ADDENDUM SUMMARY

Addendum #7

Date: 03/08/2024

Project: 2024 – Fishers Elementary School Addition & Renovations

This Addendum is issued in accordance with the provisions of "The General Conditions of the Contract for Construction," Article 1, "Contract Documents" and becomes a part of the Contract Documents as provided therein.

This Addendum includes the following attachments:

1. Addendum 7 Summary from CSO Architecture with revised Chiller Specification section

Misc. Item:

Please modify Bid Package #22 Plumbing as follows: Add specification section 08 31 13 Access Doors & Frames to the list of specifications included in this package.

End Addendum

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ADDENDUM

CSO
ARCHITECTURE · INTERIOR DESIGN

ADDENDUM NO: 07

BID PACKAGE NO: N/A

PROJECT: 2024 – Fishers Elementary School Addition and Renovations

PROJECT NO: 2021119 BY: Josh Cannaday
DATE: 03/7/2024

This Addendum is issued in accordance with the provisions of "The General Conditions of the Contract for Construction," Article 1, "Contract Documents" and becomes a part of the Contract Documents as provided therein. This Addendum includes:

ATTACHMENTS

See attached addendum by: REDimond
Specifications:
- 23 64 01 – Packaged Air-Cooled Water Chillers

Drawings:
- NOT USED

PART 1 - GENERAL INFORMATION

1.1 NOT USED

PART 2 - BIDDING REQUIREMENTS

2.1 NOT USED

PART 3 - SPECIFICATIONS

3.1 23 64 01 – Packaged Air-Cooled Water Chillers

A. Replace this section in its entirety with the attached.

B. Revisions to air-cooled chiller options and requirements.

PART 4 - DRAWINGS

4.1 NOT USED

PART 5 - QUESTIONS AND ANSWERS

5.1 NOT USED

END ADDENDUM

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SECTION 26 64 01 – PACKAGED, AIR-COOLED WATER CHILLERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes packaged, air-cooled, electric-motor-driven, water chillers. Two (2) Air-Cooled Chillers are required.

1.3 SUBMITTALS

A. Product Data: For each type of product.

1. Include refrigerant, rated capacities, operating characteristics, and furnished specialties and accessories.
2. Performance at AHRI standard conditions and at conditions indicated.
3. Performance at AHRI standard unloading conditions.
4. Minimum evaporator flow rate.
5. Refrigerant capacity of water chiller.
6. Oil capacity of water chiller.
7. Fluid capacity of evaporator.
8. Characteristics of safety relief valves.
9. Force and moment capacity of each piping connection.

B. Shop Drawings: Complete set of manufacturer's prints of water chiller assemblies, control panels, sections and elevations, and unit isolation. Include the following:

1. Assembled unit dimensions.
2. Weight and load distribution.
3. Required clearances for maintenance and operation.
4. Size and location of piping and wiring connections.
5. Diagrams for power, signal, and control wiring.

1.4 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For each water chiller to include in emergency, operation, and maintenance manuals.

B. Spare Parts List: Recommended spare parts list with quantity for each.

C. Touchup Paint Description: Detailed description of paint used in application of finish coat to allow for procurement of a matching paint.

D. Instructional Videos: Including those that are prerecorded and those that are recorded during training.

1.5 QUALITY ASSURANCE

A. AHRI Certification: Certify chiller according to AHRI 590 certification program.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Ship water chillers from the factory fully charged with refrigerant and filled with oil. For chillers with remote evaporators, chillers shall be shipped with a nitrogen charge. Contractor shall thoroughly inspect chillers upon arrival for damage or missing specified items.

B. Cover units with shrink wrap to protect from the environment.

1.7 WARRANTY

A. Extended warranties include, but are not limited to, the following:

1. Complete chiller including refrigerant and oil charge.
2. Complete compressor and drive assembly including refrigerant and oil charge.
3. Refrigerant and oil charge.

a. Loss of refrigerant charge for any reason due to a manufacturer's product defect and product installation. Loss of refrigerant within interconnecting piping between a remote evaporator and chiller determined to be by Contractor shall not be included. Installing Contractor shall repair piping and replace lost refrigerant.

4. Parts and labor.

B. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. AHRI Rating: Rate water chiller performance according to requirements in AHRI 550/590.

B. ASHRAE Compliance: ASHRAE 15 for safety code for mechanical refrigeration.

C. ASHRAE/IES 90.1 Compliance: Applicable requirements in ASHRAE/IES 90.1, Section 6 - "Heating, Ventilating, and Air-Conditioning."

D. ASME Compliance: Fabricate and stamp water chiller heat exchangers to comply with ASME Boiler and Pressure Vessel Code.

E. Comply with NFPA 70.

F. Comply with requirements of UL 1995, "Heating and Cooling Equipment," and include label by a qualified testing agency showing compliance.

G. Operation Following Loss of Normal Power:

1. Equipment, associated factory- and field-installed controls, and associated electrical equipment and power supply connected to backup power system shall automatically return equipment and associated controls to the operating state occurring immediately before loss of normal power without need for manual intervention by an operator when power is restored either through a backup power source, or through normal power if restored before backup power is brought on-line.
2. See drawings for equipment served by backup power systems.
3. Provide means and methods required to satisfy requirement even if not explicitly indicated.

H. Outdoor Installations:

1. Chiller shall be suitable for outdoor installation indicated. Provide adequate weather protection to ensure reliable service life over a 25-year period with minimal degradation due to exposure to outdoor ambient conditions.

2.2 MANUFACTURERS

A. Trane

B. York

C. Carrier

2.3 MANUFACTURED UNITS

A. Description: Factory-assembled and run-tested packaged air-cooled water chiller complete with compressor(s), compressor motors and motor controllers, evaporator, condenser with fans, electrical power, controls, and indicated accessories.

B. Sound-reduction package shall have the following:

1. Acoustic enclosure around compressors.
2. Reduced-speed fans with acoustic treatment.
3. Designed to reduce sound level without affecting performance.

2.4 CABINET

A. Base: Galvanized-steel base extending the perimeter of water chiller. Secure frame, compressors, and evaporator to base to provide a single-piece unit.

B. Frame: Rigid galvanized-steel frame secured to base and designed to support cabinet, condenser, control panel, and other chiller components not directly supported from base.

C. Casing: Galvanized steel.

D. Finish: Coat base, frame, and casing with a corrosion-resistant coating capable of withstanding a 500-hour salt-spray test according to ASTM B117.

2.5 COMPRESSOR-DRIVE ASSEMBLIES

A. Compressors:

1. Scroll compressors.
2. Description: Positive-displacement direct drive with hermetically sealed casing.
3. Each compressor provided with suction and discharge service valves, crankcase oil heater, and suction strainer.

    a. For multiple compressor assemblies, it is acceptable to isolate each compressor assembly in lieu of each compressor.

4. Operating Speed: Nominal 3600 rpm for 60-Hz applications.
5. Capacity Control: On-off compressor cycling.
6. Oil Lubrication System: Automatic pump with strainer, sight glass, filling connection, filter with magnetic plug or removable magnet in sump, and initial oil charge.

    a. Manufacturer's other standard methods of providing positive lubrication are acceptable in lieu of an automatic pump.

7. Vibration Isolation: Mount individual compressors on vibration isolators.

B. Compressor Motors:

1. Hermetically sealed and cooled by refrigerant suction gas.
2. High-torque, two-pole induction type with inherent thermal-overload protection on each phase.

C. Compressor Motor Controllers:

1. Across the Line: NEMA ICS 2, Class A, full voltage, nonreversing, or VFD where noted.

2.6 REFRIGERATION

A. Refrigerant: R-32, R454B, or R410A Classified as Safety Group A1 according to ASHRAE 34.

B. Refrigerant Compatibility: Parts exposed to refrigerants shall be fully compatible with refrigerants, and pressure components shall be rated for refrigerant pressures.

C. Refrigerant Circuit: Each circuit shall include expansion valve, refrigerant charging connections, a hot-gas muffler, compressor suction and discharge shutoff valves, a liquid-line shutoff valve, a replaceable-core filter-dryer, a sight glass with moisture indicator, a liquid-line solenoid valve, and an insulated suction line.

D. Refrigerant Isolation: Factory install positive shutoff isolation valves in the compressor discharge line and the refrigerant liquid-line to allow the isolation and storage of the refrigerant charge in the chiller condenser.

E. Pressure Relief Device:

1. Comply with requirements in ASHRAE 15, ASHRAE 147, and applicable portions of ASME Boiler and Pressure Vessel Code: Section VIII, Division 1.
2. Select and configure pressure relief devices to protect against corrosion and inadvertent release of refrigerant.
3. ASME-rated, spring-loaded, pressure relief valve; single- or multiple-reseating type. Pressure relief valve(s) shall be provided for each heat exchanger.

2.7 EVAPORATOR (REMOTE)

A. Brazed Plate:

1. Direct-expansion, single-pass, brazed-plate design.
2. Type 304 stainless-steel construction.
3. Code Compliance: Tested according to ASME Boiler and Pressure Vessel Code.
4. Fluid Nozzles: Terminate with grooved connections for connection to field piping.
5. Inlet Strainer: Factory-furnished, 20-mesh strainer for field installation in supply piping to evaporator. Manufacturer has option to factory install strainer.

B. Flow Switch: Factory-furnished flow switch wired to chiller operating controls.

2.8 AIR-COOLED CONDENSING UNIT

A. Coil(s) with integral subcooling on each circuit.

B. Copper/Aluminum Tube with Plate Fin Coils:

1. Construct coils of copper or aluminum tubes mechanically bonded to aluminum fins.

C. Hail Protection: Provide condenser coils with louvers, baffles, or hoods to protect against hail damage.

D. Fans: Direct-drive propeller type with statically and dynamically balanced fan blades, arranged for vertical air discharge.

E. Fan Motors: TENV or TEAO enclosure, with sealed and permanently lubricated bearings, and having built-in overcurrent- and thermal-overload protection.

1. Overcurrent- and thermal-overload protection not integral to motor is acceptable if provided with chiller electrical power package.

F. Fan Guards: Removable steel safety guards with corrosion-resistant PVC coating.

2.9 INSULATION

A. Closed-cell, flexible, elastomeric thermal insulation complying with ASTM C534/C534M, Type I for tubular materials and Type II for sheet materials.

1. Thickness: 1-1/2 inches.

B. Adhesive: As recommended by insulation manufacturer.

C. Factory-applied insulation over all cold surfaces of chiller capable of forming condensation. Components shall include, but not be limited to, evaporator, evaporator water boxes including nozzles, refrigerant suction pipe from evaporator to compressor, cold surfaces of compressor, refrigerant-cooled motor, and auxiliary piping.

1. Apply adhesive to 100 percent of insulation contact surface.
2. Before insulating steel surfaces, prepare surfaces for paint, and prime and paint as indicated for other painted components. Do not insulate unpainted steel surfaces.
3. Seal seams and joints to provide a vapor barrier.
4. After adhesive has fully cured, paint exposed surfaces of insulation to match other painted parts.
5. Manufacturer has option to factory or field insulate chiller components to reduce potential for damage during installation.
6. Field-Applied Insulation:

a. Components that are not factory insulated shall be field insulated to comply with requirements indicated.
b. Manufacturer shall be responsible for chiller insulation whether factory or field installed to ensure that manufacturer is the single point of responsibility for chillers.
c. Manufacturer's factory-authorized service representative shall instruct and supervise installation of field-applied insulation.
d. After field-applied insulation is complete, paint insulation to match factory-applied finish.

2.10 ELECTRICAL

A. Factory installed and wired, and functionally tested at factory before shipment.

B. Factory-installed and -wired switches, motor controllers, transformers, and other electrical devices necessary shall provide a single-point field power connection to water chiller.

C. House in a unit-mounted, NEMA 250, Type 3R enclosure with hinged access door with lock and key or padlock and key.

D. Wiring shall be numbered and color-coded to match wiring diagram.

E. Each motor shall have branch power circuit and controls with one of the following disconnecting means having minimum 65,000 amp SCCR to match main disconnecting means:

1. NEMA KS 1, heavy-duty, fusible switch with rejection-type fuse clips rated for fuses. Select and size fuses to provide Type 2 protection according to IEC 60947-4-1.
2. NEMA KS 1, heavy-duty, non-fusible switch.
3. UL 489, motor-circuit protector (circuit breaker) with field-adjustable, short-circuit trip coordinated with motor locked-rotor amperes.

F. Each motor shall have overcurrent protection.

G. Overload relay sized according to UL 1995, or an integral component of water chiller control microprocessor.

H. Phase-Failure and Undervoltage: Solid-state sensing with adjustable settings.

I. Controls Transformer: Unit-mounted transformer with primary and secondary fuses and sized with enough capacity to operate electrical load plus spare capacity.

J. Control Relays: Auxiliary and adjustable time-delay relays, or an integral to water chiller microprocessor.

K. Indicate the following for water chiller electrical power supply:

1. Current, phase to phase, for all three phases.
2. Voltage, phase to phase and phase to neutral for all three phases.
3. Three-phase real power (kilowatts).
4. Three-phase reactive power (kilovolt amperes reactive).
5. Power factor.
6. Running log of total power versus time (kilowatt hours).
7. Fault log, with time and date of each.

2.11 CONTROLS

A. Factory installed and wired, and functionally tested at factory before shipment.

B. Standalone, microprocessor based, with all memory stored in nonvolatile memory so that reprogramming is not required on loss of electrical power.

C. Enclosure: Share enclosure with electrical power devices or provide a separate enclosure of matching construction.

D. Operator Interface: Keypad or pressure-sensitive touch screen. Multiple-character, digital display. Display the following:

1. Date and time.
2. Operating or alarm status.
3. Operating hours.
4. Outside-air temperature if required for chilled-water reset.

5. Temperature and pressure of operating set points.
6. Chilled-water entering and leaving temperatures.
7. Refrigerant pressures in evaporator and condenser.
8. Saturation temperature in evaporator and condenser.
9. No cooling load condition.
10. Elapsed time meter (compressor run status).
11. Pump status.
12. Antirecycling timer status.
13. Percent of maximum motor amperage.
14. Current-limit set point.
15. Number of compressor starts.
16. Alarm history with retention of operational data before unit shutdown.
17. Superheat.

E. Control Functions:

1. Manual or automatic startup and shutdown time schedule.
2. Capacity control based on evaporator leaving-fluid temperature.
3. Capacity control compensated by rate of change of evaporator entering-fluid temperature.
4. Chilled-water entering and leaving temperatures, control set points, and motor load limit. Chilled-water leaving temperature shall be reset based on signal from control system.
5. Current limit and demand limit.
6. External water chiller emergency stop.
7. Antirecycling timer.
8. Automatic lead-lag switching.

F. Manual-Reset Safety Controls: The following conditions shall shut down water chiller and require manual reset:

1. Low evaporator pressure or high condenser pressure.
2. Low chilled-water temperature.
3. Refrigerant high pressure.
4. High or low oil pressure.
5. High oil temperature.
6. Loss of chilled-water flow.

G. Building Control System Interface: Factory-install hardware and software to enable system to monitor, control, and display chiller status and alarms.

1. Hardwired I/O Points:

   a. Monitoring: On/off status, trouble alarm.
   b. Control: On/off operation, chilled-water discharge temperature set-point.

2. Communication Interface: ASHRAE 135 (BACnet) communication interface shall enable control system operator to remotely control and monitor the water chiller from an operator workstation. Control features and monitoring points displayed locally at water chiller control panel shall be available through DDC system for HVAC.

H. Factory-installed wiring outside of enclosures shall be in NFPA 70-complaint raceway.

2.12 ACCESSORIES

A. Factory-furnished neoprene isolators for field installation.

B. Compressor sound blankets.

C. Low sound acoustical fans.

2.13 CAPACITIES AND CHARACTERISTICS

A. See Schedule on Drawings.

B. Chillers shall be capable of operating down to 35F ambient temperature.

2.14 SOURCE QUALITY CONTROL

A. Perform functional test of water chillers before shipping.

B. Factory test and inspect evaporator according to ASME Boiler and Pressure Vessel Code: Section VIII, Division 1. Stamp with ASME label.

C. For water chillers located outdoors, rate sound power level according to AHRI 370 procedure.

2.15 MAINTENANCE AND SERVICE AGREEMENT

A. Manufacturer's authorized service representative shall provide all maintenance and service (parts and labor) for the chiller for a period of 5 years from the date of substantial completion. Provide maintenance at intervals shown on the following matrix Schedule and coordinate all work with the HSE designated individual. Submit a written report after each visit.

B. Manufacturer shall provide emergency service throughout operating season on preferential basis at no additional charge.

C. Manufacturer shall provide Owner with certified analysis for refrigerant and compressor oil after initial cooling season.

D. Owner agrees to notify manufacturer of any operating problems or operating conditions; and, in addition, will do the following:
   1. Follow recommended written operating instructions.
   2. Provide access to equipment during normal working hours.

E. Manufacturer shall provide all maintenance and service labor and materials required to produce continuous operation. It is intended that the Owner's personnel will provide no maintenance other than starting and stopping equipment for warranty period. Manufacturer shall provide all refrigerant and oil required, and replace any materials causing malfunction.

F. Chiller manufacturer shall provide Owner a complete preventative maintenance procedure recommendation for the new equipment.

SERVICE AGREEMENT MATRIX

Item: **Packaged Air Cooled Chiller with Scroll Compressor** Quantity: 1

Task and Actions	Preventative Maintenance Twice/Year	Performance Test Twice/Year
Report to Customer Upon Arrival	x	X
Leak Test Entire Unit	x	N/A
Check Refrigerant Charge	x	N/A
Calibrate Operating Controls	x	N/A
Tighten Electrical Connections	x	N/A
Check Starter Wiring and Contacts	x	N/A
Calibrate Motor Amps & Volts	x	N/A
Check Gauges / Indicator Lights	x	N/A
Calibrate Controls and Voltage	x	N/A
Calibrate Flow Switches/Devices	x	N/A
Inspect/Clean Starter and/or Contactors	x	N/A
Lubricate Equipment as Needed	x	N/A
Clean Condenser Coils	x	N/A
Megger Compressor Motor (2^{nd} and 4^{th} years)	x	N/A
Remove Oil Sample for Analysis (or acid Test on scrolls) and Replace oil if Required	x	N/A
Check General Machine Operation	x	N/A
Check Control, Power and Piping	x	N/A
Check Safety/Operating Controls	x	N/A
Clean Water Strainers	x	N/A
Run Test Unit and Log the Following:		
Log CHW Inlet Temperature	x	x
Log CHW Outlet Temperature	x	x
Log CHW Flow ΔP	x	x
Log Cooler Refrigerant Temperature	x	x
Log Cooler Refrigerant Pressure	x	x
Perform Infrared Temperature Test	x	x
Log Oil Pressure Differential	x	x
Log Motor Temperature(s)	x	x
Make Equipment Adjustments as Required	x	x
Clean Up Work Station	x	x
Report to Customer and Advise on Departure	x	x

Service Agreement Note:

1. Annual preventative maintenance shall occur prior to each cooling season and at the midpoint of the cooling season (April and August)
2. Annual performance test shall occur at the ¼ and ¾ points of the cooling season (Approx. June & Oct.)

PREVENTATIVE MAINTENANCE:

PERFORMANCE TESTS
Each Performance Test is to consist of the task-actions listed herein for each equipment type and to be performed at the frequency listed.

PREVENTATIVE MAINTENANCE

Each Preventative Maintenance is to consist of pre-scheduled recurring preventative maintenance actions which are to be performed twice a year and as determined by equipment operating hours that may be recommended by each equipment manufacturer. These tasks are designed to prepare the equipment for prime operating condition so that the equipment will operate effectively, reliably and efficiently during peak demand months.

MINOR REPAIRS

Minor repairs shall consist of tasks which are performed during routine inspection(s) on an as needed basis that may require minor disassembly and removal of available inspection covers for minor repairs, measurements and adjustments including replacement of routine expendable parts, controls, switches and lamps. Labor and/or Material is to be included as indicated in the AGREEMENT.

REFRIGERANT MATERIAL

Installing Contractor: For any leaks detected within the interconnecting piping between the chiller and the remote evaporator, provide refrigerant as required for the performance of any Major Operating Inspection(s), Routine Operating Inspections(s), Annual Preventative Maintenance, Multi-year Preventative Maintenance or any Repair Service tasks so indicated on the Service Summary Sheet(s) herein. Any refrigerant material stocked on the job site is to be in approved storage containers and in accordance with ASHRAE Standard Safety Code for Mechanical Refrigeration (ANSI/ASHRAE 15-1994).

PART 3 - EXECUTION

3.1 EXAMINATION

A. Before water chiller installation, examine roughing-in for equipment support, anchor-bolt sizes and locations, piping, controls, and electrical connections to verify actual locations, sizes, and other conditions affecting water chiller performance, maintenance, and operations.

1. Water chiller locations indicated on Drawings are approximate. Determine exact locations before roughing-in for piping, controls, and electrical connections.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 WATER CHILLER INSTALLATION

A. Coordinate sizes and locations of bases with actual equipment provided. Cast anchor-bolt inserts into concrete bases.

B. Coordinate sizes, locations, and anchoring attachments of structural-steel support structures with actual equipment provided.

C. Install water chillers on support structure indicated.

D. Equipment Mounting:

1. Install water chillers on cast-in-place concrete equipment bases. Comply with requirements for equipment bases and foundations specified in Section 03 30 00 "Cast-in-Place Concrete."

E. Maintain manufacturer's recommended clearances for service and maintenance.

F. Maintain clearances required by governing code.

G. Chiller manufacturer's factory-trained service personnel shall charge water chiller with refrigerant if not factory charged and fill with oil if not factory installed.

H. Install separate devices furnished by manufacturer and not factory installed.

1. Chillers shipped in multiple major assemblies shall be field assembled by chiller manufacturer's factory-trained service personnel.

3.3 PIPING CONNECTIONS

A. Comply with requirements in Section 23 21 13 "Hydronic Piping" and Section 23 21 16 "Hydronic Piping Specialties." Drawings indicate general arrangement of piping, fittings, and specialties.

B. Comply with requirements in Section 23 23 00 "Refrigerant Piping." Drawings indicate general arrangement of piping, fittings, and specialties.

C. Where installing piping adjacent to chillers, allow space for service and maintenance.

D. Evaporator Fluid Connections:

1. Connect to evaporator inlet with shutoff valve, strainer**,** thermometer, and plugged tee with pressure gage.
2. Connect to evaporator outlet with shutoff valve, balancing valve, flow switch, thermometer, plugged tee with pressure gage, and drain connection with valve.
3. Make connections to water chiller.

3.4 ELECTRICAL POWER CONNECTIONS

A. Connect wiring according to Section 26 05 19 "Low-Voltage Electrical Power Conductors and Cables."

B. Ground equipment according to Section 26 05 26 "Grounding and Bonding for Electrical Systems."

C. Provide nameplate for each electrical connection indicating electrical equipment designation and circuit number feeding connection. Nameplate shall be laminated phenolic layers of black with engraved white letters at least 1/2 inch (13 mm) high. Locate nameplate where easily visible.

3.5 CONTROLS CONNECTIONS

A. Install control and electrical power wiring to field-mounted control devices.

B. Connect control wiring between chillers and other equipment to interlock operation as required to provide a complete and functioning system.

C. Connect control wiring between chiller control interface and Building Automation System (BAS) for remote monitoring and control of chillers. Comply with requirements in Section 23 09 23 "Direct Digital Control (DDC) System for HVAC."

D. Provide nameplate on face of chiller control panel indicating control equipment designation serving chiller and the I/O point designation for each control connection. Nameplate shall be laminated phenolic layers of black with engraved white letters at least 1/2 inch (13 mm) high.

3.6 STARTUP SERVICE

A. Engage a factory-authorized service representative to perform startup service.

B. Inspect field-assembled components, equipment installation, and piping and electrical connections for proper assemblies, installations, and connections.

C. Complete installation and startup checks according to manufacturer's written instructions and perform the following:

1. Verify that refrigerant charge is sufficient and water chiller has been leak tested.
2. Verify that pumps are installed and functional.
3. Verify that thermometers and gages are installed.
4. Operate water chiller for run-in period.
5. Check bearing lubrication and oil levels.
6. Verify that refrigerant pressure relief device for chillers installed indoors is vented outside.
7. Verify proper motor rotation.
8. Verify static deflection of vibration isolators, including deflection during water chiller startup and shutdown.
9. Verify and record performance of chilled-water flow and low-temperature interlocks.
10. Verify and record performance of water chiller protection devices.
11. Test and adjust controls and safeties. Replace damaged or malfunctioning controls and equipment.

D. Visually inspect chiller for damage before starting. Repair or replace damaged components, including insulation. Do not start chiller until damage that is detrimental to operation has been corrected.

E. Prepare a written startup report that records results of tests and inspections.

3.7 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain water chillers.

1. Instructor shall be factory trained and certified.
2. Provide not less than three 4-hour training sessions.
3. Train personnel in operation and maintenance and to obtain maximum efficiency in plant operation.
4. Provide instructional videos showing general operation and maintenance that are coordinated with operation and maintenance manuals.
5. Obtain Owner sign-off that training is complete.
6. Owner training shall be held at Project site.

END OF SECTION

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