Product Literature
HES Spiral

PLUG-RESISTANT HEAT TRANSFER

SPIRAL
HEAT EXCHANGERS

TRANTER®
The heat transfer people

Technology Born In The Process Industries

The spiral heat exchanger was developed in the 1920s for use in the paper industry by the Swedish engineer Curt Rosenblad. For the first time, a heat exchanger was available that allowed trouble-free heat transfer between particle-loaded process streams.

In the early 1970s, Tranter HES predecessor Kapp Apparatebau started manufacturing spiral heat exchangers based on an original design with distinct advantages over the Rosenblad design. Today, Tranter HES is the only company capable of manufacturing spiral heat exchangers either in its own design or in the Rosenblad design, in almost any size from any cold-workable and weldable material. This engineering and manufacturing flexibility enables us to offer replacements units for all applications without the need for costly repiping.

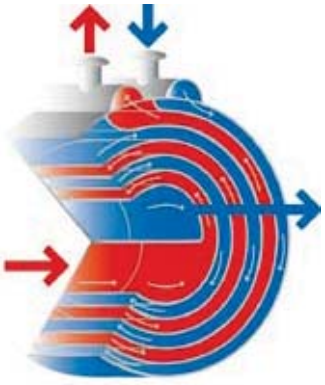
Wide-Ranging Spiral HE Applications

- Cooling, heating, heat recovery
- Near-vacuum condensation
- Evaporation
- Thermosyphon
- Reboiling
- Vegetable oil, water treatment
- CPI, food, pharma, pulp & paper, primary metals, mining
- Municipal waste water treatment/sludge processing

Spiral HE Materials And Fluid Compatibilities

- Carbon steel
- Super austenitic stainless steel
- Nickel and nickel alloys
- Titanium, others
- Liquids, two-phase media, gases
- Liquids, suspensions, fibre- and particle-loaded liquids, (highly) viscous fluids, non-Newtonian fluids including slurries and sludges
- Vapor with and without inert gases

The Spiral Heat Exchanger



The concept of a spiral heat exchanger is as simple as it is sophisticated. Two or four long metal strips, onto which spacer studs are welded, are wound around a core, thus creating two or four equally spaced, single-passage channels. An important feature of our design is the use of continuous strip from core to shell that avoids the weakening of internal welding seams and thickness transitions.

A Solution For A Wide Range Of Applications

The concentric shape of the flow passages and the studs yield turbulence at low Reynolds numbers. By optimizing the flow pattern heat transfer is enhanced, while fouling is reduced. This compact and space-saving design can be readily integrated into most available footprints, reducing installation costs.

Because of the welded, robust design and the low fouling properties, maintenance costs are minimal. On a Total Cost of Ownership basis, the spiral heat exchanger is frequently the most cost-effective solution.

Different Flow Configurations For Different Tasks

Type A: Counter- Or Co-Current-Flow

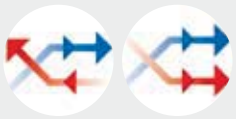
- Both covers closing the spiral body
- Liquid/liquid as well as vapor/liquid-applications

Type B: Cross-Flow

- Both covers at a distance from the spiral body
- Overhead condensation and evaporation applications

Type C: Cross-/Counter- Or Co-Current-Flow

- One cover closes the spiral body; the other is at a distance
- Condensation applications with the possibility of condensate sub-cooling



HES Spiral HE Performance Specifications

Channel spacings, in. (mm)	0.197– 2.76 (5–70)
Channel widths, in. (mm)	2–79 (50–2000)
Surface per unit, ft² (m²)	1.1– 8610 (0.1–800)
Design pressure[a], psig (barg)	vacuum–>653 (vacuum–>45)
Design temperature, °F (°C)	-148–>840 (-100–>450)
Available codes	AD-2000, PED, ASME, AS1210, etc.
Quality certifications	ISO 9001:2000, SQL

[a]Ratings offered as a general guide only. Certain combinations of physical and fluid properties may affect individual product specifications. Contact the factory with your specific application data.

Application-Focused Configurations

Tranter HES has developed a wide range of cores adapted to accomplish specific tasks, offering the right solution for each application. Since its channel geometry can be configured with great flexibility, a spiral HE can be adapted easily to particular needs. Our designers can accommodate various mass flows and temperature approaches within a single unit, often with an excellent turndown ratio. The long-flow, single-passage channels make possible finely tuned thermal length, by which difficult process flows can be heated or cooled in a single unit. Most importantly, the flow channels have no dead spaces or sharp turns that would otherwise result in plugging.

Manufacturing Capabilities

Design and fabrication are executed in accordance with international pressure-vessel codes including PED (CE-Stamp), AD-2000 Merkblätter, ASME (U-Stamp), AS1210, etc. Quality is ensured by maintaining written procedures from proposal to delivery. Corresponding certifications to ISO 9001:2000 and Manufacture License for Special Equipment (SELO) are also maintained.

Know-How, Flexibility And Service

With our extensive spiral heat exchanger applications experience, we can assist our customers in many ways. Close teamwork within the Tranter worldwide network of representatives and partners provides responsive individualized service.

Customer feedback applied to continuous improvement plays a vital role, absolutely vital for relevance in a rapidly changing world. The benefit to you is increasingly more capable units that set new standards in spiral heat exchanger technology. For certain new applications, we make available test units intended to address leading-edge process heat transfer challenges.

Typical Applications

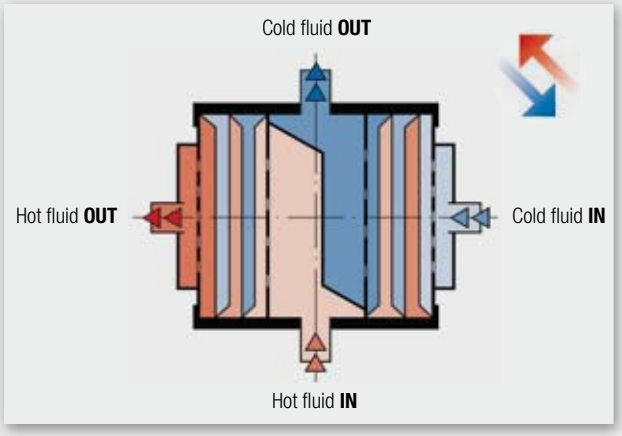
Liquids And Slurries

For viscous and/or particle-loaded fluids the spiral HE is frequently the first, if not the only choice. The spiral design prevents bypassing, resulting in a self-cleaning effect. Additionally, the unit's high heat transfer coefficients help to prevent sedimentation.

While the standard spiral heat exchanger is practically free of dead space, optional configurations can be manufactured completely dead space-free. Special units can be fabricated without spacer studs, reducing the risk of blockages to the absolute minimum. Cold and/or hot spots are eliminated, and a temperature approach of less than 5°F (3°C) can be attained.

Welded channel construction provides outstanding resistance to leakage, making the spiral unit well suited for hazardous and/or aggressive fluids.

Covers can be mounted with hook-bolts, hinges or davits to enable easy access to the channels for rapid mechanical cleaning. Because of the single-flow channels, chemical cleaning can be very effective. For high pressure/temperature applications, a through-bolted end cover mounting is available.



Counter-current unit, with diagram showing flow for both channels.

Sludge application with 431-ft² (40-m²) surface area and 75-in. (1900-mm) diameter.

Body flange.

Frame.

Hinge-mounted covers for rapid opening and cleaning.

Reinforced covers for high-temperature/pressure applications.

Condensation And Evaporation

The spiral heat exchanger functions as an ideal condenser, especially condensing mixed vapors with or without inert gases. The concentric, single-flow passage geometry maximizes product recovery. There are three possible flow arrangements: counter-current, co-current, cross-current and a combination of these.

If pressure drop is not a critical factor, a unit with counter- or co-current flow is a good solution. Vapor, particularly with a high inert gas concentration, condenses well in the long flow path characteristic of the spiral heat exchanger. In addition, the condensate and/or inert gases can be sub-cooled within the same unit.

If pressure drop needs to be minimized, such as in near-vacuum applications, a cross-flow configuration with the cooling fluid meets the need. High flow rates can be condensed with pressure-drops of less than 0.015 psi (1 mbar), and inert gases can be removed easily. Where condensate must be sub-cooled with minimal pressure-drop, a combination of cross-/counter-flow is used.

An outstanding advantage of spiral heat exchangers used as overhead condensers is that they can be flanged or welded directly onto a column. They are also easily applied as multiple-stage condensers. The assembly of the spiral condenser onto a column greatly reduces installation costs, because connections are minimized.

Spiral HEs are easily configurable to accomplish a variety of condensing tasks.

Spiral HEs configured as a three-stage overhead condenser.

Short flow path and high surface area makes the spiral HE well suited for high flow rates, efficient condensation and low pressure drop.

Spiral HE configured as a bottom condenser.

Plate Heat Exchanger Products And Services

Welded Heat Exchangers

Tranter's SUPERMAX® ULTRAMAX® and MAXCHANGER® welded heat exchangers offer distinct advantages of plate heat transfer efficiency, due in large measure to the turbulent flow created by the corrugated patterns of their plates. Because of their high efficiency, Tranter welded units can handle temperature approaches of less than 2°F (1°C). Their smaller hold-up volume than shell & tube results in faster start-ups and closer following of process changes. Beyond efficiency, all three offer cost effectiveness, high performance and minimal maintenance.

SUPERMAX Shell & Plate Heat Exchangers handle liquids, gases and two-phase mixtures at pressures to 1,000-plus psig (68-plus barg) and at temperatures to 1000°F (538°C). Eight different diameters of circular plates are available to accommodate a wide range of flow rates. The unit can be fabricated from dissimilar metals when only one side will be exposed to corrosive conditions.

The ULTRAMAX Welded Heat Exchanger incorporates the efficiencies of a plate & frame heat exchanger without gaskets. It can operate at a maximum design pressure of 650 psig (45 barg) and at low and high temperatures, from -320°F (-196°C) to 650°F (343°C). It can handle liquids, gases and mixtures of the two. Special alloy construction is available, allowing it to be used with aggressive media. Various plate chevron angles offer flexibility in optimization.

If prime application considerations include a variety of connection locations, space and single-material design, the MAXCHANGER is extremely versatile. It can be used in many duties where shell & tube units typically cool mechanical and electrical equipment—liquid-to-liquid, steam-to-liquid, gas-to-liquid, gas-to-gas and refrigerant applications (including ammonia).

PLATECOIL® Prime Surface Heat Exchangers

These versatile, highly efficient PLATECOIL® Prime Surface Heat Exchangers replace costly and unwieldy pipecoil, steam sparging or expensive resistance heating elements. High internal flow velocities of these exchangers generate effective heat transfer rates.

Tranter's exclusive Multi-Zone configuration—designed to uniformly deliver steam to all levels of the unit through zoned headers—and two Serpentine configurations are available in more than 300 standard sizes or can be custom designed. Single- and double-embossed styles may be flat, bent or rolled as immersion heaters, banked for tanks, used in mixers, cryogenic shrouds, jacketed vessels, clamp-on panels and a wide variety of other configurations.

SUPERCHANGER® Plate & Frame Heat Exchangers

SUPERCHANGER® Plate & Frame Heat Exchangers transfer heat more efficiently than S&T units in most applications, due in large measure to the turbulent flow created by the corrugated patterns of the plates. They offer "U" values three to five times greater than S&T units, a less than 2°F (1°C) temperature approach, easy maintenance and in-place expansion capability.

SUPERCHANGER offers a broad selection of plate designs, including herringbone and chevron styles, wide-gap and mixed high- and low-NTU plates. End frames offer a choice between studded port connections and flanged extended nozzles. A broad selection means a better match to your requirements, thus lower costs.

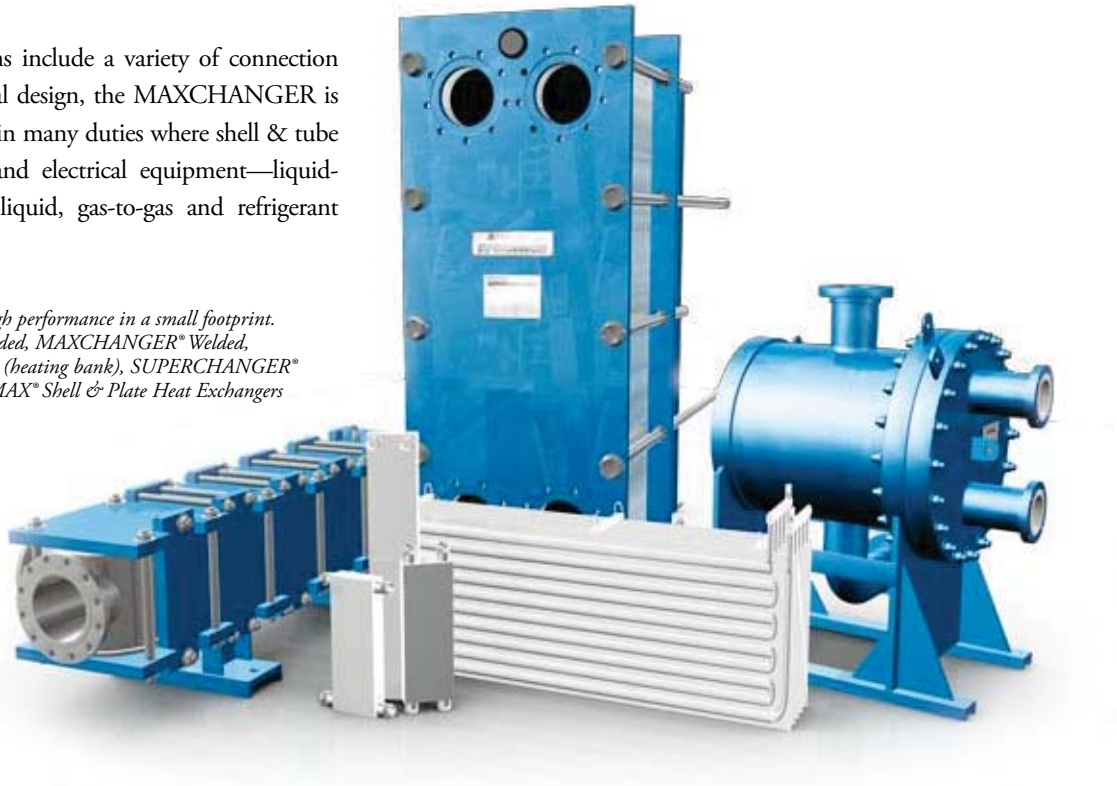


Plate heat exchangers offer high performance in a small footprint. From left: ULTRAMAX® Welded, MAXCHANGER® Welded, PLATECOIL® Prime Surface (heating bank), SUPERCHANGER® Plate & Frame and SUPERMAX® Shell & Plate Heat Exchangers

Service Centers Help Keep You On Line

At Tranter Authorized Service Centers, we safely clean and refurbish your spiral heat exchangers, returning them to peak efficiency, and guarantee our work with our own written warranties covering materials and workmanship.

We do pressure washing and chemical cleaning of spirals, spiral core replacement, sandblasting and repainting, gasket replacement and hydro testing. With Tranter and its authorized service facilities, you can always be sure that you get the right gaskets, the right plates, the friendliest service and our OEM Guarantee.

Give us a call at (940) 723-7125.

Tranter Service Centers are equipped with the knowledge, skill and OEM parts and methods necessary to maximize your exchanger uptime.

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Tranter on-site teams stand ready to restore peak efficiency to your exchangers with minimal downtime.

At the forefront of spiral heat exchanger technology for more than 80 years

Tranter HES originated from the acquisition of HES Heat Exchanger Systems GmbH in early 2009. Tranter HES represents the impressive heritage in spiral heat exchanger design and manufacturing constituted by the combined experience of Kapp Apparatebau, HES, Canzler and Vaahto; the spirals-related know-how and production machinery of the latter two were acquired by HES in 2007. Tranter HES is a worldwide operating enterprise with more than 60 years of experience in the design and manufacture of spiral heat exchangers. The Tranter worldwide Service Center network is equipped to provide repairs and overhauls of most brands of spiral units, both in the plant and in our shop.

TRANTER®
The heat transfer people

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