DOCUMENT 00 90 00
ADDENDUM

ADDENDUM NO. [2] **Date: April 15, 2020**

RE: **SCHOOL DISTRICT OF LA CROSSE**
CENTRAL HIGH SCHOOL SUTTON GYM COOLING
LA CROSSE, WISCONSIN 54601
HSR PROJECT NO. 20008

FROM: HSR Associates, Inc
100 Milwaukee Street
La Crosse, WI 54603
(608) 784-1830

To: Prospective Bidders

This addendum forms a part of the Contract Documents and modifies the original Bidding Documents dated March 2020. Acknowledge receipt of this Addendum in the space provided on the bid form. Failure to do so may subject the Bidder to disqualification.

This Addendum consists of [1] page and [2] specification sections.

CHANGES TO SPECIFICATIONS:

1. Section 23 05 00 General Provisions
    a. Modified section attached hereto as part of contract documents.
    b. Add the following paragraph:
        i. 1.13 OWNER FURNISHED
            1. A. Owner will provide building automation controls to operate the new cooling system outside of contract.
2. Section 23 62 13 Air Cooled Condensing Units
    a. Modified section attached hereto as part of contract documents.
    b. Delete paragraph M CONTROLS in its entirety.
    c. Delete paragraph N SUPPLY AIR VAV CONTROL in its entirety.
    d. Add the following paragraphs:
        i. UNIT CONTROL: Factory-provided 115-volt control circuit includes fusing and control power transformer. The unit is wired with magnetic contactors for compressor and condenser motors. Three-leg circuit breakers are used for overload and short circuit protections. The unit also has high/low pressure cutouts. Charge isolation, reset relay and anti-recycle compressor timer is provided. Across- the- line start is standard.
        ii. NO SYSTEM CONTROL: No System Control provides a terminal strip for step control provided by others. The system provides internal 3 minute fixed on and 5 minute fixed off time delays and compressor contactors. The system temperature step controller must be field provided and installed.
        iii. Note: For No Controls units with system temperature step controllers provided by others, the controller must include 5 minute on/off interstage timers to coordinate with the units fixed on/off time delay relays.

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SECTION 23 05 00

GENERAL PROVISIONS

PART 1: GENERAL

1.01 RELATED DOCUMENTS

A. Conditions of the Contract and portions of Division One of this Project Manual apply to this Section as though repeated herein.

1. Section 01 50 00 Temporary Facilities and Controls.

1.02 WORK INCLUDED

A. Provide all materials, labor, services and incidentals necessary for the completion of this Division of the Work.

B. Requirements of Section 23 05 00 applies to applicable Sections of Division 2 and all Sections of Division 23.

1. Bidding Requirements, Contract Forms, Conditions of the Contract, Division 1-General Requirements, and Sections 23 01 30 through 23 84 17 inclusive Heating, Ventilating, and Cooling Work.

C. Cutting and Patching: Section 01 07 00.

1.03 RELATED WORK

A. Fire Stopping: Section 07 84 00.

1. Refer to this section for instructions and determination of responsibility.
2. The Mechanical Trades shall submit the cost of firestopping for their Trade to the Prime Contractor under Section 07 84 00 Fire Stopping. The Prime Contractor shall then decide whether to do all of the fire stopping or assign it to the individual Trade at the submitted cost.

1.04 QUALITY ASSURANCE

A. Submit Bid based on materials and equipment of manufacturers specified. Catalog numbers of base manufacturer establishes quality required. Other manufacturers listed may be bid without prior approval, providing product is equal to base specification and subject to proof of compliance during shop drawing review by Architect/Engineer.

1. All items specified shall be the latest type or model produced by manufacturer specified. If descriptive specification or model number is obsolete, substitute current product.

B. Whenever a product of a manufacturer other than the Base Specification is furnished, include in the Bid, any additional costs for labor and/or materials required to adapt the substituted equipment variations, to the original system design. This includes full compensation to other Trades for changes required in their work. Variations include, but are not limited to:

1. Additional breeching, piping extensions, stack revisions, etc. for changes in location of boiler outlets.
2. Additional piping or ductwork extensions for equipment tapping variations.
3. Additional structural support for heavier equipment.
4. Changes in sizes of roof curbs, equipment supports and equipment pads.
5. Added cost for changes in electrical work; larger motors, wiring, disconnects, starters, lighting relocation, etc.

C. Contractor shall conform to drawings and specifications, even when there may be conditions or items specified in excess of State or local codes or regulations, unless the Contractor has notified the A/E and the documents have been modified by either an Addenda or Change Order changing or clarifying the specific matter.

D. Contractor shall contact the A/E no later than seven days before the bids are received/opened for the correct interpretation of any item on the drawing or specification needing clarification. If needed, the documents would be modified by an Addenda, changing or clarifying the specific matter.

E. All work must be performed in a workmanlike manner and according to manufacturer's recommendations.

1.05 DRAWINGS AND SPECIFICATIONS

A. In general, the drawings of the Mechanical Systems and Equipment are to scale where possible. Drawings shall not take precedence over field measurements.

B. Plans of piping and ductwork, although shown on scale drawings, are diagrammatic only. They are intended to indicate the size and/or capacity where stipulated, approximate location and/or direction, and approximate general arrangement of one phase of work to another, but not the exact detail or exact arrangement of construction. Additional offsets, fittings, etc. required for a complete and operational system shall be the responsibility of this contractor and shall be provided and so bid and shall not result in additional costs to the owner during construction.

C. If it is found before installation of any or all construction phases, that a more convenient, suitable or workable arrangement of any or all phases of the project would result by varying or altering the arrangement indicated on the drawings, the Project Manager/Engineer may require any or all Contractors to change the location or arrangement of their work without additional cost to the Owner. Such rearrangement shall be in accordance with directions from the Project Manager/Engineer.

D. Where discrepancies are discovered after certain portions or phases of any Contract have been installed, the Project Manager /Engineer reserves the right to have any or all Contractors make minor changes in pipe, duct, fixture or equipment locations or arrangements to avoid conflict with other work at no additional cost to the Owner.

E. Because the drawings are to a relatively small scale to show as large a portion as is practical, the fact that only certain features of the system are indicated does not mean that other similar or different features or details will not be required. Contractor shall furnish all incidental labor, materials, or equipment for the systems under his control, so that each system is a complete and operating one unless otherwise specifically stipulated in the detailed body of the Specifications.

F. The Contractor shall be responsible for determining all field measurements before commencing construction, giving due consideration to building design and other equipment to be installed. Mechanical equipment not dimensioned on the drawings shall be field located, giving due consideration to the work of other trades. The Contractor shall verify all dimensions before proceeding with the work. Where cutting and patching is required, each Contractor shall be responsible for his own work, unless indicated otherwise on the drawings.

G. Dimensions shall not be scaled from the drawings. If the Contractor discovers any discrepancy between actual measurements and those shown on the drawings which prevents good practice, good arrangement, or which is contrary to the intent of the drawings and specifications, he shall notify the Project Manager /Engineer before proceeding with the work.

1.06 SITE INSPECTION

A. Before submitting a proposal for the work contemplated in these specifications and accompanying drawings, each bidder shall examine the site and familiarize himself with all the existing conditions and limitations, including the extent of demolition, cutting and patching to be done by the Contractor for Mechanical Work.

B. No additional owner costs will be allowed because of the Contractor's misunderstanding as to the amount of work involved, or his lack of knowledge of any condition in connection with the work.

1.07 REGULATORY REQUIREMENTS

A. Comply with all State and Local Codes, laws, ordinances and regulations. Comply with applicable OSHA regulations.

B. Boilers, water heaters, storage tanks and other pressure vessels shall be A.S.M.E. constructed and stamped, where required by State or Local Codes. Boilers shall be installed as per ASME Codes, by Contractor's having ASME Certification, where required.

C. Comply with and pay fees for all required reviews, approvals, permits and inspections.

D. Where drawings and specifications call for materials or workmanship in excess of these requirements, drawings and specifications shall govern.

1.08 QUALIFICATIONS FOR WELDERS

A. Welders shall be qualified to perform work in accordance with Section 9 of the ASME Code or Independent Testing Laboratory.

B. Cost to qualify welders shall be borne by Contractor.

C. Standard specification provision for the Fabrication and Erection of Piping Systems as recommended by the National Certified Pipe Welding Bureau.

1. Piping shall comply with the provisions of the latest revision of the applicable sections of the ASME Code for Pressure Piping, ANSI/ASME B31.
2. Boiler external piping shall comply with the latest revision of Section I of the ASME Boiler and Pressure Vessel Code, ANSI/ASME BPV-1 Power Boilers.

D. Before any welding is performed, the contractor shall submit to the Owner, or his authorized representative, a copy of his Welding Procedure Specification together with the Procedure Qualification Record as required by Section IX of the ASME Boiler and Pressure Vessel Code.

E. Before any welder shall perform any welding, the Contractor shall submit to the Owner, or his authorized representative, a copy of the Manufacture's Record of Welder or Welding Operator Qualification tests as required by Section IX of the ASME Boiler and Pressure Vessel Code.

F. The types and extent of the non-destructive examinations required for pipe welds are shown in Table 136.4 of the ASME Code for the Pressure Piping, ANSI/ASME B31.1-Power Piping. If requirements for non-destructive examination are to be other than that stated above, the degree of examination, and basis for the rejection shall be matter of prior written agreement between the fabricator, or contractor and the purchaser.

G. Each Contractor shall be responsible for the quality of welding done by his organization and shall repair or replace any work not in accordance with these specifications.

1.09 DELIVERY, STORAGE AND HANDLING

A. Cover and protect all materials and equipment stored at Project Site from weather. Support above ground on temporary bases.

B. Cover all mechanical products and control devices from damage, dust, plaster and other construction debris. After installation is completed or while storing inside building, wrap and enclose all fixtures, equipment and control devices with canvas or heavy mill plastic, secured with wire or cord. Fixtures may be protected with the factory applied heavy paper or carton they are shipped in. Do not remove protection device until room or area is cleaned and free of dust and debris.

C. Handle all materials and equipment in accordance with manufacturer's written instructions. Lift only with lugs provided for the purpose. Handle carefully to avoid damage.

D. Do not store or install equipment unless temperature in maintained between 32 degrees F and 104 degrees F, at a relative humidity less than 95 percent (non-condensing). Maintain conditions during and after installation of products.

1.10 WARRANTY

A. Provide one-year warranty from date of substantial completion, unless otherwise noted, to the Owner for all fixtures, equipment, materials, and workmanship.

B. Warranty requirements shall extend to correction, without cost to the Owner, of all Work found to be defective or nonconforming to the contract documents. The Contractor shall bear the cost of correcting all damage resulting from defects or nonconformance with contract documents.

C. Refer to individual sections for extended warranties.

1.11 SUBMITTALS

A. Submit in accord with Section 01 30 00.

1. Descriptive product data describing all material furnished under Part 2 of this Section.
2. Submit each Specifications Section under separate cover to streamline review process.
   a) Include section number and name on cover.
   b) When multiple products are shown on a single page indicate which specific product you plan on using.
   c) Tag with equipment mark number from plans and schedules.
   d) General and Mechanical Contractors to review and stamp before forwarding on to Engineer.

1.12 ALTERNATES

A. Refer to Bid Form and Instructions to Bidders.

1.13 OWNER FURNISHED

A. Owner will provide building automation controls to operate the new cooling system outside of contract.

PART 2: PRODUCTS

2.01 MATERIALS, FIXTURES AND EQUIPMENT

A. Provide all new products unless otherwise indicated.

B. All pipe sizes are I.D. unless otherwise indicated.

C. Nameplate bearing manufacturer's name or identifiable trademark shall be securely affixed in a conspicuous plate on equipment, or name or trademark cast integrally with equipment, stamped or otherwise permanently marked on each item of equipment.

2.02 DRIVE GUARDS

A. Provide guards for all belt-driven motors.

B. Provide guards for all motor shafts.

C. Guards shall be sheet steel, cast iron, expanded metal or wire mesh. Include access hole for speed measurement.

2.03 LINTELS

A. For lintels over grouped piping or ductwork passing through walls, over recessed convectors, etc. refer to Architectural and Structural Drawings.

2.04 CONCRETE PADS AND BASES

A. For concrete pads and bases under mechanical equipment refer to Architectural, Mechanical and Structural Drawings. Under this Section, notify other Trades, of any equipment changes that will affect sizes of pads and bases.

B. Provide concrete equipment pads for all floor and grade mounted equipment, not indicated on Architectural or Structural Drawings. Minimum 3 ½" thick, sized for the purpose intended.

C. Concrete work shall conform to Division 3.

2.05 STEEL SUPPORTS AND HANGERS

A. Steel angle or pipe supports for floor mounted equipment and steel hangers for suspended equipment, including supplemental beams or angles mounted to building structure, will be furnished and installed under appropriate Mechanical Section, designed to carry total supported weight.

PART 3: EXECUTION

3.01 DEMOLITION

A. Perform all demolition as indicated on the drawings to accomplish new work. Where demolition work is to be performed adjacent to existing work that remains in an occupied area, construct temporary dust partition to minimize the amount of contamination of the occupied space. Where pipe or duct is removed and not reconnected with new work, cap ends of existing services as if they were new work. Coordinate work with the user agency to minimize disruption to the existing building occupants.

B. All pipe, wiring and associated conduit, insulation, ductwork, and similar items demolished, abandoned, or deactivated are to be removed from the site by the Contractor. All piping and ductwork specialties are to be removed from the site by the Contractor unless they are dismantled and removed or stored by the user agency. All designated equipment is to be turned over to the user agency for their use at a place and time so designated. Maintain the condition of material and/or equipment that is indicated to be reused equal to that existing before work began.

3.02 TEMPORARY ENVIROMENTAL CONTROL

A. Refer to Section 01 50 00 Temporary Facilities and Controls for temporary heating, cooling and ventilation requirements. Coordinate with General Contractor

3.03 INSTALLATION - GENERAL

A. Piping, ducts and similar items are shown on Project Drawings in approximate position desired; do not scale.

B. Determine exact location at Project Site by preliminary layout of systems (electrical, mechanical, sprinkler, structural, ceiling space, etc.) and resolve all conflicts prior to fabrication and/or ordering of materials.

C. Install exposed piping parallel to building lines, at uniform grade and at sufficient distance from walls to allow proper connections to risers and drops.

D. Close openings and open ends of all piping and ductwork during construction to exclude dust, debris and vandalism.

E. Sealing and Fire Stopping

1. FIRE AND/OR SMOKE RATED PENETRATIONS:
   a) Provide all fire stopping of fire rated penetrations and sealing of smoke rated penetrations in compliance with Section 07 84 00 Fire Stopping.
2. NON-RATED PENETRATIONS:
   a) Pipe Penetrations Through Below Grade Walls:
      1) In exterior wall openings below grade, use a modular mechanical type seal consisting of interlocking synthetic rubber links shaped to continuously fill the annular space between the uninsulated pipe and the cored opening or a water-stop type wall sleeve.
         (a) Assemble rubber links of mechanical seal to the proper size for the pipe and tighten in place, in accordance with manufacturer's instructions. Install so that the bolts used to tighten the seal are accessible from the interior of the building or vault.
   b) Pipe Penetrations:
      1) At pipe penetrations of non-rated interior walls, floors and exterior walls above grade, use urethane caulk in annular space between pipe insulation and sleeve. For non-rated drywall, plaster or wood walls where sleeve is not required use urethane caulk in annular space between pipe insulation and wall material.
         (a) At all interior walls and exterior walls, pipe penetrations are required to be sealed. Apply sealant to both sides of the penetration in such a manner that the annular space between the pipe sleeve or cored opening and the pipe or insulation is completely blocked. Pipe penetrations in exposed locations shall require escutcheon for finished appearance.
   c) Duct Penetrations:
      1) Annular space between duct (with or without insulation) and the non-rated walls or floor opening shall not be larger than 2". Where existing openings have an annular space larger than 2", the space shall be patched to match existing construction to within 2" around the duct. Where shown or specified, pack annular

space with fiberglass batt insulation or mineral wool insulation. Provide 4" sheet metal escutcheon around duct on both sides of partition or floor to cover annular space.

(a) Duct penetrations through non-rated partitions shall require sheet metal escutcheons with fiberglass or mineral wool insulation fill for spaces that include laboratories, clean rooms, animal rooms, kitchens, cart wash rooms, janitor closets, toilet rooms, mechanical rooms, conference rooms, private consultation rooms, where ducts are exposed and where noted on drawings elsewhere.

3. PENETRATIONS SUBJECT TO WATER INTRUSION:

a) For penetrations (both rated and non-rated) in floors subject to water intrusion or in rooms housing electrical equipment (but not within walls) provide one of the following:
   1) Pipe penetration where steel pipe sleeve is used extend steel sleeve 2” above the floor.
   2) Pipe penetration where cast in place fire stopping device/sleeve is used, extend device/sleeve 2” above the floor (provided it meets the device’s UL listing).
   3) Pipe penetration where there is no steel sleeve or cast in place fire stopping device/sleeve, provide 2”x 2” x 1/8” galvanized steel angles fastened to floor surrounding the penetration or group of penetrations to prevent water from getting to penetration. Provide urethane caulk between angles and floor and fasten angles to floor minimum 8”on center. Seal corners water tight with urethane caulk.
   4) Duct penetrations. Provide 2”x 2” x 1/8” galvanized steel angles fastened to floor surrounding the penetration or group of penetrations to prevent water from getting to penetration. Provide urethane caulk between angles and floor and fasten angles to floor minimum 8”on center. Seal corners water tight with urethane caulk.

b) Floors subject to water intrusion or rooms housing electrical equipment include the following locations:
   - Food Service/Kitchen Areas
   - Walk In Coolers/Freezers
   - Laundries
   - Restrooms
   - Locker/Shower Rooms
   - Janitor Rooms w/ Sinks
   - Wet Laboratories
   - Mechanical/Plumbing Equipment Rooms
   - Swimming Pool Rooms/Pool Equipment Rooms
   - Chemical/Hazardous Waste Storage
   - Maintenance/Industrial Shops
   - Vehicle Storage and Parking Ramps
   - Greenhouses
   - Data/Telecommunications Rooms
   - Electrical Equipment Rooms

c) Provide waterproof caulk sealant top coating on fire stopping system (or other approved means to protect the fire stopping system from water) in areas subject to wash down such as Food Service and Dish Washing Areas.

F. No piping shall be permitted to be installed in, enter or pass through dedicated electrical spaces for electrical switchboards, panelboards, distribution boards, etc. Dedicated electrical spaces extend from floor to structural ceiling with a width and depth that of the electrical equipment. No piping shall be permitted to be installed in, enter or pass through dedicated working spaces in front of electrical switchboards, panelboards, distribution boards, etc. Dedicated working spaces match the equipment width but not less than 30", a depth of 36" and a height to at least 78" above floor. (Sections 110-16 through 110-26 and 384-4 of NFPA 70.)

G. Where piping penetrates concrete/masonry walls and/or floors, protect piping from physical damage and corrosion by using protective tape material or pipe insulation to prevent physical contact with concrete/masonry, mortar, etc.

H. Core drill openings in existing floor/wall, as required. Size of openings shall not exceed 1" larger than the O.D. of the piping penetrating the assembly. Coordinate with draft/fire stopping requirements.

3.04 EQUIPMENT SUPPLIERS' INSPECTION

A. The following equipment shall not be placed in operation until a competent installation and service representative of the manufacturer has inspected the installation and certified that the equipment is properly installed, adjusted and lubricated; that preliminary operating instructions have been given; and that the equipment is ready for operation:

1. Condensing Units

B. Contractor shall arrange for and obtain supplier's on-site inspection(s) at proper time(s) to assure each phase of equipment installation and/or connection is in accordance with the manufacturer's instructions.

C. Submit copies of start-up reports to the Architect/Engineer and include copies of Owner's Operation and Maintenance Manuals.

3.05 EQUIPMENT START-UP

A. Equipment start-up shall not be used for temporary heating and cooling purposes without the consent of the Architect/Engineer.

3.06 OPENINGS THRU ROOF

A. All ducts, piping, and other items passing through roof shall be at least 18" apart and 18" in from roof edge, to permit proper flashing.

3.07 ADJUSTMENTS

A. Adjust all specialty items, dampers and controls to normal operating position.

B. Start and operate all mechanical equipment and systems prior to occupancy by Owner.

C. Lubricate all motors, bearing and similar items, prior to completion of project and before operating equipment.

D. All motor belt drives shall be checked for proper alignment, belt tension and fan RPM.

E. All mechanical couplings shall be checked for alignment.

F. Pressure Vessels: Pressure relief valves on equipment shall be checked for setting and accuracy. Raise pressure on system to cause operation of relief valves.

3.08 ACCESSIBILITY

A. Access panels to valves, dampers, controls and equipment in walls or above inaccessible ceilings, will normally be indicated on Architectural Drawings.

B. Provide access to all concealed mechanical equipment or accessories requiring same, not indicated on Architectural Drawings.

C. Size of access panels shall be larger than the devices requiring access, but shall be not less than 6" square for wall panels and not less than 12" square for ceiling panels. Where the openings must allow adequate room for a person to pass through, a 24" x 24" panel shall be provided.

D. Construction of access panels shall comply with Specification Section 08310 Access Doors and Panels.

3.09 CLEAN-UP

A. Remove all dust, plaster and construction debris from ductwork, piping, fixtures and equipment prior to painting or occupancy by Owner.

B. Touch-up paint on all mechanical equipment that has rusted or has had finish marred during construction. Replace if satisfactory repair cannot be made.

C. Pipe system cleansing, sterilizing and other cleaning is specified in appropriate Sections of this Division.

3.10 UTILITY REBATES

A. This Contractor shall secure on behalf of the Owner all utility rebates associated with the design. This shall include all submittals to the utility companies including substantiation where required and making all necessary arrangements on behalf of the Owner.

3.11 MAINTENANCE DATA AND OPERATING INSTRUCTIONS

A. Deliver to the Owner, through the Architect/Engineer maintenance data and operating instructions. Assemble material in three-ring binders, using an index at the front of each volume and tabs for each specification section number involved. In addition to the data indicated in the General Requirements, include the following information:

1. Copies of all approved shop drawings.
2. Manufacturer's wiring diagrams for electrically powered equipment.
3. Records of tests performed to certify compliance with system requirements.
4. Certificates of inspection by regulatory agencies.
5. Parts lists for equipment, valves and specialties.
6. Manufacturer’s installation, operation and maintenance recommendations for fixtures, equipment, valves and specialties.
7. Valve schedules.
8. Lubrication instructions, including list/frequency of lubrication.
9. Warranties.
10. Equipment Startup Reports.
11. Test and Balance Reports.

12. Sub-contractor names, addresses, and telephone numbers.
13. Additional information as indicated in the technical specification sections.
14. Separate collective information by specification section and product. Group together in their respective sections and with the respective products.

B. Instruct and demonstrate to the Owner or his representative, the operation and servicing (normal maintenance) of all equipment and systems provided.

C. Operation and maintenance manuals shall be compiled, organized and submitted for each building.

END OF SECTION 23 05 00

SECTION 23 62 13

AIR-COOLED CONDENSING UNITS

PART 1: GENERAL

1.01 RELATED DOCUMENTS

A. Conditions of the Contract and portions of Division One of this Project Manual apply to this Section as though repeated herein.

B. The requirements of Section 23 05 00 apply to this Section.

1.02 SUBMITTALS

A. Submit in accord with Section 01 30 00.

1. Shop drawings and descriptive product data describing all material furnished under Part 2 of this Section.
2. Provide matched system capacities, EER and IEER with associated AHU DX coils with submittal.
3. Cleary state the energy efficiency in units indicated in the schedules and specifications.
4. At substantial completion, submit warranty certificate and copy of start-up report as part of the O&M manuals.

1.03 WARRANTY

A. One year parts only warranty on entire unit beginning upon substantial completion of project.

B. Five year replacement compressor(s) warranty beginning upon substantial completion of project.

C. One year labor warranty from date of substantial completion to be covered by mechanical contractor.

1.04 AHRI STANDARD CAPACITY RATING CONDITIONS

A. AHRI Standard 210/240 Rating Conditions.

1. Cooling 80°F DB, 67°F WB air entering indoor coil, 95°F DB air entering outdoor coil.
2. High Temperature Heating 47°F DB, 43°F WB air entering outdoor coil, 70°F DB air entering indoor coil.
3. Low Temperature Heating 17°F DB air entering indoor coil.
4. Rated indoor airflow for heating is the same as for cooling.

1.05 EQUIPMENT START-UP

A. Provide system start-up; the equipment manufacturer's representative will provide supervision and be in attendance during unit start-up.

1. Adjust units for maximum operating efficiency, adjust all controls to required final settings and demonstrate that all components are functioning properly. Submit four copies of a written startup report following the initial start up to be included to O&M manuals. Include in the report: work done to the system, all readings taken, a statement certifying that the refrigeration system(s) are leak free and a statement certifying that the unit(s) have been placed in proper running condition as recommended by the manufacturer and as intended in the drawings and specifications.

PART 2: PRODUCTS

2.01 AIR-COOLED CONDENSING UNITS

A. Based on product by Trane.
   1. Daikin or York equals are acceptable.

B. Unit to be of model, type, size and capacities listed in Schedules on Drawings.

C. Include compressors, condenser coil, condenser fans and motors, refrigerant receiver, sight glass, charging valve, unit controls and holding charge of R-410A refrigerant. All components shall be designed for use outdoors, assembled on a common base.

D. GENERAL: The Outdoor Units are fully charged from the factory for up to 15 feet of piping. This unit is designed to operate at outdoor ambient temperatures as high as 115°F. Cooling capacities are matched with a wide selection of air handlers and furnace coils that are AHRI certified. The unit is certified to UL 1995. Exterior is designed for outdoor application.

E. CASING: Unit casing is constructed of heavy gauge, G60 galvanized steel and painted with a weather-resistant powder paint on all louvered panels and pre-paint on all other panels. Corrosion and weatherproof CMBP-G30 base.

F. REFRIGERATION MANAGEMENT: Each compressor shall have crankcase heaters installed, properly sized to minimize the amount of liquid refrigerant present in the oil sump during off cycles. Additionally, the condensing unit shall have controls to initiate refrigerant isolation at system shut down on each refrigerant circuit. To be operational, the refrigerant isolation cycle requires a field-installed isolation solenoid valve on the common liquid line near the evaporator.

G. REFRIGERATION CONTROLS: Refrigeration system controls include condenser fan, compressor contactor and high pressure switch. High and low pressure controls are inherent to the compressor. A factory supplied liquid line drier is standard. Some models may require field installation.

H. REFRIGERATION CIRCUITS: Unit shall have 2 independent refrigeration circuits with 3 compressor per circuit piped in parallel. Each refrigeration circuits to include integral subcooling. Each circuit shall have factory-supplied filter driers, suction and liquid line service valves, all piped.

I. SCROLL COMPRESSOR(S): The compressor features internal over temperature, pressure protection and total dipped hermetic motor. Other features include: Centrifugal oil pump, oil level sight glass, oil charging valve, and low vibration and noise.

J. CONDENSER FAN AND MOTORS: Vertical discharge direct-drive fans are statically and dynamically balanced. Fan motors are three-phase with permanently lubricated ball bearings, built-in current and thermal overload protection.

K. CONDENSER COIL: Condenser coils are dual circuit having an all Aluminum Microchannel design. The coils are burst tested and leak tested. Factory installed liquid line service valves are standard. The outdoor coil provides low airflow resistance and efficient heat transfer. The coil is protected on all four sides by louvered panels.

L. LOW AMBIENT COOLING: Standard ambient control allows operation down to 40oF outdoor ambient by cycling the condenser fans. Provide low ambient lockout to prevent compressor(s) from operating below 40oF outdoor ambient.

M. UNIT CONTROL: Factory-provided 115-volt control circuit includes fusing and control power transformer. The unit is wired with magnetic contactors for compressor and condenser motors. Three-leg circuit breakers are used for overload and short circuit protections. The unit also has high/low pressure cutouts. Charge isolation, reset relay and anti-recycle compressor timer is provided. Across- the- line start is standard.

N. NO SYSTEM CONTROL: No System Control provides a terminal strip for step control provided by others. The system provides internal 3 minute fixed on and 5 minute fixed off time delays and compressor contactors. The system temperature step controller must be field provided and installed.

1. Note: For No Controls units with system temperature step controllers provided by others, the controller must include 5 minute on/off interstage timers to coordinate with the units fixed on/off time delay relays.

O. ACCESSORIES:

1. Single Point Power— Unit shall have single point power connection, provide all necessary power transformers.
2. Anti-Short Cycle Timer— Solid state timing device that prevents compressor recycling until five (5) minutes have elapsed after satisfying call or power interruptions.
3. Condenser Coil guard: Metal grille with Polyvinyl chloride coating to cover condenser coil area.
4. Spring isolator package to be furnished with unit and field installed under the unit.
5. Pressure Gauges: Pressure gauges are provided for monitoring suction and discharge pressure. One set is provided for each circuit. The gauges are ship-with for field installation.
6. Hard Start Kit— Start capacitor and relay to assist compressor motor startup.
7. Suction Service Valves: This valve is provided in order to isolate the compressor for servicing. This valve is a refrigerant shutoff valve.
8. Powered Convenience Outlet:
   a) This 15 amp., 115 volt ground fault interrupter convenience outlet is factory installed, with a single point power entry from a factory mounted transformer. It meets NEC 210-63 requirements. This outlet includes a separate disconnect switch so that the outlet is powered when the unit disconnect switch is off. The unit mounted non-fused disconnect switch option with external handle is required when ordering the convenience outlet.
9. Non-Fused Disconnect:
   a) This switch is non-fused and is located inside the unit control box. An external handle allows power disconnection without having to open the control box door.

PART 3: EXECUTION

3.01 INSTALLATION

A. Unit to be installed as recommended by manufacturer; unit to be level - shim as required. Provide vibration isolation at equipment support structure. Provide flexible connections at condenser. See Section 23 05 48 Vibration Isolation.

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

C. The unit manufacturer shall verify the ***final refrigeration pipe sizing*** process to insure conformance to specific unit requirements such as max lengths, refrigerant velocities, unloading considerations and proper oil return. This contractor shall provide refrigeration piping drawings from the field which details the way the piping will actually be installed.

D. Loose Components: Install electrical components, devices, and accessories that are not factory mounted.

E. All control wiring running between air handling unit cooling coil and air-cooled condenser shall be installed in conduit.

F. Units shall be completed with all accessory components installed, ready for operation.

G. Provide refrigerant piping and insulation between outdoor condensing unit and air supply unit coils. Include thermal expansion valve, sight glass, solenoid valve, strainer and service stops in liquid line inside building at coils and service stops on suction line at condensing unit.
   1. Install a full-sized, 3 shutoff valve bypass around filter dryer(s) to permit easy replacement.
   2. Provide shutoff valves on either side of solenoid valve(s).

H. All interconnecting electrical wiring required shall be included under this Section.

I. Power wiring of units shall be done under Division 26, Electrical.

J. Contractor to include R-410A refrigerant charge of complete installed system.

3.02 CODE REQUIREMENTS

A. Post a permanent sign indicating name and address of installer, refrigerant R designator and quantity and type and amount of oil in the Mechanical Room.

B. Label all refrigerant piping.

C. Provide a schematic drawing of the system.

D. Provide emergency shutdown procedures, precautions to observe in event of a leak. Include the name, address and day or night telephone numbers for obtaining service and the fire department telephone number on the card or sign.

E. Register the system on the required State form.

END OF SECTION 23 62 13