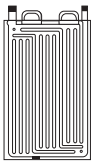
BULLETIN NO. TIS-104C

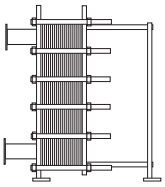
PLATECOIL®

PRIME SURFACE
HEAT EXCHANGERS



SUPERCHANGER®

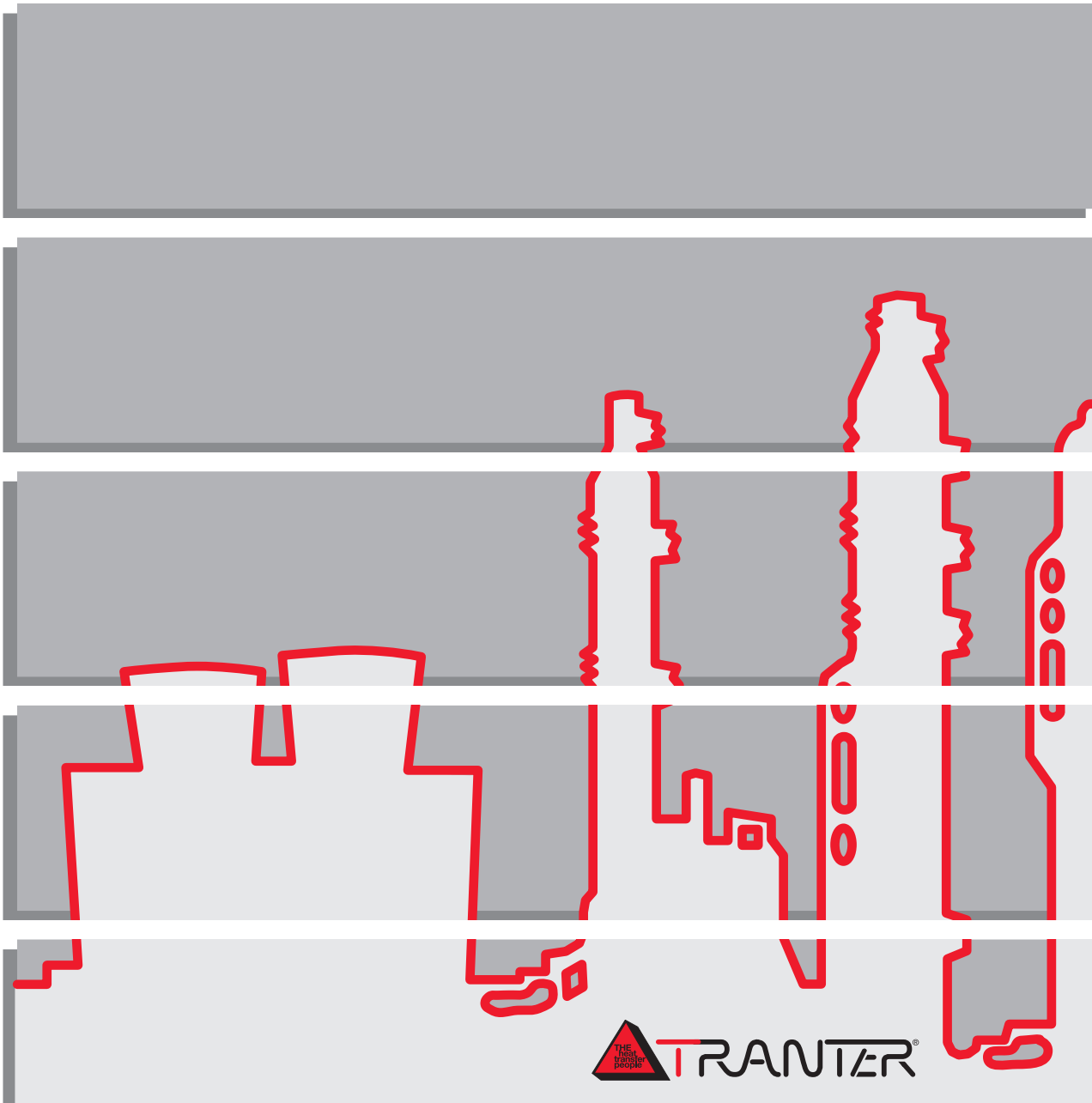
PLATE & FRAME
HEAT EXCHANGERS



MAXCHANGER®

ALL-WELDED PLATE
HEAT EXCHANGERS

FOR THE CHEMICAL INDUSTRY



TRANTER BRINGS EFFICIENCY AND RELIABILITY TO THE CHEMICAL INDUSTRY

Excellent efficiency and flexibility...optimum heat transfer... minimal maintenance...these are critical needs today in the chemical industry. Tranter provides these benefits and more, with PLATECOIL, SUPERCHANGER and MAX-CHANGER heat exchangers that are standards for the industry.

PLATECOIL® PRIME SURFACE HEAT EXCHANGERS

A multitude of design configurations and over 300 different sizes make PLATECOIL units ideally suited for a variety of applications in the chemical industry. They offer versatility in providing the heating and/or cooling required for various applications in the industry.

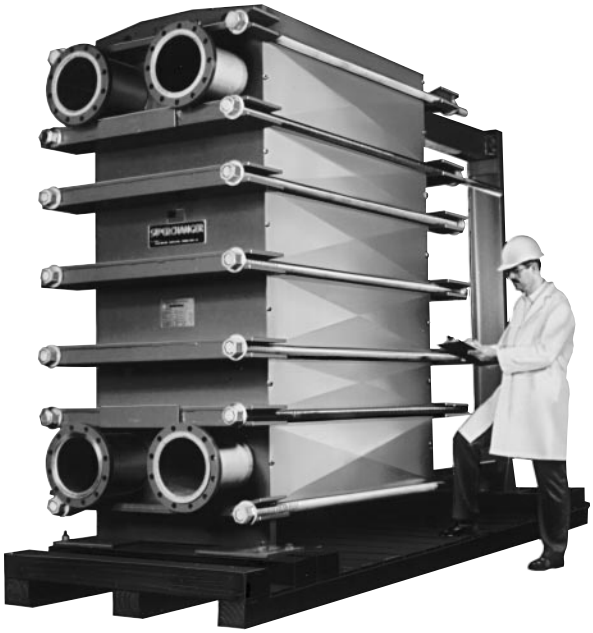
PLATECOIL units are perhaps best known as immersion-type, in-tank or as clamp-on heaters for maintaining product temperatures in tanks. Their use goes far beyond these applications, however, and includes designs for custom-engineered processing equipment.

PLATECOIL units can be fabricated from most weldable metals including carbon steel, stainless steel, titanium, Monel, nickel and various special corrosion-resistant alloys. Surface finishes are available to minimize fouling and reduce maintenance.

SUPERCHANGER® PLATE & FRAME HEAT EXCHANGERS

Plate and frame heat exchangers provide a more efficient and cost effective means of heat transfer than old, traditional shell-and-tube exchangers. This is particularly true in the chemical industry.

SUPERCHANGER plate and frame units are the best choice because they give you: (1) higher “U” values typically 3 to 5 times greater than shell-and-tube; (2) a unique turbulent flow design resulting in lower fouling; (3) closer temperature approach capability of less than 2°F, compared to the typical 10°F or higher with shell-and-tube; (4) space savings of 50% to 90% over shell-and-tube; (5) expandability and easy servicing, and (6) immediate availability, since they are made in the U.S.



MAXCHANGER® ALL-WELDED PLATE HEAT EXCHANGERS

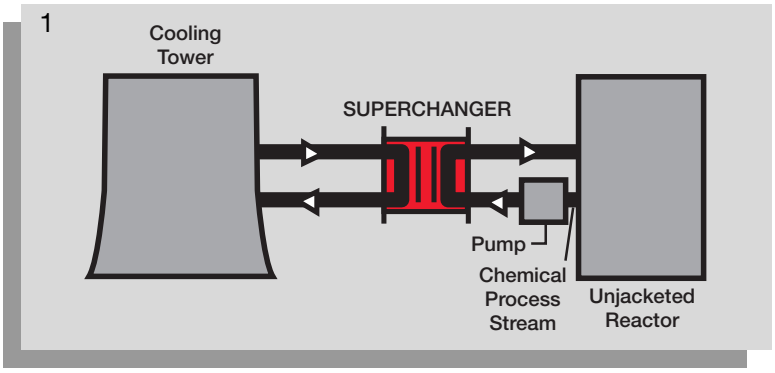
Where space is at a premium, or gasket limitations prevent the use of a SUPERCHANGER unit, the compact all-welded MAXCHANGER unit may be the best solution to many chemical applications.

NOTE: THE DIAGRAMS SHOWN ARE PURPOSELY BRIEF: NO ATTEMPT HAS BEEN MADE TO SHOW ALL THE VALVES, PUMPS, CONTROLS, ETC., THAT MAY BE REQUIRED. IN MOST SYSTEMS, ALL PIPING ACTUALLY IS FROM THE SUPERCHANGER FIXED FRAME. THIS FACILITATES OPENING THE UNITS, WHEN REQUIRED, WITHOUT DISASSEMBLING PIPING.

TYPICAL CHEMICAL INDUSTRY APPLICATIONS

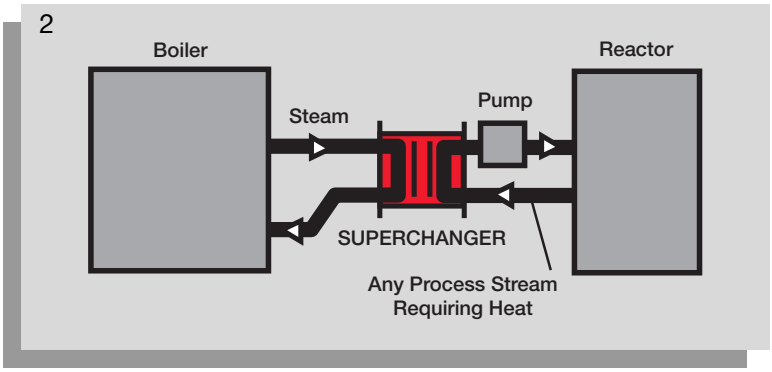
COOL CHEMICAL SOLUTIONS TO REMOVE REACTION HEAT, ETC.

SUPERCHANGER plate and frame heat exchangers find many cooling applications for chemical solutions. The unit's high "U" values make it a logical choice for these duties. In addition to the cooling tower shown here, the coolant may also come from various sources, including lakes, rivers, chillers, etc.



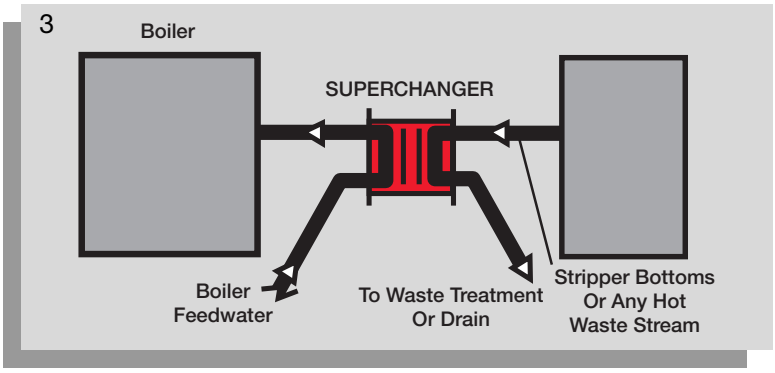
HEATING WITH STEAM

Within certain temperature limitations, low pressure steam is frequently used with a SUPERCHANGER unit for heating chemical streams. For conditions that may require occasional or frequent manual cleaning, the ease of opening this type of heat exchanger is a special added advantage. Other heating media can also be used, including hot water and hot oils.



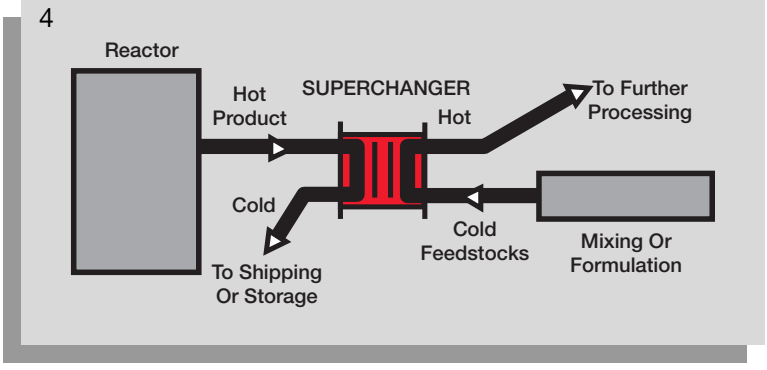
HEAT RECOVERY

With growing concern about energy conservation over recent years, hundreds of SUPERCHANGER plate and frame heat exchangers have been installed for a variety of heat recovery applications. As the chemical industry has many hot process streams and hot waste fluids, efficient and compact SUPERCHANGER units can be readily used to preheat water and other liquids.



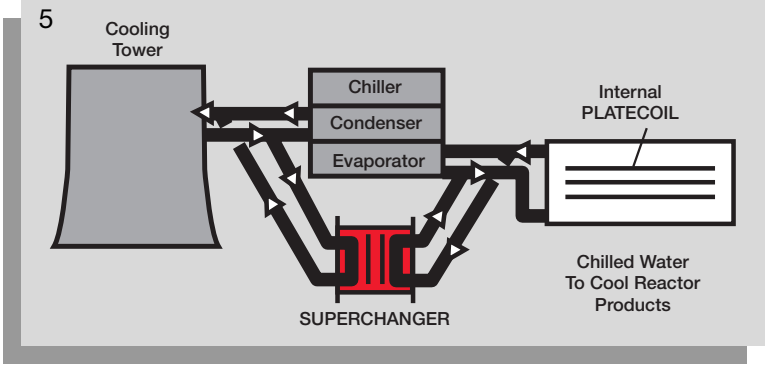
REGENERATIVE HEAT EXCHANGE

Heating cold feedstocks with hot products which require cooling is a form of heat recovery ideally suited to the SUPERCHANGER unit. With "U" values several times greater than those offered by shell-and-tube heat exchangers, a large number of SUPERCHANGER installations are currently handling liquid-to-liquid heat transfer very efficiently.



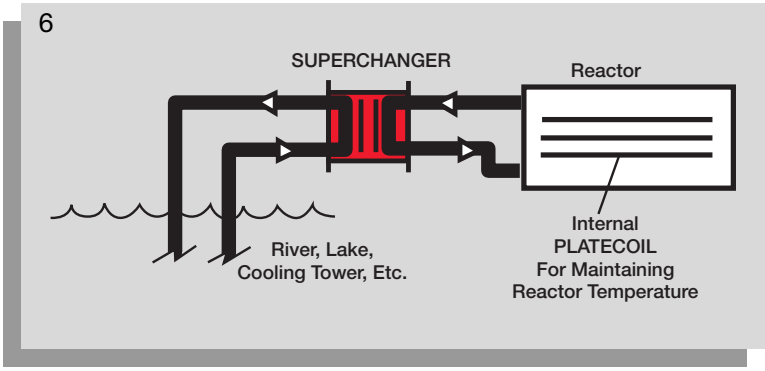
"FREE COOLING" DURING MODERATE TEMPERATURES (CHILLER BYPASS)

When ambient temperatures provide suitably cool water directly from the cooling tower, operating costs can be reduced significantly by bypassing the chiller. The SUPERCHANGER unit shown in this schematic drawing also provides cooling tower isolation so plant piping and heat exchange equipment is not fouled by cooling tower water. PLATECOIL units provide cooling for reactor products.



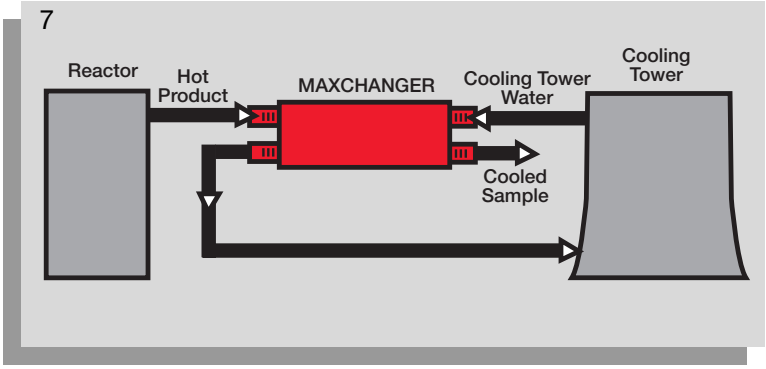
COOLING WATER CIRCUIT ISOLATION

This diagram is an example of how heat exchangers and other equipment can be protected from plugging conditions that may result from river water or other potentially fouling fluids circulated through them directly. The easy-cleaning features of the SUPERCHANGER plate and frame unit make this a very common application. In some cases, two units have been installed so that one can be used as a standby. PLATECOIL units are used for removing the heat of reaction from the vessel products. The PLATECOIL units are normally installed as a baffle in the reactor.



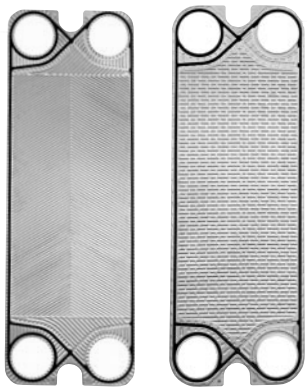
SAMPLE COOLERS FOR REACTOR PRODUCTS

In many chemical processes, it is necessary to extract a sample from the reactor to determine if the reaction is complete. In order to safely handle the sample, it must be cooled before it enters the sample container. A compact, all-welded MAXCHANGER unit is ideally suited for this duty. MAXCHANGER units can be ASME Code stamped and are more efficient and compact than a shell-and-tube heat exchanger.



SUPERCHANGER CONDENSED SPECIFICATIONS

The data on this page provides basic condensed engineering information. All selections are calculated by computer to provide the best plate size and design fit for each specific application. More complete literature and specifications are available on request.



Herringbone Design | Washboard Design

Pressure Rating: Up to 400 psig operating pressure
Maximum Temperature: 366°F
Heat Transfer Coefficients: Greater than 1,500 Btu/hr.ft.^{2}F
Heat Transfer Surface: Up to 20,000 sq. ft. per unit

Plates: SUPERCHANGER plates are fabricated from virtually any metal that can be cold-worked, including stainless steel (types 304, 316, 317, etc.), titanium, Monel, nickel, alloys 825, 20Cb-3, B-2, G, C-276 and others
Frames: Carbon steel with alkyd enamel paint, side bolts and shroud
Nozzles: Studded port with 150 lb. drilling as standard. A 150 lb. ASA-rated loose lap joint flange is available.
Gaskets: Nitrile, Ethylene Propylene, fluoroelastomer, Neoprene, Hypalon, Butyl, Teflon-encapsulated NBR, PTFE and others available

Optional Extras: Connecting frames. Threaded or clamp type nozzles. Stainless steel tightening bolts. ASME Code Stamp.
Trial Units Available: SUPERCHANGER units are available on a trial basis for in-plant testing and evaluation. Contact your Tranter representative for information on the SUPERCHANGER Trial Unit Policy.

WHERE IT'S USED

Below is a partial list of substances in the chemical industry which can be heated or cooled by SUPERCHANGER plate and frame heat exchangers:

Acetic Acid Solutions
Acetic Acid and Acetic Anhydride Mixtures
Acetic Acid and Vinyl Acetate Mixtures
Acrylonitrile
Alcohol Solutions
Amine Solutions
Amino Acids
Ammonia Solutions
Ammonical Brine
Ammonium Bromide Solutions
Ammonium Carbonate Solutions
Ammonium Nitrate
Ammonium Phosphate (Dibasic)
Ammonium Sulfate Solutions
Antibiotic Liquors
Boric Acid Liquor
Butadiene Latex Emulsions
Butyl Alcohol Solutions
Butyraldehyde
Calcium Bisulfite
Calcium Chloride Brine
Calcium Lactate
Caprolactam
Carbon Disulfide
Caustic Soda Solutions
Cellulose Acetate
Chlorinated Brine
Chlorine Solutions
Citric Acid Solutions
Crotonaldehyde
Dimethylamine
Dimethyl Formamide
Effluents from:
- Ammonia Stills
- Cellulose Bleacheries
- Glue Making Plants

Enzyme Solutions
Ethyl Alcohol
Ethylene Glycol
Ethyl-Hexyl Alcohol
Fatty Acids
Formaldehyde Solutions
Formalin
Glycerine Solutions
Gum Arabic
Hexamine
Hydrochloric Acid Solutions
Hydrolyzed Protein Liquor
Hydroxylamine Sulfate
Isopropyl Alcohol
Lacquer
Lactic Acid
Latex (Synthetic or Rubber)
Lead Fluoroborate
Lecithin
Lignin
Magnesium Hydroxide
Maleic Anhydride
Methyl Acetate
Methyl Alcohol Solutions
Methyl Methacrylate
MEA Solutions
Milk of Lime
Monochloracetic Acid
Monoethanolamine Solutions
Monosodium Glutamate Solutions
N-Methyl Pyrrolidone
Nickel Sulfate
Nitrate Acids
Oleic Acid
Oxalic Acid
Paraffin Emulsion
Paraffin Wax
Paraquat
Pectin
Pentaerythritol
Phenolic Adhesive
Phosphoric Acid Solutions
Plasticizers
Polyester Resin
Polyvinyl Acetate Solutions (PVA)
Potassium Carbonate Lye
Potassium Chloride Solutions
Propionic Acid
Propylene Glycol
PVC Solutions
Resin Liquid
Rubber Latex
Saccharified Solutions
Sodium Alkyl Glycerol Sulfonate
Sodium Aluminate Solutions
Sodium Carbonate
Sodium Chloride Solutions
Sodium Cresylate
Sodium Cyanide Liquor
Sodium Hydroxide Solutions
Sodium Hypochlorite Solutions
Sodium Metaborate Solutions
Sodium Perborate Solutions
Sodium Sulfite Liquor
Sodium Thiocyanate
Sodium Thiosulfate
Sorbitol Solutions
Stearic Acid
Sulfinol Solutions
Sulfonic Acid
Sulfite Cooking Acid
Sulfite Waste Liquor
Sulfuric Acid
Sulfurous Acid
Trichlorethylene
Triethylene Glycol
Urea Formaldehyde
Urea Formaldehyde Resins
Vinyl Acetate Solutions
Viscose
Water:
- Boiler Feed
- Deionized
- Demineralized
- Distilled
- Lake
- River
- Sea

Xylene
Yeast Cream
Zinc Chloride
Zinc Sulfate

SUPERCHANGER OUTPERFORMS SHELL-AND-TUBE

SUPERCHANGER heat exchangers require much less space than shell-and-tube units. They can pack greater than 20,000 sq. ft. of super efficient heat transfer surface in a single unit with flow rates up to 25,400 gpm. They provide greater flexibility; are more easily cleaned; experience much less fouling; have no interleakage; are lighter in weight; and cost less.

Most importantly, however, SUPERCHANGER units do a more efficient job of transferring heat in most applications, due in large measure to the turbulent flow created by the corrugated patterns of their plates.

For a side-by-side comparison between SUPERCHANGER plate and frame heat exchangers and shell-and-tube exchangers, the charts below show the difference in dimensions and comparative performance data for two units in an identical application.

SUPERCHANGER®

PLATE AND FRAME HEAT EXCHANGER	SHELL-AND-TUBE HEAT EXCHANGER
■ High efficiency—"U" values 3 to 5 times greater than shell-and-tube; often greater than 1,500 Btu/ft.^{2} hr.°F	■ Low efficiency
■ Uses only 10% to 50% of shell-and-tube space	■ Needs twice as much space to pull tube bundle
■ Easy disassembly—just loosen bolts	■ Complex disassembly—tube bundle must be pulled
■ Lower cost when stainless steel or higher grade of material is required	■ Higher cost except in all carbon steel or carbon steel/copper construction
■ Low fouling due to corrugations and inherent turbulence	■ High fouling due to circular cross-section and channeling—3 to 10 times greater
■ Variable heat transfer surface—plates easily added or removed	■ Fixed surface only
■ Low weight—typically 1/6th of shell-and-tube	■ High weight—up to 6 times that of plate and frame
■ Intermix between fluids not likely due to gasket design	■ Fluids can intermix, both at welds and at tube sheet
■ Inspection—simply disassemble and inspect	■ Inspection difficult—must usually pull tube bundle
■ Excellent chemical cleaning due to corrugations/turbulence	■ Satisfactory chemical cleaning but must be cautious of dead spots
■ Maximum viscosity—30,000 cps Nominal	■ Maximum viscosity—10,000 cps
■ Pressure drop—low to medium	■ Pressure drop—low to medium
■ Practically no heat loss—no insulation required	■ Great amount of heat loss—insulation required
■ Can be designed for less than 2°F temperature approach with more than 90% heat recovery attainable	■ Typically only a 5°F to 10°F minimum temperature approach can be achieved
■ Computer custom-designed sizing per application	■ Computer designed, but must always be oversized to be safe
■ Low internal volume—10% to 20% of shell-and-tube	■ Very high internal volume
■ Multiple duties possible with connecting frames	■ One unit required for each duty

TYPICAL UNITS DESIGNED FOR THE SAME HEAT TRANSFER CONDITIONS

ITEM	SUPERCHANGER	SHELL-AND-TUBE
Surface Area	1,000 sq. ft.	3,000 sq. ft.
Total Length Required	86"	157"
Width	32" Diameter	30" Diameter
Height	84"	42"
Gross Volume	18 ft.^{3}	116 ft.^{3}
Net Weight	1,600 lbs.	6,000 lbs.

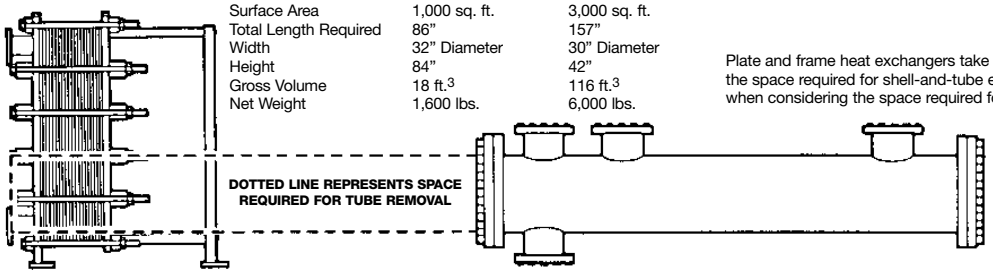


Plate and frame heat exchangers take as little as one-tenth the space required for shell-and-tube exchangers, particularly when considering the space required for tube removal.

REPRESENTED BY:

For further information on PLATECOIL prime surface, SUPERCHANGER plate and frame and MAXCHANGER all-welded plate heat exchangers, contact:
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Fax: (940) 723-5131 • http://www.tranterphe.com

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