THERMAL PRECISION INDUSTRIAL COOLING SYSTEMS

Precision-engineered solutions to
cut your cooling water costs.

THERMAL PRECISION

Division of Thermotech Corporation
www.thermalprecision.com

Close The Loop On Inefficient Cooling Water Systems

The operation of costly cooling water systems is one of the most wasteful procedures found in industry today. Water purchase, sewer discharge, EPA regulations, chemical treatment and maintenance are some of the high operating costs associated with most systems.

Industrial Cooling, — Our ONLY Business.

At **Thermal Precision**, we are industrial cooling system specialists. Our systems have replaced once through cooling, saving companies thousands of dollars per year in energy, chemical and maintenance costs. **Thermal Precision** closed loop systems are designed to substantially decrease or even eliminate the hidden costs of operating your water cooled equipment. Depending on your current operation, installed payback on a closed industrial cooling system can be achieved in months.

Thermal Precision has experience designing for a variety of applications in all industries. Our knowledge and technical expertise enable us to create the best solution for your particular needs and assure that your system is right the first time.

Our experience includes cooling systems for:

- Air compressors
- Refrigeration compressors
- Hydraulic presses
- Welding equipment
- Molding machines
- Engines
- Bearings
- Printing presses
- Furnaces
- Ovens

The **Thermal Precision** System Performance Guarantee

Thermal Precision guarantees the performance of all cooling systems as quoted, based on design specifications and heat load data as provided by the end user of our equipment, and contingent upon proper installation and maintenance of said cooling equipment. **Thermal Precision** reserves the right to correct any detected performance deficiencies in order to provide total customer satisfaction.

THERMAL PRECISION, Guaranteed To Perform To Your Specifications

At **Thermal Precision** we specialize in closed, sealed, glycol coolers for a wide variety of non contact cooling water applications. **Thermal Precision** systems are affordable and efficient.

We precision engineer all cooling systems to meet the exact requirements of your application. **Thermal Precision** will determine precisely what you need and respond with a tailor made solution, not an off the shelf product.

Systems are designed to match the heat load under the most demanding conditions to ensure that it exceeds performance expectations. In fact, we guarantee system performance.

IT'S OUR COMMITMENT TO YOUR TOTAL SATISFACTION

Understanding Closed Loop Fluid Cooling Systems.

In it's most basic form, a closed loop cooling system consists of four elements:

1. **Heat Load**- Industrial process or equipment that produces heat as a by-product, for example, an air compressor or furnace.
2. **Heat Exchanger** - Device to transfer heat energy to a cooler medium, for example, a fluid cooler or radiator.
3. **Pump System and Controls** - Recirculate heat transfer fluid from heat load to heat exchanger.
4. **Conduit System** - Pipe and valves used to connect the system components. Permits fluid circulation between heat load, heat exchanger and pump system.

The pump / control system circulates a heat transfer fluid through the conduit system that captures the heat produced by the heat load. The pump transports the fluid to the heat exchanger where it is dissipated by one of several possible cooling methods, i.e., ambient air cooling, evaporative cooling or refrigeration.

Thermal Precision considers several factors when designing an industrial cooling system:

- Maximum inlet temperature to heat load
- Ambient air conditions and elevation
- Water quality and availability
- Environmental conditions

CALCULATING HEAT LOAD

To design an industrial cooling system, the heat load must be determined. Total heat load is expressed in BTUH, or British Thermal Units per Hour.

British Thermal Unit (BTU) - Energy required to raise the temperature of one pound of water one degree Fahrenheit.

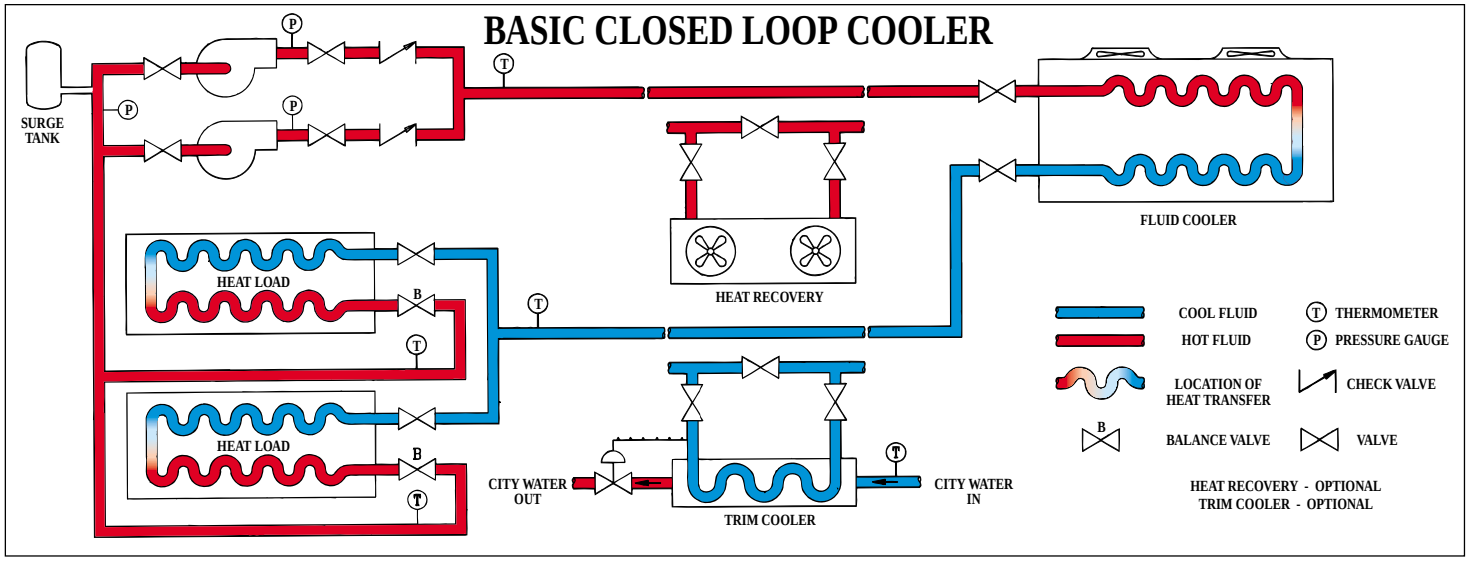
Total Heat Load can be calculated by using the following heat transfer formula:

BTUH =500 X TEMPERATURE RISE X FLOW
500 - Weight of one gallon of water x 60 minutes.
Flow - The flow of coolant through the heat load expressed in gallons per minute (GPM).
Temperature Rise - The difference between the entering and leaving coolant temperature.

This formula is valid for **water** as a coolant. For any other liquid, correct with the specific heat and gravity.

The following provides heat load in BTUH:

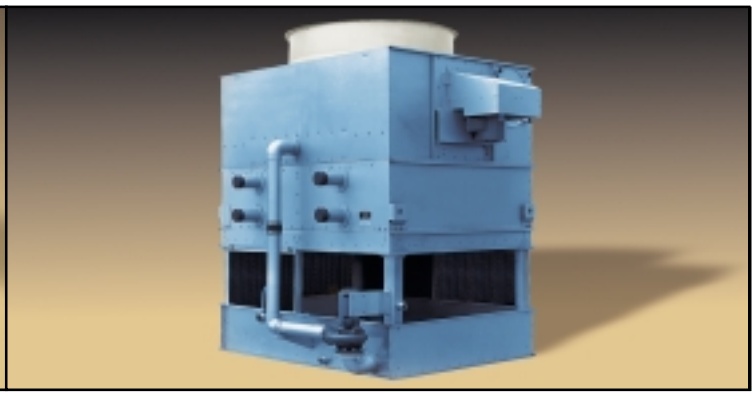
- Brake Horsepower (BHP) X 2546.4 = BTUH
- Kilovolt Amperes (KVA) X 3415 = BTUH
- Watts X 3.415 = BTUH
- Foot Pounds x 0.00128= BTUH



DESIGN OPTIONS TO MEET

DRY FLUID COOLER
DRY BULB SYSTEMS

EVAPORATIVE FLUID COOLER
WET BULB BASED SYSTEM



Basic Form of Industrial Fluid Cooling

Dry Fluid Coolers utilize a sealed, pressurized closed loop system that provides a clean, efficient, and low maintenance solution to industrial cooling applications. Dry coolers utilize ambient air to dissipate heat. Warm water/glycol fluid is recirculated from the heat load through a finned tube heat exchanger while ambient air is drawn across the coil circuit.

Precision engineered to your specifications.

Thermal Precision Dry Fluid coolers are sized to match your heat load under the most demanding conditions (ASHRAE 1%). Our coolers are delivered assembled and pre-wired for easy installation at your site and are constructed of all corrosion resistant materials. We offer either one complete module for outdoor mountings, or as two separate modules, enabling you to install the pump / control module inside and remote mount the air-cooled heat exchanger outside.

The Advantage of Trim Cooling.

The practical implementation of a dry fluid cooler is limited by maximum ambient temperatures. Optional trim cooler packages are used with dry fan-coil units to ensure cool operations during unexpected high ambient temperatures. Trim coolers are used when it is mandatory to hold fluid temperatures to specific conditions. **Thermal Precision** trim coolers are available in tube-in-shell or plate and frame type and are sized for 2 to 1 flow to save water. A quality temperature-controlled water regulating valve is standard and uses only the amount of city water required, affording automatic economical operations.

Need Lower Fluid Temperatures?

A Packaged Evaporative Cooler System is the answer to cooling needs in high ambient locations using temperature sensitive equipment **Thermal Precision** Evaporative Fluid Coolers consist of a tube bundle, spray pump and cooling fan. The tube bundle is sprayed with water while a water glycol solution circulates through the tube bundle. Heat exchange occurs from the tube bundle to the spray water and is dissipated with the evaporation of the water. The cooler is sized for the area wet bulb (ASHRAE 1%) for heat sensitive loads.

The water / glycol mixture is circulated between heat load and evaporative cooler through a packaged pump / control module, factory pre-piped and pre-wired for easy installation. The sealed, pressurized recirculating system eliminates scale corrosion build-up in your piping and heat generating equipment by eliminating entrained oxygen in the system. Corrosion inhibitors contained in the glycol provide further protection.

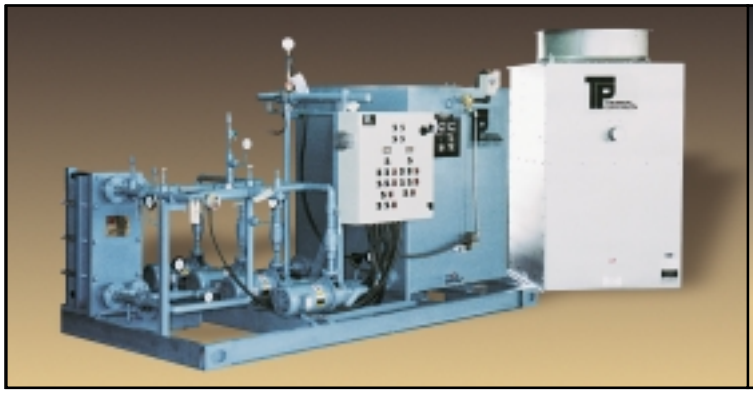
Evaporative units are available with axial fans, centrifugal fans, fan cycling, dampers and pan heaters as options to fit your specific requirements.

Closed Industrial Fluid Cooling Systems are the solution to reducing high water and sewage costs. Eliminating high cooling tower maintenance costs, stopping water cooled equipment from fouling and conserve water to help your company become more environmentally friendly.

VIRTUALLY ANY APPLICATION

We'll help you choose the options that provide the best advantage for your application

OPEN TOWERS AND CUSTOM SYSTEMS



PUMP PACKAGE THE HEART OF THE SYSTEM

Open water systems

Where open, contact water is unavoidable, **Thermal Precision** offers a complete line of open tower packages with fan cycling for precise temperature control, plus any and all options necessary for your particular application. Options include two speed fan motors, water storage tanks, pan heaters, and pan heaters. Stainless steel and fiber reinforced polyester (FRP) housing is available for reliable, extended life operation.

Additional savings with custom systems

If you have a specific hybrid application, **Thermal Precision** can custom design the most efficient combination to meet your requirements. We have the technical expertise for systems such as quench tank cooling, free cooling for chillers, specialty chilled water / glycol systems and plate & frame type heat exchangers for challenging applications.

Heat recovery for even more savings

Most **Thermal Precision** installations have the potential to offer you additional dollar savings in some form of heat recovery. We can assist you in converting your waste heat into usable energy, seasonable or year round. This can be in the form of simple space heaters, pre-heated boiler water or process water. **Thermal Precision** can custom design each heat recovery application for full automatic operation to maximize your return on investment.

Pump Station

The center of all cooling systems is the pump station, the primary control device. The design of the pump station is of critical importance for the control and performance of your system. Improper pump station design can cause serious problems ranging from high installation costs, to excessive downtime, and years of inefficient operation. The quality of our pump station is second to none. **Thermal Precision** designs feature ASME coded surge tank, fabricated channel steel frames for rugged durability and close coupled centrifugal pumps for low maintenance and long service life. The pump station is pre-piped and wired for easy on site installation at your facility. With Thermal Precision's technical excellence, the success of your system is guaranteed.

Pump Selection

Thermal Precision engineers a cooling system based on the unique characteristics of your installation. Significant emphasis is placed on pump selection to ensure efficient operation. We utilize flow switches versus pressure switches to eliminate false signals. A NEMA 4 control panel provides indicating and warning lights to keep you informed on system performance... **Thermal Precision** can custom design pump package systems to meet specific system needs and / or space requirements.

WE DELIVER PRECISION — FROM THE HEART OF THE SYSTEM AND BEYOND

STANDARD EQUIPMENT

PUMP PACKAGE
Nema 4 Control Panel
ASME Coded Surge tank, (25 Gallons)
Safety Valve Sight Glass
Purge Point
Flow Switch
Check Valves
Isolation Valves on Both Sides of Pump(s)
Pressure Gauges with Gauge Valves
Temperature Gauges with Thermal Wells
Fill Station
Close Coupled Centrifugal Pumps
Fabricated Steel Base
Pre Wired and Piped
Auto Switch Over on Duplex

DRY FLUID COOLERS
Direct Drive, Balanced Fans
Weather Protected Motors
Thermal Overload Protection on Motors
Johnson “350” Fan Cycling Controls
Weather Resistant Control Panel
Fan Guards
Corrosion Resistant Construction
Galvanized Steel Unit Cabinets
Galvanized Steel Legs
Manifold Kits for Double Wide Coolers
High Efficiency Copper Coils
Compartmented Fans
Coils Tested @ 400 PSIG
Manifold Drains and Vents

EVAPORATIVE COOLERS
Axial Fans
Corrosion Resistant Construction
TEFC Fan Motors
Fan Cycling on Multi Fan Units
PVC Water Distribution System
Mechanical Water Make Up
Nema 4 Panel With 120 Volt Controls
PVC Eliminators
Stainless Steel Strainers
Closed Units
Centrifugal Spray Pump
Galvanized Steel Coils
Bleed Line
TEFC Spray Pump Motors

USEFUL FORMULAS AND INFORMATION

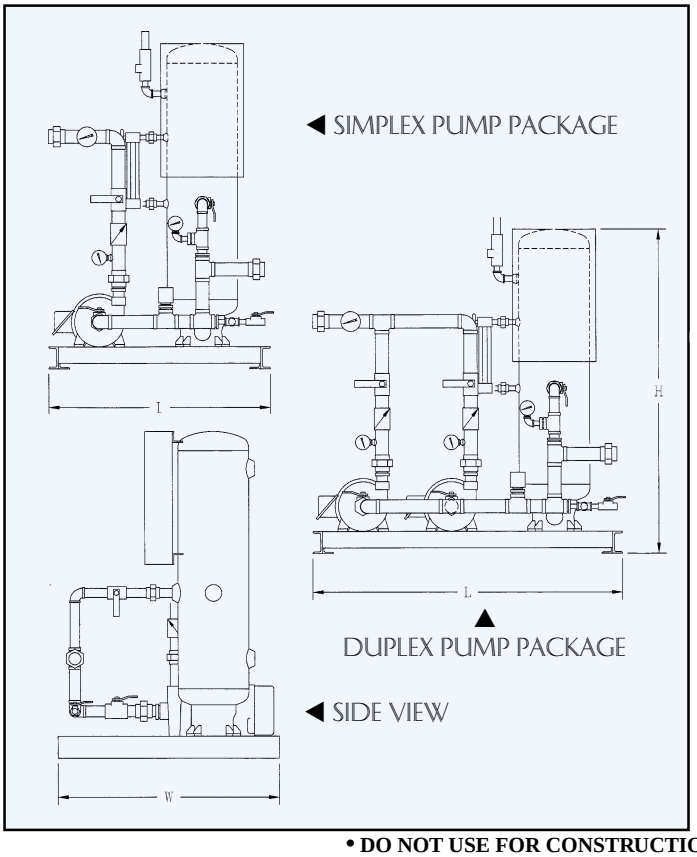
BTU = Energy required to raise one lb. of water 1°F

BTUH = 500 x TR x GPM
(TR = Temperature Rise, = Difference between entering and leaving fluid temperatures.)
(500 = 8.333 lbs. x 60 minutes)
(8.333 lbs. = weight of one gallon of water)

TR= BTUH ÷ (500 x GPM)

GPM = BTUH ÷ (500 x TR)

GPM is dictated by TR and BTUH and will vary from original equipment specifications when used at higher (fluid) operating temperatures.



BTUH =BHP x 2546.4 (SENSIBLE DUTY)
BHP x 15,000 (LATENT DUTY)
KVA x 3415
WATTS x 3.413
FT. POUNDS x 0.00128

One gallon of water = 8.333 pounds.

One pound of water = 11.99 % of one gallon.

Gallons = cubic feet x 7.4805

PSIG = 2.31 feet of water, (ΔP).

One foot of water = 0.4335 psig, (ΔP).

Evaporation rate is one pound of water per 1,000 btuh.
BTUH ÷ (1,000 x 60) x 0.1199 = GPM

% GLYCOL	FREEZE PROTECTION	CORRECTION FACTOR
10	+25°F	.984
20	+14°F	.968
30	+3°F	.938
40	-13°F	.891
50	-33°F	.856

PUMP PACKAGE DIMENSIONS* AND NOMINAL PERFORMANCE @ 100' TDH

PUMP HP	PIPE SIZE	NOM. GPM	SIMPLEX				DUPLEX			
			L	W	H	WT	L	W	H	WT
1	1½”	15	36”	36”	62”	430	56”	40”	62”	560
1½	1½”	25	36”	36”	62”	440	56”	40”	62”	580
2	1½”	40	36”	36”	62”	440	56”	40”	62”	580
3	2”	85	40”	40”	62”	500	56”	40”	62”	725
5	2”	120	40”	40”	62”	510	56”	40”	62”	745
5	3”	140	48”	48”	62”	635	66”	48”	62”	1190
7½	3”	175	48”	48”	62”	650	66”	48”	62”	1200
10	3”	250	48”	48”	62”	670	66”	48”	62”	1280
15	3”	285	54”	54”	62”	850	66”	54”	62”	1510
15	4”	350	60”	60”	62”	950	86”	60”	62”	1700
20	4”	425	60”	60”	62”	960	86”	60”	62”	1710
25	4”	500	60”	60”	62”	980	90”	64”	62”	1750
30	4”	600	64”	64”	62”	1000	90”	64”	62”	1800
30	6”	700	72”	80”	62”	1350	108”	72”	62”	2350
40	6”	900	72”	80”	62”	1390	108”	72”	62”	2390
50	6”	1200	78”	84”	62”	1460	120”	72”	62”	2510

• DO NOT USE FOR CONSTRUCTION. DIMENSIONS SUBJECT TO CHANGE
OTHER CONFIGURATIONS AND SIZES ARE AVAILABLE. CONSULT FACTORY.

CAPACITIES

OTHER STYLES, MODELS AND LARGER SIZES ARE AVAILABLE
SIZING MUST BE CONFIRMED FOR PERFORMANCE GUARANTEE ON ALL SELECTIONS

DRY FLUID COOLER

125°F TO 105°F 40% GLYCOL

CTD	15°F	10°F	5°F
DRY BULB	90°F	95°F	100°F
MODEL PFC	MBH GPM	MBH GPM	MBH GPM
0116	125 / 14	100 / 11	67 / 7
0216	251 / 28	200 / 22	137 / 15
0316	370 / 41	278 / 31	219 / 25
0232	350 / 39	248 / 28	88 / 10
0236	441 / 49	340 / 38	239 / 27
0332	551 / 62	421 / 47	276 / 31
0336	635 / 71	498 / 56	375 / 42
0432	773 / 87	589 / 66	409 / 46
0436	885 / 99	684 / 76	482 / 54
0532	955 / 107	764 / 86	521 / 58
0536	1134 / 127	880 / 98	607 / 68
0632	1104 / 124	855 / 96	554 / 62
0636	1269 / 142	995 / 111	750 / 84
0832	1544 / 173	1180 / 132	820 / 92
0836	1771 / 198	1367 / 153	964 / 108
0838	1901 / 213	1475 / 165	1048 / 117
1032	1911 / 214	1531 / 171	1040 / 116
1034	2087 / 233	1680 / 188	1142 / 128
1036	2271 / 254	1760 / 197	1212 / 136
1038	2441 / 273	1901 / 213	1318 / 147
1232	2356 / 264	1808 / 202	1297 / 145
1234	2366 / 266	1982 / 222	1432 /160
1236	2538 / 284	2165 / 242	1500 / 168
1238	2725 / 305	2216 / 248	1635 / 183

EVAPORATIVE FLUID COOLER

105°F TO 85° 40% GLYCOL

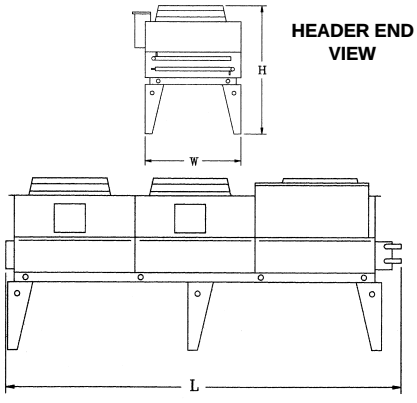
CTD	10°F	7°F	5°F
WET BULB	75°F	78°F	80°F
MODEL PEF	MBH GPM	MBH GPM	MBH GPM
0243	535 / 61	350 / 38	NA
0362	698 / 75	512 / 55	372 / 40
0363	797 / 86	592 / 64	427 / 46
0482	1078 / 116	811 / 87	567 / 61
0483	1219 / 131	952 / 102	677 / 73
0645	1486 / 160	1092 / 117	781 / 84
0646	1800 / 193	1353 / 145	962 / 103
0648	1908 / 205	1449 / 156	1036 / 111
0776	2063 / 222	1571 / 169	1119 / 120
0777	2189 / 235	1677 / 180	1217 / 131
0778	2454 / 264	1916 / 206	1416 / 152
0896	2795 / 300	2211 / 238	1627 / 175
0898	3246 / 349	2562 / 276	1938 / 208
1026	3481 / 374	2781 / 299	2129 / 229
1028	3621 / 389	2918 / 314	2264 / 244
1196	3866 / 416	3131 / 337	2434 / 262
1197	4021 / 432	3367 / 362	2582 / 278
1533	4324 / 465	3593 / 386	2771 / 298
1536	5047 / 574	4461 / 480	3459 / 393
1538	5726 / 650	5072 / 545	3950 / 449
1795	NA	5387 / 580	NA

OPEN TOWER

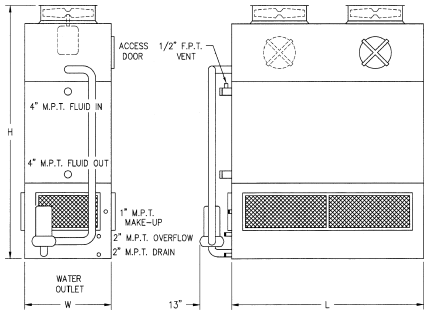
105°F TO 85°F WATER

CTD	10°F	7°F	5°F
WET BULB	75°F	78°F	80°F
MODEL ICT	MBH GPM	MBH GPM	MBH GPM
3-63	383 / 38	300 / 30	226 / 23
3-73	545 / 55	450 / 45	366 / 37
3-83	608 / 61	510 / 51	428 / 43
3-93	719 / 72	610 / 61	517 / 52
4-54	770 / 77	590 / 59	452 / 45
4-65	898 / 90	720 / 72	570 / 57
4-74	1013 / 101	820 / 82	670 / 67
4-84	1134 / 113	950 / 95	788 / 79
4-94	1327 / 132	1120 / 112	945 / 95
4-66	1501 / 150	1220 / 122	987 / 99
4-76	1688 / 169	1410 / 141	1169 / 117
4-86	1771 / 177	1460 / 146	1198 / 120
4-96	2017 / 201	1700 / 170	1435 / 144
4-59	2212 / 221	1800 / 180	1447 / 145
4-69	2359 / 236	1940 / 194	1590 / 159
4-79	2533 / 253	2090 / 209	1701 / 170
4-89	2690 / 269	2230 / 223	1843 / 184
4-99	2818 / 282	2370 / 237	1982 / 198
4-612	3002 / 300	2450 / 245	1969 / 197
4-712	3399 / 340	2840 / 284	2352 / 235
4-812	3777 / 378	3140 / 314	2607 / 260
4-912	3947 / 395	3330 / 333	2791 / 279

PFC



PEF



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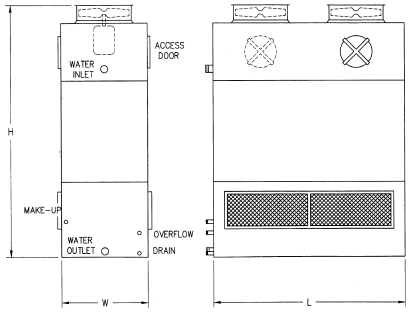

PFC	FAN / HP	L	W	H	WT
0116	1 / ½	40"	44"	58"	180
0216	2 / ½	75"	44"	58"	360
0316	3 / ½	111"	44"	58"	540
0232	2 / 1	112"	48"	58"	850
0236	2 / 1	112"	48"	58"	1050
0332	3 / 1	166"	48"	58"	1200
0336	3 / 1	166"	48"	58"	1500
0432	4 / 1	220"	48"	58"	1800
0436	4 / 1	220"	48"	58"	2150
0532	5 / 1	274"	48"	58"	2250
0536	5 / 1	274"	48"	58"	2675
0632	6 / 1	166"	96"	58"	2280
0636	6 / 1	166"	96"	58"	2750
0832	8 / 1	220"	96"	58"	2950
0836	8 / 1	220"	96"	58"	3500
1032	10 / 1	274"	96"	58"	3700
1036	10 / 1	274"	96"	58"	4400
1232	12 / 1	328"	96"	58"	4350
1236	12 / 1	328"	96"	58"	5250
1238	12 / 1	328"	96"	58"	5430

PEF	FAN-SPRAY HP	L	W	H	WT
0243	5 / ¾	72"	49"	117"	5390
0362	(2) 3 / 1	108"	49"	109"	6900
0363	(2) 3 / 1	108"	49"	117"	7780
0482	(2) 5 / 1½	144"	49"	102"	7910
0483	(2) 5 / 1½	144"	49"	109"	9080
0645	10 / 2	102"	90"	134"	12070
0646	15 / 2	102"	90"	142"	13590
0648	15 / 2	102"	90"	149"	15180
0776	15 / 2	108"	102"	150"	16090
0777	15 / 2	108"	102"	158"	17900
0778	20 / 2	108"	102"	158"	17950
0896	20 / 3	126"	102"	150"	18700
0898	25 / 3	126"	102"	158"	20840
1026	25 / 3	144"	102"	154"	20820
1028	25 / 3	144"	102"	162"	23240
1196	25 / 3	168"	102"	154"	22940
1197	25 / 3	168"	102"	168"	26690
1533	(2) 10 / 5	216"	102"	151"	27830
1536	(2) 10 / 5	216"	102"	146"	31470
1538	(2) 10 / 5	216"	102"	154"	21080
1795	(2) 15 / 7½	252"	102"	158"	36210

ICT	FAN/HP	L	W	H	WT
3-63	1	3' 1"	3'	6' 2"	880
3-73	1	3' 1"	3'	7' 2"	920
3-83	1	3' 1"	3'	8' 2"	970
3-93	1½	3' 1"	3'	8' 2"	990
4-54	2	4' 1"	4'	7' 7"	1510
4-64	2	4' 1"	4'	8' 7"	1570
4-74	2	4' 1"	4'	8' 7"	1590
4-84	2	4' 1"	4'	9' 7"	1670
4-94	3	4' 1"	4'	9' 7"	1720
4-66	3	4' 1"	6'	8' 7"	2390
4-76	3	4' 1"	6'	9' 7"	2500
4-86	5	4' 1"	6'	8' 7"	2430
4-96	5	4' 1"	6'	9' 7"	2550
4-59	(2)-2	4' 1"	9'	8' 7"	3510
4-69	(2)-2	4' 1"	9'	9' 7"	3620
4-79	(2)-3	4' 1"	9'	8' 7"	3560
4-89	(2)-3	4' 1"	9'	9' 7"	3670
4-99	(2)-3	4' 1"	9'	9' 7"	3720
4-612	(2)-3	4' 1"	12'	8' 7"	4630
4-712	(2)-3	4' 1"	12'	9' 7"	4730
4-812	(2)-5	4' 1"	12'	9' 7"	4780
4-912	(2)-5	4' 1"	12'	9' 7"	4910

INDUSTRIAL COOLING SYSTEMS

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