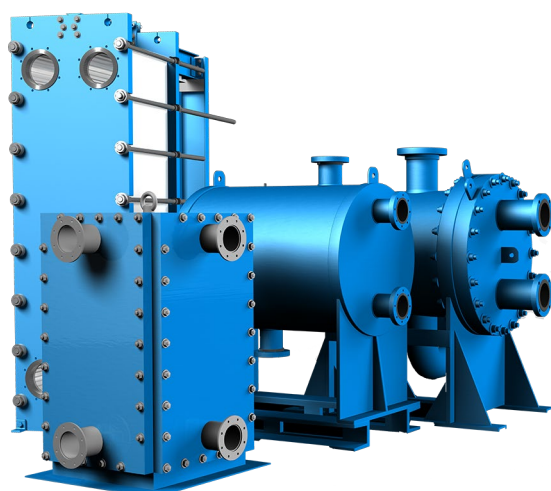


Application Literature
Industry Overview

COMPACT MAINTAINABILITY FOR THE OIL AND GAS INDUSTRY



SUPERCHANGER®
Plate & Frame HE

SUPERMAX®
Shell & Plate HE



Performance-Tuned HE Products For Oil And Gas

Special demands require special solutions

Oil and gas upstream and downstream processing places special demands on heat exchangers. Such equipment must not only withstand corrosive media, two-phase mixtures, extreme pressures and temperatures, but also be extremely compact. Tranter offers a wide range of gasketed, welded and spiral heat exchangers, proven to meet the toughest customer requirements. Our customers include leading oil and gas companies such as Shell, ExxonMobil, British Petroleum, ChevronTexaco and TOTAL.

Our patented plate technology enables us to tailor thermal and hydraulic design to optimize performance, reduce investment costs and minimize footprint and weight.

Wide capabilities to meet your demands

For heat exchanger units in critical service, Tranter can provide all major types of calculations and stability analysis, including motion load, wind load, seismic load, nozzle load and even detailed finite element analysis calculations if required. A dedicated Document Control Department produces documents in accordance with the most stringent of customer requirements.

Tranter fabricates in accordance with all major design codes, specifically ASME Section VIII Division 1 with U stamp, PED 97/23/EU with CE stamp and API 662 / ISO 15547. All Tranter manufacturing centers worldwide are certified according to ISO 9001:2000.



SUPERCHANGER® plate corrugations provide high turbulence, with heat transfer coefficients several times higher than shell & tube exchangers.

SUPERCHANGER® Gasketed Plate & Frame Heat Exchangers

The SUPERCHANGER® Gasketed Plate Heat Exchanger is a module-based heat exchanger with gasket sealing between the plates. By using plates of different sizes, draw depths, chevron angles and pass arrangements, the exchanger can be optimized for a particular application. The plate corrugations provide high turbulence, with heat transfer coefficients several times higher than shell & tube (S&T) exchangers. The high shear stress produced by the induced turbulence scours the heat transfer surface during operation, thereby reducing fouling. This turbulence also aids the effectiveness of CIP procedures. The gasketed plate heat exchanger provides full accessibility for cleaning and can also be expanded if required. Gaskets available: nitrile, hydrogenated nitrile, EPDM and PTFE/Viton.

SUPERMAX® Shell & Plate Heat Exchanger

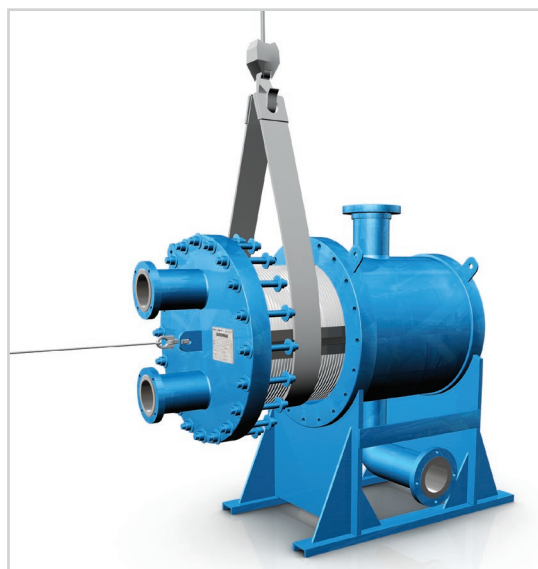
The SUPERMAX® Shell & Plate Heat Exchanger is designed for pressures to 70 barg (1,015 psig) and temperatures up to 538°C (1,000°F) for standard range units. Extended range units are available for higher temperature and pressure applications. The exchanger is particularly suited to oil and gas applications having a large flow imbalance, allowing higher flow rates on the shell side. Horizontal orientation and low pressure drop makes the SUPERMAX an excellent choice for condenser/boiling applications.

With alternating channels for hot and cold media, the SUPERMAX can be configured to provide true countercurrent or co-current flow. The SUPERMAX line offers three different diameters of circular plates. An optional flanged cover allows the plate pack to be removed for cleaning. SUPERMAX plate materials may be Type 316L stainless steel or other alloys; shells may be fabricated of carbon steel, Types 304, 316, 316L stainless steel and titanium. The unit can be fabricated from dissimilar metals when only one side will be exposed to corrosive conditions.

Various optional configurations of the SUPERMAX unit enable this versatile exchanger to meet wide-ranging application needs. The Removable Cover SUPERMAX

exchanger provides full accessibility to the plate pack for inspection and/or mechanical cleaning by removing the plate pack bundle.

In the Multi-Duty SUPERMAX, multiple separate plate packs share a single shell. The ability to combine plate packs with different plate counts affords broad flexibility in combining multiple applications within a single exchanger. For flows that require a high flow rate, the two inlets and outlets can be piped together. The Multi-Pass SUPERMAX establishes multiple passes through separate plate pack zones on both the plate and shell sides.



Flexibility is the hallmark of SUPERMAX units: low pressure drop and suitability with unbalanced flows makes them well suited in condensing and reboiling applications. The removable cover makes cleaning fast and simple.

PHE Standard Range General Specifications


	SUPERCHANGER Plate & Frame Gasketed	SUPERMAX Shell & Plate
PERFORMANCE		
Max. Pressure Rating, barg (psig) ^a	27.56 (400)	70 (1015)
Max. Temperature Rating, °C (°F)	160 (320)	538 (1000)
CONNECTIONS		
Max. Connections, DN (ANSI RF in.)	Contact Factory Also Studded Ports	400 (16)
MATERIALS		
Standard Plate Material ^c	304 SS, 316 SS	316L SS
Standard Frame/Shell Material	Carbon Steel	Carbon Steel, 316L SS, 254 SMO, AL6XN

^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.

^b For Spiral HEs, column mounted diameters up to 3,000 mm (118 in.) and maximum shell diameters up to 2,400 mm (94.5 in.) are available.

^c Higher performance materials are available.

Idea Notebook



Efficiency and ease of maintenance mark the versatility of Tranter plate heat exchangers in oil and gas applications. Consider the benefits of thermal efficiency and compactness offered by plate heat exchangers in applications traditionally handled by S&T heat exchangers, such as:

- Crude Oil Desalting
- Waste Water Treatment
- Gas Compression
- Gas Desulfurization
- Gas Dehydration
- Atmospheric & Vacuum Distillation
- Alkylation
- Fluids Catalytic Cracking
- Vis-breaking
- Coking
- Storage Tank Heating

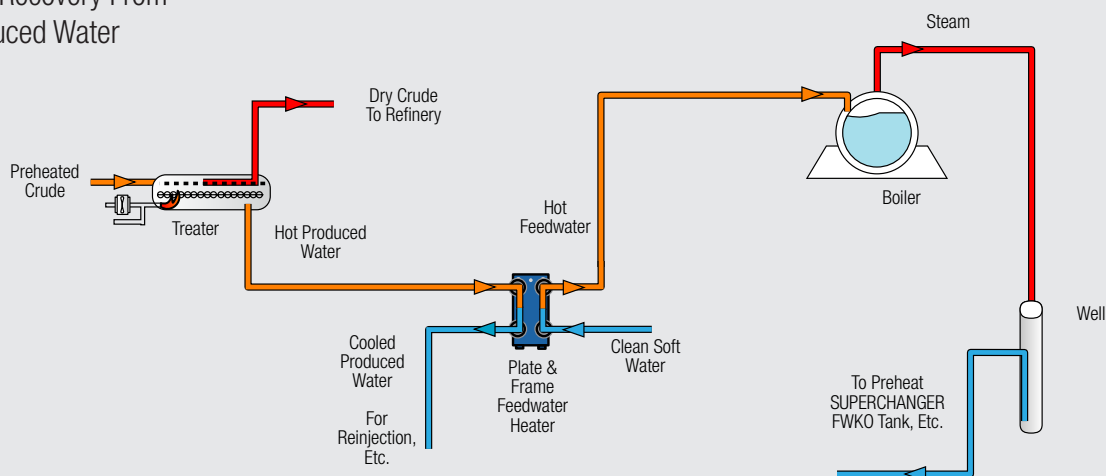
Production

Heat Recovery From Produced Water. With its high U value, a SUPERCHANGER unit recovers a large percentage of the available BTUs in hot water from treater tanks, usable for preheating boiler feedwater. The produced water alternatively can be further heated through a steam-driven SUPERCHANGER unit and reinjected into the wells to increase production rates.

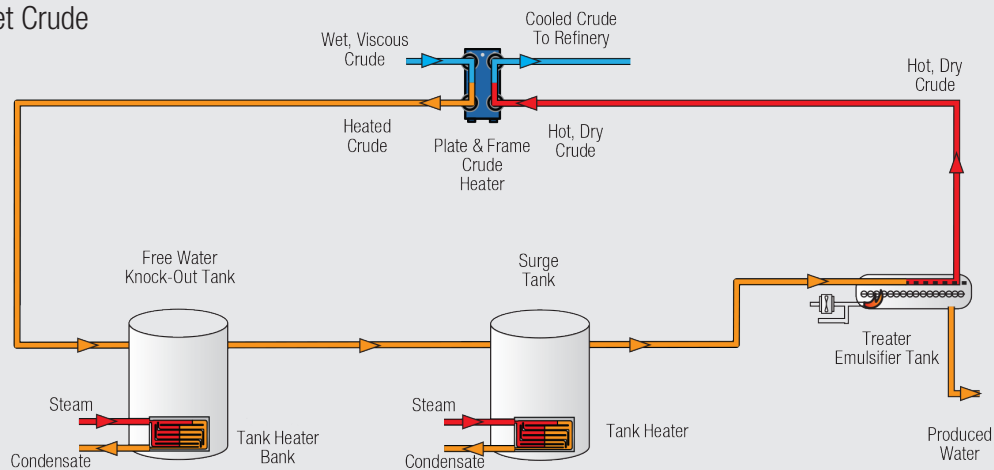
Heat Recovery From Dry Crude To Preheat Wet Crude. Hot, dry crude from the treater must be cooled; the resulting hot stream can be looped back to the crude emulsion heaters. SUPERCHANGER units are ideal for this purpose.



Heat Recovery From Produced Water



Heat Recovery From Dry To Wet Crude



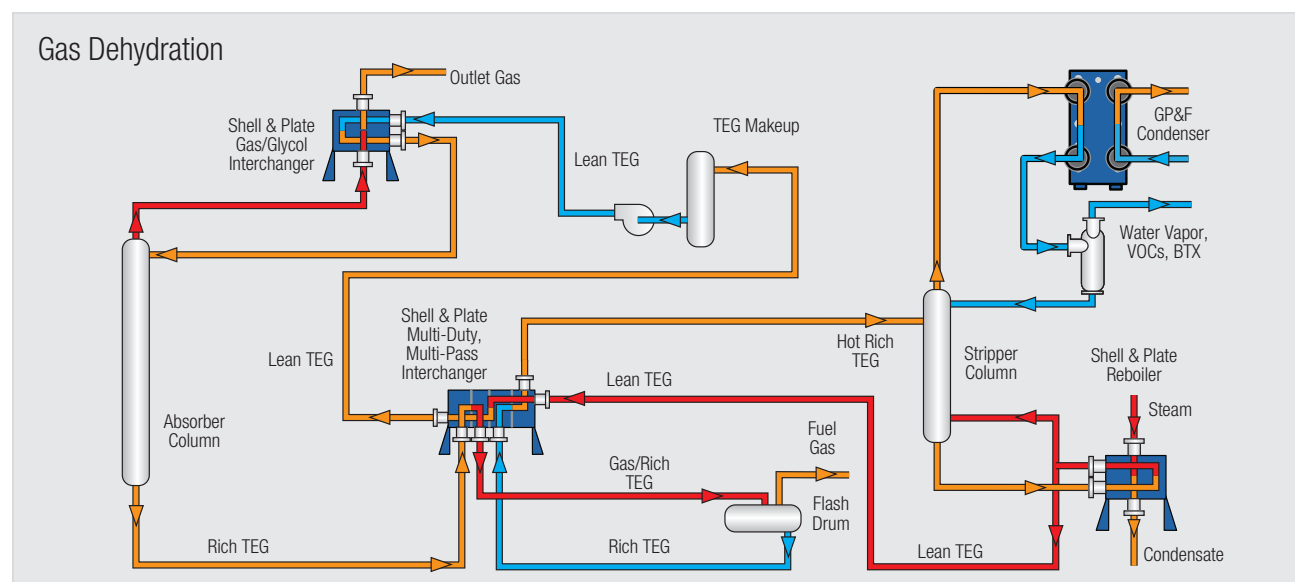
Midstream Processing

Compact Gas Dehydration Skid. A SUPERMAX unit with a three-pass/two-pass, countercurrent arrangement heats two cold-side, rich TEG streams in one unit. The SUPERMAX exchanger provides better energy recovery and reduces the size of the reboilers used in the skids. The welded unit has also resulted in a more compact skid structure and no tube bundle pulling deadspace.

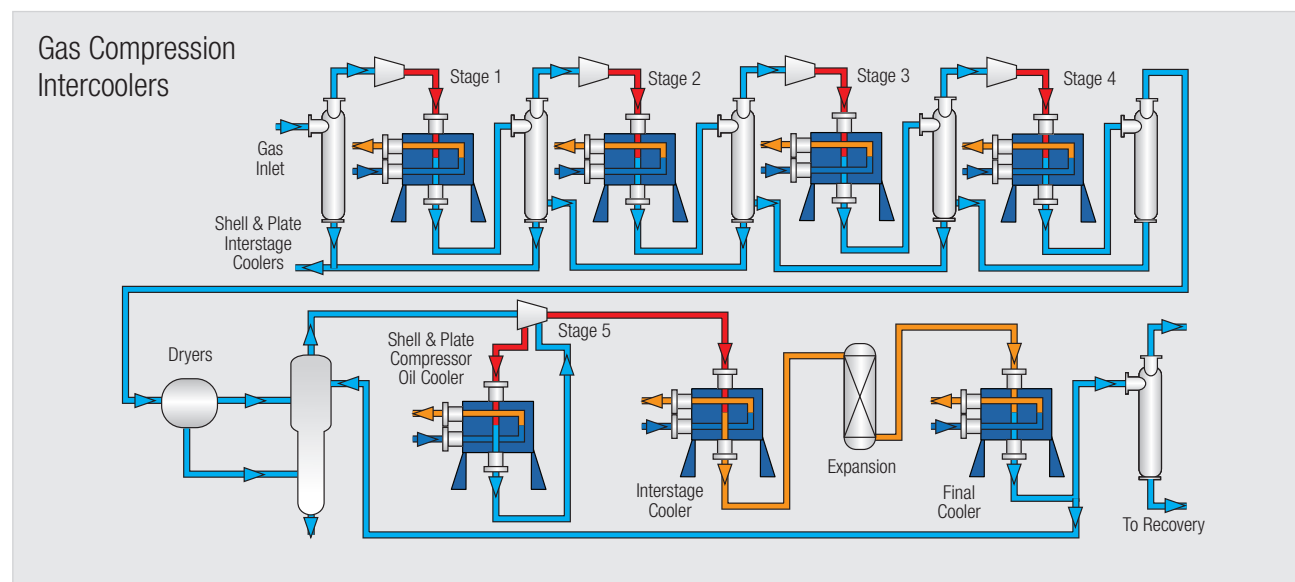
Compression Intercoolers And Lube Oil Coolers. SUPERMAX Coolers provide precise control of compressor suction temperature and increases in overall compression efficiency; gasket-free compressor SUPERMAX Lube Oil Coolers (Stage 5) withstand pressure spikes and reduce volume of expensive lubricants.



Gas Dehydration



Gas Compression Intercoolers



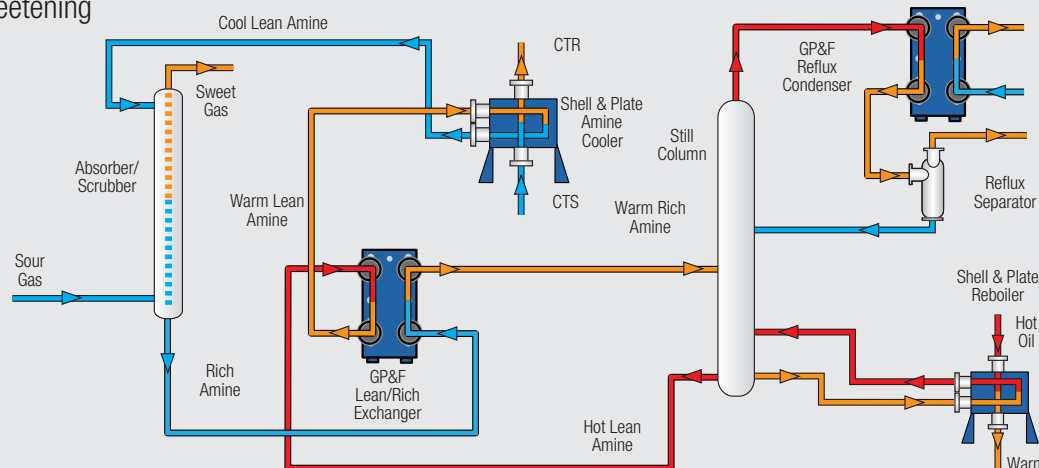
Midstream Processing

Gas Sweetening. Single-pass SUPERMAX welded units are used as a lean amine cooler and as a lean/rich amine interchanger. The small draw depth facilitates close temperature approach, reducing external energy requirements. The unit can accomplish 90%-plus heat recovery from lean to rich amine, or with sulfinol. A spiral unit provides easy maintenance as an amine reboiler.

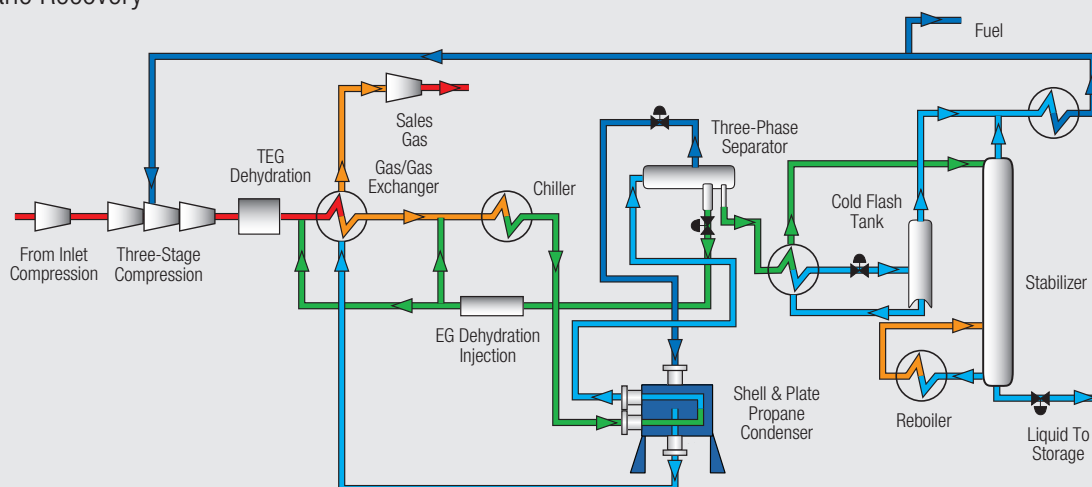
Propane Recovery. A SUPERMAX reduces temperature to condense more propane and heavier components and attain target gross heating value. Installed downstream of the chiller, the unit improves propane recovery significantly without additional refrigeration. The compact unit can fit on existing skids without additional support structures.



Gas Sweetening



Propane Recovery



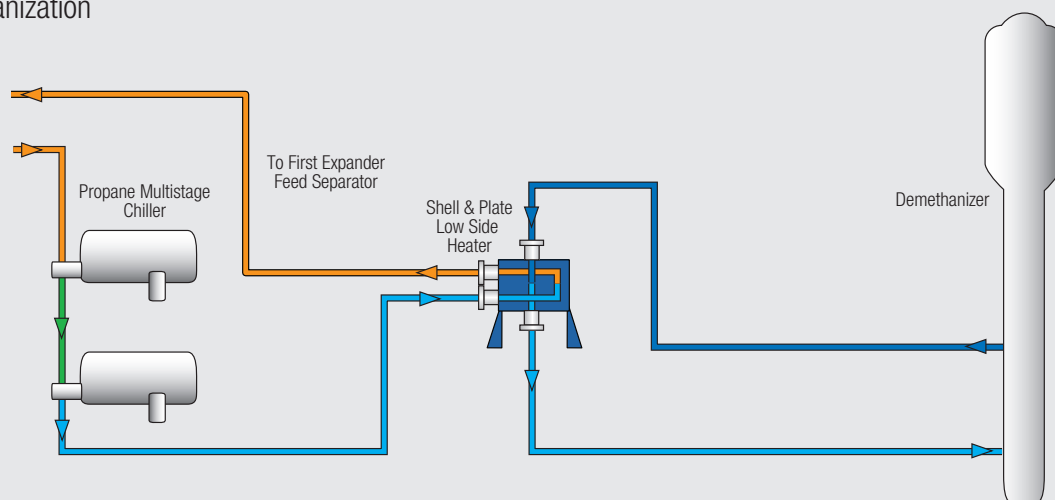
Midstream Processing

Demethanization. A SUPERMAX Shell & Plate exchanger functions as a low side heater on a demethanizer column, using -37°C (-35°F) propane to raise the methane-rich gas from -59°C (-75°F) to -41°C (-42°F). With its low pressure drop, the SUPERMAX is attractive for use as a partial or total reboiler in cryogenic service, with improvements over brazed aluminum units in withstanding thermal shock.

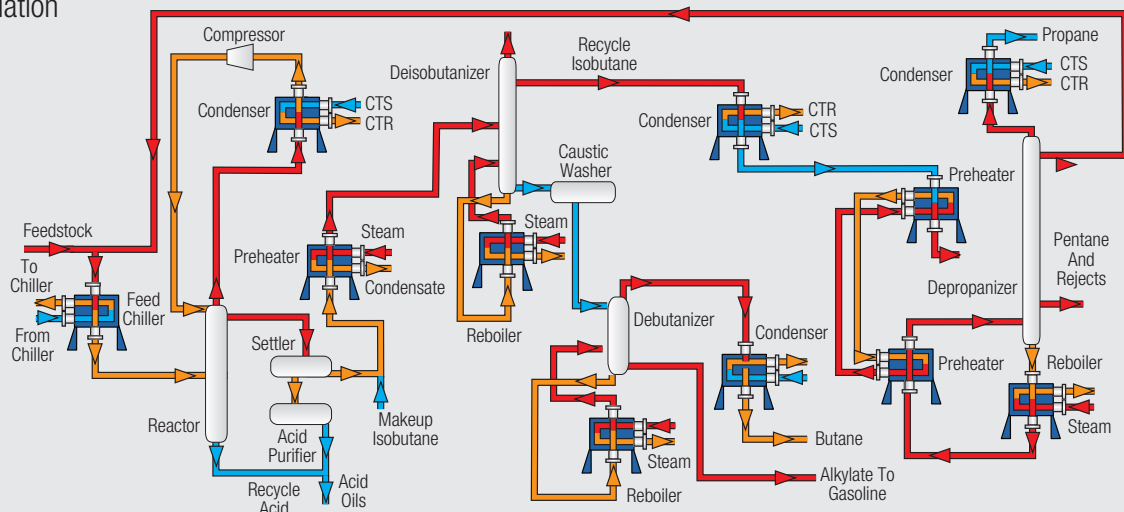
Alkylation. SUPERMAX Shell & Plate units offer significant opportunities for improving thermal efficiency and response in the alkylation process. They perform well as condensers on reactor, deisobutanizer, debutanizer and depropanizer columns; as preheaters and reboilers; as steam generators; and as feed chillers.



Demethanization



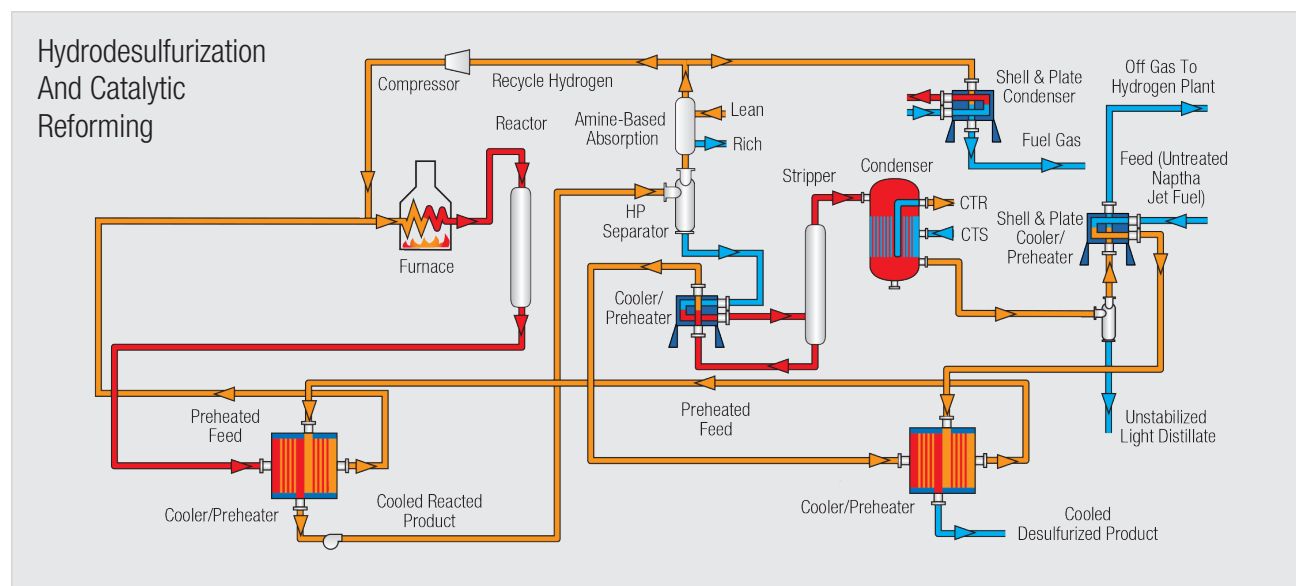
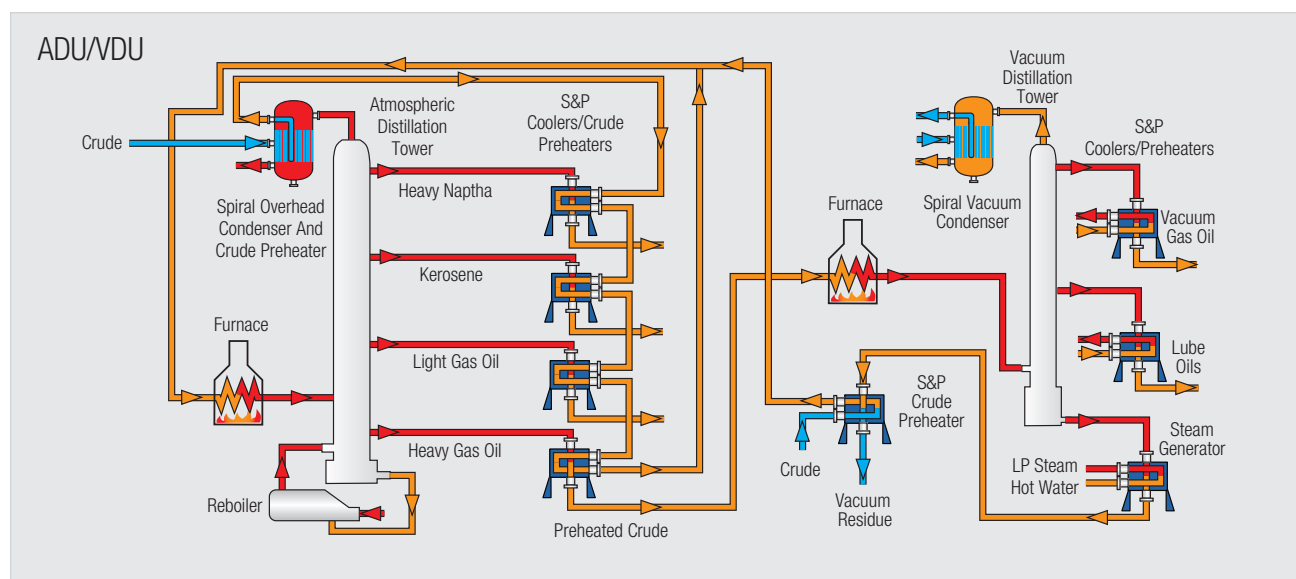
Alkylation



Downstream Processing

Distillation. Heat from cooling and condensation on distillation columns can be recovered through either SUPERMAX (shown) or Spiral units. A SUPERMAX or Spiral can function as an efficient partial reboiler. The excellent performance to size/weight ratio saves in support structures and maintenance.

Hydrodesulfurization And Catalytic Reforming. Untreated naptha/jet fuel is preheated using surplus heat from off gas, desulfurized product and raw reacted product. A Spiral preheats reacted product for the stripper column using stripped desulfurized product as a heat source. Finally, Spiral or SUPERMAX units condense the lighter distillates. Thermal efficiency is higher than with S&T units.



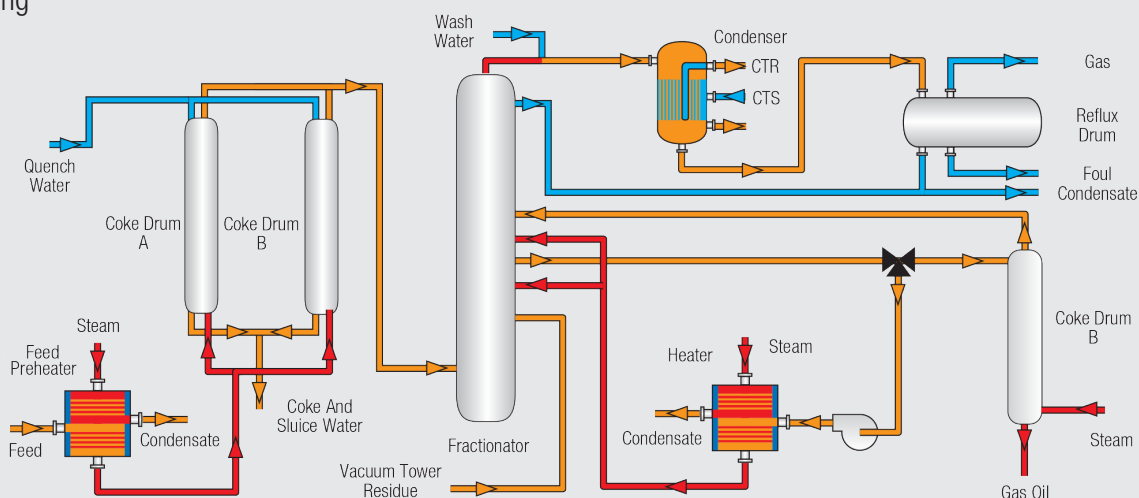
Downstream Processing

Coking. Spiral units serve as a coke drum feed preheater and as a fractionator reheater. Additional spiral units handle duties as a fractionator condenser and in heat recovery. Other welded units can serve as a gas oil fraction cooler.

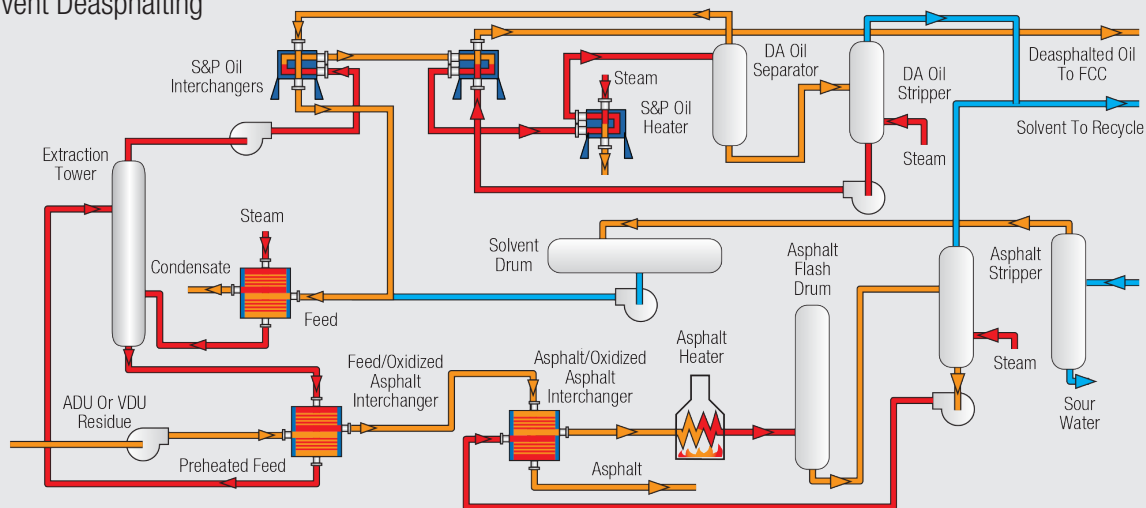
Solvent Deasphalting. Spiral units function as low-maintenance interchangers for feed/oxidized bitumen and asphalt/oxidized asphalt. They also heat solubilized stripped asphalt for reinjection into the extraction tower. SUPERMAX exchangers function well in the vapor-phase processing of deasphalted oil, as interchangers and heaters.



Coking



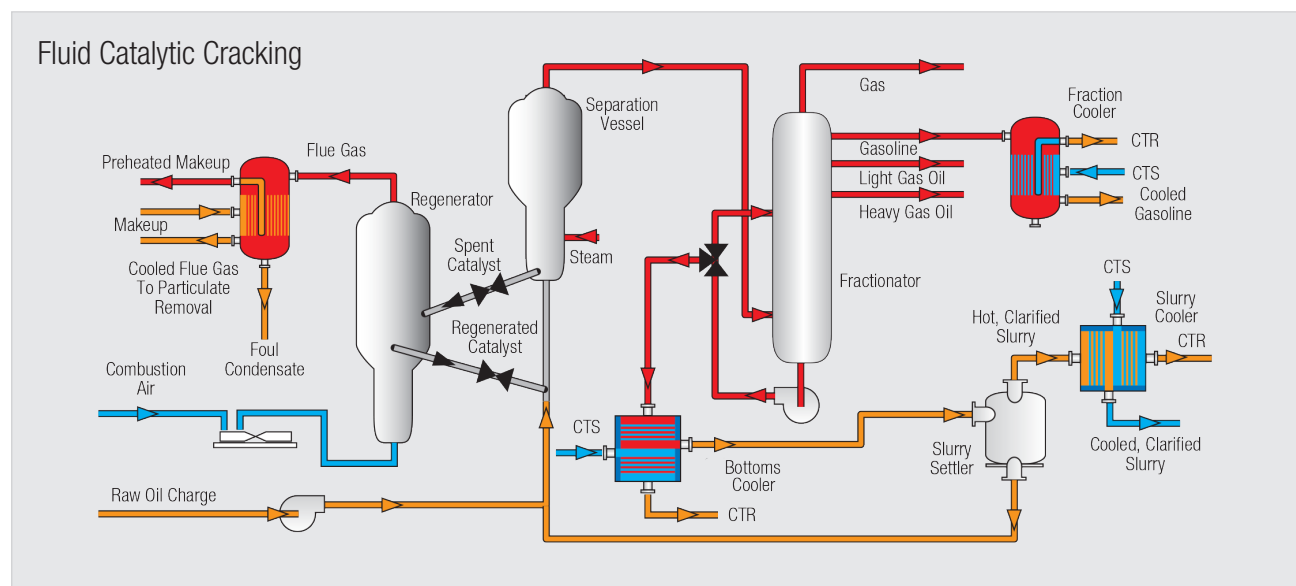
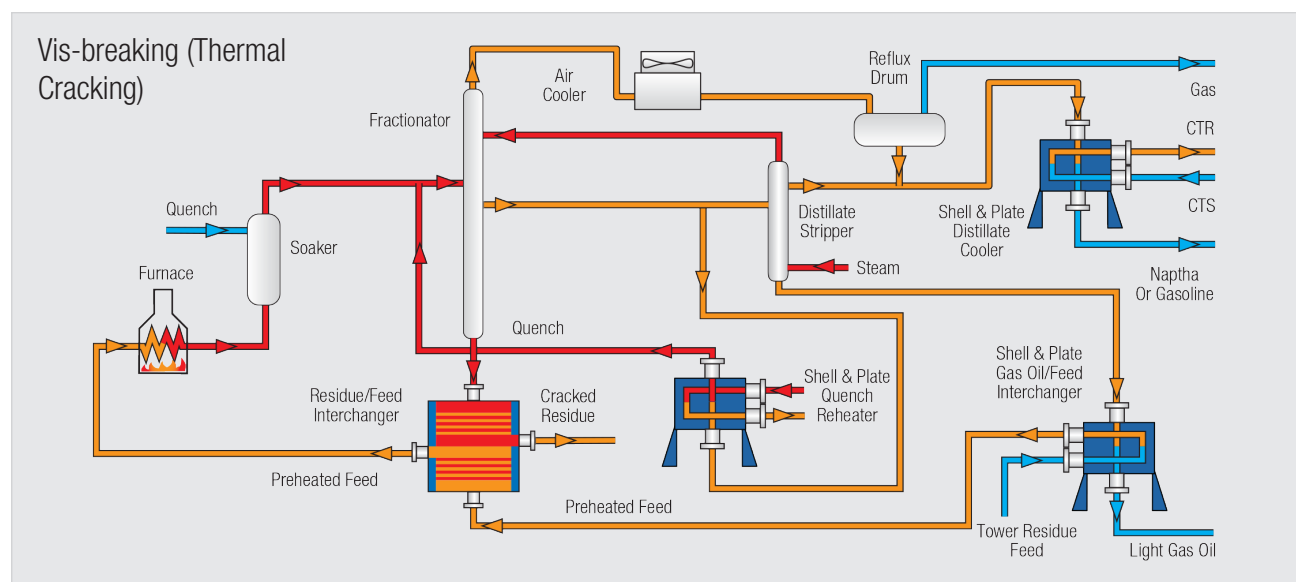
Solvent Deasphalting



Downstream Processing

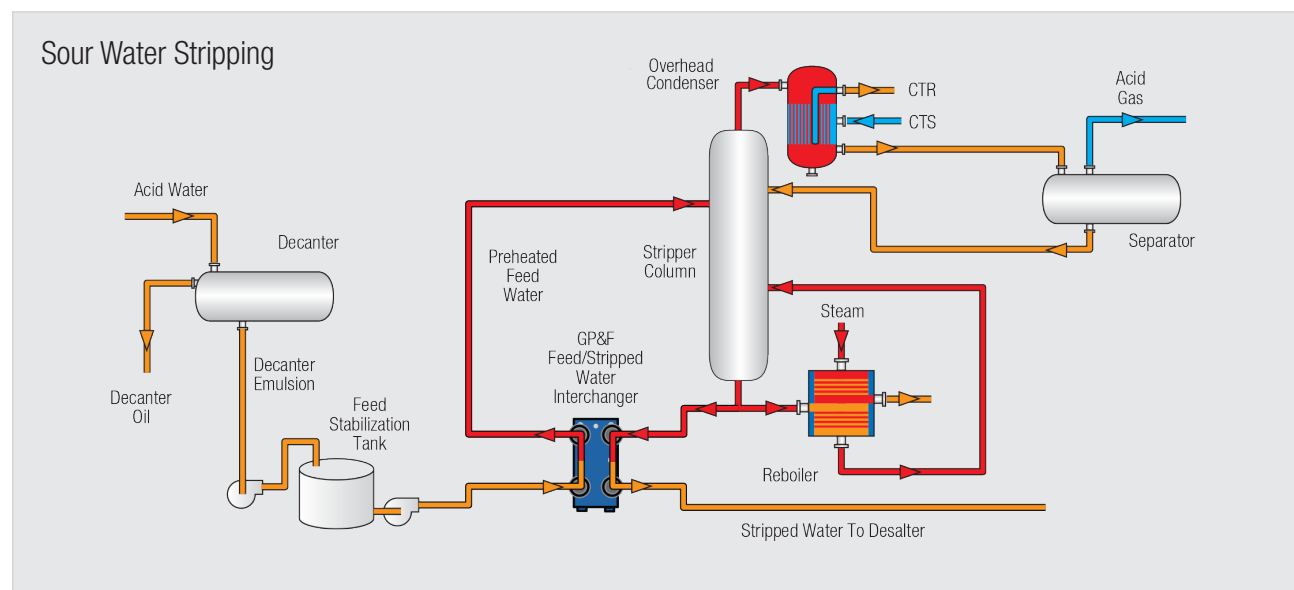
Vis-breaking (Thermal Cracking). Cracked residue contains considerable heat energy that can be recovered for preheating by Spiral exchangers. SUPERMAX units can undertake preheating duties using the gas oil fraction. SUPERMAX units are also effective as coolers of the light distillate vapor.

Fluid Catalytic Cracking. Spiral units improve response and efficiency as an overhead condenser/makeup water heater, as a bottom fraction cooler, as a clarified slurry oil cooler and as fraction coolers for several products.



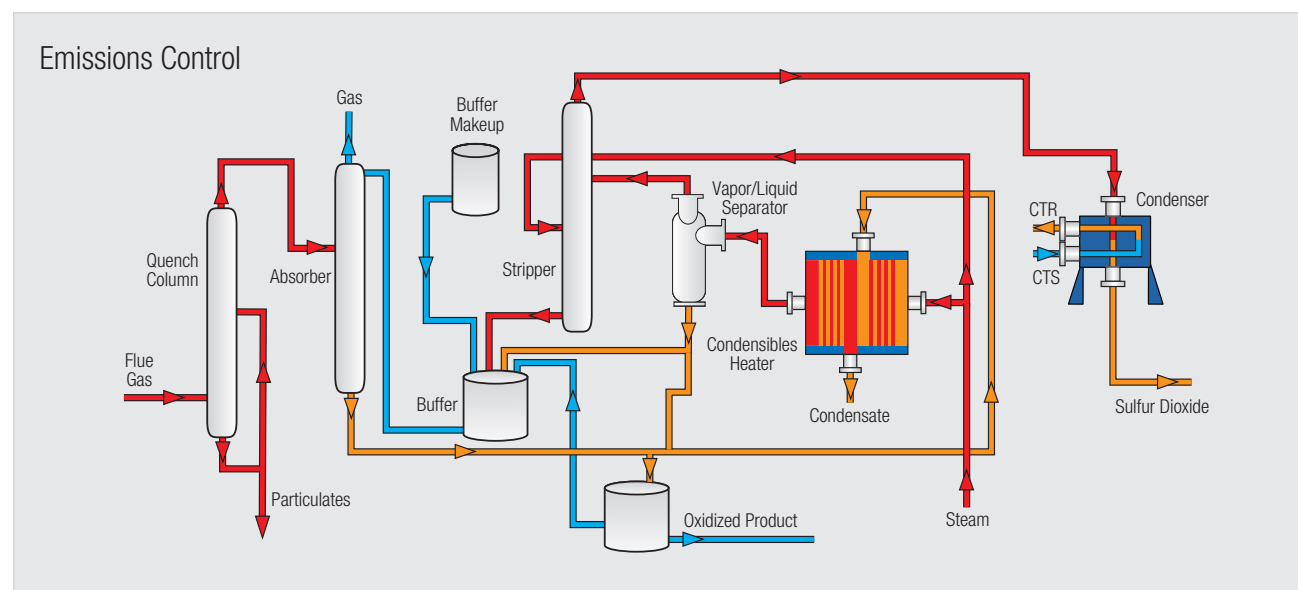
Downstream Processing

Sour Water Stripping. Superchanger units function well as a stripped water/feed emulsion interchanger, as a stripper reboiler and as an overhead stripper column condenser.



Downstream Processing

Emissions Control. Hot condensibles from the absorber column are steam-heated in a Spiral unit for oxidation and stripping. A SUPERMAX unit cools the sulfur dioxide, removing heat that can be used to preheat other streams in the plant.





For Optimized Efficiency And Maintenance...Think PHEs

Desalting

Desalter produced water/fresh water interchanger
Treated crude oil cooler
Treated/untreated crude interchanger

Atmospheric/Vacuum Distillation Units (ADU/VDU)

Crude/AR preheaters
Fraction cooler (ADU/VDU)
Top condenser and vacuum condenser

Catalytic Cracking (FCC, RFCC, RDD)

Bottom fraction cooler
Clarified slurry oil cooler
Fraction cooler
Overhead condenser

Catalytic Reforming & Hydrotreating

Feed/effluent interchanger
Fractionator condenser
Fractionator feed preheater
Fractionator fraction cooler
Fractionator reboiler

Vis-breaker

Feed preheater
Feed/effluent interchanger

Coker

Feed preheater
Fraction cooler
Fractionator condenser
Heat recovery
Reboiler/refluxer

Asphalt/Bitumen

Feed/oxidized bitumen interchanger

Lube Oil Production

Condenser
Heat recovery
Oil additive clarification
Reboiler

Gas Processing

Multi-stage compression interstage cooling
Compressor lube oil cooling
Gas dehydration and sweetening
Demethanizer low side heater
Oil sands froth treatment
Refrigeration

Amine Unit

Amine regenerator reboiler and condenser
Lean amine cooler
Lean/rich amine interchanger

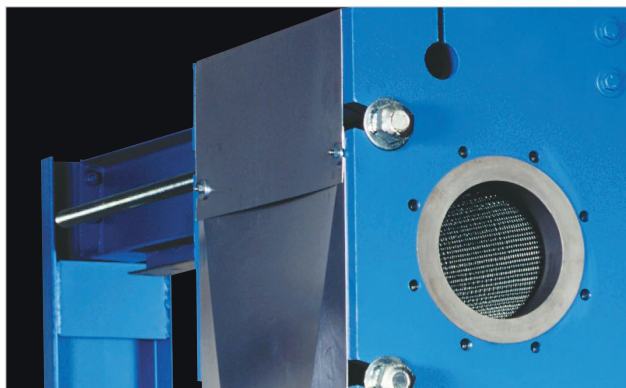
Sour Water Stripper (SWS)

Stripped/sour water interchanger
Stripper condenser and reboiler



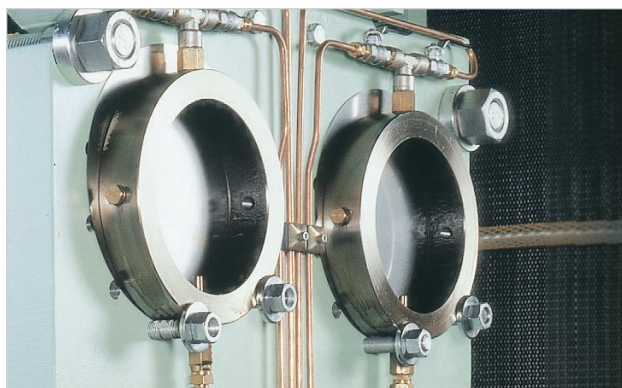


Accessories That Help Maximize Uptime And Productivity



Shrouds

Shrouds provide insulation and protection in an aggressive environment.



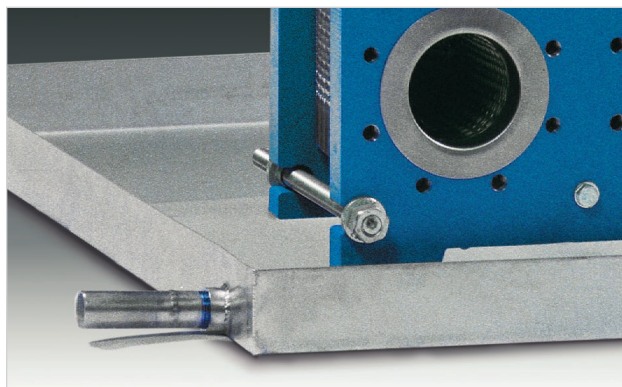
Instruments And Gauges

Special flanges are available with outlets for drainage and ventilation, pressure gauges and sensors.



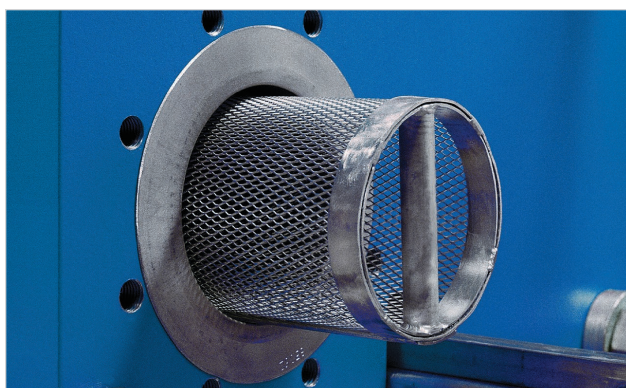
Hydraulic Tightening Devices

Hydraulic tightening devices facilitate assembly and reassembly of plate & frame heat exchangers fast, easily and securely.



Drip Pans

Drip pans prevent water and other liquids from flowing onto the floor when dismantling the heat exchanger.



Port Strainers

A strainer protects the plate pack from large particles that would otherwise foul and clog the channels. The length is adapted to the number of plates.

Other accessories include:

- Portable Clean-In-Place systems
- Backflush valves
- Wrenches
- Grounding lugs
- Molybdenum bolt coatings
- Tie-rod protectors
- HexWrap insulation
- Insulated shrouds



Service And Maintenance For Plate Heat Exchangers

With manufacturing centers on three continents, Tranter sources systems close to major onshore and offshore production and refining areas, minimizing lead-time and freight for accommodating tight project schedules.

Efficient operation is the key to optimum return of investment. Malfunctions and changes in heat transfer can have severe consequences on operational costs and may affect the product quality. Regular service and maintenance safeguards your exchanger's and your company's performance.

Tranter service only begins when the heat exchanger starts up. The Tranter service concept helps meet application requirements, prolongs the life of the exchangers and makes them top performers at all times.

Global representation

Service centers located worldwide are ready to assist with OEM plates, gaskets, assembled plate packs, cleaning services and replacement units. At your facility, we can carry out performance diagnostics, pressure washing of plates, plate inspection, checking and replacing gaskets as needed, and closing the unit to refinery specifications. We can work with you to structure a tailored service contract to reduce process downtime and give you known costs for more accurate maintenance budgeting.

In our centers, we do pressure washing and chemical cleaning of plates, die penetrant testing to check plates for defects or pinholes, and regasketing with OEM gaskets matched via the nameplate database. Entire unit refurbishment includes frame repair (sandblasting and repainting), complete plate pack service, reassembly and closing the unit to precise factory specifications. We then carry out hydro testing of the unit, and we can confirm performance on-site to affirm process compatibility under changed conditions.



Authorized service guarantees the original standards

With Tranter authorized service, you can always be sure that you get the right gaskets, the right plates and our OEM Guarantee. This ensures that the heat exchanger fulfils the original standards as well as the new common European Pressure Vessel Code, PED (Pressure Equipment Directive) highlighting the use of genuine parts regarding health and safety requirements.

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Factory/Sales/Engineering Office
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Wichita Falls, TX 76306
Tel: 1-800-414-6908
E-mail: service@tranter.com

Tranter Midwest Service Center (USA)

30241 East Frontage Road
Farmersville, IL 62533
Tel: 217-227-3470
E-mail: service_il@tranter.com

Tranter Gulf Coast Service Center (USA)

6819 Willowbrook Park
Houston, TX 77066
Tel: 1-713-467-0711
E-mail: service_hou@tranter.com

Tranter West Coast Service Center (USA)

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Tulare, CA 93274
Tel: 559-686-1840
E-mail: service_ca@tranter.com

Tranter East Coast Service Center (USA)

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Tranter Heat Exchangers Canada, Inc. (Canada)

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At the forefront of heat exchanger technology for more than 85 years

Tranter top quality, high-performance, proprietary products are on the job in demanding industrial and commercial installations around the world. Backed by our comprehensive experience and worldwide presence, Tranter offers you exceptional system performance, applications assistance and local service. Tranter is close to its customers, with subsidiary companies, agents, distributors and representatives located worldwide. Contact us for a qualified discussion of your needs.



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