SECTION 23 64 00
PACKAGED WATER CHILLERS

PART 1 - GENERAL

1.1 DESCRIPTION

A. This section covers Centrifugal water-cooled chillers, complete with accessories.

1.2 RELATED WORK

A. Section 01 00 00, GENERAL REQUIREMENTS.
B. Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, and SAMPLES.
C. Section 01 91 00, GENERAL COMMISSIONING REQUIREMENTS
D. Section 13 05 41, SEISMIC RESTRAINT REQUIREMENTS FOR NON-STRUCTURAL COMPONENTS.
E. Section 23 05 11, COMMON WORK RESULTS FOR HVAC and STEAM GENERATION.
F. Section 23 05 12, GENERAL MOTOR REQUIREMENTS FOR HVAC and STEAM GENERATION EQUIPMENT.
G. Section 23 05 41, NOISE and VIBRATION CONTROL FOR HVAC PIPING and EQUIPMENT.
H. Section 23 08 00, COMMISSIONING OF HVAC SYSTEMS.
I. Section 23 21 13, HYDRONIC PIPING.
J. Section 23 21 23, HYDRONIC PUMPS.
K. Section 26 29 11, LOW-VOLTAGE MOTOR STARTERS.

1.3 DEFINITION

A. Engineering Control Center (ECC): The centralized control point for the intelligent control network. The ECC comprises of personal computer and connected devices to form a single workstation.
B. BACNET: Building Automation Control Network Protocol, ASHRAE Standard 135.
C. Ethernet: A trademark for a system for exchanging messages between computers on a local area network using coaxial, fiber optic, or twisted-pair cables.
D. FTT-10: Echelon Transmitter-Free Topology Transceiver.

1.4 QUALITY ASSURANCE

A. Refer to Paragraph, QUALITY ASSURANCE, in Section 23 05 11, COMMON WORK RESULTS FOR HVAC and STEAM GENERATION, and comply with the following.
B. Refer to PART 3 herein after and Section 01 00 00, GENERAL REQUIREMENTS for test performance.
C. Comply with AHRI requirements for testing and certification of the chillers.

D. Refer to paragraph, WARRANTY, Section 01 00 00, GENERAL REQUIREMENTS, except as noted below:
   1. Provide a 5-year motor, and compressor warranty to include materials, parts and labor.
E. Refer to OSHA 29 CFR 1910.95(a) and (b) for Occupational Noise Exposure Standard
F. Refer to 42 CFR—Public Health, Part 84, "Approval of Respiratory Protective Devices," Subpart H—"Self-Contained Breathing Apparatus," 1998.
G. Refer to ASHRAE Standard 15, Safety Standard for Refrigeration System, for refrigerant vapor detectors and monitor.

1.5 APPLICABLE PUBLICATIONS

A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only.
B. Air Conditioning, Heating and Refrigeration Institute (AHRI):
   550/590-I-P 2020 .....Standard for Water Chilling Packages Using the Vapor Compression Cycle
   575-2017 .....Methods for Measuring Machinery Sound within Equipment Space
C. American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE):
   15-2022 .....Safety Standard for Mechanical Refrigeration Systems
D. American Society of Mechanical Engineers (ASME):
   BPVC VIII-1 2021 .....ASME Boiler and Pressure Vessel Code, Section VIII, "Pressure Vessels - Division 1"
E. American Society of Testing Materials (ASTM):
   C534/C534M-2020 .....Preformed, Flexible Elastomeric Cellular Thermal Insulation in Sheet and Tubular Form
F. National Electrical Manufacturing Association (NEMA):
   250-2021 .....Enclosures for Electrical Equipment (1000 Volts Maximum) for NEMA 1, 3R, 4 and 12 enclosures.
G. National Fire Protection Association (NFPA):
   70-2023 .....National Electrical Code
H. Underwriters Laboratories, Inc. (UL):
   1995-2015(R2022) ..... Heating and Cooling Equipment

1.6 SUBMITTALS

A. Submit in accordance with Specification Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, and SAMPLES.

B. Manufacturer's Literature and Data.

1. Centrifugal water chillers, including motor starters, control panels, and vibration isolators, and remote condenser data shall include the following:
   a. Rated capacity.
   b. Pressure drop.
   c. Efficiency at full load and part load WITHOUT applying any tolerance indicated in the AHRI 550/590/Standard.
   d. Refrigerant
   e. Fan performance (Air-Cooled Chillers only.)
   f. Accessories.
   g. Installation instructions.
   h. Startup procedures.
   i. Wiring diagrams, including factory-installed and field-installed wiring.
   j. Sound/Noise data report. Manufacturer shall provide sound ratings. Noise warning labels shall be posted on equipment.
   k. Refrigerant vapor detectors and monitors.

C. Maintenance and operating manuals for each piece of equipment in accordance with Section 01 00 00, GENERAL REQUIREMENTS.

D. Run test report for all chillers.

E. Product Certificate: Signed by chiller manufacturer certifying that chillers furnished comply with AHRI requirements. The test report shall include calibrated curves, calibration records, and data sheets for the instrumentation used in factory tests.

F. Provide seismic restraints for refrigeration equipment to withstand seismic forces.

PART 2 - PRODUCTS

2.1 CENTRIFUGAL WATER-COOLED WATER CHILLERS

A. General: Chiller shall be factor-assembled and-tested, complete with evaporator, condenser, marine water boxes for condenser and evaporator, compressor, motor, starter, oil heater and cooler, economizer or intercooler, purge system (if required), refrigerant piping, instrumentation and control piping, operating and safety controls mounted on the chiller, and other auxiliaries necessary for safe and

proper operation of the unit. Chiller operation shall be fully automatic. Make provision for space and design piping layout to suit the marine water boxes.

B. Performance: Provide the capacity as shown on the drawings. Part load and full load efficiency ratings of the chiller shall not exceed those shown on the drawings. If chillers are required to operate at less than 25 percent of full unit rated capacity, provide provision for hot gas by-pass, to operate the unit stable at any stage of capacity reduction.

C. Applicable Standard: Chillers shall be rated and certified in accordance with AHRI Standard 550/590. Chillers shall be AHRI stamped. Chiller efficiency shall comply with FEMP (Federal Energy Management Progress) requirements.

D. Acoustics: Sound pressure levels shall not exceed the following specified levels. The manufacturer shall provide sound treatment if required to comply with the specified maximum levels. Testing shall be in accordance with AHRI 575.

OCTAVE BAND								Overall
63	125	250	500	1000	2000	4000	8000	dB(A)

E. Hermetic or open: Chillers shall be open or hermetically sealed, using one of the following refrigerants: R-513, ~~HCFC-123 (~~R-1233zd(E)~~),~~ ~~HFC-134a or HCFC-410A~~ or equivalent non-flammable, no-toxic A1 ASHRAE Classification and global warming potential (GWP) of 100 or lower and listed as acceptable substitute under the EPA Significant New Alternatives Policy (SNAP) program.~~.~~

F. Compressor (Centrifugal Type): Single or multistage, having statically and dynamically balanced impeller, either direct or gear driven. Impeller shaft shall be heat-treated carbon steel of sufficient rigidity to prevent whip or vibration at operating speed. Shaft main bearings shall be of journal type with bronze or babbitt line steel cartridge, aluminum alloy one-piece insert type, or rolling element type with an AFBMA L 10 life of a minimum of 200,000 hours. Rolling element bearings shall be rated in accordance with AFBMA 9 or AFBMA 11 as applicable. Casing shall be cast iron or steel plate with split sections gasketed and bolted together. Lubrication System shall be forced-feed type and shall provide oil at proper temperature to all parts requiring lubrication. Make provisions to insure lubrication of

bearings prior to starting and of shaft seal both on stopping and starting, or bearings and shaft seal shall be submerged in oil. On units providing for forced-feed lubrication prior to starting, a differential oil pressure cutout interlocked with compressor starting equipment shall allow compressor to operate only when required oil pressure is provided to bearings. Capacity control shall be by means of variable inlet guide vanes in the compressor suction to modulate the chiller capacity from 100 to 10 percent of full unit rated capacity without unstable compressor operation. The inlet guide vanes shall be electrically operated upon the actuation of temperature or pressure sensor.

G. Evaporator: Shell-and-tube type, constructed and tested and stamped in accordance with Section VIII D1 of ASME Boiler and Pressure Vessel Code where applicable for working pressure produced by refrigerant used and water system installed, but not less than 1035 kPa (150 psig) waterside working pressure. Shell shall be fabricated of carbon steel and shall have carbon steel tube sheets; drilled and reamed to accommodate the tubes. Tubes shall be externally and internally enhanced individually replaceable and shall be expanded full diameter into tube sheets, providing a leak proof seal. Intermediate tube supports sheets shall be provided as recommended by the manufacturer to minimize tube vibration, stress, and wear. Performance shall be based on a water velocity not less than 1 m/s (3 fps) nor more than 4 m/s (12 fps), and fouling factor of 0.0000176 m^2 degrees C (0.0001 hour square foot degrees F/Btu). Removable marine water box shall be constructed of steel. Design working pressure shall be 1035 kPa (150 psig) pressure tested at 130 percent of working pressure. Water nozzle connections shall be flanged.

H. Condenser: Shell-and-tube type, constructed, tested, and stamped in accordance with applicable portions of Section VIII D1 of the ASME Boiler and Pressure Vessel Code, where applicable for working pressure produced by the refrigerant used and water system installed, but not less than 1035 kPa (150 psig). Shell shall be fabricated of carbon steel and shall have carbon steel tube sheets; drilled and reamed to accommodate the tubes. Tubes shall be nonferrous metal, externally enhanced, and internally enhanced, individually replaceable, and shall be expanded full diameter into tube sheets, providing a leak proof seal. Intermediate tube support sheets shall be provided as recommended

by the manufacturer to minimize tube vibration, stress and wear. Tubes shall fit tightly in the supports to prevent chafing due to vibration or pulsation. Performance of condenser shall be based on a water velocity not less than 1 m/s (3 fps) nor more than 4 m/s (12 fps), and a fouling factor of 0.000044 m^2 degrees C (0.00025 hour square foot) degrees F/Btu. Removable marine water box shall be constructed of steel. Design working pressure shall be 1035 kPa (150 psig) pressure tested at 130 percent of working pressure. Water nozzle connections shall be flanged.

I. Insulation: Evaporator, suction piping, compressor, and all other parts subject to condensation shall be insulated with 40 mm (1.5 inch) minimum thickness of flexible-elastomeric thermal insulation, complying with ASTM C534.

J. Economizer: Provide if required by manufacturer. Flash gas shall be piped from economizer to inlet of intermediate stage impeller wheel. In case of rotary compressor flash gas shall be piped from economizer to the intermediate compressor point. Provide a refrigerant flow control system (float valve or variable/multiple orifice system) to automatically regulate flow of liquid refrigerant through economizer. If external-type economizer is used, such economizer shall be constructed and tested in accordance with Section 8 of ASME Boiler and Pressure Vessel Code for working pressures produced by refrigerant used, unless exempt by Section U-1 of the code.

K. Motor Load Limiter: Provide a sensing and control system, which will limit maximum load current of compressor motor to a manually selectable percentage of 40 percent to 100 percent of full load current. System shall sense compressor motor current and limit it by modulating inlet guide vanes at the compressor, overriding other controls in their ability to increase loading, but not overriding their ability to reduce loading.

L. Purge System: Chillers ~~utilizing HCFC-123 and chillers~~ using refrigerants with vapor pressure less than 100 kPa (14.7 psig) shall be supplied with Purge System. Purge unit shall be factory-mounted, complete with necessary, piping, operating and safety controls and refrigerant service valves to isolate the unit from the chilling unit. Purge unit shall be air, water, or refrigerant cooled. When in operation, purge system shall function automatically to remove, water vapor, and condensable gases from refrigeration system and to condense,

separate, and return to system any refrigerant present therein. Purge system shall be manually or automatically started and stopped, and shall be assembled as a compact unit. As an option, a fully automatic purge system that operates continuously while main unit is operating may be furnished. Such purge system shall provide a means to signal operator of occurrence of excessive purging indicating abnormal air leakage into unit. The purge system shall be of high efficiency in recapturing the refrigerant at all load and head conditions and with capability to operate when the chiller is off. The purge unit shall be UL listed.

M. Spring Isolators: Per Specification Section 23 05 41, NOISE and VIBRATION CONTROL FOR HVAC PIPING and EQUIPMENT.

N. Refrigerant and Oil:

1. Provide sufficient volume of dehydrated refrigerant and lubricating oil to permit maximum unit capacity operation before and during tests. Refrigerant charge lost during the warranty period due to equipment failure shall be replaced without cost to the Government.
2. The manufacturer shall certify that chiller components, such as seals, o-ring, motor windings, etc., are fully compatible with the specified refrigerants.

O. Chillers ~~utilizing HCFC-123~~ shall be supplied with a vacuum prevention system to maintain the chiller at positive pressure during non-operational cycles.

P. Chillers ~~utilizing HCFC-123~~ shall be supplied with frangible carbon rupture disc all metal, non-fragmented with reverse buckling design rupture disc and a safety relief valve downstream of the rupture disc or~~.~~ ~~Chillers using refrigerants HFC-134a shall~~ be supplied with single or multiple reseating type, spring-loaded relief valve. Provide as applicable for refrigerant.

Q. Service valves shall be provided to facilitate refrigerant reclaim/removal required during maintenance.

R. Controls: Chiller shall be furnished with unit mounted, stand-alone, microprocessor-based controls in NEMA 12enclosure, hinged and lockable, factory wired with a single point power connection and separate control circuit. The control panel provide chiller operation, including monitoring of sensors and actuators, and shall be furnished with light emitting diodes or liquid-crystal display keypad.

1. Following functions shall display as a minimum:

a. Date and Time.
b. Outdoor air temperature.
c. Operating set point temperature and pressure.
d. Operating hours.
e. Operating or alarm status.
f. Chilled water temperature-entering and leaving.
g. Condenser water temperature-entering and leaving.
h. Refrigerant pressure-condenser and evaporator.
i. Low oil pump pressure.
j. High oil supply pressure.
k. Chiller diagnostic codes.
l. Current limit set point.
m. Number of compressor starts.
n. Purge suction temperature~~, if refrigerant HCFC-123 is used~~.
o. Purge elapsed time~~, if refrigerant HCFC-123 is used~~.

2. Control Functions:
   a. Manual or automatic startup and shutdown time schedule.
   b. Control set points for entering and leaving chilled temperatures.
   c. Condenser water temperature.
   d. Current/demand limit.
   e. Motor load limit.
3. Safety Controls: Following conditions shall shut down the chiller and require manual reset to start:
   a. High condenser pressure.
   b. High oil temperature.
   c. High or low oil pressure.
   d. Loss of flow-condenser or chilled water.
   e. Low chilled water temperature.
   f. Low evaporator refrigerant temperature.
   g. Sensor malfunctions.
   h. Power fault.
   i. Extended compressor surge.
   j. Communication loss between the chiller and its control panel. A signal must be transmitted to Energy Control Center, if provided, for this communication loss and for any abnormal.
4. The chiller control panel shall provide a relay output to initiate system changeover to free cooling. This relay shall be energized upon initiation of free cooling at the chiller control panel.

5. Leaving chilled water temperature reset, where specified in the control sequence, shall be based on return water temperature signal from a building automation system.
6. Chillers shall be pre-wired to terminal strips for interlocked to other equipment.
7. Provide contacts for remote start/stop, alarm for abnormal operation or shut down, and for Engineering Control Center (ECC) interface.
8. Chiller control panel shall reside on the "BACnet network", and provide data using open protocol network variable types and configuration properties, BACnet interworking using ARCNET or MS/TP physical data link layer protocol for communication with building automation control system.
9. Auxiliary hydronic system and the chiller(s) shall be electronically interlocked to provide time delay and starting sequence as indicated on control drawings.
10. The chiller control panel shall utilize the following components to automatically take action to prevent unit shutdown due to abnormal operating conditions which will perform as follows.
    a. High pressure switch that is set to 20 psig (adjustable setting) lower than factory pressure switch that will automatically unload the compressor to help prevent a high pressure condenser control trip. One switch is required for each compressor and indicating light shall also be provided.
    b. Motor surge pressure that is set at 95 percent of compressor RLA that will automatically unload the compressor to prevent an over current trip. One protector is required for each compressor and indicating light shall also be provided.
    c. Low pressure switch that is set at 5 PSIG above the factory low pressure switch that will automatically unload the compressor to help prevent a low evaporator temperature trip. One switch is required for each compressor and indicating light shall also be provided.
    d. In all the above cases, the chiller will continue to run, in an unloaded state and will continue to produce some chilled water in an attempt to meet the cooling load. However, if the chiller reaches the trip-out limits, the chiller controls will take the chiller off line for protection, and a manual reset is required. Once the "near trip" condition is corrected, the chiller will

return to normal operation and can then produce full load cooling.

11. With variation of +/-10 percent of design flow per minute, chiller shall be able to maintain +/-0.5 degrees F leaving water temperature control. The chiller must be able to withstand a +/- 30 percent change in flow rate per minute without unit trip. Variations in the primary flow allow for optimal system efficiency, but the chiller must be able to maintain temperature control to help ensure occupant comfort.
12. The chiller control panel shall provide +/-0.5 degrees F leaving water temperature control during normal operation. The chiller shall provide multiple steps leaving chilled water temperature controller to minimize part load energy use and optimize leaving chilled water temperature control. If manufacturer is unable to provide at least several steps of unloading, hot gas bypass shall be required to minimize loss of leaving water temperature control.
13. The chiller control panel shall provide a 2-minute stop-to-start and 5 minute start-to-start solid state timer. If the anti-recycle timers are longer than 5 minutes, then hot-gas bypass shall be provided to limit loss of leaving chilled water temperature control in low-load conditions.

S. Motor: Refer to Section 23 05 11, COMMON WORK RESULTS FOR HVAC and STEAM GENERATION. Compressor motor furnished with the chiller shall be in accordance with the chiller manufacturer and the electrical specification Section 23 05 12, GENERAL MOTOR REQUIREMENTS FOR HVAC and STEAM GENERATION EQUIPMENT. Starting torque of the motor shall be suitable for the driven chiller machine.

T. Motor Starter: Refer to Section 23 05 11, COMMON WORK RESULTS FOR HVAC. Provide a starter for each centrifugal chiller in NEMA I enclosure, designed for unit mounting. Starter shall be a variable frequency drive type. Provide starter with the following features in addition to the ones specified in Electrical Specification Section 26 29 11, LOW-VOLTAGE MOTOR STARTERS.
    1. Starter shall include incoming line provision for the number and size cables shown on the drawings. Incoming line lugs shall be copper mechanical type.
    2. Terminals connection pads shall be provided to which customers supply lugs can be attached.

3. Starters shall be coordinated with chiller packages(s) making certain all terminals are properly marked according to the chiller manufacturer’s wiring diagram.
4. Contactors shall be sized per NEMA requirements to the chillers for full load currents.
5. Ammeter(s) shall be provided, capable of displaying current to all three phases. Ammeter shall be calibrated so that inrush current can be indicated.
6. Chiller starter shall include an advanced motor protection system incorporating electronic three phase overloads and current transformers. This electronic motor protection system shall monitor and protect against the following conditions:
   a. Three phase loss with under and over voltage protection.
   b. Phase imbalance.
   c. Phase reversal.
   d. Motor overload.
   e. Motor overload protection incorrectly set.
   f. Momentary power loss protection with auto restart consisting of three phase current sensing device that monitor the status of the current.
   g. Starter contactor fault protection.
   h. Starter transition failure.
   i. Distribution fault protection.
7. When a motor driven oil pump is furnished, provide a 120- volt control circuit, mounted within starter enclosure. When an oil pump starter is provided at the refrigeration machine, provide fused disconnect in star delta starter for oil pump.
8. The starter shall be equipped with pilot relays to initiate the start sequence of compressor. These relays shall be a self-monitoring safety circuit, which shall indicate improper operation (slow operation, welding of contacts, etc.) and shall cause the chiller unit to be shut down and a fault trip indicator be displayed. The "starter circuit fault" indicator shall be located in the door of the enclosure and shall require manual reset.
9. A lockout transition safety circuit shall be provided to prevent damage from prolonged energization due to malfunction of the transistor contactor. Malfunction shall cause the chiller unit to shut down and the "starter circuit fault" indicator be displayed.

10. A permanent nameplate shall be provided and mounted on the starter panel. It shall identify the manufacturer, serial or model number identifying the date of manufacturing and component replacement parts, and all current and voltage rating, and as built wiring schematic showing all items provided.
11. An active harmonic filter (AHF) shall be provided as part of the chiller VFD. AHF shall be air cooled, microprocessor based, pulse width modulated (PWM) design to provide harmonics mitigation generated by the VFD. Water cooled designs cannot use condenser water. Input and output power devices shall be Insulated Gate Bipolar Transistors (IGBTs). An AC line reactor shall provide enough impedance for harmonics regulations in order to maintain less than 5 percent total demand distortion. AHF assembly shall have its own internal fuses and circuit breaker.
12. Non-fused main power disconnect switch.

PART 3 – EXECUTION

3.1 EXAMINATION

A. Examine roughing-in for concrete equipment bases, anchor-bolt sizes and locations, piping and electrical to verify actual locations and sizes before chiller installation and other conditions that might affect chiller performance, maintenance, and operation. Equipment locations shown on drawings are approximate. Determine exact locations before proceeding with installation.

3.2 EQUIPMENT INSTALLATION

A. Install chiller on existing concrete base with isolation pads or vibration isolators.
   1. Vibration isolator types and installation requirements are specified in Section 23 05 41, NOISE and VIBRATION CONTROL FOR HVAC PIPING and EQUIPMENT
   2. Anchor chiller to concrete base according to manufacturer’s written instructions and for seismic restraint on vibration isolators.
   3. Charge the chiller with refrigerant, if not factory charged.
   4. Install accessories and any other equipment furnished loose by the manufacturer, including remote starter, remote control panel, and remote flow switches, according to the manufacturer written instructions and electrical requirements.
   5. Chillers shall be installed in a manner as to provide easy access for tube pull and removal of compressor and motors etc.

B. Install thermometers and gages as recommended by the manufacturer and/or as shown on drawings.

C. Piping Connections:

1. Make piping connections to the chiller for chilled water, condenser water, and other connections as necessary for proper operation and maintenance of the equipment.
2. Make equipment connections with flanges and couplings for easy removal and replacement of equipment from the equipment room.
3. Extend vent piping from the relief valve and purge system to the outside.

3.3 STARTUP AND TESTING

A. Engage manufacturer's factory-trained representative to perform startup and testing service.

B. Inspect, equipment installation, including field-assembled components, and piping and electrical connections.

C. After complete installation startup checks, according to the manufacturers written instructions, do the following to demonstrate to the COR that the equipment operate and perform as intended.

1. Check refrigerant charge is sufficient and chiller has been tested for refrigerant leak.
2. Check bearing lubrication and oil levels.
3. Verify proper motor rotation.
4. Verify pumps associated with chillers are installed and operational.
5. Verify thermometers and gages are installed.
6. Verify purge system, if installed, is functional and relief piping is routed outdoor.
7. Operate chiller for run-in-period in accordance with the manufacturer’s instruction and observe its performance.
8. Check and record refrigerant pressure, water flow, water temperature, and power consumption of the chiller.
9. Test and adjust all controls and safeties. Replace or correct all malfunctioning controls, safeties and equipment as soon as possible to avoid any delay in the use of the equipment.
10. Prepare a written report outlining the results of tests and inspections, and submit it to the COR.

D. Engage manufacturer’s certified factory trained representative to provide training for 16 hours for the VA maintenance and operational

personnel to adjust, operate and maintain equipment, including self-contained breathing apparatus.

E. The Commissioning Agent will observe startup and contractor testing of selected equipment. Coordinate the startup and contractor testing schedules with the COR and Commissioning Agent. Provide a minimum of 7 days prior notice.

F. Provide services of manufacturer’s technical representative for four hours to instruct VA personnel in operation and maintenance of computer room air conditioning equipment.

3.4 COMMISSIONING

A. Provide commissioning documentation in accordance with the requirements of Section 01 91 00, GENERAL COMMISSIONING REQUIREMENTS and Section 23 08 00, COMMISSIONING OF HVAC SYSTEMS for all inspection, start up, and contractor testing required above and required by the System Readiness Checklist provided by the Commissioning Agent.

B. Components provided under this section of the specification will be tested as part of a larger system. Refer to Section 23 08 00 – COMMISSIONING OF HVAC SYSTEMS and related sections for contractor responsibilities for system commissioning.

3.5 Demonstration And Training

A. Provide services of manufacturer’s technical representative for four hours to instruct VA personnel in operation and maintenance of units. Coordinate this training with that of the cooling tower, if furnished together.

B. Submit training plans and instructor qualifications in accordance with the requirements of Section 23 08 00, COMMISSIONING OF HVAC SYSTEMS.

- - - E N D - - -