GEA
Refrigeration Division

FES Systems Inc.

G Series
Screw Compressor
Technical Manual

FES Systems Inc.

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FES Systems Inc.

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FES Systems Inc.

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Principles of Operation

The exceptional reliability of FES twin rotor screw compressors has been proven in thousands of installations world wide.

The screw compressor consists of two meshing helically grooved rotors—a male (with lobes) and a female (with flutes), that are enclosed in a stationary housing. The housing is fitted with suction and discharge ports.

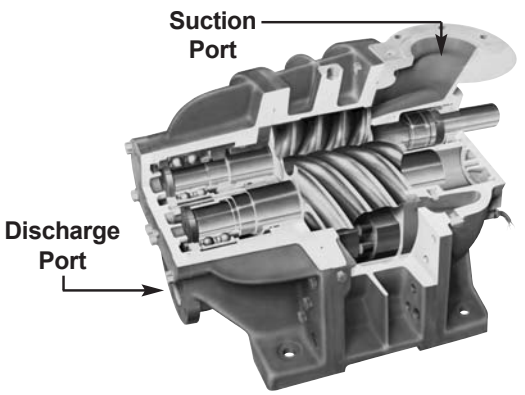
The male rotor, direct driven by a 2-pole motor, powers the female rotor. Compression of the refrigeration gas is caused by the direct volume reduction of gas trapped in the flutes of the female rotor by the lobes of the intermeshing male rotor. This process can be divided into three distinct segments:

1. Suction

As the male rotor unmeshes from the flute of the female rotor, a void is caused and vapor is drawn into the open flute through the suction port (See illustration). As the rotors continue to turn, the flute volume increases and vapor is drawn continually into the compressor.

When the open flute rotates beyond the inlet port, the entire flute is filled with vapor. As rotation continues, the vapor filled flute is moved around the circumference of the stationary housing at the suction pressure prior to the compression process.

All G Series screw compressors have a patented nozzle shaped suction channel to accelerate the suction flow before entering the grooves of the rotor. This avoids a sudden pressure drop increasing the volumetric efficiency, reducing the noise generation and ensuring smoothing operation.



2. Compression

When the flute is rotated to the point that it meshes with another lobe of the male rotor, compression begins. Oil is injected to lubricate, cool, and provide a seal to prevent vapor blow-by. The engaged lobe gradually decreases the volume of the flute toward the discharge end of the compressor to create the compression cycle. (See Illustration).

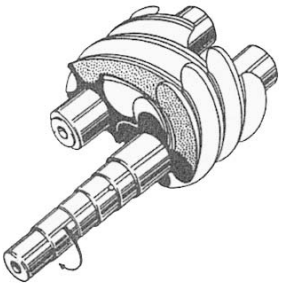
All G Series screw compressor rotors are designed with a patented line generated a symmetrical rotor profile. This profile in combination with the five (5) male driving lobes to six (6) female flutes results in a smaller blow hole area, less pressure difference between working chambers, and a smaller discharge angle. Subsequently the G Series compressors experience no wear between rotors, have a high volumetric efficiency, can operate at higher internal pressure ratios, and operate with lower noise levels.

3. Discharge

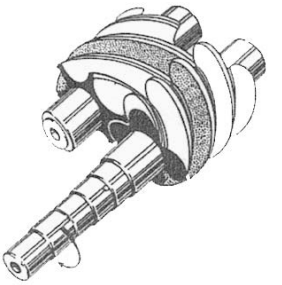
As rotation continues and the flute volume is further decreased to complete the compression cycle, the discharge port is uncovered and the compressed vapor is discharged from the flute by the lobe (See Illustration).

While the vapor is compressed and discharged by the leading edge of the meshed lobe in a flute, the trailing side of the lobe draws a fresh charge of suction vapor in the reopening flute through the compressor suction port to repeat the cycle.

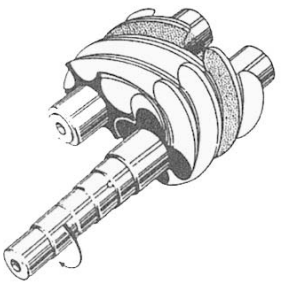
All G Series screw compressors have a patented gas vibration protection return flow channel that opens when the slide valve is less than 35%. At such low capacities, the system discharge pressure may be significantly higher than the internal pressure at the grooves of the rotor teeth at the discharge. Such pressure difference results in a back flow to the compressor causing high vibration and noise for applications with large discharge to suction suction pressure ratios. The return flow channel reduces the pressure differences that occur at part-load and dramatically reduces noise and vibration.



SUCTION



COMPRESSION



DISCHARGE

MECHANICAL SPECIFICATIONS

The chart below is a quick reference for identifying characteristic differences in FES G Series Screw Compressor Models. For more complete details on any of the topics listed below, see the corresponding section in the manual.

FES G Series Screw Compressor Characteristic Comparisons

Characteristics	GL Series	GM Series	GS Series
Compressor (TR) R-717, 10/95 °F	171.9 TR—1266.7 TR	94.3 TR—175.7 TR	43.8 TR—73.7 TR
Rotors	5 male/6 female 4 male/6 female (400GL & 565 GL)	5 male/6 female	5 male/6 female
Bearing Type Thrust Radial	 Rolling Element Sleeve	 Rolling Element Rolling Element	 Rolling Element Rolling Element
Drive	Direct	Direct	Direct
Vi	Fixed 2.6, 3.6, 4.8, 5.5 Automatic Stepless Variable (optional)	Fixed 2.6, 3.6, 4.8, 5.5 Automatic Stepless Variable (optional)	Fixed 2.6, 3.6, 4.8 Automatic Stepped Variable (optional)
Oil Pump High Stage Booster	 Partial Pump - Full Time Partial Pump - Full Time	 Internal (Capacity Control) External Partial Pump - Full Time	 Internal (Capacity Control) External Partial Pump - Full Time
Suction Strainer	External	Internal	Internal
Capacity Control (%)	10% - 100%	10% - 100%	10% - 100%

GS Series

Screw Compressor Package

Each compressor unit is a packaged assembly with all components factory piped and tested. Oil cooling is achieved through the use of either liquid injection oil cooling with automatic control valves, or with an external shell and tube oil cooler (thermosiphon or water cooled) and automatic oil temperature regulating valve. The unit includes a combination ASME designed oil separator with dual relief valves, oil heater(s), initial oil charge, suction and discharge check valves, suction gas strainer, oil filter, microprocessor control center, and hydraulically operated capacity control. High stage packages have an internal oil pump. Booster and R-22 high stage liquid injection oil cooled packages feature a direct connected recirculating oil pump with motor.

Compressor

Housing - The housing is designed in compliance with ANSI/ASHRAE 15. Castings are high grade, low porosity, gray cast iron machined to precise tolerances and hydraulically tested to 610 psi (42 bar abs). A patented flow optimized suction channel improves volumetric efficiency and reduces the compressor noise.

Rotors - The rotors are made of high grade carbon steel with advanced line generated profiles. Benefits of this design process are improved volumetric efficiency due to a shorter contact line, higher COP due to the reduced blow hole losses, lower noise levels and less rotor to rotor wear. The male driving rotor has five (5) lobes and the female has six (6) flutes.

Bearings - The four main bearings that support the rotors are high performance cylindrical roller bearings. The thrust loads are handled by duplex angular contact ball bearings which eliminate the requirement for balance piston pressure control. Bearings are designed for long life, continuous duty and ease of service.

Capacity Control - The compressor is fitted with a slide valve that provides capacity adjustment from 10% to 100%. The slide valve is operated using an integral double-acting hydraulic cylinder and piston. High pressure oil is metered into the cylinder on one side of the piston for loading through an integrated load-unload assembly containing metering and solenoid valves. To unload, the system is reversed via the load-unload assembly. A semi-hermetic solid state sensor provides a 4-20mA output to the microprocessor for slide valve position. This sensor has a static o-seal and no moving or leakage wear parts.

Volume Index - The fixed Vi version of the GS Series is available with built-in volume indices of 2.6, 3.6 or 4.8. The variable Vi version is available with a volume index range of 2.6-4.8 with automatic stepped control.

Shaft Seal - The mechanical shaft seal consists of a stationary carbon ring in contact with a rotating seal. Seals are balanced, properly loaded, lubricated and cooled to ensure positive sealing and long life.

Suction Strainer

The compressor suction strainer is integrated into the compressor suction housing. The strainer is fabricated from 250 mesh stainless steel wire and can easily be removed for cleaning.

Check Valves

Suction and discharge check valves are provided as standard. The suction check valve is integrated into the compressor suction housing, features a Teflon seal and has a dampening system to prevent check valve chatter. The suction check valve prevents compressor back-spin during shutdown. The discharge check valve is an in-line wafer type valve with a Teflon seal that prevents refrigerant migration during shutdown.

Stop Valves

Optional suction and discharge stop valves are weldable steel type that can be welded on the package or shipped loose. Suction valves are angle type and discharge valves are globe type.

Coupling

A taper-lock curved jaw coupling with a high grade urethane center member is mounted on compressors furnished with factory mounted motors. This coupling is maintenance free and has a unique

center member design that allows it to outlast the conventional flat design. The center member is removable to permit replacement of the compressor shaft seal without having to move the compressor motor. The coupling guard is designed to meet OSHA standards.

Motor Mounting

A NEMA C-Face mounted motor bolts to the coupling housing and requires no alignment.

Lubrication System

GS Series compressors being used in a high stage application do not have an external oil pump. Injection oil (for cooling) and oil for the compressor bearings, balance piston, shaft seal and capacity control is supplied by positive gas differential pressure. A compressor internal oil pump, driven by the female rotor, pressurizes the oil for capacity control. All oil is filtered after entering the compressor via an integrated oil filter. Main oil injection flow is metered using a valve integrated in the compressor casing.

GS Series compressors being used in booster applications and in high stage R-22 liquid injection applications have an external oil pump. All oil is fed by differential pressure to the compressor, where an internal filter filters the oil. Injection oil is ported internally to the rotor casing. Oil for the compressor bearings, balance piston, shaft seal and capacity control ("functional oil") is then piped to an external pump and ported to the compressor. There is no compressor internal pump in a booster application.

Oil Separator- The oil separator is a multi-compartment FES design that guarantees low oil usage, in addition to serving as an oil reservoir. Oil separation is accomplished in two sections of the separator. The first section separates by change of direction and velocity. The second section is equipped with replaceable coalescing elements to separate oil mist particles. Oil from the second stage of the separator is returned to the compressor oil port, eliminating the cfm and horsepower penalty associated with oil return to suction. Bulls-eye type sight glasses are provided to indicate oil level in both sections of the separator. The oil separator is designed, constructed, stamped and certified for 300 psi working pressure, and is furnished with dual relief valves.

Oil Charge - Units are factory charged with refrigeration grade oil that meets FES Engineering Specification ENG-5.

Oil Heater - (1) 1200 watt oil heater is standard on all compressor packages. The heater is controlled via the microprocessor to maintain the desired oil temperature when the compressor is not operating.

Oil Pump - In a high stage application, the compressor has an internal gear-type oil pump that is driven off the female rotor. The oil pump in a booster application is an external gear-type, direct driven by a "C" flange mounted motor. Oil pump motor starters must be furnished in accordance with FES Engineering Specification ENG-3.

Oil Filter - All oil to the compressor is filtered. The integrated oil filter is a replaceable 15 micron extended area super-high efficiency cartridge type. Extended area filters minimize the frequency at which filters must be changed.

Thermosiphon Oil Cooling - This type of oil cooling provides a very simple and reliable method of removing heat from the oil. The cooler is constructed, stamped and certified per Section VIII of the ASME code. A constant supply of high pressure liquid refrigerant at condensing temperature and pressure is fed to the tube side of the thermosiphon oil cooler. Oil is fed to the shell side, giving up heat to the refrigerant liquid and thereby causing it to boil or vaporize. The resultant vapor is then recondensed along with the compressor discharge gas. The thermosiphon principle causes the refrigerant to flow due to the difference in density between the entering refrigerant liquid and leaving refrigerant vapor. Liquid overfeed rate of approximately 3:1 is employed to ensure proper oil cooling. A temperature actuated proportional valve is furnished to regulate the flow of oil through the cooler to maintain constant oil temperature. Application and

performance of the FES Thermosiphon Oil Cooling System are described in detail later in this manual.

Water Cooled Oil Cooling - An optional water cooled oil cooler can be provided. The cooler is a cleanable shell and tube oil cooler with oil on the shell side and water or brine on the tube side, constructed, stamped, and certified per Section VIII of the ASME Code. It is designed for 400 psi working pressure on the shell side and 150 psi on the tube side. A temperature actuated proportional valve is furnished to regulate the flow of oil through the cooler to maintain constant oil temperature. This method maintains constant water flow through the tube side of the cooler, thus reducing scale formation on the tubes. Steel or copper tubes are available.

Liquid Injection Oil Cooling - This method of oil cooling uses a temperature-actuated proportional expansion valve to modulate the flow of high pressure refrigerant to the compressor to maintain a constant discharge temperature from the compressor. A solenoid valve with strainer is mounted in the liquid line, wired into the control panel, and allows passage of refrigerant only when required.

Economized Packages

Economizer connections are available on high stage units, resulting in improved system efficiency via liquid refrigerant subcooling. A common arrangement is to use a shell and tube heat exchanger to subcool the high pressure liquid refrigerant to improve cycle efficiency, and/or to provide proper refrigerant feed to the evaporator or load if it is remotely located (See “Precooler” Section). Alternatively, a flash-type economizer can be used. This connection can also be used for water chilling loads or other types of intermediate temperature side loads. Economizer valve stations, including stop and check valves, regulator and strainer are also available.

Custom Packages

FES screw compressor units can be custom assembled and packaged with system heat exchangers, vessels and components, thus allowing refrigeration system packaging to any extent required. FES can offer complete custom arrangements and layouts, as well as steam turbine-driven units, gas or diesel engine-driven units, and compliance with certain foreign codes. Consult a FES factory representative if special combinations or packaging is required.

Mechanical Options

Dual Oil Filters - An integral oil filter is standard. Dual oil filters (two external spin-on filters complete with service valves) are available as an optional accessory item to allow servicing of the filters during operation. The integral filter is not supplied with the dual oil filter option.

Dual Oil Pumps - For situations where a backup oil pump is required, an auxiliary pump and circuit can be provided for either manual or automatic change-over.

Safety and Construction Codes

The oil separator is designed and constructed in accordance with Section VIII of the ASME Code, 300 psi design working pressure. All standard FES compressor packages conformwith ASME Boiler and Pressure Vessel Code, Section VIII, Division 1, curent revision, ANSI/ASHRAE 15-1994, and ANSI/IIAR 2-1999.

Cleaning and Painting

After assembly, the compressor unit is hand or power brushed to remove loose scale, and solvent cleaned to remove oil and grease. It is then painted per FES Fabrication Standard FS-05.

Outdoor Use

Modifications are available which permit use of screw compressor unit outdoors, and/or under low ambient conditions.

GS Series

Operating and Design Limitations

Table 1

General Design Limits

Discharge	
Maximum Pressure	270 psig
Maximum Temperature	225°F
Suction	
Maximum Pressure at 100% Capacity	103 psig
	45 psig
	15 psig
Oil	
Minimum Temperature	90°F
Maximum Temperature	155°F
Liquid Injection	
Minimum Liquid Supply Pressure	100 psig

General Operating Limitations

Discharge Pressure Cutout		
R 717 High Stage		225 psig
R-22 High Stage		270 psig
Booster Unit		65 psig
Discharge Temperature Cutout		
Liquid Injection Units		155°F
Externally Cooled Units		225°F
Suction Pressure Cutout		
Set to Saturated Pressure Corresponding to 10°F Below Suction Setpoint		
Oil Pressure - With Pump Running	**High Stage**	**Booster**
Operating Pressure	< **P** discharge, > Minimum Pressure	25 psig Above **P** discharge
Maximum Pressure	**P** discharge	36 psig Above **P** discharge
Minimum Pressure	**P** discharge - 14.5 psig	10 psig Above **P** discharge
Oil Temperature - Normal Operating		
Externally Cooled Units		
R-717 High Stage & Booster		130°F
R-22 High Stage & Booster		130°F
Liquid Injection Cooled Units		
R-717 High Stage		120°F
R-717 Booster		140°F
Oil Temperature Cutouts		
Upper		155°F
Lower		90°F
Oil Separator Temperatures		
R-717 Minimum Above Saturated Discharge Temperature		20°F
R-22 Minimum Above Saturated Discharge Temperature		30°F
Maximum Cutout		225°F
Oil Pump Application Limits		
P_D-P_S > 60 psig - no external oil pump required		
P_D-P_S < 60 psig - external oil pump required		
Minimum Slide Valve Position for Start-up		70%

Note: General limitations vary with compressor model. Consult FES for specific applications within ranges.

GM Series

Screw Compressor Package

Each compressor unit is a packaged assembly with all components factory piped and tested. Oil cooling is achieved through the use of either liquid injection oil cooling with automatic control valves, or with an external shell and tube oil cooler (thermosiphon or water cooled) and automatic oil temperature regulating valve. The unit includes a combination ASME designed oil separator with dual relief valves, oil heater(s), initial oil charge, suction and discharge check valves, suction gas strainer, oil filter, microprocessor control center, and hydraulically operated capacity control. High stage packages have an internal oil pump. Booster and R-22 high stage liquid injection oil cooled packages feature a direct connected recirculating oil pump with motor.

Compressor

Housing - The housing is designed in compliance with ANSI/ASHRAE 15. Castings are high grade, low porosity, gray cast iron machined to precise tolerances and hydraulically tested to 610 psi (42 bar abs). A patented flow optimized suction channel improves volumetric efficiency and reduces the compressor noise.

Rotors - The rotors are made of high grade carbon steel with advanced line generated profiles. Benefits of this design process are improved volumetric efficiency due to a shorter contact line, higher COP due to the reduced blow hole losses, lower noise levels and less rotor to rotor wear. The male driving rotor has five (5) lobes and the female has six (6) flutes.

Bearings - The four main bearings that support the rotors are high performance cylindrical roller bearings. The thrust loads are handled by duplex angular contact ball bearings which eliminate the requirement for balance piston pressure control. Bearings are designed for long life, continuous duty and ease of service

Capacity Control - The compressor is fitted with a slide valve that provides capacity adjustment from 10% to 100%. The slide valve is operated using an integral double-acting hydraulic cylinder and piston. High pressure oil is metered into the cylinder on one side of the piston for loading through an integrated load-unload assembly containing metering and solenoid valves. To unload, the system is reversed via the load-unload assembly. A semi-hermetic solid state sensor provides a 4-20 mA output to the microprocessor for slide valve position. This sensor has a static o-seal and no moving or leakage wear parts.

Volume Index - The fixed Vi version of the GM Series is available with built-in volume indices of 2.6, 3.6, 4.8 or 5.5. The variable Vi version is available with a volume index range of 2.6-5.5 with automatic stepless control.

Shaft Seal - The mechanical shaft seal consists of a stationary carbon ring in contact with a rotating seal. Seals are balanced, properly loaded, lubricated and cooled to ensure positive sealing and long life.

Suction Strainer

The compressor suction strainer is integrated into the compressor suction housing. The strainer is fabricated from 250 mesh stainless steel wire and can easily be removed for cleaning.

Check Valves

Suction and discharge check valves are provided as standard. The suction check valve is integrated into the compressor suction housing, features a Teflon seal and has a dampening system to prevent check valve chatter. The suction check valve prevents compressor backspin during shutdown. The discharge check valve is an in-line wafer type valve with a Teflon seal that prevents refrigerant migration during shutdown.

Stop Valves

Optional suction and discharge stop valves are weldable steel type that can be welded on the package or shipped loose. Suction valves are angle type and discharge valves are globe type.

Coupling

A taper-lock, all steel disc coupling is mounted on compressors furnished with factory mounted

motors. The wear-resistant coupling is maintenance free and has a high degree of balance inherent to its design. The center member is removable to permit replacement of the compressor shaft seal without having to move the compressor motor. The coupling guard is designed to meet OSHA requirements.

Lubrication System

GM Series compressors being used in a high stage application do not have an external oil pump. Injection oil (for cooling) and oil for the compressor bearings, balance piston, and shaft seal is supplied by positive gas differential pressure. A compressor internal oil pump, driven by the female rotor, pressurizes the oil for capacity control. All oil supplied to the compressor bearings, balance pistons, shaft seals and capacity control is filtered.

GM Series compressors being used in booster and R-22 high stage liquid injection applicaitons have an external oil pump. Oil for the compressor bearings, balance piston, shaft seal, and capacity control ("functional oil") is delivered from the separator through a strainer to the pump suction where it is pumped through an oil filter to the oil header to be delivered to the compressor. There is no compressor internal pump in a booster application. Injection oil is supplied to the compressor by positive gas differential pressure. Injection oil is split from the pumped oil after the strainer (after the cooler in external oil cooled applications) and before the pump suction.

Oil Separator- The oil separator is a multi-compartment FES design that guarantees low oil usage, in addition to serving as an oil reservoir. Oil separation is accomplished in two sections of the separator. The first section separates by change of direction and velocity. The second section is equipped with replaceable coalescing elements to separate oil mist particles. Oil from the second stage of the separator is returned to the compressor oil port, eliminating the cfm and horsepower penalty associated with oil return to suction. Bulls-eye type sight glasses are provided to indicate oil level in both sections of the separator. The oil separator is designed, constructed, stamped and certified for 300 psi working pressure, and is furnished with dual relief valves.

Oil Charge - Units are factory charged with refrigeration grade oil that meets FES Engineering Specification ENG-5.

Oil Heater - (1) 1200 watt oil heater is standard on 110GM, 125GM and 160GM compressor packages. 195GM compressor packages have (2) 1200 watt oil heaters as standard. The heater(s) is controlled via the microprocessor to maintain the desired oil temperature when the compressor is not operating.

Oil Pump - In a high stage application, the compressor has an internal gear-type oil pump that is driven off the female rotor. The oil pump in a booster application is an external gear-type, direct driven by a "C" flange mounted motor. Oil pump motor starters must be furnished in accordance with FES Engineering Specification ENG-3.

Oil Filter - All oil to the compressor bearings, balance pistons, shaft seal and capacity control is filtered. The filter is a replaceable 15 micron extended area, high efficiency spin-on type. Extended area filters minimize the frequency at which filters must be changed. Isolating valves are provided for servicing.

Thermosiphon Oil Cooling - This type of oil cooling provides a very simple and reliable method of removing heat from the oil. The cooler is constructed, stamped and certified per Section VIII of the ASME code. A constant supply of high pressure liquid refrigerant at condensing temperature and pressure is fed to the tube side of the thermosiphon oil cooler. Oil is fed to the shell side, giving up heat to the refrigerant liquid and thereby causing it to boil or vaporize. The resultant vapor is then recondensed along with the compressor discharge gas. The thermosiphon principle causes the refrigerant to flow due to the difference in density between the entering refrigerant liquid and leaving refrigerant vapor. Liquid overfeed rate of approximately 3:1 is employed to ensure proper oil cooling. A

temperature actuated proportional valve is furnished to regulate the flow of oil through the cooler to maintain constant oil temperature. Application and performance of the FES Thermosiphon Oil Cooling System are described in detail later in this manual.

Water Cooled Oil Cooling - An optional water cooled oil cooler can be provided. The cooler is a cleanable shell and tube oil cooler with oil on the shell side and water or brine on the tube side, constructed, stamped, and certified per Section VIII of the ASME Code. It is designed for 400 psi working pressure on the shell side and 150 psi on the tube side. A temperature actuated proportional valve is furnished to regulate the flow of oil through the cooler to maintain constant oil temperature. This method maintains constant water flow through the tube side of the cooler, thus reducing scale formation on the tubes. Steel or copper tubes are available.

Liquid Injection Oil Cooling - This method of oil cooling uses a temperature-actuated proportional expansion valve to modulate the flow of high pressure refrigerant to the compressor to maintain a constant discharge temperature from the compressor. A solenoid valve with strainer is mounted in the liquid line, wired into the control panel, and allows passage of refrigerant only when required.

Economized Packages

Economizer connections are available on high stage units, resulting in improved system efficiency via liquid refrigerant subcooling. A common arrangement is to use a shell and tube heat exchanger to subcool the high pressure liquid refrigerant to improve cycle efficiency, and/or to provide proper refrigerant feed to the evaporator or load if it is remotely located (See “Precooler” Section). Alternatively, a flash-type economizer can be used. This connection can also be used for water chilling loads or other types of intermediate temperature side loads. Economizer valve stations, including stop and check valves, regulator and strainer are also available.

Custom Packages

FES screw compressor units can be custom assembled and packaged with system heat exchangers, vessels and components, thus allowing refrigeration system packaging to any extent required. FES can offer complete custom arrangements and layouts, as well as steam turbine-driven units, gas or diesel engine-driven units, and compliance with certain foreign codes. Consult a FES factory representative if special combinations or packaging is required.

Mechanical Options

Dual Oil Filters - A single high performance spin-on filter is furnished as standard. Dual oil filters (two spin-on filters complete with service valves) are available as an optional accessory item to allow servicing of the filters during operation.

Dual Oil Pumps - For situations where a backup oil pump is required, an auxiliary pump and circuit can be provided for either manual or automatic change-over.

Safety and Construction Codes

The oil separator is designed and constructed in accordance with Section VIII of the ASME Code, 300 psi design working pressure. All standard FES compressor packages conformwith ASME Boiler and Pressure Vessel Code, Section VIII, Division 1, curent revision, ANSI/ASHRAE 15-1994, and ANSI/IIAR 2-1999.

Cleaning and Painting

After assembly, the compressor unit is hand or power brushed to remove loose scale, and solvent cleaned to remove oil and grease. It is then painted per FES Fabrication Standard FS-05.

Outdoor Use

Modifications are available which permit use of screw compressor unit outdoors, and/or under low ambient conditions.

GM Series

Operating and Design Limitations

Table 2

General Design Limits

Discharge		
Maximum Pressure		270 psig
Maximum Temperature		225°F
Suction		
Maximum Pressure at 100% Capacity	2.6 Vi	103 psig
	3.6 Vi	45 psig
	4.8 Vi	15 psig
	5.5 Vi	5 psig
Oil		
Minimum Temperature		90°F
Maximum Temperature		155°F
Liquid Injection		
Minimum Liquid Supply Pressure		100 psig

General Operating Limitations

Discharge Pressure Cutout		
R 717 High Stage		225 psig
R-22 High Stage		270 psig
Booster Unit		65 psig
Discharge Temperature Cutout		
Liquid Injection Units		155°F
Externally Cooled Units		225°F

Suction Pressure Cutout

Set to Saturated Pressure Corresponding to 10°F Below Suction Setpoint

Oil Pressure - With Pump Running	**High Stage**	**Booster**
Operating Pressure	< **P** discharge, > Minimum Pressure	25 psig Above **P** discharge
Maximum Pressure	**P** discharge	36 psig Above **P** discharge
Minimum Pressure	**P** discharge - 36 psig	10 psig Above **P** discharge

Oil Temperature - Normal Operating	
Externally Cooled Units	
R-717 High Stage & Booster	130°F
R-22 High Stage & Booster	130°F
Liquid Injection Cooled Units	
R-717 High Stage	120°F
R-717 Booster	140°F
Oil Temperature Cutouts	
Upper	155°F
Lower	90°F
Oil Separator Temperatures	
R-717 Minimum Above Saturated Discharge Temperature	20°F
R-22 Minimum Above Saturated Discharge Temperature	30°F
Maximum Cutout	225°F

Oil Pump Application Limits

P_D-P_S > 60 psig - no external oil pump required

P_D-P_S < 60 psig - external oil pump required

Note: General limitations vary with compressor model. Consult FES for specific applications within ranges.

GL Series

Screw Compressor Package

Each compressor unit is a packaged assembly with all components factory piped and tested. Oil cooling is achieved through the use of either liquid injection oil cooling with automatic control valves, or with an external shell and tube oil cooler (thermosiphon or water cooled) and automatic oil temperature regulating valve. The unit includes a combination ASME designed oil separator with dual relief valves, oil heaters, initial oil charge, direct connected recirculating oil pump with motor, suction and discharge check valves, suction gas strainer, oil filter, microprocessor control center, and hydraulically operated capacity control.

Compressor

Housing - The housing is designed in compliance with ANSI/ASHRAE 15. Castings are high grade, low porosity, gray cast iron machined to precise tolerances and hydraulically tested to 610 psi (42 bar abs). A patented flow optimized suction channel improves volumetric efficiency and reduces the compressor noise.

Rotors - The rotors are made of high grade carbon steel with advanced line generated profiles. Benefits of this design process are improved volumetric efficiency due to a shorter contact line, higher COP due to the reduced blow hole losses, lower noise levels and less rotor to rotor wear. The male driving rotor has five (5) lobes and the female has six (6) flutes (except the compressors on the 400GL and 565GL packages that have a 4/6 rotor configuration).

Bearings - The four main bearings that support the rotors are heavy duty, steel backed babbitt type sleeve bearings and are arranged for continuous force feed lubrication. The thrust loads are handled by duplex angular contact ball bearings which eliminate the requirement for balance piston pressure control and allow for continuous operation at unloaded conditions. Bearings are designed for long life, continuous duty, and ease of service.

Capacity Control - The compressor is fitted with a slide valve that provides capacity adjustment from 10% to 100%. The slide valve is operated using an integral double-acting hydraulic cylinder and piston. High pressure oil is metered into the cylinder on one side of the piston for loading through a load-unload assembly containing integrated metering and solenoid valves. To unload, the system is reversed via the load-unload assembly. A semi-hermetic solid state sensor provides a 4-20 mA output to the microprocessor for slide valve position. This sensor has a static o-seal and no moving or leakage wear parts.

Volume Index - The fixed Vi version of the GL Series is available with built-in volume indices of 2.6, 3.6, 4.8 or 5.5. The variable Vi version is available with volume index ranges of 2.2-4.0 or 2.6-5.5 with automatic stepless control.

Shaft Seal - The mechanical shaft seal consists of a carbon face in contact with a steel mating ring. The seal remains flooded with oil during operation and shut-down of the compressor. Seals are balanced, properly loaded, lubricated and cooled to ensure positive sealing and long life.

Suction Strainer

The compressor suction strainer is contained in a fabricated housing external to the compressor. The strainer is easily accessible for cleaning or replacement. The strainer is fabricated from 100 mesh stainless steel wire.

Check Valves

Suction and discharge check valves are provided as standard. These are in-line, wafer type valves with a Teflon seal. The suction check valve prevents compressor back-spin during shut-down while the discharge check valve prevents refrigerant migration during shutdown.

Stop Valves

Optional suction and discharge stop valves are weldable steel type that can be welded on the package or shipped loose. Suction valves are angle type and discharge valves are globe type.

GL Series

Coupling

A taper-lock, all steel disc coupling is mounted on compressors furnished with factory mounted motors. The wear-resistant coupling is maintenance free and has a high degree of balance inherent to its design. The center member is removable to permit replacement of the compressor shaft seal without having to move the compressor motor. The coupling guard is designed to meet OSHA requirements. Adjustable shimless motor mounts are supplied and used for anchoring the motor to blocks on the separator. They allow for fast, easy and accurate vertical and lateral motor alignment.

Lubrication System

High stage and booster packages are furnished with a gear-type, close-coupled positive displacement oil pump. Oil for the compressor's bearings, shaft seal and capacity control is supplied by an oil pump. Injection oil is supplied to the compressor by positive gas differential pressure.

Oil Separator- The oil separator is a multi-compartment FES design that guarantees low oil usage, in addition to serving as an oil reservoir. Oil separation is accomplished in two sections of the separator. The first section separates by change of direction and velocity. The second section is equipped with replaceable coalescing elements to separate oil mist particles. Oil from the second stage of the separator is returned to the compressor oil port, eliminating the cfm and horsepower penalty associated with oil return to suction. Bulls-eye type sight glasses are provided to indicate oil level in both sections of the separator. The oil separator is designed, constructed, stamped and certified for 300 psi working pressure, and is furnished with dual relief valves.

Oil Charge - Units are factory charged with refrigeration grade oil that meets FES Engineering Specification ENG-5.

Oil Heater - (2) 1200 watt oil heaters are supplied on all compressor units. The heaters are controlled via the microprocessor to maintain the desired oil temperature when the compressor is not operating.

Oil Pump - The oil pump is gear type, direct-driven by a "C" flange mounted motor and is located below the oil separator to ensure a positive suction head at all times. It operates independently of the compressor to provide prelubrication at start-up. Oil pump motor starters must be furnished in accordance with FES Engineering Specification ENG-3.

Oil Filter - All oil to the compressor bearings, balance pistons, shaft seal and capacity control is filtered. The filter is a replaceable 15 micron extended area, high efficiency cartridge type. Extended area filters minimize the frequency at which filters must be changed. Isolating valves are provided for servicing.

Oil Strainer - The pump suction has a 100 mesh stainless steel, cone type strainer located between the oil separator and the suction of the oil pump. Isolation valves are provided for the servicing of the strainers without depressurizing the oil separator.

Thermosiphon Oil Cooling - This type of oil cooling provides a very simple and reliable method of removing heat from the oil. The cooler is constructed, stamped and certified per Section VIII of the ASME code. A constant supply of high pressure liquid refrigerant at condensing temperature and pressure is fed to the tube side of the thermosiphon oil cooler. Oil is fed to the shell side, giving up heat to the refrigerant liquid and thereby causing it to boil or vaporize. The resultant vapor is then recondensed along with the compressor discharge gas. The thermosiphon principle causes the refrigerant to flow due to the difference in density between the entering refrigerant liquid and leaving refrigerant vapor. Liquid overfeed rate of approximately 3:1 is employed to ensure proper oil cooling. A temperature actuated proportional valve is furnished to regulate the flow of oil through the cooler to maintain constant oil temperature.

GL Series

Application and performance of the FES Thermosiphon Oil Cooling System are described in detail later in this manual.

Water Cooled Oil Cooling - An optional water cooled oil cooler can be provided. The cooler is a cleanable shell and tube oil cooler with oil on the shell side and water or brine on the tube side, constructed, stamped, and certified per Section VIII of the ASME Code. It is designed for 400 psi working pressure on the shell side and 150 psi on the tube side. A temperature actuated proportional valve is furnished to regulate the flow of oil through the cooler to maintain constant oil temperature. This method maintains constant water flow through the tube side of the cooler, thus reducing scale formation on the tubes. Steel or copper tubes are available.

Liquid Injection Oil Cooling - This method of oil cooling uses a temperature-actuated proportional expansion valve to modulate the flow of high pressure refrigerant to the compressor to maintain a constant discharge temperature from the compressor. A solenoid valve with strainer is mounted in the liquid line, wired into the control panel, and allows passage of refrigerant only when the compressor is operating.

Economized Packages

Economizer connections are available on high stage units, resulting in improved system efficiency via liquid refrigerant subcooling. A common arrangement is to use a shell and tube heat exchanger to subcool the high pressure liquid refrigerant to improve cycle efficiency, and/or to provide proper refrigerant feed to the evaporator or load if it is remotely located (See “Precooler” Section). Alternatively, a flash-type economizer can be used. This connection can also be used for water chilling loads or other types of intermediate temperature side loads. Economizer valve stations, including stop and check valves, regulator and strainer are also available.

Custom Packages

FES screw compressor units can be custom assembled and packaged with system heat exchangers, vessels and components, thus allowing refrigeration system packaging to any extent required. FES can offer complete custom arrangements and layouts, as well as steam turbine-driven units, gas or diesel engine-driven units, and compliance with certain foreign codes. Consult a FES factory representative if special combinations or packaging is required.

Mechanical Options

Dual Oil Filters - A single filter shell with multiple filter elements is furnished as standard. Dual oil filters (two filter shells complete with service valves) are available as an optional accessory item to allow servicing of the filters during operation.

Dual Oil Pumps - For situations where a backup oil pump is required, an auxiliary pump and circuit can be provided for either manual or automatic change-over.

Safety and Construction Codes

The oil separator is designed and constructed in accordance with Section VIII of the ASME Code, 300 psi design working pressure. All standard FES compressor packages conformwith ASME Boiler and Pressure Vessel Code, Section VIII, Division 1, curent revision, ANSI/ASHRAE 15-1994, and ANSI/IIAR 2-1999.

Cleaning and Painting

After assembly, the compressor unit is hand or power brushed to remove loose scale, and solvent cleaned to remove oil and grease. It is then painted per FES Fabrication Standard FS-05.

Outdoor Use

Modifications are available which permit use of screw compressor unit outdoors, and/or under low ambient conditions.

GL Series

Operating and Design Limitations

Table 3

General Design Limits

Discharge		
Maximum Pressure		270 psig
Maximum Temperature		225°F
Suction		
Maximum Pressure at 100% Capacity	2.6 Vi	103 psig
	3.6 Vi	45 psig
	4.8 Vi	15 psig
	5.5 Vi	5 psig
Oil		
Minimum Temperature		65°F
Maximum Temperature		155°F
Liquid Injection		
Minimum Liquid Supply Pressure		100 psig

General Operating Limitations

Discharge Pressure Cutout		
R 717 High Stage		225 psig
R-22 High Stage		270 psig
Booster Unit		65 psig
Discharge Temperature Cutout		
Liquid Injection Units		155°F
Externally Cooled Units		225°F
Suction Pressure Cutout		
Set to Saturated Pressure Corresponding to 10°F Below Suction Setpoint		

Oil Pressure - With Pump Running	**High Stage**	**Booster**
Operating Pressure, Above Discharge	30 psi	20 psi
Maximum Pressure, Above Discharge	50 psi	30 psi

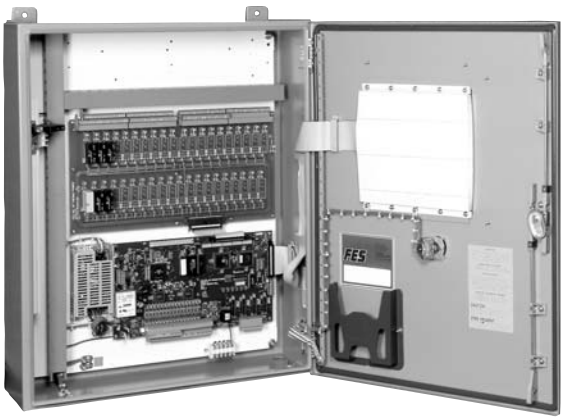
Oil Temperature - Normal Operating	
Externally Cooled Units	
R-717 High Stage & Booster	130°F
R-22 High Stage & Booster	130°F
Liquid Injection Cooled Units	
R-717 High Stage	120°F
R-717 Booster	140°F
Oil Temperature Cutouts	
Upper	155°F
Lower	90°F
Oil Separator Temperatures	
R-717 Minimum Above Saturated Discharge Temperature	20°F
R-22 Minimum Above Saturated Discharge Temperature	30°F
Maximum Cutout	225°F

Note: General limitations vary with compressor model. Consult FES for specific applications within ranges.

All Series

Micro III Compressor Control Panel

Each FES screw compressor unit is monitored and controlled by an FES Micro III panel which is mounted and wired on the compressor package. Installed on the Micro III door is a long life, highly reliable, LCD display for operational data and status viewing, and an extensive keypad for parameter and setpoint entry. This HMI (Human Machine Interface) allows the operator to monitor, control, and adjust the operation of the entire compressor package without the need for any external controls or operator stations.



Like most microprocessor based controllers, including a PLC (Programmable Logic Controller), the Micro III panel includes an AC-to-DC power supply, a microprocessor/CPU, and solid state analog and digital I/O (Inputs/Outputs). The microprocessor is programmed by FES to control the start-up sequence, monitor operating conditions and alarm when parameters are exceeded, control the suction pressure (or process temperature) while running, and control the shutdown sequencing during a normal stop or safety shut-down. The I/O assist the microprocessor in controlling the compressor unit by interfacing with the compressor package pressure and temperature transmitters, motor current transformer, slide valve 4-20mA position indicator, motor starter contactor, and compressor load/unload solenoids. The microprocessor and I/O rack are designed by FES using the latest electronics technology including flash memory, line voltage detection circuitry, and electronic sensor over current protection devices. Further hardware details are provided in FES Micro III Control Panel brochure.

Features supplied with the FES Micro III panel that are superior to other manufacturers screw compressor control panels (including custom PLC based panels) include:

1. Large keypad with 45 tactile feel keys to allow for quick operational mode changes or display access without “menu” searches or numeric entries for selections. Sixteen of the keys have LED’s which light up for a quick visual indication of the user selection or package operation.

2. Super-twist LCD display that can operate reliably in harsh industrial environments with a wide range of temperature extremes from -10 °C to +50 °C (+14°F to +122°F).

All Series

3. Twenty-two(22) or optional forty(40) module digital I/O rack with individually fused, optically isolated, and individually replaceable I/O modules. Rack includes an on-board fuse tester, detachable field wiring terminals and two screw type terminals for each field wiring point. These features make service and field wiring installation extremely convenient.

4. Power supply provides auto selection for incoming control voltages of 90-230 VAC, 50 or 60 Hz.

5. Analog inputs can be jumper selected for connection to 4-20 mA, 1-5 VDC or the industrial refrigeration industry's standard ICTD (Integrated Circuit Temperature Detector) sensors. Two of the analog inputs can also directly monitor a potentiometer and a 0-5 AMP current transformer without the need for additional DC-to-DC signal converters or transformers.

6. Analog sensor overcurrent protection avoids damage to the microprocessor board from failed or incorrectly wired sensors. Failed sensors or short circuit wiring can be easily located by disconnecting sensors one at a time and using the over current reset button until the protection does not trip.

7. Compressor control software is programmed by FES engineers. This ensures that the software has been thoroughly tested, has been provided on many previous screw compressor packages with great success, and can be supported quickly and accurately by FES should any problem arise.

8. Hardware is designed and provided by FES. By maintaining this control, FES can ensure that replacement parts will be available many years after the initial warranty has expired.

9. The built-in ComMENT network interface provides a two-wire RS–485 2.5 Megabaud peer-to-peer communications port which can be networked with other compressors for sequencing of multiple machines on a common suction level (**NOTE:** The sequencing software can be supplied as an option in one of the compressor panels or provided with a separate Micro III Sequencer panel).

10. A supervisory station or DCS system can easily access data, (both read and write), from the Micro III panel through the use of a separate, FES ComMENT Gateway. The Gateway has two communications ports: a 2.5 Megabaud RS-485 port is connected to the Micro III panel's ComMENT network and a separate 2400 Baud to 57.6 Kbaud RS-232 port is connected to the supervisory station. The RS-232 port is programmed to respond to the widely used protocols of Allen-Bradley DF-1, Modbus and GE-SNP. Thus with the addition of a Gateway, communications interface to one or multiple FES Micro III panels is simple, and in most cases will not require the development of a custom communications driver for your system.

11. Spare parts are always in stock and readily available for overnight delivery through one of FES' parts centers and through many refrigeration contractors.

12. The panel can be placed into a diagnostics mode with built-in software that allows the operator to test a variety of panel hardware and communications features. Tests include such functions as cycling on and off the processor board LED's, cycling on and off each I/O rack output, displaying the rotary and dipswitch positions, testing keypad individual key operation, filling in the

display to test LCD operation, and testing the ComMENT network installation including mapping the network and testing data transmission to other nodes on the network.

Panel Installation - The Micro III panel consists of a NEMA UL type 4 carbon steel enclosure housing the power supply, processor board with analog I/O, digital I/O rack, and field wiring terminals. Pressure transducers are installed underneath the panel. Stainless steel tubing is attached to each transducer and run to the appropriate package location. Each of the transducers electrical leads are wired into the Micro III panel. Temperature sensors are installed in wells at their appropriate package locations. And their electrical leads are run in metallic conduit on the package and wired into the Micro III. Therefore no refrigerant or oil is piped directly into the panel. Furthermore this factory wiring minimizes the amount of customer field wiring required.

Keypad Operation - The package can be started and stopped through LOCAL START and STOP keys on the keypad. A REMOTE key also exists that places the panel into a “remote” mode to allow an external “switch” to remotely start and stop the unit. Capacity control keys allow the operator to control the slide valve position of the compressor. The AUTO key enables the Micro III to automatically control the slide valve position in order to maintain a user entered suction pressure (or process temperature) setpoint. The LOAD, UNLOAD and HOLD keys allow the operator to change the compressors capacity regardless of the current setpoint. And the EXTERNAL mode key allows for two (2) external “switches” to load and unload the compressor slide valve. Additional keys exist for data entry, to navigate the operator through the various displays and functions, to control the oil pump without the compressor being started and to clear alarms and shutdowns.

Control Operation - When in AUTO mode, the Micro III will load and unload the compressor slide valve to maintain the user entered setpoint. Adjustments exist to this time proportioning pulsed control logic that allow for fine tuning to a more responsive or more stable operation. For variable Vi models, the Micro III will continually adjust the primary and secondary slides to maintain a compressor Vi appropriate for existing operating conditions. While in any capacity control mode (AUTO, LOAD, UNLOAD, HOLD, EXTERNAL), the Micro III will continually monitor discharge pressure and motor current for high conditions. If user entered limits are exceeded the panel will limit the loading or even override the normal control by unloading the compressor. In addition, if any shutdown parameter is exceeded, the Micro III will stop the compressor after appropriate time delays have expired.

Micro III Displays

Six full time and two temporary displays exist, which show compressor status information or allow for operational adjustment.

These include:

1. Operating Data - This display is the default which continually shows the most important analog sensor readings, the current control setpoint, overload conditions (i.e. high discharge pressure) etc., slide valve status (i.e. loading) etc. and communications status.

2. Analog Data - This display shows all compressor analog sensor data including the incoming Micro III line voltage. From this display, the operator can also calibrate the readings.

3. Historical Data - This display allows the operator to access the most recent 250 sets of long-term and 60 sets of short-term data logs that are continually stored while the compressor is running. Each log set contains all analog sensor readings, compressor operating status,

capacity control mode and a time stamp indicating the time of the log.

4. Operating Parameters - This display shows and allows the operator to adjust more than 50 compressor package control and shutdown setpoints. These parameters are separated into logical groups. Enhanced editing features allow the operator to quickly move between these parameter groupings. Groups consist of suction pressure control parameters, discharge pressure and motor current limits, oil pressure and temperature safeties, power failure reset modes, historical data sample periods and time clock entry to name a few.

5. Alarm Parameters - This display shows and allows the operator to adjust the compressor package alarm setpoints. When any of these parameters are exceeded, the Micro III will provide the operator with an alarm message, but not shut-down the compressor.

6. Compressor Data - This display shows important information relative to the compressor package and panel including the compressor model, anti-recycle time remaining, compressor runtime, estimated KWH consumed, refrigerant, ComMENT network ID, power failure reset mode, and software revision.

7. Shutdowns Display - This display will be available only when shutdown messages exist that have not been cleared by the customer. This display can store up to 15 shutdown messages, each with the time and date of occurrence. More than 30 possible shutdown messages exist that describe the cause for stopping the compressor.

8. Alarms Display - This display will be available only when alarm messages exist that have not been cleared by the customer. This display can store up to 15 alarm messages, each with the time and date of the alarms occurrence.

Micro III Options

The options consist of but are not limited to:

- Compressor sequencing for up to four (4) compressors on a single suction level via FES ComMENT Network. Compressor sequence order is user configurable via the 16 step Micro III “drum” sequence display. Each step of the drum has modifiable timers to allow customization for optimum performance.

- Condenser control of up to six (6) devices that are factory configurable such as single/dual speed fans and pumps including one variable speed output. Condenser sequence order is user configurable via the Micro III “drum” sequence display. Each step of the drum has modifiable timers to allow customization for optimum performance.

- Remote control and sequence via input modules for PLC-based sequencing.

- Kilowatt demand and consumption displays.

- Sophisticated timer functions allowing real time operations such as oil return to be controlled via the Micro III.

- Remote switching from temperature to pressure control via an input module.

- Hot gas bypass solenoid control output configurable based on suction pressure and slide valve position with hysteresis.

- Economizer shut-off solenoid control output configurable based on slide valve position with hysteresis.

- Auxiliary alarm and shut-down input modules.
- Keypad lockout of the complete keypad, or numeric keys only, to prevent unauthorized access.
- Motorized check valve operational control.
- Suction pressure, process temperature or slide valve position capacity control.
- Alarm and shut-down indication output modules.
- Air purging for Class 1, Group D, Division 1 or 2.
- NEMA 4X fiberglass or stainless steel enclosure.
- UL/CUL labeling.

Computer Systems and Networking

Up to 255 Micro III panels may be linked onto a common ComMENT Communications network. FES Micro II/IIE, FES MicroMASTER, and other compressor manufacturer's controllers may also be linked to this network with the installation of a FES ComMENT Communications interface board into each panel. Once networked, all of the compressor panels can be sequenced on their respective suction levels by a FES Micro III Sequence Panel that uses the ComMENT network for sending and receiving sequencing commands.

In addition, a FES ComMENT Network "Gateway" can be used to allow communications access to any panel on the network. This Gateway can be connected to:

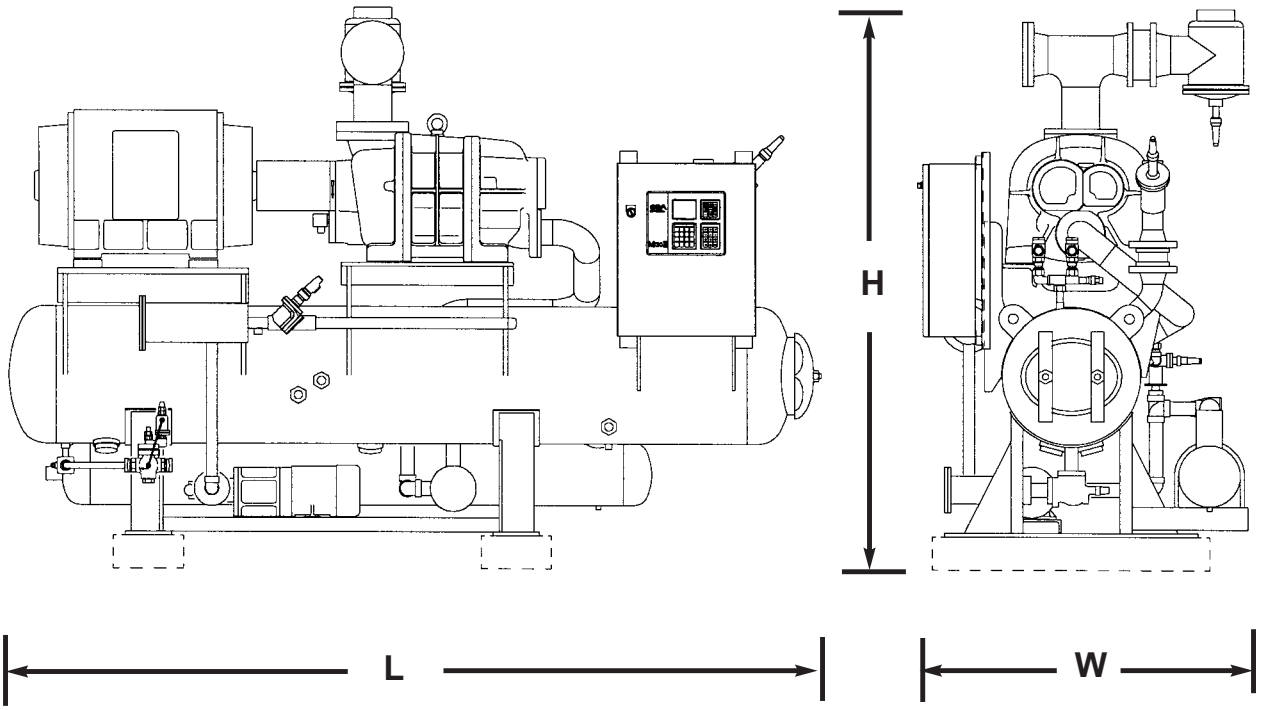
1. A FES MicroLINK PC-Based Supervisory Computer Station to provide a single point location for monitoring and control of all the panels on the network. The MicroLINK system software provides customized graphic displays of the plant's operation, historical data trending and reporting for system analysis, complete panel monitoring including setpoint and control adjustments and alarming and shut-down details, and customized reporting capabilities for both real-time and historical data. The MicroLINK system can also be remotely accessed via a remote PC and modem for off-site monitoring and control.

2. A FES LiteLINK system which provides a lower cost method for monitoring panel data and adjustment of setpoints and control operation. The LiteLINK software can be installed on the customer's PC that uses Windows 95, 98 or NT. The software provides Modbus communications with the Gateway and allows the user to select online the panel I/O and memory locations of which to read and write. FES provides with each panel a memory location "address listing" for all panel information available. Therefore the user can monitor on simple text screens almost any piece of information from any panel, and even change setpoints or start and stop equipment. Because of its simplicity and lower cost, the LiteLINK software is perfect for use in off-site monitoring via a modem for installations that do not have a MicroLINK system. Note that all monitoring is text based with real-time data and no reporting or historical data capabilities.

3. A third party supervisory system. The Gateway provides a standard RS-232 port and responds to Modbus RTU, Allen-Bradley DF1, or GE SNP protocol requests. And because most PC-based HMI software packages and DCS systems have already developed communications software (drivers), for one or more of these protocols, they can easily be configured to interface with any panel on the FES ComMENT network.

G Series Compressor Unit Dimensional Data
Horizontal Design

Figure 1



Drawing is for dimensional reference only. See “Maximum Overall Dimensions” tables (pages 21 and 23) for specific model information.

Compressor Unit Physical Data Notes: (applies to pages 21 and 23)

(1) Oil charge shown is for liquid injection and will vary depending on oil cooling method.
(2) Starting torque shown assumes slide valve at minimum capacity position and operation with a nominal Delta P of 170 psid for high stage and 60 psid for booster compressors.
(3) All weights are approximate. Package weights are for liquid injection packages less motor and options.
(4) The package weight for a Booster Model 1210 with a 36” OD oil separator is 14,425 lbs. and with a 42” OD oil separator the package weight is 19,350 lbs.
(5) High Stage Models 1025GL—1435GL are base mounted compressors with a vertical oil separator design, components depend on operating conditionS.
(6) Compressor weights shown for GS Models—excludes coupling housing and housing adapter flange.
(7) C.F. - Consult Factory for Compressor Unit Physical Data or Overall Dimensions on the indicated models.

Compressor Unit Maximum Overall Dimension Notes:

(1) Actual physical configuration will vary slightly based on model and options.
(2) Dimensions listed are maximum per model assuming external oil cooler and optional suction stop valve are provided.

GS Series
Compressor Unit Physical Data

Table 4

Model	Connection Sizes								Oil Pump		Oil Charge (Gallons)	WR2 (Lb-Ft2)	Starting Torque (Ft-Lbs)	Package Weight Less Motor (Lbs)	Compressor Weight (Lbs)
	Suction (Inches)		Discharge (Inches)		Economizer (Inches)		Liquid Injection (Inches)		(GPM)	(HP)					
	R-717	R-22	R-717	R-22	R-717	R-22	R-717	R-22							
55GS HS	2 1/2	N/A	2	N/A	1	N/A	1/2	N/A	----	----	25	0.8	48	2,000	492
55GS BSTR	2 1/2	N/A	2	N/A	----	N/A	1/2	N/A	6	0.75	25	0.8	16	2,000	492
60GS HS	2 1/2	N/A	2	N/A	1	N/A	1/2	N/A	----	----	25	1.0	57	2,000	514
60GS BSTR	2 1/2	N/A	2	N/A	----	N/A	1/2	N/A	6	0.75	25	1.0	19	2,000	514
75GS HS	3	N/A	2 1/2	N/A	1	N/A	1/2	N/A	----	----	25	1.5	67	2,700	763
75GS BSTR	3	N/A	2 1/2	N/A	----	N/A	1/2	N/A	6	0.75	25	1.5	22	2,700	763
85GS HS	3	N/A	2 1/2	N/A	1	N/A	1/2	N/A	----	----	25	1.8	79	2,700	787
85GS BSTR	3	N/A	2 1/2	N/A	----	N/A	1/2	N/A	6	0.75	25	1.8	26	2,700	787

Compressor Unit Maximum Overall Dimensions

Table 5

Model	L (Length)		W (Width)		H (Height)	
	R-717	R-22	R-717	R-22	R-717	R-22
55GS HS	89"	N/A	53"	N/A	67"	N/A
55GS BSTR	89"	N/A	53"	N/A	67"	N/A
60GS HS	89"	N/A	53"	N/A	67"	N/A
60GS BSTR	89"	N/A	53"	N/A	67"	N/A
75GS HS	89"	N/A	53"	N/A	67"	N/A
75GS BSTR	89"	N/A	53"	N/A	67"	N/A
85GS HS	89"	N/A	53"	N/A	67"	N/A
85GS BSTR	89"	N/A	53"	N/A	67"	N/A

GM Series
Compressor Unit Physical Data

Table 6

Model	Connection Sizes								Oil Pump		Oil Charge (Gallons)	WR2 (Lb-Ft2)	Starting Torque (Ft-Lbs)	Package Weight Less Motor (Lbs)	Compressor Weight (Lbs)
	Suction (Inches)		Discharge (Inches)		Economizer (Inches)		Liquid Injection (Inches)		(GPM)	(HP)					
	R-717	R-22	R-717	R-22	R-717	R-22	R-717	R-22							
110GM HS	4	N/A	3	N/A	1 1/2	N/A	3/4	N/A	---	---	25	2.7	99	2,340	807
110GM BSTR	4	N/A	3	N/A	---	N/A	1/2	N/A	15	1.5	25	2.7	33	2,340	807
125GM HS	4	N/A	3	N/A	1 1/2	N/A	3/4	N/A	---	---	25	3.3	114	2,340	840
125GM BSTR	4	N/A	3	N/A	---	N/A	1/2	N/A	15	1.5	25	3.3	38	2,340	840
160GM HS	5	N/A	3	N/A	1 1/2	N/A	3/4	N/A	---	---	25	5.6	147	2,990	1,455
160GM BSTR	5	N/A	3	N/A	---	N/A	1/2	N/A	15	1.5	25	5.6	49	2,990	1,455
195GM HS	5	N/A	3	N/A	1 1/2	N/A	3/4	N/A	---	---	65	6.9	180	5,500	1,521
195GM BSTR	5	N/A	3	N/A	---	N/A	1/2	N/A	15	1.5	65	6.9	60	5,500	1,521

Compressor Unit Maximum Overall Dimensions

Table 7

Model	L (Length)		W (Width)		H (Height)	
	R-717	R-22	R-717	R-22	R-717	R-22
110GM HS	110"	N/A	54"	N/A	85"	N/A
110GM BSTR	110"	N/A	54"	N/A	85"	N/A
125GM HS	110"	N/A	54"	N/A	85"	N/A
125GG BSTR	110"	N/A	54"	N/A	85"	N/A
160GM HS	110"	N/A	54"	N/A	92"	N/A
160GM BSTR	110"	N/A	54"	N/A	92"	N/A
195GM HS	142"	N/A	58"	N/A	98"	N/A
195GM BSTR	142"	N/A	58"	N/A	98"	N/A

GL Series

Compressor Unit Physical Data

Table 8

Model		Connection Sizes								Oil Pump		Oil Charge (Gallons)	WR2 (Lb-Ft2)	Starting Torque (Ft-Lbs)	Package Weight Less Motor (Lbs)	Compressor Weight (Lbs)
		Suction (Inches)		Discharge (Inches)		Economizer (Inches)		Liquid Injection (Inches)		(GPM)	(HP)					
		R-717	R-22	R-717	R-22	R-717	R-22	R-717	R-22							
180GL	HS	6	N/A	3	N/A	1 1/2	N/A	3/4	N/A	22	3	65	6.9	139	5,300	1,318
180GL	BSTR	6	N/A	3	N/A	----	N/A	1/2	N/A	15	3	65	6.9	59	5,300	1,318
230GL	HS	6	N/A	3	N/A	2	N/A	3/4	N/A	22	3	65	10.7	179	5,875	1,962
230GL	BSTR	6	N/A	3	N/A	----	N/A	1/2	N/A	15	3	65	10.7	71	5,875	1,962
290GL	HS	6	N/A	3	N/A	2	N/A	3/4	N/A	22	3	65	13.7	216	6,000	2,116
290GL	BSTR	6	N/A	3	N/A	----	N/A	1/2	N/A	15	3	65	13.7	85	6,000	2,116
400GL	HS	8	N/A	5	N/A	2 1/2	N/A	1	N/A	30	3	130	17.6	276	9,800	2,500
400GL	BSTR	8	N/A	5	N/A	----	N/A	3/4	N/A	22	3	130	17.6	108	9,800	2,500
475GL	HS	8	N/A	5	N/A	2 1/2	N/A	1	N/A	30	3	130	25.1	N/A	N/A	N/A
475GL	BSTR	8	N/A	5	N/A	----	N/A	3/4	N/A	22	3	130	25.1	N/A	N/A	N/A
565GL	HS	8	N/A	5	N/A	3	N/A	1	N/A	30	3	130	24.7	380	10,250	2,829
565GL	BSTR	8	N/A	5	N/A	----	N/A	3/4	N/A	22	3	130	24.7	149	10,250	2,829
675GL	HS	10	N/A	5	N/A	3	N/A	1	N/A	30/36	3	185	44.7	451	10,700	3,682
675GL	BSTR	8	N/A	5	N/A	----	N/A	3/4	N/A	22	3	185	44.7	176	10,700	3,682
800GL	HS	10	N/A	5	N/A	3	N/A	1 1/4	N/A	30/36	3	185	52.8	533	10,850	3,836
800GL	BSTR	8	N/A	5	N/A	----	N/A	3/4	N/A	22	3	185	52.8	208	10,850	3,836
*1025GLH	HS	*10	N/A	*6	N/A	*3	N/A	*1 1/4	N/A	*54	*5	*185	*97.1	*680	*14215	*5280
**1025GLH	HS	**10	N/A	**6	N/A	**3	N/A	**1 1/4	N/A	**54	**5	**205	**97.1	**680	**19350	**5280
1025GLV	HS	8 or 10	N/A	4, 5, 6, or 8	N/A	4	N/A	1 1/2	N/A	54	5	225	97.1	680	C.F.	5,280
1025GL	BSTR	8	N/A	5	N/A	----	N/A	3/4	N/A	36	3	185	97.1	266	14,075	5,280
1210GL	HS	8 or 10	N/A	4, 5, 6, or 8	N/A	4	N/A	1 1/2	N/A	54	5	225	112.2	804	C.F.	5,644
1210GL	BSTR	8 or 10	N/A	5 or 6	N/A	----	N/A	3/4	N/A	36	3	185 /210	112.2	314	14,425	5,644
1435GL	HS	10	N/A	4, 5, 6, 8, or 10	N/A	5	N/A	1 1/2	N/A	54	5	225	131.0	951	C.F.	5,830
1435GL	BSTR	10	N/A	6	N/A	----	N/A	3/4	N/A	36	3	210	131.0	372	19,525	5,830

Compressor Unit Maximum Overall Dimensions

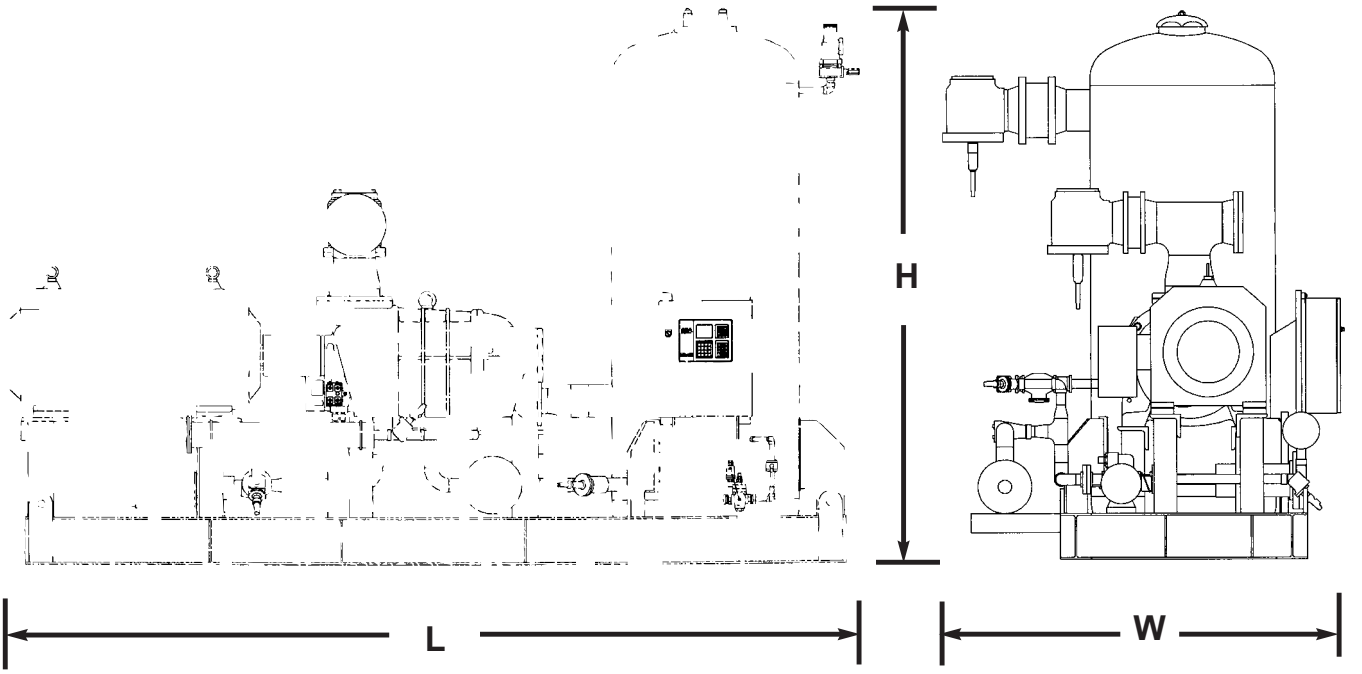
Table 9

Model		L (Length)		W (Width)		H (Height)	
		R-717	R-22	R-717	R-22	R-717	R-22
180GL	HS	141 1/4"	N/A	57 1/2"	N/A	89 13/16"	N/A
180GL	BSTR	141 1/4"	N/A	57 1/2"	N/A	89 13/16"	N/A
230GL	HS	141 1/4"	N/A	57 1/2"	N/A	91 13/16"	N/A
230GL	BSTR	141 1/4"	N/A	57 1/2"	N/A	91 13/16"	N/A
290GL	HS	141 1/4"	N/A	57 1/2"	N/A	91 13/16"	N/A
290GL	BSTR	141 1/4"	N/A	57 1/2"	N/A	91 13/16"	N/A
400GL	HS	168 1/2"	N/A	66 3/16"	N/A	109 9/16"	N/A
400GL	BSTR	168 1/2"	N/A	66 3/16"	N/A	109 9/16"	N/A
475GL	HS	168 1/2"	N/A	66 3/16"	N/A	109 9/16"	N/A
475GL	BSTR	168 1/2"	N/A	66 3/16"	N/A	109 9/16"	N/A
565GL	HS	168 1/2"	N/A	66 3/16"	N/A	109 9/16"	N/A
565GL	BSTR	168 1/2"	N/A	66 3/16"	N/A	109 9/16"	N/A
675GL	HS	174"	N/A	73 3/4"	N/A	119 15/16"	N/A
675GL	BSTR	174"	N/A	73 3/4"	N/A	116 1/2"	N/A
800GL	HS	174"	N/A	73 3/4"	N/A	119 15/16"	N/A
800GL	BSTR	174"	N/A	73 3/4"	N/A	116 1/2"	N/A
*1025GLH	HS	*175 1/4"	N/A	*82"	N/A	*125 3/16"	N/A
**1025GLH	HS	**178 15/16"	N/A	**87 1/2"	N/A	**133 5/16"	N/A
1025GLV	HS	225"	N/A	110"	N/A	143"	N/A
1025GL	BSTR	174"	N/A	72"	N/A	126 1/4"	N/A
1210GL	HS	225"	N/A	110"	N/A	143"	N/A
1210GL	BSTR	*174" 1933/4"	N/A N/A	*72" 7911/16"	N/A N/A	*126 1/4" 133 3/8"	N/A N/A
1435GL	HS	225"	N/A	110"	N/A	143"	N/A
1435GL	BSTR	1933/4"	N/A	7911/16"	N/A	1333/8"	N/A

* 36" Oil Separator; ** 42" Oil Separator

Compressor Unit Dimensional Data
Vertical Design (GL Models Only—See Below)

Figure 2



Compressor Unit Maximum Overall Dimensions

Table 10

Model	L (Length)		W (Width)		H (Height)		
	R-717	R-22	R-717	R-22	R-717 (48")	R-717 (54")	R-22
1025GL HS	225"	N/A	*110"	N/A	156 3/4"	159 7/16"	N/A
1210GL HS	225"	N/A	*110"	N/A	156 3/4"	159 7/16"	N/A
1435GL HS	225"	N/A	*110"	N/A	156 3/4"	159 7/16"	N/A

* Width with valve installed.
Package height is dependent on oil separator size (see Table 10).
Dimensions in Table 10 are for models shown; high stage applications only.

All Series

Performance data tables at 3550 RPM (60 Hz), are shown on pages 26-101. These ratings may be interpolated but must comply with design limitations shown in the "Operating and Design Limitations" tables. Horsepower ratings are based on the use of the most efficient internal volume ratio available. All ratings are in accordance with the assumptions and design criteria outlined below. Final ratings are to be determined from the basic tabular ratings and the adjustment factors shown in Table 11.

1. **R-717 and R-22 High Stage and Economized Rating Tables** are based on use of external oil cooling with saturated suction gas temperature and 10°F liquid subcooling.
2. **R-717 and R-22 Booster Rating Tables** are based on external oil cooling with saturated suction gas temperature, and liquid cooled to a temperature corresponding to intermediate pressure.
3. **R-717 and R-22 High Stage, Economized and Booster Ratings** must be corrected when liquid injection oil cooling is used in place of external oil cooling. Refer to page 75 for capacity and brake horsepower correction factors.
4. **For 50 Hz Operation** (2950 RPM) multiply the applicable compressor capacity, BHP and oil cooler heat rejection by 0.830.

Use of Economized Ratings

Compressors selected for this duty include a side suction port. This allows introduction of additional gas into the compressor at a pressure between suction and discharge with little or no reduction in the amount of gas taken into the main suction port.

Ratings are based on use of a shell and tube type subcooler with high pressure liquid cooled to within 10°F of saturated side port temperature.

Economizer ratings are given for a fully loaded compressor. Operating at part load reduces the side port effectiveness. At 75% compressor capacity, the side suction port is open to the main suction port. Therefore, maximum benefit of the economizer feature is obtained when the compressor operates fully loaded.

Table 11

Adjustment Factors

CORRECTION FOR:		R-717		R-22	
		High Stage	Booster	High Stage	Booster
Liquid	TR	1+(0.0025xSC)	1-(0.002xTD)	1+(0.005xSC)	1-(0.003xTD)
Subcooling	BHP	1.0		1.0	
Suction	TR	1-(0.002xSH)		1-(0.002xSH)	
Superheat	BHP	1.0		1.0	
Liquid	TR				
Injection	BHP	Refer to page 75.			
Oil Cooling					

Where:

SC = Temperature difference between actual subcooling and subcooling of basic rating = SC_a-10 °F.

TD = Temperature difference between saturated booster discharge temperature and liquid temperature to evaporator.

SH = Amount of (°F) of actual suction superheat.

MODEL 55GS (High Stage/Economized Ratings)

SUCTION TEMP. °F AND CORRESPONDING PRESSURE PSIG		CONDENSING TEMP. °F AND CORRESPONDING PRESSURE PSIG							
		75 125.8		85 151.7		95 181.1		105 214.2	
		H.S.	ECON	H.S.	ECON	H.S.	ECON	H.S.	ECON
-40	TR	12.3	14.2	11.8	14.1	11.4	13.8	10.8	13.4
*8.7	BHP	36.1	38.5	39.7	42.6	43.5	47.0	47.5	51.7
-35	TR	14.2	16.3	13.7	16.1	13.2	15.8	12.6	15.5
*5.4	BHP	37.6	40.1	41.5	44.6	45.6	49.4	49.9	54.5
-30	TR	16.4	18.6	15.8	18.4	15.3	18.1	14.6	17.8
*1.6	BHP	39.0	41.5	43.1	46.4	47.6	51.6	52.3	57.2
-25	TR	18.8	21.3	18.2	21.0	17.6	20.7	16.9	20.3
1.3	BHP	40.2	42.8	44.7	48.1	49.5	53.7	54.6	59.8
-20	TR	21.7	24.2	21.0	23.9	20.2	23.6	19.4	23.2
3.6	BHP	41.4	44.0	46.2	49.6	51.3	55.7	56.7	62.2
-15	TR	24.8	27.5	24.0	27.1	23.2	26.8	22.3	26.3
6.2	BHP	42.5	45.0	47.6	51.0	53.0	57.5	58.8	64.4
-10	TR	28.4	31.1	27.5	30.7	26.5	30.3	25.6	29.8
9.0	BHP	43.4	45.9	48.9	52.3	54.6	59.1	60.8	66.5
-5	TR	32.3	35.0	31.3	34.6	30.2	34.2	29.1	33.7
12.2	BHP	44.3	46.7	50.0	53.4	56.2	60.6	62.7	68.4
0	TR	36.7	39.4	35.5	38.9	34.3	38.4	33.1	37.9
15.7	BHP	45.0	47.2	51.1	54.3	57.6	61.9	64.5	70.2
5	TR	41.5	44.1	40.2	43.6	38.8	43.0	37.5	42.5
19.6	BHP	45.7	47.7	52.1	55.1	58.9	63.1	66.2	71.8
10	TR	46.7	49.2	45.3	48.7	43.8	48.1	42.3	47.4
23.8	BHP	46.2	48.0	53.0	55.7	60.1	64.1	67.8	73.3
15	TR	52.5	54.7	50.9	54.1	49.3	53.5	47.6	52.8
28.4	BHP	46.7	48.2	53.7	56.2	61.2	65.0	69.3	74.6
20	TR	58.8	60.7	57.0	60.0	55.2	59.3	53.4	58.6
33.5	BHP	47.0	48.2	54.4	56.6	62.3	65.7	70.7	75.7
25	TR	65.6	-----	63.6	-----	61.7	-----	59.7	-----
39.0	BHP	47.3	-----	55.0	-----	63.2	-----	72.0	-----
30	TR	73.0	------	70.8	------	68.7	------	66.5	------
45.0	BHP	47.4	-----	55.5	-----	64.1	-----	73.2	-----
35	TR	81.0	-----	78.6	-----	76.2	-----	73.9	-----
51.6	BHP	47.5	-----	55.9	-----	64.8	-----	74.4	-----
40	TR	89.6	-----	87.0	-----	84.4	-----	81.8	-----
58.6	BHP	47.5	-----	56.2	-----	65.5	-----	75.4	-----

Refrigeration capacity based on saturated suction conditions, the use of a shell and tube type economizer with high pressure liquid cooled to within 10°F of saturated side port temperature, and 10°F liquid subcooling from the condenser.

* Inches of mercury below one standard atmosphere (29.92")

Ratings include use of external oil cooling systems.

MODEL 55GS (Booster Ratings)

SUCTION TEMP. °F AND CORRESPONDING PRESSURE PSIG		INTERMEDIATE TEMP °F. AND CORRESPONDING PRESSURE PSIG			
		0 15.7	10 23.8	20 33.5	30 45.0
-70	TR	6.9	6.5	6.2	5.9
*21.9	BHP	11.5	14.5	17.4	20.4
-65	TR	7.8	7.3	7.0	6.7
*20.4	BHP	12.1	15.0	18.0	21.1
-60	TR	8.8	8.3	8.0	7.7
*18.6	BHP	12.6	15.5	18.5	21.7
-55	TR	10.2	9.6	9.2	8.8
*16.6	BHP	12.9	15.9	18.9	22.1
-50	TR	11.7	11.1	10.6	10.2
*14.3	BHP	13.2	16.1	19.1	22.4
-45	TR	13.6	12.9	12.3	11.8
*11.7	BHP	13.5	16.3	19.3	22.6
-40	TR	15.7	14.9	14.3	13.7
*8.7	BHP	13.8	16.5	19.5	22.7
-35	TR	18.2	17.3	16.6	15.9
*5.4	BHP	14.1	16.7	19.6	22.8
-30	TR	21.1	20.0	19.2	18.5
*1.6	BHP	14.4	16.9	19.8	22.9
-25	TR	24.3	23.1	22.2	21.3
1.3	BHP	14.8	17.2	19.9	23.0
-20	TR	27.9	26.6	25.5	24.5
3.6	BHP	15.2	17.5	20.1	23.2
-15	TR	31.9	30.5	29.3	28.2
6.2	BHP	15.8	17.9	20.4	23.4
-10	TR	36.4	34.9	33.5	32.2
9.0	BHP	16.5	18.5	20.8	23.7

Refrigeration capacity based on saturated suction conditions and refrigerant liquid cooled to a temperature corresponding with intermediate pressure.
* Inches of mercury below one standard atmosphere (29.92”)

Ratings include use of external oil cooling systems.

MODEL 60GS (High Stage/Economized Ratings)

SUCTION TEMP. °F AND CORRESPONDING PRESSURE PSIG		CONDENSING TEMP. °F AND CORRESPONDING PRESSURE PSIG							
		75 125.8		85 151.7		95 181.1		105 214.2	
		H.S.	ECON	H.S.	ECON	H.S.	ECON	H.S.	ECON
-40	TR	14.5	16.9	14.0	16.7	13.5	16.4	12.8	15.9
*8.7	BHP	42.7	45.5	46.9	50.4	51.4	55.6	56.1	61.2
-35	TR	16.8	19.3	16.3	19.1	15.6	18.8	14.9	18.3
*5.4	BHP	44.5	47.4	49.1	52.7	53.9	58.4	59.1	64.5
-30	TR	19.4	22.1	18.8	21.8	18.1	21.5	17.3	21.0
*1.6	BHP	46.1	49.1	51.0	54.9	56.3	61.1	61.9	67.7
-25	TR	22.3	25.2	21.6	24.9	20.9	24.6	20.0	24.1
1.3	BHP	47.6	50.7	52.9	56.9	58.6	63.5	64.6	70.7
-20	TR	25.7	28.7	24.9	28.4	24.0	28.0	23.1	27.5
3.6	BHP	49.0	52.1	54.7	58.7	60.7	65.8	67.1	73.5
-15	TR	29.4	32.6	28.5	32.2	27.5	31.7	26.5	31.2
6.2	BHP	50.2	53.3	56.3	60.4	62.7	68.0	69.6	76.2
-10	TR	33.6	36.8	32.6	36.4	31.5	35.9	30.3	35.4
9.0	BHP	51.4	54.3	57.8	61.8	64.6	69.9	71.9	78.7
-5	TR	38.3	41.5	37.1	41.1	35.8	40.5	34.5	39.9
12.2	BHP	52.4	55.2	59.2	63.1	66.4	71.7	74.2	81.0
0	TR	43.5	46.7	42.1	46.1	40.7	45.5	39.3	44.9
15.7	BHP	53.3	55.9	60.5	64.2	68.1	73.3	76.3	83.1
5	TR	49.2	52.3	47.6	51.7	46.1	51.0	44.5	50.3
19.6	BHP	54.1	56.4	61.6	65.2	69.7	74.7	78.3	85.0
10	TR	55.4	58.3	53.7	57.7	51.9	57.0	50.2	56.2
23.8	BHP	54.7	56.8	62.6	65.9	71.1	75.9	80.2	86.7
15	TR	62.3	64.9	60.3	64.2	58.4	63.4	56.5	62.6
28.4	BHP	55.2	57.0	63.6	66.5	72.5	76.9	81.9	88.2
20	TR	69.7	72.0	67.6	71.2	65.4	70.4	63.3	69.5
33.5	BHP	55.7	57.1	64.4	66.9	73.7	77.8	83.6	89.5
25	TR	77.8	-----	75.4	-----	73.1	-----	70.8	-----
39.0	BHP	56.0	-----	65.1	-----	74.8	-----	85.2	-----
30	TR	86.6	------	84.0	------	81.4	------	78.8	------
45.0	BHP	56.1	-----	65.6	-----	75.8	-----	86.6	-----
35	TR	96.1	-----	93.2	-----	90.4	-----	87.6	-----
51.6	BHP	56.2	-----	66.1	-----	76.7	-----	88.0	-----
40	TR	106.3	-----	103.2	-----	100.1	-----	97.0	-----
58.6	BHP	56.1	-----	66.4	-----	77.4	-----	89.2	-----

Refrigeration capacity based on saturated suction conditions, the use of a shell and tube type economizer with high pressure liquid cooled to within 10°F of saturated side port temperature, and 10°F liquid subcooling from the condenser.

* Inches of mercury below one standard atmosphere (29.92")

Ratings include use of external oil cooling systems.

MODEL 60GS (Booster Ratings)

SUCTION TEMP. °F AND CORRESPONDING PRESSURE PSIG		INTERMEDIATE TEMP °F. AND CORRESPONDING PRESSURE PSIG			
		0 15.7	10 23.8	20 33.5	30 45.0
-70	TR	8.0	7.7	7.3	7.0
*21.9	BHP	13.6	17.1	20.6	24.2
-65	TR	9.2	8.7	8.3	8.0
*20.4	BHP	14.3	17.8	21.3	25.0
-60	TR	10.5	9.9	9.4	9.1
*18.6	BHP	14.9	18.3	21.9	25.6
-55	TR	12.0	11.4	10.9	10.5
*16.6	BHP	15.3	18.8	22.3	26.1
-50	TR	13.9	13.2	12.6	12.1
*14.3	BHP	15.7	19.1	22.6	26.5
-45	TR	16.1	15.3	14.6	14.0
*11.7	BHP	16.0	19.3	22.9	26.7
-40	TR	18.6	17.7	16.9	16.3
*8.7	BHP	16.3	19.6	23.1	26.9
-35	TR	21.6	20.5	19.6	18.9
*5.4	BHP	16.6	19.8	23.2	27.0
-30	TR	25.0	23.8	22.7	21.9
*1.6	BHP	17.0	20.0	23.4	27.1
-25	TR	28.8	27.4	26.3	25.3
1.3	BHP	17.5	20.3	23.6	27.3
-20	TR	33.1	31.6	30.3	29.1
3.6	BHP	18.0	20.7	23.8	27.4
-15	TR	37.9	36.2	34.7	33.4
6.2	BHP	18.7	21.2	24.2	27.7
-10	TR	43.2	41.3	39.7	38.2
9.0	BHP	19.5	21.9	24.7	28.0

Refrigeration capacity based on saturated suction conditions and refrigerant liquid cooled to a temperature corresponding with intermediate pressure.
* Inches of mercury below one standard atmosphere (29.92”)

Ratings include use of external oil cooling systems.

MODEL 75GS (High Stage/Economized Ratings)

SUCTION TEMP. °F AND CORRESPONDING PRESSURE PSIG		CONDENSING TEMP. °F AND CORRESPONDING PRESSURE PSIG							
		75 125.8		85 151.7		95 181.1		105 214.2	
		H.S.	ECON	H.S.	ECON	H.S.	ECON	H.S.	ECON
-40	TR	17.4	20.2	16.8	20.0	16.2	19.6	15.4	19.1
*8.7	BHP	50.2	53.5	55.2	59.3	60.5	65.4	66.0	71.9
-35	TR	20.1	23.2	19.5	22.9	18.8	22.5	17.9	22.0
*5.4	BHP	52.3	55.8	57.7	62.0	63.4	68.7	69.5	75.9
-30	TR	23.2	26.5	22.5	26.2	21.7	25.8	20.8	25.2
*1.6	BHP	54.2	57.8	60.0	64.6	66.2	71.8	72.8	79.6
-25	TR	26.8	30.2	25.9	29.9	25.0	29.4	24.0	28.9
1.3	BHP	56.0	59.6	62.2	66.9	68.9	74.7	75.9	83.2
-20	TR	30.8	34.4	29.8	34.0	28.8	33.5	27.6	32.9
3.6	BHP	57.6	61.2	64.3	69.0	71.4	77.5	79.0	86.5
-15	TR	35.3	39.0	34.2	38.6	33.0	38.1	31.7	37.4
6.2	BHP	59.1	62.7	66.2	71.0	73.8	80.0	81.8	89.6
-10	TR	40.3	44.2	39.0	43.7	37.7	43.1	36.3	42.4
9.0	BHP	60.4	63.9	68.0	72.7	76.0	82.3	84.6	92.6
-5	TR	45.9	49.8	44.4	49.2	43.0	48.6	41.4	47.8
12.2	BHP	61.6	64.9	69.6	74.2	78.1	84.3	87.2	95.2
0	TR	52.1	56.0	50.5	55.3	48.8	54.6	47.1	53.8
15.7	BHP	62.7	65.7	71.1	75.6	80.1	86.2	89.7	97.7
5	TR	58.9	62.7	57.1	62.0	55.2	61.2	53.3	60.3
19.6	BHP	63.6	66.4	72.5	76.7	82.0	87.8	92.1	100.0
10	TR	66.4	69.9	64.3	69.2	62.3	68.3	60.2	67.4
23.8	BHP	64.3	66.8	73.7	77.6	83.7	89.3	94.3	102.0
15	TR	74.6	77.8	72.3	77.0	70.0	76.0	67.7	75.1
28.4	BHP	65.0	67.0	74.8	78.3	85.2	90.5	96.4	103.8
20	TR	83.6	86.3	81.0	85.3	78.5	84.3	75.9	83.3
33.5	BHP	65.5	67.1	75.7	78.7	86.7	91.5	98.3	105.3
25	TR	93.3	-----	90.4	-----	87.6	-----	84.8	-----
39.0	BHP	65.8	-----	76.5	-----	88.0	-----	100.2	-----
30	TR	103.8	------	100.7	------	97.6	------	94.5	------
45.0	BHP	66.0	-----	77.2	-----	89.1	-----	101.9	-----
35	TR	115.2	-----	111.8	-----	108.4	-----	105.0	-----
51.6	BHP	66.1	-----	77.7	-----	90.2	-----	103.5	-----
40	TR	127.4	-----	123.7	-----	120.0	-----	116.3	-----
58.6	BHP	66.0	-----	78.1	-----	91.1	-----	104.9	-----

Refrigeration capacity based on saturated suction conditions, the use of a shell and tube type economizer with high pressure liquid cooled to within 10°F of saturated side port temperature, and 10°F liquid subcooling from the condenser.

* Inches of mercury below one standard atmosphere (29.92")

Ratings include use of external oil cooling systems.

MODEL 75GS (Booster Ratings)

SUCTION TEMP. °F AND CORRESPONDING PRESSURE PSIG		INTERMEDIATE TEMP °F. AND CORRESPONDING PRESSURE PSIG			
		0.0 15.7	10.0 23.8	20.0 33.5	30.0 45.0
-70	TR	9.7	9.2	8.8	8.4
*21.9	BHP	16.1	20.1	24.2	28.4
-65	TR	11.0	10.4	9.9	9.5
*20.4	BHP	16.8	20.9	25.1	29.4
-60	TR	12.6	11.9	11.3	10.9
*18.6	BHP	17.5	21.6	25.8	30.2
-55	TR	14.4	13.6	13.0	12.5
*16.6	BHP	18.0	22.1	26.3	30.7
-50	TR	16.7	15.8	15.1	14.5
*14.3	BHP	18.4	22.4	26.6	31.1
-45	TR	19.3	18.3	17.5	16.8
*11.7	BHP	18.8	22.7	26.9	31.4
-40	TR	22.4	21.2	20.3	19.5
*8.7	BHP	19.2	23.0	27.1	31.6
-35	TR	25.9	24.6	23.6	22.7
*5.4	BHP	19.6	23.3	27.3	31.8
-30	TR	29.9	28.5	27.3	26.2
*1.6	BHP	20.0	23.6	27.5	31.9
-25	TR	34.5	32.9	31.5	30.3
1.3	BHP	20.5	23.9	27.7	32.1
-20	TR	39.7	37.8	36.3	34.9
3.6	BHP	21.2	24.4	28.0	32.3
-15	TR	45.4	43.4	41.6	40.0
6.2	BHP	22.0	25.0	28.4	32.5
-10	TR	51.8	49.6	47.6	45.8
9.0	BHP	23.0	25.7	29.0	32.9

Refrigeration capacity based on saturated suction conditions and refrigerant liquid cooled to a temperature corresponding with intermediate pressure.
* Inches of mercury below one standard atmosphere (29.92”)

Ratings include use of external oil cooling systems.

MODEL 85GS (High Stage/Economized Ratings)

SUCTION TEMP. °F AND CORRESPONDING PRESSURE PSIG		CONDENSING TEMP. °F AND CORRESPONDING PRESSURE PSIG							
		75 125.8		85 151.7		95 181.1		105 214.2	
		H.S.	ECON	H.S.	ECON	H.S.	ECON	H.S.	ECON
-40	TR	20.6	24.0	19.9	23.7	19.2	23.2	18.2	22.6
*8.7	BHP	59.4	63.3	65.3	70.1	71.5	77.3	78.1	85.1
-35	TR	23.8	27.4	23.1	27.1	22.2	26.7	21.2	26.0
*5.4	BHP	61.8	65.9	68.2	73.3	75.0	81.2	82.2	89.7
-30	TR	27.5	31.4	26.6	31.0	25.7	30.5	24.6	29.9
*1.6	BHP	64.1	68.3	71.0	76.3	78.3	84.9	86.1	94.2
-25	TR	31.7	35.8	30.7	35.4	29.6	34.9	28.4	34.2
1.3	BHP	66.2	70.5	73.6	79.1	81.4	88.4	89.8	98.3
-20	TR	36.4	40.7	35.3	40.3	34.1	39.7	32.7	39.0
3.6	BHP	68.1	72.4	76.0	81.7	84.4	91.6	93.4	102.3
-15	TR	41.8	46.2	40.4	45.7	39.1	45.1	37.6	44.3
6.2	BHP	69.9	74.1	78.3	83.9	87.3	94.6	96.8	106.0
-10	TR	47.7	52.3	46.2	51.7	44.6	51.0	43.0	50.2
9.0	BHP	71.5	75.6	80.4	86.0	89.9	97.3	100.0	109.4
-5	TR	54.3	58.9	52.6	58.3	50.9	57.5	49.0	56.6
12.2	BHP	72.9	76.8	82.3	87.8	92.4	99.7	103.1	112.6
0	TR	61.7	66.2	59.7	65.5	57.8	64.6	55.7	63.7
15.7	BHP	74.1	77.7	84.1	89.3	94.7	101.9	106.1	115.6
5	TR	69.8	74.2	67.6	73.3	65.4	72.4	63.1	71.4
19.6	BHP	75.2	78.5	85.7	90.7	96.9	103.9	108.9	118.2
10	TR	78.6	82.8	76.2	81.9	73.7	80.9	71.2	79.8
23.8	BHP	76.1	79.0	87.1	91.7	98.9	105.5	111.5	120.6
15	TR	88.3	92.1	85.6	91.1	82.9	90.0	80.1	88.9
28.4	BHP	76.8	79.3	88.4	92.5	100.8	107.0	114.0	122.7
20	TR	98.9	102.1	95.9	101.0	92.9	99.8	89.8	98.6
33.5	BHP	77.4	79.4	89.5	93.1	102.5	108.1	116.3	124.5
25	TR	110.4	-----	107.1	-----	103.7	-----	100.4	-----
39.0	BHP	77.8	-----	90.5	-----	104.0	-----	118.5	-----
30	TR	122.9	------	119.2	------	115.5	------	111.9	------
45.0	BHP	78.1	-----	91.3	-----	105.4	-----	120.5	-----
35	TR	136.3	-----	132.3	-----	128.3	-----	124.3	-----
51.6	BHP	78.2	-----	91.9	-----	106.6	-----	122.4	-----
40	TR	150.8	-----	146.4	-----	142.0	-----	137.7	-----
58.6	BHP	78.1	-----	92.4	-----	107.7	-----	124.1	-----

Refrigeration capacity based on saturated suction conditions, the use of a shell and tube type economizer with high pressure liquid cooled to within 10°F of saturated side port temperature, and 10°F liquid subcooling from the condenser.

* Inches of mercury below one standard atmosphere (29.92")

Ratings include use of external oil cooling systems.

MODEL 85GS (Booster Ratings)

SUCTION TEMP. °F AND CORRESPONDING PRESSURE PSIG		INTERMEDIATE TEMP °F. AND CORRESPONDING PRESSURE PSIG			
		0 15.7	10 23.8	20 33.5	30 45.0
-70	TR	11.2	10.9	10.4	10.0
*21.9	BHP	19.0	23.8	28.6	33.6
-65	TR	13.1	12.3	11.7	11.3
*20.4	BHP	19.9	24.8	29.7	34.8
-60	TR	14.9	14.0	13.4	12.9
*18.6	BHP	20.7	25.5	30.5	35.7
-55	TR	17.1	16.2	15.4	14.8
*16.6	BHP	21.3	26.1	31.1	36.3
-50	TR	19.7	18.7	17.8	17.2
*14.3	BHP	21.8	26.5	31.5	36.8
-45	TR	22.8	21.7	20.7	19.9
*11.7	BHP	22.2	26.9	31.8	37.2
-40	TR	26.5	25.1	24.0	23.1
*8.7	BHP	22.7	27.2	32.1	37.4
-35	TR	30.7	29.1	27.9	26.8
*5.4	BHP	23.1	27.5	32.3	37.6
-30	TR	35.4	33.7	32.3	31.0
*1.6	BHP	23.6	27.9	32.5	37.7
-25	TR	40.8	38.9	37.3	35.9
1.3	BHP	24.3	28.3	32.8	37.9
-20	TR	46.9	44.8	42.9	41.3
3.6	BHP	25.0	28.8	33.1	38.1
-15	TR	53.8	51.4	49.3	47.4
6.2	BHP	26.0	29.5	33.6	38.5
-10	TR	61.3	58.7	56.3	54.2
9.0	BHP	27.2	30.4	34.3	38.9

Refrigeration capacity based on saturated suction conditions and refrigerant liquid cooled to a temperature corresponding with intermediate pressure.
* Inches of mercury below one standard atmosphere (29.92”)

Ratings include use of external oil cooling systems.

MODEL 110GM (High Stage/Economized Ratings)

SUCTION TEMP. °F AND CORRESPONDING PRESSURE PSIG		CONDENSING TEMP. °F AND CORRESPONDING PRESSURE PSIG							
		75 125.8		85 151.7		95 181.1		105 214.2	
		H.S.	ECON	H.S.	ECON	H.S.	ECON	H.S.	ECON
-40	TR	26.4	30.6	25.5	30.3	24.5	29.7	23.3	28.9
*8.7	BHP	74.4	79.3	81.8	87.8	89.5	96.8	97.8	106.5
-35	TR	30.5	35.1	29.5	34.7	28.4	34.1	27.1	33.3
*5.4	BHP	77.4	82.6	85.4	91.8	93.9	101.7	102.9	112.4
-30	TR	35.2	40.1	34.1	39.7	32.8	39.0	31.4	38.2
*1.6	BHP	80.3	85.6	88.9	95.6	98.0	106.4	107.8	117.9
-25	TR	40.6	45.8	39.3	45.2	37.9	44.6	36.3	43.7
1.3	BHP	82.9	88.3	92.2	99.1	102.0	110.7	112.4	123.1
-20	TR	46.6	52.1	45.1	51.5	43.6	50.8	41.9	49.9
3.6	BHP	85.3	90.7	95.2	102.2	105.7	114.7	116.9	128.1
-15	TR	53.4	59.1	51.7	58.4	50.0	57.6	48.1	56.7
6.2	BHP	87.5	92.8	98.0	105.1	109.3	118.4	121.2	132.7
-10	TR	61.0	66.9	59.1	66.1	57.1	65.2	55.0	64.2
9.0	BHP	89.5	94.6	100.7	107.7	112.6	121.8	125.3	137.0
-5	TR	69.5	75.4	67.3	74.5	65.1	73.6	62.7	72.4
12.2	BHP	91.2	96.1	103.1	109.9	115.7	124.9	129.2	141.0
0	TR	78.9	84.7	76.4	83.8	73.9	82.7	71.3	81.5
15.7	BHP	92.8	97.3	105.3	111.9	118.6	127.6	132.8	144.7
5	TR	89.2	94.9	86.4	93.8	83.6	92.6	80.7	91.4
19.6	BHP	94.1	98.3	107.3	113.5	121.4	130.1	136.3	148.0
10	TR	100.6	105.9	97.4	104.7	94.3	103.4	91.1	102.1
23.8	BHP	95.3	98.9	109.1	114.8	123.9	132.2	139.6	151.0
15	TR	113.0	117.8	109.5	116.5	106.0	115.1	102.5	113.7
28.4	BHP	96.2	99.3	110.7	115.9	126.2	134.0	142.7	153.6
20	TR	126.5	130.6	122.6	129.2	118.8	127.7	114.9	126.2
33.5	BHP	96.9	99.4	112.1	116.6	128.3	135.4	145.6	155.9
25	TR	141.3	-----	137.0	-----	132.7	-----	128.4	-----
39.0	BHP	97.4	-----	113.3	-----	130.3	-----	148.3	-----
30	TR	157.2	------	152.5	------	147.8	------	143.1	------
45.0	BHP	97.8	-----	114.3	-----	132.0	-----	150.9	-----
35	TR	174.4	-----	169.2	-----	164.1	-----	159.0	-----
51.6	BHP	97.9	-----	115.1	-----	133.5	-----	153.2	-----
40	TR	192.9	-----	187.3	-----	181.7	-----	176.1	-----
58.6	BHP	97.8	-----	115.7	-----	134.9	-----	155.4	-----

Refrigeration capacity based on saturated suction conditions, the use of a shell and tube type economizer with high pressure liquid cooled to within 10°F of saturated side port temperature, and 10°F liquid subcooling from the condenser.

* Inches of mercury below one standard atmosphere (29.92")

Ratings include use of external oil cooling systems.

MODEL 110GM (Booster Ratings)

SUCTION TEMP. °F AND CORRESPONDING PRESSURE PSIG		INTERMEDIATE TEMP °F. AND CORRESPONDING PRESSURE PSIG			
		0 15.7	10 23.8	20 33.5	30 45.0
-70	TR	14.2	13.9	13.3	12.8
*21.9	BHP	23.8	29.8	35.9	42.1
-65	TR	16.7	15.7	15.0	14.4
*20.4	BHP	24.9	31.0	37.1	43.5
-60	TR	19.0	18.0	17.1	16.5
*18.6	BHP	25.9	31.9	38.1	44.7
-55	TR	21.9	20.7	19.7	19.0
*16.6	BHP	26.6	32.7	38.9	45.5
-50	TR	25.2	23.9	22.8	22.0
*14.3	BHP	27.3	33.2	39.4	46.1
-45	TR	29.2	27.7	26.5	25.5
*11.7	BHP	27.8	33.7	39.9	46.5
-40	TR	33.9	32.1	30.7	29.6
*8.7	BHP	28.4	34.1	40.2	46.8
-35	TR	39.2	37.3	35.7	34.3
*5.4	BHP	29.0	34.5	40.4	47.1
-30	TR	45.3	43.1	41.3	39.7
*1.6	BHP	29.6	34.9	40.7	47.3
-25	TR	52.2	49.8	47.7	45.9
1.3	BHP	30.4	35.4	41.1	47.5
-20	TR	60.0	57.3	54.9	52.8
3.6	BHP	31.4	36.1	41.5	47.8
-15	TR	68.8	65.7	63.0	60.6
6.2	BHP	32.6	37.0	42.1	48.2
-10	TR	78.2	75.0	72.0	69.3
9.0	BHP	34.0	38.1	42.9	48.8

Refrigeration capacity based on saturated suction conditions and refrigerant liquid cooled to a temperature corresponding with intermediate pressure.
* Inches of mercury below one standard atmosphere (29.92”)

Ratings include use of external oil cooling systems.

MODEL 125GM (High Stage/Economized Ratings)

SUCTION TEMP. °F AND CORRESPONDING PRESSURE PSIG		CONDENSING TEMP. °F AND CORRESPONDING PRESSURE PSIG							
		75 125.8		85 151.7		95 181.1		105 214.2	
		H.S.	ECON	H.S.	ECON	H.S.	ECON	H.S.	ECON
-40	TR	31.1	36.1	30.0	35.7	28.9	35.0	27.5	34.1
*8.7	BHP	86.0	91.6	94.5	101.4	103.5	111.9	113.0	123.1
-35	TR	35.9	41.3	34.8	40.9	33.5	40.2	31.9	39.2
*5.4	BHP	89.5	95.4	98.7	106.1	108.5	117.6	118.9	129.9
-30	TR	41.5	47.3	40.1	46.7	38.7	46.0	37.0	45.0
*1.6	BHP	92.8	98.9	102.8	110.5	113.3	122.9	124.6	136.3
-25	TR	47.8	53.9	46.3	53.3	44.6	52.5	42.8	51.5
1.3	BHP	95.8	102.0	106.5	114.5	117.9	127.9	130.0	142.3
-20	TR	54.9	61.4	53.2	60.7	51.3	59.8	49.3	58.7
3.6	BHP	98.6	104.8	110.0	118.2	122.2	132.6	135.1	148.1
-15	TR	63.0	69.6	60.9	68.8	58.9	67.9	56.6	66.8
6.2	BHP	101.1	107.3	113.3	121.5	126.3	136.8	140.1	153.4
-10	TR	71.9	78.8	69.6	77.9	67.3	76.8	64.8	75.6
9.0	BHP	103.4	109.4	116.4	124.5	130.1	140.8	144.8	158.4
-5	TR	81.9	88.8	79.3	87.8	76.7	86.7	73.9	85.4
12.2	BHP	105.5	111.1	119.2	127.1	133.7	144.3	149.3	163.0
0	TR	93.0	99.8	90.0	98.7	87.0	97.4	84.0	96.0
15.7	BHP	107.3	112.5	121.7	129.3	137.1	147.5	153.5	167.2
5	TR	105.1	111.8	101.8	110.5	98.5	109.2	95.1	107.7
19.6	BHP	108.8	113.6	124.0	131.2	140.3	150.3	157.6	171.1
10	TR	118.5	124.8	114.8	123.4	111.1	121.9	107.3	120.3
23.8	BHP	110.1	114.3	126.1	132.7	143.2	152.8	161.4	174.5
15	TR	133.2	138.8	129.0	137.3	124.9	135.7	120.7	133.9
28.4	BHP	111.2	114.7	128.0	133.9	145.9	154.8	165.0	177.6
20	TR	149.1	153.9	144.5	152.3	140.0	150.5	135.4	148.7
33.5	BHP	112.0	114.9	129.6	134.8	148.3	156.5	168.3	180.2
25	TR	166.4	-----	161.4	-----	156.4	-----	151.3	-----
39.0	BHP	112.6	-----	131.0	-----	150.6	-----	171.5	-----
30	TR	185.2	------	179.6	------	174.1	------	168.6	------
45.0	BHP	113.0	-----	132.1	-----	152.6	-----	174.4	-----
35	TR	205.5	-----	199.4	-----	193.4	-----	187.3	-----
51.6	BHP	113.1	-----	133.1	-----	154.4	-----	177.1	-----
40	TR	227.3	-----	220.7	-----	214.1	-----	207.5	-----
58.6	BHP	113.0	-----	133.7	-----	155.9	-----	179.6	-----

Refrigeration capacity based on saturated suction conditions, the use of a shell and tube type economizer with high pressure liquid cooled to within 10°F of saturated side port temperature, and 10°F liquid subcooling from the condenser.

* Inches of mercury below one standard atmosphere (29.92")

Ratings include use of external oil cooling systems.

MODEL 125GM (Booster Ratings)

SUCTION TEMP. °F AND CORRESPONDING PRESSURE PSIG		INTERMEDIATE TEMP °F. AND CORRESPONDING PRESSURE PSIG			
		0 15.7	10 23.8	20 33.5	30 45.0
-70	TR	16.4	16.1	15.7	15.0
*21.9	BHP	27.5	34.5	41.4	48.6
-65	TR	19.3	18.6	17.7	17.0
*20.4	BHP	28.8	35.8	42.9	50.3
-60	TR	22.4	21.2	20.2	19.4
*18.6	BHP	29.9	36.9	44.1	51.6
-55	TR	25.7	24.3	23.2	22.4
*16.6	BHP	30.8	37.8	45.0	52.6
-50	TR	29.7	28.1	26.9	25.9
*14.3	BHP	31.5	38.4	45.6	53.3
-45	TR	34.4	32.6	31.2	30.0
*11.7	BHP	32.2	38.9	46.1	53.8
-40	TR	39.9	37.9	36.2	34.8
*8.7	BHP	32.8	39.4	46.4	54.1
-35	TR	46.2	43.9	42.0	40.4
*5.4	BHP	33.5	39.8	46.7	54.4
-30	TR	53.4	50.8	48.7	46.8
*1.6	BHP	34.2	40.3	47.1	54.6
-25	TR	61.6	58.7	56.2	54.1
1.3	BHP	35.1	40.9	47.5	54.9
-20	TR	70.3	67.5	64.7	62.3
3.6	BHP	36.2	41.7	48.0	55.2
-15	TR	79.8	77.4	74.2	71.4
6.2	BHP	37.6	42.7	48.7	55.7
-10	TR	90.3	88.4	84.9	81.7
9.0	BHP	39.4	44.0	49.6	56.4

Refrigeration capacity based on saturated suction conditions and refrigerant liquid cooled to a temperature corresponding with intermediate pressure.
* Inches of mercury below one standard atmosphere (29.92”)

Ratings include use of external oil cooling systems.

MODEL 160GM (High Stage/Economized Ratings)

SUCTION TEMP. °F AND CORRESPONDING PRESSURE PSIG		CONDENSING TEMP. °F AND CORRESPONDING PRESSURE PSIG							
		75 125.8		85 151.7		95 181.1		105 214.2	
		H.S.	ECON	H.S.	ECON	H.S.	ECON	H.S.	ECON
-40	TR	39.4	45.8	38.1	45.2	36.6	44.4	34.8	43.2
*8.7	BHP	111.1	118.4	122.1	131.1	133.8	144.7	146.1	159.2
-35	TR	45.6	52.4	44.1	51.8	42.4	50.9	40.5	49.7
*5.4	BHP	115.7	123.4	127.6	137.2	140.3	152.0	153.7	167.9
-30	TR	52.6	59.9	50.9	59.3	49.1	58.3	47.0	57.1
*1.6	BHP	119.9	127.8	132.8	142.8	146.5	158.9	161.0	176.1
-25	TR	60.6	68.4	58.7	67.6	56.6	66.6	54.3	65.3
1.3	BHP	123.9	131.9	137.7	148.0	152.4	165.4	168.0	184.0
-20	TR	69.7	77.8	67.4	76.9	65.1	75.8	62.5	74.5
3.6	BHP	127.5	135.5	142.2	152.8	158.0	171.4	174.7	191.4
-15	TR	79.8	88.3	77.3	87.3	74.6	86.1	71.8	84.7
6.2	BHP	130.7	138.6	146.5	157.1	163.2	176.9	181.1	198.3
-10	TR	91.2	99.9	88.3	98.8	85.3	97.4	82.2	95.9
9.0	BHP	133.7	141.4	150.4	160.9	168.2	182.0	187.2	204.8
-5	TR	103.9	112.6	100.6	111.3	97.2	109.9	93.7	108.2
12.2	BHP	136.3	143.6	154.0	164.2	172.9	186.6	193.0	210.7
0	TR	117.9	126.6	114.1	125.1	110.4	123.5	106.5	121.8
15.7	BHP	138.7	145.4	157.3	167.2	177.2	190.7	198.5	216.2
5	TR	133.3	141.8	129.1	140.2	124.9	138.4	120.6	136.5
19.6	BHP	140.7	146.8	160.3	169.6	181.3	194.3	203.7	221.1
10	TR	150.3	158.2	145.6	156.5	140.9	154.6	136.1	152.5
23.8	BHP	142.4	147.8	163.0	171.6	185.1	197.5	208.6	225.6
15	TR	168.8	176.0	163.6	174.1	158.4	172.0	153.1	169.8
28.4	BHP	143.7	148.3	165.4	173.1	188.6	200.1	213.2	229.5
20	TR	189.1	195.2	183.2	193.1	177.5	190.8	171.7	188.5
33.5	BHP	144.8	148.5	167.5	174.2	191.7	202.3	217.6	233.0
25	TR	211.0	-----	204.6	-----	198.3	-----	191.9	-----
39.0	BHP	145.6	-----	169.3	-----	194.6	-----	221.6	-----
30	TR	234.9	------	227.8	------	220.8	------	213.8	------
45.0	BHP	146.1	-----	170.8	-----	197.2	-----	225.4	-----
35	TR	260.6	-----	252.8	-----	245.2	-----	237.6	-----
51.6	BHP	146.2	-----	172.0	-----	199.5	-----	228.9	-----
40	TR	288.3	-----	279.8	-----	271.5	-----	263.2	-----
58.6	BHP	146.1	-----	172.9	-----	201.5	-----	232.1	-----

Refrigeration capacity based on saturated suction conditions, the use of a shell and tube type economizer with high pressure liquid cooled to within 10°F of saturated side port temperature, and 10°F liquid subcooling from the condenser.

* Inches of mercury below one standard atmosphere (29.92")

Ratings include use of external oil cooling systems.

MODEL 160GM (Booster Ratings)

SUCTION TEMP. °F AND CORRESPONDING PRESSURE PSIG		INTERMEDIATE TEMP °F. AND CORRESPONDING PRESSURE PSIG			
		0.0 15.7	10.0 23.8	20.0 33.5	30.0 45.0
-70	TR	20.7	20.4	19.9	19.1
*21.9	BHP	35.5	44.5	53.6	62.9
-65	TR	24.5	23.5	22.4	21.6
*20.4	BHP	37.3	46.3	55.5	65.0
-60	TR	28.4	26.8	25.6	24.7
*18.6	BHP	38.7	47.7	57.0	66.7
-55	TR	32.6	30.9	29.5	28.4
*16.6	BHP	39.8	48.8	58.1	68.0
-50	TR	37.7	35.7	34.1	32.8
*14.3	BHP	40.7	49.6	58.9	68.9
-45	TR	43.6	41.4	39.6	38.1
*11.7	BHP	41.6	50.3	59.5	69.5
-40	TR	50.6	48.0	45.9	44.2
*8.7	BHP	42.4	50.9	60.0	70.0
-35	TR	58.6	55.7	53.3	51.2
*5.4	BHP	43.3	51.5	60.4	70.3
-30	TR	67.7	64.5	61.7	59.3
*1.6	BHP	44.2	52.1	60.8	70.6
-25	TR	78.1	74.4	71.3	68.5
1.3	BHP	45.4	52.9	61.3	70.9
-20	TR	89.2	85.6	82.1	78.9
3.6	BHP	46.9	53.9	62.0	71.4
-15	TR	101.2	98.2	94.1	90.6
6.2	BHP	48.7	55.2	62.9	72.0
-10	TR	114.5	112.1	107.6	103.6
9.0	BHP	50.9	56.9	64.1	72.8

Refrigeration capacity based on saturated suction conditions and refrigerant liquid cooled to a temperature corresponding with intermediate pressure.
* Inches of mercury below one standard atmosphere (29.92”)

Ratings include use of external oil cooling systems.

MODEL 195GM (High Stage/Economized Ratings)

SUCTION TEMP. °F AND CORRESPONDING PRESSURE PSIG		CONDENSING TEMP. °F AND CORRESPONDING PRESSURE PSIG							
		75 125.8		85 151.7		95 181.1		105 214.2	
		H.S.	ECON	H.S.	ECON	H.S.	ECON	H.S.	ECON
-40	TR	49.1	57.1	47.5	56.4	45.6	55.4	43.4	53.8
*8.7	BHP	135.9	144.9	149.4	160.4	163.6	177.0	178.7	194.7
-35	TR	56.8	65.4	55.0	64.6	52.9	63.5	50.5	62.0
*5.4	BHP	141.5	150.9	156.1	167.8	171.6	185.9	188.0	205.3
-30	TR	65.6	74.7	63.5	73.9	61.2	72.7	58.6	71.2
*1.6	BHP	146.7	156.4	162.5	174.7	179.2	194.3	196.9	215.4
-25	TR	75.6	85.2	73.1	84.3	70.6	83.1	67.7	81.4
1.3	BHP	151.5	161.3	168.4	181.0	186.4	202.2	205.5	225.0
-20	TR	86.8	97.0	84.1	95.9	81.2	94.6	78.0	92.9
3.6	BHP	155.9	165.7	174.0	186.8	193.2	209.6	213.7	234.1
-15	TR	99.5	110.1	96.4	108.8	93.1	107.4	89.5	105.6
6.2	BHP	159.9	169.6	179.2	192.1	199.7	216.4	221.5	242.6
-10	TR	113.7	124.6	110.1	123.1	106.4	121.5	102.5	119.6
9.0	BHP	163.5	172.9	184.0	196.8	205.7	222.6	228.9	250.4
-5	TR	129.5	140.4	125.4	138.8	121.2	137.0	116.8	135.0
12.2	BHP	166.7	175.7	188.4	200.9	211.4	228.2	236.0	257.7
0	TR	147.0	157.8	142.3	156.0	137.6	154.0	132.8	151.8
15.7	BHP	169.6	177.9	192.4	204.4	216.8	233.2	242.7	264.4
5	TR	166.2	176.8	161.0	174.8	155.7	172.6	150.4	170.2
19.6	BHP	172.0	179.6	196.1	207.4	221.8	237.7	249.1	270.5
10	TR	187.4	197.3	181.5	195.1	175.7	192.7	169.7	190.2
23.8	BHP	174.1	180.8	199.4	209.9	226.4	241.5	255.1	275.9
15	TR	210.5	219.5	204.0	217.1	197.5	214.5	190.9	211.7
28.4	BHP	175.8	181.4	202.3	211.7	230.6	244.8	260.8	280.8
20	TR	235.7	243.4	228.5	240.7	221.3	237.9	214.1	235.0
33.5	BHP	177.1	181.6	204.9	213.1	234.5	247.5	266.1	285.0
25	TR	263.1	-----	255.1	-----	247.2	-----	239.3	-----
39.0	BHP	178.1	-----	207.1	-----	238.0	-----	271.1	-----
30	TR	292.8	------	284.0	------	275.3	------	266.6	------
45.0	BHP	178.7	-----	208.9	-----	241.2	-----	275.7	-----
35	TR	324.9	-----	315.2	-----	305.7	-----	296.2	-----
51.6	BHP	178.9	-----	210.4	-----	244.0	-----	280.0	-----
40	TR	359.4	-----	348.9	-----	338.5	-----	328.1	-----
58.6	BHP	178.7	-----	211.5	-----	246.5	-----	283.9	-----

Refrigeration capacity based on saturated suction conditions, the use of a shell and tube type economizer with high pressure liquid cooled to within 10°F of saturated side port temperature, and 10°F liquid subcooling from the condenser.

* Inches of mercury below one standard atmosphere (29.92")

Ratings include use of external oil cooling systems.

MODEL 195GM (Booster Ratings)

SUCTION TEMP. °F AND CORRESPONDING PRESSURE PSIG		INTERMEDIATE TEMP °F. AND CORRESPONDING PRESSURE PSIG			
		0 15.7	10 23.8	20 33.5	30 45.0
-70	TR	25.9	25.4	24.8	23.8
*21.9	BHP	43.4	54.5	65.5	76.9
-65	TR	30.5	29.3	28.0	26.9
*20.4	BHP	45.6	56.7	67.9	79.6
-60	TR	35.4	33.5	31.9	30.7
*18.6	BHP	47.3	58.4	69.7	81.6
-55	TR	40.7	38.5	36.7	35.4
*16.6	BHP	48.7	59.7	71.1	83.2
-50	TR	47.0	44.5	42.5	40.9
*14.3	BHP	49.8	60.7	72.1	84.3
-45	TR	54.4	51.6	49.3	47.5
*11.7	BHP	50.9	61.5	72.8	85.1
-40	TR	63.1	59.9	57.3	55.1
*8.7	BHP	51.9	62.3	73.4	85.6
-35	TR	73.0	69.4	66.4	63.9
*5.4	BHP	52.9	63.0	73.9	86.0
-30	TR	84.4	80.4	76.9	74.0
*1.6	BHP	54.1	63.8	74.4	86.4
-25	TR	97.3	92.8	88.9	85.5
1.3	BHP	55.5	64.7	75.0	86.7
-20	TR	111.2	106.8	102.3	98.4
3.6	BHP	57.3	66.0	75.8	87.3
-15	TR	126.2	122.4	117.4	112.9
6.2	BHP	59.5	67.6	77.0	88.0
-10	TR	142.7	139.8	134.2	129.1
9.0	BHP	62.2	69.6	78.5	89.1

Refrigeration capacity based on saturated suction conditions and refrigerant liquid cooled to a temperature corresponding with intermediate pressure.
* Inches of mercury below one standard atmosphere (29.92”)

Ratings include use of external oil cooling systems.

MODEL 180GL (High Stage/Economized Ratings)

SUCTION TEMP. °F AND CORRESPONDING PRESSURE PSIG		CONDENSING TEMP. °F AND CORRESPONDING PRESSURE PSIG							
		75 125.8		85 151.7		95 181.1		105 214.2	
		H.S.	ECON	H.S.	ECON	H.S.	ECON	H.S.	ECON
-40	TR	48.0	55.8	46.5	55.2	44.8	54.4	43.0	53.4
*8.7	BHP	130.6	139.2	142.6	153.1	155.2	167.8	168.4	183.5
-35	TR	55.8	64.2	54.1	63.6	52.3	62.8	50.4	61.8
*5.4	BHP	136.5	145.5	149.8	161.0	163.8	177.4	178.5	194.9
-30	TR	64.6	73.6	62.7	72.9	60.7	72.1	58.6	71.2
*1.6	BHP	142.0	151.3	156.6	168.3	171.9	186.5	188.2	205.9
-25	TR	74.5	84.0	72.3	83.3	70.1	82.5	67.8	81.6
1.3	BHP	147.1	156.7	163.0	175.2	179.8	195.1	197.5	216.4
-20	TR	85.5	95.5	83.1	94.8	80.6	94.0	78.1	93.0
3.6	BHP	151.9	161.5	169.0	181.5	187.2	203.0	206.5	226.2
-15	TR	97.8	108.1	95.1	107.4	92.4	106.6	89.6	105.6
6.2	BHP	156.3	165.8	174.7	187.3	194.2	210.4	215.0	235.4
-10	TR	111.4	122.0	108.4	121.2	105.4	120.3	102.3	119.3
9.0	BHP	160.3	169.5	179.9	192.4	200.8	217.2	223.1	244.0
-5	TR	126.4	137.1	123.1	136.3	119.7	135.4	116.3	134.3
12.2	BHP	163.9	172.7	184.7	197.0	207.0	223.3	230.7	251.9
0	TR	142.9	153.5	139.3	152.7	135.6	151.7	131.8	150.7
15.7	BHP	167.1	175.3	189.1	200.9	212.7	228.8	237.9	259.1
5	TR	161.1	171.3	157.0	170.5	152.9	169.5	148.7	168.4
19.6	BHP	169.8	177.3	193.1	204.2	218.0	233.6	244.6	265.6
10	TR	180.9	190.5	176.4	189.6	171.9	188.6	167.3	187.5
23.8	BHP	172.1	178.7	196.5	206.8	222.8	237.7	250.9	271.3
15	TR	202.5	211.1	197.6	210.2	192.6	209.2	187.5	208.0
28.4	BHP	173.9	179.5	199.5	208.8	227.1	241.0	256.6	276.3
20	TR	226.0	233.3	220.5	232.3	215.1	231.2	209.5	230.1
33.5	BHP	175.3	179.7	202.1	210.1	230.9	243.7	261.9	280.4
25	TR	251.3	-----	245.4	-----	239.4	-----	233.4	-----
39.0	BHP	176.1	-----	204.1	-----	234.2	-----	266.6	-----
30	TR	278.8	------	272.3	------	265.8	------	259.2	------
45.0	BHP	176.5	-----	205.6	-----	237.0	-----	270.8	-----
35	TR	308.3	-----	301.2	-----	294.2	-----	287.0	-----
51.6	BHP	176.3	-----	206.6	-----	239.2	-----	274.5	-----
40	TR	340.0	-----	332.4	-----	324.7	-----	317.0	-----
58.6	BHP	175.6	-----	207.0	-----	240.9	-----	277.5	-----

Refrigeration capacity based on saturated suction conditions, the use of a shell and tube type economizer with high pressure liquid cooled to within 10°F of saturated side port temperature, and 10°F liquid subcooling from the condenser.

* Inches of mercury below one standard atmosphere (29.92”)

Ratings include use of external oil cooling systems.

MODEL 180GL (Booster Ratings)

SUCTION TEMP. °F AND CORRESPONDING PRESSURE PSIG		INTERMEDIATE TEMP °F. AND CORRESPONDING PRESSURE PSIG			
		0 15.7	10 23.8	20 33.5	30 45.0
-70	TR	24.1	23.8	23.3	22.2
*21.9	BHP	43.1	54.7	66.7	79.3
-65	TR	28.5	28.0	26.9	25.7
*20.4	BHP	44.7	56.0	67.8	80.5
-60	TR	33.2	32.5	31.1	29.8
*18.6	BHP	46.2	57.1	68.8	81.4
-55	TR	38.8	37.4	35.9	34.6
*16.6	BHP	47.6	58.1	69.5	82.1
-50	TR	44.8	43.1	41.6	40.1
*14.3	BHP	49.1	59.1	70.2	82.6
-45	TR	51.6	49.8	48.1	46.5
*11.7	BHP	50.7	60.1	70.8	83.0
-40	TR	59.4	57.4	55.6	53.9
*8.7	BHP	52.4	61.3	71.5	83.4
-35	TR	68.3	66.2	64.1	62.2
*5.4	BHP	54.4	62.6	72.3	83.9
-30	TR	78.4	76.1	73.8	71.7
*1.6	BHP	56.7	64.1	73.3	84.4
-25	TR	89.8	87.2	84.7	82.4
1.3	BHP	59.4	66.0	74.5	85.2
-20	TR	102.6	99.7	96.9	94.3
3.6	BHP	62.5	68.3	76.1	86.1
-15	TR	116.8	113.6	110.6	107.6
6.2	BHP	66.2	71.0	78.0	87.5
-10	TR	132.6	129.0	125.6	122.4
9.0	BHP	70.4	74.2	80.4	89.2

Refrigeration capacity based on saturated suction conditions and refrigerant liquid cooled to a temperature corresponding with intermediate pressure.
* Inches of mercury below one standard atmosphere (29.92”)

Ratings include use of external oil cooling systems.

MODEL 230GL (High Stage/Economized Ratings)

SUCTION TEMP. °F AND CORRESPONDING PRESSURE PSIG		CONDENSING TEMP. °F AND CORRESPONDING PRESSURE PSIG							
		75 125.8		85 151.7		95 181.1		105 214.2	
		H.S.	ECON	H.S.	ECON	H.S.	ECON	H.S.	ECON
-40	TR	62.1	72.1	60.0	71.3	57.9	70.2	55.6	69.0
*8.7	BHP	168.7	179.8	184.3	197.8	200.5	216.9	217.6	237.0
-35	TR	72.1	83.0	69.9	82.1	67.5	81.1	65.1	79.9
*5.4	BHP	176.3	188.0	193.5	208.0	211.6	229.2	230.6	251.9
-30	TR	83.5	95.1	81.0	94.2	78.4	93.2	75.7	92.0
*1.6	BHP	183.4	195.5	202.3	217.5	222.1	241.0	243.2	266.0
-25	TR	96.2	108.5	93.4	107.7	90.6	106.6	87.6	105.4
1.3	BHP	190.1	202.4	210.6	226.4	232.2	252.0	255.2	279.5
-20	TR	110.4	123.4	107.4	122.5	104.2	121.4	100.9	120.2
3.6	BHP	196.3	208.7	218.4	234.5	241.8	262.3	266.8	292.3
-15	TR	126.3	139.7	122.9	138.8	119.3	137.7	115.7	136.4
6.2	BHP	202.0	214.2	225.7	242.0	250.9	271.9	277.8	304.2
-10	TR	143.9	157.6	140.0	156.6	136.1	155.5	132.1	154.2
9.0	BHP	207.1	219.0	232.4	248.6	259.4	280.6	288.2	315.3
-5	TR	163.3	177.1	159.0	176.1	154.7	174.9	150.3	173.6
12.2	BHP	211.8	223.1	238.7	254.5	267.4	288.6	298.1	325.5
0	TR	184.7	198.3	179.9	197.3	175.1	196.0	170.2	194.7
15.7	BHP	215.9	226.5	244.3	259.6	274.8	295.6	307.4	334.8
5	TR	208.1	221.3	202.9	220.2	197.6	218.9	192.2	217.5
19.6	BHP	219.4	229.0	249.4	263.8	281.6	301.8	316.1	343.2
10	TR	233.7	246.1	227.9	245.0	222.1	243.6	216.1	242.2
23.8	BHP	222.4	230.8	253.9	267.2	287.8	307.1	324.2	350.6
15	TR	261.6	272.8	255.3	271.6	248.8	270.2	242.3	268.8
28.4	BHP	224.7	231.9	257.8	269.8	293.4	311.4	331.6	357.0
20	TR	291.9	301.4	284.9	300.2	277.9	298.8	270.7	297.2
33.5	BHP	226.5	232.1	261.1	271.5	298.3	314.8	338.4	362.3
25	TR	324.7	-----	317.1	-----	309.4	-----	301.6	-----
39.0	BHP	227.6	-----	263.7	-----	302.6	-----	344.5	-----
30	TR	360.2	------	351.8	------	343.4	------	334.9	------
45.0	BHP	228.0	-----	265.6	-----	306.2	-----	349.9	-----
35	TR	398.3	-----	389.2	-----	380.1	-----	370.9	-----
51.6	BHP	227.8	-----	266.9	-----	309.1	-----	354.6	-----
40	TR	439.3	-----	429.4	-----	419.5	-----	409.5	-----
58.6	BHP	226.9	-----	267.4	-----	311.3	-----	358.6	-----

Refrigeration capacity based on saturated suction conditions, the use of a shell and tube type economizer with high pressure liquid cooled to within 10°F of saturated side port temperature, and 10°F liquid subcooling from the condenser.

* Inches of mercury below one standard atmosphere (29.92”)

Ratings include use of external oil cooling systems.

MODEL 230GL (Booster Ratings)

SUCTION TEMP. °F AND CORRESPONDING PRESSURE PSIG		INTERMEDIATE TEMP °F. AND CORRESPONDING PRESSURE PSIG			
		0 15.7	10 23.8	20 33.5	30 45.0
-70	TR	31.2	30.7	30.1	28.6
*21.9	BHP	55.7	70.6	86.1	102.5
-65	TR	36.9	36.1	34.8	33.2
*20.4	BHP	57.8	72.3	87.6	104.1
-60	TR	42.8	41.9	40.1	38.5
*18.6	BHP	59.7	73.8	88.9	105.2
-55	TR	50.1	48.3	46.4	44.6
*16.6	BHP	61.6	75.1	89.8	106.1
-50	TR	57.9	55.7	53.7	51.8
*14.3	BHP	63.5	76.4	90.7	106.8
-45	TR	66.7	64.3	62.1	60.1
*11.7	BHP	65.5	77.7	91.5	107.3
-40	TR	76.7	74.2	71.8	69.6
*8.7	BHP	67.8	79.2	92.4	107.8
-35	TR	88.3	85.5	82.9	80.4
*5.4	BHP	70.3	80.8	93.4	108.4
-30	TR	101.3	98.3	95.4	92.7
*1.6	BHP	73.3	82.9	94.7	109.1
-25	TR	116.1	112.7	109.5	106.5
1.3	BHP	76.8	85.3	96.3	110.0
-20	TR	132.6	128.8	125.3	121.9
3.6	BHP	80.8	88.2	98.3	111.3
-15	TR	150.9	146.8	142.8	139.1
6.2	BHP	85.5	91.7	100.8	113.0
-10	TR	171.3	166.7	162.3	158.1
9.0	BHP	91.0	95.9	103.8	115.2

Refrigeration capacity based on saturated suction conditions and refrigerant liquid cooled to a temperature corresponding with intermediate pressure.
* Inches of mercury below one standard atmosphere (29.92”)

Ratings include use of external oil cooling systems.

MODEL 290GL (High Stage/Economized Ratings)

SUCTION TEMP. °F AND CORRESPONDING PRESSURE PSIG		CONDENSING TEMP. °F AND CORRESPONDING PRESSURE PSIG							
		75 125.8		85 151.7		95 181.1		105 214.2	
		H.S.	ECON	H.S.	ECON	H.S.	ECON	H.S.	ECON
-40	TR	76.9	89.4	74.4	88.4	71.8	87.1	68.9	85.5
*8.7	BHP	203.3	216.6	222.0	238.3	241.5	261.2	262.1	285.5
-35	TR	89.4	102.9	86.6	101.8	83.7	100.6	80.7	99.1
*5.4	BHP	212.4	226.4	233.1	250.5	254.8	276.1	277.8	303.4
-30	TR	103.5	117.9	100.4	116.9	97.2	115.6	93.9	114.1
*1.6	BHP	221.0	235.5	243.6	262.0	267.6	290.2	292.9	320.5
-25	TR	119.3	134.6	115.8	133.5	112.3	132.2	108.6	130.7
1.3	BHP	229.0	243.8	253.6	272.7	279.7	303.5	307.4	336.7
-20	TR	136.9	153.0	133.1	151.9	129.2	150.5	125.1	149.0
3.6	BHP	236.4	251.3	263.0	282.5	291.3	316.0	321.3	352.0
-15	TR	156.6	173.2	152.3	172.1	148.0	170.7	143.5	169.1
6.2	BHP	243.3	258.0	271.8	291.4	302.2	327.5	334.6	366.4
-10	TR	178.4	195.4	173.6	194.2	168.8	192.8	163.8	191.2
9.0	BHP	249.5	263.8	280.0	299.5	312.5	338.0	347.2	379.8
-5	TR	202.5	219.6	197.2	218.4	191.8	216.9	186.3	215.2
12.2	BHP	255.1	268.8	287.5	306.6	322.1	347.6	359.1	392.1
0	TR	229.0	245.9	223.1	244.6	217.2	243.1	211.1	241.4
15.7	BHP	260.0	272.8	294.3	312.7	331.0	356.1	370.3	403.3
5	TR	258.1	274.4	251.6	273.1	245.0	271.5	238.3	269.7
19.6	BHP	264.3	275.9	300.4	317.8	339.2	363.5	380.7	413.4
10	TR	289.8	305.2	282.6	303.8	275.4	302.1	268.0	300.3
23.8	BHP	267.8	278.1	305.8	321.9	346.7	369.9	390.4	422.3
15	TR	324.4	338.3	316.5	336.8	308.5	335.1	300.4	333.2
28.4	BHP	270.7	279.3	310.5	325.0	353.4	375.1	399.4	430.0
20	TR	362.0	373.7	353.3	372.2	344.5	370.4	335.7	368.6
33.5	BHP	272.8	279.6	314.4	327.0	359.3	379.2	407.6	436.4
25	TR	402.7	-----	393.1	-----	383.6	-----	373.9	-----
39.0	BHP	274.1	-----	317.6	-----	364.5	-----	414.9	-----
30	TR	446.6	------	436.2	------	425.8	------	415.3	------
45.0	BHP	274.6	-----	319.9	-----	368.8	-----	421.4	-----
35	TR	493.9	-----	482.6	-----	471.3	-----	459.8	-----
51.6	BHP	274.4	-----	321.4	-----	372.3	-----	427.1	-----
40	TR	544.7	-----	532.4	-----	520.2	-----	507.8	-----
58.6	BHP	273.3	-----	322.1	-----	375.0	-----	431.9	-----

Refrigeration capacity based on saturated suction conditions, the use of a shell and tube type economizer with high pressure liquid cooled to within 10°F of saturated side port temperature, and 10°F liquid subcooling from the condenser.

* Inches of mercury below one standard atmosphere (29.92")

Ratings include use of external oil cooling systems.

MODEL 290GL (Booster Ratings)

SUCTION TEMP. °F AND CORRESPONDING PRESSURE PSIG		INTERMEDIATE TEMP °F. AND CORRESPONDING PRESSURE PSIG			
		0.0 15.7	10.0 23.8	20.0 33.5	30.0 45.0
-70	TR	38.7	38.1	37.3	35.5
*21.9	BHP	67.1	85.1	103.7	123.5
-65	TR	45.7	44.8	43.1	41.1
*20.4	BHP	69.6	87.1	105.6	125.3
-60	TR	53.1	52.0	49.7	47.7
*18.6	BHP	71.9	88.8	107.0	126.7
-55	TR	62.2	59.9	57.5	55.4
*16.6	BHP	74.1	90.4	108.2	127.8
-50	TR	71.8	69.1	66.6	64.3
*14.3	BHP	76.4	92.0	109.3	128.6
-45	TR	82.7	79.7	77.0	74.5
*11.7	BHP	78.9	93.6	110.3	129.2
-40	TR	95.2	92.0	89.0	86.3
*8.7	BHP	81.6	95.3	111.3	129.8
-35	TR	109.5	106.0	102.7	99.7
*5.4	BHP	84.7	97.4	112.6	130.5
-30	TR	125.7	121.8	118.3	114.9
*1.6	BHP	88.3	99.8	114.1	131.4
-25	TR	143.9	139.7	135.7	132.0
1.3	BHP	92.5	102.7	116.0	132.5
-20	TR	164.4	159.7	155.3	151.1
3.6	BHP	97.3	106.2	118.4	134.1
-15	TR	187.1	182.0	177.1	172.5
6.2	BHP	103.0	110.4	121.4	136.1
-10	TR	212.4	206.7	201.3	196.1
9.0	BHP	109.6	115.5	125.1	138.7

Refrigeration capacity based on saturated suction conditions and refrigerant liquid cooled to a temperature corresponding with intermediate pressure.
* Inches of mercury below one standard atmosphere (29.92”)

Ratings include use of external oil cooling systems.

MODEL 400GL (High Stage/Economized Ratings)

SUCTION TEMP. °F AND CORRESPONDING PRESSURE PSIG		CONDENSING TEMP. °F AND CORRESPONDING PRESSURE PSIG							
		75 125.8		85 151.7		95 181.1		105 214.2	
		H.S.	ECON	H.S.	ECON	H.S.	ECON	H.S.	ECON
-40	TR	100.5	116.8	96.7	114.8	92.7	112.5	88.5	109.8
*8.7	BHP	259.5	276.5	283.6	304.5	308.6	333.7	334.5	364.4
-35	TR	116.7	134.3	112.6	132.3	108.2	130.0	103.7	127.3
*5.4	BHP	271.6	289.6	298.3	320.6	326.0	353.2	354.9	387.6
-30	TR	135.1	154.0	130.5	151.9	125.8	149.5	120.8	146.9
*1.6	BHP	283.0	301.7	312.2	335.8	342.7	371.8	374.6	409.8
-25	TR	155.9	175.9	150.8	173.7	145.5	171.3	140.1	168.6
1.3	BHP	293.7	312.7	325.4	349.8	358.7	389.2	393.5	431.0
-20	TR	179.1	200.1	173.4	197.9	167.6	195.3	161.7	192.6
3.6	BHP	303.4	322.5	337.8	362.8	373.9	405.5	411.7	451.1
-15	TR	205.0	226.7	198.7	224.4	192.3	221.8	185.7	218.9
6.2	BHP	312.3	331.2	349.3	374.5	388.2	420.6	429.0	469.9
-10	TR	233.6	255.9	226.6	253.5	219.5	250.7	212.3	247.8
9.0	BHP	320.2	338.6	359.9	384.9	401.6	434.4	445.5	487.4
-5	TR	265.2	287.6	257.4	285.1	249.6	282.2	241.6	279.1
12.2	BHP	327.2	344.7	369.5	394.0	414.1	446.9	461.1	503.5
0	TR	299.9	322.0	291.3	319.4	282.6	316.3	273.9	313.2
15.7	BHP	333.1	349.4	378.1	401.7	425.6	457.9	475.7	518.2
5	TR	335.5	356.8	327.8	355.9	318.8	353.2	309.1	349.9
19.6	BHP	338.0	352.8	385.7	408.0	436.1	467.4	489.3	531.3
10	TR	377.8	397.8	368.7	396.2	358.2	392.9	347.6	389.5
23.8	BHP	341.7	354.8	392.2	412.8	445.6	475.4	501.9	542.8
15	TR	421.6	439.6	412.0	438.4	401.0	435.5	389.4	431.9
28.4	BHP	344.4	355.3	397.6	416.1	453.9	481.8	513.4	552.7
20	TR	470.4	485.6	459.7	484.3	447.3	481.0	434.7	477.3
33.5	BHP	345.8	354.5	401.8	417.9	461.1	486.6	523.8	560.9
25	TR	522.2	-----	510.3	-----	497.4	-----	483.7	-----
39.0	BHP	346.0	-----	404.8	-----	467.1	-----	533.0	-----
30	TR	580.3	------	566.4	------	551.4	------	536.4	------
45.0	BHP	344.9	-----	406.6	-----	471.9	-----	541.1	-----
35	TR	640.8	-----	625.6	-----	609.4	-----	593.2	-----
51.6	BHP	342.6	-----	407.0	-----	475.4	-----	547.8	-----
40	TR	706.8	-----	689.1	-----	671.6	-----	654.0	-----
58.6	BHP	338.8	-----	406.2	-----	477.6	-----	553.3	-----

Refrigeration capacity based on saturated suction conditions, the use of a shell and tube type economizer with high pressure liquid cooled to within 10°F of saturated side port temperature, and 10°F liquid subcooling from the condenser.

* Inches of mercury below one standard atmosphere (29.92")

Ratings include use of external oil cooling systems.

MODEL 400GL (Booster Ratings)

SUCTION TEMP. °F AND CORRESPONDING PRESSURE PSIG		INTERMEDIATE TEMP °F. AND CORRESPONDING PRESSURE PSIG			
		0 15.7	10 23.8	20 33.5	30 45.0
-70	TR	49.0	48.1	47.2	46.3
*21.9	BHP	86.6	106.8	128.3	151.6
-65	TR	58.1	57.0	55.8	54.7
*20.4	BHP	89.9	109.9	131.4	154.9
-60	TR	67.6	66.2	64.9	63.5
*18.6	BHP	92.8	112.5	133.9	157.5
-55	TR	79.0	77.5	75.5	73.4
*16.6	BHP	95.3	114.6	135.8	159.5
-50	TR	91.4	89.3	87.0	84.7
*14.3	BHP	97.7	116.5	137.4	161.0
-45	TR	105.6	103.2	100.6	97.9
*11.7	BHP	100.0	118.2	138.8	162.2
-40	TR	122.2	119.3	116.4	113.3
*8.7	BHP	102.4	120.0	140.1	163.2
-35	TR	141.2	137.9	134.5	131.0
*5.4	BHP	105.0	121.8	141.3	164.2
-30	TR	162.9	159.0	155.1	151.1
*1.6	BHP	107.9	123.9	142.8	165.2
-25	TR	186.1	182.5	178.3	173.8
1.3	BHP	111.4	126.4	144.5	166.4
-20	TR	212.0	207.9	203.8	199.2
3.6	BHP	115.4	129.4	146.7	167.9
-15	TR	240.6	236.0	231.3	226.6
6.2	BHP	120.3	133.1	149.5	169.9
-10	TR	272.2	267.0	261.7	256.4
9.0	BHP	126.0	137.6	152.9	172.5

Refrigeration capacity based on saturated suction conditions and refrigerant liquid cooled to a temperature corresponding with intermediate pressure.
* Inches of mercury below one standard atmosphere (29.92”)

Ratings include use of external oil cooling systems.

MODEL 475GL (High Stage/Economized Ratings)

SUCTION TEMP. °F AND CORRESPONDING PRESSURE PSIG		CONDENSING TEMP. °F AND CORRESPONDING PRESSURE PSIG							
		75		85		95		105	
		125.8		151.7		181.1		214.2	
		H.S.	ECON	H.S.	ECON	H.S.	ECON	H.S.	ECON
-40	TR	118.9	138.2	114.4	135.8	109.7	133	104.7	129.9
*8.7	BHP	298.2	317.8	325.9	349.9	354.6	383.5	384.4	418.8
-35	TR	138.1	158.9	133.2	156.5	128	153.7	122.6	150.6
*5.4	BHP	312.2	332.8	342.8	368.4	374.6	405.9	407.8	445.4
-30	TR	159.9	182.2	154.4	179.7	148.8	176.9	142.9	173.7
*1.6	BHP	325.3	346.7	358.8	385.8	393.9	427.2	430.5	471
-25	TR	184.4	208	178.4	205.5	172.2	202.6	165.8	199.4
1.3	BHP	337.5	359.3	374	402	412.2	447.3	452.2	495.3
-20	TR	211.9	236.7	205.2	234.1	198.3	231.1	191.3	227.8
3.6	BHP	348.7	370.7	388.2	416.9	429.6	466	473.1	518.4
-15	TR	242.5	268.2	235	265.5	227.4	262.4	219.7	259
6.2	BHP	358.9	380.6	401.4	430.3	446.1	483.4	493	540
-10	TR	276.4	302.7	268.1	299.8	259.7	296.6	251.1	293.1
9.0	BHP	368	389.1	413.5	442.3	461.5	499.3	512	560.1
-5	TR	313.7	340.2	304.6	337.2	295.3	333.8	285.8	330.2
12.2	BHP	376	396.1	424.6	452.8	475.9	513.5	529.9	578.6
0	TR	354.8	381	344.6	377.8	334.3	374.2	324	370.5
15.7	BHP	382.8	401.6	434.5	461.7	489.1	526.2	546.7	595.5
5	TR	396.9	422	387.8	421	377.1	417.9	365.7	414
19.6	BHP	388.4	405.4	443.2	468.9	501.2	537.1	562.3	610.6
10	TR	446.9	470.5	436.1	468.7	423.7	464.8	411.2	460.8
23.8	BHP	392.7	407.7	450.7	474.4	512.1	546.3	576.8	623.8
15	TR	498.7	520	487.4	518.6	474.3	515.2	460.7	511
28.4	BHP	395.7	408.3	456.9	478.2	521.6	553.7	590	635.2
20	TR	556.4	574.4	543.8	572.9	529.2	569	514.3	564.6
33.5	BHP	397.4	407.4	461.8	480.3	529.9	559.2	602	644.6
25	TR	617.7	631.4	603.7	629.7	588.5	626.4	572.2	621.8
39.0	BHP	397.6	404.8	465.2	480.6	536.8	562.9	612.6	652
30	TR	686.5	694.8	670	691.8	652.3	687.3	634.6	682.7
45.0	BHP	396.4	400.8	467.2	479.2	542.3	564.7	621.8	657.5
35	TR	758	759.6	740.1	756.7	720.9	751.9	701.7	747.1
51.6	BHP	393.7	395.4	467.8	476.1	546.4	564.6	629.6	660.9
40	TR	836.1	829.6	815.3	825.1	794.5	820.2	773.7	815.2
58.6	BHP	389.4	389.4	466.8	471.5	548.9	562.7	635.9	662.3

Refrigeration capacity based on saturated suction conditions, the use of a shell and tube type economizer with high pressure liquid cooled to within 10°F of saturated side port temperature, and 10°F liquid subcooling from the condenser.

* Inches of mercury below one standard atmosphere (29.92")

Ratings include use of external oil cooling systems.

MODEL 475GL (Booster Ratings)

SUCTION TEMP. °F AND CORRESPONDING PRESSURE PSIG		INTERMEDIATE TEMP °F. AND CORRESPONDING PRESSURE PSIG			
		0	10	20	30
		15.7	23.8	33.5	45.0
-70	TR	57.9	56.9	55.8	54.8
*21.9	BHP	99.6	122.8	147.4	174.2
-65	TR	68.8	67.4	66.1	64.7
*20.4	BHP	103.3	126.3	151	178
-60	TR	79.9	78.3	76.7	75.1
*18.6	BHP	106.6	129.3	153.8	181
-55	TR	93.5	91.6	89.4	86.9
*16.6	BHP	109.5	131.7	156.1	183.3
-50	TR	108.2	105.6	103	100.2
*14.3	BHP	112.2	133.9	157.9	185
-45	TR	125	122	119	115.9
*11.7	BHP	114.9	135.9	159.5	186.4
-40	TR	144.5	141.1	137.6	134.1
*8.7	BHP	117.6	137.9	160.9	187.6
-35	TR	167	163.1	159.1	155
*5.4	BHP	120.6	140	162.4	188.6
-30	TR	192.7	188.1	183.5	178.8
*1.6	BHP	124	142.4	164.1	189.8
-25	TR	220.2	215.9	211	205.6
1.3	BHP	128	145.3	166.1	191.2
-20	TR	250.8	245.9	241	235.7
3.6	BHP	132.7	148.7	168.6	193
-15	TR	284.6	279.1	273.6	268.1
6.2	BHP	138.2	153	171.8	195.3
-10	TR	322	315.8	309.6	303.3
9.0	BHP	144.8	158.1	175.7	198.3

Refrigeration capacity based on saturated suction conditions and refrigerant liquid cooled to a temperature corresponding with intermediate pressure.
* Inches of mercury below one standard atmosphere (29.92”)

Ratings include use of external oil cooling systems.

MODEL 565GL (High Stage/Economized Ratings)

SUCTION TEMP. °F AND CORRESPONDING PRESSURE PSIG		CONDENSING TEMP. °F AND CORRESPONDING PRESSURE PSIG							
		75 125.8		85 151.7		95 181.1		105 214.2	
		H.S.	ECON	H.S.	ECON	H.S.	ECON	H.S.	ECON
-40	TR	140.7	163.5	135.4	160.7	129.8	157.4	123.9	153.7
*8.7	BHP	356.3	379.8	389.4	418.1	423.8	458.3	459.4	500.5
-35	TR	163.4	188.0	157.6	185.2	151.5	181.9	145.1	178.2
*5.4	BHP	373.0	397.7	409.6	440.3	447.7	485.1	487.4	532.3
-30	TR	189.2	215.6	182.8	212.7	176.1	209.4	169.2	205.6
*1.6	BHP	388.7	414.3	428.8	461.1	470.7	510.5	514.4	562.8
-25	TR	218.2	246.2	211.1	243.2	203.7	239.8	196.2	236.0
1.3	BHP	403.3	429.4	446.9	480.4	492.6	534.5	540.4	591.9
-20	TR	250.7	280.1	242.8	277.0	234.7	273.5	226.4	269.6
3.6	BHP	416.7	442.9	463.9	498.2	513.4	556.9	565.4	619.4
-15	TR	286.9	317.4	278.1	314.2	269.2	310.5	260.0	306.5
6.2	BHP	428.9	454.8	479.7	514.3	533.1	577.7	589.2	645.3
-10	TR	327.1	358.2	317.3	354.8	307.3	351.0	297.2	346.9
9.0	BHP	439.7	465.0	494.2	528.6	551.5	596.6	611.8	669.3
-5	TR	371.3	402.7	360.4	399.1	349.4	395.0	338.3	390.8
12.2	BHP	449.3	473.4	507.4	541.1	568.7	613.7	633.2	691.5
0	TR	419.8	450.9	407.8	447.1	395.7	442.9	383.4	438.4
15.7	BHP	457.5	479.9	519.3	551.7	584.5	628.8	653.3	711.6
5	TR	469.7	499.5	459.0	498.2	446.3	494.5	432.8	489.9
19.6	BHP	464.1	484.5	529.7	560.3	598.9	641.9	672.0	729.6
10	TR	528.9	556.9	516.1	554.7	501.4	550.1	486.6	545.3
23.8	BHP	469.3	487.2	538.6	566.9	611.9	652.9	689.3	745.5
15	TR	590.3	615.4	576.8	613.8	561.4	609.7	545.2	604.7
28.4	BHP	472.9	488.0	546.0	571.5	623.4	661.7	705.1	759.1
20	TR	658.5	679.8	643.6	678.0	626.3	673.4	608.6	668.2
33.5	BHP	474.9	486.8	551.8	573.9	633.3	668.3	719.4	770.3
25	TR	731.0	-----	714.5	-----	696.4	-----	677.1	-----
39.0	BHP	475.2	-----	556.0	-----	641.5	-----	732.0	-----
30	TR	812.4	------	792.9	------	772.0	------	751.0	------
45.0	BHP	473.7	-----	558.4	-----	648.1	-----	743.1	-----
35	TR	897.2	-----	875.9	-----	853.2	-----	830.4	-----
51.6	BHP	470.4	-----	559.0	-----	652.9	-----	752.4	-----
40	TR	989.5	-----	964.8	-----	940.2	-----	915.6	-----
58.6	BHP	465.3	-----	557.8	-----	656.0	-----	759.9	-----

Refrigeration capacity based on saturated suction conditions, the use of a shell and tube type economizer with high pressure liquid cooled to within 10°F of saturated side port temperature, and 10°F liquid subcooling from the condenser.

* Inches of mercury below one standard atmosphere (29.92")

Ratings include use of external oil cooling systems.

MODEL 565GL (Booster Ratings)

SUCTION TEMP. °F AND CORRESPONDING PRESSURE PSIG		INTERMEDIATE TEMP °F. AND CORRESPONDING PRESSURE PSIG			
		0 15.7	10 23.8	20 33.5	30 45.0
-70	TR	68.6	67.3	66.0	64.8
*21.9	BHP	119.0	146.7	176.2	208.1
-65	TR	81.4	79.8	78.2	76.6
*20.4	BHP	123.5	151.0	180.4	212.7
-60	TR	94.6	92.7	90.8	88.9
*18.6	BHP	127.4	154.5	183.8	216.3
-55	TR	110.7	108.5	105.8	102.8
*16.6	BHP	130.9	157.4	186.5	219.0
-50	TR	128.0	125.0	121.9	118.6
*14.3	BHP	134.1	160.0	188.7	221.1
-45	TR	147.9	144.4	140.8	137.1
*11.7	BHP	137.3	162.4	190.6	222.8
-40	TR	171.0	167.0	162.9	158.6
*8.7	BHP	140.6	164.7	192.3	224.1
-35	TR	197.7	193.0	188.3	183.4
*5.4	BHP	144.1	167.3	194.1	225.4
-30	TR	228.0	222.6	217.1	211.5
*1.6	BHP	148.2	170.2	196.1	226.8
-25	TR	260.6	255.5	249.7	243.3
1.3	BHP	153.0	173.6	198.5	228.5
-20	TR	296.8	291.0	285.3	278.9
3.6	BHP	158.5	177.7	201.5	230.6
-15	TR	336.9	330.4	323.8	317.3
6.2	BHP	165.2	182.8	205.3	233.3
-10	TR	381.1	373.7	366.4	359.0
9.0	BHP	173.0	188.9	210.0	236.9

Refrigeration capacity based on saturated suction conditions and refrigerant liquid cooled to a temperature corresponding with intermediate pressure.
* Inches of mercury below one standard atmosphere (29.92”)

Ratings include use of external oil cooling systems.

MODEL 675GL (High Stage/Economized Ratings)

SUCTION TEMP. °F AND CORRESPONDING PRESSURE PSIG		CONDENSING TEMP. °F AND CORRESPONDING PRESSURE PSIG							
		75 125.8		85 151.7		95 181.1		105 214.2	
		H.S.	ECON	H.S.	ECON	H.S.	ECON	H.S.	ECON
-40	TR	168.4	195.7	162.1	192.4	155.4	188.5	148.3	184.0
*8.7	BHP	422.4	450.2	461.7	495.7	502.4	543.3	544.6	593.3
-35	TR	195.6	225.1	188.6	221.7	181.4	217.8	173.7	213.3
*5.4	BHP	442.3	471.5	485.6	522.0	530.8	575.1	577.8	631.1
-30	TR	226.5	258.1	218.8	254.6	210.8	250.6	202.5	246.2
*1.6	BHP	460.8	491.2	508.4	546.6	558.0	605.3	609.9	667.2
-25	TR	261.3	294.7	252.7	291.2	243.9	287.1	234.8	282.6
1.3	BHP	478.1	509.1	529.8	569.6	584.0	633.7	640.7	701.7
-20	TR	300.2	335.3	290.7	331.6	281.0	327.4	271.0	322.7
3.6	BHP	494.0	525.1	550.0	590.6	608.7	660.3	670.3	734.4
-15	TR	343.5	380.0	333.0	376.1	322.2	371.7	311.2	366.9
6.2	BHP	508.4	539.2	568.7	609.7	632.0	684.9	698.5	765.0
-10	TR	391.5	428.8	379.8	424.8	367.9	420.2	355.8	415.2
9.0	BHP	521.3	551.2	585.9	626.7	653.8	707.3	725.3	793.5
-5	TR	444.4	482.0	431.5	477.8	418.3	472.9	405.0	467.8
12.2	BHP	532.7	561.2	601.6	641.5	674.2	727.6	750.7	819.8
0	TR	502.6	539.7	488.2	535.2	473.7	530.2	459.0	524.9
15.7	BHP	542.3	568.9	615.6	654.0	693.0	745.5	774.5	843.6
5	TR	562.2	597.8	549.3	596.3	534.2	592.0	518.1	586.5
19.6	BHP	550.3	574.4	628.0	664.3	710.1	761.0	796.7	865.0
10	TR	633.0	666.5	617.9	664.1	600.3	658.5	582.6	652.8
23.8	BHP	556.4	577.6	638.6	672.1	725.4	774.0	817.2	883.8
15	TR	706.5	736.6	690.4	734.7	672.0	729.9	652.6	723.9
28.4	BHP	560.7	578.5	647.3	677.5	739.0	784.4	835.9	899.9
20	TR	788.1	813.7	770.3	811.5	749.8	806.1	728.6	799.9
33.5	BHP	563.0	577.1	654.2	680.4	750.8	792.3	852.8	913.2
25	TR	874.9	-----	855.1	-----	833.7	-----	810.6	-----
39.0	BHP	563.3	-----	659.1	-----	760.6	-----	867.9	-----
30	TR	972.4	------	949.2	------	924.2	------	899.1	------
45.0	BHP	561.6	-----	662.0	-----	768.3	-----	880.9	-----
35	TR	1073.8	-----	1048.6	-----	1021.4	-----	994.1	-----
51.6	BHP	557.7	-----	662.7	-----	774.1	-----	891.9	-----
40	TR	1184.5	-----	1155.0	-----	1125.5	-----	1096.1	-----
58.6	BHP	551.6	-----	661.3	-----	777.7	-----	900.9	-----

Refrigeration capacity based on saturated suction conditions, the use of a shell and tube type economizer with high pressure liquid cooled to within 10°F of saturated side port temperature, and 10°F liquid subcooling from the condenser.

* Inches of mercury below one standard atmosphere (29.92")

Ratings include use of external oil cooling systems.

MODEL 675GL (Booster Ratings)

SUCTION TEMP. °F AND CORRESPONDING PRESSURE PSIG		INTERMEDIATE TEMP °F. AND CORRESPONDING PRESSURE PSIG			
		0 15.7	10 23.8	20 33.5	30 45.0
-70	TR	82.1	80.5	79.0	77.6
*21.9	BHP	141.1	173.9	208.9	246.7
-65	TR	97.4	95.5	93.6	91.6
*20.4	BHP	146.4	179.0	213.9	252.2
-60	TR	113.2	110.9	108.7	106.4
*18.6	BHP	151.0	183.1	217.9	256.4
-55	TR	132.4	129.8	126.6	123.0
*16.6	BHP	155.2	186.6	221.1	259.6
-50	TR	153.2	149.6	145.9	141.9
*14.3	BHP	159.0	189.7	223.7	262.1
-45	TR	177.0	172.9	168.6	164.1
*11.7	BHP	162.7	192.5	226.0	264.1
-40	TR	204.8	199.9	195.0	189.9
*8.7	BHP	166.6	195.3	228.0	265.7
-35	TR	236.7	231.1	225.4	219.5
*5.4	BHP	170.9	198.3	230.1	267.3
-30	TR	273.0	266.5	259.9	253.2
*1.6	BHP	175.7	201.7	232.5	268.9
-25	TR	311.9	305.8	298.9	291.3
1.3	BHP	181.3	205.8	235.3	270.9
-20	TR	355.2	348.3	341.4	333.9
3.6	BHP	188.0	210.7	238.9	273.4
-15	TR	403.2	395.4	387.6	379.7
6.2	BHP	195.8	216.7	243.3	276.6
-10	TR	456.1	447.3	438.5	429.7
9.0	BHP	205.1	224.0	248.9	280.9

Refrigeration capacity based on saturated suction conditions and refrigerant liquid cooled to a temperature corresponding with intermediate pressure.
* Inches of mercury below one standard atmosphere (29.92”)

Ratings include use of external oil cooling systems.

MODEL 800GL (High Stage/Economized Ratings)

SUCTION TEMP. °F AND CORRESPONDING PRESSURE PSIG		CONDENSING TEMP. °F AND CORRESPONDING PRESSURE PSIG							
		75 125.8		85 151.7		95 181.1		105 214.2	
		H.S.	ECON	H.S.	ECON	H.S.	ECON	H.S.	ECON
-40	TR	199.2	231.5	191.6	227.5	183.7	222.9	175.4	217.6
*8.7	BHP	499.6	532.4	546.0	586.2	594.1	642.5	644.1	701.6
-35	TR	231.4	266.2	223.1	262.2	214.5	257.6	205.5	252.3
*5.4	BHP	523.0	557.6	574.3	617.3	627.7	680.1	683.3	746.3
-30	TR	267.8	305.2	258.7	301.1	249.3	296.4	239.5	291.1
*1.6	BHP	545.0	580.9	601.2	646.4	659.9	715.8	721.2	789.1
-25	TR	309.0	348.6	298.8	344.4	288.4	339.5	277.7	334.1
1.3	BHP	565.4	602.0	626.6	673.6	690.6	749.4	757.7	829.8
-20	TR	355.0	396.5	343.8	392.2	332.3	387.2	320.5	381.7
3.6	BHP	584.2	621.0	650.4	698.5	719.8	780.8	792.7	868.4
-15	TR	406.2	449.4	393.8	444.8	381.0	439.6	368.1	433.9
6.2	BHP	601.2	637.7	672.5	721.0	747.4	809.9	826.1	904.7
-10	TR	463.0	507.1	449.2	502.3	435.1	496.9	420.8	491.1
9.0	BHP	616.5	651.9	692.9	741.1	773.2	836.5	857.8	938.4
-5	TR	525.6	570.0	510.2	565.0	494.7	559.3	478.9	553.2
12.2	BHP	629.9	663.6	711.4	758.6	797.3	860.4	887.8	969.4
0	TR	594.4	638.3	577.3	633.0	560.1	627.0	542.8	620.7
15.7	BHP	641.3	672.8	728.0	773.5	819.5	881.6	915.9	997.7
5	TR	664.9	707.0	649.7	705.2	631.8	700.1	612.7	693.6
19.6	BHP	650.7	679.3	742.6	785.5	839.7	899.9	942.1	1022.9
10	TR	748.6	788.3	730.7	785.3	709.9	778.8	688.9	772.0
23.8	BHP	658.0	683.1	755.1	794.8	857.9	915.3	966.4	1045.1
15	TR	835.5	871.1	816.5	868.9	794.7	863.1	771.8	856.1
28.4	BHP	663.0	684.1	765.5	801.2	874.0	927.7	988.5	1064.2
20	TR	932.1	962.3	911.0	959.8	886.6	953.3	861.6	946.0
33.5	BHP	665.8	682.5	773.6	804.6	887.8	936.9	1008.5	1080.0
25	TR	1034.8	-----	1011.4	-----	985.9	-----	958.6	-----
39.0	BHP	666.2	-----	779.4	-----	899.4	-----	1026.3	-----
30	TR	1150.0	------	1122.5	------	1092.9	------	1063.2	------
45.0	BHP	664.1	-----	782.8	-----	908.6	-----	1041.7	-----
35	TR	1269.9	-----	1240.0	-----	1207.8	-----	1175.7	-----
51.6	BHP	659.5	-----	783.7	-----	915.4	-----	1054.8	-----
40	TR	1400.8	-----	1365.9	-----	1331.0	-----	1296.2	-----
58.6	BHP	652.3	-----	782.0	-----	919.6	-----	1065.3	-----

Refrigeration capacity based on saturated suction conditions, the use of a shell and tube type economizer with high pressure liquid cooled to within 10°F of saturated side port temperature, and 10°F liquid subcooling from the condenser.

* Inches of mercury below one standard atmosphere (29.92")

Ratings include use of external oil cooling systems.

MODEL 800GL (Booster Ratings)

SUCTION TEMP. °F AND CORRESPONDING PRESSURE PSIG		INTERMEDIATE TEMP °F. AND CORRESPONDING PRESSURE PSIG			
		0 15.7	10 23.8	20 33.5	30 45.0
-70	TR	97.0	95.2	93.5	91.8
*21.9	BHP	166.8	205.7	247.0	291.8
-65	TR	115.2	113.0	110.7	108.4
*20.4	BHP	173.2	211.7	253.0	298.2
-60	TR	133.9	131.2	128.5	125.8
*18.6	BHP	178.6	216.6	257.7	303.2
-55	TR	156.6	153.5	149.7	145.5
*16.6	BHP	183.5	220.7	261.5	307.0
-50	TR	181.2	177.0	172.5	167.8
*14.3	BHP	188.0	224.3	264.6	310.0
-45	TR	209.4	204.5	199.4	194.1
*11.7	BHP	192.5	227.6	267.2	312.3
-40	TR	242.2	236.5	230.6	224.6
*8.7	BHP	197.1	231.0	269.7	314.2
-35	TR	279.9	273.3	266.5	259.6
*5.4	BHP	202.1	234.5	272.1	316.1
-30	TR	322.8	315.1	307.4	299.5
*1.6	BHP	207.8	238.6	274.9	318.0
-25	TR	368.9	361.7	353.5	344.5
1.3	BHP	214.4	243.4	278.3	320.3
-20	TR	420.1	411.9	403.8	394.9
3.6	BHP	222.3	249.2	282.5	323.3
-15	TR	476.8	467.6	458.4	449.1
6.2	BHP	231.5	256.3	287.8	327.1
-10	TR	539.4	529.0	518.7	508.2
9.0	BHP	242.5	264.9	294.4	332.2

Refrigeration capacity based on saturated suction conditions and refrigerant liquid cooled to a temperature corresponding with intermediate pressure.
* Inches of mercury below one standard atmosphere (29.92”)

Ratings include use of external oil cooling systems.

MODEL 1025GL (High Stage/Economized Ratings)

SUCTION TEMP. °F AND CORRESPONDING PRESSURE PSIG		CONDENSING TEMP. °F AND CORRESPONDING PRESSURE PSIG							
		75 125.8		85 151.7		95 181.1		105 214.2	
		H.S.	ECON	H.S.	ECON	H.S.	ECON	H.S.	ECON
-40	TR	254.3	295.5	244.6	290.4	234.5	284.5	223.9	277.7
*8.7	BHP	637.7	679.6	696.9	748.3	758.4	820.2	822.1	895.6
-35	TR	295.3	339.8	284.8	334.7	273.8	328.8	262.3	322.0
*5.4	BHP	667.6	711.8	733.1	787.9	801.2	868.1	872.2	952.6
-30	TR	341.9	389.6	330.3	384.4	318.2	378.3	305.7	371.6
*1.6	BHP	695.7	741.5	767.4	825.2	842.3	913.7	920.6	1007.2
-25	TR	394.4	444.9	381.5	439.6	368.2	433.4	354.5	426.5
1.3	BHP	721.7	768.5	799.8	859.8	881.6	956.6	967.2	1059.3
-20	TR	453.1	506.2	438.8	500.6	424.1	494.2	409.1	487.2
3.6	BHP	745.7	792.7	830.2	891.6	918.8	996.7	1011.8	1108.6
-15	TR	518.6	573.6	502.6	567.8	486.4	561.1	469.8	553.9
6.2	BHP	767.5	814.0	858.4	920.4	954.0	1033.8	1054.4	1154.8
-10	TR	591.0	647.4	573.3	641.2	555.4	634.3	537.1	626.8
9.0	BHP	787.0	832.1	884.4	946.0	987.0	1067.7	1094.9	1197.8
-5	TR	670.9	727.7	651.3	721.2	631.5	713.9	611.3	706.2
12.2	BHP	804.1	847.1	908.1	968.4	1017.7	1098.3	1133.2	1237.5
0	TR	758.7	814.8	737.0	808.0	715.0	800.3	692.8	792.3
15.7	BHP	818.7	858.8	929.3	987.3	1046.0	1125.3	1169.1	1273.5
5	TR	849.0	902.8	829.6	900.5	806.5	893.7	782.1	885.3
19.6	BHP	830.6	867.1	947.9	1002.7	1071.9	1148.7	1202.6	1305.7
10	TR	955.9	1006.6	932.7	1002.5	906.1	994.1	879.4	985.4
23.8	BHP	839.9	871.9	963.9	1014.6	1095.1	1168.4	1233.6	1334.1
15	TR	1066.9	1112.4	1042.6	1109.5	1014.5	1101.7	985.2	1092.7
28.4	BHP	846.4	873.3	977.2	1022.7	1115.6	1184.1	1261.9	1358.4
20	TR	1190.3	1228.8	1163.2	1225.5	1131.8	1216.9	1099.8	1207.5
33.5	BHP	849.9	871.2	987.5	1027.1	1133.3	1196.0	1287.4	1378.6
25	TR	1321.3	-----	1291.4	-----	1258.5	-----	1223.7	-----
39.0	BHP	850.4	-----	994.9	-----	1148.1	-----	1310.1	-----
30	TR	1468.5	------	1432.9	------	1395.1	------	1357.2	------
45.0	BHP	847.8	-----	999.3	-----	1159.9	-----	1329.8	-----
35	TR	1621.6	-----	1582.9	-----	1541.8	-----	1500.7	-----
51.6	BHP	841.9	-----	1000.4	-----	1168.5	-----	1346.4	-----
40	TR	1788.1	-----	1743.5	-----	1699.0	-----	1654.6	-----
58.6	BHP	832.7	-----	998.3	-----	1173.9	-----	1359.9	-----

Refrigeration capacity based on saturated suction conditions, the use of a shell and tube type economizer with high pressure liquid cooled to within 10°F of saturated side port temperature, and 10°F liquid subcooling from the condenser.

* Inches of mercury below one standard atmosphere (29.92")

Ratings include use of external oil cooling systems.

MODEL 1025GL (Booster Ratings)

SUCTION TEMP. °F AND CORRESPONDING PRESSURE PSIG		INTERMEDIATE TEMP °F. AND CORRESPONDING PRESSURE PSIG			
		0 15.7	10 23.8	20 33.5	30 45.0
-70	TR	123.9	121.6	119.4	117.2
*21.9	BHP	212.9	262.6	315.3	372.5
-65	TR	147.1	144.2	141.3	138.4
*20.4	BHP	221.0	270.2	322.9	380.6
-60	TR	170.9	167.5	164.1	160.7
*18.6	BHP	228.0	276.4	329.0	387.0
-55	TR	200.0	196.0	191.1	185.7
*16.6	BHP	234.2	281.7	333.8	391.9
-50	TR	231.3	225.9	220.2	214.2
*14.3	BHP	240.0	286.3	337.8	395.7
-45	TR	267.3	261.0	254.5	247.8
*11.7	BHP	245.7	290.6	341.1	398.7
-40	TR	309.1	301.8	294.4	286.7
*8.7	BHP	251.6	294.8	344.2	401.1
-35	TR	357.2	348.8	340.2	331.4
*5.4	BHP	258.0	299.4	347.4	403.4
-30	TR	412.1	402.3	392.4	382.3
*1.6	BHP	265.3	304.5	350.9	405.9
-25	TR	471.0	461.8	451.2	439.7
1.3	BHP	273.7	310.7	355.2	408.9
-20	TR	536.4	526.0	515.6	504.0
3.6	BHP	283.7	318.1	360.6	412.7
-15	TR	608.9	597.1	585.3	573.5
6.2	BHP	295.6	327.1	367.3	417.6
-10	TR	688.8	675.5	662.3	648.9
9.0	BHP	309.6	338.1	375.8	424.0

Refrigeration capacity based on saturated suction conditions and refrigerant liquid cooled to a temperature corresponding with intermediate pressure.
* Inches of mercury below one standard atmosphere (29.92”)

Ratings include use of external oil cooling systems.

MODEL 1210GL (High Stage/Economized Ratings)

SUCTION TEMP. °F AND CORRESPONDING PRESSURE PSIG		CONDENSING TEMP. °F AND CORRESPONDING PRESSURE PSIG							
		75 125.8		85 151.7		95 181.1		105 214.2	
		H.S.	ECON	H.S.	ECON	H.S.	ECON	H.S.	ECON
-40	TR	300.3	349.0	288.9	343.0	277.0	336.0	264.4	328.0
*8.7	BHP	753.1	802.6	823.1	883.7	895.6	968.6	971.0	1057.8
-35	TR	348.8	401.3	336.3	395.3	323.3	388.3	309.8	380.3
*5.4	BHP	788.5	840.6	865.8	930.6	946.3	1025.3	1030.1	1125.0
-30	TR	403.8	460.1	390.0	454.0	375.8	446.8	361.0	438.9
*1.6	BHP	821.6	875.7	906.3	974.6	994.8	1079.1	1087.3	1189.6
-25	TR	465.8	525.5	450.5	519.1	434.9	511.8	418.7	503.7
1.3	BHP	852.4	907.6	944.6	1015.4	1041.2	1129.8	1142.3	1251.1
-20	TR	535.2	597.8	518.2	591.2	500.9	583.7	483.1	575.4
3.6	BHP	880.7	936.2	980.5	1053.0	1085.2	1177.1	1195.0	1309.2
-15	TR	612.4	677.4	593.6	670.6	574.5	662.7	554.9	654.2
6.2	BHP	906.4	961.3	1013.8	1087.0	1126.7	1221.0	1245.3	1363.9
-10	TR	698.0	764.6	677.1	757.3	655.9	749.1	634.3	740.3
9.0	BHP	929.4	982.8	1044.5	1117.3	1165.7	1261.0	1293.2	1414.7
-5	TR	792.4	859.4	769.2	851.8	745.8	843.1	722.0	834.0
12.2	BHP	949.6	1000.5	1072.5	1143.7	1202.0	1297.1	1338.4	1461.5
0	TR	896.0	962.3	870.4	954.2	844.5	945.2	818.3	935.7
15.7	BHP	966.9	1014.2	1097.5	1166.0	1235.4	1329.1	1380.8	1504.0
5	TR	1002.4	1066.0	979.5	1063.3	952.4	1055.4	923.7	1045.6
19.6	BHP	981.0	1024.0	1119.5	1184.3	1265.9	1356.7	1420.3	1542.1
10	TR	1128.7	1188.5	1101.6	1183.9	1070.2	1174.0	1038.6	1163.8
23.8	BHP	991.9	1029.8	1138.4	1198.2	1293.3	1379.9	1456.9	1575.6
15	TR	1259.7	1313.4	1231.0	1310.0	1198.1	1301.2	1163.5	1290.6
28.4	BHP	999.6	1031.4	1154.1	1207.8	1317.6	1398.5	1490.3	1604.3
20	TR	1405.4	1450.9	1373.5	1447.0	1336.7	1437.1	1298.9	1426.1
33.5	BHP	1003.7	1028.9	1166.3	1213.0	1338.5	1412.5	1520.4	1628.1
25	TR	1560.1	-----	1524.8	-----	1486.4	-----	1445.2	-----
39.0	BHP	1004.3	-----	1175.0	-----	1355.9	-----	1547.2	-----
30	TR	1733.9	------	1692.3	------	1647.6	------	1602.9	------
45.0	BHP	1001.2	-----	1180.1	-----	1369.8	-----	1570.5	-----
35	TR	1914.6	-----	1869.4	-----	1820.9	-----	1772.4	-----
51.6	BHP	994.3	-----	1181.5	-----	1380.0	-----	1590.2	-----
40	TR	2111.8	-----	2059.2	-----	2006.6	-----	1954.1	-----
58.6	BHP	983.4	-----	1179.0	-----	1386.4	-----	1606.1	-----

Refrigeration capacity based on saturated suction conditions, the use of a shell and tube type economizer with high pressure liquid cooled to within 10°F of saturated side port temperature, and 10°F liquid subcooling from the condenser.

* Inches of mercury below one standard atmosphere (29.92")

Ratings include use of external oil cooling systems.

MODEL 1210GL (Booster Ratings)

SUCTION TEMP. °F AND CORRESPONDING PRESSURE PSIG		INTERMEDIATE TEMP °F. AND CORRESPONDING PRESSURE PSIG			
		0 15.7	10 23.8	20 33.5	30 45.0
-70	TR	146.3	143.6	140.9	138.3
*21.9	BHP	251.5	310.1	372.4	439.9
-65	TR	173.7	170.3	166.9	163.4
*20.4	BHP	261.0	319.1	381.4	449.6
-60	TR	201.8	197.8	193.8	189.7
*18.6	BHP	269.3	326.5	388.5	457.1
-55	TR	236.1	231.5	225.7	219.4
*16.6	BHP	276.6	332.7	394.3	462.9
-50	TR	273.2	266.8	260.1	253.0
*14.3	BHP	283.5	338.2	398.9	467.3
-45	TR	315.6	308.2	300.6	292.6
*11.7	BHP	290.1	343.2	402.9	470.8
-40	TR	365.1	356.5	347.7	338.6
*8.7	BHP	297.1	348.2	406.5	473.7
-35	TR	421.9	411.9	401.8	391.4
*5.4	BHP	304.7	353.5	410.3	476.5
-30	TR	486.7	475.1	463.4	451.5
*1.6	BHP	313.3	359.7	414.5	479.4
-25	TR	556.1	545.3	532.9	519.3
1.3	BHP	323.3	366.9	419.6	482.9
-20	TR	633.3	621.1	608.8	595.3
3.6	BHP	335.1	375.7	425.9	487.4
-15	TR	718.9	705.0	691.1	677.1
6.2	BHP	349.1	386.3	433.8	493.2
-10	TR	813.3	797.6	782.0	766.2
9.0	BHP	365.6	399.3	443.8	500.8

Refrigeration capacity based on saturated suction conditions and refrigerant liquid cooled to a temperature corresponding with intermediate pressure.
* Inches of mercury below one standard atmosphere (29.92”)

Ratings include use of external oil cooling systems.

MODEL 1435GL (High Stage/Economized Ratings)

SUCTION TEMP. °F AND CORRESPONDING PRESSURE PSIG		CONDENSING TEMP. °F AND CORRESPONDING PRESSURE PSIG							
		75 125.8		85 151.7		95 181.1		105 214.2	
		H.S.	ECON	H.S.	ECON	H.S.	ECON	H.S.	ECON
-40	TR	355.5	413.1	342.0	406.0	327.9	397.7	313.0	388.3
*8.7	BHP	891.5	950.1	974.3	1046.1	1060.2	1146.6	1149.3	1252.1
-35	TR	412.9	475.1	398.1	468.0	382.7	459.6	366.7	450.2
*5.4	BHP	933.3	995.1	1024.9	1101.6	1120.1	1213.6	1219.4	1331.8
-30	TR	478.0	544.6	461.7	537.4	444.9	528.9	427.4	519.5
*1.6	BHP	972.5	1036.6	1072.9	1153.6	1177.6	1277.3	1287.0	1408.1
-25	TR	551.3	622.0	533.3	614.5	514.7	605.9	495.6	596.3
1.3	BHP	1009.0	1074.4	1118.2	1202.0	1232.5	1337.3	1352.1	1480.9
-20	TR	633.5	707.6	613.5	699.8	592.9	690.9	571.9	681.1
3.6	BHP	1042.5	1108.2	1160.6	1246.4	1284.6	1393.4	1414.6	1549.8
-15	TR	725.0	801.9	702.7	793.8	680.0	784.5	656.8	774.4
6.2	BHP	1073.0	1137.9	1200.1	1286.7	1333.7	1445.3	1474.1	1614.5
-10	TR	826.3	905.0	801.6	896.5	776.4	886.7	750.9	876.3
9.0	BHP	1100.2	1163.3	1236.4	1322.5	1379.9	1492.7	1530.8	1674.6
-5	TR	938.0	1017.3	910.6	1008.2	882.8	998.1	854.6	987.2
12.2	BHP	1124.1	1184.3	1269.5	1353.8	1422.8	1535.4	1584.3	1730.0
0	TR	1060.7	1139.1	1030.3	1129.6	999.6	1118.9	968.6	1107.6
15.7	BHP	1144.5	1200.6	1299.2	1380.3	1462.4	1573.3	1634.5	1780.4
5	TR	1186.6	1261.8	1159.4	1258.5	1127.4	1249.4	1093.4	1237.7
19.6	BHP	1161.2	1212.2	1325.2	1401.9	1498.5	1606.0	1681.3	1825.5
10	TR	1336.0	1406.8	1304.0	1401.5	1266.8	1389.8	1229.4	1377.6
23.8	BHP	1174.2	1219.0	1347.6	1418.4	1531.0	1633.4	1724.6	1865.1
15	TR	1491.1	1554.7	1457.2	1550.6	1418.2	1540.3	1377.3	1527.7
28.4	BHP	1183.2	1220.9	1366.1	1429.7	1559.6	1655.5	1764.1	1899.1
20	TR	1663.5	1717.4	1625.7	1712.8	1582.3	1701.2	1537.6	1688.1
33.5	BHP	1188.2	1218.0	1380.6	1435.9	1584.4	1672.0	1799.8	1927.3
25	TR	1846.7	-----	1804.9	-----	1759.5	-----	1710.7	-----
39.0	BHP	1188.9	-----	1390.9	-----	1605.1	-----	1831.5	-----
30	TR	2052.3	------	2003.2	------	1950.3	------	1897.4	------
45.0	BHP	1185.2	-----	1397.0	-----	1621.5	-----	1859.1	-----
35	TR	2266.3	-----	2212.9	-----	2155.4	-----	2098.0	-----
51.6	BHP	1177.0	-----	1398.6	-----	1633.6	-----	1882.3	-----
40	TR	2499.8	-----	2437.5	-----	2375.3	-----	2313.2	-----
58.6	BHP	1164.1	-----	1395.6	-----	1641.2	-----	1901.2	-----

Refrigeration capacity based on saturated suction conditions, the use of a shell and tube type economizer with high pressure liquid cooled to within 10°F of saturated side port temperature, and 10°F liquid subcooling from the condenser.

* Inches of mercury below one standard atmosphere (29.92")

Ratings include use of external oil cooling systems.

MODEL 1435GL (Booster Ratings)

SUCTION TEMP. °F AND CORRESPONDING PRESSURE PSIG		INTERMEDIATE TEMP °F. AND CORRESPONDING PRESSURE PSIG			
		0 15.7	10 23.8	20 33.5	30 45.0
-70	TR	173.2	170.0	166.8	163.8
*21.9	BHP	297.7	367.1	440.8	520.7
-65	TR	205.5	201.6	197.5	193.4
*20.4	BHP	309.0	377.7	451.4	532.2
-60	TR	238.9	234.2	229.4	224.6
*18.6	BHP	318.8	386.5	459.9	541.1
-55	TR	279.5	274.0	267.2	259.7
*16.6	BHP	327.5	393.9	466.7	547.9
-50	TR	323.4	315.8	307.9	299.5
*14.3	BHP	335.5	400.3	472.2	553.2
-45	TR	373.6	364.9	355.8	346.4
*11.7	BHP	343.5	406.2	476.9	557.3
-40	TR	432.1	422.0	411.5	400.8
*8.7	BHP	351.7	412.2	481.2	560.8
-35	TR	499.4	487.6	475.6	463.3
*5.4	BHP	360.6	418.5	485.6	564.0
-30	TR	576.1	562.4	548.5	534.4
*1.6	BHP	370.8	425.7	490.6	567.5
-25	TR	658.3	645.5	630.8	614.7
1.3	BHP	382.7	434.3	496.6	571.6
-20	TR	749.7	735.1	720.6	704.6
3.6	BHP	396.7	444.7	504.1	576.9
-15	TR	851.0	834.5	818.1	801.5
6.2	BHP	413.2	457.3	513.5	583.8
-10	TR	962.7	944.1	925.6	906.9
9.0	BHP	432.8	472.6	525.3	592.8

Refrigeration capacity based on saturated suction conditions and refrigerant liquid cooled to a temperature corresponding with intermediate pressure.
* Inches of mercury below one standard atmosphere (29.92”)

Ratings include use of external oil cooling systems.

MODEL 55GS (High Stage/Economized Ratings)

SUCTION TEMP. °F AND CORRESPONDING PRESSURE PSIG		CONDENSING TEMP. °F AND CORRESPONDING PRESSURE PSIG							
		85 155.7		95 181.8		105 210.8		115 242.7	
		H.S.	ECON	H.S.	ECON	H.S.	ECON	H.S.	ECON
-40	TR	13.3	17.2	12.6	17.0	11.8	16.6	10.9	15.9
0.5	BHP	40.2	45.1	44.5	50.5	49.2	56.5	54.5	63.3
-35	TR	15.2	19.4	14.4	19.1	13.5	18.6	12.4	17.9
2.6	BHP	41.6	46.7	46.1	52.4	51.0	58.8	56.6	66.0
-30	TR	17.3	21.8	16.4	21.4	15.4	20.9	14.2	20.2
4.9	BHP	42.9	48.2	47.6	54.2	52.8	61.0	58.6	68.6
-25	TR	19.7	24.4	18.7	24.0	17.5	23.4	16.2	22.6
7.4	BHP	44.2	49.6	49.1	56.0	54.5	63.1	60.6	71.1
-20	TR	22.4	27.3	21.2	26.8	19.9	26.2	18.4	25.3
10.1	BHP	45.4	51.0	50.5	57.6	56.2	65.1	62.5	73.5
-15	TR	25.3	30.4	23.9	29.8	22.5	29.2	20.9	28.2
13.2	BHP	46.6	52.2	52.0	59.1	57.9	67.0	64.4	75.8
-10	TR	28.5	33.8	27.0	33.2	25.4	32.4	23.6	31.4
16.5	BHP	47.8	53.3	53.3	60.5	59.5	68.7	66.3	77.9
-5	TR	32.1	37.4	30.4	36.7	28.5	35.9	26.6	34.9
20.1	BHP	48.9	54.3	54.7	61.8	61.0	70.3	68.1	79.9
0	TR	36.0	41.3	34.0	40.6	32.0	39.7	29.9	38.5
24.0	BHP	50.0	55.1	55.9	62.9	62.5	71.8	69.9	81.7
5	TR	40.2	45.5	38.1	44.7	35.8	43.7	33.4	42.5
28.2	BHP	51.0	55.8	57.1	63.9	64.0	73.0	71.6	83.4
10	TR	44.8	50.0	42.4	49.0	40.0	48.0	37.4	46.7
32.8	BHP	51.9	56.4	58.3	64.7	65.4	74.2	73.2	84.9
15	TR	49.8	54.7	47.2	53.7	44.5	52.6	41.6	51.2
37.7	BHP	52.8	56.8	59.4	65.4	66.7	75.1	74.8	86.1
20	TR	55.2	59.7	52.3	58.6	49.3	57.4	46.2	56.0
43.0	BHP	53.6	57.1	60.4	65.9	67.9	75.9	76.3	87.2
25	TR	61.0	-----	57.9	-----	54.6	-----	51.2	-----
48.8	BHP	54.3	-----	61.3	-----	69.1	-----	77.7	-----
30	TR	67.3	-----	63.8	-----	60.3	-----	56.6	-----
54.9	BHP	55.0	-----	62.2	-----	70.2	-----	79.1	-----
35	TR	74.0	-----	70.2	-----	66.4	-----	62.4	-----
61.5	BHP	55.6	-----	63.0	-----	71.2	-----	80.3	-----
40	TR	81.1	-----	77.0	-----	72.9	-----	68.6	-----
68.5	BHP	56.0	-----	63.7	-----	72.1	-----	81.5	-----

Refrigeration capacity based on saturated suction conditions, the use of a shell and tube type economizer with high pressure liquid cooled to within 10°F of saturated side port temperature, and 10°F liquid subcooling from the condenser.

* Inches of mercury below one standard atmosphere (29.92")

Ratings include use of external oil cooling systems.

MODEL 55GS (Booster Ratings)

SUCTION TEMP. °F AND CORRESPONDING PRESSURE PSIG		INTERMEDIATE TEMP °F. AND CORRESPONDING PRESSURE PSIG			
		0 24.0	10 32.8	20 43.0	30 54.9
-70	TR	8.8	8.1	7.5	7.1
*16.6	BHP	12.9	15.6	18.4	21.5
-65	TR	9.8	9.0	8.5	8.0
*14.4	BHP	13.4	16.1	19.0	22.1
-60	TR	11.1	10.3	9.7	9.2
*12.0	BHP	13.9	16.5	19.4	22.6
-55	TR	12.6	11.8	11.1	10.5
*9.2	BHP	14.3	16.9	19.8	23.0
-50	TR	14.5	13.5	12.8	12.1
*6.2	BHP	14.9	17.3	20.1	23.3
-45	TR	16.6	15.6	14.7	14.0
*2.7	BHP	15.4	17.7	20.4	23.6
-40	TR	19.1	17.9	17.0	16.1
0.5	BHP	16.1	18.2	20.7	23.8
-35	TR	21.9	20.6	19.5	18.6
2.6	BHP	17.0	18.7	21.1	24.1
-30	TR	25.1	23.6	22.4	21.3
4.9	BHP	18.0	19.5	21.6	24.4
-25	TR	28.6	27.0	25.6	24.4
7.4	BHP	19.3	20.4	22.2	24.8
-20	TR	32.5	30.7	29.2	27.8
10.1	BHP	20.8	21.5	23.0	25.4
-15	TR	36.8	34.9	33.1	31.5
13.2	BHP	22.5	22.9	24.0	26.1
-10	TR	41.5	39.4	37.4	35.7
16.5	BHP	24.6	24.5	25.3	27.0

Refrigeration capacity based on saturated suction conditions and refrigerant liquid cooled to a temperature corresponding with intermediate pressure.
* Inches of mercury below one standard atmosphere (29.92”)

Ratings include use of external oil cooling systems.

MODEL 60GS (High Stage/Economized Ratings)

SUCTION TEMP. °F AND CORRESPONDING PRESSURE PSIG		CONDENSING TEMP. °F AND CORRESPONDING PRESSURE PSIG							
		85 155.7		95 181.8		105 210.8		115 242.7	
		H.S.	ECON	H.S.	ECON	H.S.	ECON	H.S.	ECON
-40	TR	15.8	20.4	15.0	20.1	14.0	19.6	12.9	18.8
0.5	BHP	47.6	53.4	52.6	59.7	58.3	66.9	64.5	74.9
-35	TR	18.0	23.0	17.1	22.6	16.0	22.1	14.7	21.3
2.6	BHP	49.2	55.3	54.5	62.0	60.4	69.6	66.9	78.1
-30	TR	20.5	25.8	19.5	25.4	18.2	24.8	16.8	23.9
4.9	BHP	50.7	57.0	56.3	64.2	62.5	72.2	69.3	81.2
-25	TR	23.4	28.9	22.1	28.4	20.7	27.8	19.2	26.8
7.4	BHP	52.3	58.7	58.1	66.2	64.5	74.7	71.7	84.2
-20	TR	26.5	32.3	25.1	31.8	23.5	31.0	21.8	30.0
10.1	BHP	53.7	60.3	59.8	68.2	66.5	77.0	74.0	87.0
-15	TR	30.0	36.0	28.4	35.4	26.6	34.6	24.7	33.5
13.2	BHP	55.2	61.7	61.5	70.0	68.5	79.2	76.2	89.7
-10	TR	33.8	40.0	32.0	39.3	30.1	38.4	28.0	37.3
16.5	BHP	56.6	63.0	63.1	71.6	70.4	81.3	78.4	92.2
-5	TR	38.0	44.3	36.0	43.5	33.8	42.6	31.5	41.3
20.1	BHP	57.9	64.2	64.7	73.1	72.2	83.2	80.6	94.6
0	TR	42.6	49.0	40.4	48.1	38.0	47.0	35.4	45.7
24.0	BHP	59.1	65.2	66.2	74.4	74.0	84.9	82.7	96.7
5	TR	47.7	53.9	45.1	53.0	42.5	51.8	39.7	50.4
28.2	BHP	60.3	66.0	67.6	75.6	75.7	86.4	84.7	98.7
10	TR	53.1	59.2	50.3	58.1	47.4	56.9	44.3	55.4
32.8	BHP	61.4	66.7	69.0	76.6	77.3	87.7	86.6	100.4
15	TR	59.1	64.8	55.9	63.7	52.7	62.3	49.4	60.7
37.7	BHP	62.5	67.2	70.3	77.4	78.9	88.9	88.5	101.9
20	TR	65.5	70.8	62.0	69.5	58.5	68.1	54.8	66.4
43.0	BHP	63.4	67.6	71.5	78.0	80.4	89.8	90.3	103.2
25	TR	72.3	-----	68.6	-----	64.7	-----	60.7	-----
48.8	BHP	64.3	-----	72.6	-----	81.8	-----	91.9	-----
30	TR	79.7	-----	75.6	-----	71.5	-----	67.1	-----
54.9	BHP	65.1	-----	73.6	-----	83.1	-----	93.5	-----
35	TR	87.7	-----	83.2	-----	78.7	-----	74.0	-----
61.5	BHP	65.7	-----	74.5	-----	84.3	-----	95.0	-----
40	TR	96.2	-----	91.3	-----	86.4	-----	81.4	-----
68.5	BHP	66.3	-----	75.3	-----	85.3	-----	96.4	-----

Refrigeration capacity based on saturated suction conditions, the use of a shell and tube type economizer with high pressure liquid cooled to within 10°F of saturated side port temperature, and 10°F liquid subcooling from the condenser.

* Inches of mercury below one standard atmosphere (29.92")

Ratings include use of external oil cooling systems.

MODEL 60GS (Booster Ratings)

SUCTION TEMP. °F AND CORRESPONDING PRESSURE PSIG		INTERMEDIATE TEMP °F. AND CORRESPONDING PRESSURE PSIG			
		0 24.0	10 32.8	20 43.0	30 54.9
-70	TR	10.4	9.6	8.9	8.4
*16.6	BHP	15.2	18.4	21.8	25.4
-65	TR	11.6	10.7	10.0	9.5
*14.4	BHP	15.8	19.0	22.4	26.2
-60	TR	13.1	12.2	11.4	10.9
*12.0	BHP	16.4	19.5	23.0	26.8
-55	TR	15.0	14.0	13.1	12.5
*9.2	BHP	17.0	20.0	23.4	27.3
-50	TR	17.2	16.0	15.1	14.4
*6.2	BHP	17.6	20.4	23.8	27.6
-45	TR	19.7	18.5	17.4	16.6
*2.7	BHP	18.3	20.9	24.1	27.9
-40	TR	22.7	21.3	20.1	19.1
0.5	BHP	19.1	21.5	24.5	28.2
-35	TR	26.0	24.5	23.1	22.0
2.6	BHP	20.1	22.2	25.0	28.5
-30	TR	29.7	28.0	26.5	25.3
4.9	BHP	21.3	23.0	25.6	28.9
-25	TR	33.9	32.0	30.4	28.9
7.4	BHP	22.8	24.1	26.3	29.4
-20	TR	38.6	36.5	34.6	32.9
10.1	BHP	24.5	25.4	27.3	30.0
-15	TR	43.7	41.3	39.3	37.4
13.2	BHP	26.7	27.0	28.4	30.8
-10	TR	49.3	46.7	44.4	42.3
16.5	BHP	29.1	29.0	29.9	31.9

Refrigeration capacity based on saturated suction conditions and refrigerant liquid cooled to a temperature corresponding with intermediate pressure.
* Inches of mercury below one standard atmosphere (29.92”)

Ratings include use of external oil cooling systems.

MODEL 75GS (High Stage/Economized Ratings)

SUCTION TEMP. °F AND CORRESPONDING PRESSURE PSIG		CONDENSING TEMP. °F AND CORRESPONDING PRESSURE PSIG							
		85 155.7		95 181.8		105 210.8		115 242.7	
		H.S.	ECON	H.S.	ECON	H.S.	ECON	H.S.	ECON
-40	TR	18.9	24.5	18.0	24.1	16.8	23.5	15.4	22.6
0.5	BHP	56.0	62.8	61.9	70.3	68.5	78.7	75.9	88.1
-35	TR	21.6	27.5	20.5	27.1	19.2	26.5	17.7	25.5
2.6	BHP	57.9	65.0	64.1	72.9	71.0	81.8	78.7	91.9
-30	TR	24.6	30.9	23.3	30.4	21.9	29.7	20.2	28.7
4.9	BHP	59.7	67.1	66.2	75.5	73.5	84.9	81.5	95.5
-25	TR	28.0	34.7	26.5	34.1	24.9	33.3	23.0	32.2
7.4	BHP	61.5	69.1	68.3	77.9	75.9	87.8	84.3	99.0
-20	TR	31.8	38.7	30.1	38.1	28.2	37.2	26.2	36.0
10.1	BHP	63.2	70.9	70.3	80.2	78.2	90.6	87.0	102.3
-15	TR	35.9	43.2	34.0	42.4	31.9	41.4	29.7	40.1
13.2	BHP	64.9	72.6	72.3	82.3	80.5	93.2	89.7	105.5
-10	TR	40.5	48.0	38.4	47.1	36.0	46.0	33.5	44.7
16.5	BHP	66.5	74.1	74.2	84.2	82.8	95.6	92.3	108.5
-5	TR	45.6	53.2	43.1	52.2	40.6	51.0	37.8	49.5
20.1	BHP	68.1	75.5	76.1	86.0	84.9	97.8	94.8	111.2
0	TR	51.1	58.7	48.4	57.7	45.5	56.4	42.4	54.8
24.0	BHP	69.5	76.7	77.8	87.6	87.0	99.9	97.2	113.7
5	TR	57.2	64.7	54.1	63.5	50.9	62.1	47.5	60.4
28.2	BHP	70.9	77.7	79.5	88.9	89.0	101.6	99.6	116.0
10	TR	63.7	71.0	60.3	69.7	56.8	68.2	53.1	66.4
32.8	BHP	72.3	78.5	81.1	90.1	91.0	103.2	101.9	118.1
15	TR	70.8	77.7	67.1	76.3	63.2	74.7	59.2	72.8
37.7	BHP	73.5	79.1	82.6	91.0	92.8	104.5	104.1	119.8
20	TR	78.5	84.9	74.4	83.3	70.1	81.6	65.7	79.6
43.0	BHP	74.6	79.5	84.1	91.7	94.5	105.6	106.2	121.3
25	TR	86.7	-----	82.2	-----	77.6	-----	72.8	-----
48.8	BHP	75.6	-----	85.4	-----	96.2	-----	108.1	-----
30	TR	95.6	-----	90.7	-----	85.7	-----	80.5	-----
54.9	BHP	76.5	-----	86.6	-----	97.7	-----	110.0	-----
35	TR	105.1	-----	99.8	-----	94.3	-----	88.7	-----
61.5	BHP	77.3	-----	87.6	-----	99.1	-----	111.8	-----
40	TR	115.3	-----	109.5	-----	103.6	-----	97.5	-----
68.5	BHP	78.0	-----	88.6	-----	100.4	-----	113.4	-----

Refrigeration capacity based on saturated suction conditions, the use of a shell and tube type economizer with high pressure liquid cooled to within 10°F of saturated side port temperature, and 10°F liquid subcooling from the condenser.

* Inches of mercury below one standard atmosphere (29.92")

Ratings include use of external oil cooling systems.

MODEL 75GS (Booster Ratings)

SUCTION TEMP. °F AND CORRESPONDING PRESSURE PSIG		INTERMEDIATE TEMP °F. AND CORRESPONDING PRESSURE PSIG			
		0 24.0	10 32.8	20 43.0	30 54.9
-70	TR	12.5	11.5	10.7	10.1
*16.6	BHP	17.9	21.7	25.6	29.9
-65	TR	13.9	12.9	12.0	11.4
*14.4	BHP	18.6	22.3	26.4	30.8
-60	TR	15.8	14.6	13.7	13.0
*12.0	BHP	19.3	22.9	27.0	31.5
-55	TR	18.0	16.7	15.7	15.0
*9.2	BHP	19.9	23.5	27.5	32.1
-50	TR	20.6	19.2	18.1	17.2
*6.2	BHP	20.7	24.0	27.9	32.5
-45	TR	23.7	22.2	20.9	19.9
*2.7	BHP	21.5	24.6	28.4	32.8
-40	TR	27.2	25.5	24.1	22.9
0.5	BHP	22.5	25.3	28.8	33.2
-35	TR	31.2	29.3	27.7	26.4
2.6	BHP	23.6	26.1	29.4	33.5
-30	TR	35.7	33.6	31.8	30.3
4.9	BHP	25.1	27.1	30.1	34.0
-25	TR	40.7	38.4	36.4	34.6
7.4	BHP	26.8	28.4	31.0	34.6
-20	TR	46.2	43.7	41.5	39.5
10.1	BHP	28.9	29.9	32.1	35.3
-15	TR	52.3	49.6	47.1	44.8
13.2	BHP	31.4	31.8	33.5	36.3
-10	TR	59.1	56.0	53.2	50.7
16.5	BHP	34.3	34.1	35.2	37.5

Refrigeration capacity based on saturated suction conditions and refrigerant liquid cooled to a temperature corresponding with intermediate pressure.
* Inches of mercury below one standard atmosphere (29.92”)

Ratings include use of external oil cooling systems.

MODEL 85GS (High Stage/Economized Ratings)

SUCTION TEMP. °F AND CORRESPONDING PRESSURE PSIG		CONDENSING TEMP. °F AND CORRESPONDING PRESSURE PSIG							
		85 155.7		95 181.8		105 210.8		115 242.7	
		H.S.	ECON	H.S.	ECON	H.S.	ECON	H.S.	ECON
-40	TR	22.4	29.0	21.3	28.6	19.9	27.9	18.3	26.7
0.5	BHP	66.2	74.3	73.2	83.1	81.0	93.0	89.7	104.2
-35	TR	25.6	32.6	24.2	32.1	22.7	31.4	20.9	30.2
2.6	BHP	68.4	76.9	75.8	86.2	84.0	96.8	93.1	108.6
-30	TR	29.2	36.6	27.6	36.0	25.9	35.2	23.9	33.9
4.9	BHP	70.6	79.3	78.3	89.2	86.9	100.4	96.4	112.9
-25	TR	33.2	41.0	31.4	40.4	29.4	39.4	27.2	38.1
7.4	BHP	72.7	81.7	80.8	92.1	89.7	103.8	99.7	117.1
-20	TR	37.6	45.9	35.6	45.1	33.4	44.0	31.0	42.6
10.1	BHP	74.8	83.9	83.2	94.8	92.5	107.1	102.9	121.0
-15	TR	42.5	51.1	40.3	50.2	37.8	49.1	35.1	47.5
13.2	BHP	76.7	85.9	85.5	97.3	95.2	110.2	106.0	124.8
-10	TR	48.0	56.8	45.4	55.8	42.7	54.5	39.7	52.9
16.5	BHP	78.7	87.7	87.8	99.6	97.9	113.1	109.1	128.3
-5	TR	54.0	62.9	51.1	61.8	48.0	60.4	44.7	58.6
20.1	BHP	80.5	89.3	89.9	101.7	100.4	115.7	112.1	131.5
0	TR	60.5	69.5	57.3	68.2	53.9	66.7	50.2	64.9
24.0	BHP	82.2	90.7	92.0	103.5	102.9	118.1	115.0	134.5
5	TR	67.7	76.6	64.0	75.2	60.3	73.5	56.3	71.5
28.2	BHP	83.9	91.8	94.0	105.1	105.3	120.2	117.8	137.2
10	TR	75.4	84.1	71.4	82.5	67.2	80.7	62.9	78.6
32.8	BHP	85.4	92.8	95.9	106.5	107.6	122.0	120.5	139.6
15	TR	83.8	92.0	79.4	90.3	74.8	88.4	70.0	86.2
37.7	BHP	86.9	93.5	97.7	107.6	109.7	123.6	123.1	141.7
20	TR	92.9	100.5	88.0	98.6	83.0	96.6	77.8	94.3
43.0	BHP	88.2	94.0	99.4	108.4	111.8	124.9	125.5	143.5
25	TR	102.7	-----	97.3	-----	91.9	-----	86.2	-----
48.8	BHP	89.4	-----	100.9	-----	113.7	-----	127.9	-----
30	TR	113.2	-----	107.4	-----	101.4	-----	95.3	-----
54.9	BHP	90.5	-----	102.4	-----	115.5	-----	130.1	-----
35	TR	124.4	-----	118.1	-----	111.6	-----	105.0	-----
61.5	BHP	91.4	-----	103.6	-----	117.2	-----	132.2	-----
40	TR	136.5	-----	129.6	-----	122.6	-----	115.5	-----
68.5	BHP	92.2	-----	104.8	-----	118.7	-----	134.1	-----

Refrigeration capacity based on saturated suction conditions, the use of a shell and tube type economizer with high pressure liquid cooled to within 10°F of saturated side port temperature, and 10°F liquid subcooling from the condenser.

* Inches of mercury below one standard atmosphere (29.92")

Ratings include use of external oil cooling systems.

MODEL 85GS (Booster Ratings)

SUCTION TEMP. °F AND CORRESPONDING PRESSURE PSIG		INTERMEDIATE TEMP °F. AND CORRESPONDING PRESSURE PSIG			
		0 24.0	10 32.8	20 43.0	30 54.9
-70	TR	14.7	13.6	12.7	12.0
*16.6	BHP	21.2	25.6	30.3	35.3
-65	TR	16.5	15.2	14.3	13.5
*14.4	BHP	22.0	26.4	31.2	36.4
-60	TR	18.7	17.3	16.2	15.4
*12.0	BHP	22.8	27.1	31.9	37.3
-55	TR	21.3	19.8	18.6	17.7
*9.2	BHP	23.6	27.8	32.5	37.9
-50	TR	24.4	22.8	21.5	20.4
*6.2	BHP	24.4	28.4	33.0	38.4
-45	TR	28.0	26.2	24.8	23.5
*2.7	BHP	25.4	29.1	33.5	38.8
-40	TR	32.2	30.2	28.5	27.1
0.5	BHP	26.6	29.9	34.1	39.2
-35	TR	36.9	34.7	32.8	31.2
2.6	BHP	27.9	30.8	34.8	39.7
-30	TR	42.2	39.8	37.7	35.8
4.9	BHP	29.6	32.1	35.6	40.2
-25	TR	48.1	45.4	43.1	41.0
7.4	BHP	31.7	33.5	36.6	40.9
-20	TR	54.6	51.7	49.1	46.7
10.1	BHP	34.1	35.4	37.9	41.7
-15	TR	61.6	58.7	55.7	53.0
13.2	BHP	37.1	37.6	39.6	42.9
-10	TR	69.2	66.3	63.0	60.0
16.5	BHP	40.5	40.3	41.6	44.4

Refrigeration capacity based on saturated suction conditions and refrigerant liquid cooled to a temperature corresponding with intermediate pressure.
* Inches of mercury below one standard atmosphere (29.92”)

Ratings include use of external oil cooling systems.

MODEL 110GM (High Stage/Economized Ratings)

SUCTION TEMP. °F AND CORRESPONDING PRESSURE PSIG		CONDENSING TEMP. °F AND CORRESPONDING PRESSURE PSIG							
		85 155.7		95 181.8		105 210.8		115 242.7	
		H.S.	ECON	H.S.	ECON	H.S.	ECON	H.S.	ECON
-40	TR	28.7	37.1	27.2	36.6	25.4	35.7	23.4	34.2
0.5	BHP	80.5	90.3	89.1	101.1	98.6	113.1	109.1	126.7
-35	TR	32.7	41.7	31.0	41.1	29.1	40.1	26.8	38.6
2.6	BHP	83.2	93.5	92.2	104.9	102.1	117.7	113.2	132.1
-30	TR	37.3	46.8	35.3	46.1	33.1	45.0	30.6	43.4
4.9	BHP	85.9	96.5	95.2	108.6	105.7	122.1	117.3	137.4
-25	TR	42.4	52.5	40.2	51.6	37.7	50.4	34.9	48.7
7.4	BHP	88.4	99.4	98.2	112.0	109.1	126.3	121.3	142.4
-20	TR	48.1	58.7	45.5	57.7	42.7	56.3	39.6	54.5
10.1	BHP	90.9	102.0	101.2	115.3	112.5	130.3	125.2	147.2
-15	TR	54.4	65.4	51.5	64.2	48.4	62.7	44.9	60.8
13.2	BHP	93.4	104.4	104.0	118.4	115.8	134.1	129.0	151.8
-10	TR	61.4	72.7	58.1	71.4	54.6	69.7	50.7	67.6
16.5	BHP	95.7	106.6	106.8	121.2	119.1	137.5	132.7	156.0
-5	TR	69.0	80.5	65.3	79.0	61.4	77.3	57.2	75.0
20.1	BHP	97.9	108.6	109.4	123.7	122.2	140.7	136.3	160.0
0	TR	77.4	88.9	73.3	87.3	68.9	85.4	64.3	83.0
24.0	BHP	100.0	110.3	112.0	125.9	125.2	143.6	139.9	163.6
5	TR	86.5	97.9	81.9	96.1	77.1	94.0	72.0	91.5
28.2	BHP	102.1	111.7	114.4	127.9	128.1	146.2	143.3	166.9
10	TR	96.5	107.5	91.3	105.6	86.0	103.3	80.4	100.6
32.8	BHP	103.9	112.9	116.7	129.6	130.9	148.5	146.5	169.8
15	TR	107.2	117.7	101.6	115.6	95.7	113.1	89.6	110.3
37.7	BHP	105.7	113.7	118.9	130.9	133.5	150.4	149.7	172.4
20	TR	118.8	128.5	112.6	126.2	106.2	123.6	99.5	120.6
43.0	BHP	107.3	114.3	120.9	131.9	136.0	151.9	152.7	174.5
25	TR	131.3	-----	124.5	-----	117.5	-----	110.3	-----
48.8	BHP	108.8	-----	122.8	-----	138.3	-----	155.6	-----
30	TR	144.8	-----	137.3	-----	129.7	-----	121.8	-----
54.9	BHP	110.1	-----	124.5	-----	140.5	-----	158.2	-----
35	TR	159.2	-----	151.1	-----	142.8	-----	134.3	-----
61.5	BHP	111.2	-----	126.1	-----	142.6	-----	160.8	-----
40	TR	174.6	-----	165.8	-----	156.9	-----	147.7	-----
68.5	BHP	112.2	-----	127.5	-----	144.4	-----	163.1	-----

Refrigeration capacity based on saturated suction conditions, the use of a shell and tube type economizer with high pressure liquid cooled to within 10°F of saturated side port temperature, and 10°F liquid subcooling from the condenser.

* Inches of mercury below one standard atmosphere (29.92")

Ratings include use of external oil cooling systems.

MODEL 110GM (Booster Ratings)

SUCTION TEMP. °F AND CORRESPONDING PRESSURE PSIG		INTERMEDIATE TEMP °F. AND CORRESPONDING PRESSURE PSIG			
		0 24.0	10 32.8	20 43.0	30 54.9
-70	TR	18.9	17.3	16.2	15.3
*16.6	BHP	25.8	31.1	36.9	43.0
-65	TR	21.1	19.5	18.2	17.3
*14.4	BHP	26.8	32.1	38.0	44.3
-60	TR	23.9	22.1	20.8	19.7
*12.0	BHP	27.7	33.0	38.8	45.3
-55	TR	27.2	25.3	23.8	22.7
*9.2	BHP	28.7	33.8	39.6	46.1
-50	TR	31.2	29.1	27.5	26.1
*6.2	BHP	29.7	34.5	40.2	46.7
-45	TR	35.8	33.5	31.7	30.1
*2.7	BHP	30.9	35.4	40.8	47.2
-40	TR	41.1	38.6	36.5	34.7
0.5	BHP	32.3	36.3	41.5	47.7
-35	TR	47.2	44.4	42.0	39.9
2.6	BHP	34.0	37.5	42.3	48.2
-30	TR	54.0	50.9	48.2	45.8
4.9	BHP	36.1	39.0	43.3	48.9
-25	TR	61.6	58.1	55.1	52.4
7.4	BHP	38.5	40.8	44.5	49.7
-20	TR	69.1	66.2	62.8	59.8
10.1	BHP	41.5	43.0	46.1	50.8
-15	TR	78.0	75.0	71.3	67.8
13.2	BHP	45.1	45.8	48.1	52.2
-10	TR	87.6	84.8	80.6	76.7
16.5	BHP	49.3	49.0	50.6	54.0

Refrigeration capacity based on saturated suction conditions and refrigerant liquid cooled to a temperature corresponding with intermediate pressure.
* Inches of mercury below one standard atmosphere (29.92”)

Ratings include use of external oil cooling systems.

MODEL 125GM (High Stage/Economized Ratings)

SUCTION TEMP. °F AND CORRESPONDING PRESSURE PSIG		CONDENSING TEMP. °F AND CORRESPONDING PRESSURE PSIG							
		85 155.7		95 181.8		105 210.8		115 242.7	
		H.S.	ECON	H.S.	ECON	H.S.	ECON	H.S.	ECON
-40	TR	33.8	43.7	32.0	43.1	30.0	42.0	27.5	40.3
0.5	BHP	94.9	106.4	104.9	119.1	116.1	133.3	128.6	149.3
-35	TR	38.6	49.2	36.5	48.4	34.2	47.3	31.5	45.5
2.6	BHP	98.1	110.2	108.6	123.6	120.4	138.7	133.4	155.7
-30	TR	43.9	55.2	41.6	54.3	39.0	53.0	36.0	51.1
4.9	BHP	101.2	113.7	112.2	127.9	124.5	143.9	138.2	161.9
-25	TR	50.0	61.8	47.3	60.8	44.4	59.4	41.1	57.4
7.4	BHP	104.2	117.1	115.7	132.0	128.6	148.8	142.9	167.8
-20	TR	56.7	69.1	53.7	67.9	50.4	66.4	46.7	64.2
10.1	BHP	107.1	120.2	119.2	135.9	132.6	153.5	147.5	173.5
-15	TR	64.1	77.0	60.7	75.7	57.0	73.9	52.9	71.6
13.2	BHP	110.0	123.1	122.5	139.5	136.5	158.0	152.0	178.8
-10	TR	72.3	85.6	68.4	84.1	64.3	82.2	59.8	79.7
16.5	BHP	112.7	125.7	125.8	142.8	140.3	162.1	156.4	183.8
-5	TR	81.3	94.9	77.0	93.1	72.4	91.0	67.4	88.4
20.1	BHP	115.4	128.0	128.9	145.7	144.0	165.8	160.6	188.5
0	TR	91.2	104.8	86.3	102.9	81.2	100.6	75.7	97.7
24.0	BHP	117.9	130.0	131.9	148.4	147.5	169.2	164.8	192.8
5	TR	102.0	115.4	96.5	113.3	90.8	110.8	84.8	107.8
28.2	BHP	120.2	131.7	134.8	150.7	150.9	172.3	168.8	196.7
10	TR	113.7	126.7	107.6	124.4	101.4	121.7	94.8	118.5
32.8	BHP	122.5	133.0	137.5	152.7	154.2	174.9	172.7	200.1
15	TR	126.3	138.7	119.7	136.2	112.8	133.3	105.6	129.9
37.7	BHP	124.5	134.0	140.1	154.2	157.3	177.2	176.4	203.1
20	TR	140.0	151.4	132.7	148.7	125.1	145.6	117.3	142.1
43.0	BHP	126.4	134.7	142.5	155.4	160.2	179.0	179.9	205.7
25	TR	154.7	-----	146.7	-----	138.5	-----	129.9	-----
48.8	BHP	128.2	-----	144.7	-----	163.0	-----	183.3	-----
30	TR	170.6	-----	161.8	-----	152.8	-----	143.6	-----
54.9	BHP	129.7	-----	146.7	-----	165.6	-----	186.5	-----
35	TR	187.5	-----	178.0	-----	168.3	-----	158.3	-----
61.5	BHP	131.0	-----	148.6	-----	168.0	-----	189.4	-----
40	TR	205.7	-----	195.4	-----	184.8	-----	174.0	-----
68.5	BHP	132.2	-----	150.2	-----	170.2	-----	192.2	-----

Refrigeration capacity based on saturated suction conditions, the use of a shell and tube type economizer with high pressure liquid cooled to within 10°F of saturated side port temperature, and 10°F liquid subcooling from the condenser.

* Inches of mercury below one standard atmosphere (29.92")

Ratings include use of external oil cooling systems.

MODEL 125GM (Booster Ratings)

SUCTION TEMP. °F AND CORRESPONDING PRESSURE PSIG		INTERMEDIATE TEMP °F. AND CORRESPONDING PRESSURE PSIG			
		0 24.0	10 32.8	20 43.0	30 54.9
-70	TR	21.9	20.4	19.1	18.1
*16.6	BHP	30.4	36.7	43.4	50.6
-65	TR	24.8	22.9	21.5	20.4
*14.4	BHP	31.6	37.9	44.7	52.2
-60	TR	28.1	26.1	24.5	23.2
*12.0	BHP	32.7	38.9	45.8	53.4
-55	TR	32.1	29.8	28.1	26.7
*9.2	BHP	33.8	39.8	46.6	54.3
-50	TR	36.8	34.3	32.3	30.8
*6.2	BHP	35.0	40.7	47.4	55.0
-45	TR	42.2	39.5	37.3	35.5
*2.7	BHP	36.4	41.7	48.1	55.7
-40	TR	48.5	45.5	43.0	40.9
0.5	BHP	38.1	42.8	48.9	56.2
-35	TR	55.6	52.3	49.5	47.1
2.6	BHP	40.1	44.2	49.8	56.8
-30	TR	63.6	60.0	56.8	54.0
4.9	BHP	42.5	45.9	51.0	57.6
-25	TR	72.2	68.5	64.9	61.8
7.4	BHP	45.4	48.1	52.5	58.6
-20	TR	79.8	77.5	74.0	70.4
10.1	BHP	48.9	50.7	54.3	59.8
-15	TR	90.1	87.5	84.0	79.9
13.2	BHP	53.1	53.9	56.7	61.5
-10	TR	101.2	98.3	94.9	90.4
16.5	BHP	58.1	57.8	59.6	63.6

Refrigeration capacity based on saturated suction conditions and refrigerant liquid cooled to a temperature corresponding with intermediate pressure.
* Inches of mercury below one standard atmosphere (29.92”)

Ratings include use of external oil cooling systems.

MODEL 160GM (High Stage/Economized Ratings)

SUCTION TEMP. °F AND CORRESPONDING PRESSURE PSIG		CONDENSING TEMP. °F AND CORRESPONDING PRESSURE PSIG							
		85 155.7		95 181.8		105 210.8		115 242.7	
		H.S.	ECON	H.S.	ECON	H.S.	ECON	H.S.	ECON
-40	TR	42.8	55.4	40.6	54.6	38.0	53.3	34.9	51.1
0.5	BHP	120.3	134.9	133.1	151.0	147.3	169.0	163.1	189.4
-35	TR	48.9	62.3	46.3	61.4	43.4	59.9	40.0	57.7
2.6	BHP	124.3	139.7	137.7	156.7	152.6	175.9	169.2	197.4
-30	TR	55.7	70.0	52.8	68.9	49.5	67.3	45.7	64.9
4.9	BHP	128.3	144.2	142.3	162.2	157.9	182.5	175.2	205.3
-25	TR	63.4	78.4	60.0	77.1	56.3	75.3	52.1	72.8
7.4	BHP	132.1	148.5	146.8	167.4	163.1	188.7	181.2	212.8
-20	TR	71.9	87.6	68.0	86.1	63.8	84.1	59.2	81.4
10.1	BHP	135.9	152.4	151.1	172.3	168.1	194.7	187.0	219.9
-15	TR	81.3	97.7	76.9	96.0	72.2	93.8	67.1	90.8
13.2	BHP	139.5	156.0	155.4	176.8	173.1	200.3	192.7	226.7
-10	TR	91.7	108.6	86.8	106.6	81.5	104.2	75.8	101.0
16.5	BHP	143.0	159.3	159.5	181.0	177.9	205.5	198.3	233.1
-5	TR	103.2	120.3	97.6	118.1	91.7	115.4	85.4	112.1
20.1	BHP	146.3	162.3	163.5	184.8	182.5	210.3	203.7	239.0
0	TR	115.7	132.9	109.5	130.4	102.9	127.5	96.0	123.9
24.0	BHP	149.5	164.8	167.3	188.2	187.0	214.6	209.0	244.5
5	TR	129.3	146.3	122.4	143.6	115.2	140.5	107.6	136.7
28.2	BHP	152.5	166.9	170.9	191.1	191.4	218.5	214.0	249.4
10	TR	144.1	160.7	136.5	157.7	128.5	154.3	120.1	150.3
32.8	BHP	155.3	168.7	174.4	193.6	195.5	221.8	218.9	253.8
15	TR	160.2	175.9	151.7	172.7	143.0	169.0	133.8	164.8
37.7	BHP	157.9	169.9	177.6	195.6	199.5	224.6	223.6	257.6
20	TR	177.5	192.0	168.2	188.5	158.7	184.6	148.7	180.1
43.0	BHP	160.3	170.8	180.6	197.1	203.2	226.9	228.1	260.8
25	TR	196.2	-----	186.0	-----	175.6	-----	164.7	-----
48.8	BHP	162.5	-----	183.5	-----	206.7	-----	232.4	-----
30	TR	216.3	-----	205.2	-----	193.8	-----	182.1	-----
54.9	BHP	164.5	-----	186.0	-----	210.0	-----	236.4	-----
35	TR	237.8	-----	225.7	-----	213.4	-----	200.7	-----
61.5	BHP	166.2	-----	188.4	-----	213.0	-----	240.2	-----
40	TR	260.8	-----	247.7	-----	234.4	-----	220.6	-----
68.5	BHP	167.6	-----	190.4	-----	215.8	-----	243.7	-----

Refrigeration capacity based on saturated suction conditions, the use of a shell and tube type economizer with high pressure liquid cooled to within 10°F of saturated side port temperature, and 10°F liquid subcooling from the condenser.

* Inches of mercury below one standard atmosphere (29.92")

Ratings include use of external oil cooling systems.

MODEL 160GM (Booster Ratings)

SUCTION TEMP. °F AND CORRESPONDING PRESSURE PSIG		INTERMEDIATE TEMP °F. AND CORRESPONDING PRESSURE PSIG			
		0 24.0	10 32.8	20 43.0	30 54.9
-70	TR	27.8	25.9	24.2	22.9
*16.6	BHP	38.5	46.5	55.1	64.2
-65	TR	31.5	29.1	27.2	25.8
*14.4	BHP	40.0	48.0	56.7	66.2
-60	TR	35.6	33.1	31.0	29.5
*12.0	BHP	41.5	49.3	58.0	67.7
-55	TR	40.7	37.8	35.6	33.8
*9.2	BHP	42.9	50.4	59.1	68.9
-50	TR	46.6	43.5	41.0	39.0
*6.2	BHP	44.4	51.6	60.1	69.8
-45	TR	53.5	50.1	47.3	45.0
*2.7	BHP	46.2	52.8	61.0	70.6
-40	TR	61.5	57.7	54.5	51.9
0.5	BHP	48.3	54.3	62.0	71.3
-35	TR	70.5	66.3	62.8	59.7
2.6	BHP	50.8	56.1	63.2	72.1
-30	TR	80.7	76.0	72.0	68.5
4.9	BHP	53.9	58.3	64.6	73.0
-25	TR	91.6	86.9	82.3	78.3
7.4	BHP	57.6	61.0	66.5	74.3
-20	TR	101.2	98.2	93.8	89.3
10.1	BHP	62.1	64.3	68.9	75.9
-15	TR	114.3	110.9	106.5	101.4
13.2	BHP	67.4	68.4	71.9	78.0
-10	TR	128.4	124.6	120.4	114.6
16.5	BHP	73.7	73.3	75.6	80.6

Refrigeration capacity based on saturated suction conditions and refrigerant liquid cooled to a temperature corresponding with intermediate pressure.
* Inches of mercury below one standard atmosphere (29.92”)

Ratings include use of external oil cooling systems.

MODEL 195GM (High Stage/Economized Ratings)

SUCTION TEMP. °F AND CORRESPONDING PRESSURE PSIG		CONDENSING TEMP. °F AND CORRESPONDING PRESSURE PSIG							
		85 155.7		95 181.8		105 210.8		115 242.7	
		H.S.	ECON	H.S.	ECON	H.S.	ECON	H.S.	ECON
-40	TR	53.4	69.1	50.6	68.1	47.4	66.4	43.5	63.7
0.5	BHP	150.0	168.3	165.9	188.3	183.6	210.8	203.3	236.1
-35	TR	61.0	77.7	57.8	76.5	54.1	74.7	49.8	71.9
2.6	BHP	155.0	174.2	171.7	195.4	190.3	219.3	211.0	246.2
-30	TR	69.5	87.3	65.8	85.9	61.7	83.9	57.0	80.9
4.9	BHP	159.9	179.8	177.4	202.2	196.9	227.5	218.5	255.9
-25	TR	79.0	97.8	74.8	96.2	70.2	93.9	64.9	90.7
7.4	BHP	164.7	185.1	183.0	208.7	203.3	235.3	225.9	265.3
-20	TR	89.6	109.3	84.8	107.4	79.6	104.9	73.8	101.5
10.1	BHP	169.4	190.0	188.4	214.8	209.6	242.8	233.2	274.2
-15	TR	101.4	121.8	95.9	119.6	90.1	116.9	83.6	113.2
13.2	BHP	173.9	194.6	193.7	220.5	215.8	249.7	240.3	282.7
-10	TR	114.4	135.4	108.2	132.9	101.7	129.9	94.5	126.0
16.5	BHP	178.2	198.7	198.9	225.7	221.8	256.2	247.2	290.6
-5	TR	128.6	150.0	121.7	147.2	114.4	143.9	106.5	139.7
20.1	BHP	182.4	202.3	203.8	230.4	227.6	262.2	254.0	298.0
0	TR	144.2	165.7	136.5	162.6	128.4	159.0	119.7	154.5
24.0	BHP	186.4	205.5	208.6	234.6	233.2	267.6	260.5	304.8
5	TR	161.2	182.4	152.6	179.1	143.6	175.2	134.1	170.4
28.2	BHP	190.1	208.1	213.1	238.3	238.6	272.4	266.9	310.9
10	TR	179.7	200.3	170.2	196.6	160.2	192.4	149.8	187.4
32.8	BHP	193.6	210.3	217.4	241.3	243.8	276.6	273.0	316.4
15	TR	199.7	219.3	189.2	215.3	178.3	210.7	166.9	205.4
37.7	BHP	196.9	211.9	221.4	243.8	248.7	280.1	278.9	321.2
20	TR	221.4	239.4	209.8	235.0	197.8	230.2	185.4	224.6
43.0	BHP	199.9	213.0	225.2	245.7	253.3	283.0	284.5	325.2
25	TR	244.7	-----	232.0	-----	218.9	-----	205.4	-----
48.8	BHP	202.6	-----	228.7	-----	257.7	-----	289.8	-----
30	TR	269.7	-----	255.8	-----	241.6	-----	227.0	-----
54.9	BHP	205.0	-----	232.0	-----	261.8	-----	294.8	-----
35	TR	296.5	-----	281.4	-----	266.0	-----	250.2	-----
61.5	BHP	207.2	-----	234.9	-----	265.6	-----	299.5	-----
40	TR	325.2	-----	308.9	-----	292.2	-----	275.1	-----
68.5	BHP	209.0	-----	237.4	-----	269.0	-----	303.9	-----

Refrigeration capacity based on saturated suction conditions, the use of a shell and tube type economizer with high pressure liquid cooled to within 10°F of saturated side port temperature, and 10°F liquid subcooling from the condenser.

* Inches of mercury below one standard atmosphere (29.92")

Ratings include use of external oil cooling systems.

MODEL 195GM (Booster Ratings)

SUCTION TEMP. °F AND CORRESPONDING PRESSURE PSIG		INTERMEDIATE TEMP °F. AND CORRESPONDING PRESSURE PSIG			
		0 24.0	10 32.8	20 43.0	30 54.9
-70	TR	34.7	32.3	30.2	28.6
*16.6	BHP	48.1	58.0	68.7	80.0
-65	TR	39.3	36.3	34.0	32.2
*14.4	BHP	49.9	59.9	70.7	82.5
-60	TR	44.4	41.2	38.7	36.8
*12.0	BHP	51.7	61.5	72.4	84.4
-55	TR	50.7	47.2	44.4	42.2
*9.2	BHP	53.5	62.9	73.7	85.9
-50	TR	58.1	54.3	51.1	48.6
*6.2	BHP	55.4	64.3	74.9	87.0
-45	TR	66.7	62.5	59.0	56.1
*2.7	BHP	57.6	65.9	76.0	88.0
-40	TR	76.7	71.9	68.0	64.7
0.5	BHP	60.2	67.7	77.3	88.9
-35	TR	87.9	82.7	78.2	74.4
2.6	BHP	63.3	69.9	78.8	89.9
-30	TR	100.6	94.8	89.8	85.4
4.9	BHP	67.2	72.6	80.6	91.1
-25	TR	114.1	108.3	102.7	97.7
7.4	BHP	71.8	76.0	82.9	92.6
-20	TR	126.1	122.4	117.0	111.3
10.1	BHP	77.4	80.2	85.9	94.6
-15	TR	142.4	138.3	132.8	126.4
13.2	BHP	84.0	85.2	89.6	97.2
-10	TR	160.0	155.4	150.1	142.9
16.5	BHP	91.9	91.4	94.3	100.6

Refrigeration capacity based on saturated suction conditions and refrigerant liquid cooled to a temperature corresponding with intermediate pressure.
* Inches of mercury below one standard atmosphere (29.92”)

Ratings include use of external oil cooling systems.

MODEL 180GL (High Stage/Economized Ratings)

SUCTION TEMP. °F AND CORRESPONDING PRESSURE PSIG		CONDENSING TEMP. °F AND CORRESPONDING PRESSURE PSIG							
		85 155.7		95 181.8		105 210.8		115 242.7	
		H.S.	ECON	H.S.	ECON	H.S.	ECON	H.S.	ECON
-40	TR	53.1	68.7	50.6	68.1	47.7	66.8	44.2	64.8
0.5	BHP	145.6	163.3	159.3	180.8	173.7	199.4	188.9	219.4
-35	TR	60.8	77.5	57.9	76.7	54.6	75.4	50.8	73.2
2.6	BHP	151.4	170.2	166.3	189.2	181.9	209.6	198.4	231.6
-30	TR	69.3	87.0	66.0	86.2	62.3	84.7	58.1	82.5
4.9	BHP	157.0	176.5	172.9	197.1	189.7	219.2	207.5	243.1
-25	TR	78.7	97.4	75.0	96.5	70.9	94.9	66.2	92.5
7.4	BHP	162.3	182.4	179.2	204.4	197.1	228.2	216.2	254.0
-20	TR	89.2	108.7	85.0	107.6	80.4	105.9	75.2	103.4
10.1	BHP	167.3	187.7	185.1	211.0	204.2	236.5	224.5	264.1
-15	TR	100.6	120.9	95.9	119.6	90.8	117.8	85.1	115.2
13.2	BHP	172.0	192.4	190.8	217.1	210.9	244.1	232.4	273.4
-10	TR	113.2	134.0	107.9	132.6	102.2	130.6	95.9	127.9
16.5	BHP	176.4	196.6	196.1	222.5	217.2	250.9	239.8	282.0
-5	TR	126.9	147.9	121.0	146.4	114.7	144.3	107.8	141.4
20.1	BHP	180.5	200.2	201.0	227.2	223.1	257.0	246.9	289.7
0	TR	141.7	162.8	135.2	161.1	128.3	158.9	120.7	155.9
24.0	BHP	184.2	203.1	205.6	231.2	228.6	262.3	253.4	296.5
5	TR	157.8	178.6	150.6	176.8	143.0	174.4	134.7	171.2
28.2	BHP	187.7	205.5	209.8	234.6	233.8	266.8	259.6	302.5
10	TR	175.2	195.3	167.3	193.3	158.9	190.8	149.9	187.5
32.8	BHP	190.8	207.2	213.6	237.2	238.5	270.5	265.3	307.5
15	TR	194.0	213.0	185.3	210.8	176.1	208.1	166.3	204.8
37.7	BHP	193.6	208.3	217.1	239.1	242.8	273.4	270.6	311.6
20	TR	214.1	231.5	204.6	229.2	194.6	226.4	184.0	222.9
43.0	BHP	196.0	208.8	220.2	240.3	246.7	275.5	275.4	314.8
25	TR	235.6	-----	225.3	-----	214.4	-----	203.0	-----
48.8	BHP	198.1	-----	223.0	-----	250.2	-----	279.7	-----
30	TR	258.7	-----	247.4	-----	235.7	-----	223.4	-----
54.9	BHP	199.9	-----	225.3	-----	253.2	-----	283.6	-----
35	TR	283.3	-----	271.1	-----	258.4	-----	245.2	-----
61.5	BHP	201.3	-----	227.3	-----	255.8	-----	287.0	-----
40	TR	309.5	-----	296.3	-----	282.7	-----	268.4	-----
68.5	BHP	202.3	-----	228.8	-----	258.0	-----	290.0	-----

Refrigeration capacity based on saturated suction conditions, the use of a shell and tube type economizer with high pressure liquid cooled to within 10°F of saturated side port temperature, and 10°F liquid subcooling from the condenser.

* Inches of mercury below one standard atmosphere (29.92")

Ratings include use of external oil cooling systems.

MODEL 180GL (Booster Ratings)

SUCTION TEMP. °F AND CORRESPONDING PRESSURE PSIG		INTERMEDIATE TEMP °F. AND CORRESPONDING PRESSURE PSIG			
		0 24.0	10 32.8	20 43.0	30 54.9
-70	TR	32.4	31.5	29.4	27.7
*16.6	BHP	49.4	57.8	67.7	79.0
-65	TR	37.6	35.5	33.3	31.5
*14.4	BHP	50.9	59.1	69.0	80.4
-60	TR	43.3	40.3	37.9	36.0
*12.0	BHP	52.5	60.4	70.1	81.6
-55	TR	49.1	46.0	43.4	41.3
*9.2	BHP	54.1	61.6	71.2	82.7
-50	TR	55.9	52.6	49.9	47.6
*6.2	BHP	55.8	62.9	72.2	83.6
-45	TR	63.8	60.2	57.3	54.8
*2.7	BHP	57.8	64.4	73.3	84.4
-40	TR	72.7	68.9	65.7	62.9
0.5	BHP	60.0	66.0	74.5	85.3
-35	TR	82.9	78.8	75.2	72.1
2.6	BHP	62.6	67.9	75.8	86.3
-30	TR	94.2	89.7	85.8	82.4
4.9	BHP	65.6	70.2	77.5	87.4
-25	TR	106.8	101.9	97.6	93.8
7.4	BHP	69.2	72.8	79.4	88.8
-20	TR	118.1	114.6	110.6	106.3
10.1	BHP	73.3	76.0	81.8	90.6
-15	TR	133.3	129.4	124.9	120.1
13.2	BHP	78.0	79.7	84.6	92.6
-10	TR	149.8	145.4	140.6	135.2
16.5	BHP	83.5	84.0	88.0	95.2

Refrigeration capacity based on saturated suction conditions and refrigerant liquid cooled to a temperature corresponding with intermediate pressure.
* Inches of mercury below one standard atmosphere (29.92”)

Ratings include use of external oil cooling systems.

MODEL 230GL (High Stage/Economized Ratings)

SUCTION TEMP. °F AND CORRESPONDING PRESSURE PSIG		CONDENSING TEMP. °F AND CORRESPONDING PRESSURE PSIG							
		85 155.7		95 181.8		105 210.8		115 242.7	
		H.S.	ECON	H.S.	ECON	H.S.	ECON	H.S.	ECON
-40	TR	68.7	88.8	65.4	88.0	61.6	86.3	57.1	83.7
0.5	BHP	188.1	211.0	205.8	233.5	224.5	257.7	244.1	283.4
-35	TR	78.5	100.1	74.8	99.1	70.6	97.4	65.6	94.6
2.6	BHP	195.7	219.8	214.8	244.4	235.0	270.9	256.4	299.2
-30	TR	89.5	112.4	85.3	111.3	80.5	109.5	75.1	106.6
4.9	BHP	202.9	228.1	223.4	254.6	245.1	283.3	268.1	314.1
-25	TR	101.7	125.9	97.0	124.6	91.6	122.6	85.6	119.6
7.4	BHP	209.7	235.6	231.5	264.0	254.7	294.8	279.4	328.1
-20	TR	115.2	140.5	109.8	139.0	103.8	136.9	97.2	133.6
10.1	BHP	216.2	242.5	239.2	272.7	263.8	305.5	290.1	341.2
-15	TR	130.0	156.2	123.9	154.6	117.3	152.2	109.9	148.8
13.2	BHP	222.2	248.6	246.5	280.5	272.5	315.3	300.2	353.3
-10	TR	146.2	173.1	139.4	171.3	132.1	168.7	124.0	165.2
16.5	BHP	227.9	254.0	253.3	287.5	280.6	324.2	309.9	364.3
-5	TR	163.9	191.1	156.3	189.1	148.2	186.4	139.3	182.7
20.1	BHP	233.2	258.6	259.7	293.6	288.3	332.1	318.9	374.3
0	TR	183.1	210.3	174.7	208.2	165.7	205.3	156.0	201.4
24.0	BHP	238.0	262.4	265.6	298.8	295.4	338.9	327.4	383.1
5	TR	203.9	230.8	194.6	228.4	184.7	225.3	174.1	221.2
28.2	BHP	242.5	265.4	271.0	303.1	302.0	344.8	335.4	390.8
10	TR	226.4	252.4	216.1	249.8	205.3	246.5	193.7	242.3
32.8	BHP	246.5	267.7	276.0	306.4	308.1	349.5	342.8	397.3
15	TR	250.6	275.1	239.3	272.4	227.5	268.9	214.9	264.5
37.7	BHP	250.1	269.1	280.5	308.9	313.7	353.3	349.6	402.6
20	TR	276.6	299.1	264.3	296.2	251.4	292.5	237.8	288.0
43.0	BHP	253.2	269.8	284.5	310.4	318.7	356.0	355.8	406.7
25	TR	304.4	-----	291.1	-----	277.1	-----	262.3	-----
48.8	BHP	256.0	-----	288.1	-----	323.2	-----	361.4	-----
30	TR	334.2	-----	319.7	-----	304.5	-----	288.6	-----
54.9	BHP	258.2	-----	291.1	-----	327.1	-----	366.4	-----
35	TR	366.0	-----	350.3	-----	333.9	-----	316.7	-----
61.5	BHP	260.1	-----	293.6	-----	330.5	-----	370.8	-----
40	TR	399.9	-----	382.8	-----	365.2	-----	346.8	-----
68.5	BHP	261.4	-----	295.6	-----	333.4	-----	374.6	-----

Refrigeration capacity based on saturated suction conditions, the use of a shell and tube type economizer with high pressure liquid cooled to within 10°F of saturated side port temperature, and 10°F liquid subcooling from the condenser.

* Inches of mercury below one standard atmosphere (29.92")

Ratings include use of external oil cooling systems.

MODEL 230GL (Booster Ratings)

SUCTION TEMP. °F AND CORRESPONDING PRESSURE PSIG		INTERMEDIATE TEMP °F. AND CORRESPONDING PRESSURE PSIG			
		0 24.0	10 32.8	20 43.0	30 54.9
-70	TR	41.9	40.6	38.0	35.8
*16.6	BHP	63.9	74.6	87.4	102.1
-65	TR	48.6	45.9	43.0	40.6
*14.4	BHP	65.8	76.4	89.1	103.9
-60	TR	55.9	52.1	49.0	46.5
*12.0	BHP	67.8	78.0	90.6	105.5
-55	TR	63.4	59.4	56.1	53.4
*9.2	BHP	69.8	79.6	92.0	106.8
-50	TR	72.2	67.9	64.4	61.5
*6.2	BHP	72.1	81.3	93.3	108.0
-45	TR	82.4	77.8	74.0	70.8
*2.7	BHP	74.6	83.2	94.7	109.1
-40	TR	94.0	89.1	84.9	81.3
0.5	BHP	77.5	85.3	96.2	110.2
-35	TR	107.1	101.8	97.2	93.2
2.6	BHP	80.9	87.8	98.0	111.5
-30	TR	121.7	115.9	110.9	106.4
4.9	BHP	84.8	90.7	100.1	113.0
-25	TR	138.0	131.7	126.1	121.1
7.4	BHP	89.4	94.1	102.6	114.8
-20	TR	152.5	148.1	143.0	137.4
10.1	BHP	94.7	98.2	105.7	117.0
-15	TR	172.2	167.2	161.4	155.2
13.2	BHP	100.8	103.0	109.3	119.7
-10	TR	193.5	187.9	181.6	174.7
16.5	BHP	107.9	108.6	113.7	123.0

Refrigeration capacity based on saturated suction conditions and refrigerant liquid cooled to a temperature corresponding with intermediate pressure.
* Inches of mercury below one standard atmosphere (29.92”)

Ratings include use of external oil cooling systems.

MODEL 290GL (High Stage/Economized Ratings)

SUCTION TEMP. °F AND CORRESPONDING PRESSURE PSIG		CONDENSING TEMP. °F AND CORRESPONDING PRESSURE PSIG							
		85 155.7		95 181.8		105 210.8		115 242.7	
		H.S.	ECON	H.S.	ECON	H.S.	ECON	H.S.	ECON
-40	TR	85.1	110.1	81.1	109.1	76.4	107.1	70.8	103.8
0.5	BHP	233.2	261.6	255.2	289.6	278.3	319.5	302.7	351.4
-35	TR	97.4	124.1	92.8	122.9	87.5	120.8	81.4	117.3
2.6	BHP	242.6	272.6	266.3	303.1	291.4	335.8	317.9	371.0
-30	TR	111.0	139.4	105.8	138.0	99.9	135.7	93.1	132.1
4.9	BHP	251.6	282.8	277.0	315.7	303.9	351.2	332.5	389.4
-25	TR	126.2	156.1	120.2	154.5	113.6	152.0	106.1	148.3
7.4	BHP	260.0	292.2	287.0	327.4	315.8	365.6	346.4	406.8
-20	TR	142.9	174.2	136.2	172.4	128.8	169.7	120.5	165.7
10.1	BHP	268.0	300.7	296.6	338.1	327.2	378.9	359.7	423.1
-15	TR	161.2	193.7	153.7	191.7	145.5	188.7	136.3	184.6
13.2	BHP	275.5	308.3	305.6	347.8	337.9	391.0	372.3	438.0
-10	TR	181.3	214.6	172.9	212.4	163.7	209.2	153.7	204.8
16.5	BHP	282.6	314.9	314.1	356.4	348.0	402.0	384.2	451.7
-5	TR	203.2	237.0	193.8	234.5	183.7	231.1	172.7	226.5
20.1	BHP	289.1	320.6	322.0	364.0	357.4	411.7	395.5	464.1
0	TR	227.0	260.8	216.6	258.1	205.5	254.5	193.4	249.7
24.0	BHP	295.1	325.4	329.3	370.4	366.3	420.2	406.0	475.0
5	TR	252.8	286.1	241.3	283.2	229.0	279.3	215.9	274.3
28.2	BHP	300.6	329.1	336.1	375.8	374.5	427.5	415.9	484.5
10	TR	280.7	312.9	268.0	309.7	254.6	305.7	240.2	300.4
32.8	BHP	305.6	331.9	342.2	379.9	382.0	433.4	425.0	492.6
15	TR	310.7	341.2	296.8	337.7	282.1	333.5	266.5	328.0
37.7	BHP	310.1	333.7	347.8	383.0	388.9	438.0	433.4	499.2
20	TR	342.9	370.9	327.7	367.2	311.7	362.7	294.8	357.1
43.0	BHP	314.0	334.6	352.8	384.9	395.2	441.4	441.1	504.2
25	TR	377.5	-----	360.9	-----	343.5	-----	325.2	-----
48.8	BHP	317.4	-----	357.2	-----	400.8	-----	448.1	-----
30	TR	414.4	-----	396.4	-----	377.6	-----	357.9	-----
54.9	BHP	320.2	-----	360.9	-----	405.6	-----	454.3	-----
35	TR	453.8	-----	434.3	-----	414.0	-----	392.7	-----
61.5	BHP	322.4	-----	364.1	-----	409.8	-----	459.8	-----
40	TR	495.8	-----	474.7	-----	452.8	-----	430.0	-----
68.5	BHP	324.1	-----	366.6	-----	413.4	-----	464.5	-----

Refrigeration capacity based on saturated suction conditions, the use of a shell and tube type economizer with high pressure liquid cooled to within 10°F of saturated side port temperature, and 10°F liquid subcooling from the condenser.

* Inches of mercury below one standard atmosphere (29.92")

Ratings include use of external oil cooling systems.

MODEL 290GL (Booster Ratings)

SUCTION TEMP. °F AND CORRESPONDING PRESSURE PSIG		INTERMEDIATE TEMP °F. AND CORRESPONDING PRESSURE PSIG			
		0 24.0	10 32.8	20 43.0	30 54.9
-70	TR	51.9	50.4	47.2	44.4
*16.6	BHP	79.2	92.6	108.4	126.6
-65	TR	60.3	56.9	53.3	50.4
*14.4	BHP	81.6	94.7	110.5	128.9
-60	TR	69.3	64.5	60.7	57.6
*12.0	BHP	84.0	96.7	112.4	130.8
-55	TR	78.6	73.6	69.5	66.2
*9.2	BHP	86.6	98.7	114.1	132.4
-50	TR	89.5	84.2	79.9	76.2
*6.2	BHP	89.4	100.8	115.7	133.9
-45	TR	102.1	96.5	91.7	87.7
*2.7	BHP	92.5	103.1	117.4	135.2
-40	TR	116.5	110.4	105.2	100.8
0.5	BHP	96.1	105.7	119.3	136.6
-35	TR	132.8	126.2	120.5	115.5
2.6	BHP	100.3	108.8	121.5	138.2
-30	TR	150.9	143.8	137.5	131.9
4.9	BHP	105.2	112.4	124.1	140.1
-25	TR	171.1	163.3	156.4	150.2
7.4	BHP	110.8	116.7	127.3	142.3
-20	TR	189.2	183.7	177.3	170.3
10.1	BHP	117.4	121.7	131.0	145.1
-15	TR	213.6	207.4	200.2	192.4
13.2	BHP	125.0	127.7	135.6	148.4
-10	TR	240.0	233.0	225.2	216.6
16.5	BHP	133.8	134.6	140.9	152.5

Refrigeration capacity based on saturated suction conditions and refrigerant liquid cooled to a temperature corresponding with intermediate pressure.
* Inches of mercury below one standard atmosphere (29.92”)

Ratings include use of external oil cooling systems.

MODEL 400GL (High Stage/Economized Ratings)

SUCTION TEMP. °F AND CORRESPONDING PRESSURE PSIG		CONDENSING TEMP. °F AND CORRESPONDING PRESSURE PSIG							
		85 155.7		95 181.8		105 210.8		115 242.7	
		H.S.	ECON	H.S.	ECON	H.S.	ECON	H.S.	ECON
-40	TR	109.6	141.8	103.7	139.5	97.2	136.2	90.0	131.9
0.5	BHP	285.9	320.6	312.6	354.7	340.7	391.2	370.5	430.2
-35	TR	125.9	160.5	119.2	157.9	111.9	154.5	103.9	149.9
2.6	BHP	297.3	334.0	326.3	371.3	357.1	411.5	389.7	454.8
-30	TR	144.0	180.8	136.4	178.0	128.3	174.3	119.4	169.5
4.9	BHP	308.4	346.7	339.6	387.1	372.9	430.9	408.3	478.3
-25	TR	164.0	203.0	155.5	199.9	146.4	195.9	136.5	190.8
7.4	BHP	319.1	358.5	352.4	401.9	388.1	449.2	426.2	500.6
-20	TR	185.3	225.9	176.5	223.5	166.4	219.2	155.4	213.8
10.1	BHP	329.3	369.4	364.6	415.7	402.7	466.3	443.4	521.6
-15	TR	209.5	251.7	199.6	248.9	188.3	244.4	176.2	238.6
13.2	BHP	339.0	379.3	376.3	428.3	416.6	482.1	459.9	541.1
-10	TR	235.8	279.0	224.9	276.2	212.3	271.3	199.0	265.1
16.5	BHP	348.2	388.1	387.4	439.7	429.8	496.6	475.6	559.2
-5	TR	262.3	305.8	251.3	304.0	238.5	300.0	223.8	293.5
20.1	BHP	356.9	395.8	397.8	449.7	442.3	509.5	490.5	575.6
0	TR	293.4	337.1	281.3	335.1	266.9	330.6	250.7	323.7
24.0	BHP	364.9	402.3	407.5	458.4	454.0	520.9	504.5	590.2
5	TR	325.7	368.6	312.3	366.5	297.6	363.0	280.0	355.8
28.2	BHP	372.2	407.5	416.5	465.7	464.9	530.7	517.6	603.0
10	TR	361.5	402.9	346.7	400.6	330.8	397.2	311.6	389.7
32.8	BHP	378.9	411.5	424.7	471.5	474.9	538.8	529.7	614.0
15	TR	400.0	439.2	383.8	436.7	366.6	433.3	345.6	425.4
37.7	BHP	384.8	414.1	432.0	475.7	484.0	545.2	540.9	622.9
20	TR	441.9	477.9	424.1	475.2	405.0	471.3	382.2	463.0
43.0	BHP	389.9	415.4	438.5	478.4	492.2	549.7	551.0	629.8
25	TR	486.9	-----	467.3	-----	446.1	-----	421.5	-----
48.8	BHP	394.2	-----	444.1	-----	499.4	-----	560.0	-----
30	TR	535.8	-----	514.5	-----	490.1	-----	463.5	-----
54.9	BHP	397.6	-----	448.7	-----	505.5	-----	567.9	-----
35	TR	587.9	-----	564.5	-----	537.0	-----	508.4	-----
61.5	BHP	400.1	-----	452.3	-----	510.5	-----	574.7	-----
40	TR	644.4	-----	616.8	-----	587.0	-----	556.2	-----
68.5	BHP	401.6	-----	454.9	-----	514.4	-----	580.3	-----

Refrigeration capacity based on saturated suction conditions, the use of a shell and tube type economizer with high pressure liquid cooled to within 10°F of saturated side port temperature, and 10°F liquid subcooling from the condenser.

* Inches of mercury below one standard atmosphere (29.92")

Ratings include use of external oil cooling systems.

MODEL 400GL (Booster Ratings)

SUCTION TEMP. °F AND CORRESPONDING PRESSURE PSIG		INTERMEDIATE TEMP °F. AND CORRESPONDING PRESSURE PSIG			
		0 24.0	10 32.8	20 43.0	30 54.9
-70	TR	65.9	64.1	62.0	59.4
*16.6	BHP	91.5	111.3	132.8	156.1
-65	TR	76.6	74.2	70.8	67.2
*14.4	BHP	93.8	113.5	135.1	158.9
-60	TR	88.4	84.6	80.4	76.7
*12.0	BHP	96.3	115.5	137.1	161.1
-55	TR	101.2	96.3	91.9	87.9
*9.2	BHP	99.0	117.6	138.8	162.9
-50	TR	115.4	110.2	105.4	101.1
*6.2	BHP	102.1	119.8	140.6	164.4
-45	TR	131.8	126.2	121.0	116.2
*2.7	BHP	105.8	122.5	142.5	165.9
-40	TR	150.6	144.5	138.8	133.4
0.5	BHP	110.4	125.7	144.7	167.5
-35	TR	171.0	165.1	158.8	152.8
2.6	BHP	115.8	129.6	147.4	169.4
-30	TR	193.2	187.4	181.2	174.5
4.9	BHP	122.4	134.5	150.9	171.7
-25	TR	217.6	211.2	204.7	198.1
7.4	BHP	130.4	140.4	155.2	174.7
-20	TR	240.5	233.5	226.4	219.1
10.1	BHP	139.8	147.7	160.5	178.5
-15	TR	271.6	263.6	255.6	247.5
13.2	BHP	150.9	156.3	167.1	183.4
-10	TR	305.1	296.3	287.3	278.2
16.5	BHP	163.8	166.6	175.1	189.3

Refrigeration capacity based on saturated suction conditions and refrigerant liquid cooled to a temperature corresponding with intermediate pressure.
* Inches of mercury below one standard atmosphere (29.92”)

Ratings include use of external oil cooling systems.

MODEL 475GL (High Stage/Economized Ratings)

SUCTION TEMP. °F AND CORRESPONDING PRESSURE PSIG		CONDENSING TEMP. °F AND CORRESPONDING PRESSURE PSIG							
		85 155.7		95 181.8		105 210.8		115 242.7	
		H.S.	ECON	H.S.	ECON	H.S.	ECON	H.S.	ECON
-40	TR	129.7	167.8	122.7	165	115	161.2	106.5	156.1
0.5	BHP	338.2	379.3	369.8	419.6	403.1	462.7	438.3	508.9
-35	TR	148.9	189.8	141	186.8	132.4	182.7	123	177.3
2.6	BHP	351.7	395.2	386	439.3	422.4	486.8	461	538
-30	TR	170.3	213.9	161.4	210.6	151.7	206.2	141.2	200.5
4.9	BHP	364.9	410.1	401.7	457.9	441.1	509.7	483	565.8
-25	TR	194	240.1	184	236.5	173.2	231.8	161.5	225.7
7.4	BHP	377.5	424.1	416.9	475.5	459.1	531.4	504.2	592.2
-20	TR	219.1	267.2	208.8	264.4	196.8	259.4	183.9	252.9
10.1	BHP	389.6	437	431.4	491.7	476.3	551.6	524.6	617
-15	TR	247.8	297.7	236.2	294.5	222.8	289.1	208.5	282.2
13.2	BHP	401.1	448.7	445.2	506.6	492.8	570.4	544.1	640.2
-10	TR	278.9	330.1	266	326.7	251.2	320.9	235.4	313.7
16.5	BHP	412	459.1	458.3	520.1	508.5	587.4	562.7	661.5
-5	TR	310.2	361.8	297.3	359.7	282.1	354.9	264.7	347.2
20.1	BHP	422.2	468.2	470.6	532	523.3	602.8	580.2	680.9
0	TR	347.1	398.7	332.7	396.4	315.7	391.1	296.6	383
24.0	BHP	431.6	475.9	482.1	542.3	537.1	616.3	596.8	698.2
5	TR	385.3	436	369.4	433.5	352.1	429.4	331.2	420.9
28.2	BHP	440.3	482.1	492.7	550.9	550	627.9	612.3	713.4
10	TR	427.6	476.6	410.1	473.9	391.4	469.9	368.6	461
32.8	BHP	448.2	486.7	502.4	557.7	561.8	637.4	626.7	726.3
15	TR	473.2	519.6	454	516.6	433.7	512.6	408.9	503.3
37.7	BHP	455.2	489.9	511.1	562.8	572.6	644.9	639.9	736.9
20	TR	522.8	565.3	501.6	562.1	479.1	557.5	452.2	547.8
43.0	BHP	461.2	491.4	518.8	565.9	582.3	650.3	651.8	745.1
25	TR	575.9	613.4	552.8	610	527.8	604.6	498.6	594.5
48.8	BHP	466.3	491.4	525.4	567.3	590.7	653.6	662.5	750.8
30	TR	633.9	664.7	608.6	661.1	579.8	653.7	548.3	643.3
54.9	BHP	470.3	489.9	530.8	566.8	598	654.6	671.9	754.1
35	TR	695.4	718.2	667.8	714	635.3	704.8	601.4	694
61.5	BHP	473.3	487.1	535.1	564.5	603.9	653.6	679.9	754.9
40	TR	762.2	775.1	729.6	768	694.4	758.2	658	747.1
68.5	BHP	475.1	483	538.2	560.5	608.6	650.4	686.4	753.2

Refrigeration capacity based on saturated suction conditions, the use of a shell and tube type economizer with high pressure liquid cooled to within 10°F of saturated side port temperature, and 10°F liquid subcooling from the condenser.

* Inches of mercury below one standard atmosphere (29.92")

Ratings include use of external oil cooling systems.

MODEL 475GL (Booster Ratings)

SUCTION TEMP. °F AND CORRESPONDING PRESSURE PSIG		INTERMEDIATE TEMP °F. AND CORRESPONDING PRESSURE PSIG			
		0	10	20	30
		24.0	32.8	43.0	54.9
-70	TR	77.9	75.8	73.3	70.3
*16.6	BHP	108.2	131.7	157.1	184.7
-65	TR	90.6	87.8	83.7	79.5
*14.4	BHP	111	134.2	159.9	188
-60	TR	104.6	100	95.1	90.7
*12.0	BHP	113.9	136.6	162.2	190.6
-55	TR	119.7	113.9	108.7	104
*9.2	BHP	117.1	139.1	164.2	192.7
-50	TR	136.5	130.3	124.7	119.6
*6.2	BHP	120.8	141.7	166.3	194.5
-45	TR	155.9	149.3	143.2	137.5
*2.7	BHP	125.2	144.9	168.5	196.3
-40	TR	178.1	170.9	164.2	157.8
0.5	BHP	130.5	148.7	171.2	198.2
-35	TR	202.2	195.3	187.9	180.8
2.6	BHP	137	153.3	174.4	200.4
-30	TR	228.5	221.7	214.4	206.5
4.9	BHP	144.9	159.1	178.5	203.2
-25	TR	257.4	249.9	242.2	234.4
7.4	BHP	154.2	166.1	183.6	206.7
-20	TR	284.5	276.2	267.8	259.2
10.1	BHP	165.4	174.7	189.9	211.2
-15	TR	321.2	311.9	302.4	292.8
13.2	BHP	178.5	184.9	197.7	216.9
-10	TR	360.9	350.5	339.9	329.1
16.5	BHP	193.8	197.1	207.1	224

Refrigeration capacity based on saturated suction conditions and refrigerant liquid cooled to a temperature corresponding with intermediate pressure.
* Inches of mercury below one standard atmosphere (29.92”)

Ratings include use of external oil cooling systems.

MODEL 565GL (High Stage/Economized Ratings)

SUCTION TEMP. °F AND CORRESPONDING PRESSURE PSIG		CONDENSING TEMP. °F AND CORRESPONDING PRESSURE PSIG							
		85 155.7		95 181.8		105 210.8		115 242.7	
		H.S.	ECON	H.S.	ECON	H.S.	ECON	H.S.	ECON
-40	TR	153.5	198.6	145.2	195.2	136.1	190.7	126.1	184.7
0.5	BHP	400.2	448.9	437.6	496.6	477.0	547.6	518.7	602.3
-35	TR	176.2	224.6	166.9	221.0	156.7	216.2	145.5	209.8
2.6	BHP	416.3	467.7	456.8	519.8	499.9	576.1	545.6	636.7
-30	TR	201.6	253.2	191.0	249.2	179.6	244.1	167.2	237.3
4.9	BHP	431.8	485.4	475.4	541.9	522.0	603.2	571.6	669.6
-25	TR	229.6	284.1	217.7	279.8	204.9	274.3	191.1	267.1
7.4	BHP	446.7	501.9	493.3	562.7	543.3	628.8	596.7	700.8
-20	TR	259.4	316.2	247.2	312.9	232.9	306.9	217.6	299.3
10.1	BHP	461.0	517.2	510.5	581.9	563.7	652.8	620.8	730.2
-15	TR	293.3	352.3	279.5	348.5	263.6	342.1	246.7	334.0
13.2	BHP	474.7	531.0	526.9	599.6	583.2	675.0	643.9	757.6
-10	TR	330.1	390.6	314.8	386.7	297.2	379.8	278.5	371.2
16.5	BHP	487.5	543.4	542.4	615.5	601.8	695.2	665.9	782.9
-5	TR	367.2	428.1	351.8	425.7	333.8	420.0	313.3	410.9
20.1	BHP	499.6	554.1	556.9	629.6	619.3	713.4	686.7	805.8
0	TR	410.8	471.9	393.8	469.2	373.6	462.8	351.0	453.2
24.0	BHP	510.8	563.2	570.5	641.8	635.7	729.3	706.3	826.3
5	TR	456.0	516.0	437.2	513.1	416.7	508.2	392.0	498.1
28.2	BHP	521.1	570.5	583.1	652.0	650.9	743.0	724.6	844.3
10	TR	506.1	564.1	485.4	560.9	463.2	556.1	436.2	545.5
32.8	BHP	530.4	576.0	594.5	660.0	664.9	754.3	741.6	859.6
15	TR	560.0	614.9	537.3	611.4	513.2	606.7	483.9	595.6
37.7	BHP	538.7	579.7	604.8	666.0	677.7	763.2	757.2	872.1
20	TR	618.7	669.1	593.7	665.3	567.0	659.8	535.1	648.2
43.0	BHP	545.8	581.6	613.9	669.7	689.1	769.6	771.4	881.8
25	TR	681.6	-----	654.2	-----	624.6	-----	590.1	-----
48.8	BHP	551.8	-----	621.7	-----	699.1	-----	784.0	-----
30	TR	750.2	-----	720.2	-----	686.2	-----	648.9	-----
54.9	BHP	556.6	-----	628.2	-----	707.7	-----	795.1	-----
35	TR	823.0	-----	790.3	-----	751.8	-----	711.7	-----
61.5	BHP	560.1	-----	633.3	-----	714.7	-----	804.6	-----
40	TR	902.1	-----	863.5	-----	821.8	-----	778.7	-----
68.5	BHP	562.3	-----	636.9	-----	720.2	-----	812.4	-----

Refrigeration capacity based on saturated suction conditions, the use of a shell and tube type economizer with high pressure liquid cooled to within 10°F of saturated side port temperature, and 10°F liquid subcooling from the condenser.

* Inches of mercury below one standard atmosphere (29.92")

Ratings include use of external oil cooling systems.

MODEL 565GL (Booster Ratings)

SUCTION TEMP. °F AND CORRESPONDING PRESSURE PSIG		INTERMEDIATE TEMP °F. AND CORRESPONDING PRESSURE PSIG			
		0 24.0	10 32.8	20 43.0	30 54.9
-70	TR	92.2	89.7	86.8	83.2
*16.6	BHP	128.0	155.8	185.9	218.6
-65	TR	107.2	103.9	99.1	94.1
*14.4	BHP	131.4	158.8	189.2	222.5
-60	TR	123.8	118.4	112.6	107.3
*12.0	BHP	134.8	161.7	191.9	225.6
-55	TR	141.7	134.8	128.7	123.1
*9.2	BHP	138.6	164.6	194.4	228.1
-50	TR	161.5	154.2	147.6	141.5
*6.2	BHP	142.9	167.7	196.8	230.2
-45	TR	184.5	176.6	169.4	162.7
*2.7	BHP	148.2	171.5	199.4	232.3
-40	TR	210.8	202.2	194.3	186.8
0.5	BHP	154.5	175.9	202.6	234.5
-35	TR	239.4	231.1	222.3	214.0
2.6	BHP	162.2	181.5	206.4	237.1
-30	TR	270.4	262.4	253.7	244.3
4.9	BHP	171.4	188.3	211.2	240.4
-25	TR	304.7	295.7	286.6	277.4
7.4	BHP	182.5	196.6	217.3	244.6
-20	TR	336.8	326.9	316.9	306.8
10.1	BHP	195.7	206.7	224.8	250.0
-15	TR	380.2	369.1	357.9	346.5
13.2	BHP	211.3	218.9	234.0	256.7
-10	TR	427.1	414.8	402.2	389.5
16.5	BHP	229.4	233.3	245.1	265.1

Refrigeration capacity based on saturated suction conditions and refrigerant liquid cooled to a temperature corresponding with intermediate pressure.
* Inches of mercury below one standard atmosphere (29.92”)

Ratings include use of external oil cooling systems.

MODEL 675GL (High Stage/Economized Ratings)

SUCTION TEMP. °F AND CORRESPONDING PRESSURE PSIG		CONDENSING TEMP. °F AND CORRESPONDING PRESSURE PSIG							
		85 155.7		95 181.8		105 210.8		115 242.7	
		H.S.	ECON	H.S.	ECON	H.S.	ECON	H.S.	ECON
-40	TR	183.8	237.7	173.8	233.7	162.9	228.4	150.9	221.1
0.5	BHP	479.1	537.4	523.9	594.4	571.1	655.6	620.9	721.0
-35	TR	211.0	268.9	199.7	264.6	187.6	258.9	174.2	251.2
2.6	BHP	498.3	559.9	546.9	622.3	598.4	689.7	653.1	762.2
-30	TR	241.3	303.1	228.6	298.3	215.0	292.2	200.1	284.1
4.9	BHP	516.9	581.1	569.2	648.8	624.9	722.1	684.3	801.6
-25	TR	274.9	340.1	260.6	335.0	245.3	328.4	228.8	319.8
7.4	BHP	534.8	600.9	590.6	673.6	650.4	752.8	714.3	838.9
-20	TR	310.4	378.5	295.9	374.6	278.8	367.5	260.5	358.3
10.1	BHP	551.9	619.1	611.2	696.7	674.9	781.5	743.2	874.1
-15	TR	351.0	421.7	334.6	417.2	315.6	409.5	295.3	399.8
13.2	BHP	568.2	635.7	630.7	717.8	698.2	808.0	770.8	907.0
-10	TR	395.0	467.5	376.9	462.9	355.8	454.7	333.5	444.4
16.5	BHP	583.6	650.5	649.3	736.9	720.4	832.2	797.1	937.2
-5	TR	439.5	512.4	421.1	509.5	399.7	502.8	375.0	491.9
20.1	BHP	598.1	663.4	666.7	753.7	741.3	854.0	822.1	964.7
0	TR	491.7	564.8	471.3	561.5	447.3	554.1	420.2	542.6
24.0	BHP	611.5	674.2	683.0	768.3	761.0	873.1	845.5	989.2
5	TR	545.8	617.6	523.3	614.1	498.8	608.3	469.2	596.3
28.2	BHP	623.8	683.0	698.0	780.5	779.2	889.5	867.5	1010.7
10	TR	605.7	675.1	580.9	671.3	554.5	665.8	522.2	653.1
32.8	BHP	635.0	689.6	711.8	790.2	796.0	903.1	887.8	1029.0
15	TR	670.3	736.0	643.0	731.8	614.4	726.2	579.3	713.0
37.7	BHP	644.8	694.0	724.1	797.3	811.2	913.7	906.5	1044.0
20	TR	740.5	800.8	710.6	796.2	678.8	789.8	640.6	776.0
43.0	BHP	653.4	696.2	734.9	801.8	824.9	921.3	923.5	1055.6
25	TR	815.8	-----	783.0	-----	747.7	-----	706.4	-----
48.8	BHP	660.6	-----	744.3	-----	836.9	-----	938.6	-----
30	TR	897.9	-----	862.0	-----	821.4	-----	776.9	-----
54.9	BHP	666.3	-----	752.0	-----	847.2	-----	951.9	-----
35	TR	985.0	-----	945.9	-----	900.1	-----	852.0	-----
61.5	BHP	670.5	-----	758.1	-----	855.6	-----	963.2	-----
40	TR	1079.7	-----	1033.7	-----	983.8	-----	932.2	-----
68.5	BHP	673.2	-----	762.5	-----	862.2	-----	972.5	-----

Refrigeration capacity based on saturated suction conditions, the use of a shell and tube type economizer with high pressure liquid cooled to within 10°F of saturated side port temperature, and 10°F liquid subcooling from the condenser.

* Inches of mercury below one standard atmosphere (29.92")

Ratings include use of external oil cooling systems.

MODEL 675GL (Booster Ratings)

SUCTION TEMP. °F AND CORRESPONDING PRESSURE PSIG		INTERMEDIATE TEMP °F. AND CORRESPONDING PRESSURE PSIG			
		0 24.0	10 32.8	20 43.0	30 54.9
-70	TR	110.3	107.4	103.9	99.6
*16.6	BHP	153.3	186.5	222.6	261.7
-65	TR	128.4	124.4	118.6	112.6
*14.4	BHP	157.3	190.2	226.5	266.3
-60	TR	148.1	141.7	134.7	128.5
*12.0	BHP	161.3	193.6	229.7	270.0
-55	TR	169.6	161.4	154.1	147.3
*9.2	BHP	165.9	197.0	232.7	273.0
-50	TR	193.4	184.6	176.7	169.4
*6.2	BHP	171.1	200.8	235.6	275.6
-45	TR	220.9	211.5	202.8	194.8
*2.7	BHP	177.4	205.3	238.8	278.1
-40	TR	252.3	242.1	232.6	223.6
0.5	BHP	184.9	210.6	242.5	280.7
-35	TR	286.5	276.7	266.2	256.2
2.6	BHP	194.1	217.3	247.1	283.9
-30	TR	323.6	314.1	303.7	292.5
4.9	BHP	205.2	225.4	252.9	287.8
-25	TR	364.7	353.9	343.0	332.0
7.4	BHP	218.5	235.4	260.1	292.8
-20	TR	403.1	391.3	379.3	367.1
10.1	BHP	234.3	247.5	269.1	299.2
-15	TR	455.0	441.8	428.3	414.7
13.2	BHP	252.9	262.0	280.1	307.3
-10	TR	511.2	496.4	481.4	466.2
16.5	BHP	274.6	279.3	293.4	317.3

Refrigeration capacity based on saturated suction conditions and refrigerant liquid cooled to a temperature corresponding with intermediate pressure.
* Inches of mercury below one standard atmosphere (29.92”)

Ratings include use of external oil cooling systems.

MODEL 800GL (High Stage/Economized Ratings)

SUCTION TEMP. °F AND CORRESPONDING PRESSURE PSIG		CONDENSING TEMP. °F AND CORRESPONDING PRESSURE PSIG							
		85 155.7		95 181.8		105 210.8		115 242.7	
		H.S.	ECON	H.S.	ECON	H.S.	ECON	H.S.	ECON
-40	TR	217.3	281.1	205.5	276.4	192.7	270.0	178.5	261.4
0.5	BHP	566.6	635.5	619.5	703.0	675.4	775.3	734.3	852.7
-35	TR	249.5	318.0	236.2	312.9	221.8	306.1	206.0	297.1
2.6	BHP	589.3	662.1	646.7	736.0	707.7	815.6	772.4	901.3
-30	TR	285.4	358.4	270.4	352.8	254.2	345.5	236.6	335.9
4.9	BHP	611.3	687.2	673.1	767.2	739.0	854.0	809.2	947.9
-25	TR	325.1	402.3	308.2	396.2	290.1	388.3	270.6	378.1
7.4	BHP	632.4	710.6	698.4	796.6	769.1	890.3	844.7	992.1
-20	TR	367.1	447.6	349.9	443.0	329.7	434.5	308.1	423.7
10.1	BHP	652.7	732.2	722.7	823.8	798.1	924.2	878.9	1033.8
-15	TR	415.1	498.7	395.7	493.4	373.2	484.3	349.3	472.8
13.2	BHP	672.0	751.8	745.9	848.8	825.7	955.6	911.6	1072.5
-10	TR	467.2	552.9	445.7	547.4	420.8	537.7	394.3	525.5
16.5	BHP	690.2	769.3	767.8	871.4	851.9	984.2	942.7	1108.3
-5	TR	519.7	606.0	498.0	602.5	472.6	594.6	443.5	581.8
20.1	BHP	707.3	784.5	788.5	891.4	876.7	1009.9	972.1	1140.8
0	TR	581.5	668.0	557.4	664.1	528.9	655.2	497.0	641.7
24.0	BHP	723.2	797.3	807.7	908.6	899.9	1032.5	999.9	1169.8
5	TR	645.5	730.4	618.9	726.3	589.9	719.4	554.9	705.1
28.2	BHP	737.7	807.7	825.5	923.0	921.5	1051.9	1025.9	1195.2
10	TR	716.3	798.5	687.0	793.9	655.7	787.3	617.5	772.3
32.8	BHP	750.9	815.5	841.7	934.4	941.3	1067.9	1049.9	1216.9
15	TR	792.7	870.4	760.5	865.5	726.6	858.8	685.0	843.2
37.7	BHP	762.6	820.7	856.3	942.8	959.4	1080.5	1072.0	1234.6
20	TR	875.8	947.1	840.4	941.7	802.7	934.0	757.6	917.7
43.0	BHP	772.7	823.3	869.1	948.2	975.5	1089.5	1092.1	1248.3
25	TR	964.8	-----	926.1	-----	884.2	-----	835.4	-----
48.8	BHP	781.2	-----	880.2	-----	989.7	-----	1110.0	-----
30	TR	1061.9	-----	1019.5	-----	971.4	-----	918.7	-----
54.9	BHP	788.0	-----	889.4	-----	1001.8	-----	1125.7	-----
35	TR	1165.0	-----	1118.7	-----	1064.4	-----	1007.6	-----
61.5	BHP	793.0	-----	896.5	-----	1011.8	-----	1139.1	-----
40	TR	1276.9	-----	1222.4	-----	1163.4	-----	1102.4	-----
68.5	BHP	796.1	-----	901.7	-----	1019.6	-----	1150.1	-----

Refrigeration capacity based on saturated suction conditions, the use of a shell and tube type economizer with high pressure liquid cooled to within 10°F of saturated side port temperature, and 10°F liquid subcooling from the condenser.

* Inches of mercury below one standard atmosphere (29.92")

Ratings include use of external oil cooling systems.

MODEL 800GL (Booster Ratings)

SUCTION TEMP. °F AND CORRESPONDING PRESSURE PSIG		INTERMEDIATE TEMP °F. AND CORRESPONDING PRESSURE PSIG			
		0 24.0	10 32.8	20 43.0	30 54.9
-70	TR	130.5	127.0	122.8	117.8
*16.6	BHP	181.3	220.6	263.2	309.4
-65	TR	151.8	147.1	140.3	133.2
*14.4	BHP	186.0	224.9	267.8	315.0
-60	TR	175.2	167.6	159.3	151.9
*12.0	BHP	190.8	228.9	271.7	319.3
-55	TR	200.6	190.9	182.2	174.2
*9.2	BHP	196.2	233.0	275.2	322.9
-50	TR	228.7	218.3	209.0	200.3
*6.2	BHP	202.4	237.5	278.6	325.9
-45	TR	261.2	250.1	239.9	230.3
*2.7	BHP	209.8	242.7	282.4	328.8
-40	TR	298.4	286.3	275.1	264.5
0.5	BHP	218.7	249.1	286.8	332.0
-35	TR	338.8	327.2	314.8	302.9
2.6	BHP	229.6	256.9	292.2	335.7
-30	TR	382.8	371.4	359.2	345.9
4.9	BHP	242.7	266.6	299.1	340.4
-25	TR	431.3	418.6	405.7	392.6
7.4	BHP	258.4	278.4	307.6	346.3
-20	TR	476.7	462.7	448.6	434.2
10.1	BHP	277.1	292.7	318.2	353.9
-15	TR	538.1	522.5	506.6	490.5
13.2	BHP	299.1	309.8	331.2	363.4
-10	TR	604.6	587.1	569.4	551.4
16.5	BHP	324.7	330.2	347.0	375.3

Refrigeration capacity based on saturated suction conditions and refrigerant liquid cooled to a temperature corresponding with intermediate pressure.
* Inches of mercury below one standard atmosphere (29.92”)

Ratings include use of external oil cooling systems.

MODEL 1025GL (High Stage/Economized Ratings)

SUCTION TEMP. °F AND CORRESPONDING PRESSURE PSIG		CONDENSING TEMP. °F AND CORRESPONDING PRESSURE PSIG							
		85 155.7		95 181.8		105 210.8		115 242.7	
		H.S.	ECON	H.S.	ECON	H.S.	ECON	H.S.	ECON
-40	TR	277.4	358.8	262.4	352.8	245.9	344.7	227.8	333.7
0.5	BHP	723.3	811.2	790.8	897.3	862.1	989.6	937.4	1088.4
-35	TR	318.5	406.0	301.5	399.4	283.1	390.8	263.0	379.2
2.6	BHP	752.2	845.1	825.5	939.4	903.4	1041.1	985.9	1150.5
-30	TR	364.3	457.5	345.1	450.4	324.5	441.1	302.1	428.8
4.9	BHP	780.3	877.2	859.2	979.3	943.3	1090.1	1033.0	1210.0
-25	TR	414.9	513.5	393.4	505.7	370.4	495.7	345.4	482.7
7.4	BHP	807.3	907.1	891.5	1016.8	981.8	1136.4	1078.3	1266.4
-20	TR	468.8	571.6	446.6	565.5	420.9	554.7	393.3	540.9
10.1	BHP	833.1	934.6	922.6	1051.6	1018.7	1179.7	1121.9	1319.6
-15	TR	530.1	636.8	505.0	629.8	476.4	618.2	445.8	603.6
13.2	BHP	857.8	959.6	952.1	1083.5	1054.0	1219.8	1163.6	1369.1
-10	TR	596.6	706.1	568.9	698.8	537.1	686.3	503.4	670.8
16.5	BHP	881.0	982.0	980.1	1112.3	1087.5	1256.3	1203.3	1414.7
-5	TR	663.7	773.9	636.0	769.4	603.3	759.0	566.1	742.6
20.1	BHP	902.9	1001.4	1006.5	1137.8	1119.1	1289.1	1240.9	1456.2
0	TR	742.5	852.9	711.7	848.0	675.2	836.4	634.4	819.1
24.0	BHP	923.1	1017.8	1031.0	1159.8	1148.7	1318.0	1276.4	1493.3
5	TR	824.2	932.7	790.3	927.4	753.0	918.3	708.3	900.1
28.2	BHP	941.7	1031.0	1053.7	1178.2	1176.2	1342.7	1309.5	1525.7
10	TR	914.7	1019.6	877.3	1013.8	837.0	1005.0	788.3	985.9
32.8	BHP	958.5	1041.0	1074.4	1192.8	1201.6	1363.2	1340.2	1553.3
15	TR	1012.3	1111.4	971.1	1105.1	927.5	1096.3	874.4	1076.3
37.7	BHP	973.4	1047.6	1093.0	1203.5	1224.6	1379.2	1368.4	1576.0
20	TR	1118.3	1209.3	1073.1	1202.5	1024.6	1192.3	967.0	1171.4
43.0	BHP	986.4	1051.0	1109.4	1210.3	1245.2	1390.8	1394.0	1593.5
25	TR	1232.0	-----	1182.5	-----	1128.7	-----	1066.4	-----
48.8	BHP	997.2	-----	1123.5	-----	1263.4	-----	1416.9	-----
30	TR	1355.9	-----	1301.8	-----	1240.0	-----	1172.7	-----
54.9	BHP	1005.9	-----	1135.2	-----	1278.8	-----	1436.9	-----
35	TR	1487.6	-----	1428.5	-----	1358.7	-----	1286.2	-----
61.5	BHP	1012.2	-----	1144.4	-----	1291.6	-----	1454.0	-----
40	TR	1630.5	-----	1560.4	-----	1485.1	-----	1407.2	-----
68.5	BHP	1016.2	-----	1151.0	-----	1301.5	-----	1468.0	-----

Refrigeration capacity based on saturated suction conditions, the use of a shell and tube type economizer with high pressure liquid cooled to within 10°F of saturated side port temperature, and 10°F liquid subcooling from the condenser.

* Inches of mercury below one standard atmosphere (29.92")

Ratings include use of external oil cooling systems.

MODEL 1025GL (Booster Ratings)

SUCTION TEMP. °F AND CORRESPONDING PRESSURE PSIG		INTERMEDIATE TEMP °F. AND CORRESPONDING PRESSURE PSIG			
		0 24.0	10 32.8	20 43.0	30 54.9
-70	TR	166.7	162.1	156.9	150.4
*16.6	BHP	231.4	281.6	336.0	395.0
-65	TR	193.9	187.8	179.0	170.0
*14.4	BHP	237.4	287.1	341.9	402.1
-60	TR	223.7	213.9	203.4	193.9
*12.0	BHP	243.6	292.2	346.8	407.6
-55	TR	256.1	243.7	232.6	222.4
*9.2	BHP	250.4	297.4	351.2	412.1
-50	TR	291.9	278.7	266.7	255.7
*6.2	BHP	258.3	303.1	355.6	416.0
-45	TR	333.4	319.2	306.2	294.0
*2.7	BHP	267.8	309.8	360.4	419.8
-40	TR	380.9	365.5	351.1	337.6
0.5	BHP	279.2	318.0	366.1	423.8
-35	TR	432.6	417.7	401.8	386.7
2.6	BHP	293.1	328.0	373.0	428.5
-30	TR	488.8	474.3	458.5	441.5
4.9	BHP	309.8	340.3	381.7	434.5
-25	TR	550.7	534.5	518.0	501.4
7.4	BHP	329.9	355.3	392.6	442.1
-20	TR	608.7	590.9	572.8	554.5
10.1	BHP	353.7	373.6	406.2	451.7
-15	TR	687.2	667.1	646.9	626.3
13.2	BHP	381.8	395.5	422.8	463.9
-10	TR	772.1	749.7	727.0	704.0
16.5	BHP	414.5	421.5	443.0	479.1

Refrigeration capacity based on saturated suction conditions and refrigerant liquid cooled to a temperature corresponding with intermediate pressure.
* Inches of mercury below one standard atmosphere (29.92”)

Ratings include use of external oil cooling systems.

MODEL 1210GL (High Stage/Economized Ratings)

SUCTION TEMP. °F AND CORRESPONDING PRESSURE PSIG		CONDENSING TEMP. °F AND CORRESPONDING PRESSURE PSIG							
		85 155.7		95 181.8		105 210.8		115 242.7	
		H.S.	ECON	H.S.	ECON	H.S.	ECON	H.S.	ECON
-40	TR	327.6	423.8	309.9	416.7	290.5	407.1	269.1	394.1
0.5	BHP	854.2	958.0	933.9	1059.8	1018.1	1168.8	1107.0	1285.5
-35	TR	376.2	479.4	356.1	471.8	334.4	461.5	310.6	447.8
2.6	BHP	888.4	998.1	975.0	1109.5	1066.9	1229.6	1164.4	1358.8
-30	TR	430.2	540.3	407.6	531.9	383.3	520.9	356.8	506.4
4.9	BHP	921.5	1035.9	1014.7	1156.6	1114.1	1287.5	1219.9	1429.0
-25	TR	490.0	606.4	464.6	597.2	437.4	585.4	408.0	570.1
7.4	BHP	953.4	1071.3	1052.9	1200.9	1159.5	1342.1	1273.5	1495.7
-20	TR	553.5	674.9	527.5	667.8	497.1	655.1	464.4	638.8
10.1	BHP	984.0	1103.8	1089.6	1242.0	1203.2	1393.3	1325.0	1558.4
-15	TR	625.9	751.9	596.5	743.9	562.7	730.1	526.5	712.8
13.2	BHP	1013.0	1133.4	1124.5	1279.7	1244.8	1440.6	1374.2	1616.9
-10	TR	704.4	833.7	671.9	825.3	634.4	810.6	594.5	792.2
16.5	BHP	1040.5	1159.7	1157.6	1313.7	1284.3	1483.7	1421.1	1670.8
-5	TR	783.6	913.7	750.9	908.4	712.5	896.4	668.6	877.1
20.1	BHP	1066.3	1182.7	1188.7	1343.8	1321.7	1522.5	1465.6	1719.8
0	TR	876.7	1007.1	840.3	1001.3	797.4	987.8	749.2	967.3
24.0	BHP	1090.2	1202.0	1217.7	1369.8	1356.7	1556.6	1507.4	1763.6
5	TR	973.2	1101.3	933.1	1095.0	889.3	1084.6	836.5	1063.1
28.2	BHP	1112.2	1217.6	1244.5	1391.5	1389.2	1585.8	1546.5	1801.9
10	TR	1080.0	1203.9	1035.8	1197.0	988.5	1186.9	931.0	1164.3
32.8	BHP	1132.0	1229.4	1268.9	1408.7	1419.1	1610.0	1582.8	1834.5
15	TR	1195.2	1312.3	1146.6	1304.9	1095.4	1294.8	1032.7	1271.2
37.7	BHP	1149.6	1237.3	1290.9	1421.4	1446.3	1628.9	1616.1	1861.3
20	TR	1320.4	1427.9	1267.0	1419.8	1210.1	1408.1	1142.1	1383.5
43.0	BHP	1164.9	1241.2	1310.3	1429.4	1470.7	1642.5	1646.4	1881.9
25	TR	1454.7	-----	1396.3	-----	1333.0	-----	1259.4	-----
48.8	BHP	1177.7	-----	1326.9	-----	1492.1	-----	1673.4	-----
30	TR	1601.0	-----	1537.1	-----	1464.5	-----	1385.0	-----
54.9	BHP	1188.0	-----	1340.8	-----	1510.4	-----	1697.0	-----
35	TR	1756.4	-----	1686.7	-----	1604.7	-----	1519.0	-----
61.5	BHP	1195.5	-----	1351.6	-----	1525.4	-----	1717.2	-----
40	TR	1925.2	-----	1842.9	-----	1753.9	-----	1661.9	-----
68.5	BHP	1200.1	-----	1359.4	-----	1537.2	-----	1733.8	-----

Refrigeration capacity based on saturated suction conditions, the use of a shell and tube type economizer with high pressure liquid cooled to within 10°F of saturated side port temperature, and 10°F liquid subcooling from the condenser.

* Inches of mercury below one standard atmosphere (29.92")

Ratings include use of external oil cooling systems.

MODEL 1210GL (Booster Ratings)

SUCTION TEMP. °F AND CORRESPONDING PRESSURE PSIG		INTERMEDIATE TEMP °F. AND CORRESPONDING PRESSURE PSIG			
		0 24.0	10 32.8	20 43.0	30 54.9
-70	TR	196.8	191.4	185.2	177.6
*16.6	BHP	273.3	332.5	396.8	466.5
-65	TR	228.9	221.8	211.5	200.8
*14.4	BHP	280.4	339.0	403.8	474.8
-60	TR	264.1	252.6	240.2	229.0
*12.0	BHP	287.7	345.1	409.6	481.4
-55	TR	302.4	287.8	274.7	262.7
*9.2	BHP	295.7	351.2	414.8	486.7
-50	TR	344.7	329.2	315.0	302.0
*6.2	BHP	305.1	358.0	420.0	491.3
-45	TR	393.8	377.0	361.6	347.2
*2.7	BHP	316.2	365.9	425.7	495.7
-40	TR	449.9	431.6	414.7	398.7
0.5	BHP	329.7	375.5	432.4	500.5
-35	TR	510.8	493.3	474.5	456.7
2.6	BHP	346.1	387.3	440.6	506.1
-30	TR	577.1	560.0	541.5	521.5
4.9	BHP	365.9	401.8	450.8	513.1
-25	TR	650.2	631.1	611.7	592.0
7.4	BHP	389.6	419.6	463.7	522.1
-20	TR	718.7	697.7	676.3	654.7
10.1	BHP	417.7	441.2	479.7	533.5
-15	TR	811.3	787.7	763.8	739.5
13.2	BHP	450.9	467.1	499.3	547.9
-10	TR	911.6	885.2	858.4	831.3
16.5	BHP	489.5	497.9	523.2	565.8

Refrigeration capacity based on saturated suction conditions and refrigerant liquid cooled to a temperature corresponding with intermediate pressure.
* Inches of mercury below one standard atmosphere (29.92”)

Ratings include use of external oil cooling systems.

MODEL 1435GL (High Stage/Economized Ratings)

SUCTION TEMP. °F AND CORRESPONDING PRESSURE PSIG		CONDENSING TEMP. °F AND CORRESPONDING PRESSURE PSIG							
		85 155.7		95 181.8		105 210.8		115 242.7	
		H.S.	ECON	H.S.	ECON	H.S.	ECON	H.S.	ECON
-40	TR	387.8	501.7	366.8	493.3	343.8	481.9	318.5	466.6
0.5	BHP	1011.2	1134.1	1105.5	1254.5	1205.2	1383.5	1310.4	1521.7
-35	TR	445.3	567.5	421.5	558.4	395.8	546.3	367.6	530.1
2.6	BHP	1051.7	1181.5	1154.1	1313.4	1262.9	1455.5	1378.4	1608.5
-30	TR	509.2	639.6	482.5	629.6	453.7	616.6	422.3	599.5
4.9	BHP	1090.8	1226.3	1201.1	1369.2	1318.8	1524.0	1444.1	1691.6
-25	TR	580.1	717.8	550.0	707.0	517.8	693.0	482.9	674.8
7.4	BHP	1128.6	1268.1	1246.4	1421.5	1372.6	1588.7	1507.5	1770.5
-20	TR	655.2	798.8	624.4	790.6	588.4	775.5	549.8	756.2
10.1	BHP	1164.8	1306.6	1289.8	1470.2	1424.2	1649.3	1568.4	1844.8
-15	TR	740.9	890.0	706.1	880.5	666.0	864.3	623.3	843.8
13.2	BHP	1199.2	1341.6	1331.1	1514.8	1473.5	1705.3	1626.7	1914.0
-10	TR	833.8	986.8	795.3	976.9	750.9	959.5	703.7	937.8
16.5	BHP	1231.7	1372.8	1370.3	1555.1	1520.3	1756.4	1682.2	1977.8
-5	TR	927.5	1081.5	888.8	1075.3	843.4	1061.1	791.5	1038.2
20.1	BHP	1262.2	1399.9	1407.1	1590.7	1564.5	1802.2	1734.8	2035.8
0	TR	1037.7	1192.0	994.7	1185.2	943.9	1169.3	886.9	1145.1
24.0	BHP	1290.5	1422.9	1441.4	1621.4	1605.9	1842.6	1784.4	2087.6
5	TR	1151.9	1303.5	1104.5	1296.1	1052.7	1283.8	990.3	1258.4
28.2	BHP	1316.5	1441.4	1473.1	1647.1	1644.4	1877.2	1830.7	2133.0
10	TR	1278.4	1425.0	1226.1	1416.9	1170.2	1405.0	1102.0	1378.3
32.8	BHP	1340.0	1455.3	1502.1	1667.5	1679.8	1905.8	1873.6	2171.6
15	TR	1414.7	1553.3	1357.2	1544.5	1296.6	1532.7	1222.5	1504.7
37.7	BHP	1360.9	1464.6	1528.1	1682.5	1712.0	1928.2	1913.1	2203.2
20	TR	1562.9	1690.2	1499.8	1680.6	1432.4	1666.8	1351.9	1637.7
43.0	BHP	1379.0	1469.3	1551.0	1692.1	1740.9	1944.3	1948.8	2227.7
25	TR	1721.8	-----	1652.7	-----	1578.0	-----	1490.8	-----
48.8	BHP	1394.1	-----	1570.7	-----	1766.2	-----	1980.8	-----
30	TR	1895.0	-----	1819.4	-----	1733.5	-----	1639.5	-----
54.9	BHP	1406.2	-----	1587.1	-----	1787.9	-----	2008.8	-----
35	TR	2079.0	-----	1996.5	-----	1899.5	-----	1798.1	-----
61.5	BHP	1415.1	-----	1599.9	-----	1805.7	-----	2032.7	-----
40	TR	2278.8	-----	2181.5	-----	2076.2	-----	1967.3	-----
68.5	BHP	1420.6	-----	1609.1	-----	1819.6	-----	2052.3	-----

Refrigeration capacity based on saturated suction conditions, the use of a shell and tube type economizer with high pressure liquid cooled to within 10°F of saturated side port temperature, and 10°F liquid subcooling from the condenser.

* Inches of mercury below one standard atmosphere (29.92")

Ratings include use of external oil cooling systems.

MODEL 1435GL (Booster Ratings)

SUCTION TEMP. °F AND CORRESPONDING PRESSURE PSIG		INTERMEDIATE TEMP °F. AND CORRESPONDING PRESSURE PSIG			
		0 24.0	10 32.8	20 43.0	30 54.9
-70	TR	232.9	226.6	219.2	210.2
*16.6	BHP	323.5	393.6	469.7	552.2
-65	TR	270.9	262.5	250.3	237.7
*14.4	BHP	331.9	401.3	477.9	562.1
-60	TR	312.6	299.1	284.4	271.1
*12.0	BHP	340.5	408.5	484.8	569.9
-55	TR	358.0	340.7	325.1	310.9
*9.2	BHP	350.1	415.8	491.0	576.2
-50	TR	408.1	389.6	372.9	357.5
*6.2	BHP	361.1	423.8	497.2	581.6
-45	TR	466.1	446.3	428.0	411.0
*2.7	BHP	374.3	433.2	503.9	586.8
-40	TR	532.5	510.9	490.9	471.9
0.5	BHP	390.3	444.5	511.8	592.5
-35	TR	604.6	584.0	561.7	540.6
2.6	BHP	409.7	458.5	521.5	599.1
-30	TR	683.1	662.9	641.0	617.3
4.9	BHP	433.1	475.7	533.7	607.4
-25	TR	769.7	747.0	724.0	700.7
7.4	BHP	461.2	496.7	548.9	618.0
-20	TR	850.7	825.8	800.5	774.9
10.1	BHP	494.5	522.3	567.8	631.5
-15	TR	960.4	932.4	904.0	875.3
13.2	BHP	533.7	552.9	591.1	648.5
-10	TR	1079.0	1047.8	1016.1	983.9
16.5	BHP	579.5	589.3	619.3	669.7

Refrigeration capacity based on saturated suction conditions and refrigerant liquid cooled to a temperature corresponding with intermediate pressure.
* Inches of mercury below one standard atmosphere (29.92”)

Ratings include use of external oil cooling systems.

OIL COOLER HEAT REJECTION (MBH)

GS Series

Table 12

R-717 HIGH STAGE									
MODEL		55GS		60GS		75GS		85GS	
CT °F	ET °F	MBH	Nominal Oil Flow	MBH	Nominal Oil Flow	MBH	Nominal Oil Flow	MBH	Nominal Oil Flow
75	-40	60.5	4.8	71.4	5.7	83.2	6.7	98.3	7.9
	-35	60.1	4.8	71.1	5.7	82.6	6.6	97.6	7.8
	-30	59.0	4.7	69.7	5.6	80.8	6.5	95.5	7.7
	-25	57.1	4.6	67.5	5.4	78.2	6.3	92.3	7.4
	-20	54.6	4.4	64.5	5.2	74.5	6.0	88.0	7.0
	-15	51.1	4.1	60.3	4.8	69.4	5.6	81.9	6.6
	-10	46.8	3.8	55.3	4.4	63.3	5.1	74.7	6.0
	-5	42.0	3.4	49.5	4.0	56.3	4.5	66.5	5.3
	0	36.0	3.0	42.4	3.4	47.7	4.0	56.3	4.5
	5	30.7	2.9	34.2	2.9	40.2	3.9	44.7	3.9
	10	26.9	2.9	28.7	2.9	35.5	3.9	37.8	3.9
	15	23.1	2.9	24.7	2.9	30.3	3.8	32.3	3.8
	20	20.2	2.8	20.9	2.8	26.2	3.8	27.0	3.8
	25	16.2	2.8	17.9	2.8	21.9	3.7	22.8	3.7
	30	13.2	2.8	14.3	2.8	16.6	3.7	17.8	3.7
	35	10.8	2.7	10.8	2.7	14.4	3.7	14.4	3.7
	40	10.7	2.7	10.7	2.7	14.2	3.6	14.2	3.6
85	-40	70.7	5.7	83.6	6.7	97.5	7.8	115.2	9.2
	-35	71.3	5.7	84.3	6.8	98.2	7.9	116.1	9.3
	-30	71.1	5.7	84.0	6.7	97.8	7.8	115.5	9.3
	-25	70.3	5.6	83.0	6.7	96.5	7.7	114.0	9.1
	-20	68.8	5.5	81.2	6.5	94.2	7.5	111.3	8.9
	-15	66.3	5.3	78.3	6.3	90.6	7.3	107.0	8.6
	-10	63.1	5.1	74.5	6.0	86.0	6.9	101.6	8.1
	-5	59.4	4.8	70.1	5.6	80.7	6.5	95.3	7.6
	0	54.6	4.4	64.4	5.2	73.7	5.9	87.0	7.0
	5	48.9	3.9	57.6	4.6	65.5	5.3	77.4	6.2
	10	42.4	3.4	50.0	4.0	56.3	4.5	66.4	5.3
	15	35.3	3.1	41.5	3.3	46.0	4.1	54.3	4.4
	20	31.0	3.0	32.7	3.0	39.9	4.1	43.1	4.1
	25	26.9	3.0	28.5	3.0	35.3	4.0	37.2	4.0
	30	23.8	2.9	24.4	2.9	31.0	3.9	31.6	3.9
	35	20.5	2.9	21.4	2.9	26.4	3.9	27.5	3.9
	40	17.3	2.9	17.3	2.9	22.0	3.8	21.8	3.8
95	-40	81.7	6.5	96.6	7.7	112.9	9.0	133.4	10.7
	-35	83.3	6.7	98.5	7.9	115.0	9.2	135.9	10.9
	-30	84.1	6.7	99.4	8.0	116.0	9.3	137.1	11.0
	-25	84.4	6.8	99.7	8.0	116.1	9.3	137.3	11.0
	-20	84.0	6.7	99.2	7.9	115.4	9.2	136.4	10.9
	-15	82.6	6.6	97.6	7.8	113.4	9.1	134.0	10.7
	-10	80.7	6.5	95.3	7.6	110.5	8.9	130.5	10.5
	-5	78.1	6.3	92.3	7.4	106.8	8.6	126.2	10.1
	0	74.5	6.0	88.0	7.1	101.6	8.1	120.0	9.6
	5	70.2	5.6	82.8	6.6	95.3	7.6	112.5	9.0
	10	65.0	5.2	76.7	6.1	87.9	7.0	103.8	8.3
	15	59.2	4.7	69.8	5.6	79.6	6.4	93.9	7.5
	20	52.5	4.2	61.9	5.0	69.9	5.6	82.5	6.6
	25	45.2	3.6	53.2	4.3	59.4	4.8	70.1	5.6
	30	36.9	3.2	43.4	3.5	47.6	4.3	56.1	4.5
	35	31.5	3.1	33.1	3.1	41.3	4.2	43.2	4.2
	40	27.9	3.1	29.8	3.1	36.4	4.1	38.8	4.1
105	-40	93.7	7.5	110.8	8.9	129.5	10.4	153.1	12.3
	-35	96.3	7.7	113.9	9.1	133.1	10.7	157.3	12.6
	-30	98.2	7.9	116.1	9.3	135.6	10.9	160.3	12.5
	-25	99.6	8.0	117.7	9.4	137.4	11.0	162.4	12.4
	-20	100.3	8.0	118.6	9.5	138.3	11.1	163.4	12.3
	-15	100.2	8.0	118.4	9.5	138.0	11.1	163.0	12.1
	-10	99.5	8.0	117.6	9.4	136.8	11.0	161.7	12.0
	-5	98.3	7.9	116.1	9.3	134.9	10.8	159.4	11.8
	0	96.0	7.7	113.4	9.1	131.6	10.5	155.5	11.6
	5	93.0	7.5	109.9	8.8	127.2	10.2	150.3	11.4
	10	89.3	7.2	105.5	8.4	121.8	9.8	143.9	11.2
	15	85.0	6.8	100.3	8.0	115.6	9.3	136.5	10.9
	20	79.8	6.4	94.2	7.5	108.1	8.7	127.6	10.2
	25	74.1	5.9	87.3	7.0	99.8	8.0	117.8	9.4
	30	67.4	5.4	79.4	6.4	90.2	7.2	106.5	8.5
	35	59.3	4.8	69.9	5.6	78.7	6.3	92.8	7.4
	40	51.1	4.1	60.1	4.8	66.9	5.4	78.8	6.3

Note: All values are at 100% compressor load. Refer to FES if part load operation will occur for an extended period of time, or if elevated condensing temperature may occur. Values are based on 130 °F oil out of cooler.

FES Systems Inc.

OIL COOLER HEAT REJECTION (MBH)

GS Series

Table 13

R-717 BOOSTER									
MODEL		55GSB		60GSB		75GSB		85GSB	
CT °F	ET °F	MBH	Nominal Oil Flow	MBH	Nominal Oil Flow	MBH	Nominal Oil Flow	MBH	Nominal Oil Flow
0	-70	13.7	3.5	16.2	3.5	18.8	4.7	22.2	4.7
	-65	13.3	3.5	15.3	3.5	17.9	4.7	20.6	4.7
	-60	11.6	3.5	13.2	3.5	15.5	4.7	17.7	4.7
	-55	10.2	3.5	11.7	3.5	13.7	4.7	15.5	4.7
	-50	8.6	3.5	9.8	3.5	11.2	4.7	12.8	4.7
	-45	6.7	3.5	7.5	3.5	8.6	4.7	9.7	4.7
	-40	4.5	3.5	5.0	3.5	5.6	4.7	6.0	4.7
	-35	2.3	3.5	2.3	3.5	3.0	4.6	3.0	4.6
	-30	2.3	3.5	2.3	3.5	3.0	4.6	3.0	4.6
	-25	2.3	3.5	2.3	3.5	3.0	4.6	3.0	4.6
	-20	2.3	3.5	2.3	3.5	3.0	4.6	3.0	4.6
	-15	2.3	3.5	2.3	3.5	3.0	4.6	3.0	4.6
	-10	2.3	3.5	2.3	3.5	3.0	4.6	3.0	4.6
10	-70	21.4	3.7	25.3	4.2	29.3	5.0	34.6	5.3
	-65	20.9	3.6	24.7	4.1	28.5	4.9	33.7	5.2
	-60	18.8	3.5	22.2	3.8	25.6	4.7	30.2	5.1
	-55	17.2	3.5	20.2	3.5	23.2	4.7	27.3	4.7
	-50	15.4	3.5	17.4	3.5	20.6	4.7	23.3	4.7
	-45	13.1	3.5	15.0	3.5	17.4	4.7	19.9	4.7
	-40	10.8	3.5	12.1	3.5	14.0	4.7	15.7	4.7
	-35	8.0	3.5	9.0	3.5	10.4	4.7	11.6	4.7
	-30	5.2	3.5	5.8	3.5	6.5	4.7	7.2	4.7
	-25	3.3	3.5	3.3	3.5	4.4	4.7	4.4	4.7
	-20	3.3	3.5	3.3	3.5	4.4	4.7	4.4	4.7
	-15	3.3	3.5	3.3	3.5	4.4	4.6	4.4	4.6
	-10	3.3	3.5	3.3	3.5	4.4	4.6	4.4	4.6
20	-70	29.4	4.7	34.8	4.7	40.5	5.9	36.4	5.9
	-65	29.1	4.6	34.4	4.7	40.0	5.8	35.8	5.8
	-60	27.2	4.4	32.1	4.6	37.3	5.7	44.0	5.7
	-55	25.6	4.2	30.3	4.5	35.0	5.6	41.4	5.6
	-50	23.3	3.9	27.6	4.4	31.7	5.3	37.5	5.5
	-45	20.5	3.6	24.2	4.0	27.7	4.8	32.7	5.4
	-40	17.2	3.5	20.1	3.5	23.0	4.7	26.8	4.7
	-35	14.3	3.5	15.9	3.5	18.8	4.7	21.3	4.7
	-30	11.3	3.5	12.5	3.5	14.5	4.7	16.1	4.7
	-25	8.2	3.5	9.0	3.5	10.5	4.7	11.5	4.7
	-20	5.3	3.5	5.8	3.5	6.4	4.7	7.0	4.7
	-15	4.4	3.5	4.4	3.5	5.8	4.7	5.8	4.7
	-10	4.4	3.5	4.4	3.5	5.8	4.7	5.8	4.7
30	-70	37.6	5.4	44.4	5.4	51.8	6.6	41.9	6.6
	-65	37.5	5.3	34.0	5.3	51.6	6.6	41.4	6.6
	-60	35.8	5.2	42.3	5.2	49.2	6.5	40.8	6.5
	-55	34.4	5.2	40.7	5.2	47.3	6.4	40.1	6.4
	-50	32.3	5.1	38.2	5.1	44.2	6.3	39.3	6.3
	-45	29.6	4.7	35.0	5.0	40.4	6.2	47.7	6.2
	-40	26.3	4.3	31.0	4.8	35.6	5.8	42.0	6.0
	-35	22.3	3.8	26.3	4.3	30.0	5.1	35.4	5.8
	-30	17.7	3.6	20.8	3.6	23.4	4.8	27.6	4.8
	-25	14.4	3.6	16.1	3.6	19.1	4.7	20.9	4.7
	-20	11.3	3.5	12.3	3.5	14.3	4.7	15.9	4.7
	-15	7.9	3.5	8.8	3.5	9.9	4.7	11.1	4.7
	-10	5.5	3.5	5.6	3.5	7.3	4.7	7.3	4.7

Note: All values are at 100% compressor load. Refer to FES if part load operation will occur for an extended period of time, or if elevated condensing temperature may occur. Values are based on 130 °F oil out of cooler.

FES Systems Inc.

OIL COOLER HEAT REJECTION (MBH)

GS Series

Table 14

R-22 HIGH STAGE									
MODEL		55GS		60GS		75GS		85GS	
CT °F	ET °F	MBH	Nominal Oil Flow	MBH	Nominal Oil Flow	MBH	Nominal Oil Flow	MBH	Nominal Oil Flow
85	-50	37.6	3.4	44.4	3.6	50.6	4.6	60.0	4.9
	-45	35.7	3.4	43.3	3.5	47.7	4.6	60.1	4.9
	-40	33.2	3.4	41.6	3.5	44.7	4.5	57.8	4.8
	-35	30.7	3.4	37.6	3.4	41.1	4.5	51.2	4.6
	-30	27.9	3.4	33.2	3.4	37.1	4.5	45.1	4.5
	-25	25.5	3.3	28.2	3.3	32.9	4.4	38.2	4.4
	-20	22.4	3.3	24.0	3.3	29.3	4.4	31.2	4.4
	-15	19.2	3.3	20.7	3.3	24.8	4.4	26.7	4.4
	-10	16.8	3.2	17.7	3.2	21.5	4.3	22.4	4.3
	-5	13.9	3.2	15.0	3.2	18.5	4.3	18.6	4.3
	0	13.7	3.2	13.7	3.2	18.3	4.2	18.3	4.2
	5	13.6	3.1	13.6	3.1	18.1	4.2	18.1	4.2
	10	13.4	3.1	13.4	3.1	17.9	4.1	17.9	4.1
	15	13.2	3.0	13.2	3.0	17.6	4.1	17.6	4.1
	20	13.0	3.0	13.0	3.0	17.4	4.0	17.4	4.0
	25	12.8	3.0	12.8	3.0	17.1	3.9	17.1	3.9
	30	12.6	2.9	12.6	2.9	16.8	3.9	16.8	3.9
	35	12.4	2.9	12.4	2.9	16.6	3.8	16.6	3.8
	40	12.2	2.8	12.2	2.8	16.3	3.8	16.3	3.8
95	-50	49.3	4.0	58.2	4.7	67.0	5.4	79.1	6.3
	-45	47.1	3.8	55.6	4.5	63.7	5.1	75.2	6.0
	-40	44.2	3.7	52.1	4.2	58.8	4.9	69.5	5.6
	-35	41.6	3.7	49.3	4.0	57.7	4.9	68.4	5.6
	-30	38.1	3.7	47.8	3.9	52.3	4.9	66.3	5.4
	-25	34.9	3.6	44.1	3.8	47.3	4.8	61.2	5.2
	-20	32.0	3.6	39.0	3.6	42.6	4.8	53.1	5.0
	-15	29.0	3.6	33.5	3.6	38.3	4.7	45.5	4.7
	-10	25.9	3.5	27.4	3.5	34.0	4.7	38.9	4.7
	-5	22.9	3.5	24.6	3.5	29.8	4.6	31.8	4.6
	0	20.1	3.4	21.0	3.4	25.8	4.6	26.7	4.6
	5	17.6	3.4	19.1	3.4	22.3	4.5	24.2	4.5
	10	15.9	3.3	16.4	3.3	21.1	4.4	21.1	4.4
	15	15.6	3.3	15.6	3.3	20.8	4.4	20.8	4.4
	20	15.4	3.2	15.4	3.2	20.5	4.3	20.5	4.3
	25	15.1	3.2	15.1	3.2	20.1	4.2	20.1	4.2
	30	14.8	3.1	14.8	3.1	19.8	4.2	19.8	4.2
	35	14.5	3.1	14.5	3.1	19.4	4.1	19.4	4.1
	40	14.3	3.0	14.3	3.0	19.0	4.0	19.0	4.0
105	-50	63.0	5.1	74.5	6.0	86.1	6.9	101.8	8.2
	-45	61.7	4.9	72.8	5.8	84.1	6.7	99.3	8.0
	-40	59.7	4.8	70.4	5.6	81.1	6.5	95.7	7.7
	-35	57.0	4.6	67.2	5.4	77.1	6.2	91.0	7.3
	-30	53.5	4.3	63.1	5.1	72.1	5.8	85.1	6.8
	-25	49.4	4.0	58.2	4.7	65.5	5.4	77.4	6.3
	-20	46.0	4.0	54.4	4.4	63.7	5.3	75.4	6.1
	-15	41.8	3.9	52.1	4.2	58.0	5.2	72.2	5.9
	-10	38.2	3.9	47.0	4.0	51.3	5.2	65.1	5.6
	-5	34.4	3.8	41.3	3.8	45.6	5.1	56.1	5.3
	0	31.5	3.8	35.8	3.8	41.6	5.0	48.5	5.0
	5	29.0	3.7	29.8	3.7	38.0	5.0	41.7	5.0
	10	25.4	3.7	26.6	3.7	33.0	4.9	34.4	4.9
	15	23.5	3.6	24.0	3.6	30.4	4.8	30.8	4.8
	20	20.5	3.5	22.0	3.5	26.2	4.7	28.1	4.7
	25	17.9	3.5	18.6	3.5	23.9	4.6	23.9	4.6
	30	17.6	3.4	17.6	3.4	23.4	4.5	23.4	4.5
	35	17.2	3.3	17.2	3.3	23.0	4.4	23.0	4.4
	40	16.8	3.3	16.8	3.3	22.5	4.3	22.5	4.3
115	-50	79.3	6.4	93.7	7.5	108.9	8.7	128.7	10.3
	-45	78.8	6.3	93.1	7.5	108.1	8.7	127.7	10.2
	-40	77.8	6.2	91.9	7.4	106.4	8.5	125.7	10.1
	-35	76.1	6.1	89.9	7.2	103.9	8.3	122.7	9.8
	-30	73.8	5.9	87.1	7.0	100.4	8.0	118.6	9.5
	-25	70.8	5.7	83.5	6.7	96.0	7.7	113.3	9.1
	-20	67.1	5.4	79.2	6.3	90.6	7.3	107.0	8.6
	-15	62.7	5.0	73.9	5.9	84.2	6.7	99.4	8.0
	-10	57.5	4.6	67.7	5.4	76.7	6.1	90.5	7.2
	-5	51.6	4.3	60.7	4.9	68.8	5.7	81.3	6.6
	0	45.9	4.2	55.8	4.5	64.2	5.7	77.3	6.3
	5	42.2	4.2	51.6	4.3	56.2	5.6	71.4	5.9
	10	39.7	4.1	45.4	4.1	50.9	5.5	62.7	5.6
	15	36.2	4.0	40.5	4.0	47.8	5.4	54.9	5.4
	20	32.9	4.0	34.7	4.0	43.2	5.3	47.8	5.3
	25	29.9	3.9	30.7	3.9	39.0	5.2	39.9	5.2
	30	27.3	3.8	27.2	3.8	35.5	5.1	35.1	5.1
	35	25.5	3.7	24.6	3.7	33.1	4.9	31.6	4.9
	40	21.7	3.6	22.4	3.6	27.9	4.8	28.8	4.8

Note: All values are at 100% compressor load. Refer to FES if part load operation will occur for an extended period of time, or if elevated condensing temperature may occur. Values are based on 130 °F oil out of cooler.

FES Systems Inc.

OIL COOLER HEAT REJECTION (MBH)

GS Series **Table 15**

R-22 BOOSTER									
MODEL		55GSB		60GSB		75GSB		85GSB	
CT °F	ET °F	MBH	Nominal Oil Flow	MBH	Nominal Oil Flow	MBH	Nominal Oil Flow	MBH	Nominal Oil Flow
0	-70	2.3	3.5	2.3	3.5	3.1	4.7	3.1	4.7
	-65	2.3	3.5	2.3	3.5	3.1	4.7	3.1	4.7
	-60	2.3	3.5	2.3	3.5	3.1	4.7	3.1	4.7
	-55	2.3	3.5	2.3	3.5	3.1	4.7	3.1	4.7
	-50	2.3	3.5	2.3	3.5	3.1	4.7	3.1	4.7
	-45	2.3	3.5	2.3	3.5	3.1	4.7	3.1	4.7
	-40	2.3	3.5	2.3	3.5	3.1	4.7	3.1	4.7
	-35	2.3	3.5	2.3	3.5	3.1	4.7	3.1	4.7
	-30	2.3	3.5	2.3	3.5	3.0	4.6	3.0	4.6
	-25	2.3	3.5	2.3	3.5	3.0	4.6	3.0	4.6
	-20	2.3	3.5	2.3	3.5	3.0	4.6	3.0	4.6
	-15	2.3	3.5	2.3	3.5	3.0	4.6	3.0	4.6
	-10	2.3	3.5	2.3	3.5	3.0	4.6	3.0	4.6
10	-70	4.9	3.5	5.5	3.5	6.1	4.7	6.8	4.7
	-65	3.5	3.5	3.8	3.5	4.5	4.7	4.5	4.7
	-60	3.4	3.5	3.4	3.5	4.5	4.7	4.5	4.7
	-55	3.4	3.5	3.4	3.5	4.5	4.7	4.5	4.7
	-50	3.4	3.5	3.4	3.5	4.5	4.7	4.5	4.7
	-45	3.4	3.5	3.4	3.5	4.5	4.7	4.5	4.7
	-40	3.4	3.5	3.4	3.5	4.5	4.7	4.5	4.7
	-35	3.3	3.5	3.3	3.5	4.5	4.7	4.5	4.7
	-30	3.3	3.5	3.3	3.5	4.5	4.7	4.5	4.7
	-25	3.3	3.5	3.3	3.5	4.4	4.7	4.4	4.7
	-20	3.3	3.5	3.3	3.5	4.4	4.7	4.4	4.7
	-15	3.3	3.5	3.3	3.5	4.4	4.6	4.4	4.6
	-10	3.3	3.5	3.3	3.5	4.4	4.6	4.4	4.6
20	-70	11.6	3.6	13.0	3.6	15.0	4.8	16.8	4.8
	-65	10.1	3.6	11.1	3.6	12.9	4.8	14.5	4.8
	-60	7.9	3.6	8.7	3.6	10.0	4.8	11.0	4.8
	-55	5.1	3.6	5.7	3.6	6.1	4.8	6.8	4.8
	-50	4.5	3.6	4.5	3.6	6.0	4.8	6.0	4.8
	-45	4.5	3.6	4.5	3.6	5.9	4.7	5.9	4.7
	-40	4.5	3.5	4.5	3.5	5.9	4.7	5.9	4.7
	-35	4.4	3.5	4.4	3.5	5.9	4.7	5.9	4.7
	-30	4.4	3.5	4.4	3.5	5.9	4.7	5.9	4.7
	-25	4.4	3.5	4.4	3.5	5.9	4.7	5.9	4.7
	-20	4.4	3.5	4.4	3.5	5.9	4.7	5.9	4.7
	-15	4.4	3.5	4.4	3.5	5.9	4.7	5.9	4.7
	-10	4.4	3.5	4.4	3.5	5.8	4.7	5.8	4.7
30	-70	18.0	3.7	21.2	3.7	24.2	4.9	28.2	4.9
	-65	16.6	3.7	18.8	3.7	22.2	4.9	24.8	4.9
	-60	14.5	3.6	16.0	3.6	18.9	4.9	21.2	4.9
	-55	11.6	3.6	13.0	3.6	15.1	4.8	16.5	4.8
	-50	8.6	3.6	9.4	3.6	10.9	4.8	11.8	4.8
	-45	5.6	3.6	5.8	3.6	7.5	4.8	7.5	4.8
	-40	5.6	3.6	5.6	3.6	7.5	4.8	7.5	4.8
	-35	5.6	3.6	5.6	3.6	7.4	4.8	7.4	4.8
	-30	5.6	3.6	5.6	3.6	7.4	4.8	7.4	4.8
	-25	5.5	3.6	5.5	3.6	7.4	4.8	7.4	4.8
	-20	5.5	3.6	5.5	3.6	7.4	4.7	7.4	4.7
	-15	5.5	3.5	5.5	3.5	7.3	4.7	7.3	4.7
	-10	5.5	3.5	5.5	3.5	7.3	4.7	7.3	4.7

Note: All values are at 100% compressor load. Refer to FES if part load operation will occur for an extended period of time, or if elevated condensing temperature may occur. Values are based on 130 °F oil out of cooler.

FES Systems Inc.

OIL COOLER HEAT REJECTION (MBH)

GM Series

Table 16

R-717 HIGH STAGE									
MODEL		110GM		125GM		160GM		195GM	
CT °F	ET °F	MBH	Nominal Oil Flow	MBH	Nominal Oil Flow	MBH	Nominal Oil Flow	MBH	Nominal Oil Flow
75	-40	121.7	9.7	139.1	11.1	181.8	14.6	220.0	17.6
	-35	120.7	9.7	137.8	11.0	180.3	14.4	217.8	17.4
	-30	117.8	9.4	134.2	10.8	176.0	14.1	212.2	17.0
	-25	113.6	9.1	129.1	10.3	169.7	13.6	204.1	16.3
	-20	107.9	8.6	122.2	9.8	161.2	12.9	193.3	15.5
	-15	100.0	8.0	112.9	9.0	149.4	12.0	178.4	14.3
	-10	90.7	7.3	101.7	8.2	135.5	10.9	160.9	12.9
	-5	80.1	6.4	89.1	7.1	119.6	9.6	140.9	11.3
	0	66.9	5.4	73.6	5.9	100.0	8.7	116.3	9.3
	5	53.2	4.9	55.9	4.9	86.3	8.6	90.5	8.6
	10	45.7	4.9	46.9	4.9	76.1	8.5	79.0	8.5
	15	38.9	4.8	40.4	4.8	64.7	8.4	66.5	8.4
	20	32.5	4.7	32.8	4.7	53.4	8.3	54.8	8.3
	25	25.7	4.7	26.8	4.7	43.8	8.2	45.9	8.2
	30	21.5	4.6	19.8	4.6	35.2	8.1	35.1	8.1
	35	18.0	4.6	18.0	4.6	31.5	8.0	31.5	8.0
	40	17.8	4.5	17.8	4.5	31.1	7.9	31.1	7.9
85	-40	142.9	11.4	163.7	13.1	213.5	17.1	258.8	20.7
	-35	143.8	11.5	164.6	13.2	214.8	17.2	260.2	20.8
	-30	142.9	11.4	163.3	13.1	213.5	17.1	258.2	20.7
	-25	140.8	11.3	160.6	12.9	210.3	16.8	253.9	20.3
	-20	137.2	11.0	156.2	12.5	205.0	16.4	247.0	19.8
	-15	131.5	10.5	149.4	12.0	196.5	15.7	236.2	18.9
	-10	124.5	10.0	140.9	11.3	186.0	14.9	222.8	17.8
	-5	116.2	9.3	131.0	10.5	173.6	13.9	207.2	16.6
	0	105.5	8.5	118.3	9.5	157.6	12.6	187.0	15.0
	5	93.1	7.5	103.6	8.3	139.1	11.1	163.7	13.1
	10	79.0	6.3	86.8	7.0	118.0	9.5	137.3	11.0
	15	63.4	5.1	68.3	5.5	96.9	9.0	108.1	9.0
	20	52.3	5.1	53.2	5.1	85.5	8.9	90.3	8.9
	25	45.0	5.0	44.4	5.0	75.6	8.7	77.1	8.7
	30	38.3	4.9	38.5	4.9	63.3	8.6	64.8	8.6
	35	33.4	4.8	32.8	4.8	53.4	8.5	56.2	8.5
	40	26.6	4.8	27.7	4.8	43.6	8.3	43.9	8.3
95	-40	165.8	13.3	190.2	15.2	247.7	19.8	300.7	23.7
	-35	168.7	13.5	193.4	15.5	252.1	20.2	305.8	23.5
	-30	170.0	13.6	194.7	15.6	253.9	20.3	307.8	23.3
	-25	170.0	13.6	194.5	15.4	254.0	20.3	307.5	23.0
	-20	168.7	13.5	192.7	15.3	252.1	20.2	304.7	22.8
	-15	165.4	13.2	188.7	15.0	247.2	19.8	298.3	22.5
	-10	160.8	12.9	183.1	14.7	240.3	19.2	289.4	22.1
	-5	155.1	12.4	176.1	14.1	231.7	18.6	278.5	21.7
	0	147.0	11.8	166.4	13.3	219.6	17.6	263.1	21.1
	5	137.3	11.0	154.8	12.4	205.1	16.4	244.8	19.6
	10	126.0	10.1	141.3	11.3	188.2	15.1	223.5	17.9
	15	113.2	9.1	126.2	10.1	169.1	13.5	199.5	16.0
	20	98.5	7.9	108.7	8.7	147.2	11.8	171.9	13.8
	25	82.5	6.6	89.8	7.2	123.3	9.9	142.0	11.4
	30	64.5	5.3	68.5	5.5	99.5	9.3	108.3	9.3
	35	52.6	5.2	54.4	5.2	89.0	9.2	90.3	9.2
	40	47.3	5.1	45.0	5.1	78.4	9.0	80.8	9.0
105	-40	190.5	15.3	218.9	17.5	284.7	22.8	346.1	26.3
	-35	195.6	15.7	224.7	17.5	292.3	23.4	355.2	26.1
	-30	199.2	15.9	228.5	17.3	297.6	23.8	361.3	25.9
	-25	201.5	16.1	231.1	17.2	301.1	24.1	365.3	25.6
	-20	202.7	16.2	232.1	17.0	302.8	24.2	367.0	25.4
	-15	201.9	16.2	231.0	16.8	301.7	24.2	365.2	25.1
	-10	199.9	16.0	228.4	16.6	298.7	23.9	361.2	24.7
	-5	196.9	15.8	224.6	16.3	294.2	23.6	355.1	24.4
	0	191.6	15.3	218.2	16.1	286.3	22.9	344.9	24.0
	5	184.8	14.8	209.9	15.7	276.1	22.1	331.9	23.5
	10	176.4	14.1	199.9	15.4	263.6	21.1	316.1	23.0
	15	166.8	13.4	188.4	15.0	249.2	20.0	297.8	22.4
	20	155.3	12.4	174.6	14.0	232.0	18.6	276.1	21.8
	25	142.6	11.4	159.5	12.8	213.0	17.1	252.2	20.2
	30	128.0	10.2	142.2	11.4	191.2	15.3	224.8	18.0
	35	110.3	8.8	121.3	9.7	164.9	13.2	191.7	15.4
	40	92.3	7.4	99.9	8.0	137.9	11.0	157.9	12.7

Note: All values are at 100% compressor load. Refer to FES if part load operation will occur for an extended period of time, or if elevated condensing temperature may occur. Values are based on 130 °F oil out of cooler.

OIL COOLER HEAT REJECTION (MBH)

GM Series **Table 17**

R-717 BOOSTER									
MODEL		110GMB		125GMB		160GMB		195GMB	
CT °F	ET °F	MBH	Nominal Oil Flow	MBH	Nominal Oil Flow	MBH	Nominal Oil Flow	MBH	Nominal Oil Flow
0	-70	27.4	5.8	31.4	5.8	42.9	10.2	50.0	10.2
	-65	25.1	5.8	28.2	5.8	39.6	10.2	45.5	10.2
	-60	21.4	5.8	23.3	5.8	32.9	10.2	37.6	10.2
	-55	18.6	5.8	20.1	5.8	28.8	10.2	32.6	10.2
	-50	15.1	5.8	16.0	5.8	23.4	10.2	25.7	10.2
	-45	11.2	5.8	11.6	5.8	17.6	10.2	18.9	10.2
	-40	6.8	5.8	6.4	5.8	10.7	10.2	10.8	10.2
	-35	3.8	5.8	3.8	5.8	6.7	10.1	6.7	10.1
	-30	3.8	5.8	3.8	5.8	6.7	10.1	6.7	10.1
	-25	3.8	5.8	3.8	5.8	6.7	10.1	6.7	10.1
	-20	3.8	5.8	3.8	5.8	6.6	10.1	6.6	10.1
	-15	3.8	5.8	3.8	5.8	6.6	10.1	6.6	10.1
	-10	3.8	5.8	3.8	5.8	6.6	10.1	6.6	10.1
10	-70	42.7	7.0	49.4	7.9	64.8	11.0	78.2	12.7
	-65	41.4	6.8	47.0	7.6	61.9	10.6	74.4	12.2
	-60	36.9	6.3	41.6	6.9	55.1	10.3	65.8	11.1
	-55	33.2	5.9	37.2	6.3	49.9	10.2	58.9	10.2
	-50	28.3	5.9	31.1	5.9	43.8	10.2	49.6	10.2
	-45	23.9	5.8	25.5	5.8	37.0	10.2	41.4	10.2
	-40	18.6	5.8	19.6	5.8	29.3	10.2	32.2	10.2
	-35	13.4	5.8	13.8	5.8	21.1	10.2	22.5	10.2
	-30	7.8	5.8	7.7	5.8	12.3	10.2	12.2	10.2
	-25	5.6	5.8	5.6	5.8	9.7	10.2	9.7	10.2
	-20	5.5	5.8	5.5	5.8	9.7	10.2	9.7	10.2
	-15	5.5	5.8	5.5	5.8	9.7	10.1	9.7	10.1
	-10	5.5	5.8	5.5	5.8	9.7	10.1	9.7	10.1
20	-70	59.3	9.0	67.8	9.0	88.6	14.0	107.2	14.8
	-65	58.4	9.0	66.7	9.0	87.3	13.9	105.5	14.7
	-60	54.2	8.5	61.7	8.9	81.0	13.1	97.6	14.6
	-55	50.8	8.0	57.6	8.8	75.9	12.4	91.1	14.4
	-50	45.8	7.4	51.7	8.2	68.4	11.5	81.7	13.2
	-45	39.7	6.6	44.5	7.2	59.3	10.3	70.4	11.7
	-40	32.1	5.9	35.6	6.1	49.0	10.3	56.2	10.3
	-35	25.4	5.9	26.7	5.9	39.7	10.3	43.6	10.3
	-30	19.2	5.9	19.8	5.9	30.1	10.3	33.0	10.3
	-25	13.0	5.9	13.0	5.9	21.0	10.2	21.5	10.2
	-20	7.8	5.9	7.3	5.9	12.8	10.2	12.8	10.2
	-15	7.3	5.8	7.3	5.8	12.8	10.2	12.8	10.2
	-10	7.3	5.8	7.3	5.8	12.8	10.2	12.8	10.2
30	-70	76.1	9.8	64.8	9.8	113.6	15.9	102.6	15.9
	-65	75.7	9.8	64.2	9.8	113.1	15.8	101.8	15.8
	-60	72.0	9.7	82.3	9.7	107.6	15.6	130.1	15.6
	-55	68.9	9.6	78.6	9.6	103.0	15.5	124.3	15.5
	-50	64.3	9.5	73.1	9.5	96.1	15.0	115.6	15.4
	-45	58.5	9.0	66.3	9.3	87.5	13.9	104.8	15.2
	-40	51.2	8.1	57.6	8.9	76.5	12.5	91.1	14.4
	-35	42.7	7.0	47.6	7.6	63.8	10.9	75.2	12.4
	-30	32.7	5.9	35.9	6.2	50.3	10.4	56.7	10.4
	-25	25.1	5.9	25.7	5.9	39.9	10.4	42.6	10.4
	-20	18.9	5.9	18.9	5.9	30.1	10.4	30.9	10.4
	-15	12.2	5.9	12.4	5.9	20.3	10.3	19.6	10.3
	-10	9.1	5.9	9.1	5.9	16.0	10.3	16.0	10.3

Note: All values are at 100% compressor load. Refer to FES if part load operation will occur for an extended period of time, or if elevated condensing temperature may occur. Values are based on 130 °F oil out of cooler.

OIL COOLER HEAT REJECTION (MBH)

GM Series

Table 18

R-22 HIGH STAGE									
MODEL		110GM		125GM		160GM		195GM	
CT °F	ET °F	MBH	Nominal Oil Flow	MBH	Nominal Oil Flow	MBH	Nominal Oil Flow	MBH	Nominal Oil Flow
85	-50	72.5	5.9	85.4	6.9	103.5	10.0	135.1	11.0
	-45	70.1	5.9	85.6	7.0	97.0	10.0	135.1	11.0
	-40	63.9	5.8	82.2	6.8	90.1	9.9	123.4	10.8
	-35	56.1	5.6	72.7	6.6	82.3	9.8	108.7	10.4
	-30	48.9	5.6	62.8	6.4	73.5	9.8	95.2	10.1
	-25	40.8	5.5	51.7	6.0	64.1	9.7	79.8	9.7
	-20	35.1	5.5	43.0	5.6	56.6	9.6	64.3	9.6
	-15	29.8	5.4	33.3	5.4	46.9	9.5	52.6	9.5
	-10	23.4	5.4	25.3	5.4	41.0	9.4	43.3	9.4
	-5	23.2	5.3	23.2	5.3	40.6	9.3	40.6	9.3
	0	22.9	5.3	22.9	5.3	40.1	9.2	40.1	9.2
	5	22.6	5.2	22.6	5.2	39.6	9.1	39.6	9.1
	10	22.3	5.1	22.3	5.1	39.1	9.0	39.1	9.0
	15	22.0	5.1	22.0	5.1	38.5	8.9	38.5	8.9
	20	21.7	5.0	21.7	5.0	38.0	8.7	38.0	8.7
	25	21.4	4.9	21.4	4.9	37.4	8.6	37.4	8.6
	30	21.1	4.8	21.1	4.8	36.8	8.5	36.8	8.5
	35	20.7	4.8	20.7	4.8	36.3	8.3	36.3	8.3
	40	20.4	4.7	20.4	4.7	35.7	8.2	35.7	8.2
95	-50	90.3	7.2	106.4	8.5	134.9	11.0	168.2	13.5
	-45	83.7	6.8	98.7	8.0	125.1	10.9	156.0	12.7
	-40	84.0	6.8	99.0	8.0	123.2	10.8	156.5	12.7
	-35	82.6	6.7	97.3	7.9	115.1	10.7	153.9	12.5
	-30	75.9	6.5	94.3	7.7	103.7	10.7	143.9	12.1
	-25	67.4	6.3	85.4	7.4	93.5	10.6	130.2	11.8
	-20	57.8	6.0	73.8	7.1	84.7	10.5	112.2	11.1
	-15	50.1	5.9	63.0	6.7	75.5	10.4	95.4	10.5
	-10	40.8	5.9	51.2	6.2	66.3	10.2	79.0	10.2
	-5	34.4	5.8	42.8	5.8	57.5	10.1	64.2	10.1
	0	30.8	5.7	34.3	5.7	49.3	10.0	53.1	10.0
	5	26.8	5.6	27.7	5.6	46.9	9.9	46.9	9.9
	10	26.4	5.6	26.4	5.6	46.2	9.7	46.2	9.7
	15	26.0	5.5	26.0	5.5	45.5	9.6	45.5	9.6
	20	25.6	5.4	25.6	5.4	44.8	9.4	44.8	9.4
	25	25.1	5.3	25.1	5.3	44.0	9.2	44.0	9.2
	30	24.7	5.2	24.7	5.2	43.2	9.1	43.2	9.1
	35	24.2	5.1	24.2	5.1	42.4	8.9	42.4	8.9
	40	23.8	5.0	23.8	5.0	41.6	8.7	41.6	8.7
105	-50	118.2	9.5	139.3	11.2	176.6	14.1	220.2	17.6
	-45	114.6	9.2	135.0	10.8	171.2	13.7	213.5	17.1
	-40	109.5	8.8	129.1	10.3	163.7	13.1	204.1	16.3
	-35	103.0	8.3	121.4	9.7	153.9	12.3	191.9	15.4
	-30	96.3	7.8	113.5	9.2	143.9	11.8	179.4	14.6
	-25	93.5	7.6	110.2	9.0	139.4	11.7	174.2	14.2
	-20	91.0	7.4	107.2	8.7	126.8	11.6	169.5	13.8
	-15	81.2	7.1	102.4	8.3	112.8	11.5	156.6	13.2
	-10	71.6	6.7	89.1	7.9	99.6	11.3	135.9	12.5
	-5	62.3	6.4	76.4	7.4	90.8	11.2	118.4	11.8
	0	52.2	6.3	65.7	6.9	82.6	11.0	99.4	11.0
	5	43.0	6.2	54.8	6.5	75.6	10.9	84.6	10.9
	10	38.1	6.1	46.3	6.1	65.3	10.7	71.0	10.7
	15	34.3	6.0	38.6	6.0	55.9	10.5	58.1	10.5
	20	30.5	5.9	30.5	5.9	53.4	10.3	53.4	10.3
	25	29.9	5.8	29.9	5.8	52.3	10.1	52.3	10.1
	30	29.3	5.7	29.3	5.7	51.3	9.9	51.3	9.9
	35	28.7	5.6	28.7	5.6	50.2	9.7	50.2	9.7
	40	28.1	5.4	28.1	5.4	49.1	9.5	49.1	9.5
115	-50	151.3	12.1	178.3	14.3	226.1	18.1	281.9	22.6
	-45	149.6	12.0	176.2	14.1	223.5	17.9	278.6	22.3
	-40	146.5	11.7	172.6	13.8	218.9	17.5	272.9	21.9
	-35	142.1	11.4	167.4	13.4	212.3	17.0	264.7	21.2
	-30	136.3	10.9	160.6	12.9	203.6	16.3	253.9	20.3
	-25	129.1	10.3	152.1	12.2	192.8	15.4	240.4	19.3
	-20	120.5	9.7	142.0	11.4	180.0	14.4	224.4	18.0
	-15	110.2	8.8	129.8	10.4	164.6	13.2	205.3	16.4
	-10	102.9	8.4	121.3	9.9	153.8	12.7	191.8	15.6
	-5	98.0	8.0	115.5	9.4	141.4	12.6	182.6	14.8
	0	89.8	7.6	109.6	8.9	127.4	12.4	170.2	14.1
	5	78.6	7.1	97.7	8.4	113.7	12.2	149.1	13.2
	10	68.5	6.8	85.4	7.9	102.7	12.0	130.1	12.4
	15	60.6	6.7	74.4	7.4	92.4	11.8	115.2	11.8
	20	52.0	6.6	64.3	6.9	88.0	11.5	99.5	11.5
	25	45.9	6.5	55.2	6.5	80.1	11.3	87.2	11.3
	30	41.0	6.3	48.1	6.3	67.5	11.1	76.4	11.1
	35	37.9	6.2	41.6	6.2	63.5	10.8	62.0	10.8
	40	33.6	6.0	36.0	6.0	58.8	10.6	58.8	10.6

Note: All values are at 100% compressor load. Refer to FES if part load operation will occur for an extended period of time, or if elevated condensing temperature may occur. Values are based on 130 °F oil out of cooler.

OIL COOLER HEAT REJECTION (MBH)

GM Series **Table 19**

R-22 BOOSTER									
MODEL		110GMB		125GMB		160GMB		195GMB	
CT °F	ET °F	MBH	Nominal Oil Flow	MBH	Nominal Oil Flow	MBH	Nominal Oil Flow	MBH	Nominal Oil Flow
0	-70	3.8	5.9	3.8	5.9	6.7	10.2	6.7	10.2
	-65	3.8	5.9	3.8	5.9	6.7	10.2	6.7	10.2
	-60	3.8	5.9	3.8	5.9	6.7	10.2	6.7	10.2
	-55	3.8	5.8	3.8	5.8	6.7	10.2	6.7	10.2
	-50	3.8	5.8	3.8	5.8	6.7	10.2	6.7	10.2
	-45	3.8	5.8	3.8	5.8	6.7	10.2	6.7	10.2
	-40	3.8	5.8	3.8	5.8	6.7	10.2	6.7	10.2
	-35	3.8	5.8	3.8	5.8	6.7	10.2	6.7	10.2
	-30	3.8	5.8	3.8	5.8	6.7	10.1	6.7	10.1
	-25	3.8	5.8	3.8	5.8	6.7	10.1	6.7	10.1
	-20	3.8	5.8	3.8	5.8	6.6	10.1	6.6	10.1
	-15	3.8	5.8	3.8	5.8	6.6	10.1	6.6	10.1
	-10	3.8	5.8	3.8	5.8	6.6	10.1	6.6	10.1
10	-70	5.8	5.9	6.4	5.9	9.9	10.3	10.7	10.3
	-65	5.6	5.9	5.6	5.9	9.9	10.3	9.9	10.3
	-60	5.6	5.9	5.6	5.9	9.8	10.3	9.8	10.3
	-55	5.6	5.9	5.6	5.9	9.8	10.3	9.8	10.3
	-50	5.6	5.9	5.6	5.9	9.8	10.3	9.8	10.3
	-45	5.6	5.9	5.6	5.9	9.8	10.3	9.8	10.3
	-40	5.6	5.9	5.6	5.9	9.8	10.2	9.8	10.2
	-35	5.6	5.9	5.6	5.9	9.8	10.2	9.8	10.2
	-30	5.6	5.8	5.6	5.8	9.8	10.2	9.8	10.2
	-25	5.6	5.8	5.6	5.8	9.7	10.2	9.7	10.2
	-20	5.6	5.8	5.6	5.8	9.7	10.2	9.7	10.2
	-15	5.5	5.8	5.5	5.8	9.7	10.2	9.7	10.2
	-10	5.5	5.8	5.5	5.8	9.7	10.1	9.7	10.1
20	-70	18.2	6.0	20.1	6.0	28.3	10.5	33.2	10.5
	-65	15.2	6.0	16.5	6.0	23.4	10.5	27.6	10.5
	-60	10.9	6.0	11.7	6.0	17.0	10.4	19.4	10.4
	-55	7.5	6.0	7.5	6.0	13.1	10.4	13.1	10.4
	-50	7.4	5.9	7.4	5.9	13.0	10.4	13.0	10.4
	-45	7.4	5.9	7.4	5.9	13.0	10.4	13.0	10.4
	-40	7.4	5.9	7.4	5.9	13.0	10.4	13.0	10.4
	-35	7.4	5.9	7.4	5.9	13.0	10.3	13.0	10.3
	-30	7.4	5.9	7.4	5.9	12.9	10.3	12.9	10.3
	-25	7.4	5.9	7.4	5.9	12.9	10.3	12.9	10.3
	-20	7.3	5.9	7.3	5.9	12.9	10.3	12.9	10.3
	-15	7.3	5.9	7.3	5.9	12.8	10.2	12.8	10.2
	-10	7.3	5.8	7.3	5.8	12.8	10.2	12.8	10.2
30	-70	30.5	6.1	35.9	6.2	47.8	10.7	56.8	10.7
	-65	27.6	6.1	30.6	6.1	43.1	10.7	49.9	10.7
	-60	23.0	6.1	25.5	6.1	36.5	10.6	42.0	10.6
	-55	17.8	6.1	19.0	6.1	28.1	10.6	32.1	10.6
	-50	11.4	6.0	12.7	6.0	18.0	10.6	21.3	10.6
	-45	9.4	6.0	9.4	6.0	16.4	10.5	16.4	10.5
	-40	9.3	6.0	9.3	6.0	16.3	10.5	16.3	10.5
	-35	9.3	6.0	9.3	6.0	16.3	10.5	16.3	10.5
	-30	9.3	6.0	9.3	6.0	16.2	10.5	16.2	10.5
	-25	9.2	6.0	9.2	6.0	16.2	10.4	16.2	10.4
	-20	9.2	5.9	9.2	5.9	16.1	10.4	16.1	10.4
	-15	9.2	5.9	9.2	5.9	16.1	10.4	16.1	10.4
	-10	9.1	5.9	9.1	5.9	16.0	10.3	16.0	10.3

Note: All values are at 100% compressor load. Refer to FES if part load operation will occur for an extended period of time, or if elevated condensing temperature may occur. Values are based on 130 °F oil out of cooler.

FES Systems Inc.

OIL COOLER HEAT REJECTION (MBH)

GL Series

Table 20

R-717 HIGH STAGE																									
MODEL		180GL		230GL		290GL		400GL		475GL		565GL		675GL		800GL		1025GL		1210GL		1435GL	
CT	ET	MBH	Nominal Oil Flow	MBH	Nominal Oil Flow	MBH	Nominal Oil Flow	MBH	Nominal Oil Flow	MBH	Nominal Oil Flow	MBH	Nominal Oil Flow	MBH	Nominal Oil Flow	MBH	Nominal Oil Flow	MBH	Nominal Oil Flow	MBH	Nominal Oil Flow	MBH	Nominal Oil Flow
°F	°F																						
75	-40	209.2	20.6	270.3	26.4	320.0	30.4	402.7	38.9	454.0	43.0	546.1	50.4	643.3	59.1	760.7	68.5	971.0	89.2	1146.8	103.2	1357.5	112.8
	-35	207.4	20.4	268.0	26.2	316.4	30.1	398.8	38.6	448.4	42.5	539.9	49.9	635.3	58.4	751.3	67.7	959.0	88.1	1132.6	102.0	1340.8	111.3
	-30	202.6	20.0	261.8	25.7	308.1	29.4	388.3	37.7	435.0	41.4	524.4	48.6	616.3	56.9	728.9	65.9	930.4	85.8	1098.8	99.3	1300.7	109.6
	-25	195.7	19.4	252.8	24.9	296.4	28.4	373.1	36.4	416.1	39.9	502.4	46.8	589.5	54.7	697.1	63.3	889.9	82.5	1050.9	95.4	1244.0	107.6
	-20	186.4	18.6	240.8	23.9	280.9	27.1	352.5	34.7	391.0	37.8	473.0	44.4	553.9	51.8	655.0	59.9	836.1	78.1	987.5	90.2	1168.9	104.8
	-15	173.4	17.6	224.1	22.6	259.6	25.4	324.2	32.4	356.6	35.0	432.7	41.1	505.3	47.8	597.5	55.2	762.7	72.2	900.8	83.2	1066.3	96.5
	-10	158.0	16.3	204.2	20.9	234.5	23.4	290.5	29.7	316.1	31.7	384.9	37.2	447.8	43.2	529.6	49.7	676.0	65.1	798.4	74.9	945.1	86.7
	-5	140.5	14.9	181.5	19.1	206.0	21.0	252.1	26.6	270.1	28.0	330.8	32.8	382.8	37.9	452.6	43.5	577.7	57.2	682.3	65.5	807.7	75.6
	0	118.6	13.5	153.2	16.9	170.5	18.2	204.4	23.6	213.1	23.6	263.5	27.4	301.9	31.4	357.1	35.8	455.8	47.3	538.3	53.9	637.2	61.8
	5	101.9	13.4	128.9	16.7	133.4	16.7	172.2	23.4	174.6	23.4	193.7	23.4	218.5	26.7	258.2	27.8	329.0	40.1	389.1	41.8	460.8	47.6
	10	88.8	13.2	111.7	16.5	114.7	16.5	150.3	23.1	148.5	23.1	159.9	23.1	177.8	26.5	190.8	26.5	267.6	39.7	287.4	39.7	288.5	39.7
	15	76.2	13.1	98.5	16.4	97.6	16.4	124.4	22.9	124.1	22.9	135.5	22.9	148.6	26.2	154.0	26.2	223.5	39.2	232.0	39.2	236.2	39.2
	20	63.6	12.9	82.2	16.1	81.5	16.1	102.1	22.6	98.3	22.6	111.0	22.6	119.1	25.8	128.7	25.8	179.0	38.8	193.8	38.8	186.6	38.8
	25	52.6	12.8	68.0	16.0	63.7	16.0	85.9	22.3	80.0	22.3	87.2	22.3	90.7	25.5	93.6	25.5	136.0	38.3	140.9	38.3	142.9	38.3
	30	42.4	12.6	54.8	15.8	53.3	15.8	61.6	22.1	63.8	22.1	62.9	22.1	74.4	25.2	72.7	25.2	111.4	37.8	109.4	37.8	102.7	37.8
	35	31.7	12.4	40.9	15.5	36.7	15.5	38.7	21.8	63.0	21.8	42.8	21.8	37.6	24.9	44.3	24.9	55.9	37.3	66.6	37.3	79.0	37.3
	40	20.9	12.3	27.0	15.3	27.4	15.3	23.4	21.5	62.2	21.5	22.8	21.5	29.3	24.5	16.0	24.5	44.2	36.8	24.2	36.8	28.6	36.8
85	-40	244.3	23.7	315.6	30.4	374.7	35.2	474.6	45.2	537.1	50.2	645.2	58.9	760.9	69.2	899.9	80.3	1148.7	104.4	1356.6	121.0	1605.9	128.8
	-35	246.2	23.8	318.1	30.6	377.0	35.3	478.2	45.5	540.1	50.4	649.3	59.2	765.1	69.5	904.8	80.6	1155.0	104.8	1364.1	121.5	1614.7	127.4
	-30	245.2	23.7	316.7	30.5	374.5	35.1	475.4	45.2	535.6	50.0	644.4	58.7	758.7	68.9	897.3	80.0	1145.4	103.9	1352.7	120.5	1601.2	125.7
	-25	242.1	23.4	312.7	30.1	368.8	34.6	468.1	44.6	525.8	49.2	633.2	57.8	744.9	67.7	880.9	78.6	1124.4	102.2	1328.0	118.5	1571.9	123.8
	-20	236.6	23.0	305.7	29.5	359.4	33.8	455.7	43.5	510.1	47.9	615.1	56.3	722.6	65.9	854.6	76.5	1090.9	99.4	1288.3	115.2	1525.0	121.8
	-15	227.6	22.2	294.1	28.5	344.4	32.6	435.8	41.9	485.5	45.9	586.4	53.9	687.8	63.1	813.4	73.1	1038.3	95.1	1226.3	110.2	1451.6	119.4
	-10	216.3	21.3	279.4	27.3	325.5	31.0	410.8	39.8	455.0	43.4	550.6	51.0	644.6	59.5	762.3	68.9	973.0	89.8	1149.2	103.9	1360.3	116.8
	-5	202.8	20.2	262.1	25.9	303.4	29.2	381.3	37.4	419.3	40.4	508.8	47.6	594.0	55.4	702.5	64.1	896.7	83.5	1059.1	96.5	1253.7	112.1
	0	185.0	18.7	239.1	24.0	274.4	26.8	342.7	34.2	372.9	36.6	454.2	43.1	528.3	50.1	624.8	57.8	797.5	75.5	941.9	87.0	1115.0	100.9
	5	164.2	17.0	212.2	21.8	240.6	24.0	298.7	30.6	320.3	32.3	392.0	38.1	453.9	44.0	536.7	50.6	684.5	66.3	808.9	76.3	957.7	88.2
	10	140.4	15.0	181.3	19.2	202.0	20.9	246.3	26.3	257.7	27.3	318.3	32.1	365.1	36.8	431.7	42.1	551.1	55.5	650.9	63.5	770.4	73.0
	15	113.7	14.0	147.0	17.5	159.0	17.5	195.6	24.5	197.3	24.5	239.1	25.7	270.4	29.1	319.7	33.1	407.3	43.8	481.7	49.8	570.4	56.9
	20	101.1	13.8	126.8	17.3	128.9	17.3	167.6	24.2	171.2	24.2	181.5	24.2	201.3	27.6	213.5	27.6	302.9	41.4	321.6	41.4	337.4	41.4
	25	86.6	13.6	111.9	17.0	109.7	17.0	144.2	23.8	144.0	23.8	155.1	23.8	169.6	27.2	173.1	27.2	255.0	40.8	260.7	40.8	284.4	40.8
	30	75.6	13.4	97.7	16.7	97.2	16.7	126.8	23.4	124.1	23.4	128.4	23.4	150.1	26.8	147.1	26.8	207.1	40.1	221.7	40.1	235.3	40.1
	35	63.7	13.2	82.2	16.5	77.9	16.5	101.9	23.0	95.6	23.0	103.1	23.0	121.2	26.3	126.4	26.3	182.9	39.5	190.6	39.5	195.5	39.5
	40	51.3	12.9	66.3	16.2	65.4	16.2	85.6	22.7	77.6	22.7	79.1	22.7	94.1	25.9	92.5	25.9	142.0	38.8	139.5	38.8	131.7	38.8
95	-40	281.4	27.1	363.6	34.8	432.7	40.3	550.3	52.0	624.5	58.0	749.5	67.9	884.7	79.9	1046.2	92.9	1335.5	120.6	1577.2	140.0	1867.0	146.1
	-35	287.4	27.5	371.3	35.4	441.3	41.0	561.9	52.9	636.7	58.9	764.6	67.4	902.1	81.3	1066.8	94.5	1361.7	122.6	1608.2	142.4	1903.7	144.7
	-30	290.5	27.8	375.4	35.7	445.4	41.3	567.5	53.3	641.8	59.3	771.2	66.8	909.3	81.8	1075.4	94.1	1372.7	123.4	1621.2	143.2	1919.0	143.2
	-25	291.7	27.8	376.9	35.8	446.4	41.3	568.7	53.4	642.0	59.2	771.9	66.2	909.5	81.8	1075.6	93.2	1373.0	123.3	1621.5	141.4	1919.4	141.4
	-20	290.6	27.7	375.4	35.6	443.7	41.1	565.2	53.0	636.5	58.7	766.0	65.5	901.8	81.1	1066.5	92.0	1361.3	122.3	1607.8	139.4	1903.2	139.4
	-15	286.0	27.3	369.5	35.1	435.5	40.4	554.5	52.1	622.6	57.5	749.9	64.6	882.0	79.4	1043.0	90.8	1331.4	119.8	1572.4	137.2	1861.3	137.2
	-10	279.1	26.7	360.6	34.3	423.7	39.4	538.9	50.8	602.9	55.9	727.2	63.7	854.2	77.1	1010.2	89.3	1289.5	116.3	1522.9	134.7	1802.7	134.7
	-5	270.2	25.9	349.1	33.3	408.7	38.1	519.1	49.1	578.5	53.8	698.6	62.7	819.5	74.2	969.2	86.2	1237.1	112.0	1461.1	129.9	1729.5	131.9
	0	257.0	24.8	332.1	31.9	387.0	36.3	490.5	46.7	543.6	51.0	657.8	60.1	770.2	70.2	910.8	81.4	1162.7	105.9	1373.1	122.7	1625.4	128.8
	5	240.9	23.5	311.2	30.2	360.5	34.1	455.8	43.8	501.7	47.5	608.5	56.1	710.7	65.3	840.5	75.7	1072.9	98.5	1267.1	114.0	1499.9	125.4
	10	221.8	21.9	286.6	28.1	329.4	31.6	414.9	40.5	452.6	43.5	550.7	51.3	641.1	59.6	758.2	69.0	967.8	89.9	1143.0	103.9	1353.1	120.8
	15	200.1	20.1	258.5	25.8	294.1	28.7	368.6	36.7	397.0	38.9	485.2	46.0	562.4	53.2	665.1	61.4	849.0	80.2	1002.7	92.5	1187.0	107.3
	20	174.7	18.0	225.7	23.1	252.9	25.3	314.6	32.2	332.5	33.6	409.1	39.8	471.1	45.7	557.1	52.6	711.1	69.0	839.8	79.3	994.1	91.6
	25	146.8	15.7	189.7	20.1	207.9	21.6	255.6	27.4	262.1	27.9	326.1	33.0	371.4	37.6	439.2	43.1	560.6	56.7	662.1	64.9	783.8	74.6
	30	115.0	14.5	148.6	18.2	156.7	18.2	196.1	25.4	200.6	25.4	231.7	25.4	258.2	29.1	305.4	32.2	389.8	43.6	460.4	48.5	544.9	55.3
	35	102.3	14.3	126.7	17.8	129.3	17.8	169.1	24.9	169.4	24.9	180.4	24.9	196.6	28.5	215.5	28.5	296.8	42.8	324.9	42.8	324.0	42.8
	40	88.9	14.0	114.9	17.5	114.4	17.5	150.3	24.4	148.1	24.4	151.3	24.4	177.7	27.9	172.4	27.9	268.3	41.9	259.9	41.9	274.0	41.9
105	-40	320.8	30.8	414.5	39.6	494.4	46.0	629.8	59.4	716.3	66.3	859.0	74.7	1014.8	91.5	1200.1	106.0	1531.9	138.1	1809.2	160.3	2141.7	164.7
	-35	331.3	31.6	428.1	40.7	510.0	47.2	650.1	61.0	738.6	68.1	886.1	74.2	1046.4	94.0	1237.4	105.3	1579.6	141.8	1865.5	163.4	2208.3	163.4
	-30	339.0	32.2	438.0	41.4	521.2	47.9	664.7	62.1	754.1	69.3	905.2	73.7	1068.4	95.7	1263.4	104.5	1612.8	144.3	1904.7	161.9	2254.7	161.9
	-25	344.8	32.6	445.5	42.0	529.4	47.5	675.2	62.9	765.0	70.0	918.6	73.1	1083.8	96.8	1281.6	103.6	1636.0	146.1	1932.1	160.2	2287.1	160.2
	-20	348.5	32.9	450.2	42.3	534.2	47.0	681.3	63.3	770.6	70.4	925.9	72.5	1091.7	97.4	1291.0	102.6	1648.0	146.9	1946.3	158.4	2303.9	158.4
	-15	348.7	32.9	450.5	42.3	533.6	46.5	680.4	63.1	768.0	70.1	923.5	71.7	1088.1	97.0	1286.7	101.5	1642.5	146.3	1939.8	156.3	2296.3	156.3
	-10	346.7	32.7	447.9	42.0	529.4	45.9	675.0	62.6	760.2	69.4	914.7	70.9	1077.0	96.0	1273.6	100.2	1625.7	144.8	1920.0	154.0	2261.0	154.0
	-5	342.8	32.3	442.9	41.5	522.2	45.2	665.7	61.8	747.8	68.3	900.6	69.9	1059.5	94.5	1252.9	98.8	1599.3	142.5	1888.8	151.3	2223.0	151.3
	0	334.7	31.6	432.4	40.6	508.5	44.5	647.9	60.2	725.5	66.4	874.7	68.9	1027.9	91.8	1215.5	97.1	1551.6	138.5	1832.5	148.4	2169.2	148.4
	5	323.8	30.6	418.3	39.4	490.2	43.7	624.2	58.2	696.4	64.0	840.7	67.7	986.6	88.4	1166.8	95.3	1489.3	133.4	1759.0	145.2	2082.1	145.2
	10	310.0	29.5	400.5	37.9	467.4	42.8	594.9	55.8	660.6	61.0	798.8	66.4	935.8	84.2	1106.7	93.3	1412.7	127.0	1668.4	141.6	1975.0	141.6
	15	293.7	28.1	379.4	36.1	440.6	41.0	560.3	52.8	618.7	57.5	749.6	64.9	876.5	79.3	1036.5	91.0	1323.1	119.6	1562.6	137.6	1849.7	137.6
	20	273.8	26.4	353.7	33.9	408.1	38.3	518.4	49.3	568.2	53.3	690.2	63.1	805.0	73.4	952.0	85.2	1215.2	110.7	1435.2	128.4	1698.8	133.1
	25	251.6	24.5	325.0	31.5	371.9	35.3	471.8	45.5	512.3	48.7	624.3	57.7	725.8	66.9	858.3	77.5	1095.6	100.9	1293.9	116.8	1531.7	128.2
	30	225.5	22.4	291.4	28.7	329.8	31.8	417.4	41.0	447.3	43.4	547.7	51.4	633.7	59.4	749.4	68.6	956.6	89.5	1129.7	103.4	1337.3	120.0
	35	193.8	19.7	250.4	25.3	278.5	27.6	351.3	35.5	368.4	36.9	454.6	43.8	522.0	50.2	617.3	57.9	788.0	75.7	930.6	87.2	1101.6	100.8
	40	161.0	17.0	208.0	21.8	225.5	23.2	282.9	29.9	287.1	30.2	358.5	35.9	406.7	40.8	481.0	46.8	614.0	61.5	725.1	70.4	858.4	81.1

Note: All values are at 100% compressor load. Refer to FES if part load operation will occur for an extended period of time, or if elevated condensing temperature may occur. Values are based on 130 °F oil out of cooler.

FES Systems Inc.

OIL COOLER HEAT REJECTION (MBH)

GL Series

Table 21

R-717 BOOSTER																							
MODEL		180GLB		230GLB		290GLB		400GLB		475GLB		565GLB		675GLB		800GLB		1025GLB		1210GLB		1435GLB	
CT °F	ET °F	MBH	Nominal Oil Flow	MBH	Nominal Oil Flow	MBH	Nominal Oil Flow	MBH	Nominal Oil Flow	MBH	Nominal Oil Flow	MBH	Nominal Oil Flow	MBH	Nominal Oil Flow	MBH	Nominal Oil Flow	MBH	Nominal Oil Flow	MBH	Nominal Oil Flow	MBH	Nominal Oil Flow
0	-70	53.7	11.7	69.1	14.6	78.6	14.6	104.8	20.4	117.1	20.4	133.5	20.4	156.4	23.3	184.9	24.6	235.9	35.0	278.8	37.0	330.0	42.1
	-65	48.5	11.6	62.3	14.6	70.0	14.6	94.0	20.4	101.3	20.4	117.7	20.4	137.3	23.3	156.3	23.3	205.6	35.0	235.6	35.0	278.9	37.0
	-60	40.5	11.6	52.3	14.6	57.7	14.6	77.6	20.4	82.1	20.4	95.3	20.4	110.4	23.3	124.8	23.3	166.4	34.9	185.9	34.9	209.9	34.9
	-55	34.7	11.6	44.8	14.6	48.7	14.6	65.4	20.4	68.2	20.4	79.3	20.4	89.7	23.3	101.2	23.3	135.3	34.9	152.5	34.9	168.6	34.9
	-50	29.0	11.6	36.9	14.5	39.3	14.5	51.8	20.3	52.9	20.3	61.9	20.3	70.1	23.3	77.3	23.3	105.8	34.9	116.5	34.9	131.1	34.9
	-45	23.1	11.6	29.9	14.5	31.1	14.5	38.7	20.3	37.2	20.3	44.3	20.3	49.0	23.2	55.8	23.2	74.0	34.9	84.1	34.9	91.8	34.9
	-40	16.8	11.6	21.7	14.5	20.8	14.5	24.3	20.3	21.5	20.3	25.4	20.3	26.2	23.2	31.0	23.2	39.6	34.8	46.7	34.8	50.8	34.8
	-35	10.5	11.6	13.5	14.5	11.6	14.5	8.3	20.3	13.3	20.3	6.6	20.3	6.1	23.2	4.3	23.2	9.2	34.8	6.5	34.8	7.7	34.8
	-30	4.6	11.6	4.9	14.5	2.1	14.5	0.0	20.3	13.3	20.3	0.0	20.3	0.0	23.2	0.0	23.2	0.0	34.8	0.0	34.8	0.0	34.8
	-25	0.0	11.6	0.0	14.5	0.0	14.5	0.0	20.3	13.3	20.3	0.0	20.3	0.0	23.2	0.0	23.2	0.0	34.7	0.0	34.7	0.0	34.7
	-20	0.0	11.6	0.0	14.5	0.0	14.5	0.0	20.2	13.3	20.2	0.0	20.2	0.0	23.1	0.0	23.1	0.0	34.7	0.0	34.7	0.0	34.7
	-15	0.0	11.6	0.0	14.5	0.0	14.5	0.0	20.2	13.3	20.2	0.0	20.2	0.0	23.1	0.0	23.1	0.0	34.7	0.0	34.7	0.0	34.7
	-10	0.0	11.6	0.0	14.4	0.0	14.4	0.0	20.2	13.3	20.2	0.0	20.2	0.0	23.1	0.0	23.1	0.0	34.7	0.0	34.7	0.0	34.7
10	-70	79.7	11.7	102.9	14.7	121.2	16.0	151.8	20.5	177.1	28.0	205.2	25.9	241.4	30.2	285.5	34.6	364.3	45.5	430.3	50.7	509.4	50.7
	-65	73.1	11.7	94.1	14.7	109.6	14.8	137.3	20.5	161.0	26.0	184.8	23.8	216.8	27.8	256.4	31.7	327.2	41.9	386.5	47.8	457.5	49.9
	-60	64.0	11.7	82.2	14.6	91.9	14.6	118.3	20.5	135.4	22.7	152.9	20.6	178.6	24.0	211.1	27.2	269.3	36.1	318.2	41.0	376.7	46.8
	-55	58.0	11.7	74.4	14.6	82.2	14.6	104.5	20.5	113.7	20.5	127.9	20.5	147.1	23.4	172.3	23.4	221.9	35.1	259.7	35.1	307.4	39.9
	-50	50.7	11.7	64.9	14.6	71.3	14.6	89.9	20.5	94.0	20.5	108.5	20.5	125.2	23.4	138.5	23.4	186.5	35.1	208.8	35.1	233.5	35.1
	-45	43.5	11.7	55.6	14.6	60.2	14.6	73.9	20.5	76.0	20.5	87.7	20.5	100.2	23.4	111.9	23.4	151.3	35.1	168.7	35.1	184.1	35.1
	-40	35.5	11.7	45.0	14.6	47.7	14.6	57.6	20.4	56.3	20.4	65.3	20.4	73.3	23.3	81.6	23.3	110.7	35.0	123.1	35.0	132.1	35.0
	-35	27.3	11.7	34.4	14.6	35.3	14.6	39.4	20.4	37.9	20.4	42.8	20.4	48.7	23.3	51.8	23.3	73.5	35.0	78.1	35.0	87.2	35.0
	-30	18.7	11.6	24.2	14.6	22.5	14.6	21.7	20.4	19.5	20.4	19.7	20.4	21.3	23.3	21.9	23.3	32.2	34.9	33.0	34.9	39.0	34.9
	-25	11.1	11.6	14.3	14.5	11.5	14.5	5.0	20.3	19.4	20.3	1.1	20.3	0.0	23.3	0.0	23.3	0.0	34.9	0.0	34.9	0.0	34.9
	-20	4.5	11.6	4.5	14.5	1.0	14.5	0.0	20.3	19.4	20.3	0.0	20.3	0.0	23.2	0.0	23.2	0.0	34.8	0.0	34.8	0.0	34.8
	-15	0.0	11.6	0.0	14.5	0.0	14.5	0.0	20.3	19.4	20.3	0.0	20.3	0.0	23.2	0.0	23.2	0.0	34.8	0.0	34.8	0.0	34.8
	-10	0.0	11.6	0.0	14.5	0.0	14.5	0.0	20.3	19.4	20.3	0.0	20.3	0.0	23.2	0.0	23.2	0.0	34.7	0.0	34.7	0.0	34.7
20	-70	110.7	14.2	143.1	18.2	169.6	20.8	207.2	26.1	240.9	33.0	281.4	33.0	331.7	39.3	392.2	41.7	500.6	57.6	591.3	57.6	691.0	57.6
	-65	104.6	13.5	135.1	17.4	159.6	19.8	193.2	24.7	225.4	32.7	261.6	31.5	307.9	36.9	364.0	41.2	464.6	55.6	548.8	56.8	643.0	56.8
	-60	93.6	12.4	120.9	15.9	141.9	18.0	170.6	22.5	199.7	30.9	229.7	28.3	269.6	33.1	318.8	38.0	406.8	49.9	480.6	55.9	568.9	55.9
	-55	84.8	11.8	109.6	14.8	127.8	16.6	151.8	20.7	178.9	28.3	203.3	25.7	237.9	29.9	281.4	34.2	359.1	45.1	424.2	51.6	502.1	54.8
	-50	74.6	11.8	95.8	14.8	110.6	14.9	131.8	20.7	155.5	25.3	173.8	22.8	202.5	26.4	239.5	30.1	305.7	39.8	361.1	45.3	427.4	51.9
	-45	66.1	11.8	84.7	14.7	92.5	14.7	114.3	20.6	128.5	21.9	139.6	20.6	161.5	23.6	191.0	25.2	243.8	35.4	288.0	38.0	340.9	43.3
	-40	56.5	11.8	72.2	14.7	78.2	14.7	94.9	20.6	98.7	20.6	112.6	20.6	129.1	23.6	140.0	23.6	191.6	35.3	211.0	35.3	236.1	35.3
	-35	46.7	11.8	59.4	14.7	63.0	14.7	74.7	20.6	76.2	20.6	86.7	20.6	98.0	23.5	107.2	23.5	148.0	35.3	161.6	35.3	175.7	35.3
	-30	36.5	11.7	47.1	14.7	48.6	14.7	54.9	20.5	52.7	20.5	60.1	20.5	69.0	23.5	74.8	23.5	99.8	35.2	112.8	35.2	121.6	35.2
	-25	27.1	11.7	35.0	14.6	34.7	14.6	35.5	20.5	31.8	20.5	37.1	20.5	38.6	23.4	41.7	23.4	58.2	35.1	62.9	35.1	67.6	35.1
	-20	18.8	11.7	23.0	14.6	21.3	14.6	17.3	20.5	25.6	20.5	14.3	20.5	15.0	23.4	17.7	23.4	22.2	35.1	26.5	35.1	23.6	35.1
	-15	9.8	11.7	12.6	14.6	8.5	14.6	0.7	20.4	25.6	20.4	0.0	20.4	0.0	23.3	0.0	23.3	0.0	35.0	0.0	35.0	0.0	35.0
	-10	2.5	11.6	3.3	14.6	0.0	14.6	0.0	20.4	25.5	20.4	0.0	20.4	0.0	23.3	0.0	23.3	0.0	34.9	0.0	34.9	0.0	34.9
30	-70	145.3	17.6	187.7	22.6	223.5	23.8	267.4	32.2	310.2	36.3	364.1	36.3	429.7	47.0	508.2	47.0	648.6	65.7	763.0	65.7	884.0	65.7
	-65	139.4	17.0	180.1	21.9	214.0	23.6	254.5	30.9	295.9	36.0	345.7	36.0	407.7	46.5	482.1	46.5	615.2	64.9	723.0	64.9	840.0	64.9
	-60	128.3	15.9	165.8	20.5	196.1	23.4	232.4	28.7	270.9	35.7	314.7	35.7	370.4	43.2	437.9	45.9	558.9	64.0	660.2	64.0	769.0	64.0
	-55	119.4	15.1	154.2	19.3	181.7	22.0	215.4	27.0	252.1	35.2	290.8	34.5	341.6	40.3	404.0	45.2	515.7	60.8	609.1	63.0	715.0	63.0
	-50	108.3	14.0	140.0	17.9	163.9	20.3	194.5	24.9	228.9	34.7	261.4	31.6	306.4	36.8	362.4	42.4	462.6	55.5	546.3	61.8	646.7	61.8
	-45	96.1	12.7	124.1	16.3	144.2	18.3	170.2	22.5	201.9	31.3	227.2	28.1	265.4	32.7	313.9	37.5	400.7	49.3	473.2	56.5	560.1	60.4
	-40	81.6	11.9	105.5	14.9	121.1	16.0	140.5	20.9	168.9	27.1	185.6	24.0	215.6	27.8	254.9	31.7	325.4	41.9	384.3	47.7	455.0	54.7
	-35	69.3	11.9	88.6	14.9	95.6	14.9	117.4	20.9	131.7	22.3	138.6	20.9	159.3	23.8	188.4	25.1	240.4	35.7	284.0	37.7	336.1	42.9
	-30	57.6	11.9	73.4	14.9	78.5	14.9	94.2	20.8	95.2	20.8	108.7	20.8	123.4	23.8	132.4	23.8	186.3	35.6	199.6	35.6	218.2	35.6
	-25	46.8	11.9	59.2	14.8	62.0	14.8	70.9	20.7	71.8	20.7	79.6	20.7	91.9	23.7	96.9	23.7	133.7	35.6	146.2	35.6	159.1	35.6
	-20	36.0	11.8	46.5	14.8	47.6	14.8	51.7	20.7	49.3	20.7	54.6	20.7	62.3	23.6	64.8	23.6	94.1	35.5	97.7	35.5	107.6	35.5
	-15	26.5	11.8	32.7	14.7	32.3	14.7	32.6	20.6	32.0	20.6	30.5	20.6	34.1	23.6	35.2	23.6	51.1	35.4	53.0	35.4	53.7	35.4
	-10	16.5	11.8	21.3	14.7	18.3	14.7	15.6	20.6	31.9	20.6	10.2	20.6	10.2	23.5	11.9	23.5	14.9	35.3	17.9	35.3	21.3	35.3

Note: All values are at 100% compressor load. Refer to FES if part load operation will occur for an extended period of time, or if elevated condensing temperature may occur. Values are based on 130 °F oil out of cooler.

FES Systems Inc.

OIL COOLER HEAT REJECTION (MBH)

GL Series

Table 22

R-22 HIGH STAGE																						
MODEL		180GL		230GL		290GL		400GL		475GL		565GL		675GL		800GL		1025GL		1210GL		1435GL	
CT °F	ET °F	MBH	Nominal Oil Flow	MBH	Nominal Oil Flow	MBH	Nominal Oil Flow	MBH	Nominal Oil Flow	MBH	Nominal Oil Flow	MBH	Nominal Oil Flow	MBH	Nominal Oil Flow	MBH	Nominal Oil Flow	MBH	Nominal Oil Flow	MBH	Nominal Oil Flow	MBH	Nominal Oil Flow
85	-50	116.5	15.6	148.9	19.5	176.7	19.5	208.3	27.3	296.9	31.4	281.0	29.8	336.4	35.3	397.8	40.2	507.8	53.1	599.8	60.5	710.0	69.3
	-45	110.5	15.5	139.1	19.4	159.0	19.4	192.9	27.2	289.3	31.6	241.6	27.2	289.3	31.4	342.1	35.7	436.7	47.4	515.7	53.7	610.5	61.3
	-40	102.4	15.4	130.3	19.3	146.1	19.3	174.5	27.0	260.3	31.1	207.1	27.0	242.4	30.9	273.6	30.9	366.0	46.3	412.4	46.3	488.2	51.4
	-35	94.3	15.3	119.5	19.2	133.6	19.2	157.6	26.8	229.3	30.4	183.6	26.8	213.5	30.7	230.0	30.7	322.2	46.0	335.5	46.0	357.1	46.0
	-30	85.0	15.2	107.2	19.0	119.7	19.0	139.9	26.6	195.5	29.7	159.8	26.6	184.1	30.4	192.2	30.4	277.9	45.7	289.8	45.7	312.8	45.7
	-25	74.9	15.1	93.8	18.9	105.1	18.9	122.3	26.4	162.6	28.3	137.2	26.4	156.2	30.2	165.5	30.2	235.8	45.3	249.5	45.3	261.0	45.3
	-20	64.5	15.0	83.3	18.7	90.7	18.7	103.8	26.2	133.2	27.0	114.8	26.2	137.8	29.9	141.3	29.9	207.2	44.9	212.8	44.9	213.5	44.9
	-15	56.5	14.8	69.2	18.5	76.4	18.5	87.7	25.9	104.1	25.9	97.0	25.9	106.2	29.6	113.3	29.6	159.4	44.5	170.6	44.5	180.4	44.5
	-10	46.1	14.7	59.5	18.3	63.3	18.3	67.8	25.7	82.0	25.7	75.7	25.7	91.0	29.3	93.8	29.3	136.4	44.0	141.2	44.0	143.1	44.0
	-5	36.2	14.5	46.8	18.2	52.2	18.2	56.4	25.4	81.1	25.4	57.8	25.4	69.5	29.0	67.0	29.0	104.0	43.5	100.8	43.5	119.5	43.5
	0	27.4	14.3	35.4	17.9	37.3	17.9	39.9	25.1	80.2	25.1	44.1	25.1	53.1	28.7	46.0	28.7	79.3	43.0	69.1	43.0	81.9	43.0
	5	20.4	14.2	26.3	17.7	25.4	17.7	31.7	24.8	79.2	24.8	31.2	24.8	37.8	28.3	26.0	28.3	56.0	42.5	39.0	42.5	46.4	42.5
	10	14.9	14.0	19.3	17.5	15.9	17.5	14.0	24.5	78.1	24.5	19.7	24.5	23.9	28.0	7.6	28.0	35.0	41.9	11.3	41.9	13.5	41.9
	15	6.4	13.8	8.3	17.2	10.2	17.2	0.0	24.1	77.1	24.1	0.0	24.1	0.0	27.6	0.0	27.6	0.0	41.4	0.0	41.4	0.0	41.4
	20	0.0	13.6	0.0	17.0	0.0	17.0	0.0	23.8	76.0	23.8	0.0	23.8	0.0	27.2	0.0	27.2	0.0	40.8	0.0	40.8	0.0	40.8
	25	0.0	13.4	0.0	16.7	0.0	16.7	0.0	23.4	74.8	23.4	0.0	23.4	0.0	26.8	0.0	26.8	0.0	40.2	0.0	40.2	0.0	40.2
	30	0.0	13.2	0.0	16.5	0.0	16.5	0.0	23.1	73.7	23.1	0.0	23.1	0.0	26.4	0.0	26.4	0.0	39.6	0.0	39.6	0.0	39.6
	35	0.0	13.0	0.0	16.2	0.0	16.2	0.0	22.7	72.5	22.7	0.0	22.7	0.0	26.0	0.0	26.0	0.0	38.9	0.0	38.9	0.0	38.9
	40	0.0	12.8	0.0	16.0	0.0	16.0	0.0	22.4	71.4	22.4	0.0	22.4	0.0	25.5	0.0	25.5	0.0	38.3	0.0	38.3	0.0	38.3
95	-50	146.2	17.1	188.9	21.3	234.3	24.4	274.6	29.9	336.0	35.3	384.4	38.7	460.2	45.9	544.2	52.7	694.6	69.3	820.4	79.3	971.1	91.4
	-45	139.0	17.0	179.7	21.2	222.8	23.5	254.6	29.7	340.7	35.6	356.4	36.4	426.6	43.2	504.5	49.4	644.0	65.1	760.6	74.5	900.4	85.7
	-40	131.8	16.9	168.2	21.1	205.9	22.1	231.6	29.5	344.9	35.9	319.6	33.5	382.6	39.6	452.4	45.2	577.5	59.7	682.1	68.1	807.4	78.1
	-35	124.0	16.7	157.9	20.9	183.9	20.9	214.9	29.3	341.0	35.6	274.2	29.8	328.2	35.2	388.2	40.0	495.5	53.1	585.2	60.2	692.7	68.8
	-30	114.5	16.6	145.2	20.8	163.2	20.8	196.1	29.0	305.0	34.8	226.0	29.0	263.2	33.2	311.3	33.8	397.4	49.8	469.3	50.9	555.5	57.8
	-25	105.8	16.5	133.6	20.6	146.6	20.6	180.9	28.8	270.9	34.1	205.0	28.8	237.2	32.9	251.3	32.9	358.0	49.4	378.9	49.4	396.5	49.4
	-20	96.6	16.3	121.3	20.4	133.3	20.4	161.0	28.5	232.5	32.7	178.8	28.5	214.0	32.6	220.1	32.6	309.0	48.9	331.8	48.9	353.6	48.9
	-15	86.7	16.1	108.1	20.2	119.6	20.2	140.3	28.2	196.1	31.3	161.5	28.2	182.9	32.3	191.6	32.3	276.1	48.4	288.8	48.4	297.8	48.4
	-10	76.7	16.0	99.1	20.0	106.8	20.0	127.1	27.9	160.5	29.6	138.8	27.9	154.5	31.9	168.8	31.9	233.2	47.9	254.5	47.9	252.0	47.9
	-5	67.1	15.8	86.7	19.7	89.5	19.7	104.9	27.6	132.5	27.9	114.2	27.6	137.0	31.5	146.5	31.5	205.9	47.3	220.7	47.3	206.6	47.3
	0	58.2	15.6	75.2	19.5	80.0	19.5	87.4	27.2	107.3	27.2	98.1	27.2	117.8	31.1	122.0	31.1	176.8	46.7	183.7	46.7	187.0	46.7
	5	51.0	15.4	60.0	19.2	67.0	19.2	78.0	26.9	93.8	26.9	82.4	26.9	99.0	30.7	98.0	30.7	148.4	46.1	147.4	46.1	140.9	46.1
	10	40.1	15.1	51.8	18.9	56.0	18.9	58.3	26.5	92.5	26.5	66.8	26.5	80.3	30.3	73.9	30.3	120.1	45.4	111.1	45.4	131.7	45.4
	15	35.8	14.9	39.0	18.6	39.4	18.6	52.4	26.1	91.0	26.1	57.0	26.1	49.1	29.8	57.9	29.8	73.0	44.7	87.0	44.7	103.2	44.7
	20	27.9	14.7	36.1	18.3	34.8	18.3	37.7	25.7	89.6	25.7	34.8	25.7	42.1	29.3	49.6	29.3	62.3	44.0	74.4	44.0	43.0	44.0
	25	21.8	14.4	28.2	18.0	24.1	18.0	26.5	25.2	88.0	25.2	17.4	25.2	21.2	28.8	24.9	28.8	30.8	43.2	37.3	43.2	44.3	43.2
	30	10.6	14.1	13.7	17.7	17.0	17.7	18.4	24.8	86.4	24.8	4.0	24.8	5.3	28.3	6.0	28.3	6.7	42.4	8.8	42.4	10.6	42.4
	35	10.0	13.9	12.9	17.4	16.0	17.4	1.6	24.3	84.8	24.3	2.2	24.3	3.1	27.8	3.5	27.8	3.4	41.6	4.9	41.6	6.0	41.6
	40	2.5	13.6	3.2	17.0	4.0	17.0	6.3	23.8	83.2	23.8	0.0	23.8	0.0	27.2	0.0	27.2	0.0	40.9	0.0	40.9	0.0	40.9
105	-50	186.4	20.0	240.9	25.6	298.7	30.2	355.2	37.3	420.2	42.5	497.2	48.6	595.3	57.8	703.9	66.5	898.6	87.1	1061.3	100.1	1256.2	115.7
	-45	183.5	19.7	237.1	25.2	294.0	29.8	344.3	36.3	407.3	41.4	482.0	47.4	577.1	56.2	682.4	64.7	871.1	84.8	1028.8	97.4	1217.8	112.5
	-40	177.3	19.2	229.1	24.6	284.1	29.0	327.3	34.9	392.4	40.6	458.3	45.4	548.6	53.9	648.8	61.9	828.1	81.2	978.0	93.2	1157.8	107.6
	-35	168.0	18.5	217.0	23.6	269.1	27.7	304.3	33.0	398.2	41.0	426.1	42.8	510.1	50.7	603.2	58.2	770.0	76.5	909.4	87.6	1076.5	101.0
	-30	155.4	18.4	200.7	23.0	248.9	26.1	275.2	32.2	396.9	40.8	385.2	39.4	461.2	46.7	545.4	53.5	696.1	70.4	822.2	80.5	973.2	92.6
	-25	144.4	18.2	183.4	22.8	223.5	24.0	249.8	31.9	387.9	40.0	335.9	35.4	402.1	41.9	475.5	47.8	606.9	63.2	716.8	72.0	848.5	82.5
	-20	134.3	18.0	170.0	22.6	193.4	22.6	232.6	31.6	366.4	39.3	278.5	31.6	333.4	36.3	394.3	41.2	503.3	54.7	594.5	62.0	703.7	70.8
	-15	122.7	17.9	158.5	22.3	172.2	22.3	207.8	31.2	328.0	37.9	237.9	31.2	274.3	35.7	299.4	35.7	414.0	53.6	451.4	53.6	534.3	57.1
	-10	113.5	17.6	142.2	22.1	154.5	22.1	188.6	30.9	283.4	36.4	214.5	30.9	244.9	35.3	261.6	35.3	369.7	52.9	394.4	52.9	392.2	52.9
	-5	104.5	17.4	130.1	21.8	143.0	21.8	170.2	30.5	245.7	34.6	193.9	30.5	218.9	34.8	227.6	34.8	330.4	52.3	343.1	52.3	350.3	52.3
	0	91.7	17.2	118.5	21.5	126.6	21.5	153.2	30.1	209.2	32.7	165.2	30.1	197.7	34.4	199.0	34.4	298.5	51.5	299.9	51.5	324.0	51.5
	5	84.2	16.9	102.7	21.2	112.3	21.2	139.6	29.6	176.6	31.0	154.3	29.6	168.4	33.9	179.8	33.9	254.2	50.8	271.1	50.8	286.4	50.8
	10	72.4	16.7	93.6	20.8	99.4	20.8	117.6	29.2	147.1	29.2	134.4	29.2	142.8	33.3	147.4	33.3	215.5	50.0	222.2	50.0	224.9	50.0
	15	67.4	16.4	79.6	20.5	89.5	20.5	109.8	28.7	124.6	28.7	103.4	28.7	123.8	32.8	122.7	32.8	186.8	49.1	184.9	49.1	176.7	49.1
	20	58.3	16.1	75.3	20.1	73.1	20.1	93.7	28.1	106.7	28.1	94.2	28.1	112.8	32.2	107.3	32.2	170.2	48.3	161.7	48.3	144.8	48.3
	25	50.7	15.8	65.5	19.7	58.9	19.7	80.8	27.6	104.7	27.6	72.5	27.6	86.8	31.6	102.7	31.6	131.1	47.3	154.8	47.3	132.2	47.3
	30	45.2	15.5	48.6	19.3	48.1	19.3	72.2	27.1	102.6	27.1	56.7	27.1	67.9	30.9	80.3	30.9	102.5	46.4	121.0	46.4	87.3	46.4
	35	35.0	15.1	45.2	18.9	42.7	18.9	53.5	26.5	100.4	26.5	50.7	26.5	60.7	30.3	71.8	30.3	91.6	45.4	108.2	45.4	66.9	45.4
	40	24.9	14.8	32.2	18.5	39.9	18.5	35.0	25.9	98.2	25.9	49.1	25.9	58.7	29.6	32.2	29.6	88.7	44.4	48.5	44.4	57.4	44.4
115	-50	232.0	24.3	299.8	31.1	371.7	36.9	444.1	45.5	525.3	52.0	621.7	59.7	744.2	71.0	880.1	81.8	1123.5	107.0	1326.8	123.3	1570.6	142.8
	-45	233.7	24.4	302.0	31.2	374.4	37.0	443.4	45.4	524.5	51.9	620.7	59.6	743.1	70.8	878.7	81.6	1121.7	106.7	1324.7	123.0	1568.1	142.5
	-40	232.3	24.2	300.1	31.0	372.1	36.8	436.7	44.8	516.7	51.2	611.4	58.8	732.0	69.8	865.6	80.5	1104.9	105.3	1305.0	121.3	1544.7	140.5
	-35	227.7	23.8	294.2	30.5	364.8	36.2	424.3	43.7	501.9	49.9	594.0	57.3	711.1	68.1	841.0	78.5	1073.5	102.6	1267.8	118.2	1500.7	136.8
	-30	220.0	23.1	284.2	29.7	352.4	35.1	405.8	42.1	480.1	48.1	568.1	55.1	680.2	65.5	804.3	75.4	1026.7	98.7	1212.6	113.6	1435.4	131.5
	-25	209.2	22.2	270.2	28.5	335.1	33.7	381.4	40.1	461.5	47.1	534.0	52.3	639.3	62.1	756.0	71.5	965.0	93.7	1139.7	107.6	1349.1	124.4
	-20	195.4	21.1	252.5	27.0	313.1	31.8	351.5	37.6	452.3	46.2	492.1	48.9	589.1	58.0	696.7	66.6	889.3	87.4	1050.3	100.3	1243.2	115.8
	-15	178.2	20.1	230.2	25.1	285.4	29.5	314.8	35.1	443.6	45.4	440.7	44.6	527.6	52.9	623.9	60.6	796.4	79.8	940.5	91.3	1113.3	105.2
	-10	157.7	19.8	203.8	24.8	252.7	26.8	279.0	34.7	429.5	44.1	380.5	39.7	455.6	47.0	538.7	53.7	687.7	70.9	812.2	80.9	961.4	92.8
	-5	149.5	19.6	188.2	24.4	214.9	24.4	254.6	34.2	402.5	42.4	311.7	34.2	373.2	40.3	441.3	45.8	563.3	60.7	665.3	68.9	787.5	78.7
	0	137.3	19.3	171.8	24.1	185.7	24.1	238.3	33.7	357.1	40.6	258.9	33.7	295.1	38.6	331.4	38.6	445.4	57.8	499.6	57.8	591.4	62.8
	5	125.4	19.0	162.0	23.7	170.3	23.7	215.0	33.2	311.2	38.6	231.7	33.2	277.4	38.0	288.9	38.0	418.7	56.9	435.6	56.9	446.1	56.9
	10	113.3	18.7	146.4	23.3	156.1	23.3	191.6	32.7	275.2	36.6	206.8	32.7	247.5	37.3	249.3	37.3	373.7	56.0	375.8	56.0	367.5	56.0
	15	107.7	18.3	131.5	22.9	144.4	22.9	181.8	32.1	237.1	34.7	186.5	32.1	223.2	36.7	216.0	36.7	337.0	55.0	325.6	55.0	342.7	55.0
	20	97.6	18.0	117.8	22.5	125.4	22.5	162.8	31.5	207.3	32.9	171.7	31.5	205.6	36.0	190.2	36.0	310.3	54.0	286.8	54.0	292.3	54.0
	25	88.8	17.6	105.6	22.0	108.3	22.0	146.4	30.8	175.3	31.1	143.2	30.8	171.5	35.2	173.7	35.2	258.9	52.9	261.9	52.9	258.2	52.9
	30	74.1	17.2	95.7	21.6	106.2	21.6	133.6	30.2	150.5	30.2	142.0	30.2	143.1	34.5	169.2	34.5	216.0	51.7	255.1	51.7	245.2	51.7
	35	69.7	16.9	90.0	21.1	84.4	21.1	110.0	29.5	131.8	29.5	129.3	29.5	125.3	33.7	148.2	33.7	189.2	50.6	223.4	50.6	202.4	50.6
	40	57.5	16.4	74.3	20.6	77.2	20.6	105.4	28.8	117.7	28.8	93.5	28.8	111.9	32.9	132.4	32.9	169.0	49.3	199.6	49.3	168.2	49.3

Note: All values are at 100% compressor load. Refer to FES if part load operation will occur for an extended period of time, or if elevated condensing temperature may occur. Values are based on 130 °F oil out of cooler.

FES Systems Inc.

OIL COOLER HEAT REJECTION (MBH)

GL Series

Table 23

R-22 BOOSTER																					
MODEL		180GLB		230GLB		290GLB		400GLB		475GLB		565GLB		675GLB		800GLB		1025GLB		1210GLB		1435GLB	
CT °F	ET °F	MBH	Nominal Oil Flow	MBH	Nominal Oil Flow	MBH	Nominal Oil Flow	MBH	Nominal Oil Flow	MBH	Nominal Oil Flow	MBH	Nominal Oil Flow	MBH	Nominal Oil Flow	MBH	Nominal Oil Flow	MBH	Nominal Oil Flow	MBH	Nominal Oil Flow	MBH	Nominal Oil Flow
0	-70	-----	11.7	-----	14.6	-----	14.6	-----	20.5	13.5	20.5	-----	20.5	-----	23.4	-----	23.4	-----	35.1	-----	35.1	-----	35.1
	-65	-----	11.7	-----	14.6	-----	14.6	-----	20.5	13.4	20.5	-----	20.5	-----	23.4	-----	23.4	-----	35.1	-----	35.1	-----	35.1
	-60	-----	11.7	-----	14.6	-----	14.6	-----	20.5	13.4	20.5	-----	20.5	-----	23.4	-----	23.4	-----	35.1	-----	35.1	-----	35.1
	-55	-----	11.7	-----	14.6	-----	14.6	-----	20.4	13.4	20.4	-----	20.4	-----	23.3	-----	23.3	-----	35.0	-----	35.0	-----	35.0
	-50	-----	11.7	-----	14.6	-----	14.6	-----	20.4	13.4	20.4	-----	20.4	-----	23.3	-----	23.3	-----	35.0	-----	35.0	-----	35.0
	-45	-----	11.6	-----	14.6	-----	14.6	-----	20.4	13.4	20.4	-----	20.4	-----	23.3	-----	23.3	-----	34.9	-----	34.9	-----	34.9
	-40	-----	11.6	-----	14.5	-----	14.5	-----	20.4	13.4	20.4	-----	20.4	-----	23.3	-----	23.3	-----	34.9	-----	34.9	-----	34.9
	-35	-----	11.6	-----	14.5	-----	14.5	-----	20.3	13.3	20.3	-----	20.3	-----	23.2	-----	23.2	-----	34.9	-----	34.9	-----	34.9
	-30	-----	11.6	-----	14.5	-----	14.5	-----	20.3	13.3	20.3	-----	20.3	-----	23.2	-----	23.2	-----	34.8	-----	34.8	-----	34.8
	-25	-----	11.6	-----	14.5	-----	14.5	-----	20.3	13.3	20.3	-----	20.3	-----	23.2	-----	23.2	-----	34.8	-----	34.8	-----	34.8
	-20	-----	11.6	-----	14.5	-----	14.5	-----	20.3	13.3	20.3	-----	20.3	-----	23.2	-----	23.2	-----	34.7	-----	34.7	-----	34.7
	-15	-----	11.6	-----	14.5	-----	14.5	-----	20.2	13.3	20.2	-----	20.2	-----	23.1	-----	23.1	-----	34.7	-----	34.7	-----	34.7
	-10	-----	11.6	-----	14.4	-----	14.4	-----	20.2	13.3	20.2	-----	20.2	-----	23.1	-----	23.1	-----	34.7	-----	34.7	-----	34.7
10	-70	13.0	11.8	16.8	14.8	19.7	14.8	14.4	20.7	19.7	20.7	18.2	20.7	21.9	23.6	23.1	23.6	32.8	35.4	34.8	35.4	36.2	35.4
	-65	6.1	11.8	7.8	14.8	9.7	14.8	-----	20.6	19.7	20.6	-----	20.6	-----	23.6	-----	23.6	-----	35.4	-----	35.4	-----	35.4
	-60	-----	11.8	-----	14.7	-----	14.7	-----	20.6	19.7	20.6	-----	20.6	-----	23.6	-----	23.6	-----	35.4	-----	35.4	-----	35.4
	-55	-----	11.8	-----	14.7	-----	14.7	-----	20.6	19.7	20.6	-----	20.6	-----	23.5	-----	23.5	-----	35.3	-----	35.3	-----	35.3
	-50	-----	11.8	-----	14.7	-----	14.7	-----	20.6	19.6	20.6	-----	20.6	-----	23.5	-----	23.5	-----	35.3	-----	35.3	-----	35.3
	-45	-----	11.7	-----	14.7	-----	14.7	-----	20.5	19.6	20.5	-----	20.5	-----	23.5	-----	23.5	-----	35.2	-----	35.2	-----	35.2
	-40	-----	11.7	-----	14.6	-----	14.6	-----	20.5	19.6	20.5	-----	20.5	-----	23.4	-----	23.4	-----	35.1	-----	35.1	-----	35.1
	-35	-----	11.7	-----	14.6	-----	14.6	-----	20.5	19.5	20.5	-----	20.5	-----	23.4	-----	23.4	-----	35.1	-----	35.1	-----	35.1
	-30	-----	11.7	-----	14.6	-----	14.6	-----	20.4	19.5	20.4	-----	20.4	-----	23.3	-----	23.3	-----	35.0	-----	35.0	-----	35.0
	-25	-----	11.6	-----	14.6	-----	14.6	-----	20.4	19.5	20.4	-----	20.4	-----	23.3	-----	23.3	-----	35.0	-----	35.0	-----	35.0
	-20	-----	11.6	-----	14.5	-----	14.5	-----	20.3	19.4	20.3	-----	20.3	-----	23.3	-----	23.3	-----	34.9	-----	34.9	-----	34.9
	-15	-----	11.6	-----	14.5	-----	14.5	-----	20.3	19.4	20.3	-----	20.3	-----	23.2	-----	23.2	-----	34.8	-----	34.8	-----	34.8
	-10	-----	11.6	-----	14.5	-----	14.5	-----	20.3	19.4	20.3	-----	20.3	-----	23.2	-----	23.2	-----	34.8	-----	34.8	-----	34.8
20	-70	35.3	12.0	44.7	15.0	52.2	15.0	52.5	20.9	58.8	20.9	65.6	20.9	76.2	23.9	84.4	23.9	114.7	35.9	127.1	35.9	135.3	35.9
	-65	27.9	11.9	36.0	14.9	41.0	14.9	36.0	20.9	40.7	20.9	43.7	20.9	52.3	23.9	55.4	23.9	78.9	35.9	83.5	35.9	93.2	35.9
	-60	18.8	11.9	24.3	14.9	27.4	14.9	19.2	20.9	26.2	20.9	24.3	20.9	26.1	23.9	30.9	23.9	39.4	35.8	46.5	35.8	48.7	35.8
	-55	8.9	11.9	11.6	14.9	12.8	14.9	1.0	20.8	26.1	20.8	1.4	20.8	1.6	23.8	1.9	23.8	2.4	35.7	2.9	35.7	3.4	35.7
	-50	-----	11.9	-----	14.9	-----	-----	0.0	20.8	26.1	20.8	-----	20.8	-----	23.8	-----	23.8	-----	35.7	-----	35.7	-----	35.7
	-45	-----	11.9	-----	14.8	-----	-----	0.0	20.8	26.0	20.8	-----	20.8	-----	23.7	-----	23.7	-----	35.6	-----	35.6	-----	35.6
	-40	-----	11.8	-----	14.8	-----	-----	0.0	20.7	26.0	20.7	-----	20.7	-----	23.7	-----	23.7	-----	35.5	-----	35.5	-----	35.5
	-35	-----	11.8	-----	14.8	-----	-----	0.0	20.7	25.9	20.7	-----	20.7	-----	23.6	-----	23.6	-----	35.4	-----	35.4	-----	35.4
	-30	-----	11.8	-----	14.7	-----	-----	0.0	20.6	25.8	20.6	-----	20.6	-----	23.6	-----	23.6	-----	35.3	-----	35.3	-----	35.3
	-25	-----	11.8	-----	14.7	-----	-----	0.0	20.6	25.8	20.6	-----	20.6	-----	23.5	-----	23.5	-----	35.3	-----	35.3	-----	35.3
	-20	-----	11.7	-----	14.6	-----	-----	0.0	20.5	25.7	20.5	-----	20.5	-----	23.4	-----	23.4	-----	35.2	-----	35.2	-----	35.2
	-15	-----	11.7	-----	14.6	-----	-----	0.0	20.5	25.6	20.5	-----	20.5	-----	23.4	-----	23.4	-----	35.1	-----	35.1	-----	35.1
	-10	-----	11.7	-----	14.6	-----	-----	0.0	20.4	25.6	20.4	-----	20.4	-----	23.3	-----	23.3	-----	35.0	-----	35.0	-----	35.0
30	-70	59.2	12.2	75.7	15.2	87.3	15.2	97.4	21.3	108.3	21.3	120.1	21.3	139.0	24.4	152.8	24.4	209.8	36.6	230.4	36.6	267.6	36.6
	-65	51.5	12.2	65.5	15.2	75.2	15.2	81.8	21.3	91.1	21.3	98.7	21.3	115.5	24.3	126.9	24.3	174.3	36.5	191.3	36.5	209.3	36.5
	-60	42.0	12.1	53.1	15.2	60.4	15.2	62.3	21.2	69.4	21.2	77.0	21.2	89.1	24.3	94.5	24.3	134.5	36.4	142.5	36.4	155.7	36.4
	-55	30.6	12.1	39.5	15.1	44.3	15.1	42.6	21.2	45.6	21.2	51.0	21.2	57.6	24.2	64.0	24.2	86.9	36.3	96.5	36.3	99.5	36.3
	-50	18.9	12.1	24.4	15.1	26.7	15.1	18.8	21.2	32.8	21.2	23.1	21.2	27.6	24.2	28.0	24.2	41.7	36.3	42.2	36.3	41.6	36.3
	-45	6.9	12.1	8.9	15.1	11.0	15.1	-----	21.1	32.7	21.1	-----	21.1	-----	24.1	-----	24.1	-----	36.2	-----	36.2	-----	36.2
	-40	-----	12.0	-----	15.0	-----	15.0	-----	21.0	32.6	21.0	-----	21.0	-----	24.0	-----	24.0	-----	36.1	-----	36.1	-----	36.1
	-35	-----	12.0	-----	15.0	-----	15.0	-----	21.0	32.6	21.0	-----	21.0	-----	24.0	-----	24.0	-----	36.0	-----	36.0	-----	36.0
	-30	-----	11.9	-----	14.9	-----	14.9	-----	20.9	32.4	20.9	-----	20.9	-----	23.9	-----	23.9	-----	35.9	-----	35.9	-----	35.9
	-25	-----	11.9	-----	14.9	-----	14.9	-----	20.8	32.3	20.8	-----	20.8	-----	23.8	-----	23.8	-----	35.7	-----	35.7	-----	35.7
	-20	-----	11.9	-----	14.8	-----	14.8	-----	20.8	32.2	20.8	-----	20.8	-----	23.7	-----	23.7	-----	35.6	-----	35.6	-----	35.6
	-15	-----	11.8	-----	14.8	-----	14.8	-----	20.7	32.1	20.7	-----	20.7	-----	23.6	-----	23.6	-----	35.5	-----	35.5	-----	35.5
	-10	-----	11.8	-----	14.7	-----	14.7	-----	20.6	32.0	20.6	-----	20.6	-----	23.6	-----	23.6	-----	35.3	-----	35.3	-----	35.3

Note: All values are at 100% compressor load. Refer to FES if part load operation will occur for an extended period of time, or if elevated condensing temperature may occur. Values are based on 130 °F oil out of cooler.

THERMOSIPHON OIL COOLING
(Piping and Vessel Design)

G Series

Thermosiphon oil cooling uses liquid refrigerant from the condenser to remove heat from the oil. The refrigerant is fed by gravity to the oil cooler, where it is vaporized. The vapor is returned to the condenser to be recondensed.

Proper piping of the thermosiphon oil cooling system is critical to ensure the liquid refrigerant will feed to the oil cooler. Design of the system will vary to suit each refrigeration system. The following guidelines will help you design a proper system.

A. The oil cooler must be provided with at least a five-minute uninterrupted liquid refrigerant supply, independent of all other system liquid requirements and regardless of system operating status. The receiver should be sized such that it will operate at a level of half full at the design minimum supply volume (see Table 24). It is strongly recommended that an independent auxiliary receiver (as shown in Figure 3) be installed to provide liquid refrigerant to the oil cooler. This vessel should be designed and installed in accordance with ASME, ASHRAE and IIAR codes or standards. The auxiliary receiver shall be fitted with a dual safety relief valve assembly. A drain connection should be provided at the lowest level in the vessel.

B. If isolation valves are installed in the refrigerant lines to or from the oil cooler, then a suitable pressure relief device must be incorporated so as to safely relieve excess pressure from the refrigerant side of the cooler due to hydrostatic pressure, fire or some other abnormal condition.

C. Total net positive liquid supply head to the cooler must be sufficient to overcome pressure losses in the cooler, pipes, valves and fittings at the design circulation rate. The oil coolers have been designed such that six to ten feet of head is sufficient for most applications if lines are properly sized.

Note: Excessive high head (over 25 feet) can cause elevated saturation temperatures resulting in performance loss. On such installations, a throttling valve must be installed on the inlet piping.

D. As a general rule, the liquid supply line from the condenser to the receiver should be sized for a maximum velocity of 100 ft/min (see Table 25). The vapor return line from the receiver to the condenser should be sized for a maximum pressure loss of 0.2 psid/100 ft for R-717 and 0.15 psid/100 ft for R-22 (see Table 26). The liquid supply line to the thermosiphon oil cooler and the liquid/vapor return line from the cooler should be sized per Table 27.

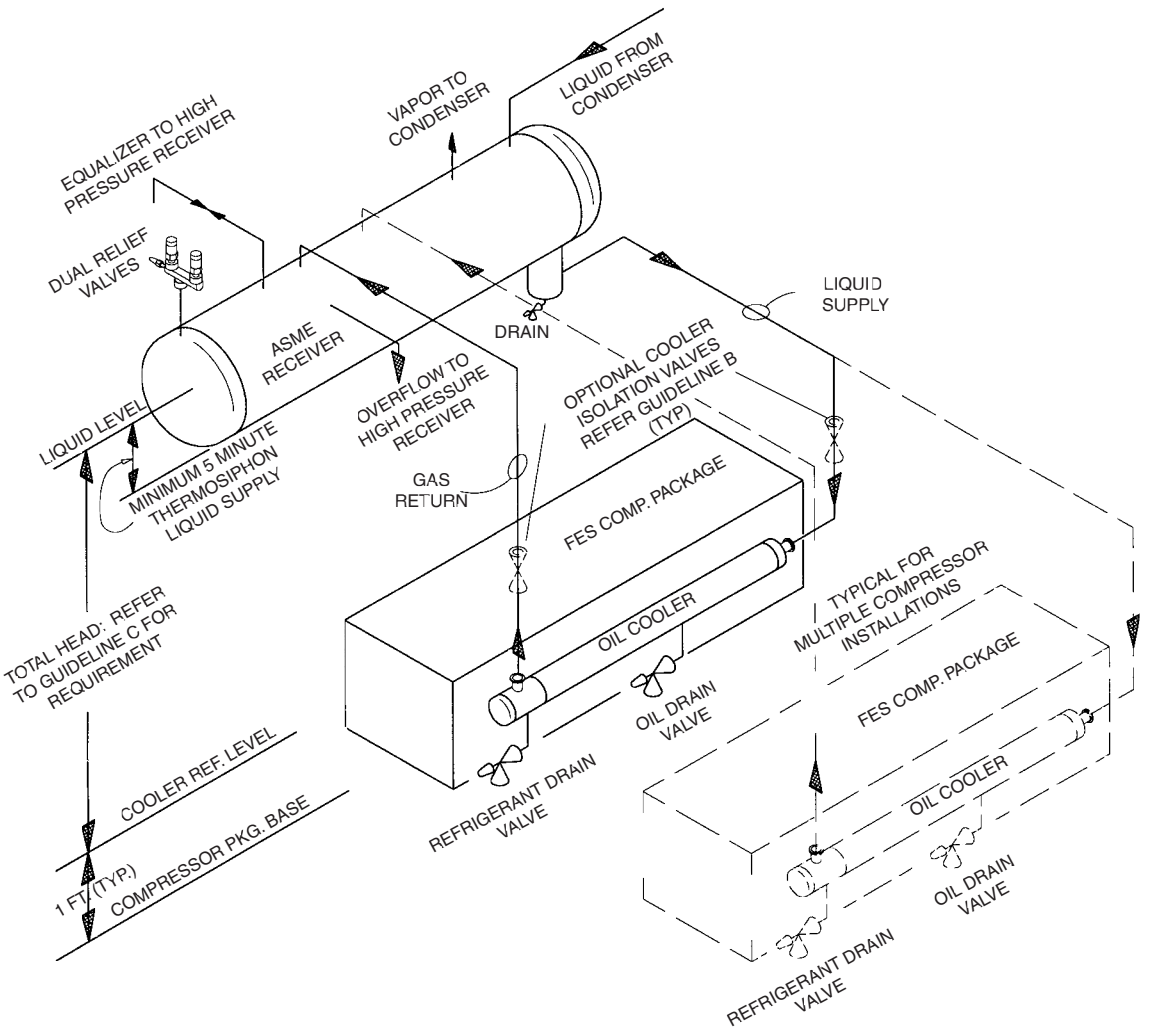
E. Horizontal liquid supply lines to the thermosiphon coolers shall be properly vented to allow generated gas to escape, or be arranged to provide sewer flow into the cooler allowing generated gas to migrate back to the liquid source without obstructing liquid flow.

F. R-717 systems require oil to be regularly drained from the lowest point of each system.

Typical Thermosiphon Oil Cooler Piping

All Series

Figure 3



Minimum Liquid Supply Volume

Table 24

OCHR (MBH)	R-717 (Cu. Ft.)	R-22 (Cu. Ft.)
50	0.2	0.8
100	0.5	1.6
300	1.4	4.7
600	2.8	9.4
900	4.2	14.0
1200	5.6	18.7
1500	7.1	23.4
2000	9.4	31.2
2500	11.8	39.0
3000	14.1	46.8
3500	16.5	54.6
4000	18.8	62.4
4500	21.2	70.2
5000	23.5	78.0

Based in 5 min., 95 °F Saturated Liquid

Maximum Capacities for Liquid Line from Condenser to Receiver

Table 25

PIPE SIZE	R-717 OCHR (MBH)	R-22 OCHR (MBH)
1/2	173	52
3/4	320	96
1	531	160
1 1/4	947	285
1 1/2	1,305	393
2	2,478	747
2 1/2	3,529	1,063
3	5,451	1,643

Based on 100 ft/min., 95 °F Saturated Liquid

Maximum Capacities for Vapor Line from Receiver to Condenser

Table 26

PIPE SIZE	R-717 OCHR (MBH)	R-22 OCHR (MBH)
1 1/4	136	44
1 1/2	206	66
2	400	273
2 1/2	638	204
3	1,128	361
4	2,305	737
5	4,114	1,318
6	6,651	2,128
8	13,615	4,354

Based on 95 °F Saturated Vapor

Thermosiphon Line Sizes To and From Oil Cooler

Table 27

OCHR (MBH)	R-717		R-22	
	LIQ IN	LIQ/VAP OUT	LIQ IN	LIQ/VAP OUT
Up to 60	3/4	1 1/2	1	2
61 to 300	1	2	2	3
301 to 600	1 1/2	3	3	4
601 to 900	2	4	4	6
901 to 1500	3	5	4	8
1501 to 2700	3	6	6	10
2701 to 4800	4	8	8	12

Thermosiphon Oil Cooler Physical Data

Table 28

OIL COOLER MODEL	CONNECTION SIZES			REFRIGERANT VOLUME (cu. Ft.)	OIL VOLUME (cu. Ft.)	WEIGHT (lbs.)
	Oil (inches)	Refrig. In (inches)	Refrig. Out (inches)			
605	1 1/2	1	2	0.4	0.6	477
805	1 1/2	1	2	0.8	0.9	725
1005	1 1/2	1 1/2	3	1.7	1.4	1,010
507	2	1	2	0.3	0.6	467
607	2	1	2	0.5	0.9	568
807	2	1 1/2	3	0.9	1.3	896
1007	3	2	4	1.9	2.0	1,289
1010	3	3	5	2.2	2.8	1,672
1410	4	3	6	4.0	4.6	2,680

Note: Carbon steel tubes are standard for R-717 and R-22 applications.

GS Series Thermosiphon Oil Cooler Capacities (MBH) R-717

Table 29

Oil Cooler Model	GS Series Design Oil Outlet Temperture	Oil Cooler Capacity (MBH) Condensing Temperature 75 F	85 F	95 F	105 F	Minimum Oil Flow (GPM)	H.S. Maximum Oil Flow (GPM)	BSTR Maximum Oil Flow (GPM)	• Standard Oil Coolers for the GS Series 55GS-60GS H.S	BSTR	75GS-85GS H.S	BSTR
605	130 F	201.5	167.0	129.7	90.1	8.0	40.0	40.0	•	•	•	•
805	130 F	362.0	362.0	343.5	233.6	12.0	45.0	45.0	•		•	

GM Series Thermosiphon Oil Cooler Capacities (MBH) R-717

Table 30

Oil Cooler Model	GM Series Design Oil Outlet Temperture	Oil Cooler Capacity (MBH) Condensing Temperature 75 F	85 F	95 F	105 F	Minimum Oil Flow (GPM)	H.S. Maximum Oil Flow (GPM)	BSTR Maximum Oil Flow (GPM)	• Standard Oil Coolers for the GM Series 110GM & 125GM H.S	BSTR	160GM & 195GM H.S	BSTR
605	130 F	201.5	167.0	129.7	90.1	8.0	40.0	40.0	•	•		
805	130 F	362.0	362.0	343.5	233.6	12.0	45.0	45.0	•	•		
1005	130 F	558.0	558.0	558.0	473.0	12.0	45.0	45.0	•			
507	130 F	268.0	217.7	165.9	112.4	7.0	26.0	26.0			•	•
607	130 F	345.5	282.4	216.6	147.6	12.0	37.0	37.0			•	•
807	130 F	885.0	800.0	601.0	396.0	15.0	63.0	63.0			•	

GL Series Thermosiphon Oil Cooler Capacities (MBH) R-717

Table 31

Oil Cooler Model	GL Series Design Oil Outlet Temperture	Oil Cooler Capacity (MBH) Condensing Temperature 75 F	85 F	95 F	105 F	Minimum Oil Flow (GPM)	H.S. Maximum Oil Flow (GPM)	BSTR Maximum Oil Flow (GPM)	• Standard Oil Coolers for the GL Series 180GL-290GL H.S	BSTR	400GL-565GL H.S	BSTR	675GL-800GL H.S	BSTR	1025GLH H.S.	BSTR	1025GLV-1435GLV H.S. (48" Oil Sep)	1210GL-1435GL BSTR
507	130 F	268.0	217.7	165.9	112.4	7.0	26.0	26.0	•	•	•	•	•	•		•		•
607	130 F	345.5	282.4	216.6	147.6	12.0	37.0	37.0	•	•	•	•	•	•		•		•
807	130 F	885.0	800.0	601.0	396.0	15.0	63.0	63.0	•	•	•	•	•	•	•	•	•	•
1007	130 F	1230.0	1230.0	1000.0	657.0	28.0	110.0	110.0	•		•		•	•	•	•	•	•
1010	130 F	1970.0	1970.0	1625.0	1055.0	35.0	135.0	135.0			•		•		•		•	•
1410	130 F	3285.0	3285.0	3285.0	2190.0	70.0	260.0	260.0					•		•		•	

1. Use pages 102-113 to determine OCHR and Nominal Oil Flow for selected compressor conditions.
2. From the charts above and based on condensing temperature, select an oil cooler
   a. whose MBH exceeds that required by the compressor AND
   b. whose oil flow (GPM) limits encompass the compressor nominal oil flow AND
   c. whose design is standard for the selected model as indicated by the •.
3. If the oil flow limits are exceeded, increase the oil cooler size.
4. If the required size is not a standard design (•), contact FES or their factory representative.
5. High Stage models 1025GLV-1435GLV designed with a 54” oil separator uses a model 807 oil cooler as standard.

GS Series Thermosiphon Oil Cooler Capacities (MBH) R-22

Table 32

Oil Cooler Model	GS Series Design Oil Outlet Temperture	Oil Cooler Capacity (MBH) Condensing Temperature 75 F	85 F	95 F	105 F	115 F	Minimum Oil Flow (GPM)	H.S. Maximum Oil Flow (GPM)	BSTR Maximum Oil Flow (GPM)	• Standard Oil Coolers for the GS Series 55GS-75GS H.S.	55GS-75GS BSTR	85GS H.S.	85GS BSTR
605	130 F	185.9	154.0	119.5	82.8	45.4	8.0	40.0	40.0	•	•	•	•
805	130 F	322.0	322.0	322.0	218.5	117.0	12.0	45.0	45.0	•		•	
1005	130 F	C.F.	C.F.	498.0	475.0	226.3	12.0	45.0	45.0			•	

GM Series Thermosiphon Oil Cooler Capacities (MBH) R-22

Table 33

Oil Cooler Model	GM Series Design Oil Outlet Temperture	Oil Cooler Capacity (MBH) Condensing Temperature 75 F	85 F	95 F	105 F	115 F	Minimum Oil Flow (GPM)	H.S. Maximum Oil Flow (GPM)	BSTR Maximum Oil Flow (GPM)	• Standard Oil Coolers for the GM Series 110GM-125GM H.S.	110GM-125GM BSTR	160GM H.S.	160GM BSTR	195GM H.S.	195GM BSTR
605	130 F	185.9	154.0	119.5	82.8	45.4	8.0	40.0	40.0	•	•	•	•		•
805	130 F	322.0	322.0	322.0	218.5	117.0	12.0	45.0	45.0	•		•	•		•
1005	130 F	C.F.	C.F.	498.0	475.0	226.3	12.0	45.0	45.0	•		•			
507	130 F	248.4	206.4	158.0	107.0	56.6	7.0	26.0	26.0					•	
607	130 F	319.5	265.0	203.0	138.8	74.3	12.0	37.0	37.0					•	
807	130 F	790.0	740.0	576.0	390.5	199.1	15.0	63.0	63.0					•	

GL Series Thermosiphon Oil Cooler Capacities (MBH) R-22

Table 34

Oil Cooler Model	GL Series Design Oil Outlet Temperture	Oil Cooler Capacity (MBH) Condensing Temperature 75 F	85 F	95 F	105 F	115 F	Minimum Oil Flow (GPM)	H.S. Maximum Oil Flow (GPM)	BSTR Maximum Oil Flow (GPM)	• Standard Oil Coolers for the GL Series 180GL-230GL H.S	180GL-230GL BSTR	290GL H.S	290GL BSTR	400GL-475GL H.S	400GL-475GL BSTR	565GL-800GL H.S.	565GL-800GL BSTR	1025GL-1435GL H.S.	1025GL-1435GL BSTR
507	130 F	248.4	206.4	158.0	107.0	56.6	7.0	26.0	26.0	•	•	•	•	•	•	•	•		•
607	130 F	319.5	265.0	203.0	138.8	74.3	12.0	37.0	37.0	•	•	•	•	•	•	•	•	•	•
807	130 F	790.0	740.0	576.0	390.5	199.1	15.0	63.0	63.0	•		•		•	•	•	•	•	•
1007	130 F	1100.0	1100.0	970.0	650.0	328.0	28.0	110.0	110.0	•		•		•		•		•	•
1010	130 F	1755.0	1755.0	1535.0	1020.0	514.0	35.0	135.0	135.0			•		•		•		•	
1410	130 F	2800.0	2800.0	2800.0	2120.0	1050.0	70.0	260.0	260.0							•		•	

1. Use pages 102-113 to determine OCHR and Nominal Oil Flow for selected compressor conditions.
2. From the charts above and based on condensing temperature, select an oil cooler
   a. whose MBH exceeds that required by the compressor AND
   b. whose oil flow (GPM) limits encompass the compressor nominal oil flow AND
   c. whose design is standard for the selected model as indicated by the •.
3. If the oil flow limits are exceeded, increase the oil cooler size.
4. If the required size is not a standard design (•), contact FES or their factory representative.

Water Cooled Oil Cooler Tube Side Pressure Drop

All Series

Figure 4

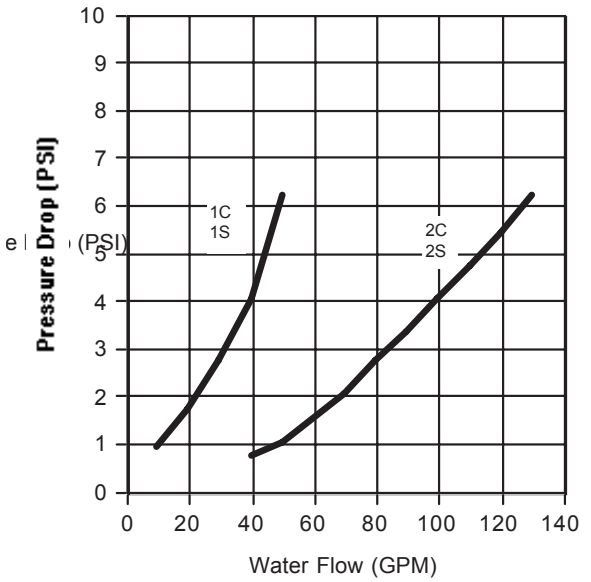


Figure 5

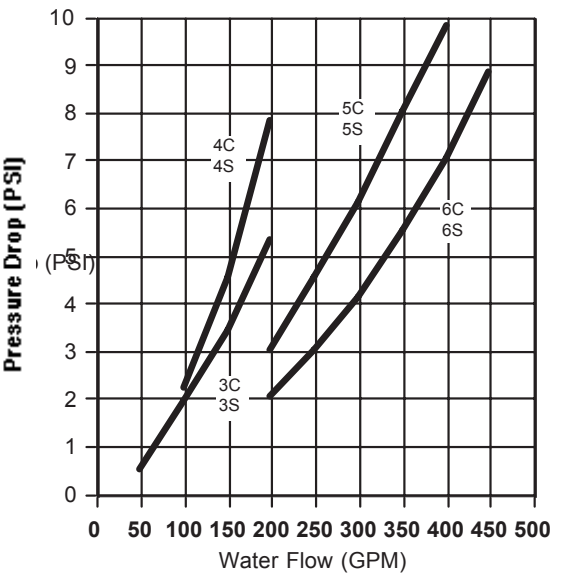


Figure 6

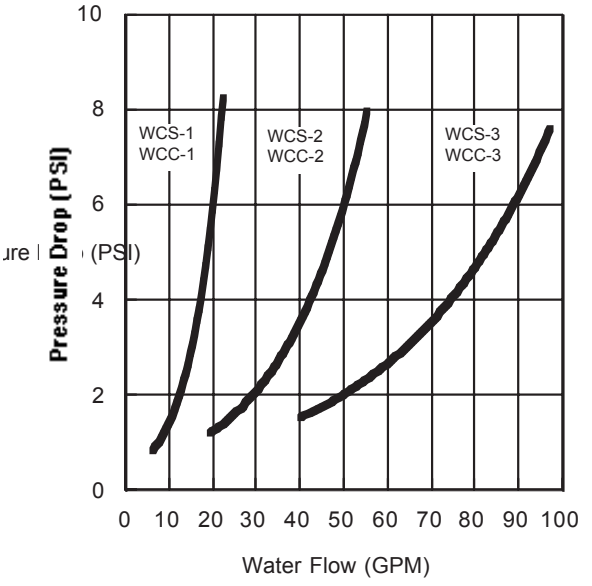
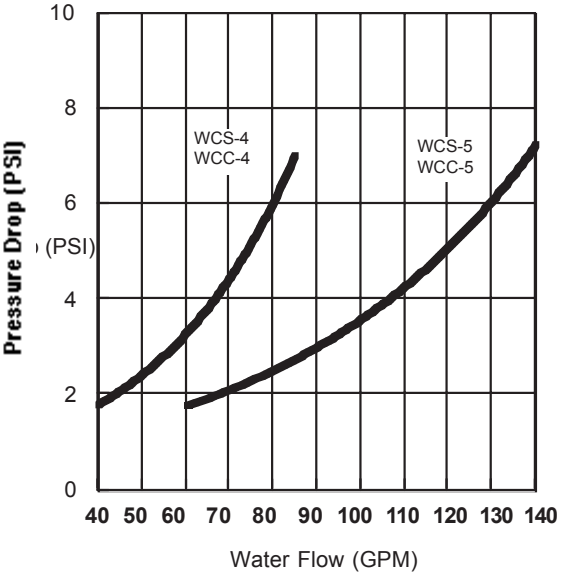


Figure 7



Water Cooled Oil Cooler Physical Data

Table 35

OIL COOLER MODEL		OIL	CONNECTION SIZES		WATER	OIL	
CARBON STEEL TUBES	COPPER TUBES	COOLER SIZE	Oil (inches)	Water (inches)	VOLUME (cu. Ft.)	VOLUME (cu. Ft.)	WEIGHT (lbs.)
WCS-1	WCC-1	4-48	1	1	0.2	0.2	244
WCS-2	WCC-2	6-48	1	1 1/2	0.5	0.4	370
WCS-3	WCC-3	8-48	1	2	0.9	0.7	538
WCS-4	WCC-4	8-60	1	2	1.1	0.9	593
WCS-5	WCC-5	10-60	1	2 1/2	2.1	1.4	822
1S	1C	5-84	2	1 1/2	0.4	0.6	394
2S	2C	8-84	2	2 1/2	0.9	1.4	716
3S	3C	10-84	3	3	1.9	2.2	994
4S	4C	10-120	3	3	2.2	3.1	1,226
5S	5C	12-120	4	3	3.4	3.9	1,666
6S	6C	13-120	4	4	4.3	4.6	1,992

Note: Carbon steel tubes (for use on R-717 or R-22 applications), copper tubes (for use on R-22 applications only).

Stainless Steel tubes are available as an option and can be used on both R-717 and R-22 applications.

GS Series Water Cooled Oil Cooler Capacities (MBH) R-717 Table 36

GM Series Water Cooled Oil Cooler Capacities (MBH) R-717 Table 37

GL Series Water Cooled Oil Cooler Capacities (MBH) R-717 Table 38

1. Use pages 102-113 to determine OCHR and Nominal Oil Flow for selected compressor conditions.
2. From the charts above and based on condensing temperature, select an oil cooler
   a. whose MBH exceeds that required by the compressor AND
   b. whose oil flow (GPM) limits encompass the compressor nominal oil flow AND
   c. whose design is standard for the selected model as indicated by the •.
3. If the oil flow limits are exceeded, increase the oil cooler size.
4. If the required size is not a standard design (•), contact FES or their factory representative.
5. High Stage models 1025GLV-1435GLV designed with a 54" oil separator uses a model 807 oil cooler as standard.

GS Series Water Cooled Oil Cooler Capacities (MBH) R-22

Table 39

Oil Cooler Model	Oil Cooler Size	GS Series Design Oil Outlet Temperture	Oil Cooler Capacity (MBH) Water Inlet Temperature 75 F	85 F	90 F	95 F	Minimum Oil Flow (GPM)	H.S. Maximum Oil Flow (GPM)	BSTR Maximum Oil Flow (GPM)	• Standard Oil Coolers for the GS Series 55GS H.S	55GS BSTR	60GS H.S	60GS BSTR	75GS H.S	75GS BSTR	85GS H.S	85GS BSTR
WCC-1	4 OD-48 OAL	130 F	80.0	68.0	61.2	53.7	8.0	20.0	20.0	•	•	•	•	•	•	•	•
WCC-2	6 OD-48 OAL	130 F	208.8	180.7	163.9	145.2	8.0	20.0	20.0	•		•		•		•	
WCC-3	8 OD-48 OAL	130 F	322.0	322.0	315.0	280.2	15.0	45.0	45.0								
WCC-4	8 OD-60 OAL	130 F	322.0	322.0	322.0	322.0	20.0	45.0	45.0								
WCC-5	10 OD-60 OAL	130 F	497.5	497.5	497.5	497.5	25.0	45.0	45.0								

GM Series Water Cooled Oil Cooler Capacities (MBH) R-22

Table 40

Oil Cooler Model	Oil Cooler Size	GM Series Design Oil Outlet Temperture	Oil Cooler Capacity (MBH) Water Inlet Temperature 75 F	85 F	90 F	95 F	Minimum Oil Flow (GPM)	H.S. Maximum Oil Flow (GPM)	BSTR Maximum Oil Flow (GPM)	• Standard Oil Coolers for the GM Series 110GM H.S	110GM BSTR	125GM H.S	125GM BSTR	160GM H.S	160GM BSTR	195GM H.S	195GM BSTR
WCC-1	4 OD-48 OAL	130 F	80.0	68.0	61.2	53.7	8.0	20.0	20.0	•	•	•	•	•	•		•
WCC-2	6 OD-48 OAL	130 F	208.8	180.7	163.9	145.2	8.0	20.0	20.0	•		•		•	•		•
WCC-3	8 OD-48 OAL	130 F	322.0	322.0	315.0	280.2	15.0	45.0	45.0			•		•			
WCC-4	8 OD-60 OAL	130 F	322.0	322.0	322.0	322.0	20.0	45.0	45.0								
WCC-5	10 OD-60 OAL	130 F	497.5	497.5	497.5	497.5	25.0	45.0	45.0								
1C	5 OD-84 OAL	130 F	251.4	189.6	154.5	123.6	7.0	30.0	30.0							•	
2C	8 OD-84 OAL	130 F	C.F.	655.0	615.0	518.0	15.0	48.0	48.0							•	

GL Series Water Cooled Oil Cooler Capacities (MBH) R-22

Table 41

Oil Cooler Model	Oil Cooler Size	S Series Design Oil Outlet Temperture	Oil Cooler Capacity (MBH) Water Inlet Temperature 75 F	85 F	90 F	95 F	Minimum Oil Flow (GPM)	H.S. Maximum Oil Flow (GPM)	BSTR Maximum Oil Flow (GPM)	• Standard Oil Coolers for the GL Series 180GL-290GL H.S	180GL-290GL BSTR	400GL-565GL H.S	400GL-565GL BSTR	675GL-800GL H.S	675GL-800GL BSTR	1025GL-1435GL H.S	1025GL-1435GL BSTR
1C	5 OD-84 OAL	130 F	251.4	189.6	154.5	123.6	7.0	30.0	30.0	•	•	•	•	•	•		•
2C	8 OD-84 OAL	130 F	C.F.	655.0	615.0	518.0	15.0	48.0	48.0	•		•	•	•	•	•	•
3C	10 OD-84 OAL	130 F	C.F.	1080.0	1015.0	850.0	28.0	90.0	90.0			•		•		•	
4C	10 OD-120 OAL	130 F	C.F.	C.F.	C.F.	1080.0	28.0	90.0	90.0					•		•	
5C	12 OD-120 OAL	130 F	C.F.	C.F.	C.F.	1775.0	50.0	160.0	160.0							•	
6C	13 OD-120 OAL	130 F	C.F.	C.F.	C.F.	2230.0	75.0	235.0	235.0								

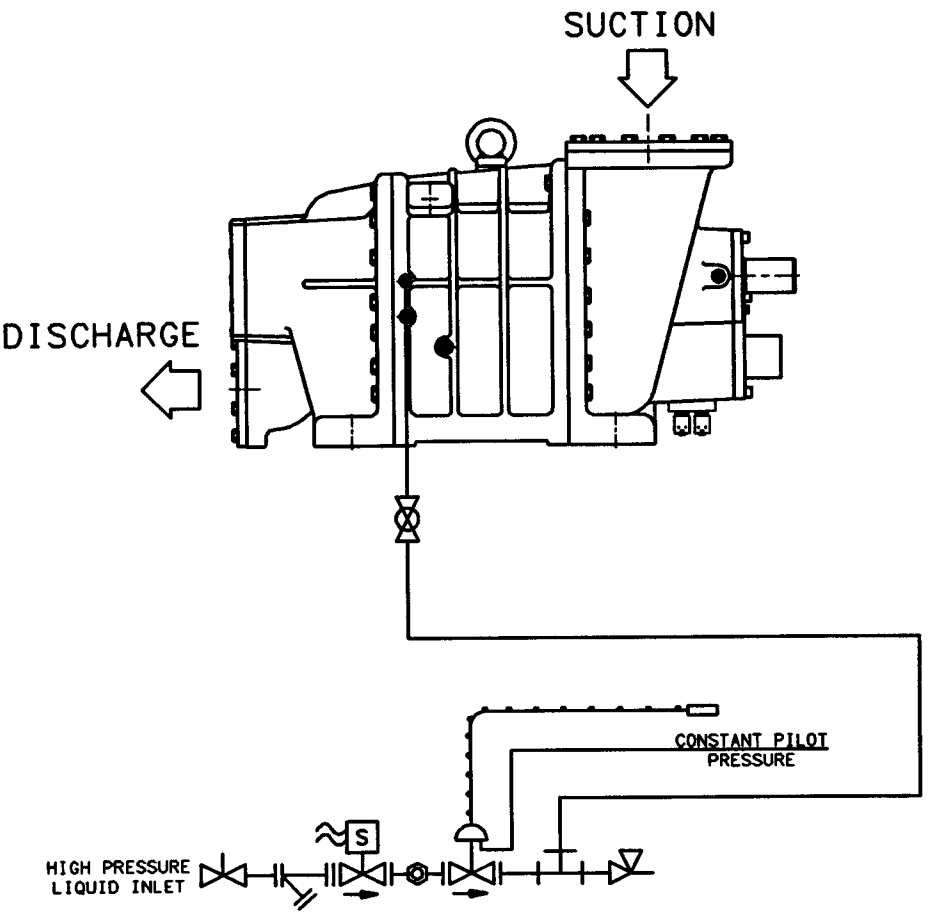
1. Use pages 102-113 to determine OCHR and Nominal Oil Flow for selected compressor conditions.
2. From the charts above and based on condensing temperature, select an oil cooler
   a. whose MBH exceeds that required by the compressor AND
   b. whose oil flow (GPM) limits encompass the compressor nominal oil flow AND
   c. whose design is standard for the selected model as indicated by the •.
3. If the oil flow limits are exceeded, increase the oil cooler size.
4. If the required size is not a standard design (•), contact FES or their factory representative.

G Series

The standard method of oil cooling for R-717 and R-22 compressor units is via liquid injection. As shown in Figure 8, the FES system supplies condensed liquid refrigerant to the compressor injection port. The compressor's internal pressure is sufficiently low to allow the refrigerant to flow into the compressor where the liquid flashes to cool the oil.

The control piping includes a stop valve, strainer, solenoid valves, sight glass and refrigerant modulating valve that is controlled by the discharge temperature. The solenoid valve is controlled by the microprocessor.

Figure 8



In order to assure successful operation, and permit the liquid refrigerant to be injected into the compressor, the liquid supply source to the liquid injection system must be adequate, in accordance with the compressor requirements, and uninterrupted. When condensing pressure is less than 100 psi, the application should be referred to FES.

R-717 Liquid Injection Requirements

GS Series

Table 42

Compressor Model	High Stage		Booster	
	Surge Vol. (Cu. Ft.)	Line Size (IPS Sch 80)	Surge Vol. (Cu. Ft.)	Line Size (IPS Sch 80)
55GS	0.8	1/2"	0.1	1/2"
60GS	0.9	1/2"	0.1	1/2"
75GS	1.1	1/2"	0.2	1/2"
85GS	1.2	1/2"	0.2	1/2"

GM Series

Table 43

Compressor Model	High Stage		Booster	
	Surge Vol. (Cu. Ft.)	Line Size (IPS Sch 80)	Surge Vol. (Cu. Ft.)	Line Size (IPS Sch 80)
110GM	1.6	3/4"	0.2	1/2"
125GM	1.8	3/4"	0.3	1/2"
160GM	2.3	3/4"	0.4	1/2"
195GM	2.8	3/4"	0.4	1/2"

GL Series

Table 44

Compressor Model	High Stage		Booster	
	Surge Vol. (Cu. Ft.)	Line Size (IPS Sch 80)	Surge Vol. (Cu. Ft.)	Line Size (IPS Sch 80)
180GL	2.8	3/4"	0.5	1/2"
230GL	3.6	3/4"	0.6	1/2"
290GL	4.3	3/4"	0.7	1/2"
400GL	5.5	1"	0.9	3/4"
475GL	6.3	1"	0.9	1/2"
565GL	7.5	1"	1.2	3/4"
675GL	8.9	1"	1.4	3/4"
800GL	10.5	1 1/4"	1.6	3/4"
1025GL	13.4	1 1/4"	2.1	3/4"
1210GL	15.9	1 1/4"	2.5	3/4"
1435GL	18.8	1 1/4"	2.9	3/4"

Tables 42-44 provide the recommended liquid injection supply volume and liquid line size requirements. The surge volume is based on providing a five minute supply of liquid to the compressor.

R-22 Liquid Injection Requirements

GS Series

Table 45

Compressor Model	High Stage		Booster	
	Surge Vol. (Cu. Ft.)	Line Size (IPS Sch 80)	Surge Vol. (Cu. Ft.)	Line Size (IPS Sch 80)
55GS	3.7	1/2"	0.2	1/2"
60GS	4.4	1/2"	0.2	1/2"
75GS	5.6	3/4"	0.3	1/2"
85GS	5.4	3/4"	0.3	1/2"

GM Series

Table 46

Compressor Model	High Stage		Booster	
	Surge Vol. (Cu. Ft.)	Line Size (IPS Sch 80)	Surge Vol. (Cu. Ft.)	Line Size (IPS Sch 80)
110GM	2.0	3/4"	0.5	1/2"
125GM	2.3	3/4"	0.5	1/2"
160GM	2.7	1"	0.6	1/2"
195GM	3.2	1"	0.6	3/4"

GL Series

Table 47

Compressor Model	High Stage		Booster	
	Surge Vol. (Cu. Ft.)	Line Size (IPS Sch 80)	Surge Vol. (Cu. Ft.)	Line Size (IPS Sch 80)
180GL	6.7	1 1/4"	0.8	1/2"
230GL	8.6	1 1/4"	1.0	1/2"
290GL	10.6	1 1/4"	1.0	1/2"
400GL	12.8	1 1/2"	1.5	3/4"
475GL	15.2	1 1/2"	2.0	3/4"
565GL	18.0	1 1/2"	2.0	3/4"
675GL	21.5	2"	2.5	3/4"
800GL	25.4	2"	3.0	3/4"
1025GL	32.5	2 1/2"	3.5	1"
1210GL	38.3	2 1/2"	4.5	1"
1435GL	45.4	2 1/2"	5.0	1"

Tables 45-47 provide the recommended liquid injection supply volume and liquid line size requirements. The surge volume is based on providing a five minute supply of liquid to the compressor.

Figures 9, 10 and 11 suggest typical liquid supply piping arrangements for liquid injection oil cooling systems. Each vessel should be ASME coded for appropriate design pressure and contain at least a five-minute supply of liquid refrigerant for the liquid injection oil cooling requirements to the compressors. The receiver should be fitted with a safety relief valve assembly in accordance with the relevant requirements of the current edition of ASHRAE standard “ASHRAE 15”.

The arrangement shown in Figure 9 uses a float switch to close the main plant liquid solenoid valve if the level in the receiver drops below the level necessary to supply the compressor liquid injection requirements.

Figure 9

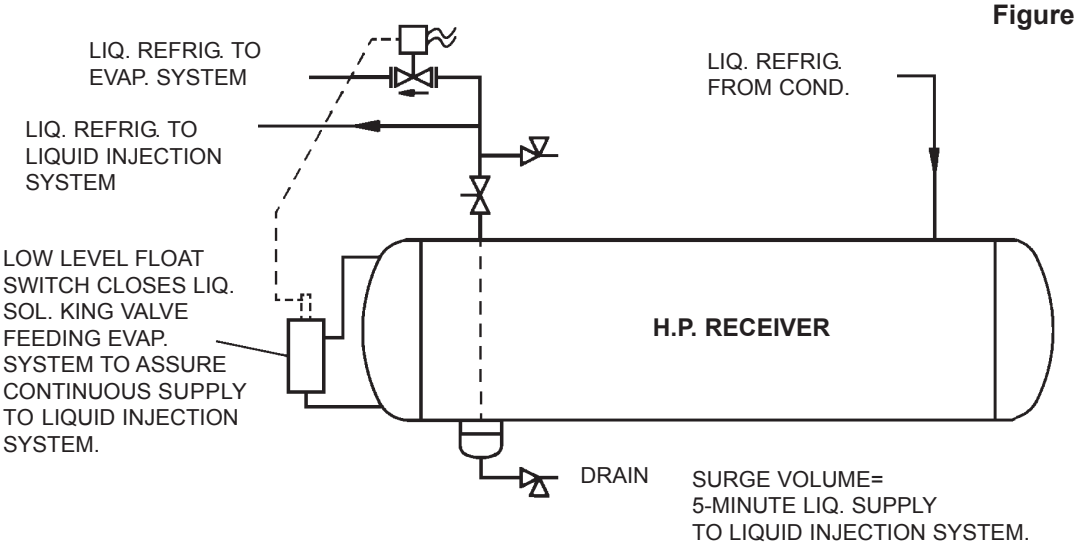


Figure 10 shows a separate liquid injection receiver sized to maintain a level of liquid sufficient to provide five minutes of compressor oil cooling.

Figure 10

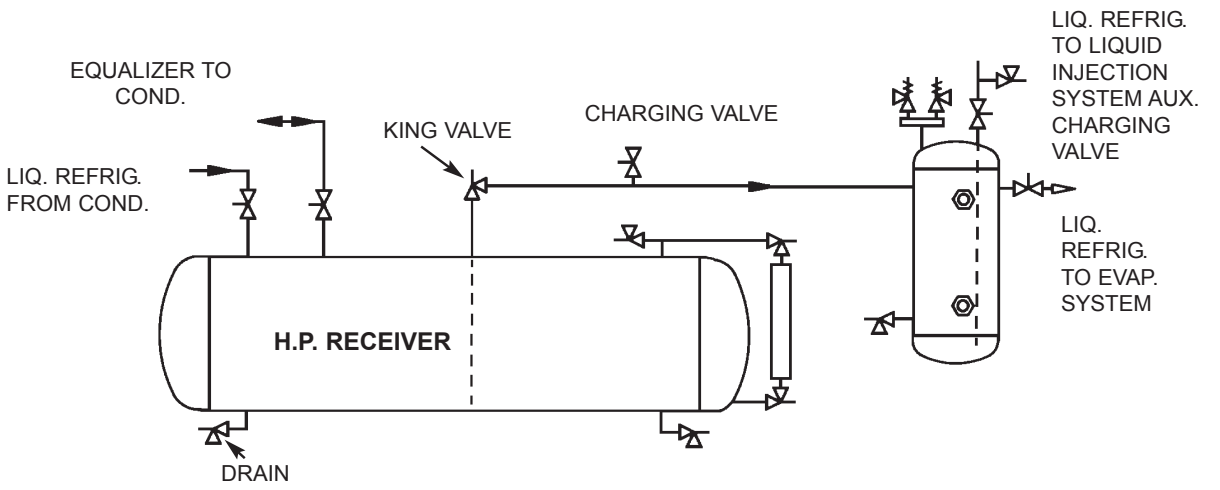
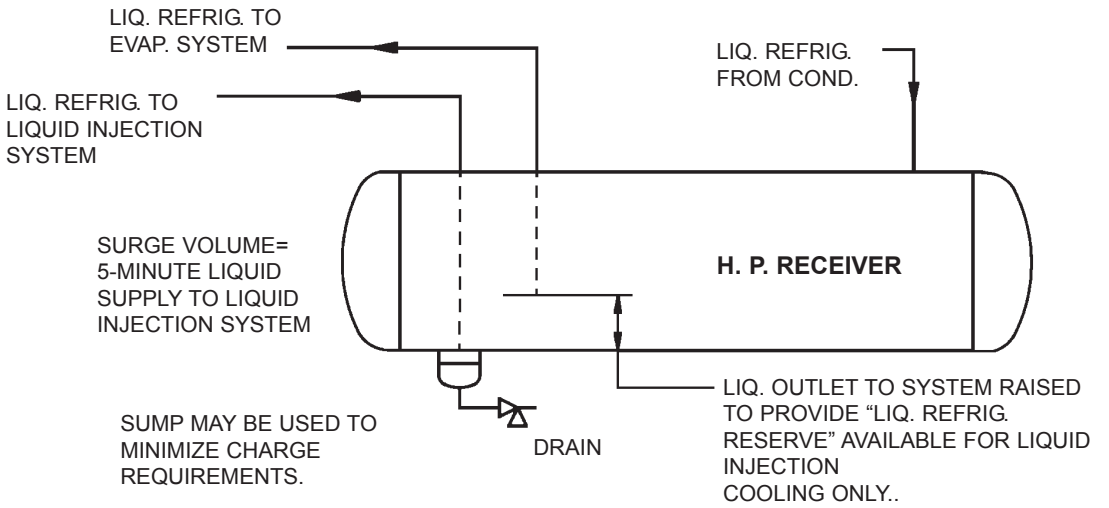


Figure 11 illustrates the use of a receiver with a second dip tube, located at the lower level in the receiver, to supply liquid to the compressor oil cooling even after the main liquid supply is below its minimum level.

Figure 11



LIQUID INJECTION OIL COOLING
Correction Factors

Ratings provided in this manual are based on using “external” oil cooling. When utilizing liquid injection oil cooling, it is necessary to correct the compressor capacity and horsepower by the factors shown on Page 25.

R-717 High Stage Liquid Injection Capacity Correction Factors

G Series

Table 48

	75 °F CTP		85 °F CTP		95 °F CTP		105 °F CTP	
EPT	H Port	L Port	H Port	L Port	H Port	L Port	H Port	L Port
-40	0.980		0.978		0.975		0.972	
-30	0.983		0.980		0.977		0.975	
-20	0.985		0.983		0.980		0.977	
-10		0.982		0.979	0.982		0.980	
0		0.986		0.982		0.978	0.982	
10		0.989		0.985		0.981		0.977
20		0.992		0.988		0.984		0.981
30		0.995		0.992		0.988		0.984
40		0.999		0.995		0.991		0.987

R-717 High Stage Liquid Injection BHP Correction Factors

G Series

Table 49

	75 °F CTP		85 °F CTP		95 °F CTP		105 °F CTP	
EPT	H Port	L Port	H Port	L Port	H Port	L Port	H Port	L Port
-40	1.033		1.036		1.040		1.044	
-30	1.028		1.032		1.035		1.039	
-20	1.023		1.027		1.031		1.034	
-10		1.023		1.027	1.026		1.030	
0		1.018		1.022		1.026	1.025	
10		1.013		1.017		1.022		1.052
20		1.009		1.013		1.017		1.042
30		1.004		1.008		1.012		1.033
40		1.000		1.003		1.007		1.023

Notes: 1. R-717 Booster capacity correction factor is 0.99 for all conditions (based on high pressure port).
2. R-717 Booster power correction factor is 1.015 for all conditions (based on high pressure port).

LIQUID INJECTION OIL COOLING
Correction Factors

Ratings provided in this manual are based on using “external” oil cooling. When utilizing liquid injection oil cooling, it is necessary to correct the compressor capacity and horsepower by the factors shown on Page 25.

R-22 High Stage Liquid Injection Capacity Correction Factors

G Series

Table 50

	75 °F CTP		85 °F CTP		95 °F CTP		105 °F CTP	
EPT	H Port	L Port	H Port	L Port	H Port	L Port	H Port	L Port
-40	0.990		0.989		0.988		0.986	
-30	0.991		0.990		0.989		0.987	
-20	0.993		0.991		0.990		0.989	
-10		0.991		0.989	0.991		0.990	
0		0.993		0.991		0.989	0.991	
10		0.994		0.993		0.991		0.989
20		1.000		0.994		0.992		0.990
30		1.000		0.996		0.994		0.992
40		1.000		0.997		0.996		0.994

R-22 High Stage Liquid Injection BHP Correction Factors

G Series

Table 51

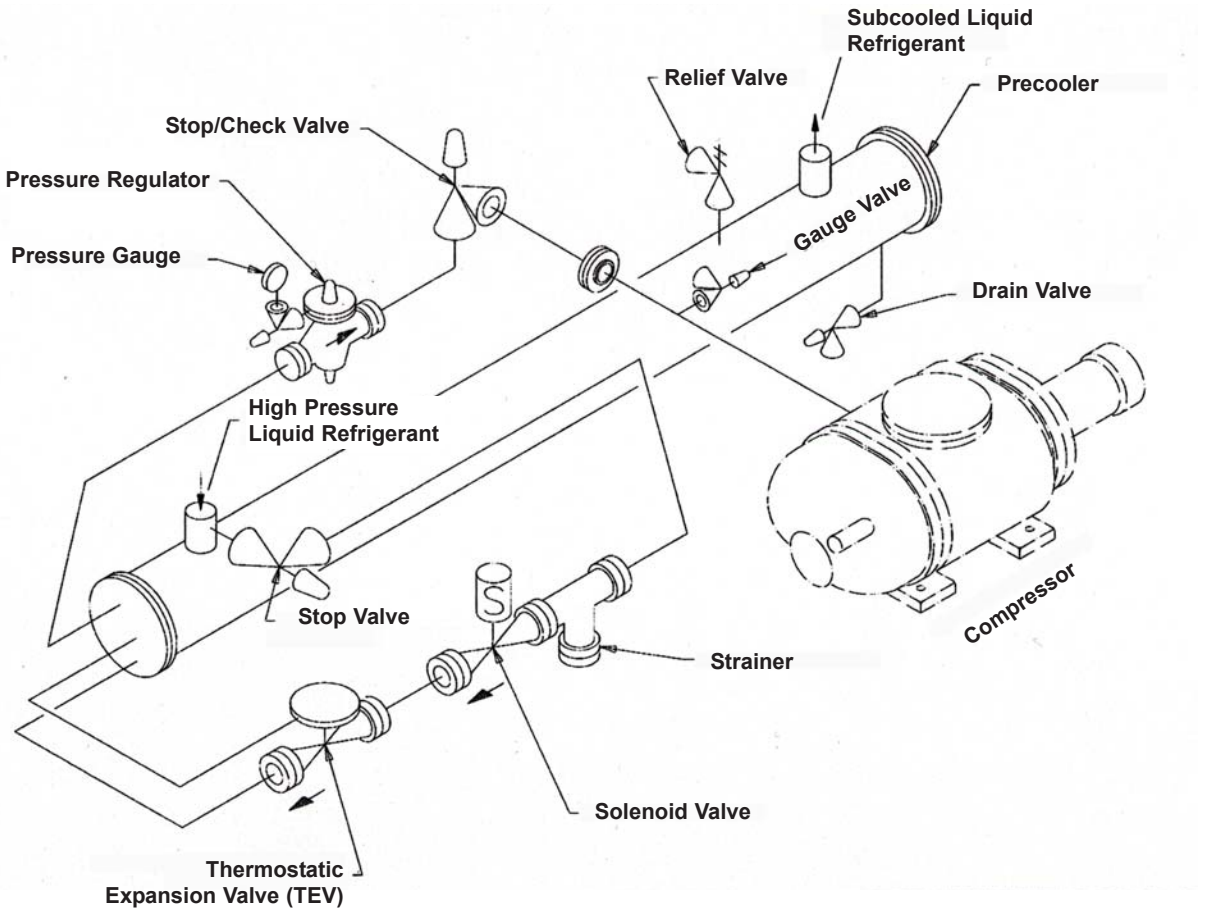
	75 °F CTP		85 °F CTP		95 °F CTP		105 °F CTP	
EPT	H Port	L Port	H Port	L Port	H Port	L Port	H Port	L Port
-40	1.016		1.018		1.020		1.022	
-30	1.014		1.016		1.018		1.020	
-20	1.012		1.014		1.015		1.017	
-10		1.011		1.013	1.013		1.015	
0		1.009		1.011		1.013	1.013	
10		1.007		1.009		1.011		1.013
20		1.000		1.006		1.008		1.011
30		1.000		1.004		1.006		1.008
40		1.000		1.002		1.004		1.006

Notes: 1. R-22 Booster capacity correction factor is 0.99 for all conditions (based on high pressure port).
2. R-22 Booster power correction factor is 1.015 for all conditions (based on high pressure port).

Typical Precooler Piping and Components

G Series

Figure 12



G Series–R-717

Table 52

Saturated Suction Temp (F)	High Stage (75°F CTP)																	
	55GS	60GS	75GS	85GS	110GM	125GM	160GM	195GM	180GL	230GL	290GL	400GL	475GL	565GL	675GL	800GL	1025GL	1210GL	1435GL
-40	AA	BB	BB	BB	CC	CC	CC	B	A	B	B	C	C	C	D	E	F	F	CF
-30	BB	BB	CC	CC	CC	CC	DD	B	B	B	C	C	D	D	D	F	F	G	CF
-20	BB	BB	CC	CC	CC	DD	DD	C	B	C	C	D	D	D	E	F	G	G	CF
-10	BB	CC	CC	CC	DD	DD	EE	C	C	C	D	D	E	E	E	G	G	CF	CF
0	BB	CC	DD	DD	DD	DD	EE	C	C	C	D	D	E	E	F	G	CF	CF	CF

Saturated Suction Temp (F)	High Stage (85°F CTP)																	
	55GS	60GS	75GS	85GS	110GM	125GM	160GM	195GM	180GL	230GL	290GL	400GL	475GL	565GL	675GL	800GL	1025GL	1210GL	1435GL
-40	AA	BB	BB	BB	CC	CC	CC	B	A	B	C	C	C	D	D	F	F	F	CF
-30	AA	BB	CC	CC	CC	DD	DD	C	B	C	C	C	D	D	D	F	G	G	CF
-20	BB	BB	CC	CC	DD	DD	DD	C	B	C	C	D	E	E	E	G	G	CF	CF
-10	BB	CC	DD	DD	DD	DD	EE	C	C	C	D	D	E	E	F	G	CF	CF	CF
0	BB	CC	DD	DD	DD	EE	EE	D	C	C	D	E	F	F	F	CF	CF	CF	CF

Saturated Suction Temp (F)	High Stage (95°F CTP)																	
	55GS	60GS	75GS	85GS	110GM	125GM	160GM	195GM	180GL	230GL	290GL	400GL	475GL	565GL	675GL	800GL	1025GL	1210GL	1435GL
-40	AA	BB	BB	BB	CC	CC	DD	B	A	B	C	C	C	D	D	F	F	F	CF
-30	BB	BB	CC	CC	CC	DD	DD	C	B	C	C	D	D	D	D	F	F	G	CF
-20	BB	BB	CC	CC	DD	DD	DD	C	B	C	D	D	E	E	E	G	CF	CF	CF
-10	BB	CC	DD	DD	DD	DD	EE	D	C	C	D	E	E	F	F	CF	CF	CF	CF
0	CC	CC	DD	DD	EE	EE	EE	D	C	D	E	E	F	F	F	CF	CF	CF	CF

Saturated Suction Temp (F)	High Stage (105°F CTP)																	
	55GS	60GS	75GS	85GS	110GM	125GM	160GM	195GM	180GL	230GL	290GL	400GL	475GL	565GL	675GL	800GL	1025GL	1210GL	1435GL
-40	AA	BB	BB	BB	CC	CC	DD	B	A	B	C	C	D	D	D	F	F	F	CF
-30	BB	BB	CC	CC	CC	DD	DD	C	B	C	C	D	D	D	E	F	G	G	CF
-20	BB	CC	CC	CC	DD	DD	EE	C	C	C	D	D	E	E	F	G	CF	CF	CF
-10	BB	CC	DD	DD	DD	EE	EE	D	C	D	D	E	F	F	F	CF	CF	CF	CF
0	CC	CC	DD	DD	EE	EE	EE	D	C	D	E	E	F	F	F	CF	CF	CF	CF

C.F. - Consult Factory

Motors for FES compressors must be furnished in accordance with FES Engineering Specification ENG-4 and sized for all expected operating conditions. Maximum motor sizes that can be used on standard compressors are shown in Table 53. Proper selection of motors and methods of starting must be employed to ensure the compressor accelerates to operating speed properly and within the limits of the local power company (see page 135).

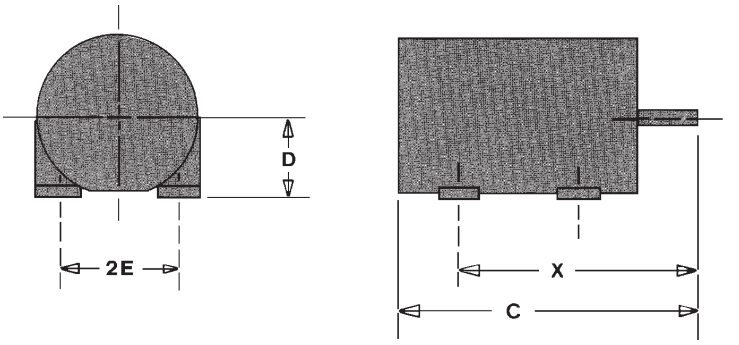
Motor Size Limit **Table 53**

GS Series COMPRESSOR MODEL		MAXIMUM DIMENSIONS (IN.)			
		D	E	X	C
55GS	HS	9.00	7.00	22.08	27.55
55GS	BSTR	7.00	5.50	19.00	26.40
60GS	HS	10.00	8.00	23.12	29.51
60GS	BSTR	7.00	5.50	19.00	26.40
75GS	HS	10.00	8.00	23.12	29.51
75GS	BSTR	7.00	5.50	19.00	26.40
85GS	HS	10.00	8.00	24.62	31.01
85GS	BSTR	7.00	5.50	19.00	26.40

GM Series COMPRESSOR MODEL		MAXIMUM DIMENSIONS (IN.)			
		D	E	X	C
110GM	HS	11.00	9.00	26.75	33.95
110GM	BSTR	8.00	6.25	21.00	26.04
125GM	HS	11.00	9.00	26.75	33.95
125GM	BSTR	9.00	7.00	20.88	26.57
160GM	HS	11.00	9.00	28.75	35.95
160GM	BSTR	9.00	7.00	21.88	27.55
195GM	HS	11.00	9.00	32.25	39.46
195GM	BSTR	9.00	7.00	21.88	27.55

GL Series COMPRESSOR MODEL		MAXIMUM DIMENSIONS (IN.)			
		D	E	X	C
180GL	HS	12.50	10.00	35.25	43.47
180GL	BSTR				
230GL	HS				
230GL	BSTR				
290GL	HS				
290GL	BSTR				
400GL	HS	14.50	11.50	43.75	53.50
400GL	BSTR				
475GL	HS				
475GL	BSTR				
565GL	HS				
565GL	BSTR				
675GL	HS	14.50	11.50	51.75	61.50
675GL	BSTR				
800GL	HS				
800GL	BSTR				
1025GL	HS	14.50	11.50	60.75	70.50
1025GL	BSTR	12.50	10.00	38.25	46.45
1210GL	HS	14.50	11.50	60.75	70.50
1210GL*	BSTR	12.50	10.00	45.25	53.45
1435GL	HS	14.50	11.50	60.75	70.50
1435GL	BSTR	12.50	10.00	45.25	53.45

*For36"or42"OilSeparator.



X=(N-W)+BA+2F (REFER TO A TYPICAL MOTOR DIMENSION SHEET)

Selecting Motors and Starters

When selecting motors and starters, both the operating torque and starting torque requirements must be considered. Motors should be sized to handle all the expected operating and pull-down conditions. In many cases the local power supplier or the facility will mandate the type of motor starting that must be applied. Reduced voltage starters reduce the starting torque capability of the motor and it, therefore, must be checked against the data below. Even if the motor has adequate torque for normal compressor operation, a larger motor or an alternate starting method may be required.

Table 55 lists the minimum torque required for each compressor at various pressure differentials (discharge pressure-suction pressure). From these tables determine the torque value required for the expected start-up pressure differential for a specific compressor. As a rule, it's best to use the worst case, or at least the normal operating differential as the expected start-up differential. From the motor manufacturer's data, determine the "minimum pull-up torque" expressed in ft-lb units. The motor's minimum pull-up torque must be greater than the compressor minimum starting torque. When using a reduced voltage starter, the motor pull-up torque must be adjusted accordingly using Table 54.

Example: Minimum Starting Torque

From the rating tables or the FES selection program, a model 180GL operating at 15°F (28.4 psi) saturated suction and 95°F (181.1 psi) condensing, requires approximately 227.1 BHP. Adding 10% to allow for pull-down and upset conditions yields 249.8 BHP. Therefore, initially select a 250 HP motor.

From the FES motor data determine the motor's pull-up torque; in this case the value is 515 ft. lbs. From Table 54, at a pressure difference of 152.7 psi, the minimum starting torque required for a model 180GL is approximately 123 ft-lbs.The minimum allowable starting torque multiplier is 123 ft-lbs/515 ft-lbs = 0.239 or 23.9%.

For this example, a wye-delta starter will be capable of accelerating the compressor to full operating speed on the initial phase of starting. However, if the minimum allowable starting torque multiplier calculate above was greater than 0.33 (33%) a Wye-Delta starter may not have been able to accelerate the compressor to full operating speed on the initial phase of starting. Consequently, it may be necessary to use a relatively short transition time which may result in a larger current surge. The local electric utility or facility manager should be consulted to determine if this is acceptable.

Reduced Voltage Starter Multiplier
All Series

Table 54

Starter Type	Torque Multiplier
Wye-Delta	33%
Autotransformer (65% tap)	42%
Autotransformer (80% tap)	64%

Table 55

GS Series Minimum Starting Torque (ft-lbs)

Model	Booster			High Stage							
	Pressure Diff. (psi)			Pressure Diff. (psi)							
	30	45	60	75	90	105	120	145	170	195	220
55GS	9.1	12.4	15.9	23.1	27.0	30.6	33.9	39.4	47.9	53.9	59.9
60GS	10.8	14.7	18.9	27.4	32.0	36.1	40.0	46.5	56.6	63.6	70.9
75GS	12.7	17.3	22.2	32.3	37.6	42.5	47.1	54.8	66.6	74.9	83.4
85GS	15.0	20.4	26.2	38.1	44.5	50.4	55.8	64.8	78.8	88.5	98.6

GM Series Minimum Starting Torque (ft-lbs)

Model	Booster			High Stage							
	Pressure Diff. (psi)			Pressure Diff. (psi)							
	30	45	60	75	90	105	120	145	170	195	220
110GM	18.8	25.5	32.8	47.6	55.6	62.9	69.6	81.0	98.5	109.1	123.3
125GM	21.8	29.5	38.0	55.1	64.4	72.8	80.6	93.6	113.9	126.3	142.6
160GM	28.1	38.1	49.0	71.3	83.1	94.0	104.1	121.0	147.1	163.0	184.3
195GM	34.4	46.7	60.0	87.3	101.8	115.1	127.4	148.1	180.1	199.6	225.5

GL Series Minimum Starting Torque (ft-lbs)

Model	Booster			High Stage							
	Pressure Diff. (psi)			Pressure Diff. (psi)							
	30	45	60	75	90	105	120	145	170	195	220
180GL	32.6	45.4	58.7	69.3	80.6	90.9	100.4	116.5	138.6	155.4	172.6
230GL	42.2	56.5	70.8	89.6	104.1	117.4	129.8	150.6	179.1	200.8	223.0
290GL	50.9	68.2	85.4	108.0	125.5	141.6	156.5	181.6	216.0	242.2	268.9
400GL	64.2	86.0	108.1	136.1	159.3	180.6	200.2	233.0	276.5	309.7	343.4
475GL	76.0	102.2	132.0	156.6	183.4	207.8	230.4	268.1	318.2	351.4	395.2
565GL	88.2	118.3	148.6	187.1	219.0	248.2	275.2	320.2	380.0	425.8	472.1
675GL	104.7	140.3	176.2	221.9	259.8	294.4	326.4	379.8	450.7	505.0	559.9
800GL	123.8	165.9	208.4	262.4	307.2	348.2	386.0	449.2	533.0	597.2	662.2
1025GL	158.0	211.7	266.0	335.0	392.1	444.5	492.7	573.4	680.4	762.3	845.2
1210GL	186.6	250.1	314.1	395.6	463.1	524.9	581.9	677.2	803.6	900.3	998.2
1425GL	220.9	296.0	371.9	468.3	548.2	621.4	688.8	801.6	951.2	1065.7	1181.7

Starters
All Series

Starters for use with FES Compressors should be furnished in accordance with FES Engineering Specification ENG-3, have NEMA Type 1 enclosures and comply with the requirements of the United States Department of Labor Occupation Safety and Health Administration, the National Electrical Code, National Electrical Manufacturers' Association, and any other state or municipal codes or restrictions, unless otherwise specified.

If a disconnect or circuit breaker is provided as part of the motor starter, it must be capable of interrupting the maximum possible short circuit current from the power source. It must also be rated for the compressor motor running at the maximum load amperage.

The proper phase relationship of power wiring should be carried through the starter to the motor terminals in accordance with NEMA standards, and all power terminals identified with suitable markers.

Overload protection should be provided in each phase of the compressor motor during both the starting and running periods. The overload relays in starters for protection of open-type motors may be either the magnetic type, electronic type, or ambient-compensated bimetallic (standard trip) thermal type. The trip characteristic of these overload relays must lie within the band shown below on Figure 13. All overload relays shall be provided with manual reset features. Overload trip current should be no more than 125 percent of the motor nameplate full load (line) current. On wye-delta starters, the overload relays must be installed in the phase conductors. This allows protection for "locked rotor" in the wye connection, as well as in the delta connection. The maximum overload tripping amperage of the wye-delta starter overload elements must be no greater than the nameplate full load amperage multiplied by 1.25, divided by 1.73.

Trip Characteristics For Overload Relays

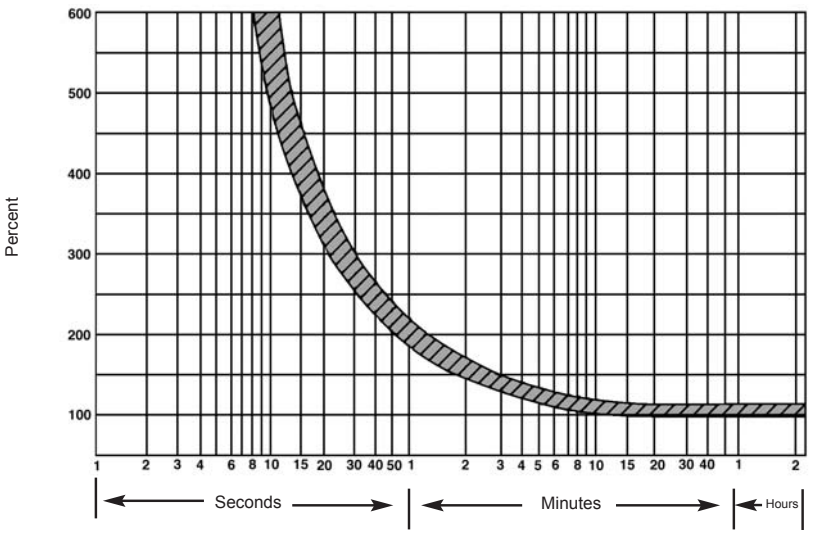


Figure 13

Trip Time

When a compressor control panel power transformer is included in the starter, it should be sized in accordance with FES drawings. The transformer must be equipped with appropriately rated primary and secondary short circuit protection.

When a current transformer is supplied for motor load limiting, it must be sized in accordance with Table 56. It must also have a maximum output of 5 amps and capacity of at least 0.5 VA.

CURRENT TRANSFORMER RATIOS (MICROPROCESSOR) Table 56

HP	VOLTAGE						
	230	380	460	575	2300	4160	5000
25	100	100	100	100	100	100	100
50	200	200	100	100	100	100	100
100	400	300	200	200	100	100	100
125	500	300	300	200	100	100	100
150	600	400	300	300	100	100	100
200	800	500	400	400	100	100	100
250	1,200	600	500	400	100	100	100
300	1,200	800	600	500	200	100	100
350	1,500	1,200	800	600	200	100	100
400	2,000	1,200	800	800	200	100	100
450	2,000	1,200	1,200	800	200	100	100
500	2,000	1,200	1,200	800	200	200	100
600	2,500	1,500	1,200	1,200	300	200	200
700		2,000	1,500	1,200	300	200	200
800		2,000	2,000	1,500	400	200	200
900			2,000	1,500	400	200	200
1,000			2,000	2,000	400	300	200
1,200			2,500	2,000	500	300	300
1,500			3,000	2,500	600	400	300

The oil pump starter should be NEMA size 1 combination across-the-line starter with circuit breaker to be located in the same enclosure as the compressor motor starter, unless the latter is a high voltage unit. The oil pump power wiring shall be wired from the load side of the compressor motor starter disconnect through short-circuit protection for the oil pump motor circuit to the line side of the oil pump motor starter. An exception would be if the compressor motor voltage differs from the oil pump motor voltage. (Note: Oil pump starter is not required with GM or GS Series compressor packages with an internal oil pump).

All auxiliary contacts on the starters should have a minimum rating of 10 amps at 115 volts.

Note: Auxiliary contacts must be supplied and wired in accordance with FES drawings. The isolation relay is a specific requirement on all starters.

Manufacturer reserves the right to discontinue, or change at any time, specifications or designs without notice and without incurring obligations.

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