



SPECIFICATIONS FOR BID

**Carrier AquaForce 30XA Air-Cooled Rotary Screw Chiller
(80 Ton), or Port Approved Equivalent**

Deadline for Submission of Bid

3 p.m.

Wednesday, April 15, 2020

1225 Main Street

Beaumont, Texas, 77701

(409) 835-5367

Fax (409) 835-0512

SECTION I
GENERAL INFORMATION AND INSTRUCTIONS

NOTICE

Information provided in these specifications is to be used for purposes of the Port of Beaumont Navigation District of Jefferson County, Texas (the "POB") purchasing one (1) Carrier AquaForce 30XA Air Cooled Rotary Screw Chiller (80 Ton), or Port Approved Equivalent. It is further expected that each bidder will read these specifications with care, since failure to meet each condition or a combination of specified conditions may invalidate the proposal.

The POB reserves the right to reject any or all bids or any portion thereof and to accept the bid determined to be the best value to the POB.

Bidders are required to submit quotations on the basis of these specifications. Any exceptions to terms requested herein must be clearly noted in writing and be included as a part of the bid proposal.

POB believes that the data contained in these specifications is sufficient for preparation of bids. The information is believed to be accurate and is based upon the latest available information, but it is not to be considered in any way as a warranty. Requests for additional information should be directed in writing to:

David C. Fisher, Port Director and CEO, 1225 Main Street, Beaumont, TX 77701 (phone 409-835-5367).

STATEMENT OF PURPOSE

1. The information contained in these specifications is to be used only in connection with preparing a bid to sell a Carrier AquaForce 30XA Air Cooled Rotary Screw Chiller (80 Ton), or Port Approved Equivalent, to the POB.
2. POB reserves the right to reject any or all bids or any portion thereof and to accept the bid determined to be the best value to the POB. The POB also reserves to waive minor technicalities and waive formalities.
3. Bid proposals are to be submitted on the basis of the specifications contained herein. All deviations from the specifications must be clearly identified and explained.
4. The information contained herein is believed to be accurate and up-to-date but is not intended to be an express or implied warranty.

5. No telephone, fax or e-mail bid proposals will be accepted. Bid proposals will only be accepted if delivered by U.S. Postal Service, contract carrier, or by hand. POB will not be responsible for missing, lost or late mail. Any bid proposals received after the time set for opening will be returned to the bidder unopened.

6. Bidders are cordially invited to the bid proposal opening on Wednesday, April 15, 2020 at 3 p.m. but are not required to attend.

TIMETABLE

1. These specifications are to be released for action on or about Monday, March 23, 2020.

2. Bid proposals should be delivered or mailed to the POB, its Port Director, to arrive no later than 3 p.m. on Wednesday, April 15, 2020.

3. It is anticipated that the successful bidder will be selected on or about Monday, April 27, 2020 at the POB Board of Commissioners meeting.

4. Carrier AquaForce 30XA Air Cooled Rotary Screw Chiller (80 Ton), or Port Approved Equivalent, is to be delivered and installed as proposed in the successful bidder's proposal.

PREPARATION OF PROPOSAL

The bidder shall prepare their bid proposal in duplicate on the attached bid proposal forms with attachments as necessary to fulfill the specifications contained herein. Unless otherwise stated, all blank spaces on the bid proposal page or pages, applicable to the subject specification, must be correctly filled in. A unit price must be stated for each item, either typed in or written in ink. Any exceptions or deviations from the requested products must be clearly indicated in writing and must be submitted with and form a part of the proposal form. Failure to follow this instruction will be grounds for disqualification of a proposal.

SUBMISSION OF BID PROPOSAL

The bid proposal shall be submitted in duplicate in a sealed envelope. Each envelope or package must be addressed as follows:

Port of Beaumont Navigation District of Jefferson County, Texas

c/o Port Director and CEO David C. Fisher

1225 Main Street

Beaumont, Texas 77701

On the front of each envelope shall be written the following words:

"PROPOSAL FOR 80-TON OUTDOOR AIR-COOLED LIQUID CHILLER"

Bid proposals must be submitted to the POB, its Port Director, by 3 p.m. Wednesday, April 15, 2020, Beaumont, Texas local time.

WITHDRAWAL OF PROPOSAL

Bidders may withdraw their proposals at any time up to the time specified as the closing time for acceptance of bids. However, no bidder shall withdraw or cancel their proposal for a period of sixty (60) days after said closing date for acceptance of proposals nor shall the successful bidder withdraw or cancel or modify their proposal, except at the request of the POB, after having been notified that said proposal has been accepted by the POB.

INTERPRETATION OF SPECIFICATIONS

If any person contemplating submitting a proposal is in doubt as to the true meaning of any part of these specifications, they may submit a written request for interpretation thereof to David C. Fisher, Port Director and CEO.

CRITERIA USED IN EVALUATING PROPOSALS

1. Proposals will be carefully evaluated for cost effectiveness and for compliance with the requirements contained in the specifications.
2. The contract will be awarded to the responsible vendor who submits a superior but economical proposal based on an analysis of its compliance with the specifications.

QUALIFICATION OF COMPANIES SUBMITTING BID PROPOSALS

Bid proposals must include a description of the bidder (corporation, partnership, sole proprietorship, etc.), and a listing of the names of the principals involved.

DEVIATION FROM SPECIFIED REQUIREMENTS

Bidders must specifically state each specified item that is not being included in the bid proposal. It will not be acceptable to simply refer to an enclosed specimen contract. Failure to follow this instruction will be grounds for disqualification.

ADDENDUMS TO REQUEST FOR PROPOSAL

If it becomes necessary to revise any part of this request for bids, a written addendum will be provided to all bidders. POB is not bound by any oral representation, clarifications, or changes made in the written specifications by the POB's employees, unless such clarification or change is provided to bidders in written addendum from an authorized representative of the POB.

COMPLIANCE WITH LAWS

All bidders involved shall observe and comply with all regulations, laws, ordinances, etc., of local, state, and federal governments as they apply to this bidding process.

UNIT PRICING

This proposal must be prepared using unit pricing. The POB has supplied the number of units to be purchased.

AUTHORIZED SIGNATURE

All bid proposal forms must be signed by persons who have the legal authority to bind the bidder to the equipment and services that are proposed.

DISQUALIFICATION AND REJECTION OF PROPOSALS

Failure to comply with the requirements or the procedures set forth herein, or to satisfy the criteria as set forth in the specifications, may result in disqualification. It is not intended that exceptions to the specifications will, in and of themselves, result in disqualification.

DELIVERY OF 80-TON OUTDOOR AIR-COOLED LIQUID CHILLER

It is anticipated that the successful bidder will be chosen on Monday, April 27, 2020 at the POB Board of Commissioners meeting. The successful bidder will be expected to be able to deliver and install the requested 80-Ton Outdoor Air-Cooled Liquid Chiller in the number of days proposed herein beginning from the date of notification of the award of the bid.

SECTION II

Carrier AquaForce 30XA Air Cooled Rotary Screw Chiller (80 Ton)

or Port Approved Equivalent

SPECIFICATIONS

General Specifications

The POB requires one (1) Carrier AquaForce 30XA Air Cooled Rotary Screw Chiller (80 Ton), or Port Approved Equivalent, to replace a failed unit.

The chiller must be microprocessor controlled, have high-efficiency, rotary screw compressors and low-sound fans, and be rated in accordance with AHRI Standards.

The chiller must have a single-piece chassis with factory wiring, piping controls and refrigerant charge of R-134a.

The chiller must be delivered and installed by bidder. Crane, rigging and lifting equipment must be provided by bidder.

Bidder shall describe in detail any special features included, as well as any features related to safety, efficiency, and/or options that reduce the environmental impact of the chiller.

Basic Chiller

The POB requires the following items:

- R-134a refrigerant
- Freeze Protection
- Suction Line Insulation
- Control Transformer
- Dual Point Power Connection
- Control Panel: Color Touch Screen Display With Web-based Connection
- Operation from -20 degree F to 125 degree F ambient conditions
- Heavy-gauge galvanized steel frame
- Micro Guard Protective Condenser Coil Coating
- Security Grilles and Hail Guards

See Exhibit "A" For Full Specifications

Warranty

The POB is requiring factory startup and standard manufacturer warranty. Should the bidder wish to propose an extended warranty, an attachment should be made to the bid proposal detailing the available extended warranties and related costs.

Installation

The POB requires that the bid proposal include installation on site. Bidder shall list possible cost savings opportunities if POB were to provide assistance.

Manuals

At least two full sets of operation and maintenance manuals must be provided.

Technical Assistance

The POB requires that the bidder attach to the bid proposal a statement of what technical assistance will be provided, the location of the technicians and the location of the authorized parts distributor. The details of the level of technical assistance must be included.

Currency

All bid proposal prices are to be in US Dollars.

State and Federal Compliance

POB requires that the chiller be delivered with all current certificates required by state and federal laws for operation.

Delivery Date

The Bidder shall specify the number of calendar days and/or weeks from the notice of award of bid that will be required for delivery and installation of the chiller. This will determine the delivery date, which will be included in the notice of award of bid. The POB reserves the right to withdraw the award of the bid in the event that the chiller is not delivered by the delivery date.

Bid Award Basis

The bid will be awarded on the basis of the price, ability to meet technical specifications and desired options, taking into consideration the proposed delivery period.

Determination of Compliance with Specifications

The Port Director (or his designee) will be responsible for assuring that the delivered chiller complies with the successful bidder's bid proposal. This examination will take place on the date of delivery. The Port Director (or his designee) will make the final determination as to the compliance of the chiller with these specifications.

Terms of Payment

The POB is interested in obtaining this chiller on a direct purchase agreement. Bid proposal should detail the specific terms of the direct purchase agreement available for the chiller. The POB reserves the right to negotiate payment terms with the successful bidder.

Billing address for invoices due is:

Port of Beaumont Navigation District Accounts Payable

P.O. Drawer 2297 Beaumont, TX 77704

SECTION III
PROPOSAL SUBMISSION FORMS

Bidder's Acknowledgment Form

Having carefully examined the information, notices and specifications and conditions contained in this package, the undersigned Bidder's agent or representative hereby proposes and agrees to furnish proposed chiller in strict compliance with the specification at the prices quoted. The Bidder affirms that, to the best of their knowledge, this bid proposal has been arrived at independently and is submitted without collusion with anyone to obtain information or gain any favoritism that would in any way limit competition or give Bidder an unfair advantage over other bidders in the award of this bid.

Addendum(s) received:

Deadline for Submission: 3 p.m. April 15, 2020

Vendor:
Address:
Phone:
Signature of Bidder:
Position with Company:
Signature of Company Official Authorizing this Bid Proposal:
Position with Company:

Submission Form

Attachments to this proposal which are required:

1. Offer from supplier detailing technical and installation specifications
2. Description of the bidder and a listing of names of the principals involved
3. A statement detailing any deviations from these specifications
4. Extended warranty information
5. Technical support information

Exhibit A

Outdoor Air-Cooled Liquid Chiller

HVAC Guide Specifications

Size Range: **80 to 500 Tons, Nominal**

(265 to 1740 kW, Nominal)

Carrier Model Number: **30XA**

Part 1 — General

1.01 SYSTEM DESCRIPTION

Microprocessor controlled, air-cooled liquid chiller for outdoor installation, utilizing screw compressors and low sound fans.

1.02 QUALITY ASSURANCE

- A. Unit shall be rated in accordance with AHRI (Air- Conditioning, Heating, and Refrigeration Institute) Standard 550/590 (U.S.A.) latest edition and all units shall be ASHRAE (American Society of Heating, Refrigerating, and Air-Conditioning Engineers) 90.1 compliant.
- B. Unit construction shall comply with ASHRAE 15 Safety Code, UL (Underwriters Laboratories) 1995, and ASME (American Society of Mechanical Engineers) applicable codes (U.S.A. codes).
- C. The management system governing the manufacture of this product is ISO (International Organization for Standardization) 9001:2015 certified.
- D. Unit shall be full load run tested at the factory.

1.03 DELIVERY, STORAGE AND HANDLING

- A. Unit controls shall be capable of withstanding 150°F (65.5°C) storage temperatures in the control compartment.
- B. Unit shall be stored and handled per unit manufacturer's recommendations.

Part 2 — Products

2.01 EQUIPMENT

A. General:

Factory assembled, single-piece chassis, air-cooled liquid chiller. Contained within the unit cabinet shall be all factory wiring, piping, controls, refrigerant charge (R-134a), and special features required prior to field start-up.

B. Materials of Construction:

1. The base rail is industrial-quality, 7 ga, zinc-dipped galvanized frame (with Magni-coated screws).
2. Cabinet shall be galvanized steel casing with a baked enamel powder or pre-painted finish.
3. Cabinet shall be capable of withstanding 500-hour salt spray test in accordance with the ASTM (American Society for Testing and Materials) (U.S.A.) B-117 standard.

C. Fans:

1. Condenser fans shall be direct-driven, 9-blade airfoil cross-section, reinforced polymer construction, shrouded-axial type, and shall be statically and dynamically balanced with inherent corrosion resistance.
2. Air shall be discharged vertically upward.
3. Fans shall be protected by coated steel wire safety guards.

D. Compressor/Compressor Assembly:

1. Comprised of semi-hermetic twin screw type compressors.
2. Compressor motor shall be direct drive, 3500 rpm, protected by motor temperature sensors, suction gas cooled motor.
3. Capacity control shall utilize an infinitely modulating slide valve to modulate capacity from 100% to 15% full load.

E. Flooded Cooler:

1. Shall be a mechanically cleanable tubes in a shell-and-tube type cooler with removable heads.
2. Tubes shall be internally enhanced seamless-copper type rolled into tube sheets.
3. Shall be equipped with Victaulic-type water connections.
4. Shell and cooler heads shall be insulated with $\frac{3}{4}$ -in. PVC foam (closed-cell) with a maximum K factor of 0.28.
5. Design shall incorporate 2 independent refrigerant circuits.
6. Cooler shall be tested and stamped in accordance with ASME Code for a refrigerant working side pressure of 220 psig (1517 kPa). Cooler shall have a maximum water-side pressure of 300 psig (2068 kPa).
7. Cooler shall have a cooler drain and vent.
8. Low-ambient temperature protection: unit shall have factory-installed cooler heater (where applicable), and pumpout cycle to protect cooler from ambient temperature freeze down to 0°F (-17.8°C).
9. Cooler shall be provided with a factory-installed flow switch.

F. Condenser:

1. Coil shall be air-cooled Novation® heat exchanger technology (MCHX) and shall have a series of flat tubes containing a series of multiple, parallel flow microchannels layered between the refrigerant manifolds. Novation coils shall consist of a two-pass arrangement. Coil construction shall consist of aluminum alloys for fins, tubes, and manifolds in combination with a corrosion-resistant coating.
2. Tubes shall be cleaned, dehydrated, and sealed.
3. Assembled condenser coils shall be pressure tested at the coil factory at 660 psig (5448 kPa) and subsequently shall be leak tested at 145 psig \pm 5 psig (1000 kPa \pm 34.5 kPa) and pressure tested at 350 psig (2413 kPa) at final unit assembly.
4. To plan the chiller installation and for ease of maintenance/coil removal, all refrigerant piping entering and leaving the condenser coils shall be located on only one side of the chiller so the coils can be removed (when needed) from the side free of piping. This is important to consider because removing the coils from the header side, although possible, involves extra labor due to extra bending and brazing of the coil headers.

G. Refrigeration Components:

Refrigerant circuit components shall include replaceable-core filter drier, moisture indicating sight glass, electronic expansion valve, discharge service valves and liquid line service valves, and complete operating charge of both refrigerant R-134a and compressor oil.

H. Controls, Safeties, and Diagnostics:

1. Unit controls shall include the following minimum components:
 - a. Microprocessor with non-volatile memory. Battery backup system shall not be accepted.
 - b. Separate terminal block for power and controls.
 - c. Separate 115-v power supply to serve all controllers, relays, and control components.
 - d. ON/OFF control switch.
 - e. Replaceable solid-state controllers.
 - f. Pressure sensors installed to measure suction, oil, economizer, and discharge pressure. Thermistors installed to measure cooler entering and leaving fluid temperatures and outside air temperature.
2. Unit controls shall include the following functions:
 - a. Automatic circuit lead/lag.
 - b. Capacity control based on leaving chilled fluid temperature and compensated by rate of change of return-fluid temperature with temperature set point accuracy to 0.1°F (0.05°C).

- c. Limiting the chilled fluid temperature pull-down rate at start-up to an adjustable range of 0.2°F to 2°F (0.1 to 1.1°C) per minute to prevent excessive demand spikes at start-up.
- d. Seven-day time schedule.
- e. Leaving chilled fluid temperature reset from return fluid and outside air temperature.
- f. Chilled water pump start/stop control.
- g. Chiller control for parallel chiller applications without addition of hardware modules and control panels (requires thermistors).
- h. Timed maintenance scheduling to signal maintenance activities for strainer maintenance and user-defined maintenance activities.
- i. Low ambient protection to energize cooler heaters (if installed).
- j. Single step demand limit control activated by remote contact closure.
- k. Periodic pump start to ensure pump seals are properly maintained during off-season periods.
- l. Night time sound mode to reduce the sound of the machine by a user-defined schedule.

3. Diagnostics:

- a. The control panel shall include, as standard, a display:
 - 1) Touch screen display consisting of 1/4 VGA LCD (liquid crystal display) with adjustable contrast and backlighting.
 - 2) Display shall allow a user to navigate through menus, select desired options and modify data.
- b. Features of the display shall include:
 - 1) Display shall be customizable and allow up to 72 data points.
 - 2) Display shall support both local equipment or network made for remote mount.
 - 3) Display shall allow access to configuration, maintenance, service, set point, time schedules, alarm history and status data.
 - 4) Display shall have one button for chiller on/off.
 - 5) Display shall include three levels of password protection against unauthorized access to configuration and maintenance information, and display set up parameters.
 - 6) Display shall allow for easy connection of a portable hand held technician tool to access information and upload and/or download chiller settings.
 - 7) Display shall be compatible with the Carrier Comfort Network® (CCN) system and provide network alarm acknowledgment or indication and provide capability to fully monitor and control chiller.
 - 8) Display alarms and parameters shall be capable of being displayed in full text.
 - 9) Display shall be capable of displaying the last 50 alarms and will store a snapshot of a minimum of 20 status data parameters for each alarm.
 - 10) Compressor run hours.
 - 11) Compressor number of starts.
 - 12) Compressor current.
 - 13) Time of day:
 - a) Display module, in conjunction with the microprocessor, must also be capable of displaying the output (results) of a service test. Service test shall verify operation of every switch, thermistor, fan, and compressor before chiller is started.
 - b) Diagnostics shall include the ability to review a list of the 30 most recent alarms with clear language descriptions of the alarm event. Display of alarm codes without the ability for clear language descriptions shall be prohibited.
 - c) An alarm history buffer shall allow the user to store no less than 30 alarm events with clear language descriptions, time and date stamp event entry.

d) The chiller controller shall include multiple connection ports for communicating with the local equipment network, the Carrier Comfort Network® (CCN) system and the ability to access all chiller control functions from any point on the chiller.

e) The control system shall allow software upgrade without the need for new hardware modules.

4. Safeties:

a. Unit shall be equipped with thermistors and all necessary components in conjunction with the control system to provide the unit with the following protections:

- 1) Loss of refrigerant charge.
- 2) Reverse rotation.
- 3) Low chilled fluid temperature.
- 4) Motor overtemperature.
- 5) High pressure.
- 6) Electrical overload.
- 7) Loss of phase.
- 8) Loss of chilled water flow.

b. Condenser-fan motors shall have internal overcurrent protection.

I. Operating Characteristics:

1. Unit shall be capable of starting and running at outdoor ambient temperatures from 32°F (0°C) to 125.6°F (52°C) for all sizes.

2. Unit shall be capable of starting up with 95°F (35°C) entering fluid temperature to the cooler.

J. Motors:

Condenser-fan motors shall be totally enclosed, air over, single speed, 3-phase type with permanently lubricated bearings and Class F insulation.

K. Electrical Requirements:

1. Unit primary electrical power supply shall enter the unit at a single location (all chiller voltage/size combinations shall have the ability to accommodate 2 power supplies to meet job-specific requirements).

2. Primary electrical power supply shall be rated to operate up to 131°F (55°C) for 401-501 units and up to 125°F (52°C) ambient temperature for all other models.

3. Unit shall operate on 3-phase power at the voltage shown in the equipment schedule.

4. Control points shall be accessed through terminal block.

5. Unit shall be shipped with factory control and power wiring installed.

L. Chilled Water Circuit:

1. Chilled water circuit shall be rated for 300 psig (2068 kPa). Units with optional pump package are rated for 150 psig (1034 kPa) working pressure.

2. Thermal dispersion proof of flow switch shall be factory installed and wired.

3. Optional hydronic package:

a. With or without VFD (variable frequency drive) (30XA090-162 units only, not available with high SCCR [short circuit current rating]):

1) Field pipe connections shall be Victaulic type.

2) Optional single or primary/stand-by operation pump systems. Dual pump systems shall have a pump discharge check valve.

3) Pumps shall be vertical in-line, single stage design, and capable of being serviced without disturbing piping connections.

a) Pump casing shall be of class 30 cast iron.

b) The impeller shall be of cast bronze, closed type, dynamically balanced, keyed to the shaft and secured by locking cap screw.

- c) The hydronic kit will be provided with a flush line connection to ensure lubrication at the seal face and allow for positive venting of the seal chamber.
 - d) Each port shall be fitted with an isolation valve that allow the units to operate in parallel or standby, yet may be used to isolate one pumping unit for servicing or removal with the other pump still running.
 - e) Pump shall be rated for 150 psig (1034 kPa) working pressure.
 - f) The pump case shall have gage tappings at the suction and discharge nozzles and include drain ports.
 - g) Dual pumps shall allow for the servicing of one pump without draining the chilled water loop.
 - h) Motors shall be premium efficiency, Totally Enclosed Fan Cooled (TEFC) 3-phase type with grease lubricated ball bearings.
 - i) Each pump shall be factory tested per Hydraulic Institute Standards.
 - 4) Pressure/temperature taps (3) shall be factory installed to measure the pressure differential across the pump and across the strainer.
 - 5) Combination valve (which includes check, isolation, and modulation) shall be factory installed. Pressure/temperature taps (2) shall be factory installed to measure the pressure differential across the combination valve.
 - 6) Hydronic assembly shall have factory-supplied electric freeze protection to -20°F (-29°C).
 - 7) Piping shall be Schedule 40 black steel.
 - 8) Cast iron or ductile iron body $1/8$ in. perforated strainer. A factory-installed, removable fine mesh start-up strainer for initial run period shall be included. The start-up strainer must be removed within 24 hours after chiller start-up.
- b. With VFD (these comments are applicable in addition to the comments in section a when the VFD hydronic package is employed [30XA090-162 units only]):
- 1) The drive shall be of the voltage vector control - pulse with modulation (VVC-PWM) type, providing near unity displacement power factor without the need for external power factor correction capacitors at all loads and speeds.
 - 2) The drive and motor protection shall include: motor phase to ground fault, loss of supply phase, over voltage, under voltage, motor over temperature, inverter overload, over current. Over current is not allowed, ensuring hydronic units will not overload the motor at any point in the operating range of the unit.
 - 3) Sensorless control software shall be available in the hydronic unit to provide automatic speed control without the need for pump mounted (internal/external) or remotely mounted differential pressure system feedback sensors. Control mode setting and minimum/maximum head set points shall be set at the factory and be user adjustable via the programming interface.
 - 4) The integrated control shall incorporate an integrated graphical user interface that shall provide running and diagnostic information and identify faults and status in clear English language. Faults shall be logged/recorded for review at a later date. It shall be possible to upload parameters from one drive into the non-volatile memory of a computer and download the parameters into other drives requiring the same settings. The key pad shall incorporate Hand-Off-Auto pushbuttons to enable switching between BMS (building management systems) and manual control. The drive shall incorporate a USB port for direct connection to a PC and an RS485 connection with Modbus¹ RTU protocol. Optional protocols available should include BACnet² and LonWorks³.
 - 5) The control shall have the following additional features: Sensorless override for BMS, manual pump control or closed loop PID control; programmable skip frequencies and adjustable switching frequency for noise/vibration control; auto alarm reset; motor pre-heat function; six programmable digital inputs; two analog inputs; one programmable analog/digital output; two volt-free contacts.

¹Modbus is a registered trademark of Schneider Electric.

²BACnet is a registered trademark of ASHRAE (American Society of Heating, Refrigerating, and Air-Conditioning Engineers).

³LonWorks is a registered trademark of Echelon Corporation.

- 6) The hydronic unit shall be capable of operating in any of the following control modes:
 - a) Duty pump and standby pumps with sensorless control.
 - b) Duty pump and standby pumps with remote sensor or building system (BAS) control.

M. Special Features:

Certain standard features are not applicable when the features designated by * are specified. For assistance in amending the specifications, contact your Carrier representative.

1. DX (Direct Expansion) Cooler Option (Not Available on sizes 401-501):

- a. Shell-and-tube type, direct expansion.
- b. Tubes shall be internally enhanced seamless-copper type rolled into tube sheets.
- c. Shall be equipped with Victaulic-type water connections.
- d. Shell shall be insulated with $\frac{3}{4}$ -in. (19 mm) PVC foam (closed-cell) with a maximum K factor of 0.28.
- e. Design shall incorporate a minimum of 2 independent direct-expansion refrigerant circuits.
- f. Cooler shall be rested and stamped in accordance with ASME Code for a refrigerant working side pressure of 220 psig (1517 kPa). Cooler shall have a maximum water-side pressure of 300 psig (2068 kPa).
- g. Cooler shall be provided with a factory-installed flow switch.

* 2. Low Ambient Temperature Head Pressure Control:

Unit shall be capable of running at outdoor ambient temperatures down to -20°F (-29°C) with the addition of antifreeze in the cooler circuit, wind baffles, and field-installed or factory-installed solid-state low ambient temperature head pressure control with condenser coil temperature sensor.

3. Unit-Mounted Non-Fused Disconnect:

Unit shall be supplied with factory-installed, lockable, non-fused electrical disconnect for main power supply. This is not available with the combination of dual point power and high SCCR (short circuit current rating).

4. Optional Condenser Coil Materials:

a. E-coated microchannel coils:

E-coated aluminum microchannel coil shall have a flexible epoxy polymer coating uniformly applied to all coil external surface areas without material bridging between fins or louvers. Coating process shall ensure complete coil encapsulation, including all exposed fin edges. E-coat shall have a thickness of 0.8 to 1.2 mil with top coat having a uniform dry film thickness from 1.0 to 2.0 mil on all external coil surface areas including fin edges. E-coated coils shall have superior hardness characteristics of 2H per ASTM D3363-00 and cross hatch adhesion of 4B-5B per ASTM D3359-02. Impact resistance shall be up to 160 in./lb (ASTM D2794-93). E-coated coil shall have superior impact resistance with no cracking, chipping, or peeling per NSF/ANSI 51-2002 Method 10.2. E-coated aluminum microchannel coils shall be capable of withstanding an 8000-hour salt spray test in accordance with the ASTM (American Society for Testing and Materials) (U.S.A.) B-117 Standard.

b. Aluminum fin/copper-tube coils:

Coil shall be constructed of seamless copper tubes mechanically bonded to aluminum fins. Fins shall have wavy enhancements. These condenser coils are recommended with remote cooler applications. These coils are not recommended for corrosive environments.

c. Pre-coated aluminum-fin coils:

Shall have a durable epoxy-phenolic coating to provide protection in mildly corrosive coastal environments. Coating shall be applied to the aluminum fin stock prior to the fin stamping process to create an inert barrier between the aluminum fin and copper tube. Epoxy-phenolic barrier shall minimize galvanic action between dissimilar metals.

d. Copper-fin coils:

Shall be constructed of copper fins mechanically bonded to copper tubes and copper tube sheets. Galvanized steel tube sheets shall not be acceptable. A polymer strip shall prevent coil assembly from contacting sheet

metal coil pan to minimize potential for galvanic corrosion between the coil and pan. All copper construction shall provide protection in moderate coastal applications.

e. E-coated aluminum-fin coils:

Shall have a flexible epoxy polymer coating uniformly applied to all coil surface areas without material bridging between fins. Coating process shall ensure complete coil encapsulation. Color shall be high gloss black with gloss — 60° of 65-90% per ASTM D523-89. Uniform dry film thickness from 0.8 to 1.2 mil on all surface areas including fin edges. Superior hardness characteristics of 2H per ASTM D3363-92A and cross hatch adhesion of 4B-5B per ASTM D3359-93. Impact resistance shall be up to 160 in./lb (ASTM D2794-93). Humidity and water immersion resistance shall be up to minimum 1000 and 250 hours respectively (ASTM D2247-92 and ASTM D870-92). Corrosion durability shall be confirmed through testing to no less than 3000 hours salt spray per ASTM B117-90. Coil construction shall be aluminum fins mechanically bonded to copper tubes.

f. E-coated copper-fin coils:

Shall have a flexible epoxy polymer coating uniformly applied to all coil surface areas without material bridging between fins. Coating process shall ensure complete coil encapsulation. Color shall be high gloss black with gloss — 60° of 65-90% per ASTM D523-89. Uniform dry film thickness from 0.8 to 1.2 mil on all surface areas including fin edges. Superior hardness characteristics of 2H per ASTM D3363-92A and cross hatch adhesion of 4B-5B per ASTM D3359-93. Impact resistance shall be up to 160 in./lb (ASTM D2794-93). Humidity and water immersion resistance shall be up to minimum 1000 and 250 hours respectively (ASTM D2247-92 and ASTM D870-92). Corrosion durability shall be confirmed through testing to no less than 3000 hours salt spray per ASTM B117-90. Coil construction shall be copper-fins mechanically bonded to copper tube sheets. Galvanized steel tube sheets shall not be acceptable. A polymer strip shall prevent coil assembly from contacting sheet metal coil pan to maintain coating integrity and minimize corrosion potential between the coil and pan.

5. Remote Enhanced Display:

Unit shall be supplied with indoor-mounted, remote, 40-character per line, 16-line display panel for field installation.

6. Chillervisor System Manager III Multi-Unit Control:

Field-installed control shall sequence 2 chillers in series, or between 2 and 8 chillers in parallel in a single system.

7. Energy Management Module:

A factory or field-installed module shall provide the following energy management capabilities: 4 to 20 mA signals for leaving fluid temperature reset, cooling set point reset or demand limit control; 2-step demand limit control (from 0% to 100%) activated by a remote contact closure; and discrete input for "Ice Done" indication for ice storage system interface.

8. Condenser Coil Trim Panels:

Unit shall be supplied with field-installed coil covers.

9. BACnet Communication Option:

Shall provide pre-programmed factory-installed communication capability with a BACnet MS/TP network. Allows integration with i-Vu® Open control system or a third-party BACnet building automation system. No field programming shall be required.

10. BACnet/Modbus Translator Control:

Unit shall be supplied with factory or field-installed interface between the chiller and a BACnet Local Area Network (LAN, i.e., MS/TP EIA-485). Field programming shall be required.

11. LON Translator Control:

Unit shall be supplied with factory or field-installed interface between the chiller and a Local Operating Network (LON; i.e., LonWorks FT-10A ANSI/EIA-709.1). Field programming shall be required.

12. Navigator™ hand-held portable display:

- a. Portable hand-held display module with a minimum of 4 lines and 20 characters per line, or clear English, Spanish, Portuguese or French language.
- b. Display menus shall provide clear language descriptions of all menu items, operating modes, configuration points and alarm diagnostics. Reference to factory codes shall not be accepted.
- c. RJ-14 connection plug shall allow display module to be connected to factory-installed receptacle.
- d. Industrial grade coiled extension cord shall allow the display module to be moved around the chiller.
- e. Magnets shall hold the display module to any sheet metal panel to allow hands-free operation.
- f. Display module shall have NEMA 4x housing suitable for use in outdoor environments.
- g. Display shall have backlight and contrast adjustment for easy viewing in bright sunlight or night conditions.
- h. Raised surface buttons with positive tactile response.

13. Touch Pilot™ Display:

Unit shall be supplied with a field-installed, remote-mount, touch screen display for network attachment to the chiller. The Touch Pilot display provides information in clear English, Spanish, Portuguese, or French language.

14. Isolation Valve Option:

Unit shall be supplied with factory-installed isolation valve which provides a means of isolating the compressors from the cooler vessel, which is beneficial in servicing the chiller. The isolation option comes in various configurations depending on the cooler type (flooded or DX) and the installation region (Middle Eastern or elsewhere). On all units equipped with the flooded cooler which are not installed in the Middle East region, a liquid line service valve and a motorized discharge isolation valve are always provided per refrigerant circuit. For Middle Eastern regions only, a manual discharge valve is standard and a motorized discharge ball valve is optional. On units equipped with the optional DX cooler, the liquid line service valve and a manual discharge service valve is included in the isolation valve option, regardless of the region of installation. Regardless of which cooler option is employed, the selection of the isolation valve option results in chillers which are equipped with a liquid line service valve, a discharge service valve (motorized or manual type), and a series of valves on or near the cooler. The net effect is to provide isolation capability in the condenser area, the cooler area and the compressor area.

NOTE: The only situation in which the isolation of the condenser area allows the full charge to be stored in the condenser is when round tube, plate fin (RTPF) coils are employed.

15. Suction Line Insulation:

Unit shall be supplied with suction line insulation. Insulation shall be tubular closed-cell insulation. This option shall be required with applications with leaving fluid temperatures below 30°F (-1.1°C) and recommended for areas of high dewpoints where condensation may be a concern.

16. Service Option:

Unit shall be provided with a service option which provides a remote service port for Navigator™ connection and a factory-installed convenience outlet that includes 4-amp GFI (ground fault interrupt) receptacle with independent fuse protection. Convenience outlet shall be 115-v female receptacle. Service option not available with 380 v.

17. Remote Service Port:

Shall be a field-installed receptacle for Navigator device connection.

18. Wye-Delta Starter:

Unit shall have a factory-installed, wye-delta start to minimize electrical inrush current.

19. Control Transformer:

Unit shall be supplied with a factory-installed transformer that will allow supply control circuit power from the main unit power supply.

20. GFI Convenience Outlet:

Shall be factory or field-installed and mounted with easily accessible 115-v female receptacle. Shall include 4 amp GFI (ground fault interrupt) receptacle. Not available with 380-v units.

21. Plus-One-Pass Cooler (Flooded Coolers Only):

Unit shall be equipped with plus-one-pass cooler heads to be used with high delta T application. This option is not available on unit sizes 401-501.

22. Minus-One-Pass Cooler (Flooded Coolers Only):

Unit shall be equipped with minus-one-pass cooler heads with reduced water-side pressure drop for series flow dual chiller control or high chilled water flow applications.

23. High Ambient Temperature:

Unit shall be equipped with high speed condenser fan motors to improve performance at high ambient temperatures. This option shall be required for 30XA401-501 chillers, and it is also required for all 30XA401-501 chillers which are operating in multi-chiller configurations or have ambient temperatures at or above 100°F (37.8°C).

24. Security Grilles:

Unit shall be provided with factory (or field) installed painted grilles to protect the condenser, cooler and compressor.

25. Upper Hail Guard:

Unit shall be equipped with a factory-installed option consisting of louvered panels on the ends of the machine which firmly fasten to the machine frame. These panels shall cover the unit from the top to the bottom of the coils, thus providing protection of the coils from hail damage.

26. Full Hail Guard:

Unit shall be equipped with field-installed accessory consisting of hinged, louvered panels, which cover both ends of the unit. This accessory provides complete protection from hail.

27. Full End Screen:

Unit shall be equipped with a factory-installed option consisting of louvered panels that cover the machine ends from top to bottom and firmly fasten to the machine frame. These end screens function as a privacy screen and also provide hail protection.

28. Low Sound Package:

Unit shall be provided with sound attenuation package to include sheet metal enclosures with sound absorbing panels for each compressor.

29. Remote Cooler Kit:

Allows remote installation of the cooler. This is not available on sizes 401-501.

30. Minimum Load Control:

Unit shall be equipped with microprocessor- controlled minimum load control that shall permit unit operation below the minimum standard operation (varies by unit size).

31. High SCCR (Short Circuit Current Rating):

The optional high SCCR (short circuit current rating) device shall allow the chiller to tolerate a 65 kA (460-v units) or 25 kA (575-v units) short circuit current for a brief period of time while protecting downstream com-

ponents. The high SCCR option shall provide a higher level of protection than the standard unit. This option is only available on 30XA140-352 and only at 460 or 575 volts.

32. Dual Chiller Accessory Kit:

For dual chiller applications (with units piped in parallel), unit shall be provided with the additional hardware (thermistors, wells, connectors) required for proper system operation.

33. Seismic Certification:

A seismic kit is available which will result in a unit SDS (seismic design acceleration parameter) level of 2.4.