

Refrigeration Product & Application Catalog

FlatPlate[®] by GEA PHE Systems

- DX Evaporators
- Condensers
- DX Subcoolers
- Heat Pumps
- Liquid to Liquid Cooling
- Special Applications
- Shell-and-Tube Replacement



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FlatPlateSelect™ Free Online Selection Software

Application

Although the selections in this catalog cover the common design situations, there may be times when you have a less common design, or you may need submittal sheets. All of this is available at www.flatplateselect.com.

The FlatPlate Advantage.

- Simple. No training needed.
- Free. No Fees. Just sign in and use it.
- Flexible. Save your selections, print them, and come back later to modify them.
- Accessible. Always on, 24/7.



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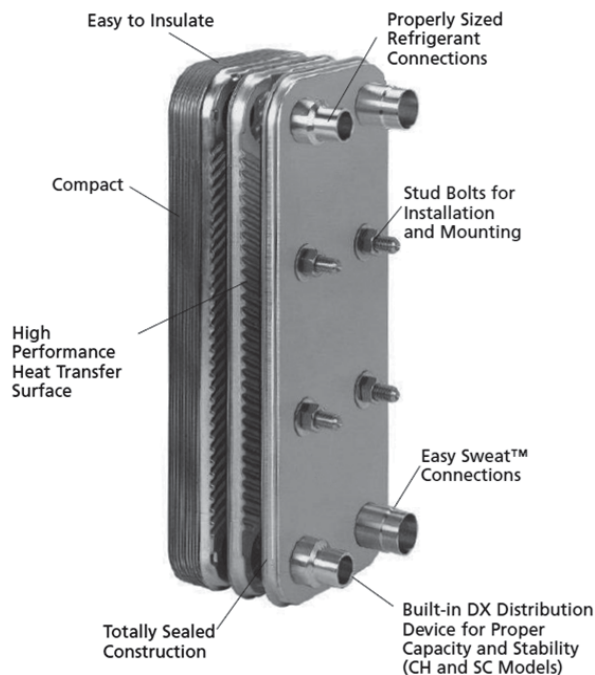
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Refrigeration Heat Exchangers



What Makes FlatPlate Heat Exchangers Work So Well?

FlatPlate brazed plate heat exchangers consist of a series of specially formed stainless steel plates, which are then brazed together in a vacuum furnace for leak-tight, rugged construction.

When stacked, the plates form two separate flow passages between the plates, thus allowing a fluid or gas to flow between every other plate.

This provides heat transfer and complete separation of the two media.

With FlatPlate's high performance heat transfer surface, a very compact, cost effective design is the result.

"FlatPlate" is a registered trademark of GEA North America Inc.

Easy to Select

- Refer to the pages that follow for the full range of operating conditions.
- For more detailed operating conditions, go to www.flatplateselect.com

Easy To Install

- Mounting studs allow the use of mounting brackets to hold the unit in place while you pipe it up.
- Compact size means it fits easily into confined spaces, especially when replacing a much larger shell-and-tube heat exchanger.
- Insulation is a snap with our tools-free insulation kits.

High Performance

- High turbulence created by corrugations in the plates result in closer approach temperatures with much smaller units.
- Fully brazed construction handles high operating pressures.
- Choice of brazing materials (copper or nickel-chrome) broadens the range of media possible.
- Choice of plate material (*316L or marine grade stainless steel) means you can pick the right heat exchanger for your applications, not a "good enough" heat exchanger.

Proven and Reliable

- Easily complies with requirements of UL, CE and ASME Section VIII (UM-tamp)
- CRN (Canadian Registration Number) optional.
- Every heat exchanger is tested before it leaves our plant.

Here are the many FlatPlate Applications:

Water Chillers for:

- Comfort Cooling Air Conditioning Systems
- Comfort Heating/Cooling Heat Pumps
- Computer Room Systems
- Ships & Yachts

Process Chillers for:

- Machine Cooling
- MRI/X-Ray Machines
- Lasers
- Plastics Injection Mold

- Cooling
- Food Process
- Semi-Conductor systems
- De-ionized Water Chilling
- Laboratory Chillers

Glycol Chillers for:

- Low Temperatures Processes
- Food Processes
- Printing Presses
- Ice Rinks
- Special Processes

Economizers/Subcoolers

- DX Refrigerant to Refrigerant

Supermarket Systems

- Subcoolers
- Liquid Coolers
- Condensers

Ice Making Machines

- Condensers
- Pre-Coolers

Environmental Chambers

- Cascade Condensers
- Desuperheaters

Compressed Air & Gas Driers

- Refrigerant to Gas
- Gas to Gas Re-heater

Hydraulic Oil Cooling

- Refrigerant to Oil
- Oil to Water

Hydrocarbon Processing

- Condensers
- Evaporators/Chillers

Beverage, Beer & Wine

- Cooling
- Glycol to Liquid

Swimming Pool Heating/Cooling

- Heating
- Cooling

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Direct Expansion (DX) Evaporators for Operating Pressures up to 450 psig

The FlatPlate Advantage:

FlatPlate CH series DX Evaporators offer a cost effective alternative to conventional "chiller barrels" and other liquid chiller designs.

The CH Series is designed specifically for DX water chilling and liquid cooling applications that use R-22, R-134a, R404a, R407c and other halocarbon refrigerants.

The advantages of FlatPlate CH series DX evaporators include their compact size and lighter weight, which reduce shipping and installation costs.

Construction:

- Copper brazed 316L stainless steel plates.
- Maximum Allowable Working Pressure is 450 psig (45 barg)
- Mounting Studs included as standard for use with optional Mounting Bracket.

Code Approvals:

- UL Listed as standard
- ASME Code Stamp available on request.
- CE-PED available on request.
- CRN available on request.

Selection Notes:

Unit selections are based on the following conditions of service:

- Nominal tons: 12,000 BTUH/ton
- 54°F Entering Water Temperature (EWT)
- 44°F Leaving Water Temperature (LWT)
- 35°F Evaporating Temperature
- 8°F Superheat
- 2.4 gpm/ton
- R22 refrigerant

If your conditions vary significantly from these, you can select a heat exchanger to your exact conditions using FlatPlateSelect.

Nom. Tons	Model	Dimensions			Connections			Weight (lbs.)	Accessories for Better Performance	
		Width	Length	Depth	Ref OUT	Ref IN	Liquid		Insulation Kit	Mounting Bracket
1/2	CH1/2AG	5.1"	13.3"	1.1"	5/8" IDS	5/8" IDS	7/8" IDS	6	133001627	BKT5X12
3/4	CH3/4AG	5.1"	13.3"	1.3"	5/8" IDS	5/8" IDS	7/8" IDS	7	133001627	BKT5X12
1	CH1AG	5.1"	13.3"	1.5"	5/8" IDS	5/8" IDS	7/8" IDS	7	133001628	BKT5X12
1-1/2	CH1-1/2AG	5.1"	13.3"	1.8"	5/8" IDS	5/8" IDS	7/8" IDS	8	133001628	BKT5X12
2	CH2AG	5.1"	13.3"	2.2"	5/8" IDS	5/8" IDS	7/8" IDS	10	133001628	BKT5X12
2-1/2	CH2-1/2AG	5.1"	13.3"	2.5"	5/8" IDS	5/8" IDS	7/8" IDS	11	133001629	BKT5X12
3	CH3AG	5.1"	13.3"	3.0"	5/8" IDS	5/8" IDS	7/8" IDS	13	133001629	BKT5X12
3-1/2	CH3-1/2AG	5.1"	13.3"	3.6"	7/8" IDS	5/8" IDS	7/8" IDS	14	133001630	BKT5X12
4	CH4AG	5.1"	13.3"	4.3"	7/8" IDS	5/8" IDS	1-1/8" IDS	17	133001631	BKT5X12
5	CH5AG	5.1"	13.3"	5.2"	7/8" IDS	5/8" IDS	1-1/8" IDS	20	133001632	BKT5X12
6	CH6G	5.1"	21.1"	3.0"	1-1/8" IDS	7/8" IDS	1-1/8" IDS	20	133001650	BKT5X20
7-1/2	CH7-1/2G	5.1"	21.1"	3.9"	1-1/8" IDS	7/8" IDS	1-1/8" IDS	25	133001651	BKT5X20
10	CH10G	11.1"	21.4"	3.0"	1-3/8" IDS	7/8" IDS	1-5/8" IDS	55	133001670	BKT10X20S
12	CH12G	11.1"	21.4"	3.6"	1-3/8" IDS	7/8" IDS	1-5/8" IDS	62	133001670	BKT10X20S
15	CH15G	11.1"	21.4"	4.6"	1-3/8" IDS	7/8" IDS	1-5/8" IDS	73	133001671	BKT10X20S
20	CH20G	11.1"	21.4"	5.7"	1-5/8" IDS	7/8" IDS	1-5/8" IDS	84	133001672	BKT10X20S
25	CH25G	11.1"	21.4"	6.7"	1-5/8" IDS	1-1/8" IDS	2-1/8" IDS	95	133001673	BKT10X20S
30	CH30G	11.1"	21.4"	7.7"	2-1/8" IDS	1-1/8" IDS	2-1/8" IDS	106	133001674	BKT10X20S
35	CH35G	11.1"	21.4"	9.8"	2-1/8" IDS	1-1/8" IDS	2-5/8" IDS	128	133001676	BKT10X20S
40	CH40G	11.1"	21.4"	10.9"	2-1/8" IDS	1-1/8" IDS	2-5/8" IDS	139	133001677	BKT10X20L
50	CH50G	11.1"	21.4"	14.0"	2-5/8" IDS	1-1/8" IDS	2-5/8" IDS	172	133001734	BKT10X20L
60	CH60G	11.1"	21.4"	16.1"	2-5/8" IDS	1-1/8" IDS	2-5/8" IDS	194	133001736	BKT10X20L
70	CH70G	11.1"	21.4"	18.1"	2-5/8" IDS	1-1/8" IDS	2-5/8" IDS	216	133001739	BKT10X20L
80	CH80G	11.1"	21.4"	20.2"	2-5/8" IDS	1-1/8" IDS	2-5/8" IDS	238	133001741	BKT10X20L

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Direct Expansion (DX) Evaporators for Operating Pressures up to 650 psig

The FlatPlate Advantage:

FlatPlate CH-XP Series DX Evaporators are a cost effective alternative to conventional "chiller barrels" and other liquid chiller designs. The CH Series is designed specifically for DX water chilling and liquid cooling applications that use R410a refrigerant.

They are smaller and lighter, reducing shipping and installation costs.

Mounting studs (standard on every unit) allow the use of mounting brackets to make installation fast and easy.

Construction:

- Copper brazed 316L stainless steel plates.
- Mounting Studs included as standard for use with Mounting Bracket.
- Maximum Allowable Working Pressure is 650 psig.

Code Approvals:

- UL Listed as standard
- ASME Code Stamp optional
- CE-PED optional
- CRN optional

Selection Notes:

Unit selections are based on the following conditions of service:

- Nominal tons: 12,000 BTUH/ton
- Nominal tons: 12,000 BTUH/ton
- 54°F Entering Water Temperature (EWT)
- 44°F Leaving Water Temperature (LWT)
- 35°F Evaporating Temperature
- 8°F Superheat
- 2.4 gpm/ton
- R410a refrigerant

If your conditions vary significantly from these, you can select a heat exchanger to your exact conditions using FlatPlateSelect.

Nom. Tons	Model	Dimensions			Connections			Weight (lbs.)	Accessories for Better Performance	
		Width	Length	Depth	Ref OUT	Ref IN	Liquid		Insulation Kit	Mounting Bracket
1/2	CH1/2A-XP	4.9"	12.2"	1.2"	5/8" IDS	5/8" IDS	7/8" IDS	16	133001617	BKT5X12
3/4	CH3/4A-XP	4.9"	12.2"	1.4"	5/8" IDS	5/8" IDS	7/8" IDS	17	133001617	BKT5X12
1	CH1A-XP	4.9"	12.2"	1.6"	5/8" IDS	5/8" IDS	7/8" IDS	18	133001618	BKT5X12
1-1/2	CH1-1/2A-XP	4.9"	12.2"	1.9"	5/8" IDS	5/8" IDS	7/8" IDS	19	133001618	BKT5X12
2	CH2A-XP	4.9"	12.2"	2.3"	5/8" IDS	5/8" IDS	7/8" IDS	20	133001618	BKT5X12
2-1/2	CH2-1/2A-XP	4.9"	12.2"	2.6"	5/8" IDS	5/8" IDS	7/8" IDS	22	133001619	BKT5X12
3	CH3A-XP	4.9"	12.2"	3.2"	5/8" IDS	5/8" IDS	7/8" IDS	23	133001619	BKT5X12
3-1/2	CH3-1/2A-XP	4.9"	12.2"	3.7"	5/8" IDS	5/8" IDS	7/8" IDS	25	133001620	BKT5X12
4	CH4A-XP	4.9"	12.2"	4.4"	7/8" IDS	5/8" IDS	1-1/8" IDS	28	133001621	BKT5X12
5	CH5A-XP	4.9"	12.2"	5.3"	7/8" IDS	5/8" IDS	1-1/8" IDS	31	133001622	BKT5X12
6	CH6-XP	5.0"	20.3"	3.2"	1-1/8" IDS	7/8" IDS	1-1/8" IDS	40	133001640	BKT5X20
7-1/2	CH7-1/2-XP	5.0"	20.3"	4.1"	1-1/8" IDS	7/8" IDS	1-1/8" IDS	45	133001641	BKT5X20
10	CH10-XP	9.8"	20.3"	2.6"	1-3/8" IDS	7/8" IDS	1-5/8" IDS	81	133001660	BKT10X20S
12	CH12-XP	9.8"	20.3"	3.2"	1-3/8" IDS	7/8" IDS	1-5/8" IDS	87	133001660	BKT10X20S
15	CH15-XP	9.8"	20.3"	4.1"	1-3/8" IDS	7/8" IDS	1-5/8" IDS	97	133001661	BKT10X20S
20	CH20-XP	9.8"	20.3"	5.0"	1-5/8" IDS	7/8" IDS	1-5/8" IDS	107	133001662	BKT10X20S
25	CH25-XP	9.8"	20.3"	5.9"	1-5/8" IDS	1-1/8" IDS	2-1/8" IDS	117	133001663	BKT10X20S
30	CH30-XP	9.8"	20.3"	6.8"	2-1/8" IDS	1-1/8" IDS	2-1/8" IDS	128	133001664	BKT10X20S
35	CH35-XP	9.8"	20.3"	8.6"	2-1/8" IDS	1-1/8" IDS	2-5/8" IDS	148	133001666	BKT10X20S
40	CH40-XP	9.8"	20.3"	9.5"	2-1/8" IDS	1-1/8" IDS	2-5/8" IDS	158	133001667	BKT10X20S
50	CH50-XP	9.8"	20.3"	12.2"	2-5/8" IDS	1-1/8" IDS	2-5/8" IDS	189	133001721	BKT10X20L
60	CH60-XP	9.8"	20.3"	14.0"	2-5/8" IDS	1-1/8" IDS	2-5/8" IDS	209	133001723	BKT10X20L
70	CH70-XP	9.8"	20.3"	15.8"	2-5/8" IDS	1-1/8" IDS	2-5/8" IDS	230	133001725	BKT10X20L
80	CH80-XP	9.8"	20.3"	17.6"	2-5/8" IDS	1-1/8" IDS	2-5/8" IDS	250	133001727	BKT10X20L

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Two-Circuit DX Evaporators for Operating Pressures up to 450 psig

The FlatPlate Advantage:

The 2C series offers the most advanced and cost effective heat exchanger solution for 2-compressor package chillers and shell-and-tube replacement.

The 2C Series is designed for R22, R407C, R134a, R404A and other halocarbon refrigerants for DX evaporator, condenser, and heat pump operation.

Two refrigerant circuits are "interlaced" with the liquid side, such that 100% of the liquid is cooled even when only one compressor is operating.

Construction Notes:

- Copper brazed, 316L stainless steel plates.
- Mounting Studs included as standard for use with Mounting Bracket.
- All models include two 1/2" FPT waterside temperature probe connections.
- Refrigerant side is rated to 450 psig, and liquid side is rated to 350 psig.

Code Approvals:

- UL Listed as standard
- ASME Code Stamp optional
- CE-PED optional
- CRN optional

Selection Notes:

Unit selections are based on the following conditions of service:

- Nominal tons: 12,000 BTUH/ton
- 54°F Entering Water Temperature (EWT)
- 44°F Leaving Water Temperature (LWT)
- 35°F Evaporating Temperature
- 8°F Superheat
- 2.4 gpm/ton
- R22 refrigerant

If your conditions vary significantly from these, you can select a heat exchanger to your exact conditions using FlatPlateSelect.

Nom. Tons	Model	Dimensions			Connections			Weight (lbs.)	Accessories for Better Performance	
		Width	Length	Depth	Ref OUT	Ref IN	Liquid		Insulation Kit	Mounting Bracket
3	CH3-2C	9.8"	20.3"	1.5"	7/8" IDS	5/8" IDS	1" MPT	47	133001690	BKT10X20S
5	CH5-2C	9.8"	20.3"	1.8"	7/8" IDS	5/8" IDS	1" MPT	52	133001691	BKT10X20S
6	CH6-2C	9.8"	20.3"	2.2"	7/8" IDS	5/8" IDS	1" MPT	56	133001691	BKT10X20S
8	CH8-2C	9.8"	20.3"	2.5"	7/8" IDS	5/8" IDS	1" MPT	60	133001692	BKT10X20S
10	CH10-2C	9.8"	20.3"	2.9"	1-1/8" IDS	7/8" IDS	1-1/2" MPT	64	133001692	BKT10X20S
12	CH12-2C	9.8"	20.3"	3.3"	1-1/8" IDS	7/8" IDS	1-1/2" MPT	68	133001692	BKT10X20S
15	CH15-2C	9.8"	20.3"	4.0"	1-1/8" IDS	7/8" IDS	1-1/2" MPT	77	133001693	BKT10X20S
20	CH20-2C	9.8"	20.3"	5.1"	1-3/8" IDS	7/8" IDS	1-1/2" MPT	89	133001694	BKT10X20S
25	CH25-2C	9.8"	20.3"	6.1"	1-3/8" IDS	7/8" IDS	2" MPT	102	133001696	BKT10X20S
30	CH30-2C	9.8"	20.3"	7.2"	1-3/8" IDS	7/8" IDS	2" MPT	115	133001697	BKT10X20S
35	CH35-2C	9.8"	20.3"	8.7"	1-3/8" IDS	7/8" IDS	2" MPT	131	133001698	BKT10X20S
40	CH40-2C	9.8"	20.3"	9.7"	1-5/8" IDS	7/8" IDS	2-1/2" MPT	144	133001745	BKT10X20L
50	CH50-2C	9.8"	20.3"	12.3"	1-5/8" IDS	1-1/8" IDS	2-1/2" MPT	173	133001747	BKT10X20L
60	CH60-2C	9.8"	20.3"	14.1"	2-1/8" IDS	1-1/8" IDS	2-1/2" MPT	194	133001750	BKT10X20L
70	CH70-2C	9.8"	20.3"	15.9"	2-1/8" IDS	1-1/8" IDS	2-1/2" MPT	215	133001752	BKT10X20L
80	CH80-2C	9.8"	20.3"	18.4"	2-1/8" IDS	1-1/8" IDS	2-1/2" MPT	245	133001754	BKT10X20L

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Two-Circuit DX Evaporators for Operating Pressures up to 650 psig

The FlatPlate Advantage:

The CH-2C-XP series offers the most advanced and cost effective heat exchanger solution for higher pressure 2-compressor package chillers and shell-and-tube replacements.

The CH-2C-XP Series is designed for R410a and other refrigerants that require elevated pressures for DX evaporator operation.

Construction Notes:

- Copper brazed, 316L stainless steel plates.
- Mounting Studs included as standard for use with optional Mounting Bracket.
- All models include two 1/2" FPT waterside temperature probe connections.
- Refrigerant side is rated to 650 psig, and liquid side is rated to 350 psig.

Code Approvals:

- UL Listed as standard
- ASME Code Stamp optional
- CE-PED optional
- CRN optional

Selection Notes:

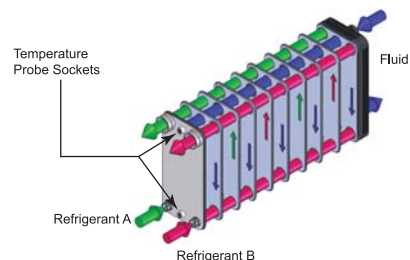
Unit selections are based on the following conditions of service:

- Nominal tons: 12,000 BTUH/ton
- 54°F Entering Water Temperature (EWT)
- 44°F Leaving Water Temperature (LWT)
- 35°F Evaporating Temperature
- 8°F Superheat
- 2.4 gpm/ton
- R410a refrigerant

If your conditions vary significantly from these, you can select a heat exchanger to your exact conditions using FlatPlateSelect.

How does the 2C work?

- The 2C has two independent refrigerant circuits, one on the left front side and one on the right front side of the unit.
- The fluid side connections are on the reverse side for easier access.
- Temperature probe sockets (1/2" FPT) are built in on the front for convenient and accurate temperature measurement.
- Operation is based on the principle of having the two refrigerants "interlaced" between the fluid circuits, thus allowing full 100% refrigerant contact with the fluid side.
- So when only one compressor operates, 100% of the fluid is being chilled.



Nom. Tons	Model	Dimensions			Connections			Weight (lbs.)	Accessories for Better Performance	
		Width	Length	Depth	Ref OUT	Ref IN	Liquid		Insulation Kit	Mounting Bracket
3	CH3-2C-XP	9.8"	20.3"	1.4"	7/8" IDS	5/8" IDS	1" MPT	75	133001690	BKT10X20S
5	CH5-2C-XP	9.8"	20.3"	1.7"	7/8" IDS	5/8" IDS	1" MPT	79	133001691	BKT10X20S
6	CH6-2C-XP	9.8"	20.3"	2.1"	7/8" IDS	5/8" IDS	1" MPT	83	133001691	BKT10X20S
8	CH8-2C-XP	9.8"	20.3"	2.5"	7/8" IDS	5/8" IDS	1" MPT	87	133001692	BKT10X20S
10	CH10-2C-XP	9.8"	20.3"	2.8"	1-1/8" IDS	7/8" IDS	1-1/2" MPT	91	133001692	BKT10X20S
12	CH12-2C-XP	9.8"	20.3"	3.2"	1-1/8" IDS	7/8" IDS	1-1/2" MPT	95	133001692	BKT10X20S
15	CH15-2C-XP	9.8"	20.3"	3.9"	1-1/8" IDS	7/8" IDS	1-1/2" MPT	104	133001693	BKT10X20S
20	CH20-2C-XP	9.8"	20.3"	5.0"	1-3/8" IDS	7/8" IDS	1-1/2" MPT	116	133001694	BKT10X20S
25	CH25-2C-XP	9.8"	20.3"	6.1"	1-3/8" IDS	7/8" IDS	2" MPT	128	133001696	BKT10X20S
30	CH30-2C-XP	9.8"	20.3"	7.1"	1-3/8" IDS	7/8" IDS	2" MPT	140	133001697	BKT10X20S
35	CH35-2C-XP	9.8"	20.3"	8.6"	1-3/8" IDS	7/8" IDS	2" MPT	157	133001698	BKT10X20S
40	CH40-2C-XP	9.8"	20.3"	9.7"	1-5/8" IDS	7/8" IDS	2-1/2" MPT	169	133001745	BKT10X20L
50	CH50-2C-XP	9.8"	20.3"	12.2"	1-5/8" IDS	1-1/8" IDS	2-1/2" MPT	197	133001747	BKT10X20L
60	CH60-2C-XP	9.8"	20.3"	14.0"	2-1/8" IDS	1-1/8" IDS	2-1/2" MPT	218	133001750	BKT10X20L
70	CH70-2C-XP	9.8"	20.3"	15.8"	2-1/8" IDS	1-1/8" IDS	2-1/2" MPT	238	133001752	BKT10X20L
80	CH80-2C-XP	9.8"	20.3"	18.3"	2-1/8" IDS	1-1/8" IDS	2-1/2" MPT	267	133001754	BKT10X20L

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Industrial Direct Expansion (DX) Evaporators

The FlatPlate Advantage:

The CHN series all stainless, proprietary nickel-chrome brazed models are industry standards for de-ionized water, solvents and liquids not compatible with copper. They are fully compatible with halocarbon refrigerants, such as R22, R134a, R404A and R407C. Compact and flexible in design, they are a versatile solution for problematic media.

Construction Notes:

- 316L stainless steel plates
- Proprietary nickel-chrome brazing.
- Mounting Studs included as standard for use with optional Mounting Bracket.

- 304 stainless steel connections.
- Refrigerant connections are sweat fittings.
- Liquid connections are Male Pipe Thread (MPT).
- Maximum Allowable Working Pressure is 300 psig (20.7 barg)

Code Approvals:

- UL Listed as standard
- ASME Code Stamp optional
- CE-PED optional
- CRN optional

Selection Notes:

Unit selections shown are based on the following conditions of service:

- Nominal tons: 12,000 BTUH/ton
- 54°F Entering Water Temperature (EWT)
- 44°F Leaving Water Temperature (LWT)
- 35°F Evaporating Temperature 8oF Superheat
- 2.4 gpm/ton
- R22 refrigerant

If your conditions vary significantly from these, you can select a heat exchanger to your exact conditions using FlatPlateSelect.

Nom. Tons	Model	Dimensions			Connections			Weight (lbs.)	Accessories for Better Performance	
		Width	Length	Depth	Ref OUT	Ref IN	Liquid		Insulation Kit	Mounting Bracket
1/2	CHN1/2A (1" MPT)	4.9"	12.2"	1.1"	5/8" IDS	5/8" IDS	1" MPT	5	133001617	BKT5X12
3/4	CHN3/4A (1" MPT)	4.9"	12.2"	1.3"	5/8" IDS	5/8" IDS	1" MPT	6	133001617	BKT5X12
1	CHN1A (1" MPT)	4.9"	12.2"	1.4"	5/8" IDS	5/8" IDS	1" MPT	6	133001618	BKT5X12
1-1/2	CHN1-1/2A (1" MPT)	4.9"	12.2"	1.8"	5/8" IDS	5/8" IDS	1" MPT	8	133001618	BKT5X12
2	CHN2A (1" MPT)	4.9"	12.2"	2.2"	5/8" IDS	5/8" IDS	1" MPT	9	133001618	BKT5X12
2-1/2	CHN2-1/2A (1" MPT)	4.9"	12.2"	2.5"	5/8" IDS	5/8" IDS	1" MPT	10	133001619	BKT5X12
3	CHN3A (1" MPT)	4.9"	12.2"	3.1"	5/8" IDS	5/8" IDS	1" MPT	12	133001619	BKT5X12
3-1/2	CHN3-1/2A (1" MPT)	4.9"	20.3"	3.6"	5/8" IDS	5/8" IDS	1" MPT	14	133001620	BKT5X12
4	CHN4A (1" MPT)	4.9"	12.2"	4.3"	7/8" IDS	5/8" IDS	1" MPT	17	133001621	BKT5X12
5	CHN5A (1" MPT)	4.9"	12.2"	5.2"	7/8" IDS	5/8" IDS	1" MPT	20	133001622	BKT5X12
6	CHN6 (1-1/4" MPT)	5.0"	20.3"	3.1"	1-1/8" IDS	7/8" IDS	1-1/4" MPT	21	133001640	BKT5X20
7-1/2	CHN7-1/2 (1-1/4" MPT)	5.0"	20.3"	4.0"	1-1/8" IDS	7/8" IDS	1-1/4" MPT	27	133001641	BKT5X20
10	CHN10 (1-1/2" MPT)	9.8"	20.3"	2.5"	1-3/8" IDS	7/8" IDS	1-1/2" MPT	48	133001660	BKT10X20S
12	CHN12 (1-1/2" MPT)	9.8"	20.3"	3.1"	1-3/8" IDS	7/8" IDS	1-1/2" MPT	54	133001660	BKT10X20S
15	CHN15 (1-1/2" MPT)	9.8"	20.3"	4.0"	1-3/8" IDS	7/8" IDS	1-1/2" MPT	64	133001661	BKT10X20S
20	CHN20 (1-1/2" MPT)	9.8"	20.3"	4.9"	1-5/8" IDS	7/8" IDS	1-1/2" MPT	74	133001662	BKT10X20S
25	CHN25 (2" MPT)	9.8"	20.3"	5.8"	1-5/8" IDS	1-1/8" IDS	2" MPT	85	133001663	BKT10X20S
30	CHN30 (2" MPT)	9.8"	20.3"	6.7"	2-1/8" IDS	1-1/8" IDS	2" MPT	95	133001664	BKT10X20S
35	CHN35 (2-1/2" MPT)	9.8"	20.3"	8.5"	2-1/8" IDS	1-1/8" IDS	2-1/2" MPT	115	133001666	BKT10X20S
40	CHN40 (2-1/2" MPT)	9.8"	20.3"	9.4"	2-1/8" IDS	1-1/8" IDS	2-1/2" MPT	125	133001667	BKT10X20S
50	CHN50 (2-1/2" MPT)	9.8"	20.3"	12.1"	2-5/8" IDS	1-3/8" IDS	2-1/2" MPT	156	133001721	BKT10X20L
60	CHN60 (2-1/2" MPT)	9.8"	20.3"	13.9"	2-5/8" IDS	1-3/8" IDS	2-1/2" MPT	176	133001723	BKT10X20L
70	CHN70 (2-1/2" MPT)	9.8"	20.3"	15.7"	2-5/8" IDS	1-3/8" IDS	2-1/2" MPT	197	133001725	BKT10X20L
80	CHN80 (2-1/2" MPT)	9.8"	20.3"	17.5"	2-5/8" IDS	1-3/8" IDS	2-1/2" MPT	217	133001727	BKT10X20L

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Manifolded Direct Expansion (DX) Evaporators up to 160 tons

The FlatPlate Advantage:

For 80-160 ton chiller applications, the CH-M Series is the most compact design available for new system designs and is ideal for shell-and-tube replacements. Comprised of two heat exchangers with a large common liquid side manifold, the CH-M Series can be ordered configured for single, dual or quad refrigerant circuits.

Construction Notes:

- Copper brazed, 316L stainless steel plates.
- Refrigerant connections are sweat solder.
- Liquid side manifold and flange connections are carbon steel, with optional stainless steel for potable water applications.
- Refrigerant side is rated to 450 psig, and liquid side is rated to 150 psig.
- Higher pressure ratings are available on request.

Code Approvals:

- UL Listed as standard
- ASME Code Stamp optional
- CE-PED optional
- CRN optional

Selection Notes:

Unit selections are based on the following conditions of service:

- Nominal tons: 12,000 BTUH/ton
- 54°F Entering Water Temperature (EWT)
- 44°F Leaving Water Temperature (LWT)
- 35°F Evaporating Temperature
- 8°F Superheat
- 2.4 gpm/ton
- R22 refrigerant

If your conditions vary significantly from these, you can select a heat exchanger to your exact conditions using FlatPlateSelect.

Single Circuit Evaporators

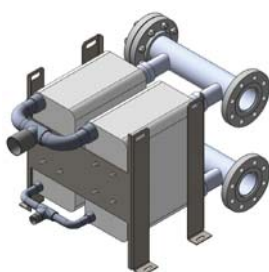
Tons	Model	Dimensions			Connections			Weight (lbs.)
		Width	Length	Depth	Ref Out	Ref In	Liquid	
80	CH80M-1C	28.7"	28.4"	36.9"	2-5/8" IDS	1-5/8" IDS	4" FLG	446
100	CH100M-1C	28.7"	28.4"	39.6"	3-1/8" IDS	2-1/8" IDS	4" FLG	508
120	CH120M-1C	28.7"	28.4"	41.4"	3-1/8" IDS	2-1/8" IDS	4" FLG	549
140	CH140M-1C	28.7"	28.4"	43.2"	3-5/8" IDS	2-5/8" IDS	4" FLG	590
160	CH160M-1C	28.7"	28.4"	45.0"	3-5/8" IDS	2-5/8" IDS	4" FLG	630

Dual Circuit Evaporators

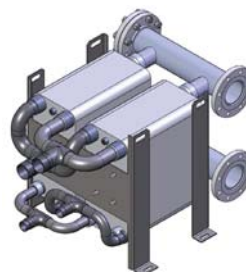
80	CH80M-2C	25.5"	28.4"	38.2"	2-1/8" IDS	1-1/8" IDS	4" FLG	496
100	CH100M-2C	25.5"	28.4"	40.8"	2-1/8" IDS	1-1/8" IDS	4" FLG	554
120	CH120M-2C	25.5"	28.4"	42.6"	2-5/8" IDS	1-3/8" IDS	4" FLG	596
140	CH140M-2C	25.5"	28.4"	44.4"	2-5/8" IDS	1-5/8" IDS	4" FLG	638
160	CH160M-2C	25.5"	28.4"	46.9"	2-5/8" IDS	1-5/8" IDS	4" FLG	698

Quad Circuit Evaporators

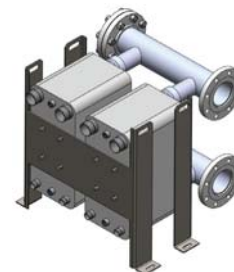
80	CH80M-4C	25.5"	28.4"	25.2"	1-5/8" IDS	1-1/8" IDS	4" FLG	472
100	CH100M-4C	25.5"	28.4"	27.8"	1-5/8" IDS	1-1/8" IDS	4" FLG	530
120	CH120M-4C	25.5"	28.4"	29.6"	2-1/8" IDS	1-1/8" IDS	4" FLG	572
140	CH140M-4C	25.5"	28.4"	31.4"	2-1/8" IDS	1-1/8" IDS	4" FLG	614
160	CH160M-4C	25.5"	28.4"	33.9"	2-1/8" IDS	1-1/8" IDS	4" FLG	674



Single Circuit



Dual Circuit



Quad Circuit

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Condensers for Operating Pressures up to 450 psig

The FlatPlate Advantage:

The C Series offers the most advanced and cost effective heat exchanger solution for condensers and heat pumps. It is especially well suited for shell-and-tube replacement because of its small size and light weight.

The C Series is designed for R22, R407C, R134a, R404A and other halocarbon refrigerants.

Construction Notes:

- Copper brazed, 316L stainless steel plates.
- Mounting Studs included as standard for use with optional Mounting Bracket.

- All models include two 1/2" FPT waterside temperature probe connections.
- Both sides are rated to 450 psig.

Code Approvals:

- UL Listed as standard
- ASME Code Stamp available on request.
- CE-PED available on request.
- CRN available on request.

Selection Notes:

Unit selections are based on the following conditions of service:

- Nominal tons: 15,000 BTUH/ton
- 85°F Entering Water Temperature (EWT). If EWT is 75°F, multiply the capacity of the selected unit by 2.0.

- 95°F Leaving Water Temperature (LWT)
- 105°F Condensing Temperature
- 5°F Subcooling
- 3 gpm/ton
- R22 refrigerant

For capacities exceeding 80 tons, also see the manifold option on page 15. If your conditions vary significantly from these, you can select a heat exchanger to your exact conditions using FlatPlateSelect.

Nom. Tons	Model	Dimensions			Connections			Weight (lbs.)	Accessories for Better Performance Mounting Bracket
		Width	Length	Depth	Ref OUT	Ref IN	Liquid		
1/2	C1/2AG	5.1"	13.3"	1.1"	5/8" IDS	5/8" IDS	7/8" IDS	6	BKT5X12
3/4	C3/4AG	5.1"	13.3"	1.3"	5/8" IDS	5/8" IDS	7/8" IDS	7	BKT5X12
1	C1AG	5.1"	13.3"	1.4"	5/8" IDS	5/8" IDS	7/8" IDS	7	BKT5X12
1-1/2	C1-1/2AG	5.1"	13.3"	1.8"	5/8" IDS	5/8" IDS	7/8" IDS	8	BKT5X12
2	C2AG	5.1"	13.3"	2.2"	5/8" IDS	5/8" IDS	7/8" IDS	10	BKT5X12
2-1/2	C2-1/2AG	5.1"	13.3"	2.5"	5/8" IDS	5/8" IDS	7/8" IDS	11	BKT5X12
3	C3AG	5.1"	13.3"	3.1"	5/8" IDS	5/8" IDS	7/8" IDS	13	BKT5X12
3-1/2	C3-1/2AG	5.1"	13.3"	3.6"	5/8" IDS	5/8" IDS	7/8" IDS	14	BKT5X12
4	C4AG	5.1"	13.3"	4.3"	5/8" IDS	7/8" IDS	1-1/8" IDS	17	BKT5X12
5	C5AG	5.1"	13.3"	5.2"	5/8" IDS	7/8" IDS	1-1/8" IDS	20	BKT5X12
6	C6G	5.1"	21.1"	2.5"	5/8" IDS	7/8" IDS	1-1/8" IDS	18	BKT5X20
7-1/2	C7-1/2G	5.1"	21.1"	3.0"	7/8" IDS	1-1/8" IDS	1-1/8" IDS	20	BKT5X20
10	C10CG	11.1"	21.4"	2.5"	7/8" IDS	1-3/8" IDS	1-5/8" IDS	51	BKT10X20S
12-1/2	C12G	11.1"	21.4"	3.0"	7/8" IDS	1-3/8" IDS	1-5/8" IDS	55	BKT10X20S
15	C15G	11.1"	21.4"	3.6"	7/8" IDS	1-3/8" IDS	1-5/8" IDS	62	BKT10X20S
20	C20G	11.1"	21.4"	4.6"	1-1/8" IDS	1-5/8" IDS	1-5/8" IDS	73	BKT10X20S
25	C25G	11.1"	21.4"	5.7"	1-1/8" IDS	1-5/8" IDS	2-1/8" IDS	84	BKT10X20S
30	C30G	11.1"	21.4"	6.7"	1-1/8" IDS	2-1/8" IDS	2-1/8" IDS	95	BKT10X20S
35	C35G	11.1"	21.4"	7.7"	1-3/8" IDS	2-1/8" IDS	2-5/8" IDS	106	BKT10X20S
40	C40G	11.1"	21.4"	8.8"	1-3/8" IDS	2-1/8" IDS	2-5/8" IDS	117	BKT10X20S
50	C50G	11.1"	21.4"	10.9"	1-5/8" IDS	2-1/8" IDS	2-5/8" IDS	139	BKT10X20L
60	C60G	11.1"	21.4"	12.9"	1-5/8" IDS	2-1/8" IDS	2-5/8" IDS	161	BKT10X20L
70	C70G	11.1"	21.4"	15.0"	1-5/8" IDS	2-1/8" IDS	2-5/8" IDS	183	BKT10X20L
80	C80G	11.1"	21.4"	17.1"	1-5/8" IDS	2-1/8" IDS	2-5/8" IDS	205	BKT10X20L

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Condensers for Operating Pressures up to 650 psig

The FlatPlate Advantage:

The C-XP Series offers the most advanced and cost effective heat exchanger solution for condensers and heat pumps. It is especially well suited for shell-and-tube replacement because of its small size and light weight.

The C-XP Series is designed for R22, R407C, R134a, R404A and other halocarbon refrigerants.

Construction Notes:

- Copper brazed, 316L stainless steel plates.
- Mounting Studs included as standard for use with optional Mounting Bracket.
- Both sides are rated to 650 psig.

Code Approvals:

- UL Listed as standard
- ASME Code Stamp available on request.
- CE-PED available on request.
- CRN available on request.

Selection Notes:

Unit selections are based on the following conditions of service:

- Nominal tons: 15,000 BTUH/ton
- 85°F Entering Water Temperature (EWT). If EWT is 75°F, multiply the capacity of the selected unit by 2.0.
- 95°F Leaving Water Temperature (LWT)
- 105°F Condensing Temperature
- 5°F Subcooling
- 3 gpm/ton
- R410a refrigerant

For capacities exceeding 80 tons, also see the manifold option on page 15.

If your conditions vary significantly from these, you can select a heat exchanger to your exact conditions using FlatPlateSelect.

Nom. Tons	Model	Dimensions			Connections			Weight (lbs.)	Accessories for Better Performance Mounting Bracket
		Width	Length	Depth	Ref OUT	Ref IN	Liquid		
1/2	C1/2A-XP	4.9"	12.2"	1.2"	5/8" IDS	5/8" IDS	7/8" IDS	16	BKT5X12
3/4	C3/4A-XP	4.9"	12.2"	1.4"	5/8" IDS	5/8" IDS	7/8" IDS	17	BKT5X12
1	C1A-XP	4.9"	12.2"	1.6"	5/8" IDS	5/8" IDS	7/8" IDS	18	BKT5X12
1-1/2	C1-1/2A-XP	4.9"	12.2"	1.9"	5/8" IDS	5/8" IDS	7/8" IDS	19	BKT5X12
2	C2A-XP	4.9"	12.2"	2.3"	5/8" IDS	5/8" IDS	7/8" IDS	20	BKT5X12
2-1/2	C2-1/2A-XP	4.9"	12.2"	2.6"	5/8" IDS	5/8" IDS	7/8" IDS	22	BKT5X12
3	C3A-XP	4.9"	12.2"	3.2"	5/8" IDS	5/8" IDS	7/8" IDS	24	BKT5X12
3-1/2	C3-1/2A-XP	4.9"	12.2"	3.7"	5/8" IDS	5/8" IDS	7/8" IDS	25	BKT5X12
4	C4A-XP	4.9"	12.2"	4.4"	5/8" IDS	7/8" IDS	1-1/8" IDS	28	BKT5X12
5	C5A-XP	4.9"	12.2"	5.3"	5/8" IDS	7/8" IDS	1-1/8" IDS	31	BKT5X12
6	C6-XP	5.0"	20.3"	2.6"	5/8" IDS	7/8" IDS	1-1/8" IDS	36	BKT5X20
7-1/2	C7-1/2-XP	5.0"	20.3"	3.2"	7/8" IDS	1-1/8" IDS	1-1/8" IDS	27	BKT5X20
10	C10C-XP	9.8"	20.3"	2.3"	7/8" IDS	1-3/8" IDS	1-5/8" IDS	77	BKT10X20S
12-1/2	C12-XP	9.8"	20.3"	2.6"	7/8" IDS	1-3/8" IDS	1-5/8" IDS	81	BKT10X20S
15	C15-XP	9.8"	20.3"	3.2"	7/8" IDS	1-3/8" IDS	1-5/8" IDS	87	BKT10X20S
20	C20-XP	9.8"	20.3"	4.1"	1-1/8" IDS	1-5/8" IDS	1-5/8" IDS	97	BKT10X20S
25	C25-XP	9.8"	20.3"	5.0"	1-1/8" IDS	1-5/8" IDS	2-1/8" IDS	107	BKT10X20S
30	C30-XP	9.8"	20.3"	5.9"	1-1/8" IDS	2-1/8" IDS	2-1/8" IDS	118	BKT10X20S
35	C35-XP	9.8"	20.3"	6.8"	1-3/8" IDS	2-1/8" IDS	2-5/8" IDS	128	BKT10X20S
40	C40-XP	9.8"	20.3"	7.7"	1-3/8" IDS	2-1/8" IDS	2-5/8" IDS	138	BKT10X20S
50	C50-XP	9.8"	20.3"	9.5"	1-5/8" IDS	2-1/8" IDS	2-5/8" IDS	158	BKT10X20S
60	C60-XP	9.8"	20.3"	11.3"	1-5/8" IDS	2-1/8" IDS	2-5/8" IDS	179	BKT10X20L
70	C70-XP	9.8"	20.3"	13.1"	1-5/8" IDS	2-1/8" IDS	2-5/8" IDS	199	BKT10X20L
80	C80-XP	9.8"	20.3"	14.9"	1-5/8" IDS	2-1/8" IDS	2-5/8" IDS	219	BKT10X20L

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Two-Circuit Condensers for Operating Pressures up to 450 psig

The FlatPlate Advantage:

The 2C Series offers the most advanced and cost effective heat exchanger solution for 2-compressor package chillers and shell-and-tube replacement.

The 2C Series is designed for R22, R407C, R134a, R404A and other halocarbon refrigerants for DX evaporator, condenser and heat pump operation.

Construction Notes:

- Copper brazed, 316L stainless steel plates
- Mounting Studs included as standard for use with optional Mounting Bracket.
- All models include two 1/2" FPT waterside temperature probe connections.
- Refrigerant side is rated to 450 psig, and liquid side is rated to 350 psig.

Code Approvals:

- UL Listed as standard
- ASME Code Stamp optional
- CE-PED optional
- CRN optional

Selection Notes:

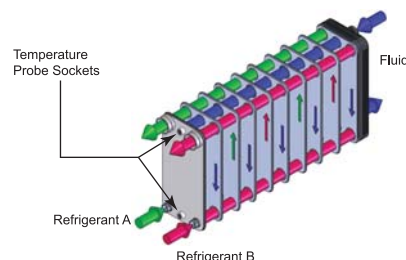
Unit selections are based on the following conditions of service:

- Nominal tons: 12,000 BTUH/ton
- 85°F Entering Water Temperature (EWT)
- 95°F Leaving Water Temperature (LWT)
- 105°F Condensing Temperature
- 5°F Subcooling
- 3 gpm/ton
- R22 refrigerant

If your conditions vary significantly from these, you can select a heat exchanger to your exact conditions using FlatPlateSelect.

How does the 2C work?

- The 2C has two independent refrigerant circuits, one on the left front side and one on the right front side of the unit.
- The fluid side connections are on the reverse side for easier access.
- Temperature probe sockets (1/2" FPT) are built in on the front for convenient and accurate temperature measurement.
- Operation is based on the principle of having the two refrigerants "interlaced" between the fluid circuits, thus allowing full 100% refrigerant contact with the fluid side.
- So when only one compressor operates, 100% of the fluid is being heated.



Nom. Tons	Model	Dimensions			Connections			Weight (lbs.)	Accessories for Better Performance Mounting Bracket
		Width	Length	Depth	Ref OUT	Ref IN	Liquid		
3	C3-2C	9.8"	20.3"	1.1"	5/8" IDS	7/8" IDS	1" MPT	43	BKT10X20S
5	C5-2C	9.8"	20.3"	1.5"	5/8" IDS	7/8" IDS	1" MPT	47	BKT10X20S
6	C6-2C	9.8"	20.3"	1.8"	5/8" IDS	7/8" IDS	1" MPT	52	BKT10X20S
8	C8-2C	9.8"	20.3"	2.2"	5/8" IDS	7/8" IDS	1" MPT	56	BKT10X20S
10	C10-2C	9.8"	20.3"	2.5"	7/8" IDS	1-1/8" IDS	1-1/2" MPT	60	BKT10X20S
12	C12-2C	9.8"	20.3"	3.3"	7/8" IDS	1-1/8" IDS	1-1/2" MPT	68	BKT10X20S
15	C15-2C	9.8"	20.3"	3.6"	7/8" IDS	1-1/8" IDS	1-1/2" MPT	73	BKT10X20S
20	C20-2C	9.8"	20.3"	4.3"	7/8" IDS	1-3/8" IDS	1-1/2" MPT	81	BKT10X20S
25	C25-2C	9.8"	20.3"	5.1"	7/8" IDS	1-3/8" IDS	2" MPT	89	BKT10X20S
30	C30-2C	9.8"	20.3"	6.1"	7/8" IDS	1-3/8" IDS	2" MPT	102	BKT10X20S
40	C40-2C	9.8"	20.3"	7.9"	1-1/8" IDS	1-5/8" IDS	2-1/2" MPT	123	BKT10X20S
50	C50-2C	9.8"	20.3"	9.7"	1-1/8" IDS	1-5/8" IDS	2-1/2" MPT	144	BKT10X20L
60	C60-2C	9.8"	20.3"	12.3"	1-1/8" IDS	2-1/8" IDS	2-1/2" MPT	173	BKT10X20L
70	C70-2C	9.8"	20.3"	14.1"	1-1/8" IDS	2-1/8" IDS	2-1/2" MPT	194	BKT10X20L
80	C80-2C	9.8"	20.3"	15.9"	1-1/8" IDS	2-1/8" IDS	2-1/2" MPT	215	BKT10X20L

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Two-Circuit Condensers for Operating Pressures up to 650 psig

The FlatPlate Advantage:

The C-2C-XP Series offers the most advanced and cost effective heat exchanger solution for higher pressure 2-compressor package chillers and shell-and-tube replacements.

The C-2C-XP Series is designed for R410a and other refrigerants that require elevated pressures for condenser operation.

Construction Notes:

- Copper brazed 316L stainless steel plates
- Mounting Studs included as standard for use with optional Mounting Bracket.
- All models include two 1/2" FPT waterside temperature probe connections.
- Refrigerant side is rated to 650 psig, and liquid side is rated to 350 psig.

Code Approvals:

- UL Listed as standard
- ASME Code Stamp optional
- CE-PED optional
- CRN optional

Selection Notes:

Unit selections are based on the following conditions of service:

- Nominal tons: 12,000 BTUH/ton
- 85°F Entering Water Temperature (EWT)
- 95°F Leaving Water Temperature (LWT)
- 105°F Condensing Temperature
- 5°F Subcooling
- 3 gpm/ton
- R410a refrigerant

If your conditions vary significantly from these, you can select a heat exchanger to your exact conditions using FlatPlateSelect.

Nom. Tons	Model	Dimensions			Connections			Weight (lbs.)	Accessories for Better Performance Mounting Bracket
		Width	Length	Depth	Ref OUT	Ref IN	Liquid		
3	C3-2C-XP	9.8"	20.3"	1.0"	5/8" IDS	7/8" IDS	1" MPT	71	BKT10X20S
5	C5-2C-XP	9.8"	20.3"	1.4"	5/8" IDS	7/8" IDS	1" MPT	75	BKT10X20S
6	C6-2C-XP	9.8"	20.3"	1.7"	5/8" IDS	7/8" IDS	1" MPT	79	BKT10X20S
8	C8-2C-XP	9.8"	20.3"	2.1"	5/8" IDS	7/8" IDS	1" MPT	83	BKT10X20S
10	C10-2C-XP	9.8"	20.3"	2.5"	7/8" IDS	1-1/8" IDS	1-1/2" MPT	87	BKT10X20S
12	C12-2C-XP	9.8"	20.3"	3.2"	7/8" IDS	1-1/8" IDS	1-1/2" MPT	95	BKT10X20S
15	C15-2C-XP	9.8"	20.3"	3.5"	7/8" IDS	1-1/8" IDS	1-1/2" MPT	99	BKT10X20S
20	C20-2C-XP	9.8"	20.3"	4.3"	7/8" IDS	1-3/8" IDS	1-1/2" MPT	108	BKT10X20S
25	C25-2C-XP	9.8"	20.3"	5.0"	7/8" IDS	1-3/8" IDS	2" MPT	116	BKT10X20S
30	C30-2C-XP	9.8"	20.3"	6.1"	7/8" IDS	1-3/8" IDS	2" MPT	128	BKT10X20S
40	C40-2C-XP	9.8"	20.3"	7.9"	1-1/8" IDS	1-5/8" IDS	2-1/2" MPT	148	BKT10X20S
50	C50-2C-XP	9.8"	20.3"	9.7"	1-1/8" IDS	1-5/8" IDS	2-1/2" MPT	169	BKT10X20L
60	C60-2C-XP	9.8"	20.3"	12.2"	1-1/8" IDS	2-1/8" IDS	2-1/2" MPT	197	BKT10X20L
70	C70-2C-XP	9.8"	20.3"	14.0"	1-1/8" IDS	2-1/8" IDS	2-1/2" MPT	218	BKT10X20L
80	C80-2C-XP	9.8"	20.3"	15.8"	1-1/8" IDS	2-1/8" IDS	2-1/2" MPT	238	BKT10X20L

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Condensers for Industrial Applications

The FlatPlate Advantage:

The MCN Series is designed for brackish water, chlorinated and swimming pool water and liquids with corrosion potential or micro-biological elements. It is especially well suited for shell-and-tube replacement because of its small size and light weight.

The MCN Series is designed for R22, R407C, R134a, R404A and other refrigerants.

Construction Notes:

- Nickel-Chrome brazing.
- Marine-grade stainless steel plates.
- Connections are type 304 stainless steel.
- Both sides are rated to 300 psig.

Code Approvals:

- UL Listed as standard
- ASME Code Stamp available on request.
- CE-PED available on request.
- CRN available on request.

Selection Notes:

Unit selections are based on the following conditions of service:

- Nominal tons: 15,000 BTUH/ton
- 85°F Entering Water Temperature (EWT). If EWT is 75°F, multiply the capacity of the selected unit by 2.0.
- 95°F Leaving Water Temperature (LWT)
- 105°F Condensing Temperature
- 5°F Subcooling
- 3 gpm/ton
- R22 refrigerant

For capacities exceeding 80 tons, see also the manifold option on page 15.

If your conditions vary significantly from these, you can select a heat exchanger to your exact conditions using FlatPlateSelect.

Nom. Tons	Model	Dimensions			Connections			Weight (lbs.)	Accessories for Better Performance Mounting Bracket
		Width	Length	Depth	Ref OUT	Ref IN	Liquid		
1/2	MCN1/2A	4.9"	12.2"	1.1"	5/8" IDS	5/8" IDS	3/4" FPT	5	BKT5X12
3/4	MCN3/4AG	4.9"	12.2"	1.3"	5/8" IDS	5/8" IDS	3/4" FPT	6	BKT5X12
1	MCN1A	4.9"	12.2"	1.4"	5/8" IDS	5/8" IDS	3/4" FPT	6	BKT5X12
1-1/2	MCN1-1/2A	4.9"	12.2"	1.8"	5/8" IDS	5/8" IDS	3/4" FPT	8	BKT5X12
2	MCN2A	4.9"	12.2"	2.2"	5/8" IDS	5/8" IDS	3/4" FPT	9	BKT5X12
2-1/2	MCN2-1/2A	4.9"	12.2"	2.5"	5/8" IDS	5/8" IDS	1" FPT	10	BKT5X12
3	MCN3A	4.9"	12.2"	3.1"	5/8" IDS	5/8" IDS	1" FPT	12	BKT5X12
3-1/2	MCN3-1/2A	4.9"	12.2"	3.6"	5/8" IDS	5/8" IDS	1" FPT	14	BKT5X12
4	MCN4A	4.9"	12.2"	4.3"	5/8" IDS	7/8" IDS	1" FPT	17	BKT5X12
5	MCN5A	4.9"	12.2"	5.2"	5/8" IDS	7/8" IDS	1" FPT	20	BKT5X12
7-1/2	MCN7-1/2A	4.9"	12.2"	7.6"	7/8" IDS	1-1/8" IDS	1-1/4" FPT	28	BKT5X12
10	MCN10A	4.9"	12.2"	10.3"	7/8" IDS	1-1/8" IDS	1-1/4" FPT	38	BKT5X12
12-1/2	MCN12L	9.8"	20.3"	2.5"	1-1/8" IDS	1-5/8" IDS	1-1/2" FPT	48	BKT10X20S
15	MCN15L	9.8"	20.3"	3.1"	1-1/8" IDS	1-5/8" IDS	1-1/2" FPT	54	BKT10X20S
20	MCN20L	9.8"	20.3"	4.0"	1-1/8" IDS	1-5/8" IDS	1-1/2" FPT	64	BKT10X20S
25	MCN25L	9.8"	20.3"	4.9"	1-1/8" IDS	1-5/8" IDS	2" FPT	74	BKT10X20S
30	MCN30L	9.8"	20.3"	5.8"	1-3/8" IDS	2-1/8" IDS	2" FPT	85	BKT10X20S
35	MCN35L	9.8"	20.3"	6.7"	1-3/8" IDS	2-1/8" IDS	2" FPT	95	BKT10X20S
40	MCN40L	9.8"	20.3"	7.6"	1-3/8" IDS	2-1/8" IDS	2" FPT	105	BKT10X20S
50	MCN50L	9.8"	20.3"	9.4"	1-5/8" IDS	2-1/8" IDS	2" FPT	125	BKT10X20L
60	MCN60L	9.8"	20.3"	11.2"	1-5/8" IDS	2-1/8" IDS	2" FPT	146	BKT10X20L
70	MCN70L	9.8"	20.3"	13.8"	1-5/8" IDS	2-1/8" IDS	2" FPT	166	BKT10X20L
75	MCN75L	9.8"	20.3"	17.5"	1-7/8" IDS	2-1/8" IDS	2" FPT	217	BKT10X20L

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Manifolded Condensers up to 160 tons

The FlatPlate Advantage:

For 80-160 ton condenser applications, the C-M Series is the most compact design available for new system designs and is ideal for shell-and-tube replacements. Comprised of two heat exchangers with a large common liquid side manifold, the C-M Series can be ordered configured for single, dual or quad refrigerant circuits.

Construction Notes:

- Copper brazed 316L stainless plates.
- Refrigerant connections are sweat solder.
- Liquid side manifold and flange connections are carbon steel, with optional stainless steel for potable water applications.
- Refrigerant side is rated to 450 psig, and liquid side is rated to 150 psig.
- Higher pressure ratings are available on request.

Code Approvals:

- Individual heat exchangers are UL Listed as standard
- ASME Code Stamp available on request for individual units.
- CE-PED optional
- CRN optional

Selection Notes:

Unit selections are based on the following conditions of service:

- Nominal tons: 15,000 BTUH/ton
- 85°F Entering Water Temperature (EWT). If EWT is 75°F, multiply the capacity of the selected unit by 2.0.
- 95°F Leaving Water Temperature (LWT)
- 105°F Condensing Temperature
- 5°F Subcooling
- 3 gpm/ton
- R22 refrigerant

If your conditions vary significantly from these, you can select a heat exchanger to your exact conditions using FlatPlateSelect.

Single Circuit Condensers

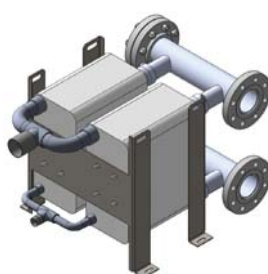
Nom. Tons	Model	Dimensions			Connections			Weight (lbs.)
		Width	Length	Depth	Ref OUT	Ref IN	Liquid	
80	C80M-1C	28.7"	28.4"	35.1"	1-5/8" IDS	2-5/8" IDS	4" FLG	382
100	C100M-1C	28.7"	28.4"	36.9"	1-5/8" IDS	2-5/8" IDS	4" FLG	424
120	C120M-1C	28.7"	28.4"	38.7"	2-1/8" IDS	3-1/8" IDS	4" FLG	464
140	C140M-1C	28.7"	28.4"	40.5"	2-1/8" IDS	3-1/8" IDS	4" FLG	504
160	C160M-1C	28.7"	28.4"	42.3"	2-1/8" IDS	3-1/8" IDS	4" FLG	546

Dual Circuit Condensers

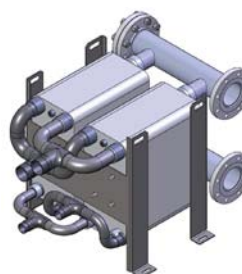
80	C80M-2C	25.5"	28.4"	36.4"	1-1/8" IDS	2-1/8" IDS	4" FLG	454
100	C100M-2C	25.5"	28.4"	38.2"	1-1/8" IDS	2-1/8" IDS	4" FLG	496
120	C120M-2C	25.5"	28.4"	40.0"	1-3/8" IDS	2-5/8" IDS	4" FLG	554
140	C140M-2C	25.5"	28.4"	41.9"	1-3/8" IDS	2-5/8" IDS	4" FLG	596
160	C160M-2C	25.5"	28.4"	43.6"	1-3/8" IDS	2-5/8" IDS	4" FLG	638

Quad Circuit Condensers

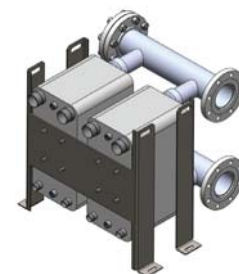
80	C80M-4C	25.5"	28.4"	23.4"	1-3/8" IDS	2-1/8" IDS	4" FLG	430
100	C100M-4C	25.5"	28.4"	25.2"	1-5/8" IDS	2-1/8" IDS	4" FLG	472
120	C120M-4C	25.5"	28.4"	27.0"	1-5/8" IDS	2-1/8" IDS	4" FLG	530
140	C140M-4C	25.5"	28.4"	28.8"	1-5/8" IDS	2-1/8" IDS	4" FLG	572
160	C160M-4C	25.5"	28.4"	30.6"	1-5/8" IDS	2-1/8" IDS	4" FLG	614



Single Circuit



Dual Circuit



Quad Circuit

Your choice of single, dual or quad circuit configuration for complete flexibility in design.

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DX Subcoolers for Operating Pressures up to 450 psig

The FlatPlate Advantage:

The SC Series Subcooler features advanced technology for low load stability and capacity control, and is ideal for any application where subcooled refrigerant is used to enhance system efficiency and capacity.

It is versatile, and can be used in supermarkets, food processing, industrial refrigeration, two-stage systems and economizers.

The SC Series Subcooler is designed for R22, R407C, R134a, R404A and other halocarbon refrigerants.

Construction Notes:

- Copper brazed 316L stainless steel plates
- Mounting Studs included as standard for use with Mounting Bracket.
- Both sides are rated to 450 psig.

Code Approvals:

- UL Listed as standard
- ASME Code Stamp available on request.
- CE-PED available on request.
- CRN available on request.

Selection Notes:

Unit selections are based on the following conditions of service:

- Nominal tons: 12,000 BTUH/ton
- Liquid refrigerant subcooled from 100°F to 50°F.
- 8°F Superheat
- 35°F Evaporating Temperature
- R22 refrigerant

If your conditions vary significantly from these, you can select a heat exchanger to your exact conditions using FlatPlateSelect.

Nom. Tons	Model	Dimensions			Connections			Weight (lbs.)	Accessories for Better Performance	
		Width	Length	Depth	Ref OUT	Ref IN	Liquid		Insulation Kit	Mounting Bracket
1	SC1G	5.1"	13.3"	1.1"	7/8" IDS	5/8" IDS	1-1/8" IDS	6	133001627	BKT5X12
2	SC2G	5.1"	13.3"	1.4"	7/8" IDS	5/8" IDS	1-1/8" IDS	7	133001628	BKT5X12
3	SC3G	5.1"	13.3"	1.8"	7/8" IDS	5/8" IDS	1-1/8" IDS	8	133001628	BKT5X12
5	SC5G	5.1"	13.3"	2.3"	1-1/8" IDS	7/8" IDS	1-1/8" IDS	10	133001629	BKT5X12
7	SC7G	5.1"	13.3"	3.0"	1-1/8" IDS	7/8" IDS	1-1/8" IDS	13	133001629	BKT5X12
10	SC10G	5.1"	13.3"	3.9"	1-3/8" IDS	7/8" IDS	1-3/8" IDS	16	133001630	BKT5X12
12	SC12G	5.1"	13.3"	4.8"	1-3/8" IDS	7/8" IDS	1-3/8" IDS	19	133001631	BKT5X12
14	SC14G	5.1"	13.3"	5.7"	1-3/8" IDS	7/8" IDS	1-3/8" IDS	22	133001632	BKT5X12
16	SC16G	11.1"	21.4"	2.5"	1-5/8" IDS	1-1/8" IDS	2-1/8" IDS	51	133001669	BKT10X20S
22	SC22G	11.1"	21.4"	3.6"	1-5/8" IDS	1-1/8" IDS	2-1/8" IDS	62	133001670	BKT10X20S
28	SC28G	11.1"	21.4"	4.6"	2-1/8" IDS	1-1/8" IDS	2-5/8" IDS	73	133001671	BKT10X20S
35	SC35G	11.1"	21.4"	5.7"	2-1/8" IDS	1-1/8" IDS	2-5/8" IDS	84	133001672	BKT10X20S
42	SC42G	11.1"	21.4"	6.7"	2-1/8" IDS	1-1/8" IDS	2-5/8" IDS	95	133001673	BKT10X20S
54	SC54G	11.1"	21.4"	8.8"	2-5/8" IDS	1-1/8" IDS	2-5/8" IDS	117	133001675	BKT10X20S
66	SC66G	11.1"	21.4"	10.9"	2-5/8" IDS	1-1/8" IDS	2-5/8" IDS	139	133001677	BKT10X20S
80	SC80G	11.1"	21.4"	12.9"	2-5/8" IDS	1-1/8" IDS	2-5/8" IDS	161	133001733	BKT10X20L
90	SC90G	11.1"	21.4"	15.0"	2-5/8" IDS	1-3/8" IDS	2-5/8" IDS	183	133001735	BKT10X20L
100	SC100G	11.1"	21.4"	16.1"	2-5/8" IDS	1-5/8" IDS	2-5/8" IDS	194	133001736	BKT10X20L
120	SC120G	11.1"	21.4"	18.1"	2-5/8" IDS	1-5/8" IDS	2-5/8" IDS	216	133001739	BKT10X20L

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DX Subcoolers for Operating Pressures up to 650 psig

The FlatPlate Advantage:

The SC-XP Series Direct Expansion Subcooler features advanced technology for low load stability and capacity control, and is ideal for any application where subcooled refrigerant is used to enhance system efficiency and capacity.

It is versatile, and can be used in supermarkets, food processing, industrial refrigeration, two-stage systems and economizers.

The SC-XP Series Subcooler is designed for R410a and other halocarbon refrigerants that require elevated pressures for subcooler operation.

Construction Notes:

- Copper brazed 316L stainless steel plates.
- Mounting Studs included as standard for use with optional Mounting Bracket.
- Both sides are rated to 650 psig.

Code Approvals:

- UL Listed as standard
- ASME Code Stamp available on request.
- CE-PED available on request.
- CRN available on request.

Selection Notes:

Unit selections are based on the following conditions of service:

- Nominal tons: 12,000 BTUH/ton
- Liquid refrigerant subcooled from 100°F to 50°F.
- 8°F Superheat
- 35°F Evaporating Temperature
- R410a refrigerant

If your conditions vary significantly from these, you can select a heat exchanger to your exact conditions using FlatPlateSelect.

Nom. Tons	Model	Dimensions			Connections			Weight (lbs.)	Accessories for Better Performance	
		Width	Length	Depth	Ref OUT	Ref IN	Liquid		Insulation Kit	Mounting Bracket
1	SC1-XP	4.9"	12.2"	1.2"	7/8" IDS	5/8" IDS	1-1/8" IDS	16	133001617	BKT5X12
2	SC2-XP	4.9"	12.2"	1.6"	7/8" IDS	5/8" IDS	1-1/8" IDS	18	133001618	BKT5X12
3	SC3-XP	4.9"	12.2"	1.9"	7/8" IDS	5/8" IDS	1-1/8" IDS	19	133001618	BKT5X12
4	SC4-XP	4.9"	12.2"	2.3"	1-1/8" IDS	5/8" IDS	1-1/8" IDS	20	133001618	BKT5X12
5	SC5-XP	4.9"	12.2"	2.5"	1-1/8" IDS	7/8" IDS	1-1/8" IDS	21	133001619	BKT5X12
7	SC7-XP	4.9"	12.2"	3.2"	1-1/8" IDS	7/8" IDS	1-1/8" IDS	23	133001619	BKT5X12
8	SC8-XP	4.9"	12.2"	3.7"	1-3/8" IDS	7/8" IDS	1-3/8" IDS	25	133001620	BKT5X12
10	SC10-XP	4.9"	12.2"	4.1"	1-3/8" IDS	7/8" IDS	1-3/8" IDS	27	133001620	BKT5X12
12	SC12-XP	4.9"	12.2"	5.0"	1-3/8" IDS	7/8" IDS	1-3/8" IDS	30	133001621	BKT5X12
14	SC14-XP	4.9"	12.2"	5.9"	1-3/8" IDS	7/8" IDS	1-3/8" IDS	33	133001622	BKT5X12
16	SC16-XP	9.8"	20.3"	2.3"	1-5/8" IDS	1-1/8" IDS	2-1/8" IDS	77	133001659	BKT10X20S
22	SC22-XP	9.8"	20.3"	3.2"	1-5/8" IDS	1-1/8" IDS	2-1/8" IDS	87	133001660	BKT10X20S
28	SC28-XP	9.8"	20.3"	4.1"	2-1/8" IDS	1-1/8" IDS	2-5/8" IDS	97	133001661	BKT10X20S
35	SC35-XP	9.8"	20.3"	5.0"	2-1/8" IDS	1-1/8" IDS	2-5/8" IDS	107	133001662	BKT10X20S
42	SC42-XP	9.8"	20.3"	5.9"	2-1/8" IDS	1-1/8" IDS	2-5/8" IDS	117	133001663	BKT10X20S
54	SC54-XP	9.8"	20.3"	7.7"	2-5/8" IDS	1-1/8" IDS	2-5/8" IDS	138	133001665	BKT10X20S
66	SC66-XP	9.8"	20.3"	9.5"	2-5/8" IDS	1-1/8" IDS	2-5/8" IDS	158	133001667	BKT10X20L
80	SC80-XP	9.8"	20.3"	11.3"	2-5/8" IDS	1-1/8" IDS	2-5/8" IDS	179	133001720	BKT10X20L
90	SC90-XP	9.8"	20.3"	13.1"	2-5/8" IDS	1-3/8" IDS	2-5/8" IDS	199	133001722	BKT10X20L
100	SC100-XP	9.8"	20.3"	14.0"	2-5/8" IDS	1-5/8" IDS	2-5/8" IDS	209	133001723	BKT10X20L
120	SC120-XP	9.8"	20.3"	15.8"	2-5/8" IDS	1-5/8" IDS	2-5/8" IDS	230	133001725	BKT10X20L

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Heat Pumps for Operating Pressures up to 450 psig

The FlatPlate Advantage:

The HP Series Heat Pump features advanced technology to distribute the refrigerant for optimal heat transfer in both heating and cooling modes.

It is designed for use with R22, R407c, R134a, R404a and other halocarbon refrigerants.

Construction Notes:

- Copper brazed 316L stainless steel plates.
- Mounting Studs included as standard for use with optional Mounting Bracket.
- Both sides are rated to 450 psig.

Code Approvals:

- UL Listed as standard
- ASME Code Stamp available on request.
- CE-PED available on request.
- CRN available on request.

Selection Notes:

Unit selections are based on the following conditions of service:

Heating Mode:

- Nominal tons: 12,000 BTUH/ton
- 70°F Entering Water Temperature (EWT)
- 50°F Leaving Water Temperature (LWT)
- 40°F Evaporating Temperature
- 8°F Superheat
- 2.4 gpm/ton

Cooling Mode:

- Nominal tons: 15,000 BTUH/ton
- 50°F Entering Water Temperature (EWT).
- 70°F Leaving Water Temperature (LWT)
- 105°F Condensing Temperature
- 5°F Subcooling
- 3 gpm/ton

Both Modes:

- R22 refrigerant

If your conditions vary significantly from these, you can select a heat exchanger to your exact conditions using FlatPlateSelect.

Nom. Tons	Model	Dimensions			Connections			Weight (lbs.)	Accessories for Better Performance Mounting Bracket
		Width	Length	Depth	Ref OUT	Ref IN	Liquid		
1/2	HP1/2AG	5.1"	13.3"	1.1"	5/8" IDS	5/8" IDS	7/8" IDS	6	BKT5X12
3/4	HP3/4AG	5.1"	13.3"	1.3"	5/8" IDS	5/8" IDS	7/8" IDS	7	BKT5X12
1	HP1AG	5.1"	13.3"	1.5"	5/8" IDS	5/8" IDS	7/8" IDS	7	BKT5X12
1-1/2	HP1-1/2AG	5.1"	13.3"	1.8"	5/8" IDS	5/8" IDS	7/8" IDS	8	BKT5X12
2	HP2AG	5.1"	13.3"	2.2"	5/8" IDS	5/8" IDS	7/8" IDS	10	BKT5X12
2-1/2	HP2-1/2AG	5.1"	13.3"	2.5"	5/8" IDS	5/8" IDS	7/8" IDS	11	BKT5X12
3	HP3AG	5.1"	13.3"	3.0"	5/8" IDS	5/8" IDS	7/8" IDS	13	BKT5X12
3-1/2	HP3-1/2AG	5.1"	13.3"	3.6"	7/8" IDS	5/8" IDS	7/8" IDS	14	BKT5X12
4	HP4AG	5.1"	13.3"	4.3"	7/8" IDS	5/8" IDS	1-1/8" IDS	17	BKT5X12
5	HP5AG	5.1"	13.3"	5.2"	7/8" IDS	5/8" IDS	1-1/8" IDS	20	BKT5X12
6	HP6G	5.1"	21.1"	3.0"	1-1/8" IDS	7/8" IDS	1-1/8" IDS	20	BKT5X20
7	HP7-1/2G	5.1"	21.1"	3.9"	1-1/8" IDS	7/8" IDS	1-1/8" IDS	25	BKT5X20
10	HP10G	11.1"	21.4"	3.0"	1-3/8" IDS	7/8" IDS	1-5/8" IDS	55	BKT10X20S
12	HP12G	11.1"	21.4"	3.6"	1-3/8" IDS	7/8" IDS	1-5/8" IDS	62	BKT10X20S
15	HP15G	11.1"	21.4"	4.6"	1-3/8" IDS	7/8" IDS	1-5/8" IDS	73	BKT10X20S
20	HP20G	11.1"	21.4"	5.7"	1-5/8" IDS	7/8" IDS	1-5/8" IDS	84	BKT10X20S
25	HP25G	11.1"	21.4"	6.7"	1-5/8" IDS	1-1/8" IDS	2-1/8" IDS	95	BKT10X20S
30	HP30G	11.1"	21.4"	7.7"	2-1/8" IDS	1-1/8" IDS	2-1/8" IDS	106	BKT10X20S
35	HP35G	11.1"	21.4"	9.8"	2-1/8" IDS	1-1/8" IDS	2-5/8" IDS	128	BKT10X20S
40	HP40G	11.1"	21.4"	10.9"	2-1/8" IDS	1-1/8" IDS	2-5/8" IDS	139	BKT10X20S
50	HP50G	11.1"	21.4"	14.0"	2-5/8" IDS	1-1/8" IDS	2-5/8" IDS	172	BKT10X20L
60	HP60G	11.1"	21.4"	16.1"	2-5/8" IDS	1-1/8" IDS	2-5/8" IDS	194	BKT10X20L
70	HP70G	11.1"	21.4"	18.1"	2-5/8" IDS	1-1/8" IDS	2-5/8" IDS	216	BKT10X20L
80	HP80G	11.1"	21.4"	20.2"	2-5/8" IDS	1-1/8" IDS	2-5/8" IDS	238	BKT10X20L

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Heat Pumps for Operating Pressures up to 650 psig

The FlatPlate Advantage:

The HP-XP Series Heat Pump features advanced technology to distribute the refrigerant for optimal heat transfer in both heating and cooling modes.

The HP-XP Series is designed for R410a and other refrigerants that require elevated pressures for operation.

Construction Notes:

- Copper brazed 316L stainless steel plates.
- Mounting Studs included as standard for use with optional Mounting Bracket.
- Rated to 650 psig.

Code Approvals:

- UL Listed as standard
- ASME Code Stamp available on request.
- CE-PED available on request.
- CRN available on request.

Selection Notes:

Unit selections are based on the following conditions of service:

Heating Mode:

- Nominal tons: 12,000 BTUH/ton
- 70°F Entering Water Temperature (EWT)
- 50°F Leaving Water Temperature (LWT)
- 40°F Evaporating Temperature
- 8°F Superheat
- 2.4 gpm/ton

Cooling Mode:

- Nominal tons: 15,000 BTUH/ton
- 50°F Entering Water Temperature (EWT).
- 70°F Leaving Water Temperature (LWT)
- 105°F Condensing Temperature
- 5°F Subcooling
- 3 gpm/ton

Both Modes:

- R410a refrigerant

If your conditions vary significantly from these, you can select a heat exchanger to your exact conditions using FlatPlateSelect.

Nom. Tons	Model	Dimensions			Connections			Weight (lbs.)	Accessories for Better Performance Mounting Bracket
		Width	Length	Depth	Ref OUT	Ref IN	Liquid		
1/2	HP1/2A-XP	4.9"	12.2"	1.2"	5/8" IDS	5/8" IDS	7/8" IDS	16	BKT5X12
3/4	HP3/4A-XP	4.9"	12.2"	1.4"	5/8" IDS	5/8" IDS	7/8" IDS	17	BKT5X12
1	HP1A-XP	4.9"	12.2"	1.6"	5/8" IDS	5/8" IDS	7/8" IDS	18	BKT5X12
1-1/2	HP1-1/2A-XP	4.9"	12.2"	1.9"	5/8" IDS	5/8" IDS	7/8" IDS	19	BKT5X12
2	HP2A-XP	4.9"	12.2"	2.3"	5/8" IDS	5/8" IDS	7/8" IDS	20	BKT5X12
2-1/2	HP2-1/2A-XP	4.9"	12.2"	2.6"	5/8" IDS	5/8" IDS	7/8" IDS	22	BKT5X12
3	HP3A-XP	4.9"	12.2"	3.2"	5/8" IDS	5/8" IDS	7/8" IDS	23	BKT5X12
3-1/2	HP3-1/2A-XP	4.9"	12.2"	3.7"	5/8" IDS	5/8" IDS	7/8" IDS	25	BKT5X12
4	HP4A-XP	4.9"	12.2"	4.4"	7/8" IDS	5/8" IDS	1-1/8" IDS	28	BKT5X12
5	HP5A-XP	4.9"	12.2"	5.3"	7/8" IDS	5/8" IDS	1-1/8" IDS	31	BKT5X12
6	HP6-XP	5.0"	20.3"	3.2"	1-1/8" IDS	7/8" IDS	1-1/8" IDS	40	BKT5X20
7	HP7-1/2-XP	5.0"	20.3"	4.1"	1-1/8" IDS	7/8" IDS	1-1/8" IDS	45.1	BKT5X20
10	HP10-XP	9.8"	20.3"	2.6"	1-3/8" IDS	7/8" IDS	1-5/8" IDS	81	BKT10X20S
12	HP12-XP	9.8"	20.3"	3.2"	1-3/8" IDS	7/8" IDS	1-5/8" IDS	87	BKT10X20S
15	HP15-XP	9.8"	20.3"	4.1"	1-3/8" IDS	7/8" IDS	1-5/8" IDS	97	BKT10X20S
20	HP20-XP	9.8"	20.3"	5.0"	1-5/8" IDS	7/8" IDS	1-5/8" IDS	107	BKT10X20S
25	HP25-XP	9.8"	20.3"	5.9"	1-5/8" IDS	1-1/8" IDS	2-1/8" IDS	117	BKT10X20S
30	HP30-XP	9.8"	20.3"	6.8"	2-1/8" IDS	1-1/8" IDS	2-1/8" IDS	128	BKT10X20S
35	HP35-XP	9.8"	20.3"	8.6"	2-1/8" IDS	1-1/8" IDS	2-5/8" IDS	148	BKT10X20S
40	HP40-XP	9.8"	20.3"	9.5"	2-1/8" IDS	1-1/8" IDS	2-5/8" IDS	158	BKT10X20S
50	HP50-XP	9.8"	20.3"	12.2"	2-5/8" IDS	1-1/8" IDS	2-5/8" IDS	189	BKT10X20L
60	HP60-XP	9.8"	20.3"	14.0"	2-5/8" IDS	1-1/8" IDS	2-5/8" IDS	209	BKT10X20L
70	HP70-XP	9.8"	20.3"	15.8"	2-5/8" IDS	1-1/8" IDS	2-5/8" IDS	230	BKT10X20L
80	HP80-XP	9.8"	20.3"	17.6"	2-5/8" IDS	1-1/8" IDS	2-5/8" IDS	250	BKT10X20L

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Two-Circuit Heat Pumps for Operating Pressures up to 450 psig

The FlatPlate Advantage:

The HP-2C Series Heat Pump features advanced technology to distribute the refrigerant for optimal heat transfer in both heating and cooling modes.

It is designed for use with R22, R407c, R134a, R404a and other halocarbon refrigerants.

Construction Notes:

- Copper brazed 316L stainless steel plates.
- Mounting Studs included as standard for use with optional Mounting Bracket.
- Rated to 450 psig.

Code Approvals:

- UL Listed as standard
- ASME Code Stamp available on request.
- CE-PED available on request.
- CRN available on request.

Selection Notes:

Heating Mode:

- Nominal tons: 12,000 BTUH/ton
- 70°F Entering Water Temperature (EWT)
- 50°F Leaving Water Temperature (LWT)
- 40°F Evaporating Temperature
- 8°F Superheat
- 2.4 gpm/ton

Cooling Mode:

- Nominal tons: 15,000 BTUH/ton
- 50°F Entering Water Temperature (EWT)
- 70°F Leaving Water Temperature (LWT)
- 105°F Condensing Temperature
- 5°F Subcooling
- 3 gpm/ton

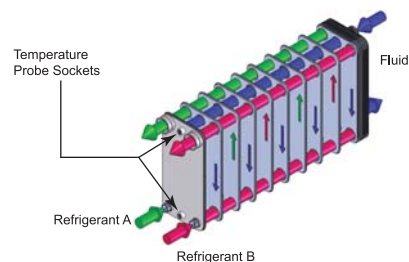
Both Modes:

- R22 refrigerant

If your conditions vary significantly from these, you can select a heat exchanger to your exact conditions using FlatPlateSelect.

How does the 2C work?

- The 2C has two independent refrigerant circuits, one on the left front side and one on the right front side of the unit.
- The fluid side connections are on the reverse side for easier access.
- Temperature probe sockets (1/2" FPT) are built in on the front, for convenient and accurate temperature measurement.
- Operation is based on the principle of having the two refrigerants "interlaced" between the fluid circuits, thus allowing full 100% refrigerant contact with the fluid side.
- So when only one compressor operates, 100% of the fluid is being heated or cooled.



Nom. Tons	Model	Dimensions			Connections			Weight (lbs.)	Accessories for Better Performance Mounting Bracket
		Width	Length	Depth	Ref OUT	Ref IN	Liquid		
3	HP3-2C	9.8"	20.3"	1.5"	7/8" IDS	5/8" IDS	1" MPT	47	BKT10X20S
5	HP5-2C	9.8"	20.3"	1.8"	7/8" IDS	5/8" IDS	1" MPT	52	BKT10X20S
6	HP6-2C	9.8"	20.3"	2.2"	7/8" IDS	5/8" IDS	1" MPT	56	BKT10X20S
8	HP8-2C	9.8"	20.3"	2.5"	7/8" IDS	5/8" IDS	1" MPT	60	BKT10X20S
10	HP10-2C	9.8"	20.3"	2.9"	1-1/8" IDS	7/8" IDS	1-1/2" MPT	64	BKT10X20S
12	HP12-2C	9.8"	20.3"	3.3"	1-1/8" IDS	7/8" IDS	1-1/2" MPT	68	BKT10X20S
15	HP15-2C	9.8"	20.3"	4.0"	1-1/8" IDS	7/8" IDS	1-1/2" MPT	77	BKT10X20S
20	HP20-2C	9.8"	20.3"	5.1"	1-3/8" IDS	7/8" IDS	1-1/2" MPT	89	BKT10X20S
25	HP25-2C	9.8"	20.3"	6.1"	1-3/8" IDS	7/8" IDS	2" MPT	102	BKT10X20S
30	HP30-2C	9.8"	20.3"	7.2"	1-3/8" IDS	7/8" IDS	2" MPT	115	BKT10X20S
35	HP35-2C	9.8"	20.3"	8.7"	1-3/8" IDS	7/8" IDS	2" MPT	131	BKT10X20S
40	HP40-2C	9.8"	20.3"	9.7"	1-5/8" IDS	7/8" IDS	2-1/2" MPT	144	BKT10X20L
50	HP50-2C	9.8"	20.3"	12.3"	1-5/8" IDS	1-1/8" IDS	2-1/2" MPT	173	BKT10X20L
60	HP60-2C	9.8"	20.3"	14.1"	2-1/8" IDS	1-1/8" IDS	2-1/2" MPT	194	BKT10X20L
70	HP70-2C	9.8"	20.3"	15.9"	2-1/8" IDS	1-1/8" IDS	2-1/2" MPT	215	BKT10X20L
80	HP80-2C	9.8"	20.3"	18.4"	2-1/8" IDS	1-1/8" IDS	2-1/2" MPT	245	BKT10X20L

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Two-Circuit Heat Pumps for Operating Pressures up to 650 psig

The FlatPlate Advantage:

The HP-2C-XP Series Heat Pump features advanced technology to distribute the refrigerant for optimal heat transfer in both heating and cooling modes.

The HP-2C-XP Series Heat Pump is designed for R410a refrigerant and other refrigerants that require elevated operating pressures

Construction Notes:

- Copper brazed 316L stainless steel plates.
- Mounting Studs included as standard for use with optional Mounting Bracket.
- Both sides are rated to 650 psig.

Code Approvals:

- UL Listed as standard
- ASME Code Stamp available on request.
- CE-PED available on request.
- CRN available on request.

Selection Notes:

Unit selections are based on the following conditions of service:

Heating Mode:

- Nominal tons: 12,000 BTUH/ton
- 70°F Entering Water Temperature (EWT)
- 50°F Leaving Water Temperature (LWT)
- 40°F Evaporating Temperature
- 8°F Superheat
- 2.4 gpm/ton

Cooling Mode:

- Nominal tons: 15,000 BTUH/ton
- 50°F Entering Water Temperature (EWT).
- 70°F Leaving Water Temperature (LWT)
- 105°F Condensing Temperature
- 5°F Subcooling
- 3 gpm/ton

Both Modes:

- R410a refrigerant

If your conditions vary significantly from these, you can select a heat exchanger to your exact conditions using FlatPlateSelect.

Nom. Tons	Model	Dimensions			Connections			Weight (lbs.)	Accessories for Better Performance Mounting Bracket
		Width	Length	Depth	Ref OUT	Ref IN	Liquid		
3	HP3-2C-XP	9.8"	20.3"	1.4"	7/8" IDS	5/8" IDS	1" MPT	75	BKT10X20S
5	HP5-2C-XP	9.8"	20.3"	1.7"	7/8" IDS	5/8" IDS	1" MPT	79	BKT10X20S
6	HP6-2C-XP	9.8"	20.3"	2.1"	7/8" IDS	5/8" IDS	1" MPT	83	BKT10X20S
8	HP8-2C-XP	9.8"	20.3"	2.5"	7/8" IDS	5/8" IDS	1" MPT	87	BKT10X20S
10	HP10-2C-XP	9.8"	20.3"	2.8"	1-1/8" IDS	7/8" IDS	1-1/2" MPT	91	BKT10X20S
12-1/2	HP12-2C-XP	9.8"	20.3"	3.2"	1-1/8" IDS	7/8" IDS	1-1/2" MPT	95	BKT10X20S
15	HP15-2C-XP	9.8"	20.3"	3.9"	1-1/8" IDS	7/8" IDS	1-1/2" MPT	104	BKT10X20S
20	HP20-2C-XP	9.8"	20.3"	5.0"	1-3/8" IDS	7/8" IDS	1-1/2" MPT	116	BKT10X20S
25	HP25-2C-XP	9.8"	20.3"	6.1"	1-3/8" IDS	7/8" IDS	2" MPT	128	BKT10X20S
30	HP30-2C-XP	9.8"	20.3"	7.1"	1-3/8" IDS	7/8" IDS	2" MPT	140	BKT10X20S
35	HP35-2C-XP	9.8"	20.3"	8.6"	1-3/8" IDS	7/8" IDS	2" MPT	157	BKT10X20S
40	HP40-2C-XP	9.8"	20.3"	9.7"	1-5/8" IDS	7/8" IDS	2-1/2" MPT	169	BKT10X20L
50	HP50-2C-XP	9.8"	20.3"	12.2"	1-5/8" IDS	1-1/8" IDS	2-1/2" MPT	197	BKT10X20L
60	HP60-2C-XP	9.8"	20.3"	14.0"	2-1/8" IDS	1-1/8" IDS	2-1/2" MPT	218	BKT10X20L
70	HP70-2C-XP	9.8"	20.3"	15.8"	2-1/8" IDS	1-1/8" IDS	2-1/2" MPT	238	BKT10X20L
80	HP80-2C-XP	9.8"	20.3"	18.3"	2-1/8" IDS	1-1/8" IDS	2-1/2" MPT	267	BKT10X20L

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Liquid to Liquid General Purpose

The FlatPlate Advantage:

FlatPlate heat exchangers can be used in a wide range of applications, where the approach temperature is 10°F or less, and can deliver approach temperatures down to 2°F. This means the cooling source

can cool the secondary load side to within 2°F of the source temperature.

The result is that a FlatPlate heat exchanger can improve the performance of a wide range of systems, including:

- Chilled Water to Process Liquid
- Glycol Blends to Process Water
- Process Water to Process Water

In addition they offer quicker response to changing operating conditions and a smaller size for easier retrofit.

Construction Notes:

- Copper brazed 316L stainless steel plates.
- Mounting Studs included as standard for use with optional Mounting Bracket.
- Both sides of the 5X12 and 10X20 sizes are rated to 450 psig.
- The 15X34 size is rated to 435 psig.

Code Approvals:

- UL Listed as standard
- ASME Code Stamp available on request.
- CE-PED available on request.
- CRN available on request.

Selection Notes:

Unit selections are based on the following conditions of service:

- Side A media: 40% Propylene Glycol
- 35°F Side A Entering Temp.
- 45°F Side A Leaving Temp.
- Side B Media: Water
- 60°F Side B Entering Temp.
- 50°F Side B Leaving Temp.

If your conditions vary significantly from these, you can select a heat exchanger to your exact conditions using FlatPlateSelect.

Capacity (BTUH)	Model	Side A		Side B		Mounting Bracket
		Minimum Required Flow Rate (GPM)	Pressure Drop (PSIG) at the Min. Required Flow Rate	Minimum Required Flow Rate (GPM)	Pressure Drop (PSIG) at the Min. Required Flow Rate	
50,000	FG5X12-20 (1-1/4" MPT)	10	3.5	11	4.1	BKT5X12
70,000	FG5X12-24 (1-1/4" MPT)	14	4.5	15	5.8	BKT5X13
90,000	FG5X12-30 (1-1/4" MPT)	18	4.7	20	6.3	BKT5X14
120,000	FG5X12-40 (1-1/4" MPT)	24	4.7	26.3	6.5	BKT5X16
150,000	FG5X12-50 (1-1/4" MPT)	30	4.8	33	6.8	BKT5X17
200,000	FG5X12-60 (1-1/4" MPT)	40	6.1	44	8.9	BKT5X18
225,000	FG5X12-80 (1-1/4" MPT)	45	6	49	8.6	BKT5X19
250,000	FG5X12-80 (1-1/4" MPT)	50	6.1	55	8.6	BKT5X20
300,000	FG10X20L-50 (2-1/2" MPT)	60	1.5	66	2	BKT10X20S
350,000	FG10X20L-60 (2-1/2" MPT)	70	1.5	77	2	BKT10X20S
450,000	FG10X20L-70 (2-1/2" MPT)	90	1.9	99	2.7	BKT10X20S
500,000	FG10X20L-80 (2-1/2" MPT)	100	2	110	2.7	BKT10X20S
600,000	FG10X20L-100 (2-1/2" MPT)	120	2.2	132	2.9	BKT10X20L
700,000	FG10X20L-110 (2-1/2" MPT)	140	2.6	154	3.6	BKT10X20L
800,000	FG10X20L-120 (2-1/2" MPT)	160	3.2	176	4.3	BKT10X20L
900,000	FG10X20L-140 (2-1/2" MPT)	180	3.5	198	4.8	BKT10X20L
1,050,000	FG10X20L-160 (2-1/2" MPT)	210	4.4	231	5.8	BKT10X20L
1,200,000	FG10X20L-180 (2-1/2" MPT)	240	5.3	263	7.1	BKT10X20L
1,300,000	FG10X20L-200 (2-1/2" MPT)	260	5.9	285	7.8	BKT10X20L
1,500,000	FG10X20L-220 (2-1/2" MPT)	300	7.5	329	9.9	BKT10X20L
1,640,000	FG15X34H-FB-180 (4" FLG)	328	7.2	360	10	Included
1,810,000	FG15X34H-FB-200 (4" FLG)	362	7.2	397	10	Included
1,980,000	FG15X34H-FB-220 (4" FLG)	396	7.2	435	10	Included
2,140,000	FG15X34H-FB-240 (4" FLG)	428	7.2	470	10	Included
2,300,000	FG15X34H-FB-260 (4" FLG)	460	7.2	505	10	Included
2,460,000	FG15X34H-FB-280 (4" FLG)	492	7.2	540	10	Included
2,620,000	FG15X34H-FB-300 (4" FLG)	524	7.3	575	10	Included
2,770,000	FG15X34H-FB-320 (4" FLG)	554	7.3	608	10	Included
2,905,000	FG15X34H-FB-340 (4" FLG)	581	7.3	638	10	Included
3,050,000	FG15X34H-FB-360 (4" FLG)	610	7.3	670	10	Included

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Manifolded Liquid to Liquid General Purpose

The FlatPlate Advantage:

The FP-M Series is an ultra-compact, versatile unit designed for liquid-liquid applications up to 400 gpm and for practical use up to 2000 gpm with multiple units. One fifth the size of typical shell-and-tube heat exchangers, these models are space savers in large commercial and industrial applications.

Construction Notes:

- Large external manifolds allow easy piping to flange connections.
- Copper brazed 316L stainless steel plates
- Standard models used carbon steel external piping manifolds rated for 150 psig.
- Higher pressure versions available on request.
- Optional stainless steel manifolds and flanges available on request.

Code Approvals:

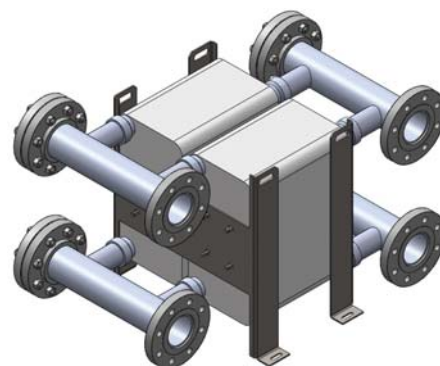
- Individual modules are UL listed and optional ASME stamped.

Selection Notes:

Unit selections are based on the following conditions of service:

- Side A media: 40% Propylene Glycol
- 35°F Side A Entering Temp.
- 45°F Side A Leaving Temp.
- Side B Media: Water
- 60°F Side B Entering Temp.
- 50°F Side B Leaving Temp.

If your conditions vary significantly from these, you can select a heat exchanger to your exact conditions using FlatPlateSelect.



Capacity (BTUH)	Model	Side A		Side B		Weight (lbs.)	Dimensions		
		Minimum Required Flow Rate (GPM)	Pressure Drop (PSIG) at the min. req. Flow Rate	Minimum Required Flow Rate (GPM)	Pressure Drop (PSIG) at the min. req. Flow Rate		Width	Length	Depth
2,000,000	FP10X20L- 160M (4" FLG)	400	7.5	425	9.5	506	29.4"	28.4"	38.6"
2,300,000	FP10X20L- 200M (4" FLG)	460	7.6	489	9.6	547	29.4"	28.4"	40.4"
2,500,000	FP10X20L- 240M (4" FLG)	500	7.5	531	9.5	588	29.4"	28.4"	42.2"
2,700,000	FP10X20L- 280M (4" FLG)	540	7.8	574	9.7	628	29.4"	28.4"	44.0"
2,800,000	FP10X20L- 320M (4" FLG)	560	7.7	595	9.5	670	29.4"	28.4"	45.8"
2,900,000	FP10X20L- 360M (4" FLG)	580	7.7	616	9.4	710	29.4"	28.4"	47.6"
3,000,000	FP10X20L- 400M (4" FLG)	600	7.8	638	9.5	751	29.4"	28.4"	49.4"

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Double Wall Liquid to Liquid General Purpose

The FlatPlate Advantage:

When local codes require potable water isolation, the FlatPlate DW series provides a clean solution. It features a "true" double wall vented design, with double wall plates and double seal fluid ports, both of which have positive leak detection.

Paired with the quicker response that comes from brazed PHEs, this is an excellent solution for isolating potable water.

Construction Notes:

- Full thickness copper-brazed 316L stainless steel plates for longer life and reliability.
- Mounting studs are included as standard for easy mounting with optional mounting brackets.
- Maximum Allowable Working Pressure is 450 psig.

Code Approvals:

- UL Listed as standard
- CRN available on request
- ASME code stamp available on request.
- CE/PED available on request

Selection Notes:

Unit selections are based on the following conditions of service:

- Side A media: 40% Propylene Glycol
- 35°F Side A Entering Temp.
- 45°F Side A Leaving Temp.
- Side B Media: Water
- 60°F Side B Entering Temp.
- 50°F Side B Leaving Temp.

If your conditions vary significantly from these, you can select a heat exchanger to your exact conditions using FlatPlateSelect.

Capacity (BTUH)	Model	Side A		Side B		Weight (lbs.)	Accessories for Better Performance Mounting Bracket
		Minimum Required Flow Rate (GPM)	Pressure Drop (PSIG) at the min. req. Flow Rate	Minimum Required Flow Rate (GPM)	Pressure Drop (PSIG) at the min. req. Flow Rate		
20,000	DW5X12-10 (1"MPT)	5	4	5	3.8	7	BKT5X12
35,000	DW5X12-14 (1"MPT)	7	4.3	7	4.7	8	BKT5X12
40,000	DW5X12-16 (1"MPT)	8	4.1	9	4.7	8	BKT5X12
50,000	DW5X12-20 (1"MPT)	10	3.9	11	4.8	10	BKT5X12
60,000	DW5X12-24 (1"MPT)	12	3.8	13	4.8	11	BKT5X12
70,000	DW5X12-30 (1"MPT)	14	3.3	15	4.2	13	BKT5X12
80,000	DW5X12-36 (1"MPT)	16	3	17	3.8	14	BKT5X12
90,000	DW5X20-40 (1-1/4"MPT)	18	4	19	5	25	BKT5X20
110,000	DW5X20-50 (1-1/4"MPT)	22	3.8	23	4.8	30	BKT5X20
130,000	DW5X20-60 (1-1/4"MPT)	26	3.8	28	4.8	35	BKT5X20
140,000	DW5X20-70 (1-1/4"MPT)	28	3.3	30	4.1	40	BKT5X20
170,000	DW5X20-80 (1-1/4"MPT)	34	3.9	36	4.9	44	BKT5X20
190,000	DW5X20-90 (1-1/4"MPT)	38	3.9	40	5	49	BKT5X20
200,000	DW5X20-100 (1-1/4"MPT)	40	3.7	43	4.6	54	BKT5X20
220,000	DW5X20-110 (1-1/4"MPT)	44	3.9	47	4.9	59	BKT5X20
240,000	DW5X20-120 (1-1/4"MPT)	46	3.7	49	4.6	64	BKT5X20

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Industrial Liquid to Liquid General Purpose

The FlatPlate Advantage:

The MPN Series is designed specifically for aggressive media, where chlorine, biological elements or low concentrations of acids are present. It is rugged, yet very compact, representing advanced technology in aggressive environment duty plate heat exchangers.

Its proprietary nickel-chrome brazed, marine-grade stainless steel plates offer significant improvements in reliability over copper brazing and traditional stainless materials and have the high efficiency heat transfer associated with plate heat exchangers.

Construction Notes:

- Full-thickness marine-grade stainless steel plates for longer life and reliability
- Proprietary nickel-chrome brazing.
- Connections are type 304 stainless steel male pipe thread.
- Mounting studs are included as standard for easy mounting with optional mounting brackets.
- Maximum Allowable Working Pressure is 300 psig.

Code Approvals:

- UL Listed as standard
- CRN available on request
- ASME code stamp available on request.
- CE/PED available on request

Selection Notes:

Unit selections are based on the following conditions of service:

- Side A media: 40% Propylene Glycol
- 35°F Side A Entering Temp.
- 45°F Side A Leaving Temp.
- Side B Media: Water
- 60°F Side B Entering Temp.
- 50°F Side B Leaving Temp.

If your conditions vary significantly from these, you can select a heat exchanger to your exact conditions using FlatPlateSelect.

Capacity (BTUH)	Model and Size MPN = Model 5X12 = Nominal Size -10 = Plate Count (1" MPT) = Connection	Side A		Side B		Weight (lbs.)	Accessories for Better Performance
		Minimum Required Flow Rate (GPM)	Pressure Drop (PSIG) at the min. req. Flow Rate	Minimum Required Flow Rate (GPM)	Pressure Drop (PSIG) at the min. req. Flow Rate		Mounting Bracket
7,000	MPN5X12-4 (3/4" MPT)	1	5.3	2	1.8	4	BKT5X12
10,000	MPN5X12-6 (3/4" MPT)	2	2.8	2	1.7	5	BKT5X12
20,000	MPN5X12-8 (3/4" MPT)	4	4.8	4	4	5	BKT5X12
30,000	MPN5X12-10 (3/4" MPT)	6	6	6	6	6	BKT5X12
40,000	MPN5X12-14 (3/4" MPT)	8	4.9	9	5.5	7	BKT5X12
50,000	MPN5X12-16 (3/4" MPT)	10	5.5	11	6.7	8	BKT5X12
75,000	MPN5X12-24 (1" MPT)	15	5.2	16	6.8	10	BKT5X12
100,000	MPN5X12-36 (1-1/4" MPT)	20	4.1	21	5.4	14	BKT5X12
150,000	MPN5X12-50 (1-1/4" MPT)	30	4.8	32	6.7	19	BKT5X12
200,000	MPN5X12-70 (1-1/4" MPT)	40	4.8	43	6.6	25	BKT5X12
300,000	MPN10X20L-24 (1-1/2" MPT)	60	5.6	64	6.7	81	BKT10X20S
400,000	MPN10X20L-36 (1-1/2" MPT)	80	4.5	85	5.6	93	BKT10X20S
500,000	MPN10X20L-50 (2" MPT)	100	3.9	106	5	107	BKT10X20S
700,000	MPN10X20L-70 (2" MPT)	140	4.5	149	5.7	128	BKT10X20S
900,000	MPN10X20L-90 (2-1/2" MPT)	180	5.3	191	6.8	148	BKT10X20S
1,000,000	MPN10X20L-110 (2-1/2" MPT)	200	5.3	213	6.7	169	BKT10X20L
1,100,000	MPN10X20L-130 (2-1/2" MPT)	220	5.5	234	6.9	189	BKT10X20L
1,200,000	MPN10X20L-160 (2-1/2" MPT)	240	5.7	255	7	220	BKT10X20L
1,270,000	MPN10X20L-200 (2-1/2" MPT)	254	5.6	270	7	260	BKT10X20L

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Replacing Another Brand of BPHE

The FlatPlate Advantage:

FlatPlate heat exchangers are easy replacements for several import brands used in a wide range of HVAC/R equipment, supermarket systems and process chillers.

FlatPlate models meet or exceed performance and design pressure ratings of the models shown below.

Dimensional Fit Notes:

For replacement applications, check the dimensions on the following units, which may be slightly larger or smaller than the unit it is replacing:

- SWEP B10 models are 4.0" to 4.5" high x 12" high, replaced by FlatPlate models which measure 4.9" wide x 12" high.
- SWEP B45 and B50 models are 9.5" to 10" wide by 20" high, replaced by FlatPlate models measuring 9.8" wide by 20" high.

Pressure Rating Notes:

Check the operating pressure before ordering a replacement. All CH and C Series heat exchangers are rated up to 450 psig operating pressures. If a higher operating pressure is needed:

- Change CH to CH-XP.
- Change C to C-XP.

When replacing a heat exchanger that is less than 5 years old:

If the unit being replaced has been in service for less than 5 years, the cause or mode of failure may repeat itself due to water quality or other factors.

We can perform a failure analysis and report for a nominal fee, as part of a replacement heat exchanger order.

DX Evaporators	
SWEP Model	Is replaced by this FlatPlate Model
B10*10	CH3/4AG
B8*20	CH3/4AG
B10*16	CH1AG
B8*30	CH1AG
B10*20	CH2AG
B10*30	CH3AG
B10*40	CH3-1/2AG
B15*20	CH2G
B25*10	CH2G
B15*30	CH3G
B25*20	CH3G
B25*26	CH4G
B15*40	CH4G
B25*30	CH5G
V27*30	CH5G
V27*40	CH7-1/2G
B25*50	CH7-1/2G
V27*50	CH10BG
V45*30	CH10G
V50*30	CH10G
V45*40	CH15G
V50*40	CH15G
V45*50	CH20G
V50*50	CH20G
V45*70	CH25G
V50*70	CH25G
V45*80	CH30G
V50*80	CH30G
V45*100	CH40
V45*130	CH40
V50*130	CH40

Condensers	
SWEP Model	Is replaced by this FlatPlate Model
B8*20	C1AG
B10*16	C1AG
B8*30	C2AG
B10*20	C2AG
B8*50	C3AG
V10*30	C3AG
B15*20	C2G
B15*30	C3G
B25*16	C3G
B15*50	C4G
B25*20	C4G
B15*60	C5G
B25*26	C5G
B25*30	C7-1/2G
B25*40	C10G
B45*20	C10CG
B35*40	C10CG
B45*30	C15G
B35*24	C15G
B45*40	C20G
B35*30	C20G
B45*50	C25G
B35*40	C25G
B45*60	C30G
B35*50	C30G

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Replacing Another Brand of BPHE

The FlatPlate Advantage:

FlatPlate heat exchangers are easy replacements for several import brands used in a wide range of HVAC/R equipment, supermarket systems and process chillers.

FlatPlate models meet or exceed performance and design pressure ratings of the models shown below.

Dimensional Fit Notes:

For replacement applications, check the dimensions on the following units, which may be slightly larger or smaller than the unit it is replacing:

- Alfa Laval CB25 and CB26 models are 4.0-4.5" wide x 12" high, replaced by FlatPlate models which measure 4.9" wide x 12" high.
- Alfa Laval CB75 and CB76 models are 7.5" wide by 24.5" high, replaced by FlatPlate models measuring 9.8" wide by 20" high.

Pressure Rating Notes:

Check the operating pressure before ordering a replacement. All CH and C Series heat exchangers are rated up to 450 psig operating pressures. If a higher operating pressure is needed:

- Change CH to CH-XP.
- Change C to C-XP.

When replacing a heat exchanger that is less than 5 years old:

If the unit being replaced has been in service for less than 5 years, the cause or mode of failure may repeat itself due to water quality or other factors.

We can perform a failure analysis and report for a nominal fee as part of a replacement heat exchanger order.

DX Evaporators	
Alfa Laval Model	Is replaced by this FlatPlate Model
CB25-12	CH3/4AG
CB26-12	CH3/4AG
CB25-14	CH1AG
CB26-14	CH1AG
CB25-24	CH2AG
CB26-24	CH2AG
CB25-34	CH3AG
CB26-34	CH3AG
CB25-44	CH3-1/2AG
CB26-44	CH3-1/2AG
CB50-14	CH2G
CB51-14	CH2G
CB50-20	CH3G
CB51-20	CH3G
CB50-26	CH4G
CB51-26	CH4G
CB50-30	CH5G
CB51-30	CH5G
CB50-50	CH7-1/2G
CB51-50	CH7-1/2G
CB75-30HX	CH10G
CB76-30HX	CH10G
CB75-40HX	CH15G
CB75-50HX	CH20G
CB76-50HX	CH20G
CB75-70HX	CH25G
CB76-70HX	CH25G
CB75-80HX	CH30G
CB76-80HX	CH30G
CB75-100HX	CH40
CB76-100HX	CH40

Condensers	
Alfa Laval Model	Is replaced by this FlatPlate Model
CB25-16	C1AG
CB26-16	C1AG
CB25-20	C2AG
CB26-20	C2AG
CB25-30	C3AG
CB26-30	C3AG
CB50-14	C2G
CB51-14	C2G
CB50-16	C3G
CB51-16	C3G
CB50-20	C4G
CB51-20	C4G
CB50-26	C5G
CB51-26	C5G
CB50-30	C7-1/2G
CB51-30	C7-1/2G
CB50-40	C10G
CB51-40	C10G
CB75-20	C10CG
CB76-20	C10CG
CB75-30	C15G
CB76-30	C15G
CB75-40	C20G
CB76-40	C20G
CB75-50	C25G
CB76-50	C25G
CB75-60	C30G
CB76-60	C30G

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Accessories to Make Your Life Easier

Insulation Kits for Evaporators and Subcoolers

The FlatPlate Advantage:

Insulation kits prevent excessive sweating, ice buildup, or heat loss, on Evaporators and Subcoolers. FlatPlate insulation kits are precut and come out of the box with peel-and-stick adhesive for easy and quick installation. No knives or messy adhesives to wrestle with.

Construction Details:

- Kits consist of three pieces; a front, a back and a side.
- All pieces are precut to a specific model.
- Insulation is 1/2" black Armaflex®.
- Adhesive is pre-applied with protective backing for shipment.
- Install by peeling off the backing and sticking the piece to the heat exchanger.

Selection Details

- Single kit is recommended for operating conditions where the lowest temperature is 20°F or higher.
- For operating temperatures less than 20°F, we recommend two kits.
- Kits are suitable up to maximum temperature of 220°F.



Mounting Brackets

The FlatPlate Advantage:

Holding a brazed plate heat exchanger in place while you pipe it up can be a difficult challenge, especially with sweat connections. Piping alignment problems can decrease system efficiency and cause premature piping failures. FlatPlate makes this easy to prevent. Every FlatPlate brazed plate heat exchanger is equipped as standard with mounting studs which allow the use of our proprietary mounting brackets.

Construction Details:

- Bracket is made of AISI 304 Stainless Steel.



10X20 Size Shown

Zinc Anode

The FlatPlate Advantage:

A Zinc Anode is required for any application where galvanic corrosion is possible.



Y-Strainer

The FlatPlate Advantage:

It is important to keep the liquid media clean to reduce fouling and clogging of the FlatPlate heat exchanger. In some cases, it is a requirement for operation of the system. We stock sizes up to 2-1/2".

- Construction Details
- Construction material is cast bronze.
- They are rated for working pressure of 400 psig at 150°F.
- Connections at both ends are Female Pipe Thread (FPT).
- The 20 mesh filter is removable and cleanable.



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Field Application Tips - Liquid Chillers

The FlatPlate Advantage:

For projects involving comfort cooling for large homes, commercial and industrial cooling, or process cooling, a liquid chiller can be configured using standard industry condensing units in both residential and commercial versions.

These applications are typically noncritical temperature control and allow an economical and reliable installation.

FlatPlate units are used in widely available process liquid chiller packages, available from a number of manufacturers for greater capabilities, precision liquid temperature control and other features.

Selection Notes:

- Under-sizing the FlatPlate unit or over-sizing the condensation unit could cause freeze conditions.
- Evaporation temperatures below 34°F should be avoided, unless glycol or non-freezing liquid is used.
- Applications below 25°F ETP should include use of oil separator.
- Applications with high transient loads should use suction accumulator.
- Suction to Liquid heat exchanger recommended for applications with long suction or liquid pipe runs.
- Matching BTUH performance of the condensing unit (at design ETP Evaporator Temperature at design Pressure) to the appropriate FlatPlate Model (or one size larger) is very

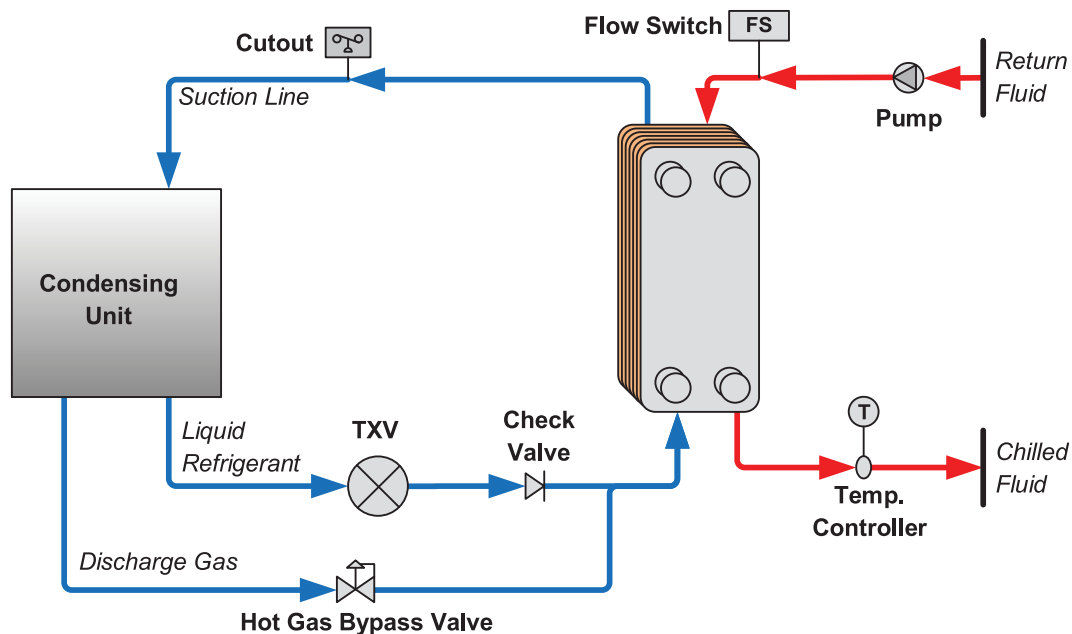
important. For example: For a condensing unit rated at 230,000 BTUH at 45°F ETP, use a FlatPlate model CH20 or CH25.

Pumps:

- Liquid pump should be sized for 2.4-3 gpm per ton, with ample pump head capacity for the heat exchanger, piping, and load for full flow.
- Variable flow through a FlatPlate DX Evaporator is not recommended.
- For medium and low temperature applications, be sure to include pump power and piping thermal losses in the load calculations.

Controls and Freeze Protection:

Fatigue failure through freezing is the single most common cause of brazed plate heat exchanger failure. Take these steps to prevent that from happening in your installation.



Put in the proper controls.

- Use a flow switch or differential pressure switch to verify that liquid flow exists before the refrigerant circuit is activated.
- Incorporate a low pressure cutout into the suction line after the heat exchanger, set to cut off the

compressor should the refrigerant pressure decrease below the equivalent freeze point of the liquid being chilled, but no less than 28°F for water chillers.

- A temperature controller should be used to maintain liquid temperatures. Compressor anti-cycling may be needed.

- A hot gas bypass valve and modulating control should also be used for low load control, and part load requirements, if needed.
- Digital pulsing expansion valves and digital (on/off) hot gas valves are not suitable.

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Field Application Tips - Process Liquid Chillers with Storage Tank

The FlatPlate Advantage:

Liquid Chillers with storage tanks have several advantages, including:

- better process temperature control.
- higher transient load capabilities
- ability to handle variable flow rates
- better compressor/chiller operation
- may allow use of smaller chillers, depending on the average and peak loads.

Some process applications also have highly variable loads and require chilled liquid storage tanks, or make-up water tanks. A Liquid Chiller can be configured (same as previous section), integrating a standard storage tank, 40 to 200 gallons, or large up to several thousand gallons.

Condensing Unit Selection Notes:

When combined with a Liquid Storage tank, the overall compressor size and condensing unit selection is sometimes smaller, yet highly dependent upon the pull-down rate required for the tank, tank recovery rate needed, and maximum transient load, if a continuous full load is not always present.

Piping Notes:

The pump for the chiller is normally sized for 2.4 gpm to 3 gpm per ton, but is constantly re-circulated to the tank. This allows variable or constant flow to the load. A temperature control mixing valve can be added to provide precise liquid temperature control if needed.

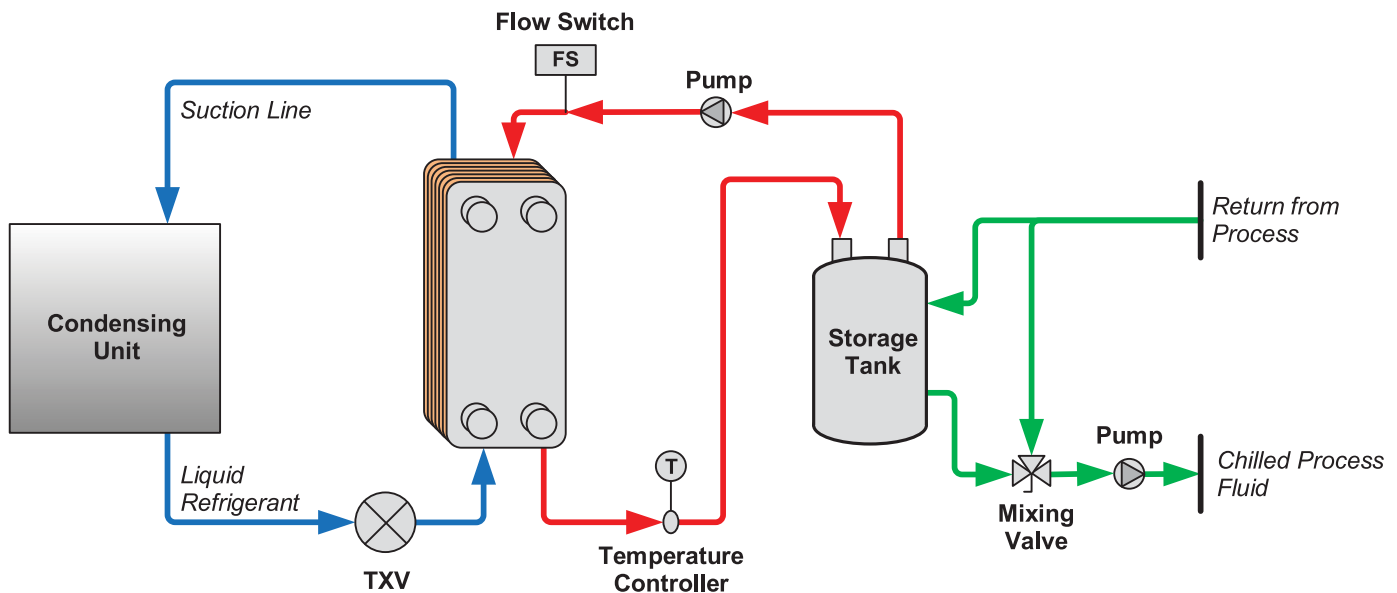
Controls:

Proper controls are required to maintain liquid temperatures and prevent freeze conditions.

- A flow switch or differential pressure switch must be used to verify that liquid flow exists before the refrigerant circuit is activated.
- A low pressure cut-out must be incorporated into the suction line after the heat exchanger, set to cut off the compressor should the refrigerant pressure decrease below the equivalent freeze point of the liquid being chilled, but no less than 28°F for water chillers.
- A temperature controller should be used to maintain liquid temperatures. Compressor anti-cycling may be needed.
- A hot gas bypass valve is typically not needed depending on tank size.
- Digital pulsing expansion valves and hot gas valves are not suitable.

Application Selection Notes:

For applications using water, 9F to 10F approach temps (Leaving water temp minus Etp Evap temp), use standard models. For all other design conditions, glycols, oils and other liquids, contact your local FlatPlate rep or distributor for a computer selection.



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Field Application Tips - Liquid Isolation

The FlatPlate Advantage:

Some cooling applications require liquid isolation to ensure:

- that any possible failure of the refrigeration system will not contaminate the process with refrigerant or refrigerant oil
- proper control of the process
- protection of the refrigeration system.

Taking the simple step to put in an Isolation Heat Exchanger is good design practice for system reliability, safety, and easier maintenance, especially in these applications:

- Potable make-up water
- Water chilling to 35°F for bakeries
- Ethylene Glycol to potable water

- Food Process Liquids
- Wine and liquor cooling
- Live fish and wildlife cooling
- Critical (and medical) liquids and gases
- High temperature liquids (e.g. water or oil)
- Cooling acids or solvents
- Machinery oil cooling
- Hydraulic Systems cooling
- Liquids with particulates

Isolation heat exchangers are also very popular in industrial manufacturing operations where a plant chilled water (or glycol) loop, or hot water loop is present. Isolation (or Interface) heat exchangers can be used to isolate machinery and process needs, to provide

precise temperature control and to protect the machinery from variable water quality.

Selection Notes:

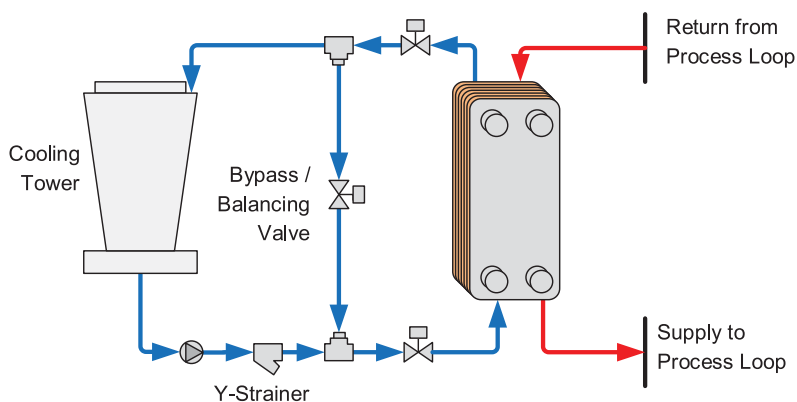
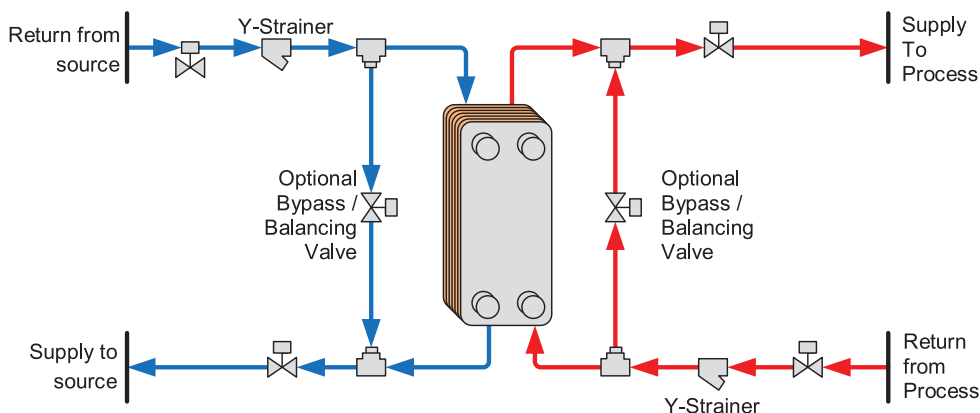
Typically a FlatPlate Liquid-To-Liquid model is selected based on a 10°F approach (Chiller Liquid Loop Design Temp minus the Process Loop Design Temp). Approaches of 5-6°F are also practical and approaches of 2-3°F are also possible but less economical. Depending on the liquid or application, an FP, FPN, or MPN model is chosen based on design conditions and overall BTUH load. A computer selection is required. Contact your local FlatPlate representative or distributor.

Piping Notes:

The isolation loop should be a constant flow rate, whereas the Process loop can be variable or constant.

Application Notes:

- **35°F Water** - For applications requiring 35°F potable water on the process side, the chilled liquid loop should be 15% or greater Propylene Glycol, operating at 28-30°F. The appropriate Isolation heat exchanger can be selected for 5°F approach for achieving 35°F water temperatures.
- **High Temperature Liquids or Oils** - For cooling 80-220°F temperature liquids, the appropriate heat exchanger is typically selected based on 50°F Entering Chilled Water / 60°F Leaving and the Process Liquid temperatures as desired. This allows the Liquid Chiller to operate normally and the Isolation Heat Exchanger to be very small and cost effective.
- **Fish and Aquatic Wildlife** - Copper is toxic to many fish and crustaceans. Use only nickel-chrome brazed BPHEs or Titanium GPHEs.
- **Liquid Compatibility** - For compatibility with special liquids, contact your local FlatPlate representative or distributor.



Controls Notes:

Several methods of control are possible depending on the requirement. The process loop temperature can be controlled by modulating the Chilled Liquid bypass valve, or modulating a Process loop valve, or left to run full at all times, but controlling the Chiller/Compressor.

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Field Application Tips - Replacing an STHE

Replacing a Shell-and-Tube Heat Exchanger being used as an Evaporator

The FlatPlate Advantage:

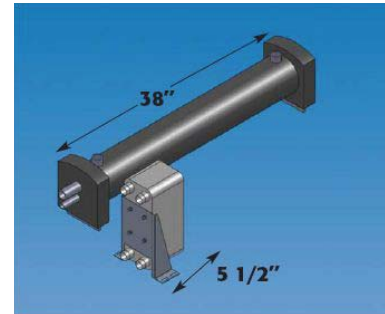
FlatPlate CH and CH-2C models can be used for replacement of chiller barrels in comfort cooling chillers and process chillers. The reasons to use a FlatPlate CH, CH-2C or CHN Series unit include lower installed cost, lower shipping costs, easier rigging and installation, and much less space needed.

Application Notes:

Heat Exchanger Selection: The FlatPlate heat exchanger should be selected based on total BTUH load (design tons at 12,000 BTUH/ton), based on design Etp (Evaporator Temperature at Pressure), Liquid Temperatures In/Out and flow rate. For most applications use 2.4 gpm per ton and select from the standard models, based on a 9°F or 10°F approach

temperature. Over-sizing one or two models is okay. If operating conditions are different than standard, contact your local FlatPlate rep or distributor.

Liquid Piping: Strainer is recommended to catch debris in pipes. Heat exchanger must be piped in counterflow. Controls: Use existing low pressure (LP) cut-out and flow switch for primary safety controls. Check all controls for proper operation. For water chiller, the low pressure cut-out should NOT be set below 28°F based on refrigerant pressure. Note: Leaving chilled water cut-out is not adequate to protect any evaporator heat exchanger from freeze-up. If pump-down cycle is present, set low pressure cut-out at 28°F or 4°F below freezing temperature of liquid.



5 Ton Chiller Shown

Key Considerations: If the FlatPlate heat exchanger is being used to replace a failed chiller barrel, determine the cause of the failure (i.e. low pressure cut-out failure or flow switch failure) and thoroughly check out the system operation.

Replacing a Shell-and-Tube Heat Exchanger being used as a Condenser

The FlatPlate Advantage:

FlatPlate C and MCN models are used widely for water-cooled systems and replacement of shell-and-tube condensers because of their lower installed cost, lower shipping costs, easier rigging and installation, and much smaller footprint. Replacements applications include:

- Comfort Chillers
- Modular Chillers
- Process Equipment
- Ice Machines
- Fan Coil/Terminal/Heat Pumps
- Supermarket Systems
- Computer Room Systems

New unit applications also include:

- Closed loop systems using Dry Coolers (Air to Water)
- Process Chillers
- Refrigerated Warehouses
- Floor Warmers
- Walk-In freezers
- Supermarket Systems
- Earth-Coupled Heat Pumps
- Lake and River Water

Application Notes:

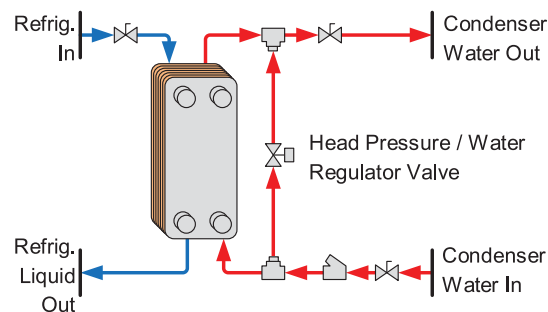
Heat Exchanger Selection: The FlatPlate heat exchanger should be selected based on total BTUH heat of rejection (tons at 15,000 BTUH/ton), based on design Ctp (Condensing Temperature), Water

Temperatures In/Out and flow rate. For most applications use 3 gpm per ton and select from the standard models. For non-standard operating conditions, contact your local FlatPlate rep for assistance. For closed loop condensers, use C Series. For open loop condensers using cooling towers, or applications with variable water quality, consider using the MCN Series. For lake water and water with pH level between 2.0 and 6.0, use the MCN Series.

Waterside Piping: A 20-60 mesh strainer MUST be installed on the condenser waterside to protect from pipe debris and tower debris. Heat exchanger MUST be piped in counter-flow.

Controls: A water flow regulator valve used to control compressor heat pressure is typical. However, if water flow rates drop below 1 gpm per ton (for open loop systems), or water content has high scale build up, a) use a pump "run-a-round" loop to maintain constant flow to the condenser, or b) use a discharge head pressure regulator valve to maintain compressor head pressures, while maintaining lower condensing pressures (thus higher water flow rates for lower fouling and better system control).

Key Considerations: If the FlatPlate condenser is being used to replace a failed shell-and-tube condenser or coiled coaxial condenser, consider the life of the previous condenser and the reason it failed. Upgrading to the MCN model may improve overall life and customer satisfaction.



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Installation and Maintenance Notes

The FlatPlate Advantage:

With over 20 years of experience in refrigeration systems, we recommend the following key tips and tricks for installing FlatPlate heat exchangers as:

- Evaporators
- Desuperheaters
- Condensers
- Heat Pumps
- Subcoolers

Overall Notes

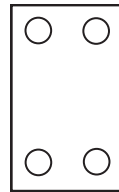
Installation Position: Heat exchanger must be installed upright in a vertical position, NOT with fittings facing down, NOT on its side.

Safety Pressure Protection: Each side of the unit should be properly protected from over-pressurizing through the use of an appropriate safety relief device.

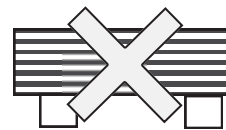
Sweat Connections: We recommend 45% silver solder with white brazing flux. Use a wet rag around the base of the connection, and do not overheat. Purge with nitrogen. DO NOT braise with the unit horizontal or sitting flat, since braze material may fall into the tube, clogging the distribution holes. Braze a complete joint to seal the tube to fitting joint.

Threaded Connections: Use Teflon or Mylar tap or other sealant on pipe thread connections to prevent leakage.

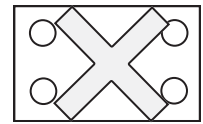
Mounting: Be sure to properly secure the heat exchanger. Do not weld or braze a mounting bracket to the heat exchanger. We recommend the use of the appropriate FlatPlate mounting bracket (see page 28).



YES



NO



NO

DX Evaporator Notes

Flow Switch: A pressure differential switch or flow switch MUST be installed on the liquid side of all DX evaporators to prevent possible freeze-up due to loss of flow. Due to the fast reaction time of brazed plate heat exchangers a low pressure cut-out or leaving temperature sensor on the liquid side does not have adequate response time.

Low Pressure Cut-out: In water chiller applications, in addition to the flow switch, the low pressure cut-out on the refrigerant side is the most important freeze protection control. To prevent potential freeze damage and to protect the heat exchanger and compressor, the low pressure cut-out should be set no lower than 28°F, based on evaporator refrigerant pressure at this temperature. If part-load or transient loads cause the evaporator to cycle off, use a resetting low pressure control with anti-cycling timer, or install a hot gas bypass control

to maintain the appropriate suction pressure at low loads. Note: Use of a leaving chilled water sensor will not provide adequate freeze protection.

Glycol Blends and Special Liquids: Make sure the glycol type (or liquid) and concentration is maintained at all times and that the freeze point is at least 10F below the operating evaporator temperature.

Water Strainer: A water strainer MUST be installed in water inlet circuit to protect the heat exchanger from restricted flow rate and/or blockage (16-20 mesh minimum, 20-40 mesh best choice).

Thermal Expansion Valve Adjustment: Some DX Evaporator models have a built-in DX distribution tube designed to distribute the gas evenly to provide optimum performance and operating stability. The thermal expansion valve may need a slight adjustment to obtain

proper operation with 5°F to 10°F Superheat. For optimum performance do not oversize the expansion valve and where practical, do not install elbows between the expansion valve and the DX inlet.

Oil Return: The DX Evaporator is installed with the Refrigerant in port at the bottom. If the Suction temperature is less than -10°F, and the fluid temp is less than 20°F, FlatPlate recommends the use of an oil separator or other method to prevent oil return problems.

Piping: Refrigerant inlet piping should be sized to provide at least a minimum liquid refrigerant velocity of 100fpm (0.5 m/s).

Insulation Kit: We recommend the use of the appropriate insulation kit (see page 28) to prevent or reduce condensation on the exterior of the heat exchanger.

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Installation and Maintenance Notes

Condenser Notes

Water Strainer: A water strainer **MUST** be installed in the water inlet circuit to protect the heat exchanger from restricted flow rate and/or blockage (16-20 mesh minimum, 20-40 mesh best choice).

Subcooler Notes

Thermal Expansion Valve Adjustment: Some DX Evaporator models have a built-in DX distribution tube designed to distribute the gas evenly to provide optimum performance and operating stability. The TXV may need a slight adjustment to obtain proper operation with 5F to 10F Superheat. For optimum performance do not oversize the expansion valve and where practical, do not install elbows between the expansion valve and the DX inlet.

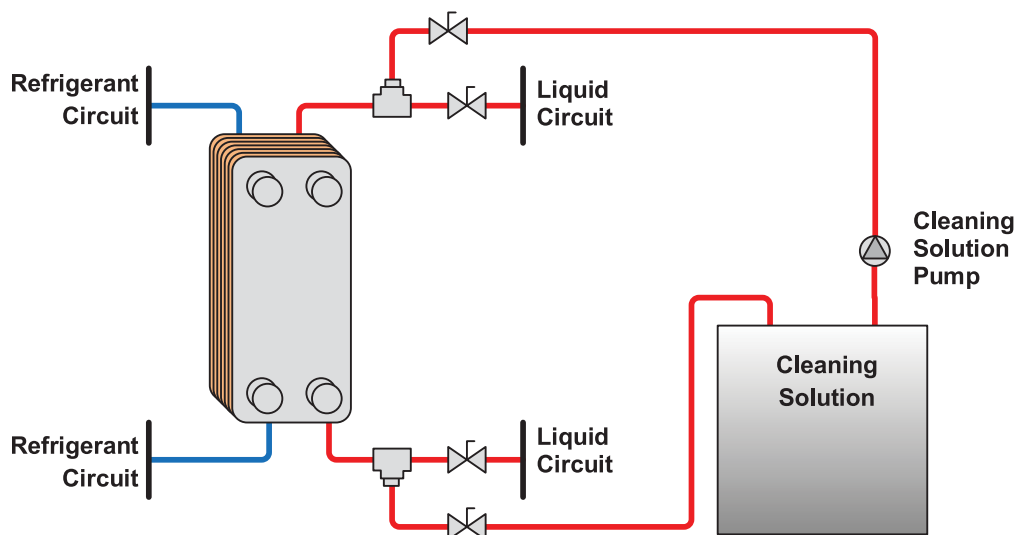
Insulation Kit: We recommend the use of the appropriate insulation kit (see page 28) to prevent or reduce condensation on the exterior of the heat exchanger.

Maintenance Notes

Water Quality: Water quality should be maintained at a pH of 7.4, and not less than 7.0 or higher than 8.0, for proper heat exchanger life. Ground water with high sulfur content or sulfuric acid, and low pH, may cause gradual copper erosion and premature failure of the heat exchanger. Contact your FlatPlate representative to discuss alternatives.

Cleaning: In some applications the FlatPlate brazed plate heat exchanger may be subjected to severe liquid or operating conditions that will lead to mineral scaling. This will penalize the performance of the heat exchanger. The right cleaning solution properly applied can restore heat exchanger function:

- A "nickel-safe" or "ice making machine" descaling solution available from a local wholesaler.
- A 5.0% phosphoric acid solution used at room temperature in many cases will restore the heat exchanger's performance.
- Use all cleaning solutions according to the manufacturer's instruction.
- Do not use sulfuric or hydrochloric acids.
- Follow the manufacturer's safety instructions.
- Always flush the heat exchanger thoroughly with fresh water after cleaning.
- Do not chemically clean the refrigerant circuit.



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Terms and Conditions of Sale

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1.1. GENERAL TERMS.

- 1.1 Binding Contract.** Unless otherwise noted in the Seller's Proposal, the Proposal shall lapse automatically upon the expiration of a thirty (30) day period after the date of its submission unless it has been previously accepted by Purchaser or revoked in writing by Seller. The Contract incorporating these Terms and Conditions does not become a binding contract until the Seller receives the Purchaser's unqualified acceptance of the Proposal or the Seller confirms the Purchaser's order in writing.

These Terms and Conditions are the only terms and conditions on which the Seller contracts for the supply of Equipment and they are incorporated in all contracts entered into by the Seller. Any other terms and conditions are hereby specifically rejected and are therefore excluded.

- 1.2 Plans, Drawing and Illustrations.** Proposal pages, catalogue illustrations and preliminary drawings are submitted only to show the general style, arrangement, approximate dimensions and weight of equipment. The Seller reserves the right to make such changes of design, construction or arrangement as it deems necessary to achieve the specifications contained herein.

- 1.3 Proprietary and Confidential Information.** This Proposal and all drawings, notebooks, operating data, specifications, and other information, data and material (whether orally disclosed, printed, handwritten, typed, numerically or computer generated, computer stored, or otherwise) furnished to Purchaser by either Seller or any of its subcontractors or sub-suppliers shall remain the proprietary and confidential property of Seller or the subcontractor or sub-supplier, respectively, and shall be used by Purchaser only with respect to the work covered by the Contract and shall not be used by Purchaser in connection with any other project. Such proprietary and confidential information and data shall not be shown or otherwise made available to any third party at any time without Seller's prior written consent.

Neither Purchaser itself shall, nor shall Purchaser permit any third party to, reverse engineer, measure or otherwise technically examine or test Seller's Equipment without Seller's prior written consent. Any such proprietary and confidential information which Purchaser determines must be disclosed to its employees shall only be disclosed to them on a need-to-know basis for the operation, maintenance, and repair of the Equipment provided under the Contract. Intellectual property or patent rights which may be obtained on the basis of the information given or made available to Purchaser under the Contract or with respect to Seller's Equipment shall remain the exclusive property of Seller or its subcontractor and/or sub-supplier, respectively.

2. SAFETY REQUIREMENTS OF PURCHASER.

Purchaser shall use, and shall train and require its employees to use and shall cause any end user to use, all safety devices, guards, and proper safe operating and maintenance procedures as prescribed by all applicable laws, rules, regulations, codes and standards and as set forth in operating and maintenance manuals and instruction sheets furnished by Seller. Purchaser shall not, and shall cause any end user not to, remove or modify any safety device, guard or warning sign.

If the Purchaser fails to strictly observe any of the obligations set forth in the preceding paragraph with regard to any of the Equipment, Purchaser agrees to defend Seller against, and indemnify and save Seller harmless from, any claim, liability or obligation (including the costs and attorneys' fees of any suit or claims related thereto) incurred by Seller as a result of persons being injured or property being damaged directly or indirectly in connection with the operation of such Equipment as a result of such failure. Purchaser also agrees to indemnify and save Seller harmless from, any claim, liability or obligation incurred by Seller as a result of persons being injured or property being damaged due to Purchaser's use of the Equipment for materials or products not specified in the Contract or use of non-original replacement parts not specifically authorized in writing by Seller or due to changes in the Seller equipment made by Purchaser without Seller's specific written authorization.

3. COMPLIANCE WITH LAWS.

The Seller shall use reasonable endeavors to ensure that the Equipment complies in technical respect with the agreed standards and in all other respects with applicable laws, rules, regulations, codes and standards of all federal, state, local and municipal governmental agencies having applicable regulatory jurisdiction, as such laws, rules, regulations, codes and standards are in effect on the date of the contract, provided that: (i) the Purchaser will include in its specifications or will bring to the attention of Seller in writing any state, local or municipal laws, rules, regulations, codes or standards which are different from those imposed by the federal governmental agencies and authorities; (ii) if any such federal, state, local or municipal laws, rules, regulations, codes or standards are changed, or if new laws, regulations, codes or standards or interpretations thereof are enacted or adopted subsequent to the date of the contract, which require a change in Seller's equipment or work, an equitable adjustment shall be made to the contract price, delivery schedule and payment terms; and (iii) Seller does not guarantee any compliance with, nor will Seller incur any liability for failure of the equipment or work to comply with, any federal, state or local pollution control, effluent or utility control laws, rules, regulations, codes or standards.

4. PRICE AND PAYMENT.

- 4.1** The purchase price shall be paid in accordance with the Proposal. Any right to retain due to payments or to set-off any claims shall be excluded unless any such claim or counterclaim of the Purchaser is undisputed by Seller or has been determined by a final judgment of the competent court or arbitration panel.

Any tax or other governmental charge now or thereafter levied upon the production, sale, use or shipment of equipment ordered or sold will be charged to and paid for by the Purchaser. Such taxes are not covered in the Seller's price(s) unless expressly so stated on the Seller's Proposal.

- 4.2** Whatever the means of payment used, payment shall not be deemed to have been effected before the Supplier's account has been fully and irrevocably credited.

- 4.3** If the Purchaser fails to pay by the stipulated date, the Seller shall be entitled to interest from the day on which payment was due. The rate of interest shall be one and one-half percent (1-1/2%) per month until the payment is made in full. Additionally, if Seller is required to expend costs and expenses in collecting any payments, Purchaser shall reimburse the Seller for such costs of collection (including reasonable attorneys' fees).

In case of late payment the Seller may suspend his performance of the Contract until it receives payment. If the Purchaser has not paid the amount due within three months of the due date, Seller shall be entitled to terminate the Contract by notice in writing to the Purchaser and to claim compensation for the losses and damages it has incurred.

5. TRANSPORTATION; INSURANCE; RISK OF LOSS.

5.1 Transportation; Delivery.

- 5.1.1** Where transportation costs are prepaid, Equipment will be shipped to an unloading point designated by the Purchaser. Unloading, haulage from the designated unloading point and further necessary handling shall be at the Purchaser's risk and expense, independent of any installation services that may be requested by the Purchaser.

- 5.1.2** Shipping instructions are to be supplied by the Purchaser at least 10 business days before the agreed on shipping date. In the event Purchaser fails to supply shipping instructions Seller at its option may place the Equipment in Seller's or any public or private storage facilities at the Purchaser's risk and expense. All such expenses shall be invoiced to Purchaser.

- 5.1.3** Equipment on which manufacture or delivery is delayed due to any cause within Purchaser's control may be placed in storage by Seller, for the Purchaser's account and risk, and regular charges and expenses in connection therewith shall be paid by Purchaser; but if, in Seller's sole opinion, it is unable to obtain or continue such storage, Purchaser shall, on request, provide or arrange for suitable storage facilities and assume all

costs and risks in connection therewith. When such delay is due to causes beyond control of either party, the matter of storage and the payment of charges therefor shall be negotiated in good faith.

- 5.2** Insurance. Purchaser accepts full responsibility for the safeguarding of all equipment delivered to the Purchaser until it is paid for in full. Until the contract price is paid in full, Purchaser shall provide and maintain insurance to the total value of the Equipment delivered hereunder against all risks of fire and explosion in the names of Purchaser and Seller, as their respective interests may appear, and shall also provide and maintain such insurance to the above value against flood, earthquake, windstorm, cyclone, tornado, hurricanes, riot and strike and civil commotion.

- 5.3** Title; Right of Possession; Security for Payment. The parties mutually agree that the Equipment specified herein shall at all times remain personal property regardless of the degree of its annexation to the real property and that the Equipment shall not by reason of any annexation to real property become a part thereof or otherwise a fixture. Title and right of possession of such Equipment shall remain in Seller at all times. Title shall pass to Purchaser in accordance with the delivery terms for the Equipment. Without waiving any rights to elect to proceed under applicable lien laws, Seller reserves a security interest in the equipment and parts furnished by it. By accepting delivery of the Equipment or parts, Purchaser grants to Seller a security interest in such Equipment and parts to secure the full and prompt payment for such Equipment and parts until the agreed price (including any notes thereto) for such Equipment and parts has been fully paid in cash. In the event of default in payment, Seller shall have all right of repossession and other rights available to a secured party under the laws applicable thereto. Any Equipment or parts may be separated from real estate for purpose of repossession by Seller or by its agent without liability for such removal if the Purchaser is in default in payment. Seller is authorized to execute, deliver and file with the appropriate filing office or offices all assignments, financing statements and other documents which Seller may require to evidence or perfect such security interest in accordance with applicable laws.

6. SELLER'S REMEDIES.

- 6.1** In the event of a material deterioration of Purchaser's financial situation or in the event of the insolvency of the Purchaser, Seller reserves the right to cancel the contract as well as the right to stop delivery of the goods and to resell same. Such a right shall not restrict or otherwise impair Seller's remedies for damages in the event of Purchaser's breach.

- 6.2** Should Purchaser fail to comply with the terms and conditions set forth herein, or if any writ or execution be levied on any of Purchaser's property, or a receiver be appointed, or if a petition in bankruptcy be filed by or against Purchaser, Seller may, upon election, demand the entire purchase price stated herein or may without notice or demand by process of law or otherwise, take possession of all or any of the equipment, wherever located, and retain all monies theretofore paid as compensation for the reasonable use of such equipment. If a contract arising from this Proposal is breached and is placed in the hands of an attorney for collection of any balance due or enforcement of any other of Seller's remedies, Purchaser agrees to pay all reasonable attorneys' fees and other expenses involved therein paid or incurred by Seller. Purchaser hereby waives any and all claims, damages and demands against Seller arising out of the repossession, retention and repair as aforesaid. All rights and remedies contained herein are cumulative and not alternative.

- 6.3** Seller reserves all other rights and remedies at law or equity available to it in the event of Purchaser's breach.

7. ASSIGNMENT.

The Purchaser shall not have the right to assign the agreement without the written consent of Seller.

8. SELLER'S LIABILITY; FORCE MAJEURE.

- 8.1** Seller shall not be liable for delay or loss or damage of any kind resulting from: (i) Purchaser failing to supply any necessary technical data, as required; (ii) Purchaser failing to supply the apparatus, materials and services required; (iii) any changes in designs or specifications made subsequent to acceptance of this Proposal; (iv) failure of supplier to furnish purchased material or auxiliary equipment within scheduled dates provided that the purchased material or auxiliary equipment was properly ordered and appropriately expedited; (v) by any other reason beyond Seller's control; or (vi) any delay caused by late payments by Purchaser.

- 8.2** Seller shall attempt to overcome but shall not be liable for any loss or damage from delay in delivery of any Equipment or completion of any work as a result of causes of any kind beyond the reasonable control of Seller, including, but not limited to, strikes or other labor difficulties, wars, riots, changes in laws and regulations and other acts of governmental authorities, inclement weather, fire, flood or unavoidable casualties, or any delays in transportation of materials, or inability to obtain timely delivery of materials from suppliers where such transportation or delivery has been properly procured and appropriately expedited. In the event of any such delay, Seller will notify the Purchaser within a reasonable time after Seller becomes aware of such cause of delay and it is agreed that the time for delivery or completion shall be extended for a period of time at least equal to the time lost by reason of the delay.

9. MATERIAL AND WORKMANSHIP WARRANTY.

Seller warrants to the Purchaser that the Equipment purchased from Seller is free from defects in material and workmanship. The warranty period shall be twelve (12) months from the date of Purchaser's initial operation using the Equipment but not more than eighteen (18) months from the date of delivery of the Equipment. Any warranty given by the Seller shall be subject to the following: (i) the Equipment is installed in accordance with Seller's specifications and instructions and is used and maintained normally and properly in accordance with Seller's instructions as to maintenance and operation, as set forth in written operation and maintenance manuals and instruction sheets furnished by Seller; (ii) the Equipment has not been changed without the prior written approval of Seller; (iii) Purchaser gives prompt written notice to Seller before the end of the warranty period specifying all alleged defects in the Equipment purchased; and (iv) Purchaser preserves and turns over to Seller and permits reasonable inspection by Seller of all allegedly defective Equipment, parts or items and access to the Equipment to observe its start-up, operation and maintenance.

This warranty shall not cover (i) any equipment furnished by Purchaser or any third party (other than a subcontractor of Seller), (ii) any defects arising from corrosion, abrasion, use of unsuitable lubricants, freezing or other operation outside of prescribed temperature ranges, or negligent attendance or faulty operation, (iii) ordinary wear and tear (e.g., gaskets), or (iv) any defects caused by errors on the part of the Purchaser in not providing a suitable place in which the Equipment is to be located, adequate foundation works, or adequate protection against influences within or outside the place where the Equipment is to be located which may affect the Equipment or its operation (improper storage), or (v) the performance of any equipment sold by Seller under conditions varying materially from those under which such equipment is usually tested under existing industry standards. Notwithstanding the warranty set forth above, Seller shall not warrant any equipment, where the vendor of such equipment (other than Seller) is specified by Purchaser, for a period longer than warranted by the vendor.

UNLESS OTHERWISE EXPRESSLY STATED IN ANY DOCUMENT ATTACHED TO THESE TERMS AND CONDITIONS, THIS WARRANTY OF MATERIAL AND WORKMANSHIP IS THE ONLY WARRANTY MADE BY SELLER AND IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, AND SELLER DISCLAIMS ON BEHALF OF ITSELF, ITS SUBCONTRACTORS AND SUBSUPPLIERS ANY AND ALL IMPLIED WARRANTIES, INCLUDING, WITHOUT LIMITATION, WARRANTIES OF MERCHANTABILITY, FITNESS FOR A SPECIFIC PURPOSE (OTHER THAN THE PURPOSE STATED IN THE PURCHASER'S SPECIFICATIONS SET FORTH IN THE CONTRACT), SUITABILITY OR PERFORMANCE. No other promise or affirmation of fact (including, but not limited to, statements regarding capacity or performance of the Equipment) shall constitute a warranty of Seller or give rise to any liability or obligation on the part of Seller.

Seller's obligation under this warranty and any other warranty or guarantee which is part of the Contract is strictly and exclusively limited to furnishing repairs or replacements for Equipment or parts determined to be defective on inspection by an authorized representative of Seller. Notwithstanding this exclusive remedy, if it is ultimately determined that the remedy fails in its essential purpose, then any action which may be brought against Seller subject to the terms of the contract will be limited to 100% of the contract price for the purchased Equipment for which the exclusive remedy has so failed. Seller assumes no responsibility and shall have no liability for any repairs or replacements by Purchaser without Seller's prior written authorization. If Seller did not originally install the Equipment, Seller shall have no liability for the costs of removing or segregating any defective Equipment so that the repairs or replacements can be made. If tests are requested by the Purchaser to determine the performance of the Equipment covered in the Seller's Proposal, the test procedure to be used must be acceptable to the Seller, and the Purchaser agrees to pay to the Seller the cost of any such test.

10. DAMAGES.

NOTWITHSTANDING ANY OTHER PROVISION OF THE CONTRACT TO THE CONTRARY:

- (A)** SELLER'S AND ITS SUBCONTRACTORS' AND SUBSUPPLIERS' AGGREGATE RESPONSIBILITY AND LIABILITY, WHETHER ARISING OUT OF CONTRACT OR TORT OR ANY OTHER LEGAL CONTEXT OR THEORY, INCLUDING NEGLIGENCE AND STRICT LIABILITY, UNDER THE CONTRACT, INCLUDING, BUT NOT LIMITED TO, ALL CLAIMS FOR BREACH OF ANY WARRANTY OR GUARANTEE, FAILURE OF PERFORMANCE OR DELAY IN PERFORMANCE BY SELLER OR PERFORMANCE OR NON-PERFORMANCE OF THE PURCHASED EQUIPMENT SHALL NOT EXCEED THE CONTRACT PRICE FOR THE PURCHASED EQUIPMENT; PROVIDED, HOWEVER, THAT THIS LIMITATION WILL NOT APPLY TO ANY LIABILITY OF SELLER FOR DIRECT DAMAGES CLAIMED BY PURCHASER FOR PHYSICAL DAMAGE TO PURCHASER'S PROPERTY (OTHER THAN EQUIPMENT PROVIDED BY SELLER) OR FOR DIRECT DAMAGES CLAIMED BY THIRD PARTIES FOR SUCH THIRD PARTIES' PERSONAL INJURY OR PHYSICAL PROPERTY DAMAGE (FOR WHICH PURCHASER IS LIABLE) TO THE EXTENT CAUSED BY THE NEGLIGENT ACTS OR OMISSIONS OR WILLFUL MISCONDUCT OF THE SELLER, FOR ALL OF WHICH MATTERS SELLER SHALL BE LIABLE UP TO AN AMOUNT OF \$1,000,000 IN THE AGGREGATE, AND

- (B)** IN NO EVENT SHALL SELLER, ITS SUBCONTRACTORS OR SUBSUPPLIERS BE LIABLE IN CONTRACT OR IN TORT UNDER ANY OTHER LEGAL CONTEXT OR THEORY, INCLUDING NEGLIGENCE AND STRICT LIABILITY, FOR ANY SPECIAL, PUNITIVE, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES OF ANY KIND OR CHARACTER, INCLUDING, BUT NOT LIMITED TO, LOSS OF USE OF PRODUCTIVE FACILITIES OR EQUIPMENT, COSTS OF PRODUCT RECALL, PLANT DOWNTIME, DAMAGE TO OR LOSS OF PRODUCT, CHEMICALS, CATALYSTS, FEEDSTOCK OR OTHER RAW MATERIALS, LOSS OF REVENUES OR PROFITS OR LOSS UNDER PURCHASES OR CONTRACTS MADE IN RELIANCE ON THE PERFORMANCE OR NON-PERFORMANCE OF THE PURCHASED EQUIPMENT, WHETHER SUFFERED BY PURCHASER OR ANY THIRD PARTY, OR FOR ANY LOSS OR DAMAGE ARISING OUT OF THE SOLE OR CONTRIBUTORY NEGLIGENCE OF THE PURCHASER, ITS EMPLOYEES OR AGENTS OR ANY THIRD PARTY.

TO THE EXTENT THAT SELLER OR THE PURCHASER MAKES ANY CLAIM UNDER ANY FRAUD OR TORT THEORY FOR THE PURPOSE OF CIRCUMVENTING THE LIMITATIONS AND DISCLAIMERS SET FORTH ABOVE AND IS UNSUCCESSFUL IN PREVAILING ON THOSE CLAIMS, IT HEREBY AGREES TO REIMBURSE AND INDEMNIFY THE OTHER PARTY FOR ALL ATTORNEYS' FEES AND EXPENSES AND COSTS INCURRED BY THE OTHER PARTY IN DEFENDING SUCH CLAIM.

11. ALTERATION - MODIFICATION.

No waiver, alteration or modification of these Terms and Conditions, except as noted in the text of the Proposal shall be valid unless made in writing and signed by an authorized representative of Seller.

12. PATENTS.

Seller shall hold Purchaser harmless against any claim that Seller's Equipment infringes United States apparatus patents, but Seller makes no representation or warranty, and Seller shall have no responsibility for any infringement or unfair competition resulting from, the use of Seller's Equipment with the Purchaser's process, or in combination with other equipment not supplied by Seller.

13. PRODUCT SELECTION AND USE.

Notwithstanding Seller's warranty obligations pursuant to these General Terms and Conditions of Sale, the Purchaser shall be responsible for accurate design and operating conditions used in the selection and use of the Seller's products. The Purchaser's selection and use of Seller's products from published literature shall be at the Purchaser's risk and appropriate application, design conditions and performance criteria use.

14. STANDARDS AND TOLERANCES.

All product dimensions and published information is subject to change without notice. All of Seller's products furnished to the Purchaser shall also be subject to tolerances and variations consistent with industry trade concerning dimensions, composition and mechanical properties and normal variations in performance characteristics and quality.

15. INTEGRATION CLAUSE.

Purchaser acknowledges (1) that the Contract may not be modified or terminated except in writing signed by a duly authorized representative of Seller making specific reference to the Contract, and (2) the Purchaser may not assign the contract without the prior written consent of Seller.

16. DISPUTE RESOLUTION; GOVERNING LAW

Any determination, agreement or performance which is disputed or cannot be made, resolved or agreed within fourteen (14) days of the date requested by either Purchaser or Seller or such longer period for resolution as may be mutually agreed shall be submitted for resolution by the chief executive officers of the Purchaser and the Seller. It shall be a condition precedent to any subsequent proceeding that the dispute shall be submitted for resolution by such chief executive officers, but if these officers shall not reach a resolution within twenty-one (21) days of the date of the dispute, then the matter shall be finally settled by arbitration under the Rules of the American Arbitration Association by one or more arbitrators appointed in accordance with such Rules. The place of arbitration will be Philadelphia, Pennsylvania. The contract between the Seller and the Purchaser and their respective performances shall be construed under and governed by the laws of Pennsylvania.

17. DEFINITIONS

In These Terms and Conditions:

"Contract" means the contract between the Seller and the Purchaser for the supply of Equipment which will comprise these Terms and Conditions, the Seller's Proposal, any documents referred to in the Proposal as forming part of the contract, the Purchaser's order and the Seller's confirmation of that order (or the Purchaser's unqualified acceptance of the Proposal);

"Equipment" means the equipment, goods and materials to be supplied to the Purchaser under the Contract;

"Proposal" means the Seller's written proposal to the Purchaser for the supply of the Equipment;

"Purchaser" means the person identified as the purchaser of the Equipment in the Proposal and the Contract;

"Seller" means GEA Heat Exchangers, Inc., PHE Division

The specifications contained in this printing unit are intended only to serve the non-binding description of our products and services and are not subject to guarantee. Binding specifications, especially pertaining to performance data and suitability for specific operating purposes, are dependent upon the individual circumstances at the operation location and can, therefore, only be made in terms of precise requests.

Your contact:

GEA Heat Exchangers

PHE Systems

GEA Heat Exchangers, Inc. PHE Division
100 GEA Drive, York, PA 17406 USA
Tel: 1-717-268-6200 · 1-800-774-0474
Fax: 1-717-268-6162
info.phe-systems.usa@gea.com
www.gea-phe.com/usa

PHE Systems

GEA Process Engineering México S.A. de C.V.
Lomas Verdes 791-4, Col. Jardines de Satélite, Naucalpan, CP 53129
Edo. de México, México
Tel: +52 55 21291161, Fax: +52 55 53439923
info.phe-systems.mexico@gea.com
www.gea-phe.com/usa