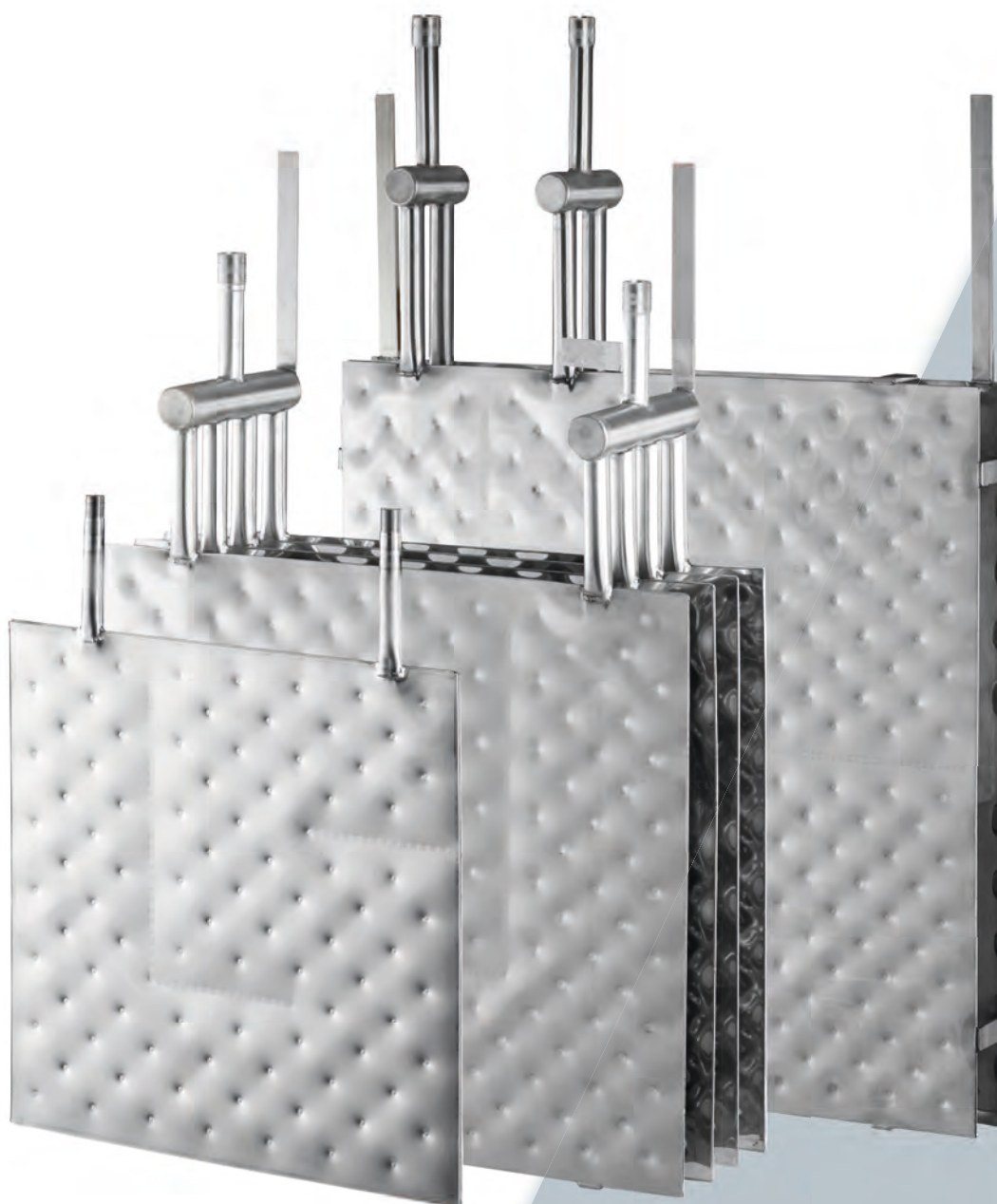


Heat Exchanger SYNOTHERM®



Metallic plate heat exchangers made of titanium and stainless steel

The SYNOTHERM® plate heat exchangers are made of titanium or stainless steel and are suited for the indirect heating and cooling of process liquids in plants or tanks.

The process liquid in the tank circulates around the plate heat exchanger and is heated up to the desired working temperature and maintains this temperature. Heat losses during the production process as well as heat input during a process (heat sources e.g. ambient heat, rectifiers or exothermic reactions) are compensated using plate heat exchangers.

Hot water, steam, saturated steam and thermal oil are applicable as heat transfer medium for heating purposes. Water, salt solutions and glycol are suitable for cooling purposes.

The SYNOTHERM® plate heat exchangers are manufactured using two metal sheets to form the basic plate. The metal sheets are cut to the required dimensions by a sheet shear before a fully automatic, retraceable spot and edge welding

process. The inlet and outlet consist of piping with appropriate fittings.

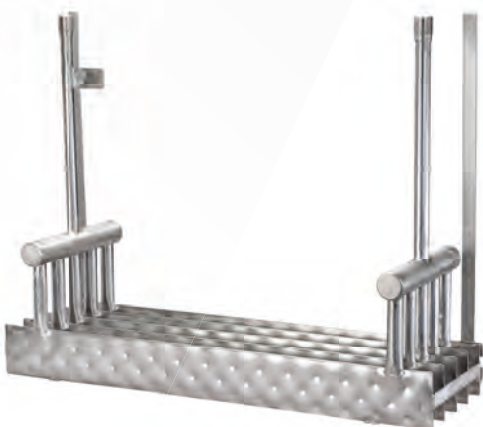
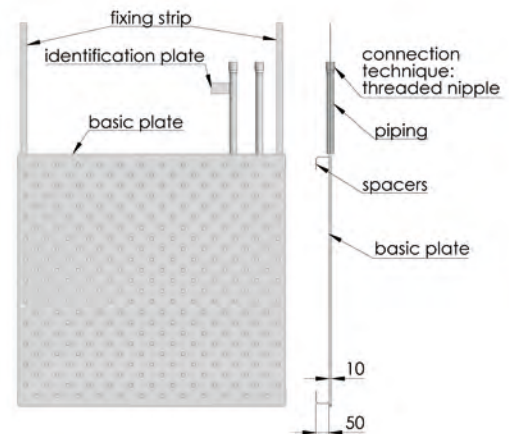
Either a flange or a threaded nipple can be welded onto the pipes. The plate heat exchangers are fixed to the tanks with fixing strips and spacers.

The pillow structure of the plate heat exchangers is generated by high pressure forming. The compact, light-weight and pressure-tight design ensures the long and safe working life of your plant.

In addition, the heat exchangers have a high power density, due to an increased surface area to volume ratio.

The total depth of the heat exchanger is 60 mm only (10 mm base plate + 50 mm spacer distance to the tank wall).

Dropped parts or sediments will not be deposited on or get stuck in the heat exchanger body (10 mm thick edge).





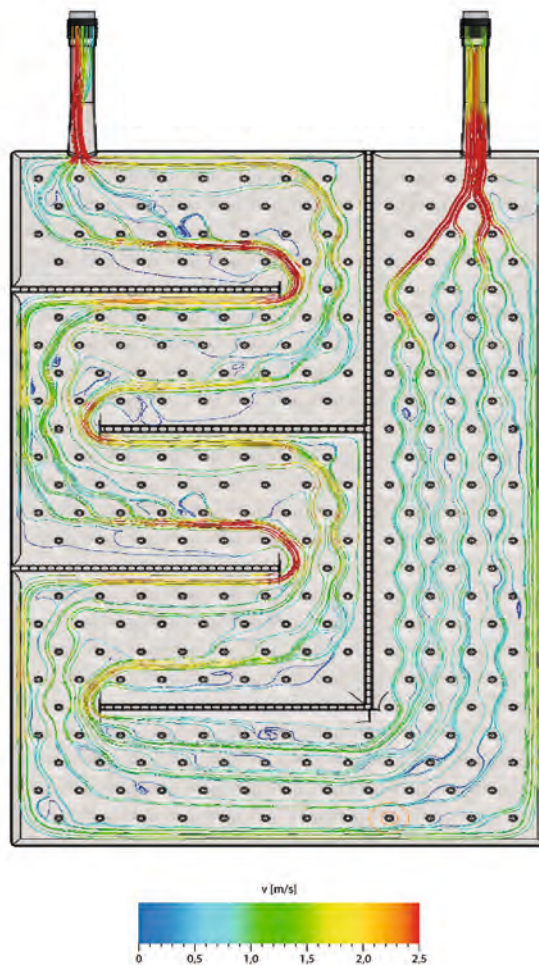
The characteristic pillow structure of the SYNOTHERM® plate heat exchangers enables turbulences in the heat transfer medium, therefore increasing the heat transfer coefficient k .

As the following basic formula^[1] shows, at a constant temperature difference $\Delta\vartheta_{in}$, less heat transfer area A is required to achieve the same power Q to be transmitted.

$$Q = k \times A \times \Delta\vartheta_{in}$$

The energy efficiency of plate heat exchangers is up to 33% higher than with coil heat exchangers, and in addition lower space is required. Sizes and costs of the tanks are reduced or there is more space for other components of the tank or the plant. Consequently the SYNOTHERM® plate heat exchangers save space, weight, material and costs.

The maintenance costs for SYNOTHERM® plate heat exchangers are significantly lower compared to tube heat exchangers. The flat and smooth surface can be cleaned easily and quickly with a steam jet or highpressure cleaners, resulting in your process being back in operation quickly.



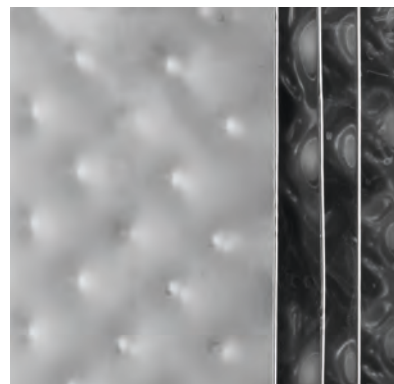
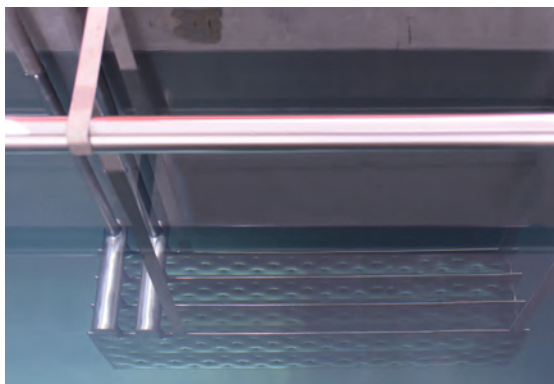
Standard working materials specification

code letter

KA	Stainless steel (Mat. no. 1.4301 / AISI 304)
KI	Stainless steel (Mat. no. 1.4404 / AISI 316L)
KB	Stainless steel (Mat. no. 1.4571 / AISI 316Ti)
KS	Stainless steel (Mat. no. 1.4539 / AISI 904L)
TI	Titanium (Mat. no. 3.7035 / ASTM grade 2)

Literature:

[1] von Böckh, P./Wetzel T. (Hrsg.) (2015): Wärmeübertragung, Grundlagen und Praxis, 6. Auflage, Karlsruhe, S.9



Our SYNOTHERM® heat exchangers are designed and produced individually according to the customer's needs. Due to various dimensions and connection options, we are able to fit our heat exchangers even to the most difficult installation situations. Our 3D-CAD-drawings allow for a perfect integration into the process system.

With our heat exchanger software, which we developed exclusively for our products, we design the heat exchanger SYNOTHERM® according to your requirements and provide detailed information like the thermal power, the required flow rates and the pressure loss, so that you can go forward and design your plants, tanks or peripheral structures.

[illegible]

Certificate for manufacture of pressure
equipment according to directive
2014/68/EU

Coated plate heat exchanger SYNOTHERM®

SYNOTHERM® coated plate heat exchangers also have metallic base bodys.

In a multi-stage coating process, a fluoropolymer coating is applied to the metallic surface. Adequate coating thickness and porosity of the coating are verified via a 100% test.

Due to the coating, SYNOTHERM® coated plate heat exchangers feature very high chemical resistance and excellent anti-adhesion properties, thus fulfilling two key requirements of chemical process equipment. They are suitable for heating and cooling of highly acidic process liquids.

The anti-adhesive fluoropolymer coating ensures homogeneous heat transfer and constant process conditions when fouling, incrustations and deposits restrict the heat transfer capacity of plain heat exchangers.

The heavy incrustation tendency with solutions such as zinc phosphates, is reduced considerably.

Incrustations can be removed from the heat exchanger in one part. They no longer have to be removed from the metal body by „jackhammering“.

Easy cleaning and extended maintenance intervals reduce your maintenance costs and ensure the operational performance of your plant in the long term.

In accordance with our certification to DIN EN ISO 3834-3, the heat exchanger can be manufactured and used as pressure equipment according to Directive 2014/68/EU.



Plastic heat exchanger SYNOTHERM®

Our plastic exchangers are made of solid plastic and are suitable for heating and cooling extremely aggressive media in which metallic plate heat exchangers cannot be used.

To determine the thermal heating/cooling capacity, a self-developed calculation programme is used.

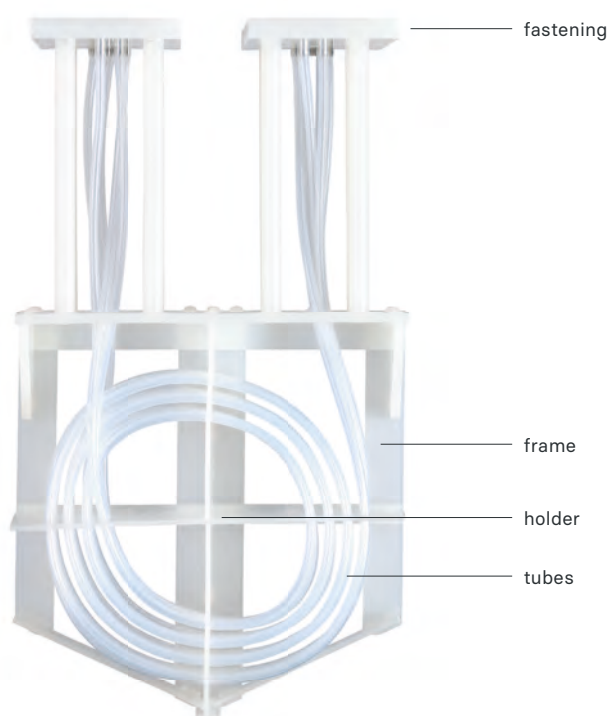
This program takes into account the heat transfer coefficient depending on the operating parameters and determines the size so that this optimally fits the customized application. The required size may vary depending on the required thermal performance and the tank dimensions selected from a modular system.

SYNOTHERM® plastic heat exchangers are pressure tested and comply with the Pressure Equipment Directive 2014/68/EU.

Plastic heat exchangers have PFA tubes. These are wound in a comb construction made of PP or PVDF.

The combs were designed to achieve a material-saving lightweight construction, so that at the same time sufficient flowability with process medium is ensured.

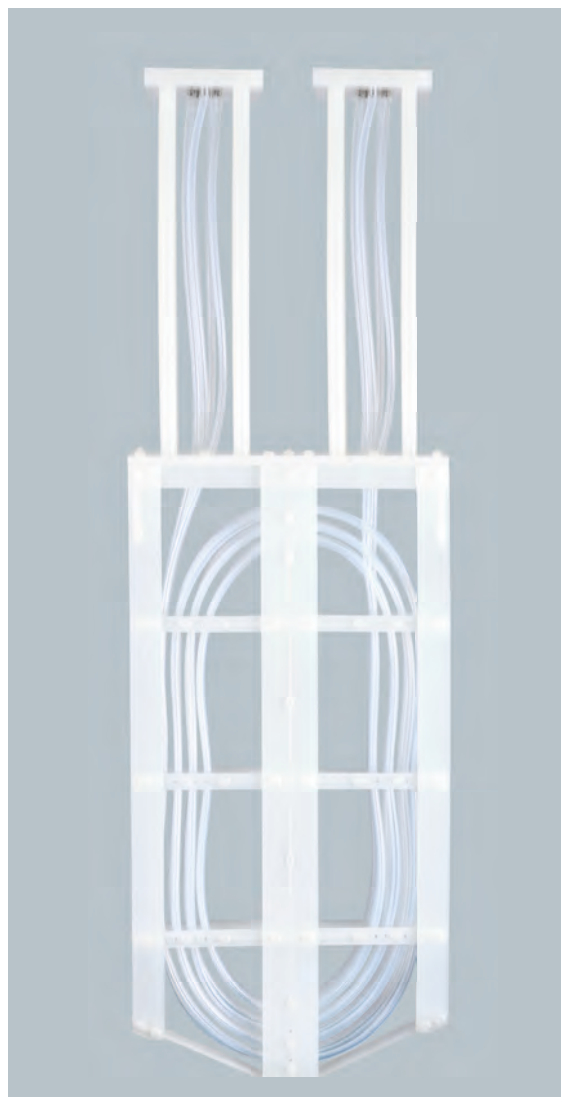
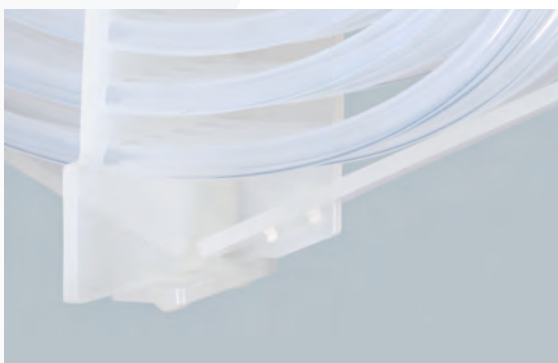
The plastic heat exchangers are constructed so that the tubing is protected against mechanical damage and all minimum distances are complied with.



The plastic heat exchangers are equipped with flanges to be attached to the customer's existing inlet and outlet streams.

The production takes place entirely in-house, with all polymer parts being manufactured on a milling machine.

With SYNOTHERM® plastic heat exchangers, you get a permanently stable, high-quality product which is reliable even under extremely demanding process conditions. The long service life means reduced investment costs and the reliable operation of your system.





**We are a forward looking and
international company!**

