

PCC-3



## World-Class Prime Surface Heat Exchangers



**PLATECOIL®**

P R I M E

▲  
S U R F A C E



**PLATECOIL®**

P R I M E  
▲  
S U R F A C E

## Infinite Flexibility In Applications Around The World



- ▲ Immersion Heaters And Coolers
- ▲ Drum Warmers
- ▲ Suction Heaters
- ▲ Bayonet Heaters
- ▲ Banks
- ▲ Jacketed Tanks
- ▲ Clamp-On For Tanks And Vessels
- ▲ Fluidized Bed Banks
- ▲ Cryogenic Shrouds
- ▲ Freeze Dry Condenser Banks
- ▲ Shipboard Heaters And Coolers
- ▲ Refrigeration Coolers
- ▲ Storage Tank Heaters
- ▲ Shelves
- ▲ Jacketed Cabinets
- ▲ Integral Jackets For Cones, Heads And Tank Sidewalls
- ▲ Gas Cylinder Heaters And Coolers
- ▲ Glycol Dehydrators
- ▲ Falling Film Evaporators
- ▲ Paint Solvent Coolers
- ▲ Water-Cooled Shields For Electric Furnaces
- ▲ Banks For Agitated Vessels
- ▲ Heated Hoods For Textile Dye Becks
- ▲ Water-Cooled Chutes For Chemical Products
- ▲ Water Chillers For Soft Drink Carbonators
- ▲ Valve Warmers
- ▲ Refrigerated Liners For Medical Testing Machines
- ▲ Evaporators For Concentrating Acids
- ▲ Jacketed Cylinders For Vessel Components
- ▲ Banks For Waste Heat Recovery
- ▲ Screw Conveyor Troughs
- ▲ Jacketed Platens And Shelves
- ▲ Components For Jacketed Environmental Chambers



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A wholly-owned subsidiary of Dover Corporation, Tranter, inc. strives to be the leader in markets it serves by applying a simple philosophy: perceiving the customer's real needs; providing better products and services than the competition; investing to maintain a competitive edge; and asking customers to pay a fair price for the extra value added.

This philosophy reinforces our long-standing reputation as the most customer-oriented plate heat exchanger manufacturer.

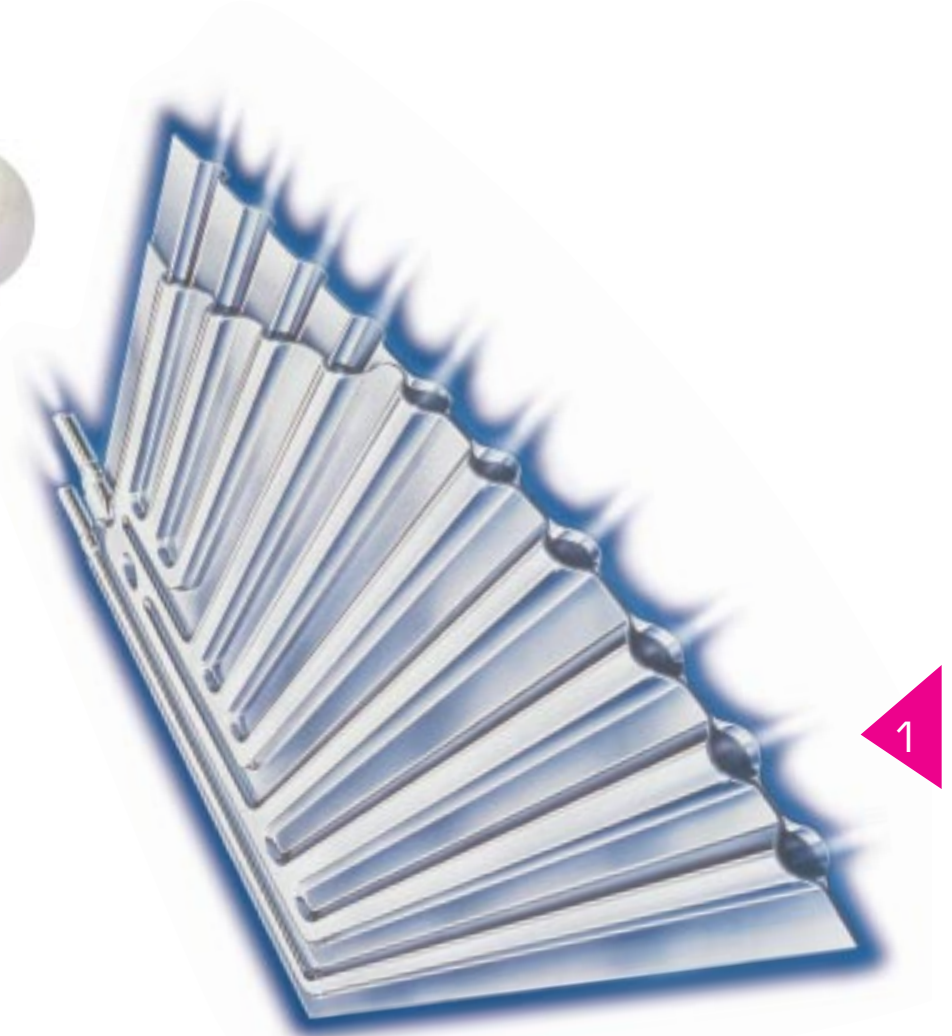
From a position of strength as an industry leader on the North American continent for over 65 years, Tranter, inc., has introduced advanced manufacturing procedures into its U.S. plants, and has made a dramatic commitment to global expansion, diversification and leadership in plate-type heat exchanger technology.

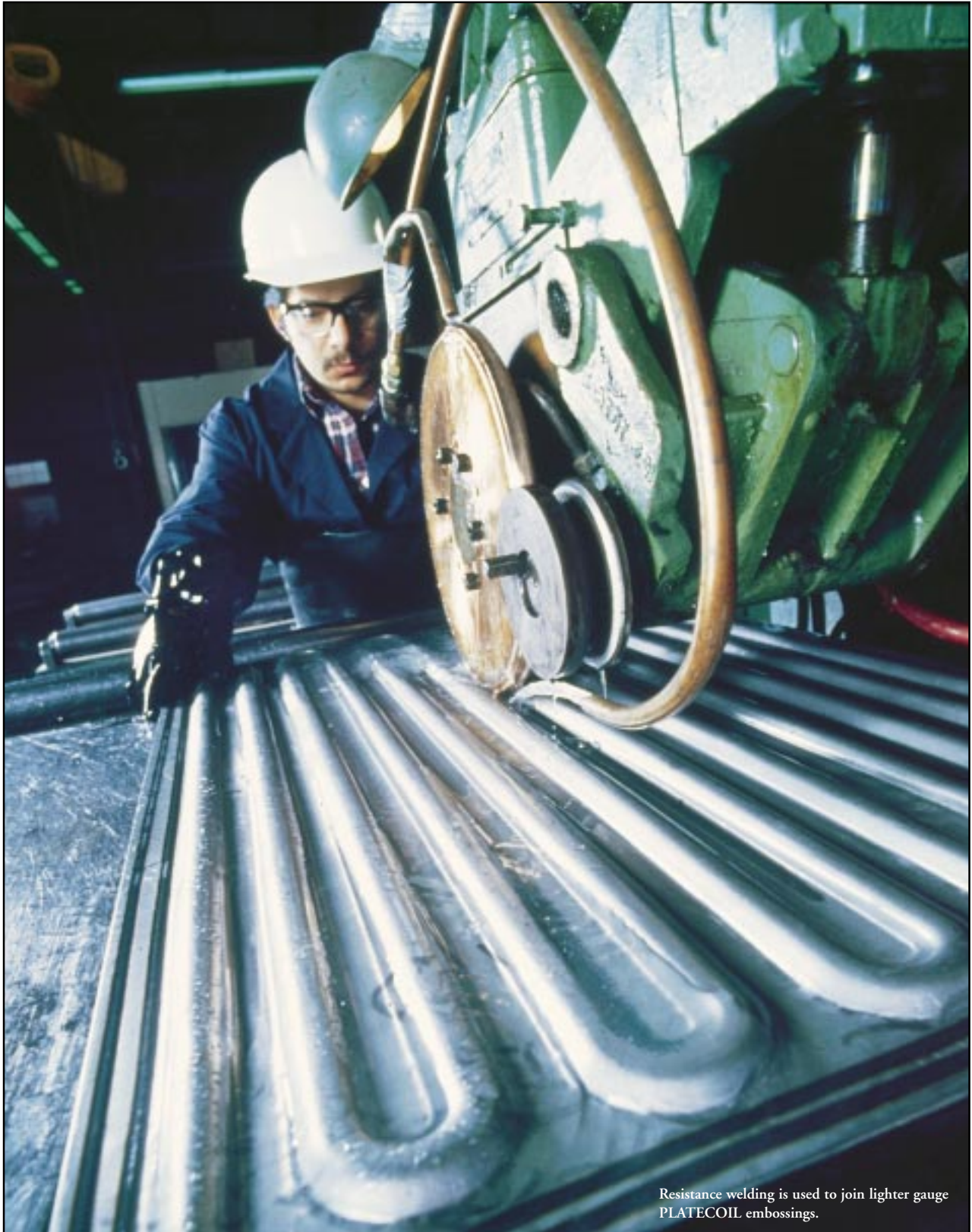
The acquisition of major products and manufacturing facilities in Sweden, Switzerland and Canada has provided Tranter heat transfer technology with even greater selectivity, efficiency and cost-effectiveness in solving any heat transfer need.

Tranter—THE heat transfer people.

### ISO 9001 Certification

Tranter—Texas Division is ISO certified, adhering to the highest standards in designing, manufacturing and testing PLATECOIL prime surface heat exchangers.







# Prime Surface Plate Heat Exchanger Technology

## Maximum Heat Transfer Efficiency

PLATECOIL designates an infinite variety of efficient and versatile heat transfer products, fabricated from two metal sheets—one or both of which are embossed. When resistance welded together, these embossings form a series of well-defined passages through which a heating or cooling media flows.

Two embossed sheets welded together form a double embossed PLATECOIL unit, while one embossed sheet welded to a flat companion plate is a single embossed unit.

## A Flow For Every Application

PLATECOIL flow designs produce maximum, streamlined prime heat transfer surfaces to resist fouling. A Multi-Zone flow configuration is exclusive to Tranter and is specially designed with zoned headers for use with steam, delivering the steam almost simultaneously to all levels of the PLATECOIL unit. This avoids efficiency-robbing condensate “blocking” commonly encountered in pipe coils or straight headered units.

A Serpentine flow-configured PLATECOIL unit provides outstanding performance with liquid heating or cooling media, allowing high internal flow velocities to achieve high heat transfer rates. Serpentine units are frequently specified for use with cold water, hot water, hot oil and refrigerants.

## Quality Designed And Manufactured

Structural integrity and durability are assured for all PLATECOIL units by strict quality control standards adhered to during fabrication. Extremely crucial welding is

done by highly experienced personnel on the most modern welding equipment.

Average thickness embossings and components are joined with resistance welds, while other welding processes are dictated when heavier gauges and plate are required or specified. PLATECOIL units can also be A.S.M.E. Code stamped, when required.

Stainless Steel standard PLATECOIL units can be annealed or stress relieved to extend their life under certain operating conditions. The process is used principally for the removal of forming and welding stresses, and to prevent chromium carbide precipitation (sensitization). An economical electropolished finish for Stainless Steel units greatly reduces the tendency for scaling in phosphatizing and other similar solutions.

## Each Unit Is Thoroughly Tested

All PLATECOIL units receive an air-under-water leak test, which is more sensitive than a hydrostatic test at the same pressure, before being authorized for shipment. All A.S.M.E. Code stamped units receive a hydrostatic test; a halogen leak test is normally performed for refrigeration applications; and a mass spectrometer test is standard for units in cryogenic service.

## Standard Styles, Sizes And Materials To Fit All Needs

Standard double embossed PLATECOIL units come in three styles of Multi-Zone and two styles of Serpentine flow configurations, in over 300 sizes. Many of these can be shipped from stock. Widths range from 12" to 43", while lengths range from 23" to 143", as shown in Tables 1 and 2 on page 7. This large assortment

of pre-engineered units is designed to satisfy a wide range of heating and cooling requirements in industrial process applications.

Carbon Steel and Types 304L and 316L Stainless Steel are standard materials for PLATECOIL units. Other alloys are available (see below).



## Custom Tooling Capability Increases PLATECOIL Versatility

To accommodate increasing demand for unique, one-of-a-kind, custom PLATECOIL prime surface heat exchange products, Tranter offers a full-time designer and an advanced, dedicated die shop, capable of producing and maintaining a wide variety of short run and high volume custom tooling.

PLATECOIL's inherent flexibility allows it to be bent, rolled, or otherwise formed into virtually any configuration. Optional materials include Monel, Nickel, Inconel, Alloy 825, AL6XN, 254SMO, Alloy 20 and Hastelloys B-2, C-276 and G. Flow configurations other than Multi-Zone and Serpentine can be specified to meet special design and performance requirements. Large pass, heavy gauge PLATECOIL units for high internal flow rates, low pressure drop and rugged use are also available.





# Typical Standard PLATECOIL Applications

## Standard Single Embossed Units



Clamp-On PLATECOIL units are unequaled as an economical means of converting an existing unjacketed vessel, or for procuring a low cost plain tank and adding efficient jacketing at the jobsite. Standard units for tank sidewalls are available in seven widths and twelve lengths, or in customized variations.



PLATECOIL jacketed vessels are compact and light in weight, yet offer high jacket operating pressures. Embossings control flow patterns to increase velocities for improved heat transfer and reduced fouling. Jackets can easily be designed with two or more zones to efficiently satisfy diverse process requirements.



PLATECOIL drum warmers are extremely effective for heating with steam, hot water, hot oil or high temperature heat transfer liquids, and are equally adaptable for cooling by using cold water or a refrigerant. Standard drum warmers include external clamp-on, saddle and immersion styles.

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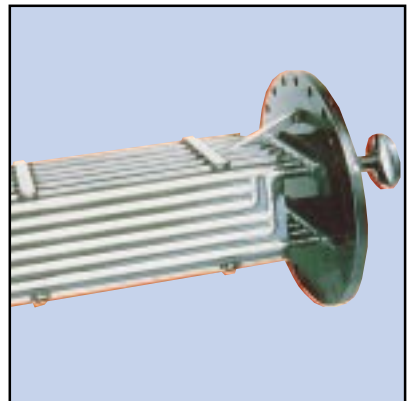
## Standard Double Embossed Units



PLATECOIL units are best known as immersion products which simplify and make open tank heating and cooling of liquids, solids or gases more efficient than with pipe coils. When hung a short distance away from a tank wall, a "chimney effect" causes a natural circulation for improved uniformity of heating.



A PLATECOIL bank-in-tank unit provides wide interspaces and open turns for effectively passing solids or fibers, while efficiently recovering heat from dirty wastewater. Thermal pollution is also reduced at the same time. Flows are basically counter-flow for maximum heat recovery.

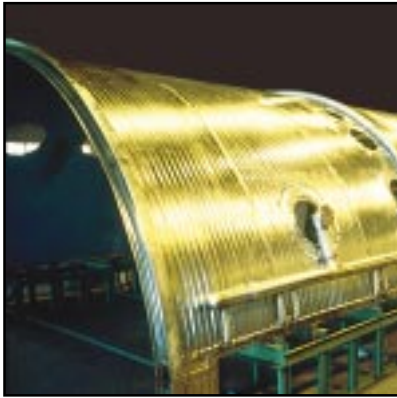


PLATECOIL bayonet heaters provide a large amount of efficient primary heating surface in a single unit for maintaining desired temperatures in storage tanks.



# Typical Custom PLATECOIL Applications

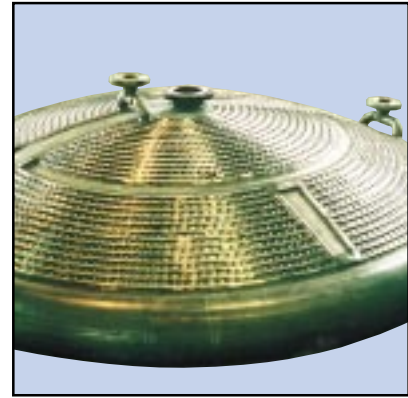
## Custom Single Embossed Units



PLATECOIL cryogenic cold shrouds are employed in numerous projects, including large and small test chambers, surfaces for helium cryopumping and bell jar covers. Tranter's "cryogenic edge" utilizes a unique treatment for pressure containment and to facilitate sensitive, required mass spectrometer leak testing.



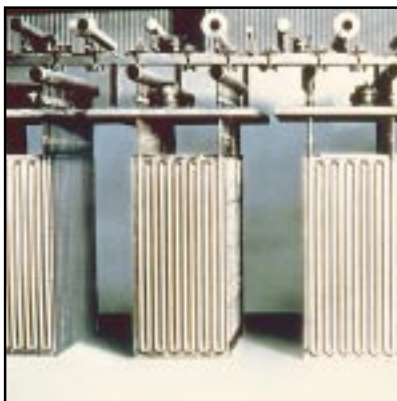
A Serpentine style flow pattern is employed in the highly effective, single-unit PLATECOIL centrifuge coolers. This results in higher internal refrigerant velocities to generally improve overall heat transfer rates.



Heavy wall PLATECOIL tanks, platens or other units which must be flat on one side, with no weld marks or discolorations on the flat side, can be MIG spot or continuous welded to A.S.M.E. Code requirements. Embossing can be provided on heads as well as on plate thickness side wall sections using MIG welding.



## Custom Double Embossed Units



Effective cooling, drying or heating of solids is accomplished by PLATECOIL fluidized bed heat exchangers. Solid products are passed between PLATECOIL units in a vertically-installed bank, which utilizes water for cooling. Heat transfer rates between eight and 40 Btu/hr sq ft °F are obtainable.



Freeze dry systems for processing foods and pharmaceuticals utilize heated PLATECOIL shelves in the vacuum chamber and refrigerated PLATECOIL units in the condensing chamber for longer life and trouble-free operation. PLATECOIL units also perform well as heated or cooled shelves in a wide variety of cabinets, ovens, etc.



PLATECOIL units are supplied for heat transfer surface in agitated vessels and reactors. They also serve as mixer baffles. Heavy gauge materials and special reinforcing features provide rugged units to withstand agitation force.



# Typical Custom PLATECOIL Applications

## Custom Single Embossed Units



PLATECOIL Snopans and Steampanns are utilized by the food industry. A wide variety of pass designs is available for tailoring to fit the requirements of each application.



This large, curved, single embossed PLATECOIL unit is used to cure felt on a 60" diameter roll. High temperature thermal fluid circulating through the unit gives very uniform surface temperatures over the 42-foot length.



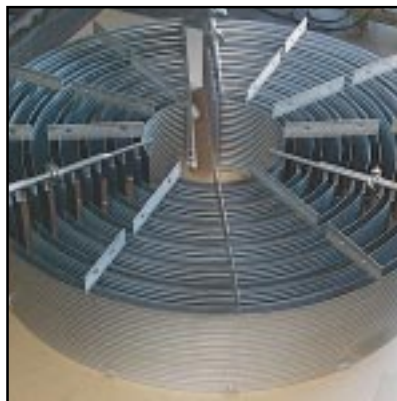
PLATECOIL units are available in a multitude of shapes and sizes. Electropolishing resists fouling and enhances the appearance of the metal surface.

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## Custom Double Embossed Units



This special PLATECOIL bank assembly is installed in a fluidized bed dryer for soybeans. Heavy gauge Carbon Steel plates are used due to erosive nature of the product.



This bank assembly is used for heating solids in a fluidized bed dryer. Low profile pattern 401 PLATECOIL units are banked to minimize erosion problems.



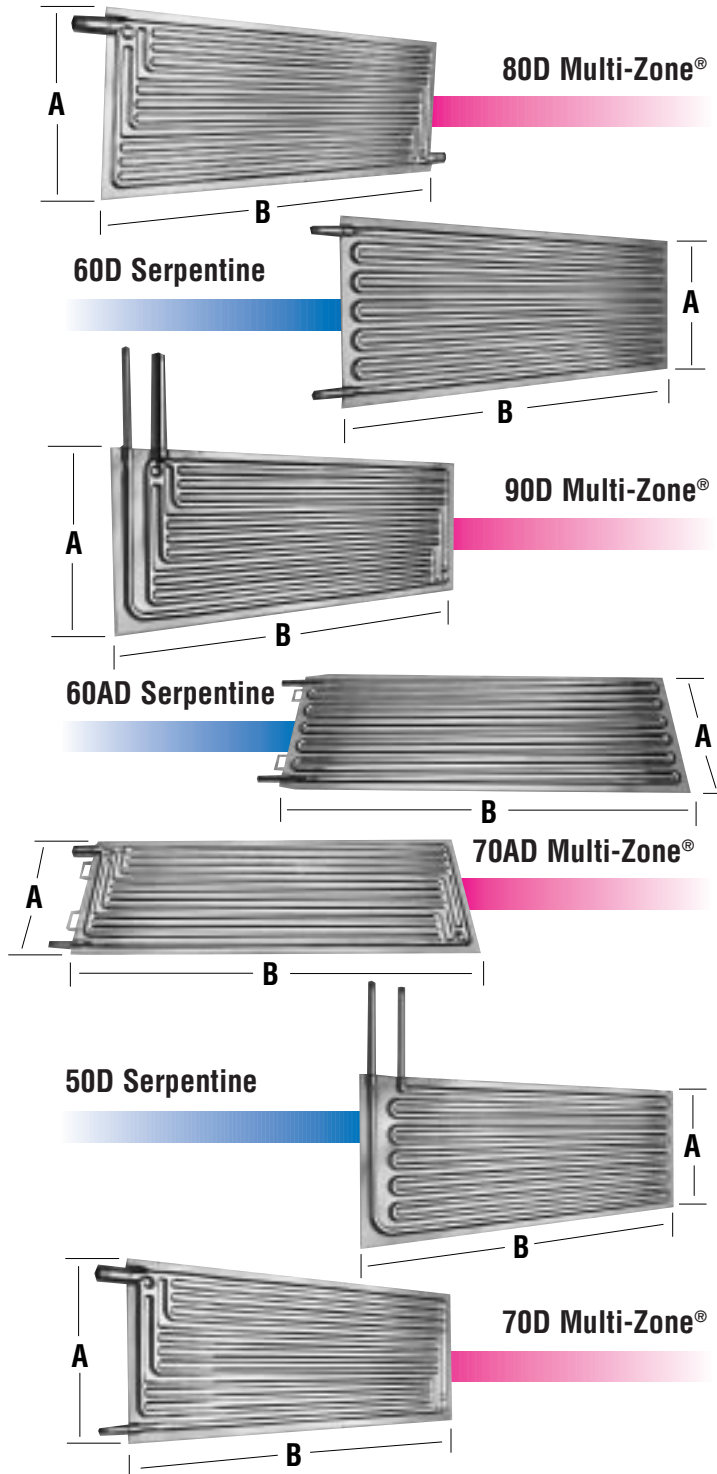
Electropolished PLATECOIL units with seal edges such as these are used in processes involving food where cleanability is critical.





# A Wide Range Of Specifications

## PLATECOIL Styles



## PLATECOIL Areas & Weights

### DOUBLE EMBOSSED SURFACE AREAS

TABLE 1 All Styles In Square Feet

Nom. Width Inches (A Dim.)	Nominal Length In Inches (B Dimension)											
	23	29	35	47	59	71	83	95	107	119	131	143
12	4.3	5.4	6.5	8.8	11.1	13.3	15.6	17.8	20.1	22.3	24.6	26.8
18	6.8	8.5	10.3	13.9	17.4	21.0	24.5	28.1	31.6	35.2	38.7	42.3
22	8.0	10.1	12.2	16.4	20.6	24.8	29.0	33.2	37.4	41.6	45.8	50.0
26	9.2	11.7	14.1	18.9	23.8	28.6	33.5	38.3	43.2	48.0	52.9	57.7
29	10.5	13.2	16.0	21.5	27.0	32.5	38.0	43.5	49.0	54.5	60.0	65.5
36	12.9	16.3	19.7	26.5	33.3	40.1	46.9	53.7	60.5	67.3	74.1	80.9
43	15.4	19.5	23.5	31.6	39.7	47.8	55.9	64.0	72.1	80.2	88.3	96.4

Many sizes of double embossed PLATECOIL in 14 and 12 ga. Carbon Steel and 16 and 14 ga. 316 Stainless Steel are available for shipment from stock. Other sizes can be shipped in 4-6 weeks.

### AREAS OF FLAT SIDE ONLY FOR SINGLE EMBOSSED

TABLE 2 All Styles In Square Feet

Nom. Width Inches (A Dim.)	Nominal Length In Inches (B Dimension)											
	23	29	35	47	59	71	83	95	107	119	131	143
12	1.9	2.4	2.9	3.9	4.9	5.9	6.9	7.9	8.9	9.9	10.9	11.9
18	3.0	3.8	4.6	6.1	7.7	9.3	10.8	12.4	14.0	15.5	17.1	18.7
22	3.6	4.5	5.4	7.3	9.1	11.0	12.8	14.7	16.5	18.4	20.2	22.1
26	4.1	5.2	6.2	8.4	10.5	12.7	14.8	16.9	19.1	21.2	23.4	25.5
29	4.7	5.9	7.1	9.5	11.9	14.4	16.8	19.2	21.6	24.1	26.5	29.0
36	5.7	7.2	8.7	11.7	14.7	17.7	20.7	23.7	26.7	29.7	32.7	35.7
43	6.8	8.6	10.4	14.0	17.6	21.1	24.7	28.3	31.9	35.4	39.0	42.6

Quick shipment in 2-3 weeks is available for single embossed 14 ga. 22" wide Style 70 curved clamp-on PLATECOIL, available in 83", 95" and 107" lengths. The flat side can be 12 or 10 ga. when needed. Other widths of single embossed PLATECOIL can be supplied in 4-6 weeks.

### PLATECOIL INTERNAL OPERATING PRESSURES (NON-A.S.M.E. CODE)

Gauge		Carbon Steel	304, 304L, 316, 316L, Monel
Double Embossed		PSI	PSI
16		180	250
14		300	330
12		400	400
Single Embossed			
Embossing	Companion	PSI	PSI
16	16	130	160
16	14	145	190
16	12	180	205
16	11	205	240
14	14	190	240
14	12	215	270
14	11 & over	265	290
12	12 & over	265	300





# Quick Selection Charts

Fig. 1 QUANTITY OF SOLUTION HEATED PER SQ FT VS. STEAM PRESSURE

Based On One Hour Heat Up Time From 60°F (U=150 Btu/hr sq ft °F)

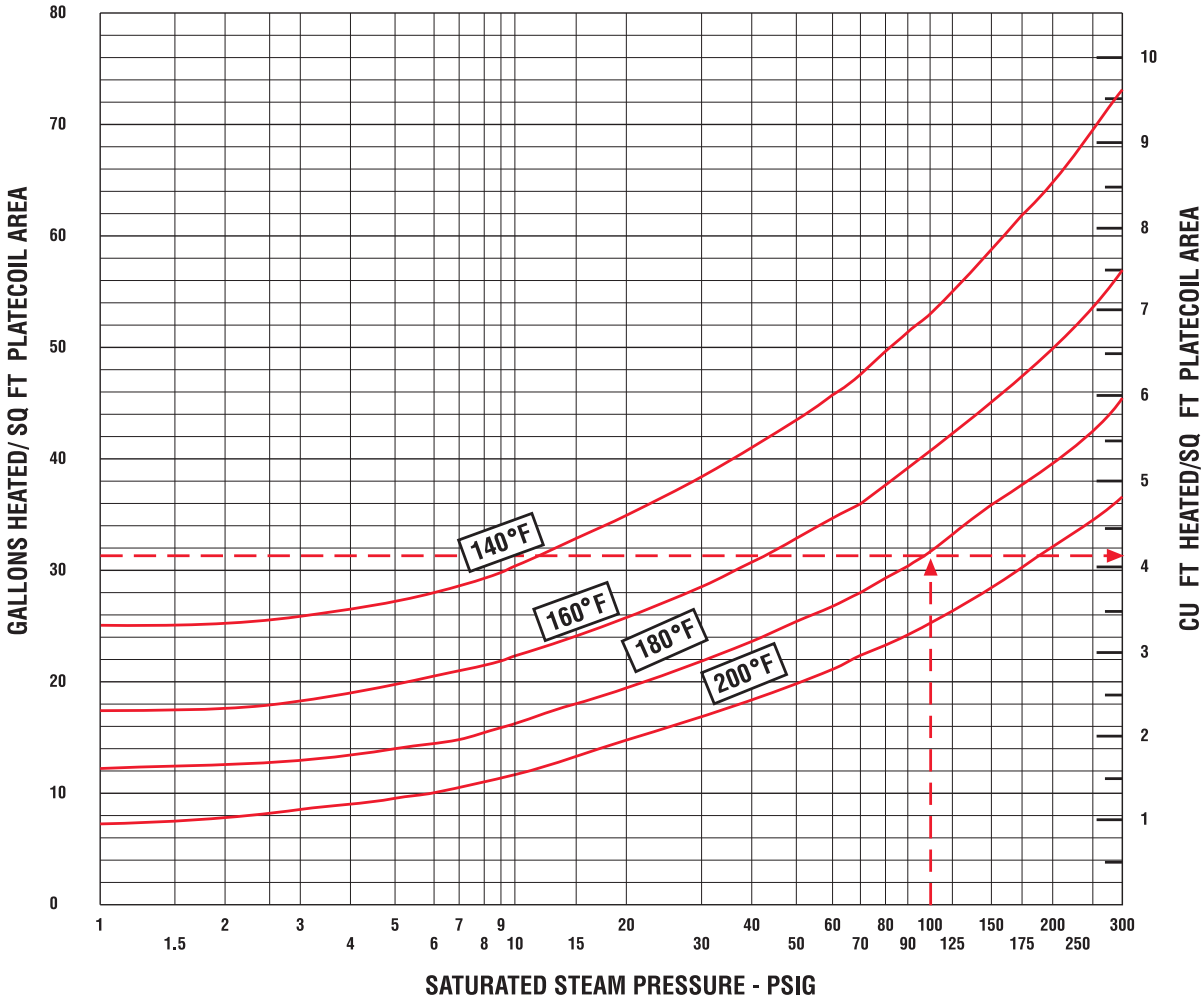


Fig. 1 Example Illustrating the Use of the Chart

Determine the total sq ft of PLATECOIL needed to heat a watery solution from 60°F to 180°F in one hour with steam at 100 psig. The tank measures 10'x5'x5' and the solution depth is 4'.

1. Calculate solution volume:  
 $V = 10' \times 5' \times 4' = 200$  cu ft.

(This is equivalent to  $200 \times 7.5$  gal/cu ft = 1500 gals.)

2. Enter the bottom of Fig. 1 at the line for 100 psig steam pressure. Follow it vertically to the curve for 180°F operating temperature. From this intersection, move horizontally to the left and read: 31.8 gal heated per sq ft of PLATECOIL, or move right and read 4.24 cu ft heated per sq ft of PLATECOIL.

3. Divide result of Step 1 by result of Step 2 to obtain PLATECOIL area  
 $\frac{200}{4.24}$  or  $\frac{1500}{31.8} = 47.2$  sq ft

4. Select the appropriate size Style 90 PLATECOIL from Table 1 on page 7. A 26" x 119" will provide 48 sq ft and will be the most economical choice.



**Fig. 2 HOLDING TEMPERATURE IN PLATING SOLUTIONS**  
Cooling With Serpentine PLATECOIL

Watts Removed Per Sq Ft	GPM/Sq Ft Cooling Water	Cooling Water Inlet Temp.	Solution Holding Temperature	Btu/hr Removed Per Sq Ft
1140	.4	50	100	3900
1730	.6	50	120	5900
2320	.8	50	140	7900
850	.3	60	100	2900
1440	.5	60	120	4900
2020	.7	60	140	6900
410	.2	70	100	1400
1140	.4	70	120	3900
1730	.6	70	140	5900

NOTE: The above table is based on a “U” value of 100 Btu/hr sq ft °F for a watery solution and a cooling water temperature rise of approximately 20°F through the PLATECOIL unit. Generally city water pressure will supply adequate cooling water for a Style 60 or Style 50 PLATECOIL unit up to about 30 sq ft. For tanks requiring more than 30 sq ft of cooling surface, several smaller PLATECOIL units may be desirable. The PLATECOIL Product Data Manual No. 5-63 gives more complete pressure drop data.

**Fig. 2 How to Use the Holding Temperature Chart**

EXAMPLE: Maximum current input into a 4’x6’x4’ liquid level cyanide copper plating bath is 30,000 watts. Determine the size of PLATECOIL required to hold 120°F operating temperature using 60°F cooling water.

SOLUTION: 1. Entering the chart at 60°F cooling water and 120°F solution temperature, a PLATECOIL capacity of 4900 Btu/hr/sq ft or 1440 watts/sq ft is noted.

2. Divide input by PLATECOIL capacity to obtain the required PLATECOIL area.

$$\frac{30,000}{1440} = 20.8 \text{ sq ft PLATECOIL area}$$

3. Select the appropriate PLATECOIL size from the surface area chart in Table 1 on page 7. A 22”x 59” PLATECOIL will do the job, utilizing 20.6 x .5 = 10.3 GPM cooling water.

**Fig. 3 AVERAGE OVERALL HEAT TRANSFER COEFFICIENTS** U=Btu/hr sq ft °F (For Immersed Or As Integral Vessel Jackets)

HEATING APPLICATIONS		PLATECOIL STYLE	CLEAN SURFACE COEFFICIENTS		DESIGN COEFFICIENTS Considering Usual Fouling In This Service		
Hot Side	Cold Side		Nat. Convect.	Forc. Convect.	Nat. Convect.	Forc. Convect.	
1. Steam	Watery solution	90-80-70	250-500	300-550	125-225	150-275	
2. Steam	Light oils	90-80-70	50-70	110-140	40-45	60-110	
3. Steam	Medium lube oil	90-80-70	40-60	100-130	25-40	50-100	
4. Steam	Bunker C or #6 fuel oil	90-80-70	20-40	70-90	10-30	60-80	
5. Steam	Tar or asphalt	90-80-70	15-35	50-70	15-25	40-60	
6. Steam	Molten sulphur	90-80-70	35-45	60-80	4-15	50-70	
7. Steam	Molten paraffin	90-80-70	35-45	45-55	25-35	40-50	
8. Steam	Air or gases	90-80-70	2-4 *	5-10 *	1-3 *	4-8	
9. Steam	Molasses or corn syrup	90-80-70	20-40	70-90	15-30	60-80	
10. High temp. hot water	Watery solutions	60-50-40	80-100	100-225	70-100 *	110-160 *	
11. High temp. ht. transfer oil	Tar or asphalt	60-50-40	12-30	45-65	10-20	30-50	
12. Therminol	Tar or asphalt	60-50-40	15-30	50-60	12-20	30-50	
COOLING APPLICATIONS							
Cold Side	Hot Side						
13. Water	Watery solution	60-50-40	70-100	90-160	50-80	80-140	
14. Water	Quench oil	60-50-40	10-15	25-45	7-10	15-25	
15. Water	Medium lube oil	60-50-40	8-12	20-30	5-8	10-20	
16. Water	Molasses or corn syrup	60-50-40	7-10	18-26	4-7	8-15	
17. Water	Air or gases	60-50-40	2-4	5-10	1-3	4-8	
18. Freon or ammonia (dir. exp.)	Watery solution	60-50	35-45	60-90	20-35	40-60	
19. Calcium or sodium brine	Watery solution	60-50-40	100-120	175-200	50-75	80-125	
CLAMP-ON PLATECOIL**		WATER AND SOLVENTS		VISCOSU PRODUCTS		AIR AND GASES ***	
		Heating	Cooling	Heating	Cooling	Heating	Cooling
20. With heat transfer mastic	30-40	20-30	12-20	5-12	1-3	1-3	1-3
21. Without heat transfer mastic	15-25	10-20	6-12	3-8	1-3	1-3	1-3

\* See curves on page 86 of PLATECOIL Product Data Manual for more detailed data.

\*\* Clamp-on PLATECOIL should be used only for holding conditions. DO NOT use for heat up or cool down except in moderate requirement situations and with calculated area doubled as a safety factor.

\*\*\* For low velocity air or gas.





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