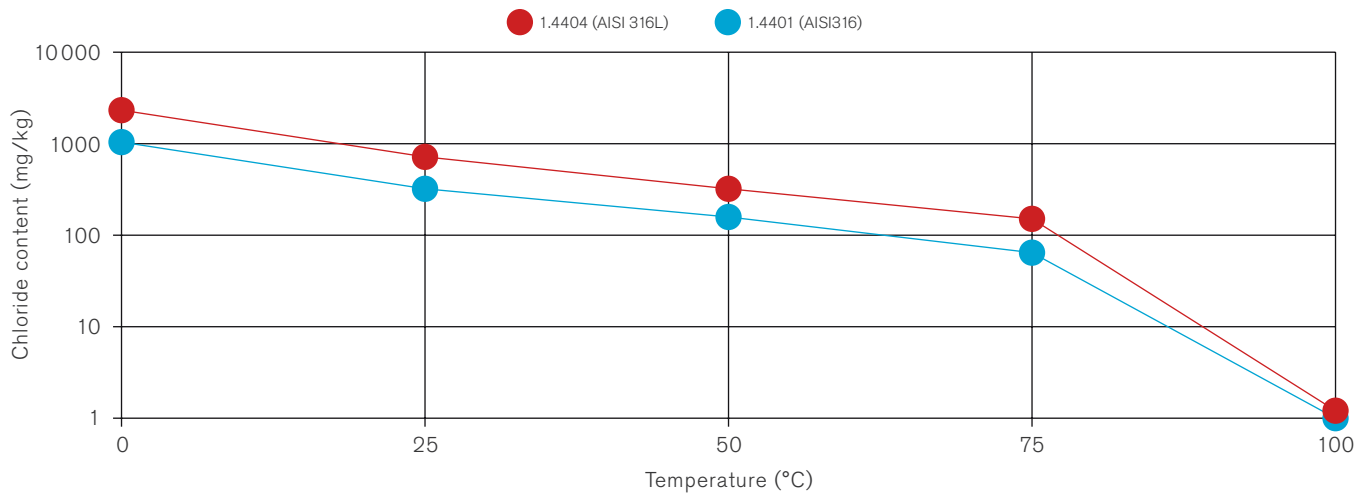
The high turbulence flow, even at low speeds, creates a self cleaning effect, which helps reduce furring and blockages. Never the less poor water quality and/or contamination can lead to furring in the heat exchanger. Where possible, keeping the temperature of drinking water under 55°C will help reduce the speed of calcification. In most cases this can be removed using SPX descaler following the instructions provided.

Water Quality

ParaBrazed plate heat exchangers consist of pressed 1.4404 (AISI 316L) stainless steel plates with copper or nickel braze.

⚠ The following chemical parameters should not be exceeded:

	Copper brazed	Nickel brazed
CHLORIDE	See Diagram, over 100°C no Chloride allowed	
IRON	< 0.2 mg/l	No specification
MANGANESE	< 0.1 mg/l	No specification
AMMONIA (NH ₃ /NH ₄ ⁺)	< 2 mg/l	No specification
PH-VALUE	7 – 9	6 - 10
ELECTRICAL CONDUCTIVITY	10 – 500 µS/cm	No specification
FREE CARBONIC ACID	< 20 mg/l	No specification
NITRATE	< 100 mg/l	No specification
SULPHATE	< 100 mg/l	<300 mg/l
SATURATION-INDEX SI	-0.2 < 0 < +0.2	No specification
HARDNESS		6 – 15 °dH
FILTERED PARTICULATE		< 30 mg/l
FREE CHLORINE		< 0.5 mg/l
HYDROGEN SULPHIDE (H ₂ S)	< 0.05 mg/l	No specification
HYDROGEN CARBONATE	< 300 mg/l	No specification
HYDROGEN CARB. / SULPHATE	> 1 mg/l	No specification
SULPHIDE	< 1 mg/l	<5 mg/l
NITRITE	< 0.1 mg/l	No specification



A WIDE RANGE OF ACCESSORIES SUITABLE FOR PARABRAZED ARE AVAILABLE TO HELP WITH THE QUICK, EASY AND PROFESSIONAL SELECTION, FITTING AND MAINTENANCE OF THE EXCHANGER.

Insulation

Combined or variations for use in hot or cold systems. Meeting current European fire regulations



More information on the ParaInsulate product sheet

Connections

Removable connections suitable for connection to pipework in weld, thread or braze variations



More information on the ParaConnect product sheet

Mounting

A variety of stands and brackets to correctly support the heat exchanger



More information on the ParaMount product sheet

Cleaning & Scale removal

Help ensure optimum operation by keeping plates and channels clear and free of dirt and lime scale



More information on the ParaCIP product sheet

Calculation

Together with the ParaCalc calculation programme, the ParaSelect App is a quick and simple selection tool to help choose the correct exchanger for standard applications.



ParaSelect can be used on PC, tablet or smart phone.

www.paraselect.com

Summary:

The SPX ParaBrazed plate heat exchanger:

- pressure from vacuum up to 30 bar
- usable in temperatures -196 °C to +200 °C
- high heat transfer coefficient
- low logarithmic temperature differences
- compact design
- low weight compared to tubular heat exchangers
- low pressure drop
- good self-cleaning, due to high media velocities
- heat transfer surfaces 0.11 – 107.4m²
- suitable for parallel use
- wide range of fittings and accessories
- construction for individual applications
- use as heat exchanger, condenser or evaporator

Full product range:

Alongside ParaBrazed, SPX has a wide range of heat exchangers of different forms offering solutions for all heat transfer requirements



Sales Network:

If you have any questions regarding SPX products and their operation, please contact your local SPX specialist. Your nearest partner can be found on the SPX website www.spxflow.com/en/apv/contact-us/