Frick®

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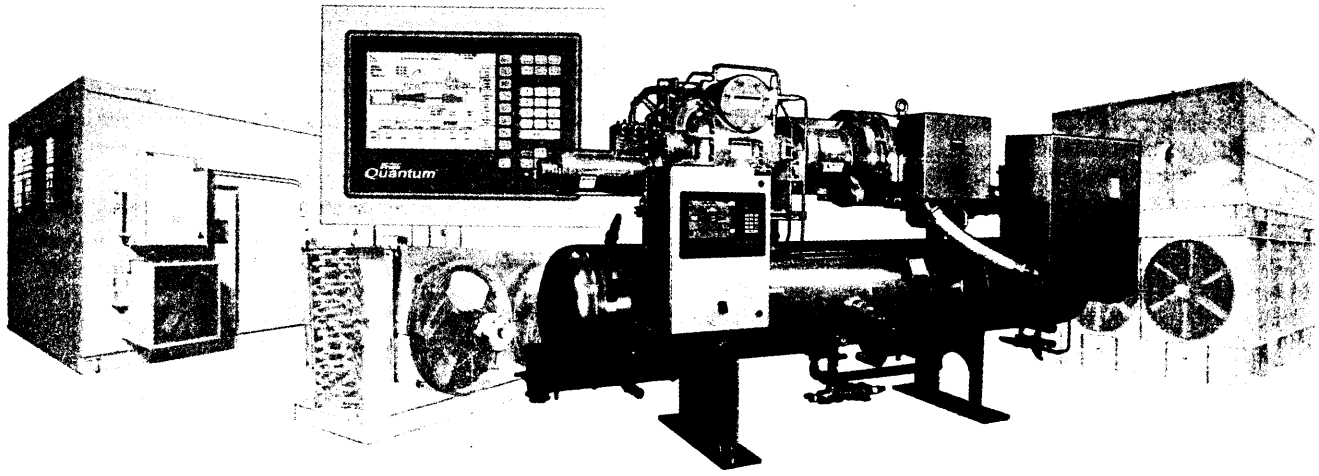
File: EQUIPMENT MANUAL - Section 70
Replaces: NOTHING (New Information)
Dist: 1, 1a, 1b, 1c, 4a, 4b, 4c

SPECIFICATIONS - ENGINEERING DATA - DIMENSIONS

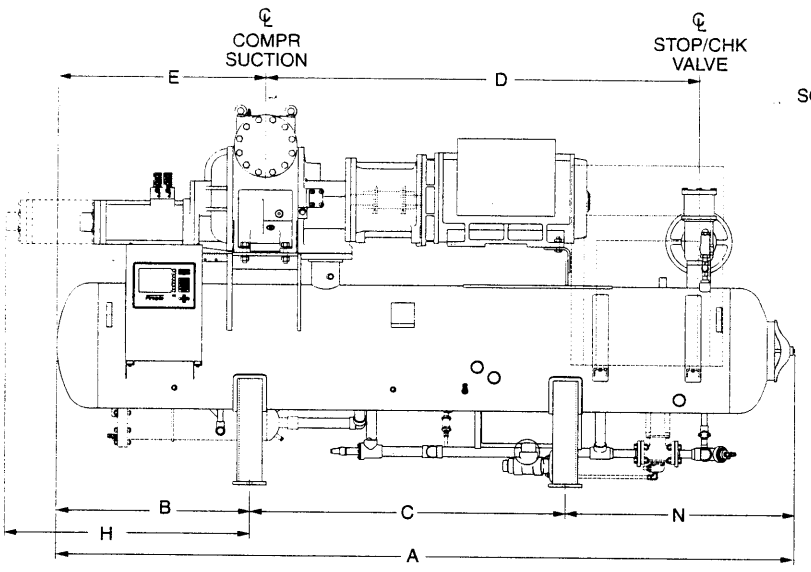
RWF

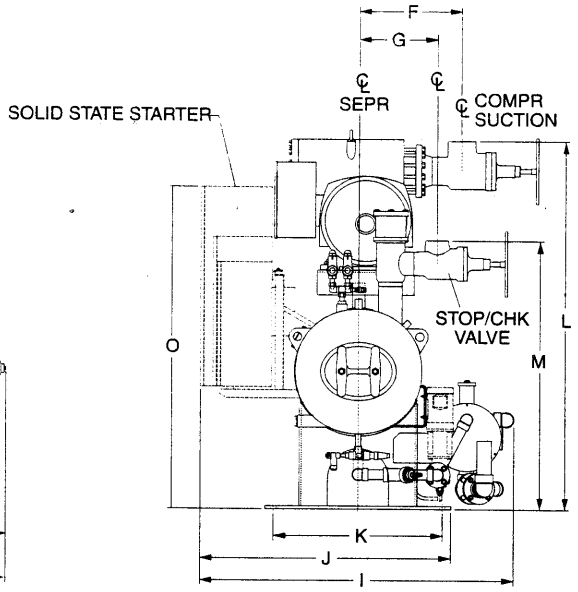
ROTARY SCREW COMPRESSOR UNITS
MODELS: RWF 100 through ~~480~~ 856

REFRIGERANTS R-717 and R-22
HIGH STAGE and BOOSTER APPLICATIONS



DIMENSIONS





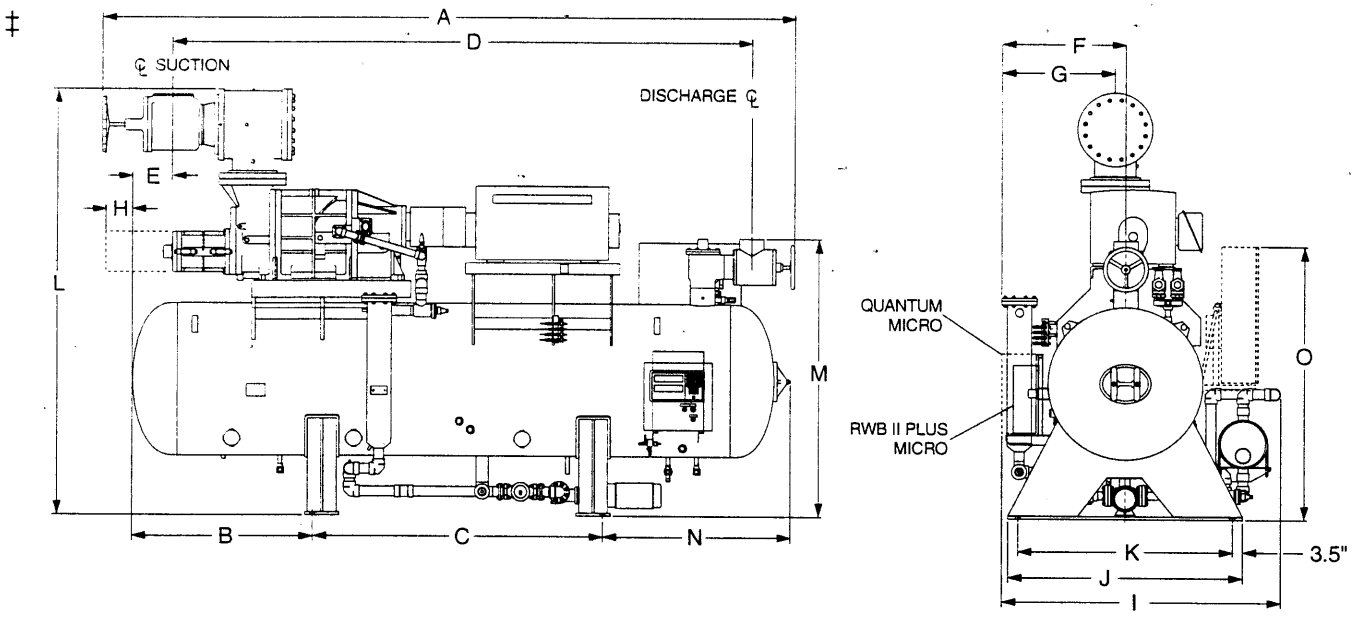
RWF MODEL NO.	APPROXIMATE DIMENSIONS INCHES/MILLIMETERS														
	A (1)	B	C	D	E	F (4)	G (4)	H (3)	I (4)	J (4)	K	L	M	N (2)	O
100	149/3785	35/889	66/1676	90/2286	37/940	22/559	17/432	57/1448	67/1702	50/1270	32/813	76/1930	56/1422	48/1219	66/1676
134	152/3861	35/889	66/1676	92/2337	35/889	24/610	17/432	63/1600	67/1702	50/1270	32/813	79/2007	56/1422	48/1219	66/1676
177	175/4445	46/1168	75/1905	101/2565	51/1295	25/635	19/482	61/1549	75/1905	60/1524	40/1016	89/2260	65/1651	55/1397	78/1981
222	175/4445	46/1168	75/1905	103/2616	49/1245	27/686	19/482	67/1702	75/1905	60/1524	40/1016	89/2260	65/1651	55/1397	78/1981
270	195/4953	51/1295	88/2235	115/2921	53/1346	28/711	24/610	78/1981	82/2083	71/1803	54/1372	99/2515	75/1905	56/1422	78/1981
316	195/4953	51/1295	88/2235	115/2921	53/1346	30/762	24/610	74/1880	93/2362	71/1803	54/1372	102/2591	74/1880	56/1422	78/1981
399	195/4953	51/1295	88/2235	117/2972	51/1295	31/787	24/610	80/2032	93/2362	71/1803	54/1372	102/2591	74/1880	56/1422	78/1981
480	204/5182	52/1321	88/2235	120/3048	50/1270	31/787	24/610	94/2388	102/2591	79/2007	62/1575	109/2769	80/2032	58/1473	78/1981

NOTE: Drawing for reference only. 177/222 is shown; other unit sizes vary slightly. Use certified drawings for erection.

1. On model 100/134 and 480, the end of the compressor extends past the end of the separator.
2. Allow additional 36 in./915 mm to remove coalescer element.
3. Required clearance for removal of movable slide valve/slide stop assembly.
4. Maximum dimension.

RWF MODEL NO.	STANDARD CONNECTIONS in./mm			
	R-717		R-22	
	SUCTION	DISCHARGE	SUCTION	DISCHARGE
100	5/127.0	4/101.6	5/127.0	4/101.6
134	6/152.4	4/101.6	6/152.4	4/101.6
177	6/152.4	5/127.0	6/152.4	5/127.0
222	6/152.4	5/127.0	8/203.2	5/127.0
270	8/203.2	6/152.4	10/254.0	6/152.4
316	8/203.2	6/152.4	N/A	N/A
399	8/203.2	6/152.4	N/A	N/A
480	8/203.2	6/152.4	N/A	N/A

HORIZONTAL SEPARATOR MODEL



MODEL NO.	APPROXIMATE DIMENSIONS INCHES/MILLIMETERS														
	A	B	C	D (4)	E (5)	F (4)	G (4)	H (3)	I (4)	J (4)	K	L (5)	M	N (2)	O (6)
496	225/5715	51/1295	93/2362	182/4623	16/406	31/787	36/914	11/279	88/2235	68/1727	62/1575	136/3454	87/2210	66/1676	97/2464
676	234/5944	53/1346	96/2438	192/4877	16/406	34/864	39/991	17/432	94/2388	77/1956	70/1778	144/3658	94/2388	71/1803	98/2489
856	245/6223	63/1600	103/2616	204/5182	14/356	43/1092	40/1016	28/711	99/2515	83/2108	75/1905	151/3835	98/2489	66/1676	97/2464

1. Horizontal design for Booster and High Stage applications with a maximum 1000 hp ODP motor.
2. Allow additional 36 in./915 mm to pull coalescer element
3. Required clearance for removal of movable slide valve/slide stop assembly.
4. Maximum dimension.
5. Ammonia units only. For Halocarbon units, consult FRICK.
6. Optional package-mounted, solid-state starter package.

NOTE: Drawing for reference only! Use certified drawing for erection.

STANDARD CONNECTIONS in./mm		
MODEL NO.	R-717 or R-22	
	SUCTION	DISCHARGE
496	12/304.8	8/203.2
676	12/304.8	8/203.2
856	14/355.6	8/203.2

RWB II PLUS 496–856 ROTARY SCREW COMPRESSOR UNITS
DIMENSIONS

VERTICAL SEPARATOR MODEL

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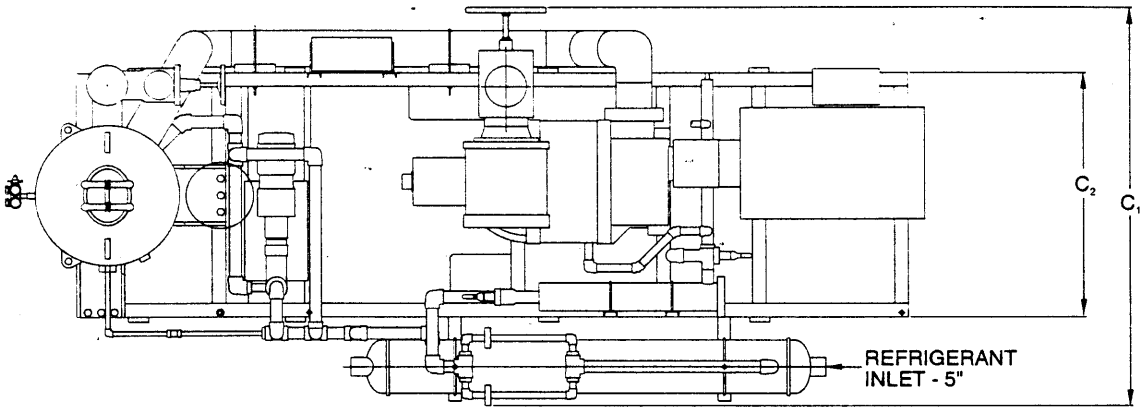

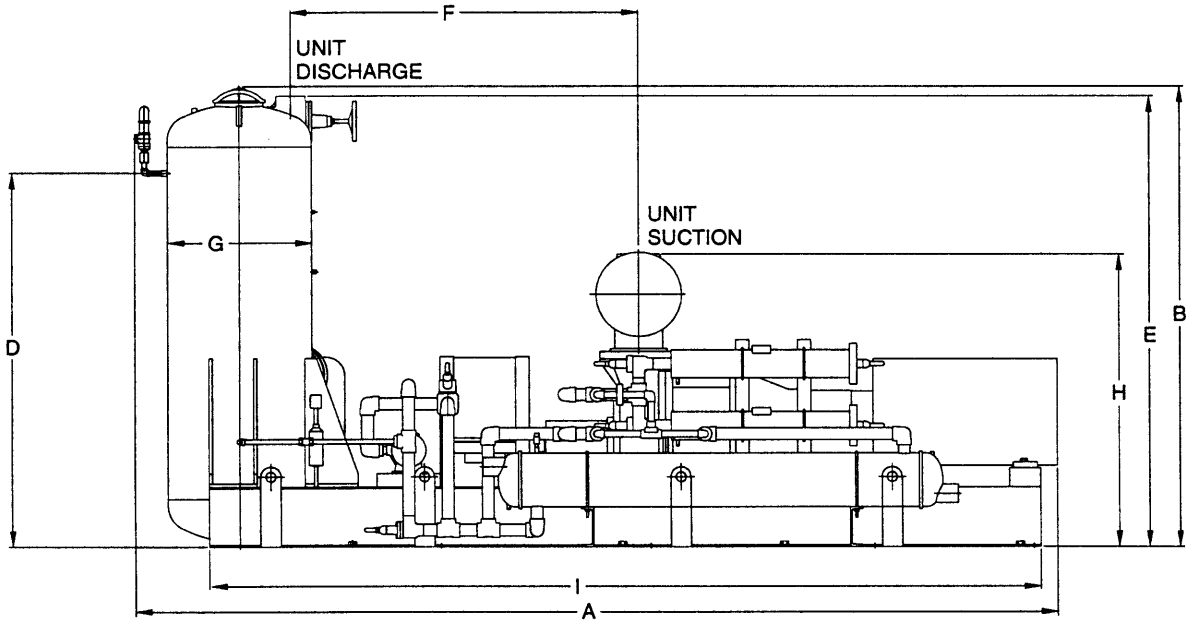

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RWB II MODEL NO.	APPROXIMATE DIMENSIONS INCHES/MILLIMETERS (5)									
	A (1)	B	C_1 (1)	C_2 (1)(2)	D	E	F (1)	G (1)	H	I
496	280/7112	138/3505	120/3048	73/1854	113/2870	136/3454	103/2616	42/1067	88/2235	246/6248
676	304/7722	138/3505	120/3048	73/1854	113/2870	136/3454	103/2616	42/1067	88/2235	246/6248
856	322/8179	142/3607	120/3048	73/1854	136/3454	124/3150	103/2616	72/1829	88/2235	250/6350

1. Maximum dimension. Varies according to separator diameter and/or oil cooler diameter as dictated by customer.
2. Maximum dimension for unit without oil cooler.
3. Actual dimension varies based on system requirement.
4. Standard connections (in./mm), suction for 496 & 676: 12/304.8, for 856: 14/355.6; discharge for 496 - 856: 8/203.2.
NOTE: Drawing for reference only! Use certified drawing for erection.

STANDARD CONDITIONS - HIGH STAGE

The RWF high stage ratings for R-717 and R-22 are based on 3550 RPM (60 Hz), 10°F liquid subcooling (except no external liquid subcooling in economizer ratings), 10°F suction superheat (not contributing to the refrigeration effect) and thermosyphon or water-cooled oil cooling.

SELECTION PROCEDURE - HIGH STAGE

The final rating for a RWF unit at any condition is determined from the standard rating and all of the applicable correction factors.

Capacity (TR) = standard rating (or economized rating) x subcooling correction factor x superheat correction factor x liquid injection correction factor if applicable (see Liquid Injection Oil Cooling) x 0.83 (50 Hz only).

Brake Horsepower (BHP) = standard rating (or economized rating) x 1.01 (liquid injection correction factor if applicable) x 0.83 (50 Hz only).

LIQUID SUBCOOLING CORRECTION FACTORS HIGH STAGE

For liquid subcooling other than 10°F, determine the liquid subcooling capacity correction factor (S.C.C.F.) in the following manner using the actual number of degrees of liquid subcooling (S.C.):

For R-717:

$$S.C.C.F. = 1+(S.C.-10°F)(.0025)$$

For R-22:

$$S.C.C.F. = 1+(S.C.-10°F)(.005)$$

No brake horsepower correction is required for liquid subcooling.

SUCTION SUPERHEAT CORRECTION FACTORS HIGH STAGE

For suction superheat in excess of 10°F, determine the suction superheat capacity correction factor (S.H.C.F.) in the following manner using the actual number of degrees of suction superheat (S.H.):

FOR R-717:

$$S.H.C.F. = \frac{1}{1+(S.H.-10°F)(.0027)}$$

FOR R-22:

$$S.H.C.F. = \frac{1}{1+(S.H.-10°F)(.0028)}$$

It is recommended that a minimum of 10°F of suction superheat be maintained to ensure that all refrigerant entering the compressor is in the vapor state.

No brake horsepower correction is required for suction superheat.

STANDARD CONDITIONS - BOOSTER

The RWF booster ratings for R-717 and R-22 are based on 3550 RPM (60 Hz), liquid cooled to intermediate temperature, no suction superheat, and thermosyphon or water-cooled oil cooling.

SELECTION PROCEDURE - BOOSTER

The final rating for a RWF unit at any condition is deter-mined from the standard rating and all of the applicable correction factors.

Capacity (TR) = standard rating x liquid temperature correction factor x superheat correction factor, if applicable, x 0.83 (50 Hz only).

Brake Horsepower (BHP) = standard rating x 1.01 (liquid injection correction factor, if applicable) x 0.83 (50 Hz only).

LIQUID TEMPERATURE CORRECTION FACTORS BOOSTER

For liquid temperatures greater than the saturated inter-mediate temperature, determine the liquid temperature derating factor (L.T.D.F.) in the following manner:

For R-717:

$$L.T.D.F. = 1-(TD)(.0025)$$

For R-22:

$$L.T.D.F. = 1-(TD)(.005)$$

Where TD is the temperature difference in degrees between the actual liquid temperature and the saturated intermediate temperature. No brake horsepower correction is required.

SUCTION SUPERHEAT CORRECTION FACTORS BOOSTER

For suction superheat in excess of 0°F, determine the suction superheat capacity correction factor (S.H.C.F.) in the following manner using the actual number of degrees of suction superheat (S.H.):

FOR R-717:

$$S.H.C.F. = \frac{1}{1+(S.H.)(.0027)}$$

FOR R-22:

$$S.H.C.F. = \frac{1}{1+(S.H.)(.0028)}$$

It is recommended that a minimum of 10°F of suction superheat be maintained to ensure that all refrigerant entering the compressor is in the vapor state.

No brake horsepower correction is required for suction superheat.

ACCESSORIES and OPTIONAL ITEMS

DUAL OIL FILTERS: A second oil filter may be furnished mounted on the unit. Isolation valves are included to provide servicing of the primary filter set while the unit is running.

DEMAND PUMP: Lubrication and oil injection may be achieved by using a positive-displacement, direct-driven gear-type oil pump capable of maintaining lube oil supply at low pressure differentials, operating independent of the compressor.

The pump will operate only when required, due to low system differential pressure.

ECONOMIZER: Increased refrigeration capacity with relatively low increase in brake horsepower can be achieved by the use of a **Frick** economizer system. The economizer consists of a shell and tube liquid subcooler with appropriate controls. The economizer vessel is shipped loose for mounting in the field.

MOTORS: The compressor drive motor can be supplied and mounted by **Frick**. In addition, a customer supplied motor can be factory mounted by **Frick**.

STARTERS: Starter packages complete with all accessories needed to interface with the RWF, prewired to numbered terminal strips are available.

SPECIAL PACKAGES: For special refrigerant selection, special drivers, or any dual or two stage applications, consult **Frick**.

STANDARD DESIGN DATA

RWF MODEL NO.	TDS COMPRESSOR			
	MODEL NO.	DIA mm	L/D	DISPLACEMENT CFM (m^3/h)
100	1913	193.0	1.35	592 (1005)
134	1918	193.0	1.80	790 (1342)
177	2313	233.0	1.35	1042 (1770)
222	2317	233.0	1.70	1311 (2228)
270	2321	233.0	2.10	1590 (2700)
316	2813	283.0	1.35	1865 (3169)
399	2817	283.0	1.70	2349 (3992)
480	2821	283.0	2.10	2824(4798)

STANDARD DESIGN DATA

RWB II PLUS MODEL NO.	TDS COMPRESSOR			
	MODEL NO.	DIA mm	L/D	DISPLACEMENT CFM (m^3/hr)
496	355S	355	1.35	2920 (4961)
676	355L	355	1.70	3982 (6765)
856	355XL	355	1.90	5067 (8609)

Other - Consult **Frick**

Lube Oil Pump: Single, High Stage _____ Demand (Opt)
Lube Oil Pump: Booster _____ Demand (Std)
Oil Filters _____ Single (Std), Dual (Opt)
Oil Cooling _____ Liquid Injection (Std)
Water Cooled (Inlet/Outlet Water Temp Req'd) (Opt)
Thermosyphon _____ (Opt)
Saturated Suction Temperature _____ °F
Condensing Temperature _____ °F
Intermediate Temperature (Booster) _____ °F
Suction Superheat _____ °F
Liquid Subcooling _____ °F
Economizer - Kit Only _____ (Opt)
Economizer - Dx Cooler _____ (Opt)
Rating _____ TR _____ BHP ____ (Including Liquid Subcooling, Suction Superheat, and Liquid Injection corrections as applicable)

Liquid line sizes and the additional receiver volume (quantity of refrigerant required for 5 minutes of liquid injection oil cooling) are given in the following table.

REF.		RWF MODEL	LIQUID LINE SIZES - Inches (1)		5 MINUTE LIQUID SUPPLY	
			PIPE	TUBING OD	MASS LB	VOL CU FT
HIGH STAGE	R 7 1 7	100,134	3/4	—	80	2.0
		177,222	1	—	140	4.0
		270	1-1/4	—	180	5.0
		316,399	1-1/4	—	250	7.0
		480	2	—	310	8.5
	R 2 2	100,134	1-1/4	1-1/8	290	4.0
		177,222	1-1/2	1-3/8	570	8.0
		270	2	2-1/8	700	10.0
		316,399	2	2-1/8	1050	14.0
		480	2-1/2	2-5/8	1300	18.0
BOOSTER	R 7 1 7	100,134	1/2	—	20	0.5
		177,222	3/4	—	30	1.0
		270	1	—	40	1.5
		316,399	1	—	40	1.5
		480	1	—	50	1.5
	R 2 2	100,134	3/4	5/8	44	0.6
		177,222	3/4	7/8	59	0.8
		270	3/4	7/8	92	1.2
		316,399	3/4	7/8	92	1.2
		480	1	1-1/8	114	1.6

1. Lines are sized for a maximum 100 foot liquid line. For longer runs, increase line size accordingly.

THERMOSYPHON OIL COOLING

Thermosyphon oil coolers, like water (or glycol)-cooled oil coolers, eliminate the capacity and power penalties associated with liquid injection oil cooling. Thermosyphon oil coolers have the further advantages of eliminating water (or glycol) pump power consumption and maintenance, fouling, and potential system contamination.

The principle of operation is as follows (see diagram). A supply of high pressure liquid is maintained in a receiver at a predetermined minimum head above the oil cooler and below the condenser. Gravity causes the liquid refrigerant to flow to the oil cooler where a portion of the liquid is boiled off, thereby cooling the hot oil. New liquid from the receiver displaces the lighter refrigerant liquid/vapor mixture which rises to the receiver, dropping out the remaining liquid before allowing the vapor to return to the condenser, completing the cycle.

PIPING ARRANGEMENT FOR THERMOSYPHON OIL COOLING SYSTEMS

The components and piping of a thermosyphon oil cooling system include a liquid source at condensing pressure, adequate static heads to provide fluid flow, appropriate control valves, safety relief valves, service valves and pump-out connections. The arrangement of component placement and fluid flow requirements must be designed to suit the individual refrigeration system layout with consideration given to piping safety practices.

The component and piping arrangement shown below is intended only to illustrate the operating principles of thermosyphon oil cooling. Other component layouts may be better suited to a specific installation.

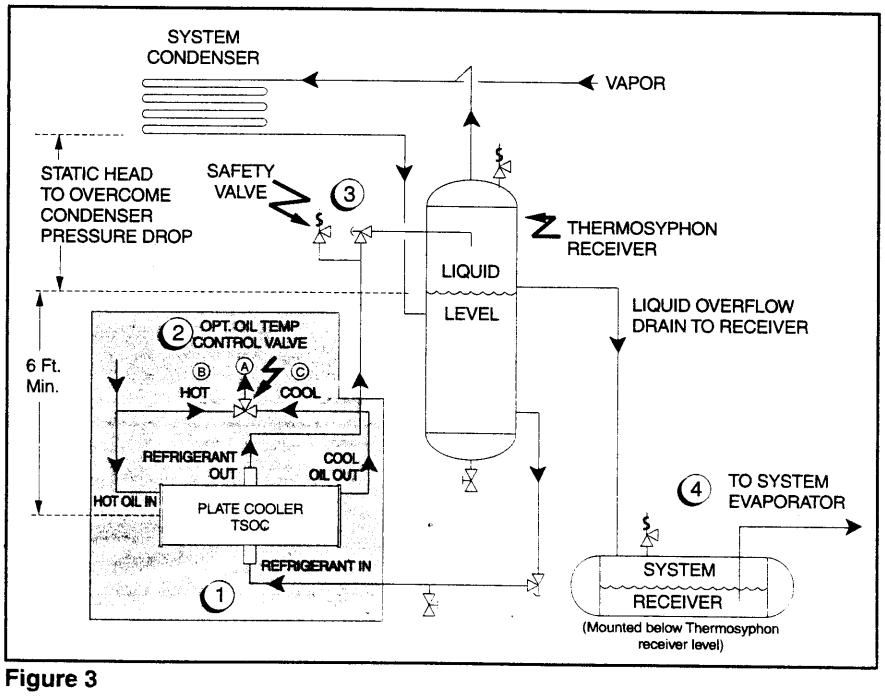


Figure 3

1. The thermosyphon oil cooler is supplied with the oil side piped to the compressor unit and stub ends supplied on the refrigerant side.
2. A three-way oil temperature control valve is required where condensing temperature is expected to go below 65°F.
3. A refrigerant-side safety valve is required in this location only when refrigerant isolation valves are installed between the cooler and thermosyphon receiver. If no valves are used between the cooler and TSOC receiver, the safety valve on the TSOC receiver must be sized to handle the volume of both vessels. Then, the safety valve on the cooler vent (liquid refrigerant side) can be eliminated.
4. The system receiver must be below the thermosyphon receiver in this arrangement.

Liquid line sizes and the additional receiver volume (quantity of refrigerant required for 5 minutes of liquid injection oil cooling) are given in the following table.

‡

REF.	RWB II MODEL	LIQUID LINE SIZES - Inches (1)		FLOW RATE (lb) 5 MIN	LIQUID VOL CU FT
		PIPE SCH 80	TUBING OD		
HIGH STAGE					
R-717	496	2"	—	310	8.5
	676	2"	—	420	11.5
	856	2"	—	650	18
R-22	496	2-1/2"	2-5/8"	1300	18.0
	676	3"	2-5/8"	1780	25.0
	856	3"	2-5/8"	1960	27.0
BOOSTER					
R-717	496	1"	—	50	1.5
	676	1"	—	70	2.0
	856	1-1/4"	—	125	3.5
R-22	496	1"	1-1/8"	114	1.6
	676	1-1/4"	1-1/8"	156	2.2
	856	1-1/4"	1-1/8"	266	3.7

1. Lines are sized for a maximum 100 foot liquid line. For longer runs, increase line size accordingly.

THERMOSYPHON OIL COOLING

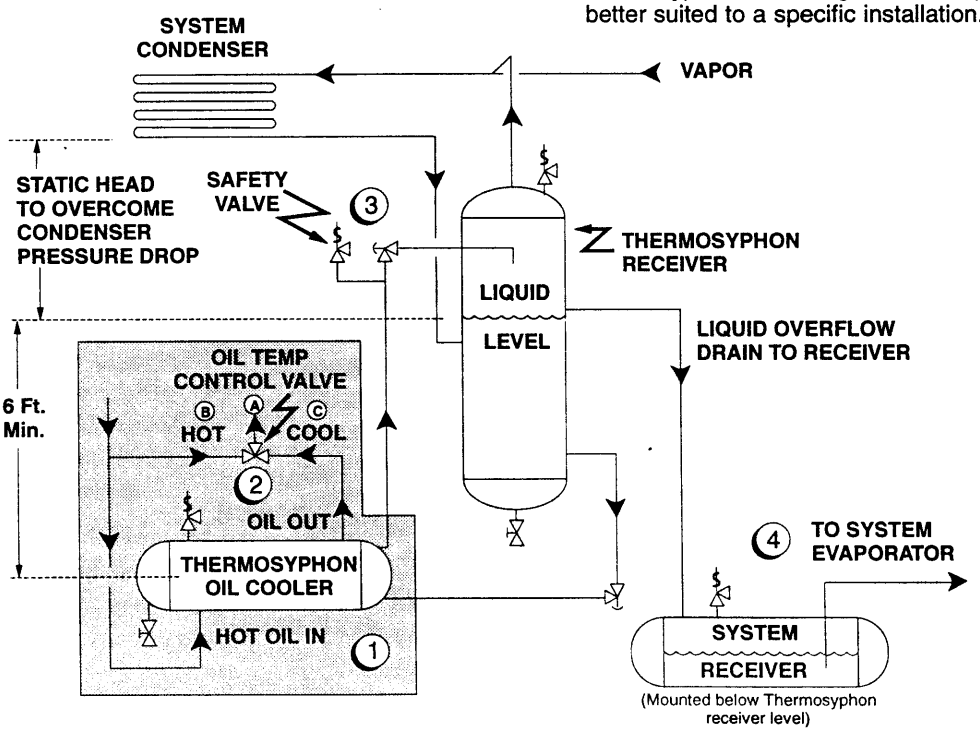
Thermosyphon oil coolers, like water (or glycol)-cooled oil coolers, eliminate the capacity and power penalties associated with liquid injection oil cooling. Thermosyphon oil coolers have the further advantages of eliminating water (or glycol) pump power consumption and maintenance, tube fouling, and potential system contamination.

The principle of operation is as follows (see diagram). A supply of high pressure liquid is maintained in a receiver at a predetermined minimum head above the oil cooler and below the condenser. Gravity causes the liquid refrigerant to flow to the oil cooler where a portion of the liquid is boiled off, thereby cooling the hot oil. New liquid from the receiver displaces the lighter refrigerant liquid/vapor mixture which rises to the receiver, dropping out the remaining liquid before allowing the vapor to return to the condenser, completing the cycle.

PIPING ARRANGEMENT FOR THERMOSYPHON OIL COOLING SYSTEMS

The components and piping of a thermosyphon oil cooling system include a liquid source at condensing pressure, adequate static heads to provide fluid flow, appropriate control valves, safety relief valves, service valves, and pump out connections. The arrangement of component placement and fluid flow requirements must be designed to suit the individual refrigeration system layout with consideration given to piping safety practices.

The component and piping arrangement shown below is intended only to illustrate the operating principles of thermosyphon oil cooling. Other component layouts may be better suited to a specific installation.



1. Thermosyphon oil cooler is supplied with the oil side piped to the compressor unit and stub ends supplied on the refrigerant side.
2. Three-way oil temperature control valve required where condensing temperature is expected to go below 65°F.
‡ **3.** A refrigerant-side safety valve is required in this location only when refrigerant isolation valves are installed between the cooler and thermosyphon receiver. If no valves are used between the cooler and TSOC receiver, the safety valve on the TSOC receiver must be sized to handle the volume of both vessels. Then, the safety valve on the cooler vent (liquid refrigerant side) can be eliminated.
4. System receiver must be mounted below thermosyphon receiver level in this arrangement.

LIQUID INJECTION OIL COOLING

High Stage compressor units may be supplied with single-port (low Vi) or dual-port (low Vi and high Vi) liquid injection oil cooling. Single port will be furnished for low compression ratio operation and dual port for high compression ratio operation. Booster compressor units use single-port liquid injection oil cooling due to the typically lower compression ratios.

The control system on high stage units with dual-port liquid injection oil cooling automatically switches the liquid refrigerant supply to the high port when the compressor is operating at higher compression ratios (above 3.5 Vi) for best efficiency.

The following table gives the evaporator temperature limits for liquid injection use and single-port application.

CONDENSING TEMPERATURE	MAX. EVAP TEMP LIQ. INJ. USE		MIN. EVAP TEMP* SINGLE PORT (LOW Vi)
	R-717	R-22	R-717 & R-22
75°F	+10°F	+ 5°F	-5°F
85°F	+25°F	+15°F	+5°F
95°F	+35°F	+25°F	+10°F
105°F	+40°F	+35°F	+15°F

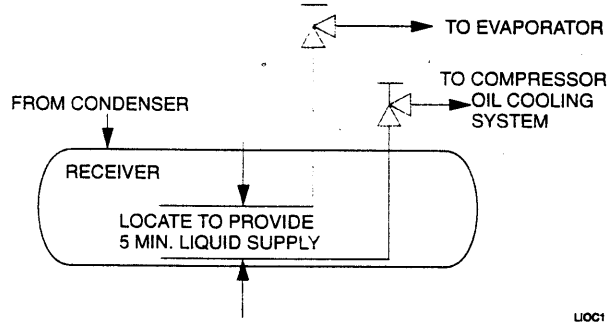
* Dual Injection Kit will be shipped by Frick below these temperatures.

Where low compression ratios are anticipated, thermosyphon or water-cooled oil cooling should be used.

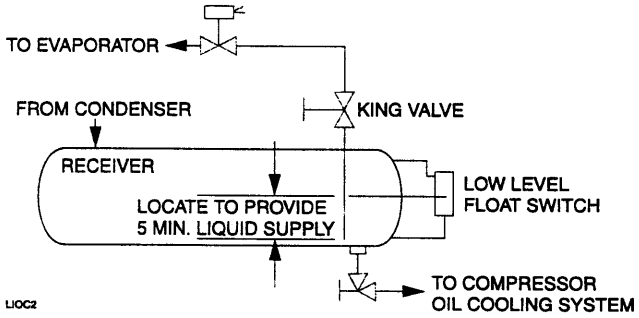
It is **IMPERATIVE** that an uninterrupted supply of high pressure liquid refrigerant be provided to the injection system at all times. Two items are of extreme importance, the design of the receiver/liquid injection supply and the size of the liquid line.

It is recommended that the receiver be oversized sufficiently to retain a 5 minute supply of refrigerant for oil cooling. The evaporator supply must be secondary to this consideration. Two methods of accomplishing this are shown.

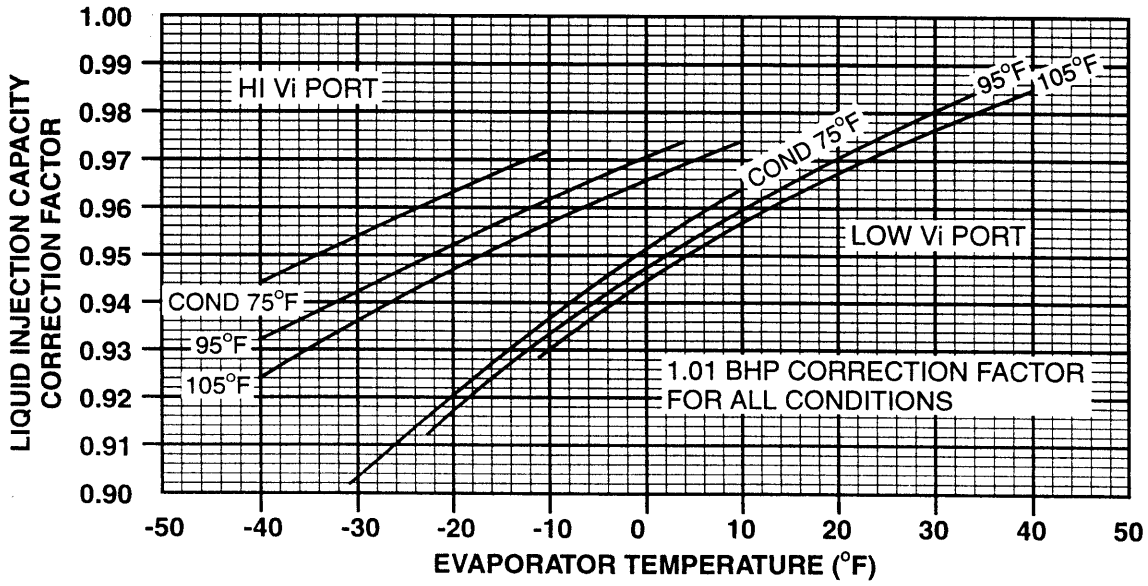
The dual dip tube method uses two dip tubes in the receiver. The liquid tube is below the evaporator tube to ensure continued oil cooling when the receiver level is low.



The level control method utilizes a float level control on the receiver to close a solenoid valve feeding the evaporator when the liquid falls below that amount necessary for 5 minutes of liquid injection oil cooling.



HIGH STAGE LIQUID INJECTION CORRECTION FACTORS - R-717 and R-22



BOOSTER LIQUID INJECTION CORRECTION FACTORS - R717 and R22: No correction factor for either capacity (TR) or power (BHP).

ECONOMIZER - HIGH STAGE (OPTIONAL)

Compressor ratings with the economizer effect included are given in the ratings tables with the "E" suffix. No allowance for vapor line pressure drop has been included. Size the economizer vapor line (including valves, strainer, etc.) from the economizer vessel to the compressor for pressure drop from one to two PSI. The economizer rating tables are based on the application of a Flash Economizer System as shown in FIG. 3 below. For capacity and brake HP with shell and coil or direct expansion (DX) type economizer (FIG. 2), refer to page 36.

The economizer option provides an increase in system capacity and efficiency by subcooling liquid from the condenser through a heat exchanger or flash tank before it goes to the evaporator. The subcooling is provided by flashing liquid in the economizer cooler to an intermediate pressure level. The intermediate pressure is provided by a port located part way down the compression process on the screw compressor.

As the screw compressor unloads, the economizer port will drop in pressure level, eventually being fully open to suction. Because of this, an output from the microprocessor is generally used to turn off the supply of flashing liquid on a shell and coil or DX economizer when the capacity falls below approximately 45%-60% capacity (85%-90% slide valve position). This is done because the compressor will be more efficient operating at a higher slide valve position with the economizer turned off, than it will at a low slide valve position with the economizer turned on. Please note however that shell and coil and DX economizers can be used at low compressor capacities in cases where efficiency is not as important as ensuring that the liquid supply is subcooled. In such cases, the economizer liquid solenoid can be left open whenever the compressor is running.

Due to the tendency of the port pressure to fall with decreasing compressor capacity, a back-pressure regulator valve (BPR) is generally required on a flash economizer system (FIG. 3) in order to maintain some preset pressure difference between the subcooled liquid in the flash vessel and the evaporators. If the back-pressure regulator valve is not used on a flash economizer, it is possible that no pressure difference will exist to drive liquid from the flash vessel to the evaporators, since the flash vessel will be at suction ‡ pressure. In cases where wide swings in pressure are anticipated in the flash economizer vessel, it may be necessary to add an outlet pressure regulator to the flash vessel outlet to avoid overpressurizing the economizer port, which could result in motor overload. Example: A system feeding liquid to the flash vessel in batches.

The recommended economizer systems are shown below. Notice that in all systems there should be a strainer and a check valve between the economizer vessel and the economizer port on the compressor. The strainer prevents dirt from passing into the compressor and the check valve prevents oil from flowing from the compressor unit to the economizer vessel during shutdown.

CAUTION: Other than the isolation valve needed for strainer cleaning, it is essential that the strainer be the last device in the economizer line before the compressor. Also, piston-type check valves are recommended for installation in the economizer line, as opposed to disc-type check valves. The latter are more prone to gas-pulsation-induced failure. The isolation and check valves and strainer should be located as closely as possible to the compressor, preferably within a few feet.

For refrigeration plants employing multiple compressors on a common economizing vessel, regardless of economizer type, each compressor must have a back-pressure regulating valve in order to balance the economizer load, or gas flow, between compressors. The problem of balancing load becomes most important when one or more compressors ‡ run at partial load, exposing the economizer port to suction pressure. In the case of a flash vessel, there is no need for the redundancy of a back-pressure regulating valve on the vessel and each of the multiple compressors. Omit the BPR valve on the flash economizer vessel and use one on each compressor, as shown in FIG. 4.

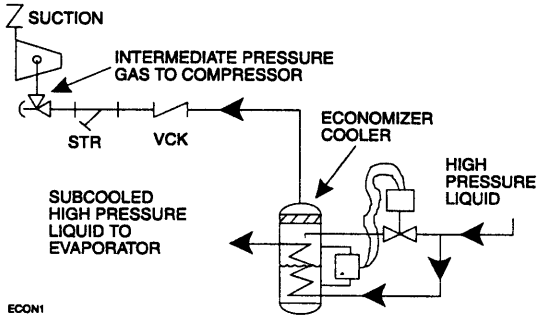


FIG. 1 - SHELL and COIL ECONOMIZER SYSTEM

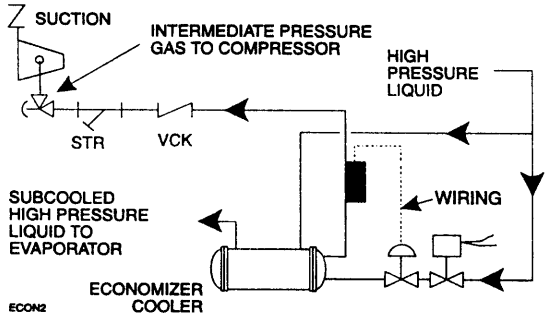


FIG. 2 - DIRECT EXPANSION ECONOMIZER SYSTEM

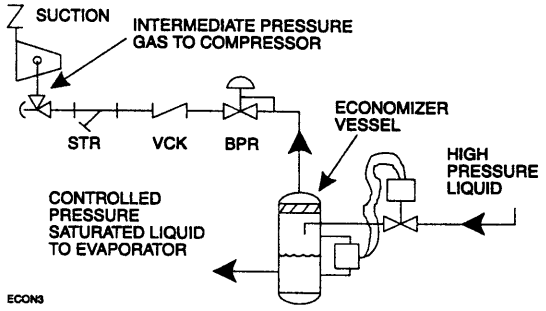


FIG. 3- FLASH ECONOMIZER SYSTEM

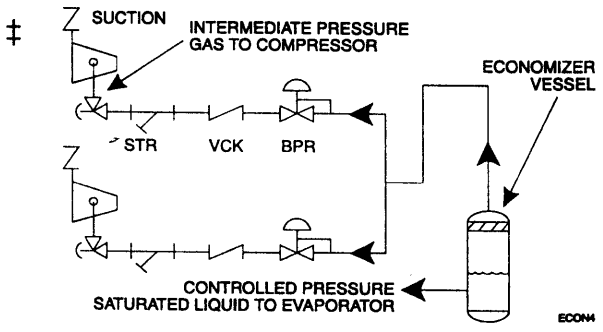
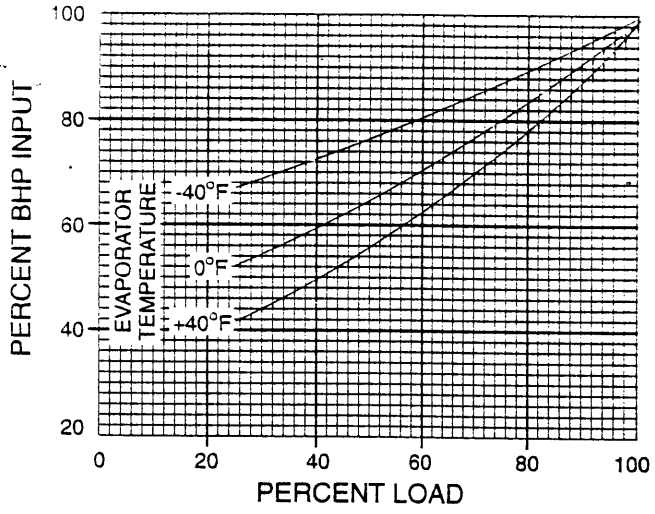


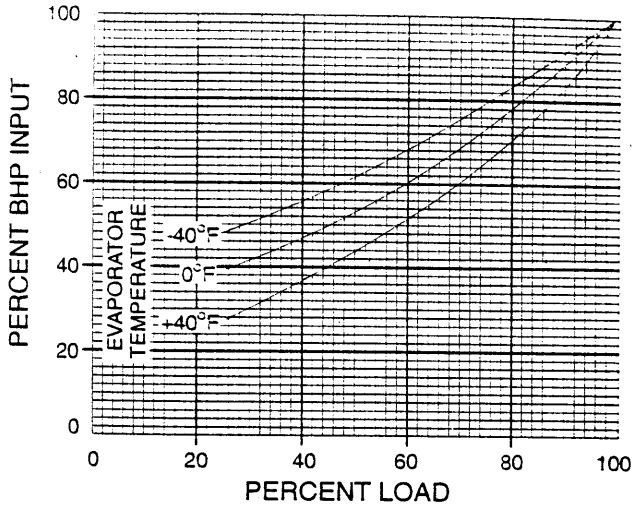
FIG. 4 - MULTIPLE COMPRESSOR ECONOMIZER SYSTEM

TYPICAL PART LOAD POWER INPUT WITH CONSTANT CONDENSING TEMPERATURE-HIGH STAGE



This curve is applicable for R-717 (85°F to 105°F) full-load condensing temperature) and R-22 (95°F to 115°F) full-load condensing temperature).

TYPICAL PART LOAD POWER INPUT WITH FALLING CONDENSING TEMPERATURE-HIGH STAGE



The curve, above, is based on a 20°F linear drop in condensing temperature from full load to 10% of full load. This curve is applicable for R-717 (85°F to 105°F) full-load condensing temperature) and R-22 (95°F to 115°F) full-load condensing temperature). It is not applicable if condensing temperature does not drop with compressor unloading as in the following examples:

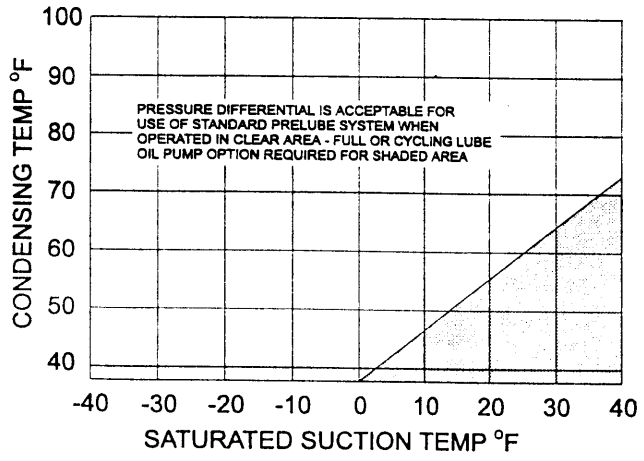
1. Water-cooled condensing temperatures cannot fall below entering water temperature.

2. Single compressor unloading on a multiple compressor system will have a negligible effect on system condensing temperature.

3. No condensing temperature drop will occur if condenser fans are cycled off as the load decreases.

‡ STANDARD LUBRICATION SYSTEM LIMITS - HIGH STAGE

The standard prelube system for compressor operation without a lube oil pump may be used on high stage applications shown in the clear area of the graph. The optional **full-lube oil pump** is required only on low differential pressure applications shown in the shaded area of the graph. Where condensing temperatures fluctuate into the shaded area only on an occasional basis in the winter, the **full-lube pump with cycling option** avoids unnecessary consumption of pump horsepower.



‡ MINIMUM COMPRESSOR FLOW

The minimum flow capacity for each compressor varies depending upon its geometry and its operating conditions. Typical minimum flow for each of our compressor models is listed below. This table represents minimum suction flow with the slide valve fully unloaded.

UNIT	MINIMUM FLOW* CFM	MINIMUM FLOW* m³/hr
496	526	893
676	717	1218
856	1520	2583
100	71	121
134	95	161
177	125	212
222	157	267
270	365	621
316	224	380
399	282	479
480	650	1,104

*@ 3550 rpm

WATER-COOLED OIL COOLER SELECTION

Required cooling water flow, GPM, is determined from the following formula.

$$GPM = \frac{OCHR}{500\ (T_o - T_i)}$$

OCHR - Oil Cooler Heat Rejection (BTU/HR)
See Tables
T_o - Cooling Water Outlet Temperature
(Not to exceed 110°F based upon 120°F oil out)
T_i - Cooling Water Inlet Temperature (°F)

OIL COOLER DATA TABLE

RWF MODEL	TYPICAL COOLER	CONNECTION	
		INLET	OUTLET
100/134 High Stage	116 Plates	3″	3″
100-222 Booster	66 Plates	2″	2″
177/222 High Stage	190 Plates	3″	3″
270 High Stage	288 Plates	3″	4″
316/399 Booster	56 Plates	3″	3″
316/399 High Stage	136 Plates	4″	5″
480 Booster	72 Plates	3″	3″
480 High Stage	188 Plates	4″	5″

OIL COOLER HEAT REJECTION (OCHR) - 1,000 BTU/HR

Based on 10°F superheat, 10°F subcooling, superheat enthalpy not contributing to refrigeration effect. For applications having greater than 10°F superheat, consult Frick.

OIL COOLER HEAT REJECTION (OCHR) - 1000 BTU/HR (10°F Superheat, 120°F oil into compressor)

COND TEMP. °F	EVAP TEMP. °F	RWF SCREW COMPRESSOR MODELS - HIGH STAGE R-717							
		100	134	177	222	270	316	399	480
75	-40	211	273	353	439	564	629	787	947
	-35	212	272	353	438	566	628	786	946
	-30	211	271	351	436	566	625	781	940
	-25	211	268	348	431	563	619	773	930
	-20	209	264	343	423	557	608	759	913
	-15	205	258	334	412	546	592	738	888
	-10	200	250	323	397	530	570	710	854
	-5	193	239	308	377	509	543	675	812
	0	183	226	290	354	482	510	633	762
	5	172	210	269	327	449	471	584	703
	10	158	192	244	296	410	425	527	634
	15	142	171	216	261	365	376	464	558
	20	146	178	221	269	373	390	484	582
	25	130	157	191	232	324	336	416	500
	30	112	134	161	195	275	282	349	420
	35	93	110	131	158	226	230	283	340
	40	73	86	103	123	178	179	220	265

OIL COOLER HEAT REJECTION (OCHR) - 1000 BTU/HR (10°F Superheat, 120°F oil into compressor)

COND TEMP. °F	EVAP TEMP. °F	RWF SCREW COMPRESSOR MODELS - HIGH STAGE R-717							
		100	134	177	222	270	316	399	480
85	-40	256	333	427	532	680	763	957	1151
	-35	257	332	429	535	687	767	961	1156
	-30	258	333	431	536	692	770	964	1160
	-25	259	332	431	536	696	770	963	1158
	-20	259	331	430	533	697	767	959	1154
	-15	259	328	426	527	694	759	948	1140
	-10	256	323	419	518	687	746	931	1120
	-5	252	316	409	504	673	727	906	1090
	0	246	306	395	486	654	701	873	1050
	5	237	293	378	463	629	669	832	1001
	10	226	277	356	435	597	630	782	941
	15	213	259	331	403	558	584	724	871
	20	197	237	302	367	513	531	658	792
	25	179	214	271	327	462	474	586	705
	30	161	190	237	285	408	413	510	614
	35	141	165	205	245	354	355	437	526
	40	146	173	212	257	367	374	462	556
95	-40	309	402	510	637	811	913	1146	1379
	-35	309	401	514	642	821	920	1154	1388
	-30	310	401	518	646	831	928	1163	1399
	-25	313	403	522	650	841	935	1171	1409
	-20	315	404	525	653	848	939	1176	1415
	-15	317	404	526	653	854	941	1177	1416
	-10	317	403	524	649	855	937	1172	1410
	-5	316	400	519	642	852	928	1159	1394
	0	314	394	511	630	843	912	1138	1369
	5	309	385	498	614	827	889	1108	1333
	10	301	373	482	592	804	858	1069	1286
	15	291	357	461	565	774	820	1020	1227
	20	278	339	436	533	737	775	962	1157
	25	262	317	407	495	692	721	895	1077
	30	243	292	374	454	640	661	818	984
	35	224	266	337	408	582	595	736	885
	40	203	240	300	362	521	528	652	784
105	-40	374	489	605	757	961	1086	1363	1640
	-35	369	480	608	761	970	1092	1370	1648
	-30	370	480	615	768	983	1103	1384	1665
	-25	372	481	622	776	998	1116	1399	1683
	-20	376	485	628	783	1013	1128	1413	1700
	-15	380	488	634	789	1027	1138	1424	1713
	-10	384	490	637	792	1037	1144	1431	1722
	-5	386	490	639	792	1044	1146	1433	1724
	0	387	489	636	788	1046	1141	1426	1715
	5	386	484	630	779	1042	1130	1411	1697
	10	382	477	619	764	1030	1111	1385	1666
	15	376	466	604	744	1011	1083	1349	1623
	20	367	452	585	718	985	1047	1303	1568
	25	354	434	561	687	950	1003	1247	1500
	30	339	412	531	649	906	949	1179	1418
	35	321	387	497	606	854	887	1100	1323
	40	300	358	459	558	794	817	1013	1219
115	-40	456	596	719	901	1140	1291	1622	1951
	-35	444	579	717	897	1140	1287	1617	1945
	-30	438	570	722	903	1153	1298	1629	1960
	-25	440	571	732	914	1172	1315	1650	1985
	-20	444	574	742	926	1193	1333	1672	2011
	-15	450	579	752	937	1214	1352	1694	2038
	-10	456	585	760	947	1234	1368	1714	2062
	-5	461	589	767	954	1251	1380	1728	2079
	0	466	592	772	958	1265	1389	1737	2090
	5	469	592	772	958	1273	1391	1739	2092
	10	470	590	769	952	1275	1385	1730	2081
	15	468	585	761	941	1269	1371	1711	2058
	20	464	576	748	923	1255	1347	1680	2021
	25	456	563	730	899	1232	1314	1638	1971
	30	445	546	707	869	1202	1272	1584	1906
	35	431	524	679	832	1161	1221	1518	1826
	40	413	499	645	788	1110	1158	1438	1730

OIL COOLER HEAT REJECTION (OCHR) - 1,000 BTU/HR

Based on 10°F superheat, 10°F subcooling, superheat enthalpy not contributing to refrigeration effect. For applications having greater than 10°F superheat, consult Frick Co.

OIL COOLER HEAT REJECTION R-717 - 1000 BTU/HR (10°F Superheat, 10°F Subcooling, 120°F oil into compressor)

‡

TEMP. °F		MODEL		
COND	EVAP	496	676	856
75	-40	996	1355	1715
75	-35	990	1346	1703
75	-30	982	1334	1686
75	-25	967	1313	1658
75	-20	945	1283	1618
75	-15	914	1241	1563
75	-10	874	1185	1492
75	-5	825	1118	1406
75	0	768	1041	1307
75	5	704	953	1195
75	10	634	858	1075
75	15	559	756	945
75	20	595	804	1007
75	25	513	692	866
75	30	429	579	724
75	35	351	473	590
75	40	278	375	467
85	-40	1223	1665	2108
85	-35	1216	1654	2094
85	-30	1213	1650	2086
85	-25	1209	1644	2077
85	-20	1199	1629	2056
85	-15	1181	1604	2023
85	-10	1155	1567	1975
85	-5	1116	1514	1906
85	0	1068	1448	1821
85	5	1011	1370	1721
85	10	944	1279	1605
85	15	870	1178	1477
85	20	790	1069	1338
85	25	702	950	1187
85	30	611	825	1031
85	35	522	705	879
85	40	562	758	945
95	-40	1484	2020	2560
95	-35	1476	2008	2544
95	-30	1472	2003	2535
95	-25	1473	2003	2534
95	-20	1475	2005	2534
95	-15	1471	1998	2523
95	-10	1458	1980	2498
95	-5	1436	1950	2458
95	0	1402	1902	2396
95	5	1356	1840	2314
95	10	1300	1762	2214
95	15	1233	1671	2097
95	20	1156	1566	1963
95	25	1072	1451	1817
95	30	979	1324	1657
95	35	878	1187	1483
95	40	776	1048	1308

TEMP. °F		MODEL		
COND	EVAP	496	676	856
105	-40	1793	2441	3096
105	-35	1773	2413	3058
105	-30	1768	2406	3048
105	-25	1770	2407	3047
105	-20	1776	2414	3054
105	-15	1785	2426	3066
105	-10	1787	2429	3067
105	-5	1782	2420	3054
105	0	1766	2398	3023
105	5	1738	2359	2971
105	10	1696	2301	2895
105	15	1642	2227	2799
105	20	1577	2137	2683
105	25	1499	2031	2547
105	30	1411	1911	2394
105	35	1314	1779	2226
105	40	1207	1632	2040
115	-40	2174	2960	3755
115	-35	2123	2891	3666
115	-30	2106	2866	3632
115	-25	2106	2865	3629
115	-20	2114	2875	3639
115	-15	2126	2891	3656
115	-10	2144	2914	3683
115	-5	2156	2929	3700
115	0	2158	2932	3700
115	5	2151	2920	3682
115	10	2131	2892	3643
115	15	2094	2842	3576
115	20	2045	2773	3487
115	25	1982	2686	3375
115	30	1906	2582	3240
115	35	1815	2459	3082
115	40	1716	2323	2909

R717 HIGH STAGE

OIL COOLER HEAT REJECTION (OCHR) - 1000 BTU/HR (Liquid at intermediate temperature, no superheat, 120°F oil into compressor)

COND TEMP. °F	EVAP TEMP. °F	RWF SCREW COMPRESSOR MODELS - BOOSTER R-717							
		100	134	177	222	270	316	399	480
-20	-80	45	60	73	91	113	126	158	190
	-75	42	55	67	82	102	114	143	172
	-70	37	48	58	71	89	99	123	148
	-65	31	41	47	57	71	79	98	118
	-60	24	32	34	41	51	56	70	84
	-55	16	20	19	23	29	32	39	47
	-50	7	9	5	6	8	8	10	12
	-45	1	1	(1)	(1)	(1)	(1)	(1)	(1)
-10	-80	58	76	94	117	145	163	204	245
	-75	55	71	88	109	135	152	190	229
	-70	50	66	81	99	124	138	172	207
	-65	46	60	73	89	111	123	153	184
	-60	40	52	62	75	94	103	129	155
	-55	33	42	48	57	72	79	98	118
	-50	24	31	33	39	49	53	66	79
	-45	14	18	16	19	24	26	32	38
	-40	6	7	1	2	2	2	3	4
	-35	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
0	-80	70	92	115	142	177	200	250	301
	-75	67	87	109	134	167	188	235	283
	-70	63	82	103	126	157	176	220	265
	-65	59	77	95	117	145	162	202	243
	-60	54	70	87	106	132	146	182	219
	-55	48	62	76	92	115	127	158	190
	-50	41	53	62	74	93	102	127	153
	-45	32	41	45	54	68	74	92	111
	-40	22	28	28	33	42	45	56	67
	-35	11	14	11	12	16	17	21	25
	-30	3	4	(1)	(1)	(1)	(1)	(1)	(1)
10	-80	81	107	134	166	207	234	293	352
	-75	78	102	128	158	197	222	278	334
	-70	74	97	122	150	187	210	263	316
	-65	71	93	116	142	177	198	247	297
	-60	67	87	108	132	165	183	229	275
	-55	62	80	99	121	151	167	208	250
	-50	56	72	89	107	134	147	183	220
	-45	49	62	75	90	113	124	154	185
	-40	40	50	58	69	87	94	117	141
	-35	29	37	40	47	59	64	79	95
	-30	18	22	21	25	31	33	41	49
	-25	7	9	4	4	6	6	7	8
	-20	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
20	-80	103	136	171	212	263	299	375	451
	-75	97	127	160	198	246	278	349	420
	-70	92	121	152	187	233	263	329	396
	-65	88	115	145	178	222	249	311	374
	-60	84	109	137	168	210	234	293	352
	-55	79	103	129	156	196	218	272	327
	-50	74	95	119	144	180	199	248	298
	-45	67	87	107	129	162	178	222	267
	-40	60	77	94	113	142	155	192	231
	-35	51	65	77	91	115	125	155	186
	-30	40	51	57	68	86	92	114	137
	-25	28	36	38	44	56	60	74	89
	-20	16	20	18	20	26	27	34	41
	-15	5	6	(1)	(1)	(1)	(1)	(1)	(1)

1. Oil cooling not required.

OIL COOLER HEAT REJECTION (OCHR) - 1000 BTU/HR (Liquid at intermediate temperature, no superheat, 120°F oil into compressor)

COND TEMP. °F	EVAP TEMP. °F	RWF SCREW COMPRESSOR MODELS - BOOSTER R-717							
		100	134	177	222	270	316	399	480
30	-80	137	181	226	281	349	397	498	599
	-75	122	161	202	250	311	353	443	533
	-70	113	149	187	231	288	326	409	492
	-65	107	140	177	218	272	306	383	461
	-60	102	133	168	206	258	289	362	435
	-55	97	127	159	195	244	272	340	409
	-50	92	119	150	182	228	254	317	381
	-45	86	111	139	167	210	232	290	349
	-40	79	101	126	152	191	210	261	314
	-35	71	91	113	135	170	185	231	278
	-30	62	79	96	114	144	156	194	233
	-25	52	65	76	90	114	123	152	183
	-20	40	50	56	65	83	88	109	131
	-15	26	33	34	40	50	53	66	79
	-10	13	16	12	14	18	19	24	29
	-5	2	2	(1)	(1)	(1)	(1)	(1)	(1)
	0	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
40	-80	201	266	328	408	507	578	726	873
	-75	162	213	267	331	412	468	588	707
	-70	143	188	237	294	365	414	520	626
	-65	132	174	219	271	337	381	478	575
	-60	125	164	207	254	318	357	448	539
	-55	119	155	196	241	301	337	422	508
	-50	114	148	187	228	285	318	398	479
	-45	108	140	176	214	269	299	373	449
	-40	101	130	164	197	248	275	343	413
	-35	93	119	149	179	226	249	310	373
	-30	86	109	136	162	205	224	279	336
	-25	76	96	119	141	179	194	241	290
	-20	66	83	100	117	149	161	199	239
	-15	54	68	78	91	116	125	154	185
	-10	40	50	56	65	83	88	109	131
	-5	26	32	33	38	48	51	63	76
	0	12	15	11	12	16	16	20	24

1. Oil cooling not required.

OIL COOLER HEAT REJECTION (OCHR) - 1,000 BTU/HR (Based on 0°F superheat, 0°F subcooling, 120°F oil temperature.)

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TEMP. °F		MODEL		
INTER-MEDIATE	EVAP	496	676	856
-20	-80	190	256	322
-20	-75	171	230	288
-20	-70	147	197	246
-20	-65	116	155	194
-20	-60	82	109	137
-20	-55	46	61	76
-20	-50	12	16	19
-10	-80	247	332	419
-10	-75	228	306	385
-10	-70	206	276	347
-10	-65	182	244	305
-10	-60	152	202	253
-10	-55	114	152	190
-10	-50	77	102	126
-10	-45	37	48	60
-10	-40	3	4	5
0	-80	303	409	516
0	-75	284	382	481
0	-70	263	354	445
0	-65	241	323	405
0	-60	215	288	361
0	-55	186	248	309
0	-50	148	197	245
0	-45	106	140	174
0	-40	64	85	105
0	-35	23	31	38
10	-80	357	482	608
10	-75	336	454	572
10	-70	317	427	537
10	-65	296	398	499
10	-60	272	365	457
10	-55	246	329	412
10	-50	215	287	358
10	-45	179	239	297
10	-40	135	179	223
10	-35	90	119	148
10	-30	47	62	76
10	-25	8	11	13
20	-80	457	619	782
20	-75	424	572	722
20	-70	398	536	676
20	-65	374	504	633
20	-60	350	470	590
20	-55	323	433	542
20	-50	293	392	490
20	-45	260	347	433
20	-40	224	298	370
20	-35	179	238	295
20	-30	131	173	214
20	-25	84	111	137
20	-20	38	50	61

TEMP. °F		MODEL		
INTER-MEDIATE	EVAP	496	676	856
30	-80	609	825	1043
30	-75	539	730	921
30	-70	496	669	844
30	-65	463	624	786
30	-60	435	585	735
30	-55	407	546	685
30	-50	377	504	631
30	-45	342	458	572
30	-40	306	408	509
30	-35	269	357	444
30	-30	224	297	368
30	-25	174	231	285
30	-20	124	164	202
30	-15	74	98	120
30	-10	26	35	42
40	-80	890	1207	1528
40	-75	719	974	1231
40	-70	633	856	1081
40	-65	580	783	987
40	-60	541	729	917
40	-55	508	682	858
40	-50	476	639	801
40	-45	443	593	743
40	-40	405	540	675
40	-35	364	485	604
40	-30	325	431	536
40	-25	279	370	459
40	-20	229	303	374
40	-15	176	232	286
40	-10	123	162	200
40	-5	70	92	113
40	0	22	29	36

R717 BOOSTER

OIL COOLER HEAT REJECTION (OCHR) - 1000 BTU/HR (10°F Superheat, 120°F oil into compressor)

COND TEMP. °F	EVAP TEMP. °F	RWF SCREW COMPRESSOR MODELS - ECONOMIZED R-717							
		100	134	177	222	270	316	399	480
75	-40	211	271	350	435	562	624	781	940
	-35	211	270	349	433	563	621	777	935
	-30	210	268	347	430	562	617	771	928
	-25	209	265	343	424	558	609	761	915
	-20	207	260	337	416	551	598	745	896
	-15	203	254	328	404	539	581	723	870
	-10	197	245	316	388	522	558	695	836
	-5	190	234	301	368	499	530	659	793
	0	180	221	283	345	471	497	616	741
	5	168	205	261	318	438	457	567	682
	10	154	186	237	286	399	413	511	615
	15	139	166	209	252	355	363	449	540
	20	142	173	214	261	362	378	469	564
	25	126	151	184	224	314	325	402	484
	30	109	130	157	189	268	275	340	409
	35	92	109	131	157	225	228	282	339
	40	73	86	103	123	178	179	220	265
85	-40	258	334	428	533	685	764	957	1151
	-35	258	332	429	533	689	766	959	1154
	-30	259	332	430	533	693	767	959	1154
	-25	259	331	429	532	695	765	956	1150
	-20	259	328	426	528	695	760	949	1142
	-15	257	325	422	521	690	751	937	1127
	-10	255	319	414	510	681	736	917	1103
	-5	250	311	403	495	666	715	890	1071
	0	243	301	388	476	645	688	855	1029
	5	234	287	370	452	618	654	813	978
	10	222	271	348	424	585	614	763	918
	15	208	252	323	392	546	568	704	847
	20	192	231	294	356	500	516	639	769
	25	174	208	263	317	450	460	568	683
	30	156	185	230	276	395	400	494	594
	35	137	160	198	237	343	343	423	509
	40	144	170	208	252	360	367	454	546
95	-40	314	407	515	643	824	923	1158	1393
	-35	313	404	518	646	832	928	1163	1399
	-30	314	404	521	649	840	933	1169	1406
	-25	316	404	524	651	848	938	1174	1412
	-20	317	404	525	651	853	939	1175	1414
	-15	318	403	524	649	856	938	1172	1410
	-10	318	401	521	644	855	932	1163	1399
	-5	316	396	515	635	850	920	1148	1381
	0	312	389	505	622	838	901	1124	1352
	5	306	380	491	604	819	876	1091	1312
	10	298	367	474	581	795	844	1050	1263
	15	287	351	452	553	763	805	1000	1203
	20	273	332	427	521	725	758	941	1132
	25	257	310	398	484	679	705	874	1051
	30	239	286	365	443	627	645	799	961
	35	219	260	330	398	570	581	718	864
	40	200	235	294	354	511	516	637	766

OIL COOLER HEAT REJECTION (OCHR) - 1000 BTU/HR (10°F Superheat, 120°F oil into compressor)

COND TEMP. °F	EVAP TEMP. °F	RWF SCREW COMPRESSOR MODELS - ECONOMIZED R-717							
		100	134	177	222	270	316	399	480
105	-40	384	499	618	773	987	1109	1392	1675
	-35	377	489	620	774	993	1112	1395	1678
	-30	377	487	624	779	1004	1120	1404	1689
	-25	379	487	629	784	1017	1130	1415	1702
	-20	382	489	634	789	1029	1138	1425	1714
	-15	385	491	638	792	1039	1145	1432	1723
	-10	387	491	639	793	1047	1147	1434	1725
	-5	388	490	638	790	1051	1146	1431	1722
	0	388	487	634	784	1049	1138	1420	1708
	5	386	482	626	772	1042	1123	1401	1685
	10	381	473	614	756	1027	1100	1371	1649
	15	374	461	597	734	1005	1070	1332	1602
	20	364	446	576	707	976	1032	1284	1545
	25	351	427	551	674	939	986	1225	1474
	30	335	405	521	636	894	931	1156	1391
	35	316	379	487	593	841	869	1078	1297
	40	295	351	450	546	781	801	992	1193
115	-40	472	615	742	929	1183	1333	1674	2014
	-35	458	595	737	922	1180	1325	1663	2001
	-30	451	584	741	925	1189	1332	1670	2009
	-25	452	583	748	933	1206	1345	1686	2028
	-20	455	585	756	942	1224	1359	1703	2049
	-15	460	588	763	950	1242	1374	1720	2069
	-10	465	592	770	957	1258	1386	1734	2086
	-5	469	594	774	961	1271	1393	1743	2097
	0	472	595	776	962	1281	1397	1747	2102
	5	473	594	774	958	1286	1395	1742	2096
	10	473	590	769	950	1283	1385	1728	2079
	15	470	583	758	935	1273	1366	1703	2049
	20	464	572	743	915	1255	1339	1668	2007
	25	455	558	723	889	1229	1302	1621	1950
	30	443	540	699	857	1195	1258	1564	1882
	35	427	517	669	819	1152	1204	1496	1800
	40	409	491	635	775	1099	1140	1416	1703

1. Oil cooling not required.

OIL COOLER HEAT REJECTION (OCHR) - 1,000 BTU/HR (Based on 10°F superheat, 10°F subcooling, 120°F oil temperature.)

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TEMP. °F		MODEL		
COND	EVAP	496	676	856
75	-40	987	1342	1697
75	-35	978	1329	1679
75	-30	967	1313	1657
75	-25	949	1289	1626
75	-20	926	1256	1582
75	-15	894	1212	1525
75	-10	852	1155	1452
75	-5	803	1088	1366
75	0	746	1010	1267
75	5	682	923	1156
75	10	613	830	1038
75	15	539	729	912
75	20	576	779	974
75	25	495	668	836
75	30	413	557	696
75	35	342	461	575
75	40	278	375	467
85	-40	1224	1665	2107
85	-35	1213	1649	2086
85	-30	1206	1639	2071
85	-25	1199	1628	2056
85	-20	1185	1609	2029
85	-15	1164	1580	1991
85	-10	1135	1539	1938
85	-5	1094	1483	1865
85	0	1044	1415	1778
85	5	985	1335	1676
85	10	919	1244	1560
85	15	845	1143	1432
85	20	766	1036	1296
85	25	680	919	1149
85	30	591	798	996
85	35	504	681	849
85	40	544	734	916
95	-40	1501	2042	2586
95	-35	1487	2023	2560
95	-30	1479	2011	2542
95	-25	1475	2004	2533
95	-20	1472	1999	2524
95	-15	1463	1986	2505
95	-10	1445	1962	2473
95	-5	1419	1926	2425
95	0	1381	1873	2357
95	5	1333	1807	2270
95	10	1274	1726	2167
95	15	1206	1634	2049
95	20	1128	1528	1914
95	25	1045	1415	1771
95	30	954	1291	1614
95	35	856	1158	1446
95	40	758	1024	1278

TEMP. °F		MODEL		
COND	EVAP	496	676	856
105	-40	1834	2496	3163
105	-35	1807	2458	3112
105	-30	1795	2441	3089
105	-25	1790	2434	3077
105	-20	1789	2432	3073
105	-15	1792	2435	3074
105	-10	1789	2429	3065
105	-5	1777	2413	3041
105	0	1756	2383	3000
105	5	1723	2336	2940
105	10	1676	2273	2856
105	15	1619	2194	2754
105	20	1550	2100	2634
105	25	1471	1991	2496
105	30	1382	1871	2342
105	35	1286	1740	2176
105	40	1181	1597	1995
115	-40	2249	3061	3880
115	-35	2188	2977	3771
115	-30	2161	2940	3722
115	-25	2153	2927	3704
115	-20	2152	2926	3700
115	-15	2157	2931	3703
115	-10	2167	2944	3717
115	-5	2171	2949	3720
115	0	2167	2941	3707
115	5	2152	2920	3677
115	10	2125	2882	3627
115	15	2082	2823	3549
115	20	2027	2747	3451
115	25	1959	2654	3331
115	30	1879	2545	3191
115	35	1787	2419	3030
115	40	1688	2283	2857

R717 ECONOMIZED