PLATE HEAT EXCHANGERS
As a result of the researches on effectiveness and cost, many different types of heat exchangers have been developed as an alternative to conventional shell & tube type.

**Plate type heat exchangers** have gained the widest use amongst them and have put an end to the use of shell & tube type in most places. Plate heat exchangers were first used in food industry and milk pasteurization, but nowadays they are widely used in many applications.

**TANPERA Plate Heat Exchangers** provide customers the highest technology, effectiveness and ease of use in a wide range of applications—from specific building technology applications to the automotive and general industrial applications, from food processing processes to chemical applications and special applications in the pharmaceutical processing industry.

**TANPERA Plate Heat Exchangers** stand out with the wide plate range offering the perfect solution for every task, the ergonomics and safety-based design and the visible quality of its structure. This quality proves itself with a long service life, economic and trouble-free operation and low repair & maintenance costs.

With **TANPERA** quality and reliability, besides conventional gasket type plate heat exchangers, special designed plate heat exchangers are also available for use in special-purpose tasks.

**TANPERA Plate Heat Exchangers** are presented to our customers together with fast and reliable pre-sales and after-sales technical support as well as qualified technical service and spare parts assurance.
Residences, apartments and housing complexes.

Campuses and social facilities.

Health, education and sports facilities.

Culture-Art complexes.

Hotels and tourist facilities.

Office buildings and malls.

State buildings and facilities.

Metal manufacturing and machining.

Chemical and pharmaceutical production.

Rafineries and petrochemical plants.

Paper mills and plastic production facilities.

Beverage and milk production.

Food processing.

Power plants.

Textile factories.

Painting facilities.

Off-shore oil rigs.

Ships.
1- Suitable for Every Task…!
Our plate range includes several models with different thermal lengths, channel depths and channel angles. Thus, the heat exchanger can be designed to be fully compatible with the desired duty conditions and while achieving the desired heat transfer function, it is also possible to benefit from the allowable pressure drop. This makes the most optimum pricing possible.

2- High Quality at Reasonable Prices…!
TANPERA plate heat exchanger requires less heat transfer surface area than shell & tube heat exchanger. Thanks to the thin heat transmission plates, and high turbulent flow provided by the specially designed plate pattern, the heat transmission in the unit area is much more compared to the shell & tube heat exchanger. Because of this feature, although the plates are produced of corrosion resistant and expensive material, the cost is less than carbon steel heat exchanger designed for the same task.

3- Long Service Life…!
Corrosion-resistant materials used in its structure, high turbulent flow and smoothness of the plate surfaces, minimize pollution, calcification, corrosion and erosion. The deeply pressed gasket groove provides better support of the gasket and due to the tapered gasket structure the compressive force reaches to highest value at the gasket axis. The sealing strength of these types of gaskets and their resistance to the impacts are considerably higher than the old type flat gaskets. All these features increase gasket life and provide trouble-free operation.

4- 1°C Temperature Difference?
Very Easy…!
Thanks to the exact counter-current flow provided, it is an ideal solution even in applications where the fluid temperatures are very close to each other.
5- Small-Light but Powerful…!
Thanks to the compact structure provided by the low heat transfer surface area, the operation weight and space requirement are much less than the shell & tube heat exchanger designed for the same task. For this reason, it can be placed in very restricted areas, as well as savings on transportation and installation costs.

6- Excellent Reflexes…!
The TANPERA plate heat exchanger allows users to better control the systems, thanks to the short response time provided by the low liquid volume.

7- Intelligent Gasket…!
The risk of mixing of fluids due to any damage that may occur in the gasket is completely eliminated by the sealing system used. That is, there is certainly no other fluid on the other side of the gasket that confines a fluid. The other side of the gasket, due to the special channels on it, is open to the environment. Therefore, in the case of gasket damage, the flow is always out of the device, not the channels where the other fluid is present, and it is easier to detect the location of the damage from the outside.

8- Operator Friendly…!
The device can be easily dismantled when necessary and all heat transfer surfaces can be reached. It is possible to clean the unit, replace old or damaged plates and gaskets, and add plates when capacity needs to be increased. The gaskets are fastened with special locking systems without glueing to the plate. The special plate holding system reduces the risk of wrong plate arrangement even in the case of inexperienced personnel. In this system, the tapered tip at the point where the plates are hung can fit to the next plate to lock the plate package, so you can be sure that the gaskets are fully seated before the tie bolts are tightened. All these features reduce the maintenance and gasket replacement time, reduce the costs and prolong the service life of the device.
Regional heating and cooling

Free cooling and all applications where the cooling tower must be isolated from the system

Geothermal heating

Also,
Thermal storage,
Greenhouse heating and
Water sourced heat pump applications.

As pressure breaker on heating-cooling systems at high rise buildings

Preparing domestic hot water

Solar heating

Swimming pool heating
APPLICATION EXAMPLES: INDUSTRY, HEAT RECOVERY, COGENERATION, MARINE

Oil Cooling

Industrial heat recovery

Heating the phosphating, anodizing, passivation, pickling, degreasing and metal plating solutions

Heating-cooling with cogeneration

Also,
Chemical production processes;
Brine heating-cooling,
Various acid processes,
Caustic soda production,
Steam condensation,
Salt purification,
Resin cooling,
Paint heating…

Food processing;
Brewer yeast cooling,
Food oil heating-cooling,
Raw milk cooling,
Pasteurization,
Tomato paste processing…

Marine applications;
Fresh water generation,
Engine cooling,
Lubricant cooling…

We reserve the right to make changes in technical information.
A plate heat exchanger mainly consists of pressed corrugated metal plates, which are arranged one after the other to form the heat transfer surface, having fluid inlet/outlet ports on them. Special rubber-based gaskets between these plates form two flow channels through which primary and secondary circuit fluids pass, at the same time preventing the fluids from intermixing or leaking out. In this way, while the fluids move through the alternate channels in the heat exchanger, the heat transfer occurs through the plates from the hot flow side to the cold flow side. The plate package consisting of heat exchanger plates and the gaskets between them, is compressed to a certain total thickness by tie bolts, between two metal plates one is movable the other is stationary, to ensure the heat exchanger is sealed.

The channels on the heat transfer plates usually have a fishbone pattern. This special pattern allows the heat transfer to be made more effective by forcing the fluid into a high turbulent flow. Because, in the turbulent flow, heat is more uniformly distributed in the fluid, and the fluid film adjacent to the plate surface becomes thinner to increase the total heat transfer coefficient. In addition, this channeled structure makes the strength of the plates and the overall heat transfer surface to be increased.

The amount of turbulence and the ability of heat transfer vary according to the size of the angle between the channels on the plates. That is, as this angle decreases, turbulence and heat transfer ability increase, but pressure drop increases also. On the other hand, the increase in the angle creates opposite results. The design of the TANPERA plate heat exchangers can be done by using narrow or wide angle plates, or by a combination of both types. By this way, optimum suitability is ensured for the described task conditions.

Plate heat exchangers are usually designed as counter-current flow. Such type of heat exchangers are more effective according to the co-current types as more heat is delivered per unit time and heat transfer surface. In a counter-current flow heat exchanger, it is possible to heat the cold fluid to higher temperatures than the hot fluid outlet temperature, while in the other it is not possible. Co-current flow heat exchangers are only used in some specific process applications. TANPERA plate heat exchangers are delivered as counter-current flow as standart.
In our product program special type plate heat exchangers are also available. These are suitable for the tasks that require special attention, which conventional gasketed types are not suitable, such as aggressive and dirty fluids, high temperature and pressure conditions, extra hygiene and safety requirements, or for the situations where lower cost is preferred.

**Semi-Welded Plate**
Produced in the form of plate cassettes, consisting of two plates connected to each other by laser welding, these types are perfectly suitable for the tasks involving aggressive fluids for gasket materials, since one of the fluids passes through the cassette and the other through the gasketed plates.

**Double-Walled Plate**
Double-walled plates are made of two plates pressed together, so if for some reason one of the plates is punctured or cracked, the fluids can not intermixed. Thus, the maximum level of reliability of the heat exchanger is obtained, for the duties where the fluids are not desired to mix with each other.

**All Welded Plate Heat Exchanger**
The plates are welded together to form a plate pack and are fitted into a shell, so there is no gasket between them. This type of heat exchanger is the ideal solution for high operating temperatures and pressures and also for aggressive fluids.

**Free-Flow Plates**
In free-flow plates, the channels through which the fluids pass have been specially expanded. These type of plates are used in many industrial heating/cooling and heat recovery applications without the clogging problem with the fibers and solid materials contained in the fluid.

**Brazed Plate Heat Exchanger**
In this type, instead of using gaskets between them, the plates are brazed to each other for sealing. Therefore, it is a low cost alternative, which can work both at high pressure and temperature conditions.
**Determination of the Capacity**

Since the heat exchanger can only transfer the energy produced by a source, it is recommended that this primary energy source and the other devices in the system (boiler, chiller, pump, etc.) provide the required energy and, if this is not possible, the heat exchanger capacity is determined according to the existing primary energy source. In the case of large capacities or critical tasks, it may be more reliable to use more than one heat exchanger in parallel, either by dividing the total capacity or by considering a certain amount of reserve capacity.

**Temperature Scenarios**

The most important rule to note here is that the outlet temperature of the hot fluid (T4) will not be lower than the inlet temperature of the cold fluid (T3) and the cold fluid will not be able to be heated to a temperature (T2) higher than the inlet temperature of the hot fluid (T1). In other words, as can be seen from the diagram on the side, the temperature (T) curves can never intersect each other.

**Pressure Drop**

One of the decisive factors in the design of a plate heat exchanger is the presumed pressure drops for the primary and secondary circuits. These pressure drops within the device play an important role in the selection of the primary and secondary circuit circulation pumps. Limiting the pressure drop to low values leads to an increase in the size of the device, while a high pressure drop causes to a bigger pump. On the other hand, it should be taken into consideration that these values, which are essential for exchanger selection, depend on the application conditions.
General System Features

For trouble-free application, it is very important to select the appropriate material for heat transfer plates, gaskets, frame and tie-bolts. For this reason, while selecting a plate heat exchanger, the specifications of the fluids and the system (such as fluid type, temperature and pressure limits, viscosity and for water, if any, glycol etc. mixing ratios) should be clearly defined.

Technical Data for Selection

Amount of heat to be transmitted ............... kCal/h

Primary Circuit / Secondary Circuit

Fluid type ..............................................................
Fluid flow rate ................................................ m³/h
Inlet temperature ..............................................°C
Outlet temperature ..........................................°C
Maximum allowable pressure drop .......... mWc
Maximum operating pressure .................. bar
Maximum operating temperature...............°C

Our experienced sales engineers can quickly determine the most suitable and economical TANPERA heat exchanger for the desired task with the aid of our special selection program and present the computer output containing all the technical details to our customers.

You can consult our company for all your questions and needs regarding project planning and selection of TANPERA plate heat exchangers.
The great white heron can stand for a long time in the cold water as it can perform an effective heat exchange between the blood coming from the heart at 40°C and the blood returning from the feet at 1°C.