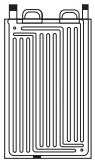
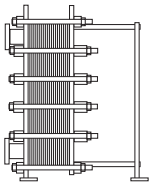
BULLETIN NO. TIS-107A

PLATECOIL®
PRIME SURFACE
HEAT EXCHANGERS

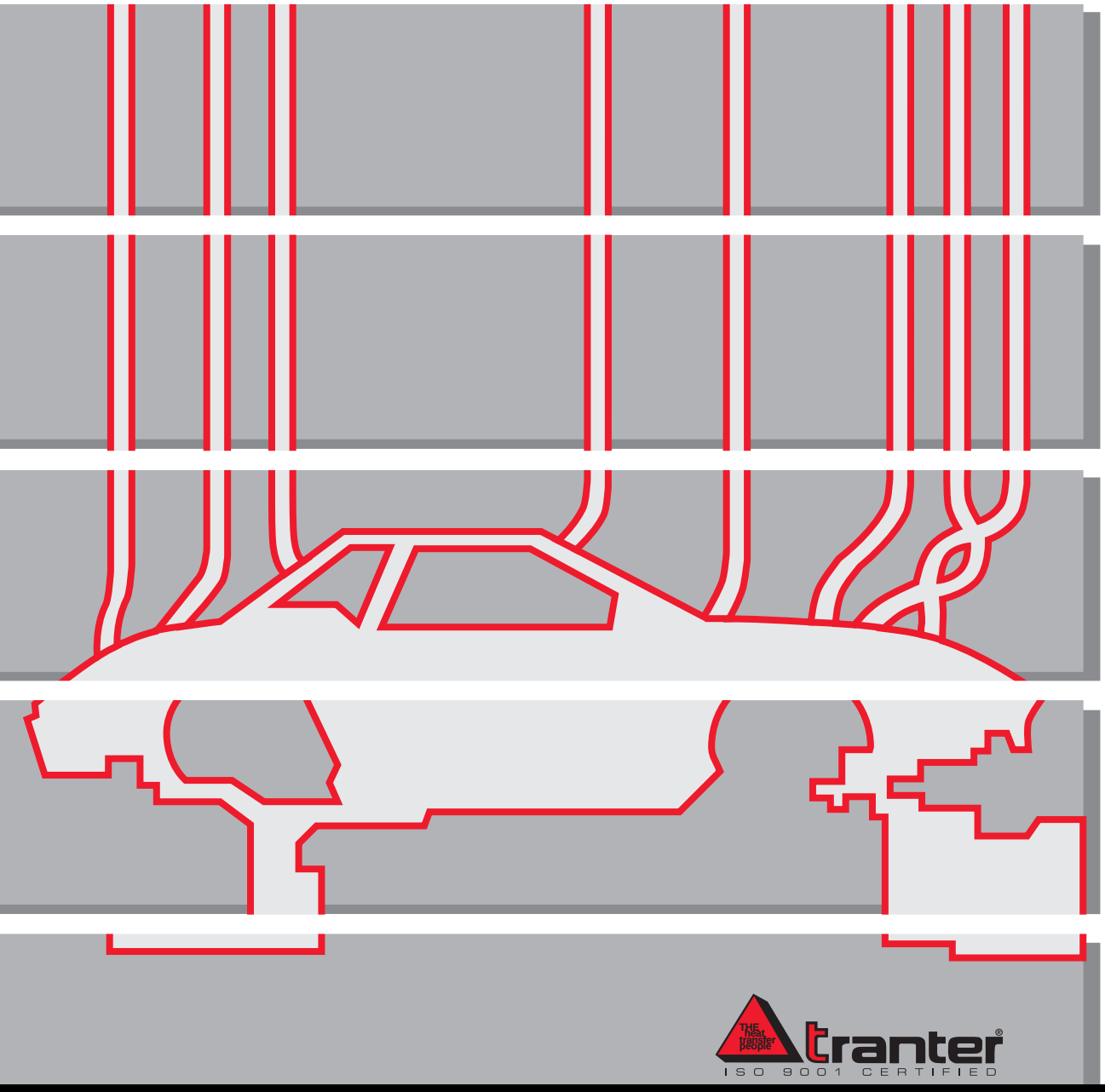


SUPERCHANGER®
PLATE & FRAME
HEAT EXCHANGERS



MAXCHANGER®
ALL-WELDED PLATE
HEAT EXCHANGERS

IN THE AUTOMOTIVE INDUSTRY



THE heat transfer people
tranter®
ISO 9001 CERTIFIED

TRANTER BRINGS EFFICIENCY AND RELIABILITY TO THE AUTOMOTIVE INDUSTRY

Excellent efficiency and flexibility...optimum heat transfer... minimal maintenance...these are critical needs today in the automotive 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 automotive 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 in great variety 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 automotive 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 automotive applications.

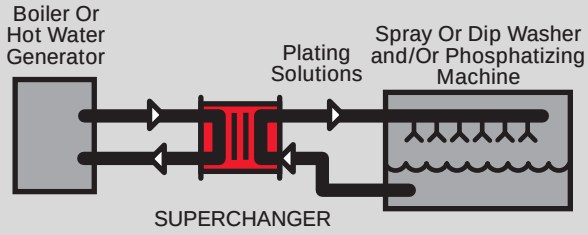
NOTE: THE DIAGRAMS SHOWN ARE PURPOSELY BRIEF: NO ATTEMPT HAS BEEN MADE TO SHOW ALL THE VALVES, PUMPS, CONTROLS, ETC., THAT MAY BE REQUIRED. IN MOST SYSTEMS, ALL PIPING ACTUALLY IS FROM THE SUPERCHANGER FIXED FRAME. THIS FACILITATES OPENING THE UNITS, WHEN REQUIRED, WITHOUT DISASSEMBLING PIPING.

TYPICAL AUTOMOTIVE INDUSTRY APPLICATIONS

HEATING METAL FINISHING SOLUTIONS

There are hundreds of spray and dip type metal cleaning washers and phosphatizing machines in the automotive industry. In recent years the use of SUPERCHANGER plate and frame heat exchangers has become very common for heating the various solutions. Hot water is generally used for the phosphatizing solutions to reduce scaling, while steam is most common for the other caustic cleaner, rinse, etc. baths.

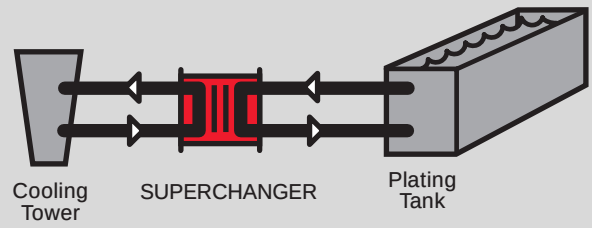
1



HEATING AND COOLING PLATING BATHS

Plating baths may require heating for start up and, generally, cooling during operation. SUPERCHANGER units are widely used, especially for cooling. The baths are operated in the 90°F range, and tower water temperature can be low enough in most locations to accomplish the cooling. The very efficient SUPERCHANGER heat exchangers act as isolators between the tower water and the closed circuit cooling water.

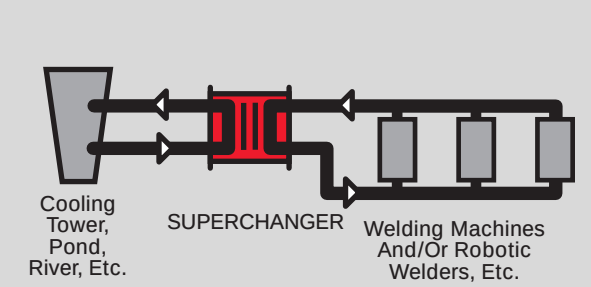
2



COOLING WELDING MACHINES

Various types of welding machines require cooling. These include resistance seam welders, automatic spot and robotic machines. There are large installations in the industry which use SUPERCHANGER units for cooling many machines. Here again, tower water temperatures are low enough for cooling the clean loop water which is circulated through the welders. The SUPERCHANGER units isolate the two water streams.

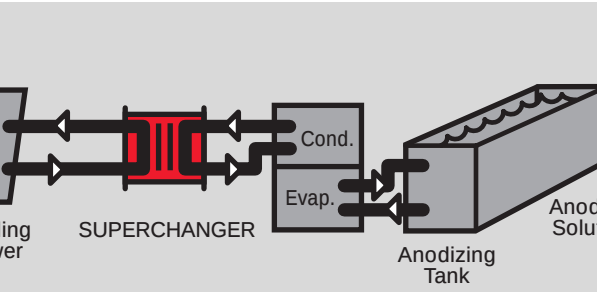
3



COOLING AND HEATING ANODIZING SYSTEM SOLUTIONS

The close temperature approach capability of SUPERCHANGER units makes them ideal for cooling conventional anodizing solutions which need to be maintained at about 72°F. Hard coat baths operate at a much lower temperature, requiring a refrigeration system. Many of the units are used to isolate the dirty tower water from the closed loop water which cools the condenser water from the refrigeration unit, or cools anodizing solutions directly. Bright dip, hot seal tanks, etc. in the anodizing systems are often heated with steam by using SUPERCHANGER units.

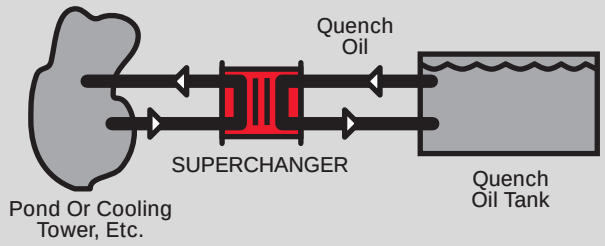
4



COOLING QUENCH OILS

SUPERCHANGER plate and frame heat exchangers are designed for efficient performance in quench oil to cooling water duty by the use of mixed plates. This capability tends to equalize the varying oil side and water side transfer rates so that optimum overall heat transfer rates are obtained. Typically the oil is pumped through the exchanger to be cooled by tower or pond water, etc.

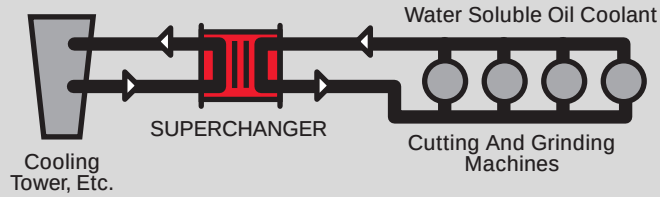
5



COOLING MACHINING AND GRINDING COOLANTS

Some plants have installed SUPERCHANGER units at various central locations throughout metal machining and grinding areas. The coolants are piped to each central station and circulated through SUPERCHANGER exchangers for cooling with tower, pond or river water, etc. The very small amount of space required and the excellent heat transfer efficiency were prime reasons these plants converted from shell-and-tube exchangers to SUPERCHANGER units.

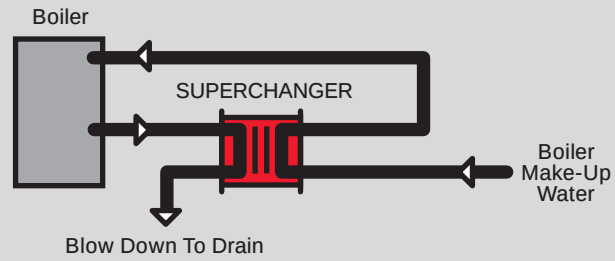
6



HEAT RECOVERY

The typical waste liquid-to-water heat recovery installation utilizing SUPERCHANGER plate and frame heat exchangers will pay back in one to two years, often quicker. Almost any warm or hot waste steam can be used. Condensate from boiler blow down for preheating boiler feed water is a common application. Hot waste streams also often must be cooled before they can be discharged. This makes heat recovery a logical application.

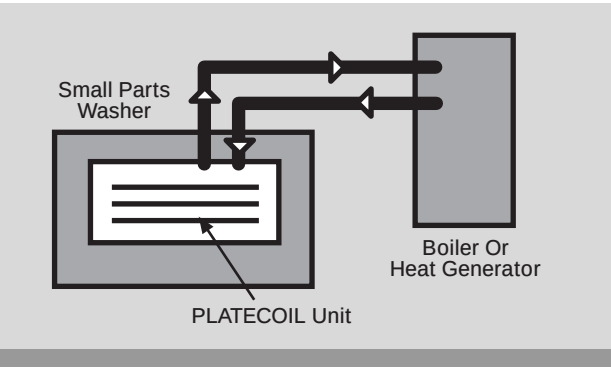
7



HEATING OR COOLING METAL FINISHING SOLUTIONS

PLATECOIL prime surface heat exchangers have been used for over 50 years for heating and cooling a variety of metal finishing solutions. The units can be immersed, clamped on, or built into solution tanks. A unique “chimney effect” is created by placing the PLATECOIL units away slightly from the tank side, which provides more precise and even heating of solutions, without the dilution or wastefulness of steam sparging or submerged combustion methods.

8



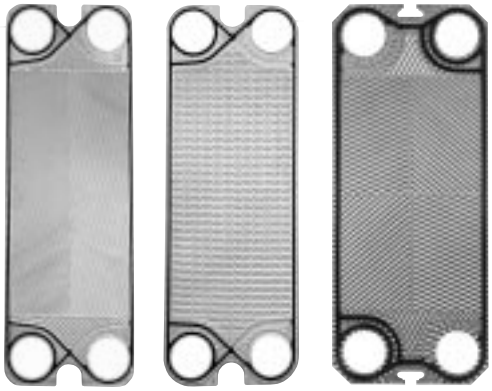
TYPICAL AUTOMOTIVE INSTALLATION FOR SUPERCHANGER EXCHANGERS

These large SUPERCHANGER plate and frame heat exchangers cool closed loop water, which is used to cool automatic welding machines, for a major U.S. automobile manufacturer at its Maryland plant. The units have provided the company significant cost-efficiency in heat transfer since their installation.

SUPERCHANGER units are employed in a number of major applications in the automotive industry. Chief among these are: heating wash, phosphate and rinse solutions; temperature control of paint or plating solutions; waste liquid-to-water heat recovery; and efficient performance in quench oil to cooling water duty, by the use of mixed plates, among other applications.

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 | Ultra-Flex® Design

Pressure Rating: Up to 400 psig operating pressure
Maximum Temperature: 366°F
Heat Transfer Coefficients: Greater than 1000 Btu/hr ft^2 °F
Heat Transfer Surface: Up to 20,000 ft^2 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 baked epoxy enamel paint, side bolts and shroud.
Nozzles: 150 lb. rated flange type, with other options available.
Gaskets: Nitrile, Ethylene Propylene, Viton, Neoprene, Hypalon, Butyl, Teflon-encapsulated NBR 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.

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 1,000 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 construction
■ Low fouling due to corrugations and inherent turbulence	■ High fouling due to circular cross-section and channeling—approximately 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 impossible 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.

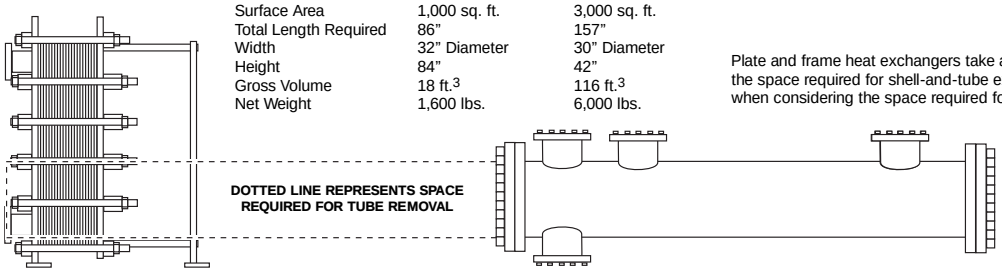


Plate and frame heat exchangers take as little as one-tenth the space required for shell-and-tube exchangers, particularly when considering the space required for tube removal.

REPRESENTED BY:

For further information on PLATECOIL prime surface heat exchangers and SUPERCHANGER plate and frame heat exchangers, contact:
TRANTER, inc., Texas Division • P.O. Box 2289
Wichita Falls, Texas 76307 • (940) 723-7125
Fax: (940) 723-5131 • http://www.tranter.com

THE heat transfer people® tranter®
ISO 9001 CERTIFIED