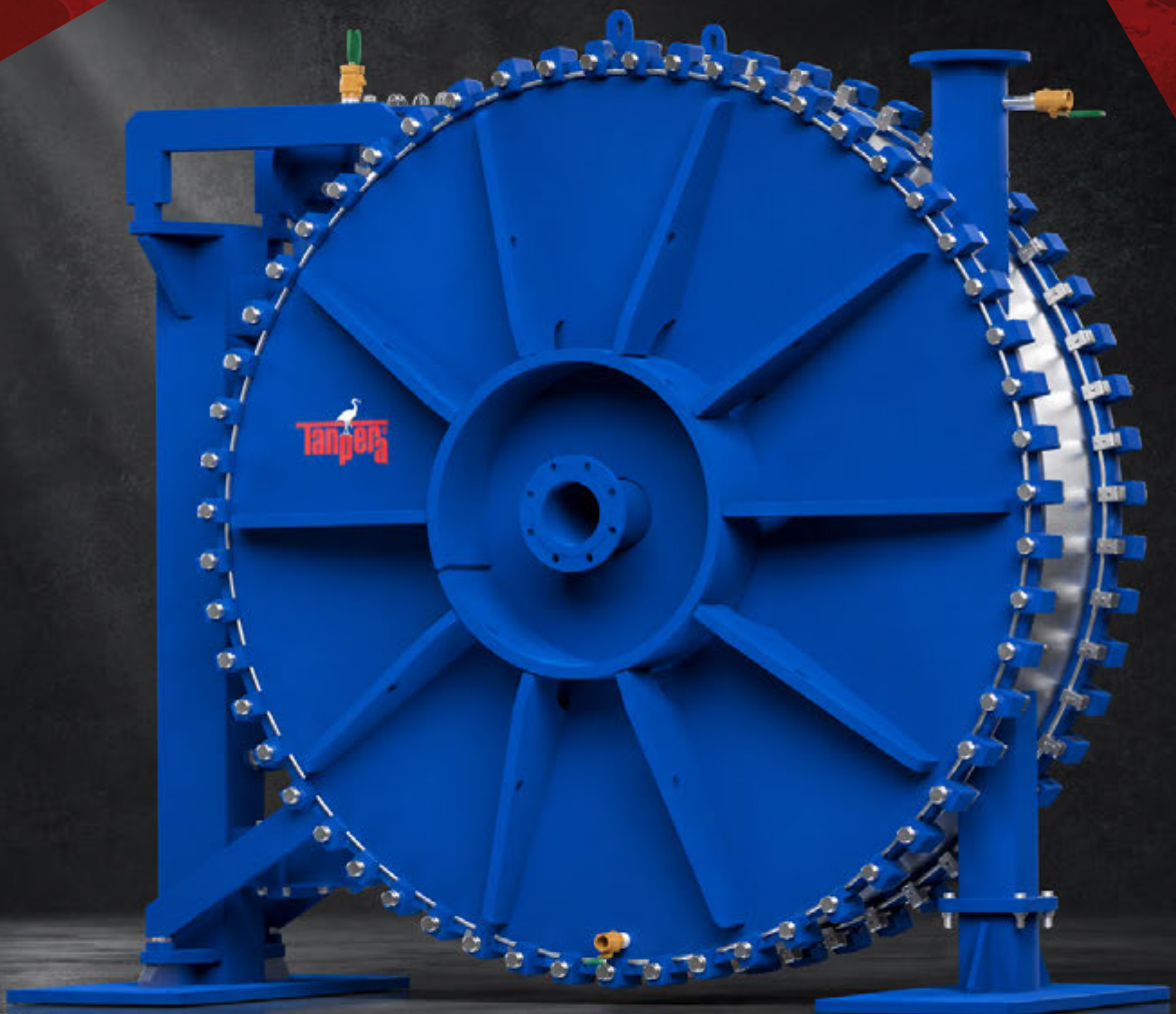


TANPERA



SPIRAL HEAT EXCHANGER

POWERFUL HEAT TRANSFER FOR DEMANDING PROCESSES



What Is a Spiral Heat Exchanger?

Spiral heat exchangers are high-performance heat transfer equipment in which two separate fluids exchange heat in counter-flow through completely isolated spiral channels. The basic operating principle is based on obtaining maximum heat transfer by ensuring that both fluids remain in continuous flow thanks to spirally wound metal plates.

Unlike traditional tubular heat exchangers, the spiral design uses the heat transfer surface extremely efficiently, and very large heat transfer capacities can be obtained in a small volume. The single-channel design makes it possible to process even difficult fluids containing sludge, wastewater, fiber, and solids easily, without any clogging problems. Tanpera spiral heat exchangers are manufactured with different material options such as stainless steel and carbon steel, suitable for many industrial applications such as food, chemicals, biogas, paper-pulp, and wastewater treatment. With their compact construction, long service life, and minimum maintenance requirement, spiral heat exchangers offer a reliable and economical solution in

General Features

- It provides high-efficiency heat transfer thanks to the counter-flow spiral channel structure.
- Thanks to its single-channel flow design, it minimizes the risk of clogging with sludge, fiber, particle-laden, and viscous fluids.
- The natural turbulence effect created along the spiral flow reduces surface fouling, providing a self-cleaning advantage.
- Thanks to its compact body structure, it delivers high capacity in minimal space and enables easy integration into existing facilities.
- With its hinged-cover system, it provides quick access to the entire heat transfer surface, reducing maintenance and cleaning times.
- It can be manufactured to suit the process with stainless steel, carbon steel, and special alloy materials.
- It is designed to adapt to different facility structures with horizontal or vertical mounting options.
- Thanks to its low fouling tendency, it extends maintenance intervals, reduces the risk of unplanned downtime, and lowers operating costs.
- Thanks to its strong body structure and high pressure resistance, it ensures long-lasting and reliable operation in heavy industrial conditions.
- With production options compliant with PED and ASME standards, it offers solutions suitable for international projects.



Advantages of the Spiral Heat Exchanger

High Heat Transfer Efficiency

Thanks to the counter-flow spiral channel structure, it provides maximum surface utilization. By offering high capacity in more compact dimensions, it increases energy efficiency.

Clog-Resistant Design

It operates safely with sludge, fiber, particle-laden, and high-viscosity fluids. Thanks to its wide channel cross-section, it is ideal for demanding processes.

Easy Cleaning and Service

With the hinged-cover design, quick access to the heat transfer surface is provided. Cleaning and maintenance times are reduced to a minimum.

Flexible Material Options

It can be manufactured with stainless steel, carbon steel, and special alloy materials. It offers special solutions suitable for the process.

Self-Cleaning Effect

The flow turbulence created in the single-channel structure reduces the formation of deposits on the surface. In this way, the fouling risk decreases and maintenance intervals are extended.

Compact and Strong Structure

It delivers high capacity in minimal space. By saving space, it enables easy integration into existing facilities.

Low Operating Cost

Thanks to reduced fouling, low maintenance need, and high energy efficiency, it lowers the total cost of ownership.

Long-Lasting Reliability

Thanks to its strong body structure and precise manufacturing technologies, it serves safely for many years in heavy operating conditions.

Highlighted Features

- ✓ It offers reliable operating performance with high-viscosity, particle-laden, and fibrous fluids.
- ✓ Thanks to its spiral channel structure, it creates natural turbulence, providing high-efficiency heat transfer.
- ✓ Thanks to its self-cleaning effect, it reduces surface fouling and extends maintenance intervals.
- ✓ Thanks to its compact design, it offers high capacity in minimal space, providing an advantage in facility layout.
- ✓ With its hinged-cover structure, it provides quick access to the entire heat transfer surface.
- ✓ Thanks to its low maintenance need and high energy efficiency, it reduces operating costs.

What Is the Operating Principle of the Spiral Heat Exchanger?

The counter-flow spiral channel system;

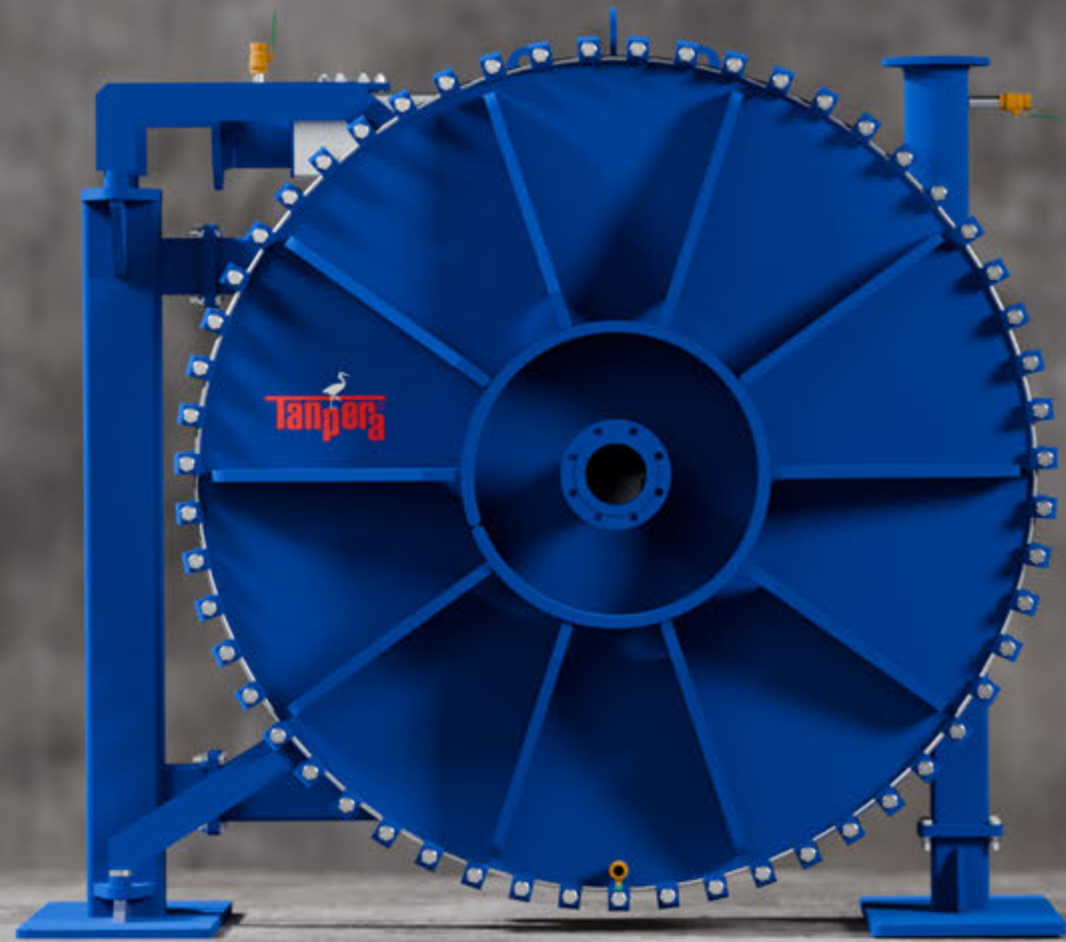
The coil of the spiral heat exchanger consists of two separate interlocking spiral plate coils, which form two completely independent channels. The hot fluid moves from the inside outward and the cold fluid from the outside inward, performing heat exchange in a counter-flow arrangement; in this way the temperature approach reaches its maximum level.

The spacer studs welded onto the plate surface keep the channel spacing constant, supporting turbulent flow and keeping the heat transfer coefficient high.

In the free-flow channel option, no spacers are used; this provides a much wider channel cross-section for fluids containing fibers and solids. Both channel designs can be combined within the same body, so operators can reach the most ideal heat transfer solution according to the requirements of the application. Thanks to the hinged-cover system, the entire heat transfer surface can be easily accessed when needed, and cleaning operations can be completed quickly so the system can be put back into service.

OPERATING PRINCIPLE





Application Areas

It offers reliable heat transfer solutions in processes involving high-viscosity, particle-laden, and demanding fluids.



Wastewater Treatment

Spiral heat exchangers offer high-efficiency heat transfer in sludge, wastewater, and biogas processes. Thanks to their wide channel structure, they reduce the risk of clogging with fluids high in solids. With their self-cleaning effect, they lower maintenance needs and support operational continuity.

Biogas and Energy Generation

Spiral heat exchangers provide high efficiency in sludge heating and heat recovery at biogas plants. Thanks to the spiral channel structure, dense and viscous fluids can be processed safely.



Chemicals and Petrochemicals

Spiral heat exchangers provide reliable heat transfer with high-viscosity process fluids. With material options suitable for corrosive environments and their compact construction, they integrate easily into process lines.

Paper - Pulp Industry

Spiral heat exchangers offer high performance in the heat transfer of fibrous fluids. While reducing the risk of clogging thanks to their wide channel structure, they enable efficient operation in energy-recovery processes.



Metallurgy and General Industry

Spiral heat exchangers deliver reliable performance in process cooling and waste-heat recovery applications. Thanks to their high-temperature-resistant construction, they are suitable for heavy industrial conditions.



Why Use a Spiral Heat Exchanger?

For demanding process fluids to be managed safely and efficiently, the heat transfer equipment must be designed to suit the flow characteristics. Thanks to their single-channel counter-flow structure, spiral heat exchangers allow the fluid to move continuously along the surface, creating highly efficient heat transfer. This structure also reduces fouling, lowers maintenance needs, and contributes to long-term stable operation of the system.

Spiral heat exchangers offer significant advantages over classic heat exchanger solutions, especially in processes involving particle-laden, fibrous, viscous, and sludge-containing fluids. Thanks to their compact construction, self-cleaning effect, and low operating cost, they are preferred in many industrial applications.

Because;

In Processes Involving Demanding Fluids

It ensures reliable operation by minimizing the risk of clogging with sludge, fiber, particle-laden, and high-viscosity fluids. Flow continuity is maintained thanks to the single-channel structure.

In Energy-Recovery Systems

It offers high heat transfer efficiency thanks to the counter-flow principle. By contributing to the recovery of waste heat, it lowers energy costs.

In Facilities Where Maintenance Times Are Critical

The natural sweeping effect reduces surface fouling. Thanks to the openable cover design, maintenance and cleaning operations can be carried out quickly.

In Projects Requiring Compact Layout

By delivering high capacity in minimal space, it enables easy integration into existing facilities. It is the ideal solution for applications requiring space saving.

In Industries Requiring Continuous Operation

It offers long-lasting and stable performance in heavy process conditions such as wastewater treatment, biogas, chemicals, food, and metallurgy.

Technical Specifications

Spiral Heat Exchangers are specially designed to provide high-efficiency heat transfer with demanding process fluids. Thanks to their compact construction, wide channel geometry, and robust construction, they can be used safely in many industrial applications.

→ Coil and Shell Materials

It can be manufactured with carbon steel, AISI 304, AISI 316, Duplex, and special alloy materials. With material selection suitable for the process conditions, it ensures long-lasting use.

→ Wide Channel Design

Thanks to the single-pass spiral channel structure, it minimizes the risk of clogging with fibrous, particle-laden, and high-viscosity fluids. It is the ideal solution for demanding fluids.

→ Pressure Resistance

It can be manufactured in different pressure classes according to project requirements. It offers safe operating performance in high-pressure processes.

→ Temperature Range

It can be designed for use in processes requiring high and low temperatures. With its wide operating temperature range, it offers versatile use.

→ Compact Design

It delivers high capacity in minimal space. By saving space in existing facilities, it creates the advantage of easy integration.

→ Easy Cleaning and Maintenance

With hinged-cover or removable-body options, it provides quick access to internal surfaces. It reduces maintenance times.

→ High Heat Transfer Efficiency

It creates high turbulence thanks to the counter-flow principle and spiral channel geometry. It provides maximum heat transfer performance.

→ High Heat Transfer Efficiency

The natural sweeping effect created during flow reduces surface deposits. In this way, efficiency is maintained for a longer time.

→ Flexible Production Options

It can be manufactured with horizontal or vertical mounting, special connection types, and project-specific dimensions. It adapts to every facility structure.

Technical Specifications

Parameter	Value / Description
Heat Transfer Surface	1 – 400 m ² (10 – 4.305 ft ²)
Shell Diameter	600 - 2,140 mm (23.6" - 84.5"). Different sizes available on request.
Width	100 , 250, 500, 750, 1,000, 1,250, 1,500 mm. Different sizes available on request.
Max. Operating Pressure	16 bar (232 psi). Higher pressures available on request.
Max. Operating Temperature	200 °C (392 °F). Higher temperatures available on request.
Min. Operating Temperature	-20 °C (-4 °F). Lower temperatures available on request.
Mounting Position	Vertical or horizontal
Connection Sizes	DN32 – DN300 (1" – 12")
Connection Types	Compliant with all known international standards
Coil Material	AISI 316L, AISI 304L, AISI 904L, Carbon Steel (P355GH). Other materials on request.
Shell Material	AISI 316L, AISI 304L, Carbon Steel (P355GH). Other materials on request.
Sealing Material	NBR, EPDM, PTFE, Graphite. Other materials on request.
Channel Design	Studded/Studded Studded/Free Flow Free Flow/Free Flow
Channel Access	Hinged cover or welded (no-access) channel
Frame Painting	C2L, C4M, C5M categories
Design Standards	PED, ASME, TR TS. Other approvals on request.

SPIRAL HEAT EXCHANGER

What Are the Components of the Product?

■ Connections

The nozzles that provide the inlet and outlet of the fluids to the heat exchanger. Available in the DN32 - DN300 range, with flange and threaded connection types compliant with all international standards.

■ Cover Doors

With a hinged or screwed closure system, they offer easy access to the entire heat transfer surface; they significantly shorten cleaning and maintenance times.

■ Sealing

Made of NBR, EPDM, PTFE, or graphite material and selected according to the fluid properties and operating temperature; the gasket-free channel design takes leak-tightness to the highest level.

■ Core

The internal structural element that centrally positions the spiral plate coils and ensures mechanical integrity.

■ Spiral Coil

The spirally wound metal plates that form the heat transfer surface are manufactured from high-quality stainless steel or carbon steel materials to provide flow channels optimized for two different fluids.

■ C-Clamps

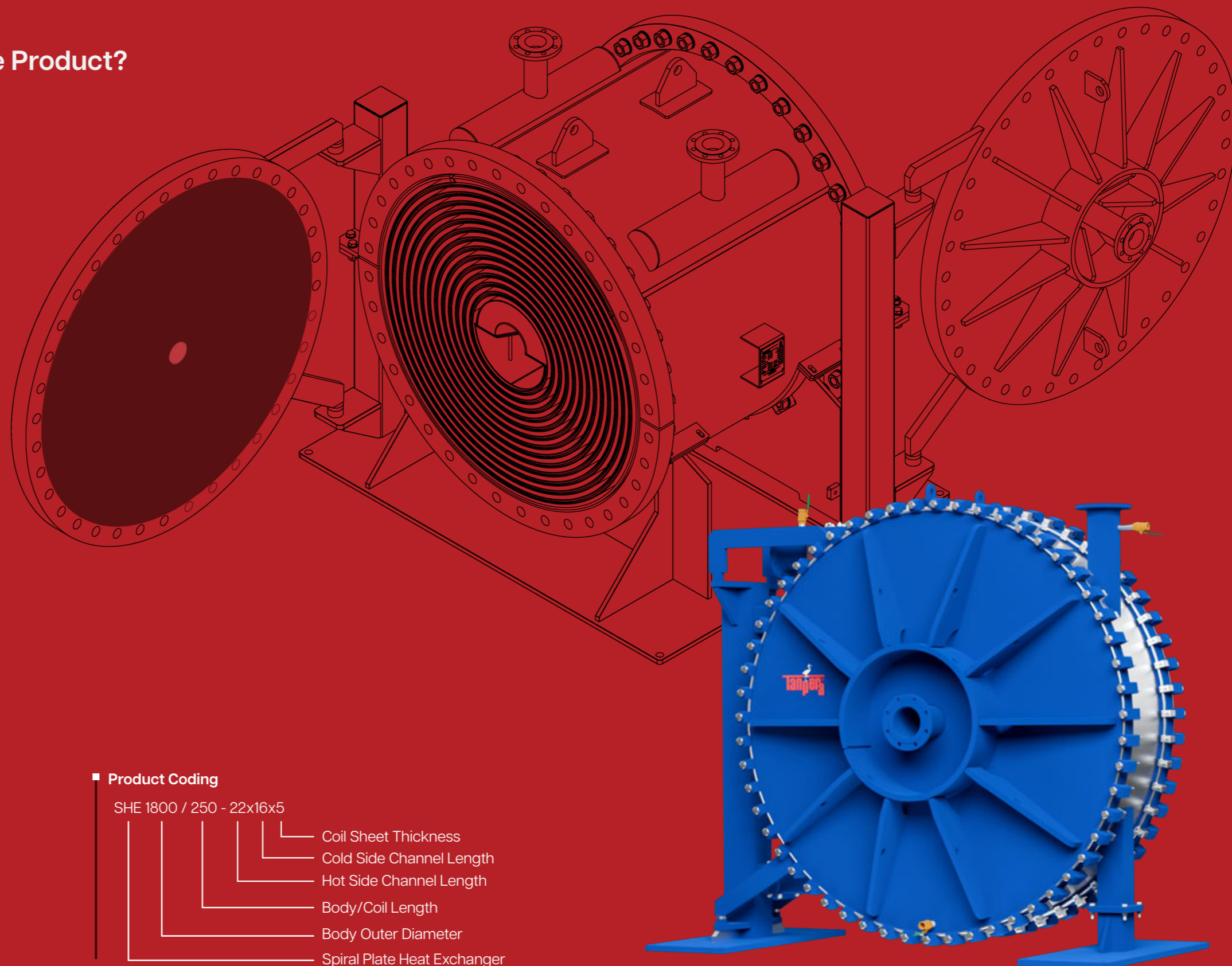
Used to securely lock the cover doors for operating pressures up to 10 bar. For pressures above 10 bar, a bolted connection system is preferred.

■ Shell

The cylindrical enclosure that surrounds the spiral coil from the outside and forms the pressure-resistant outer structure of the system. Supplied in stainless steel or carbon steel options.

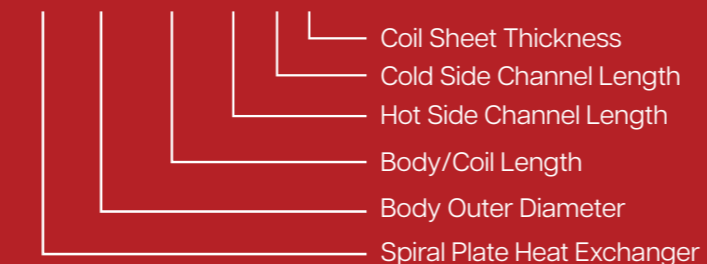
■ Frame

The support structure that carries and fixes the heat exchanger; it can be supplied in different configurations for both vertical and horizontal mounting applications.



■ Product Coding

SHE 1800 / 250 - 22x16x5



Engineering Recommendations

In selecting a spiral heat exchanger, the fluid characteristics and process conditions are just as decisive as the correct capacity. Especially with viscous, fibrous, particle-laden, or sludge-containing fluids, the channel structure, pressure loss, and cleaning access must be evaluated together.

Fluid Properties

The viscosity, solids content, fiber structure, and chemical composition of the fluid used play a critical role in determining the correct channel geometry. For demanding fluids, a wide channel or free-flow channel structure should be preferred.

Heat Transfer Capacity

The inlet-outlet temperatures, flow rate, and target heat load must be clearly defined. The counter-flow spiral structure provides a significant advantage for a high temperature approach and efficient heat transfer.

Pressure-Loss Control

The pump capacity in the process line and the permissible pressure loss must be taken into account. The channel spacing and connection diameters must be selected to support stable operation of the system.

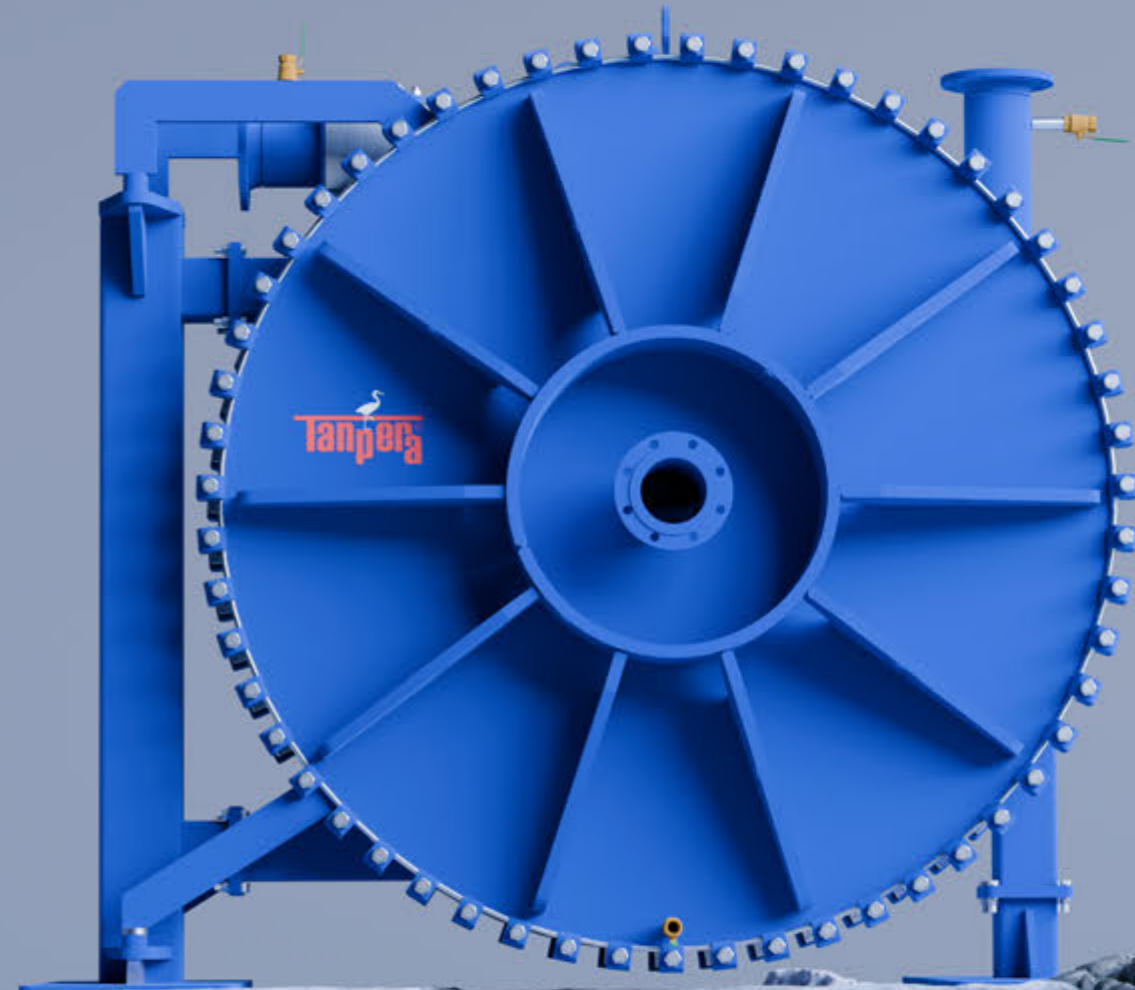
Maintenance and Cleaning Access

In applications with a high fouling risk, a hinged-cover design should be preferred to provide quick access to the entire heat transfer surface. This choice shortens maintenance times and reduces the risk of unplanned downtime.

Material Selection

Depending on the chemical nature of the fluid, carbon steel, AISI 304, AISI 316, duplex, or special alloy materials should be evaluated. The right material selection is critically important for long-lasting and safe operation.

SPIRAL HEAT EXCHANGER





By achieving an effective heat exchange between the blood returning at 40°C from its heart and at 1°C from its feet, it can remain in cold waters for a long time without freezing. Using these principles of this wonder of nature, we too design our heat exchangers - marvels of engineering.

Tanpera Turkey

+90 850 308 0114

≈üeyhli Mh. Ankara Cd. No: 380/C
34906, Pendik, Istanbul, T_ürkiye

info@tanpera.com.tr

www.tanpera.com.tr

Tanpera GmbH

+49 1590 4138428

Hermann-Essig-Str. 36 71701
Schwieberdingen, Stuttgart, Germany

info@tanpera.de

www.tanpera.de

Tanpera A.Ş. - www.tanpera.com.tr - info@tanpera.com.tr - +90 850 308 0114

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