

ADDENDUM NO. 1

July 2, 2024

Whiteland Community High School Equipment Package
300 E. Main Street
Whiteland, IN 46184

TO: ALL BIDDERS OF RECORD

This Addendum forms a part of and modifies the Bidding Requirements, Contract Forms, Contract Conditions, the Specifications, and the Drawings dated June 10, 2024, by Lancer Associates Architecture. Acknowledge receipt of the Addendum in the space provided on the Bid Form. Failure to do so may subject the Bidder to disqualification.

This Addendum consists of Pages ADD 1-1, Primary Engineering Inc. Addendum No. 1, dated July 2, 2024, consisting of one (1) Page, Specification Section 238146.13 Water-to-Air Heat Pumps, and Mechanical Drawing Revision Sheet M000.

A. BID REQUIREMENTS:

Please provide product data and shop drawings submittals with your bid.



ADDENDUM NO. 1

PROJECT: Clark-Pleasant Community School Corporation
Whiteland High School Mechanical Equipment Package

PROJECT NUMBER: #23536

DATE: July 2, 2024



The following items shall be incorporated into the specifications and drawings and are considered to be integral to the bid documents for the project. Acknowledgement of receipt of this addendum is required on the bid form.

Division 23 Specification Revisions:

1. Specification Section 238146.13 Water-to-Air Heat Pumps
 - a) 2.2G, 2.3 G, 2.4 G: revise filters to be 2 inch thick pleated MERV 8.
 - b) 2.2 H 2, 2.3 H 2, 2.4 H 2: revise thermostat information.

Mechanical Drawing Revisions:

2. Drawing Sheet M000
Drawing Sheet Title: MECHANICAL SCHEDULES
 - c) Water-to-air heat pump schedule: revise remark 5 to include thermostat information. Thermostat shall include temperature, CO2, and humidity sensing, setpoint adjustment and occupancy over ride, without display. Furnish (1) filter per heat pump.
 - d) Water-to-air heat pump schedule: revise remark 11 to include non-ducted return air configuration.
 - e) Water-to-air heat pump schedule: add air filter column. Air filters shall be disposable, pleated, 2 inch thick MERV 8.
 - f) Water-to-water heat pump schedule: revise remark 1 to omit fusing requirement with factory electrical disconnect switch.

Attachments:

Specification Section 238146.13	Water-to-Air Heat Pumps
Sheet M000	MECHANICAL SCHEDULES

Section 23 8146.13 - Water-To-Air Heat Pumps

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Concealed water-source heat pumps, 6 tons (21 kW) and smaller.
 - 2. Concealed water-source heat pumps larger than 6 tons (21 kW).
 - 3. Exposed, console water-source heat pumps.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include rated capacities, furnished specialties, and accessories for each model.
- B. Shop Drawings: Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
 - 1. Include diagrams for power, signal, and control wiring.

1.3 INFORMATIONAL SUBMITTALS

- A. Sample Warranty: For special warranty.

1.4 QUALITY ASSURANCE

- A. ASHRAE Compliance:
 - 1. ASHRAE 15.
 - 2. Applicable requirements in ASHRAE 62.1, Section 5 - "Systems and Equipment" and Section 7 - "Construction and Startup."
- 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. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- E. Comply with safety requirements in UL 484 for assembly of free-delivery, water-source heat pumps.
- F. Comply with requirements of UL 1995 "Heating and Cooling Equipment," and include label by a qualified testing agency showing compliance.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Ship heat pumps from the factory fully charged with refrigerant and filled with oil.

- B. Package heat pump for export shipping.

1.6 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of water-source heat pumps that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, refrigeration components.
 - 2. Warranty Period: Five years beginning at 6 months after date of shipment.

PART 2 - PRODUCTS

2.1 Manufacturers

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Aeon
 - 2. Carrier Global Corporation.
 - 3. ClimateMaster, Inc.
 - 4. Daikin Applied.
 - 5. FHP Manufacturing Inc.
 - 6. Trane Inc.
 - 7. WaterFurnace International, Inc.
 - 8. YORK; brand of Johnson Controls International plc, Building Solutions North America.

2.2 CONCEALED WATER-SOURCE HEAT PUMPS, 6 TONS (21 kW) AND SMALLER

- A. Description: Packaged water-source heat pump with temperature controls; factory assembled, tested, and rated according to ASHRAE/ARI/ISO-13256-1.
 - 1. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a testing agency acceptable to authorities having jurisdiction, and marked for intended location and application.
- B. Cabinet and Chassis: Galvanized-steel casing with the following features:
 - 1. Access panel for access and maintenance of internal components.
 - 2. Knockouts for electrical and piping connections.
 - 3. Flanged duct connections.
 - 4. Cabinet Insulation: Glass-fiber liner, minimum 1/2 inch thick, complying with UL 181, ASTM C1071, and ASTM G21.
 - 5. Units field convertible for various discharge configurations.
 - 6. Condensate Drainage: High-density polyethylene plastic or stainless-steel drain pan with condensate drain piping projecting through unit cabinet and complying with ASHRAE 62.1.
 - a. Condensate Overflow Protection Switch: Solid state electronic; mechanical float switch not permitted.
 - 7. Airstream Surfaces: Surfaces in contact with the airstream shall comply with requirements in ASHRAE 62.1.
 - 8. Sound Attenuation Package: Provide one or more of the following:

- a. Minimum 0.598-inch-thick compressor enclosure and front panel. Minimum 0.0937-inch-thick foam gasket around the compressor and perimeter of end panel.
 - b. Sound attenuating blanket over compressor.
 - c. Hot-gas muffler.
- C. Fan: Direct driven, centrifugal, with multispeed motor resiliently mounted in fan inlet and with inlet rings to allow wheel removal from one side without removing housing.
 1. General requirements for motors are specified in Section 23 0500 "Common Work Results for HVAC."
 2. Motor: Multispeed, permanently lubricated, ECM motor.
- D. Water Circuit:
 1. Refrigerant-to-Water Heat Exchangers:
 - a. Coaxial heat exchangers with copper water tube with enhanced heat-transfer surfaces inside a steel shell; both shell and tube are leak tested to 450 psig on refrigerant side and 400 psig on water side. Factory mount heat exchanger in unit on resilient rubber vibration isolators.
 - b. Stainless-steel, brazed-plate heat exchanger is leak tested to 450 psig on refrigerant side and 400 psig on water side. Factory mount heat exchanger in unit on resilient rubber vibration isolators.
 2. Water-Regulating Valves: Limit water flow through refrigerant-to-water heat exchanger, and control head pressure on compressor during cooling and heating. Valves shall close when heat-pump compressor is not running.
 3. Motorized Water Valve: Stop water flow through the unit when compressor is off.
- E. Refrigerant-to-Air Coils: Copper tubes with aluminum fins, leak tested to 450 psig.
- F. Refrigerant Circuit Components:
 1. Sealed Refrigerant Circuit: Charge with R-410A refrigerant.
 2. Filter-Dryer: Factory installed to clean and dehydrate the refrigerant circuit.
 3. Charging Connections: Service fittings on suction and liquid for charging and testing on each circuit.
 4. Reversing Valve: Four-way, solenoid-activated valve designed to be fail-safe in heating position with replaceable magnetic coil.
 5. Compressor: Hermetic rotary scroll, compressor installed on vibration isolators and housed in an acoustically treated enclosure with factory-installed safeties as follows:
 - a. Antirecycle timer.
 - b. High-pressure cutout.
 - c. Low-pressure cutout or loss of charge switch.
 - d. Internal thermal-overload protection.
 - e. Freezestat to stop compressor if water-loop temperature in refrigerant-to-water heat exchanger falls below 35 deg F.
 - f. Condensate overflow switch to stop compressor with high condensate level in condensate drain pan.
 - g. Water-coil, low-temperature switch.
 - h. Air-coil, low-temperature switch.
 6. Refrigerant Piping Materials: ASTM B743 copper tube with wrought-copper fittings and brazed joints.

7. Pipe Insulation: Refrigerant minimum 3/8-inch-thick, flexible elastomeric insulation on piping exposed to airflow through the unit. Maximum 25/50 flame-spread/smoke-developed indexes according to ASTM E84.
 8. Refrigerant Metering Device:
 - a. Thermal-expansion valve.
 - b. Refrigerant Metering Device: Dual-port, thermal-expansion valve to allow specified operation with entering-water temperatures from 25 to 125 deg F.
 9. Hot-Gas Reheat Valve: Pilot-operated, sliding-type valve with replaceable magnetic coil.
- G. Filters:
1. Disposable, pleated type, 2 inch thick and with a minimum efficiency reporting value of 8 according to ASHRAE 52.2.
- H. Controls:
1. Basic Unit Control Modes and Devices:
 - a. Dehumidification mode.
 - b. Unit shutdown on high or low refrigerant pressures.
 - c. Unit shutdown on low water temperature.
 - d. Low- and high-voltage protection.
 - e. Overcurrent protection for compressor and fan motor.
 - f. Random time delay, three to ten seconds, start on power-up.
 - g. Time delay override for servicing.
 - h. Control voltage transformer.
 - i. Water-coil freeze protection (selectable for water or antifreeze).
 - j. Air-coil freeze protection (check filter switch).
 - k. Condensate overflow shutdown switch.
 - l. Option to reset unit at thermostat or disconnect.
 - m. Fault type shall be retained in memory if reset at thermostat.
 - n. Automatic intelligent reset. Unit shall automatically reset five minutes after trip if the fault has cleared. Should a fault reoccur three times sequentially, lockout requiring manual reset occurs.
 - o. Ability to defeat time delays for servicing.
 - p. Light-emitting diodes (LED) to indicate high pressure, low pressure, low voltage, and high voltage.
 - q. The low-pressure switch SHALL NOT be monitored for the first 90 seconds after a compressor start command to prevent nuisance safety trips.
 - r. Remote fault-type indication at thermostat.
 - s. Selectable 24-V dc or pilot duty dry contact alarm output.
 - t. 24-V dc output to cycle a motorized water valve with compressor contactor.
 - u. Electric heat output to control two stages of electric heat (emergency heat).
 - v. Service test mode for troubleshooting and service.
 - w. Unit-performance sentinel warns when the heat pump is running inefficiently.
 2. Thermostat:
 - a. Wall-Mounted Thermostat:
 - 1) Heat-cool-off switch.
 - 2) Fan on-auto switch.
 - 3) NOT USED
 - b. NOT USED
 - c. Unoccupied period override push button.

- d. NOT USED
 - e. Data entry and access port.
 - 1) Input data include room temperature and humidity set points for occupied and unoccupied periods.
 - 2) Output data include room temperature and humidity, supply-air temperature, entering-water temperature, operating mode, and status.
 - 3. Terminal Controller:
 - a. Scheduled operation for occupied and unoccupied periods on seven-day clock with minimum of four programmable periods per day.
 - b. Two-hour unoccupied override period.
 - c. Remote-control panel to contain programmable timer and LED for fault condition.
 - d. Compressor disable relay to stop compressor operation for demand limiting or switch to unoccupied operation.
 - e. Automatic restart after five minutes if fault clears. Lockout after three attempts to restart following fault. Indicate fault for service technician.
 - f. Return-air temperature high-limit (firestat). Stop unit on high temperature.
 - g. Backup for volatile memory.
 - h. Differential pressure switch to indicate fan status. Fan failure alarm.
 - i. Differential pressure switch to indicate filter status. Dirty filter alarm.
 - 4. Interface with DDC system.
 - a. Interface relay for scheduled operation.
 - b. Interface relay to provide indication of fault at central workstation.
 - c. Provide BAC-net interface for central DDC system for HVAC workstation for the following functions:
 - 1) Set-point adjustment for set points identified in this Section.
 - 2) Start/stop and operating status of heat-pump unit.
 - 3) Data inquiry to include supply air, room air temperature and humidity, and entering-water temperature.
 - 4) Occupied and unoccupied schedules.
 - I. Electrical Connection: Single electrical connection with fused disconnect.
- 2.3 CONCEALED WATER-SOURCE HEAT PUMPS LARGER THAN 6 TONS (21 kW)
- A. Description: Packaged water-source heat pump with temperature controls; factory assembled, tested, and rated according to ASHRAE/ARI/ISO-13256-1.
 - 1. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a testing agency acceptable to authorities having jurisdiction, and marked for intended location and application.
 - B. Cabinet and Chassis: Galvanized-steel casing with the following features:
 - 1. Access panel for access and maintenance of internal components.
 - 2. Knockouts for electrical and piping connections.
 - 3. Flanged duct connections.
 - 4. Cabinet Insulation: Glass-fiber liner, minimum 1/2 inch thick, complying with UL 181, ASTM C1071, and ASTM G21.
 - 5. Units field convertible for various discharge configurations.

6. Condensate Drainage: High-density polyethylene plastic or stainless-steel drain pan with condensate drain piping projecting through unit cabinet and complying with ASHRAE 62.1.
 - a. Condensate Overflow Protection Switch: Solid state electronic; mechanical float switch not permitted.
 7. Airstream Surfaces: Surfaces lined with one-half-thick, foil-backed fiber insulation in contact with the airstream shall comply with requirements in ASHRAE 62.1.
 8. Sound Attenuation Package: Provide one or more of the following:
 - a. Minimum 0.598-inch-thick compressor enclosure and front panel. Minimum 0.0937-inch-thick foam gasket around the compressor and perimeter of end panel.
 - b. Sound attenuating blanket over compressor.
 - c. Hot-gas muffler.
- C. Fan: Belt driven, centrifugal, with motor installed on an adjustable fan base resiliently mounted in chassis and with inlet rings to allow wheel removal from one side without removing housing.
1. General requirements for motors are specified in Section 23 0500 "Common Work Results for HVAC."
 2. Motor: Single-speed, permanently lubricated, ECM motor.
- D. Water Circuit:
1. Refrigerant-to-Water Heat Exchanger:
 - a. Coaxial heat exchanger with copper water tube with enhanced heat-transfer surfaces inside a steel shell; both shell and tube are leak tested to 450 psig on refrigerant side and 400 psig on water side. Factory mount heat exchanger in unit on resilient rubber vibration isolators.
 - b. Stainless-steel, brazed-plate heat exchanger is leak tested to 450 psig on refrigerant side and 400 psig on water side. Factory mount heat exchanger in unit on resilient rubber vibration isolators.
 2. Water-Regulating Valves: Limit water flow through refrigerant-to-water heat exchanger, and control head pressure on compressor during cooling and heating. Valves shall close when heat-pump compressor is not running.
 3. Motorized Water Valve: Stop water flow through the unit when compressor is off.
- E. Refrigerant-to-Air Coils: Copper tubes with aluminum fins, leak tested to 450 psig.
- F. Refrigerant Circuit Components:
1. Sealed Refrigerant Circuit: Minimum of two circuits required for units 10 tons and larger. Intertwine circuits in refrigerant to air coil.
 - a. Charge with R-410A refrigerant.
 2. Filter-Dryer: Factory installed to clean and dehydrate each refrigerant circuit.
 3. Charging Connections: Service fittings on suction and liquid for charging and testing on each circuit.
 4. Reversing Valve: Four-way, solenoid-activated valve designed to be fail-safe in heating position with replaceable magnetic coil.
 5. Compressor: Hermetic reciprocating Scroll compressor installed on vibration isolators housed in an acoustically treated enclosure with factory-installed safeties as follows:
 - a. Antirecycle timer.
 - b. High-pressure cutout.

- c. Low-pressure cutout or loss of charge switch.
 - d. Internal thermal-overload protection.
 - e. Freezestat to stop compressor if water-loop temperature in refrigerant-to-water heat exchanger falls below 35 deg F.
 - f. Condensate overflow switch to stop compressor with high condensate level in condensate drain pan.
 - g. Water-coil, low-temperature switch.
 - h. Air-coil, low-temperature switch.
 - 6. Refrigerant Piping Materials: ASTM B743 copper tube with wrought-copper fittings and brazed joints.
 - 7. Pipe Insulation: Refrigerant minimum 3/8-inch-thick, flexible elastomeric insulation on piping exposed to airflow through the unit. Maximum 25/50 flame-spread/smoke-developed indexes per ASTM E84.
 - 8. Refrigerant Metering Device: Dual-port, thermal-expansion valve to allow specified operation with entering-water temperatures from 25 to 125 deg F.
 - 9. Hot-Gas Reheat Valve: Pilot-operated, sliding-type valve with replaceable magnetic coil.
- G. Filters:
- 1. Disposable, pleated type, 2 inch thick and with a minimum efficiency reporting value of 8 according to ASHRAE 52.2.
- H. Controls:
- 1. Basic Unit Control Modes and Devices:
 - a. Dehumidification mode.
 - b. Unit shutdown on high or low refrigerant pressures.
 - c. Unit shutdown on low water temperature.
 - d. Low- and high-voltage protection.
 - e. Overcurrent protection for compressor and fan motor.
 - f. Random time delay, three to ten seconds, start on power-up.
 - g. Time delay override for servicing.
 - h. Control voltage transformer.
 - i. Water-coil freeze protection (selectable for water or antifreeze).
 - j. Air-coil freeze protection (check filter switch).
 - k. Condensate overflow shutdown switch.
 - l. Option to reset unit at thermostat or disconnect.
 - m. Fault type shall be retained in memory if reset at thermostat.
 - n. Automatic intelligent reset. Unit shall automatically reset five minutes after trip if the fault has cleared. Should a fault reoccur three times sequentially, lockout requiring manual reset occurs.
 - o. Ability to defeat time delays for servicing.
 - p. Light-emitting diodes (LED) to indicate high pressure, low pressure, low voltage, and high voltage.
 - q. The low-pressure switch SHALL NOT be monitored for the first 90 seconds after a compressor start command to prevent nuisance safety trips.
 - r. Remote fault-type indication at thermostat.
 - s. Selectable 24-V dc or pilot duty dry contact alarm output.
 - t. 24V dc output to cycle a motorized water valve with compressor contactor.
 - u. Electric heat output to control two stages of electric heat (emergency heat).
 - v. Service test mode for troubleshooting and service.

- w. Unit-performance sentinel warns when the heat pump is running inefficiently.
 - 2. Thermostat:
 - a. Wall-Mounted Thermostat:
 - 1) Heat-cool-off switch.
 - 2) Fan on-auto switch.
 - 3) NOT USED
 - b. NOT USED
 - c. Unoccupied period override push button.
 - d. NOT USED
 - e. Data entry and access port.
 - 1) Input data include room temperature and humidity set points for occupied and unoccupied periods.
 - 2) Output data include room temperature and humidity, supply-air temperature, entering-water temperature, operating mode, and status.
 - 3. Terminal Controller:
 - a. Scheduled operation for occupied and unoccupied periods on seven-day clock with minimum of four programmable periods per day.
 - b. Two-hour unoccupied override period.
 - c. Remote-control panel to contain programmable timer and LED for fault condition.
 - d. Compressor disable relay to stop compressor operation for demand limiting or switch to unoccupied operation.
 - e. Automatic restart after five minutes if fault clears. Lockout after three attempts to restart following fault. Indicate fault for service technician.
 - f. Return-air temperature high-limit (firestat). Stop unit on high temperature.
 - g. Smoke alarm with smoke detector installed in supply and return air. Stop unit on smoke detection.
 - h. Backup for volatile memory.
 - i. Differential pressure switch to indicate fan status. Fan failure alarm.
 - j. Differential pressure switch to indicate filter status. Dirty filter alarm.
 - 4. Interface with DDC system.
 - a. Interface relay for scheduled operation.
 - b. Interface relay to provide indication of fault at central workstation.
 - c. Provide BAC-net
 - d. interface for central DDC system for HVAC workstation for the following functions:
 - 1) Set-point adjustment for set points identified in this Section.
 - 2) Start/stop and operating status of heat-pump unit.
 - 3) Data inquiry to include supply air, room air temperature and humidity, and entering-water temperature.
 - 4) Occupied and unoccupied schedules.
 - I. Electrical Connection: Single electrical connection with fused disconnect.
- 2.4 EXPOSED, CONSOLE WATER-SOURCE HEAT PUMPS
- A. Description: Packaged water-source heat pump with temperature controls; factory assembled, tested, and rated according to ASHRAE/ARI/ISO-13256-1.

1. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a testing agency acceptable to authorities having jurisdiction, and marked for intended location and application.
- B. Cabinet and Chassis: Manufacturer's standard-height, flat-top,galvanized-steel casing with the following features:
1. Access panel for access and maintenance of internal components.
 2. Knockouts for electrical and piping connections.
 3. Cabinet Insulation: Glass-fiber liner, minimum 1/2 inch thick, complying with UL 181, ASTM C1071, and ASTM G21.
 4. Cabinet Insulation, Fibrous Glass Duct Liner Standard: Glass-fiber liner, minimum 1/2 inch thick, complying with ASTM C1071 and NAIMA AH124, "Fibrous Glass Duct Liner Standard."
 5. Sound Attenuation Package: Provide one or more of the following:
 - a. Minimum 0.598-inch-thick compressor enclosure and front panel. Minimum 0.0937-inch thick foam gasket around the compressor and perimeter of end panel.
 6. Condensate Drainage: High-density polyethylene plastic or stainless-steel drain pan with condensate drain piping projecting to unit exterior and complying with ASHRAE 62.1.
 - a. Condensate Overflow Protection: Solid state electronic; mechanical float switch not permitted.
 7. Discharge Grille: Steel, aluminum, or plastic grille for adjustable discharge air pattern.
 8. Color: Selected by Architect from manufacturer's standard color selection.
 9. Airstream Surfaces: Surfaces in contact with the airstream shall comply with requirements in ASHRAE 62.1.
- C. Fan: Direct driven, centrifugal, with multispeed motor mounted on a removable fan-motor board.
1. General requirements for motors are specified in Section 23 0500 "Common Work Results for HVAC."
 2. Motor: Multispeed, permanently lubricated, ECM.
- D. Water Circuit:
1. Refrigerant-to-Water Heat Exchanger: Coaxial heat exchanger with copper water tube with enhanced heat-transfer surfaces inside a steel shell; both shell and tube are leak tested to 450 psig for refrigerant side and 400 psig for water side. Factory mount heat exchanger in unit on resilient rubber vibration isolators.
 2. Water-Regulating Valves: Limit water flow through refrigerant-to-water heat exchanger and control head pressure on compressor during cooling and heating. Valves shall close when heat-pump compressor is not running.
- E. Refrigerant-to-Air Coils: Copper tubes with aluminum fins, leak tested to 450 psig.
- F. Refrigerant Circuit Components:
1. Sealed Refrigerant Circuit: Charge with R-410A refrigerant.
 2. Filter-Dryer: Factory installed to clean and dehydrate the refrigerant circuit.
 3. Charging Connections: Service fittings on suction and liquid for charging and testing.

4. Reversing Valve: Four-way, solenoid-activated valve designed to be fail-safe in heating position with replaceable magnetic coil.
 5. Compressor: Hermetic rotary compressor installed on vibration isolators housed in an acoustically treated enclosure with factory-installed safeties as follows:
 - a. Antirecycle timer.
 - b. High-pressure cutout.
 - c. Low-pressure cutout or loss of charge switch.
 - d. Internal thermal-overload protection.
 - e. Freezestat to stop compressor if water-loop temperature in refrigerant-to-water heat exchanger falls below 35 deg F.
 - f. Condensate overflow switch to stop compressor with high condensate level in condensate drain pan.
 - g. Water-coil, low-temperature switch.
 - h. Air-coil, low-temperature switch.
 6. Refrigerant Piping Materials: ASTM B743 copper tube with wrought-copper fittings and brazed joints.
 7. Pipe Insulation: Refrigerant minimum 3/8-inch-thick, flexible elastomeric insulation on piping exposed to airflow through the unit. Maximum 25/50 flame-spread/smoke-developed indexes per ASTM E84.
 8. Refrigerant Metering Device: Dual-port, thermal-expansion valve to allow specified operation with entering-water temperatures from 25 to 125 deg F.
 9. Hot-Gas Reheat Valve: Pilot-operated, sliding-type valve with replaceable magnetic coil.
- G. Filters:
1. Disposable, pleated type, 2 inch thick and with a minimum efficiency reporting value of 8 according to ASHRAE 52.2.
- H. Controls:
1. Basic Unit Control Modes and Devices:
 - a. Dehumidification mode.
 - b. Unit shutdown on high or low refrigerant pressures.
 - c. Unit shutdown on low water temperature.
 - d. Low- and high-voltage protection.
 - e. Overcurrent protection for compressor and fan motor.
 - f. Random time delay, three to ten seconds, start on power-up.
 - g. Time delay override for servicing.
 - h. Control voltage transformer.
 - i. Water-coil freeze protection (selectable for water or antifreeze).
 - j. Air-coil freeze protection (check filter switch).
 - k. Condensate overflow shutdown switch.
 - l. Option to reset unit at thermostat or disconnect.
 - m. Fault type shall be retained in memory if reset at thermostat.
 - n. Automatic intelligent reset. Unit shall automatically reset five minutes after trip if the fault has cleared. Should a fault reoccur three times sequentially, lockout requiring manual reset occurs.
 - o. Ability to defeat time delays for servicing.
 - p. Light-emitting diodes (LED) to indicate high pressure, low pressure, low voltage, and high voltage.
 - q. The low-pressure switch SHALL NOT be monitored for the first 90 seconds after a compressor start command to prevent nuisance safety trips.

- r. Remote fault-type indication at thermostat.
 - s. Selectable 24-V dc or pilot duty dry contact alarm output.
 - t. 24V dc output to cycle a motorized water valve with compressor contactor.
 - u. Electric heat output to control two stages of electric heat (emergency heat).
 - v. Service test mode for troubleshooting and service.
 - w. Unit-performance sentinel warns when the heat pump is running inefficiently.
2. Thermostat:
- a. Wall-Mounted Thermostat:
 - 1) Heat-cool-off switch.
 - 2) Fan on-auto switch.
 - 3) NOT USED
 - b. Unoccupied period override push button.
 - c. NOT USED
 - d. Data entry and access port.
 - 1) Input data include room temperature and humidity set points for occupied and unoccupied periods.
 - 2) Output data include room temperature and humidity, supply-air temperature, entering-water temperature, operating mode, and status.
3. Terminal Controller:
- a. Scheduled operation for occupied and unoccupied periods on seven-day clock with minimum of four programmable periods per day.
 - b. Two-hour unoccupied override period.
 - c. Compressor disable relay to stop compressor operation for demand limiting or switch to unoccupied operation.
 - d. Automatic restart after five minutes if fault clears. Lockout after three attempts to restart following fault. Indicate fault for service technician.
 - e. Backup for volatile memory.
 - f. Differential pressure switch to indicate fan status. Fan failure alarm.
 - g. Differential pressure switch to indicate filter status. Dirty filter alarm.
4. Interface with DDC system.
- a. Interface relay for scheduled operation.
 - b. Interface relay to provide indication of fault at central workstation.
 - c. Provide BAC-net interface for central DDC system for HVAC workstation for the following functions:
 - 1) Set-point adjustment for set points identified in this Section.
 - 2) Start/stop and operating status of heat-pump unit.
 - 3) Data inquiry to include supply air, room air temperature and humidity, and entering-water temperature.
 - 4) Occupied and unoccupied schedules.

- I. Electrical Connection: Single electrical connection with fused disconnect.

2.5 HOSE KITS

- A. General: Hose kits shall be designed for minimum 400-psig working pressure and operating temperatures from 33 to 211 deg F. Tag hose kits to equipment designations.

- B. Hose: Length 36 inches braided stainless steel, complete with adapters. Minimum diameter, equal to water-source, heat-pump connection size.
- C. Isolation Valves: Two-piece, bronze-body ball valves with stainless-steel, standard-port ball and stem with normal pipe thread (NPT) connections, and galvanized-steel lever handle. Provide valve for supply and return. If balancing device is combination shutoff type with memory stop, the isolation valve may be omitted on the return.
- D. Strainer: Y-type with blowdown valve in supply connection.
- E. Balancing Device: Mount in return connection. Include meter ports to allow flow measurement with differential pressure gage.
 - 1. Automatic balancing valve, factory set to operate within 10 percent of design flow rate over a 40:1 differential pressure range of 2 to 80 psig.
- F. Motorized Water Valve: Slow-acting, 24-V dc, with NPT connections.

END OF SECTION 23 8146.13

WATER-TO-AIR HEAT PUMP SCHEDULE																														
COOLING													HEATING																	
TAG	MFR.	MODEL	SIZE	QUANTITY	AIRFLOW (CFM)	ESP (IN W.C.)	FILTER	MOTOR (HP)	FLOW (GPM)	WPD (FT)	TOT. CAP. (MBH)	SENS. CAP. (MBH)	HEAT OF REJECT (MBH)	EDB / EWB (DEG F)	LAT (DEG F)	EWI (DEG F)	EER	TOT. CAP. (MBH)	HEAT OF EXTRIC (MBH)	EAT (DEG F)	LAT (DEG F)	EWI (DEG F)	COP	REFRIG.	ELEC (V/PH)	FLA	MCA	MAX FUSE SIZE	REMARKS	
PHASE 2																														
HP-P1.01	WATERFURNACE	UVV	036	1	1200	0.5	2" MERV 8	1/2	9.0	5.4	34.3	26.6	41.8	75 / 63	55.0	90	15.5	46.7	38.0	70.0	105.0	70	5.3	R410A	460/3	8.7	9.8	15	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11	
HP-P1.02	WATERFURNACE	UVV	036	1	1200	0.5	2" MERV 8	1/2	9.0	5.4	34.3	26.6	41.8	75 / 63	55.0	90	15.5	46.7	38.0	70.0	105.0	70	5.3	R410A	460/3	8.7	9.8	15	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11	
HP-P1.03	WATERFURNACE	UVV	060	1	2000	0.5	2" MERV 8	1/2	16.0	12.8	54.1	42.6	68.0	75 / 63	55.0	90	13.3	76.4	61.4	70.0	105.0	70	5.1	R410A	460/3	13.0	14.7	20	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11	
HP-P1.04	WATERFURNACE	UVV	120	1	2400	0.5	2" MERV 8	1/2	23.0	3.9	73.7	47.6	95.2	75 / 63	56.0	90	11.7	87.2	61.3	70.0	103.0	70	3.4	R410A	460/3	24.5	28.9	45	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11	
HP-P1.05	WATERFURNACE	UVV	060	1	1800	0.5	2" MERV 8	1/2	18.0	12.8	53.7	41.1	67.3	75 / 63	55.0	90	13.5	75.9	60.7	70.0	107.0	70	5.0	R410A	460/3	13.0	14.7	20	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11	
HP-P1.06	WATERFURNACE	UVV	120	1	3500	0.5	2" MERV 8	1/2	28.0	4.7	107.1	76.1	140.3	75 / 63	55.0	90	11.0	125.3	90.5	70.0	102.0	70	3.6	R410A	460/3	24.5	28.9	45	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11	
HP-P1.07	WATERFURNACE	UVH	024	1	400	0.5	2" MERV 8	1/2	4.0	0.6	8.0	5.9	9.5	75 / 63	61.8	90	18.1	11.2	9.3	70.0	95.0	70	6.0	R410A	460/3	7.1	7.9	10	1, 2, 3, 4, 5, 6, 7, 8, 9	
HP-P1.08	WATERFURNACE	UVV	120	1	3700	0.5	2" MERV 8	1/2	30.0	5.7	118.3	85.8	154.5	75 / 63	55.0	90	11.2	140.2	102.8	70.0	104.0	70	3.7	R410A	460/3	24.5	28.9	45	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11	
HP-P1.09	WATERFURNACE	UVV	120	1	3900	0.5	2" MERV 8	1/2	30.0	5.7	118.3	85.8	154.5	75 / 63	55.0	90	11.2	140.2	102.8	70.0	104.0	70	3.7	R410A	460/3	24.5	28.9	45	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11	
HP-P1.10	WATERFURNACE	UVV	120	1	4750	0.5	2" MERV 8	1/2	30.0	5.7	121.5	97.8	160.7	75 / 63	56.0	90	10.8	143.4	107.4	70.0	97.0	70	4.0	R410A	460/3	24.5	28.9	45	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11	
HP-P1.11	WATERFURNACE	UVV	120	1	4750	0.5	2" MERV 8	1/2	30.0	5.7	121.5	97.8	160.7	75 / 63	56.0	90	10.8	143.4	107.4	70.0	97.0	70	4.0	R410A	460/3	24.5	28.9	45	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11	
HP-C1.01	WATERFURNACE	UVV	120	1	4000	0.5	2" MERV 8	1/2	30.0	5.7	119.7	90.3	156.9	75 / 63	55.0	90	11.0	141.5	104.7	70.0	101.0	70	3.8	R410A	460/3	24.5	28.9	45	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11	
HP-C1.02	WATERFURNACE	UVV	024	1	500	0.5	2" MERV 8	1/2	5.0	0.6	11.5	8.6	14.0	75 / 63	59.0	90	16.5	16.1	13.2	70.0	98.0	70	5.5	R410A	460/3	7.1	7.9	10	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11	
HP-C1.03	WATERFURNACE	UVV	024	1	500	0.5	2" MERV 8	1/2	5.0	0.6	11.5	8.6	14.0	75 / 63	59.0	90	16.5	16.1	13.2	70.0	98.0	70	5.5	R410A	460/3	7.1	7.9	10	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11	
PHASE 3																														
HP-G1.01	WATERFURNACE	UVV	024	1	400	0.5	2" MERV 8	1/2	3.0	0.6	8.6	6.2	10.1	75 / 63	61.0	90	20.7	10.8	9.0	70.0	94.0	70	6.0	R410A	460/3	7.1	7.9	10	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11	
HP-G1.02	WATERFURNACE	UVV	024	1	400	0.5	2" MERV 8	1/2	3.0	0.6	8.6	6.2	10.1	75 / 63	61.0	90	20.7	10.8	9.0	70.0	94.0	70	6.0	R410A	460/3	7.1	7.9	10	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11	
HP-G1.03	WATERFURNACE	UVV	024	1	400	0.5	2" MERV 8	1/2	3.0	0.6	8.6	6.2	10.1	75 / 63	61.0	90	20.7	10.8	9.0	70.0	94.0	70	6.0	R410A	460/3	7.1	7.9	10	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11	
HP-G1.04	WATERFURNACE	UVV	024	1	400	0.5	2" MERV 8	1/2	3.0	0.6	8.6	6.2	10.1	75 / 63	61.0	90	20.7	10.8	9.0	70.0	94.0	70	6.0	R410A	460/3	7.1	7.9	10	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11	
REPLACEMENT																														
HP-1	WATERFURNACE	UVV	028	19	700	0.58	2" MERV 8	1/2	6.0	5.6	25.1	16.8	30.5	75 / 63	52.8	90	15.8	30.6	24.6	70.0	110.7	70	5.0	R410A	277/1	13.2	15.5	20	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12	
HP-2	WATERFURNACE	UVV	036	76	1100	0.58	2" MERV 8	1/2	9.0	5.4	33.7	25.2	41.1	75 / 63	53.8	90	15.7	46.2	37.3	70.0	108.9	70	5.2	R410A	460/3	8.7	9.8	15	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12	
HP-3	WATERFURNACE	UVV	048	33	1520	0.66	2" MERV 8	1/2	12.0	6.3	44.0	33.6	53.6	75 / 63	54.5	90	15.5	64.8	53.7	70.0	109.5	70	5.9	R410A	460/3	11.6	13.0	15	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12	
HP-4	WATERFURNACE	UVV	060	13	1870	0.69	2" MERV 8	1/2	14.0	9.7	53.2	40.7	67.0	75 / 63	54.9	90	13.1	74.8	59.7	70.0	107.0	70	4.9	R410A	460/3	13.0	14.7	20	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12	
HP-5	WATERFURNACE	UVV	120	6	4120	1.08	2" MERV 8	1/2	28.0	4.6	119.0	89.3	156.4	75 / 63	55.0	90	10.9	138.7	101.5	70.0	101.1	70	3.8	R410A	460/3	24.5	28.9	45	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12	
REMARKS:																														
1. FURNISH WITH SOUND BLANKET ON COMPRESSOR.																														
2. FURNISH WITH 36" LONG HOSE KIT WITH STRAINER, BALL VALVES, AUTOMATIC BALANCE VALVE, AND CONTROL VALVE. REFER TO HEAT PUMP PIPING DETAIL THIS SHEET.																														
3. FURNISH WITH STAINLESS STEEL DRAIN PAN AND FLOAT SWITCH WIRED TO SHUT DOWN SUPPLY FAN.																														
4. FURNISH WITH VARIABLE SPEED ELECTRONICALLY COMMUTED MOTOR SUPPLY FAN.																														
5. FURNISH WITH PACKAGED CONTROLS, MODULATING CONTROL VALVE, FACTORY OPEN PROTOCOL, BACNET CONTROLLER CARD, DDM SEQUENCER CARD, AND WATERFURNACE ZS PLUS WALL MOUNTED THERMOSTAT OR EQUIVALENT.																														
6. FURNISH WITH FACTORY WIRED ELECTRICAL DISCONNECT.																														
7. FURNISH WITH MODULATING VARIABLE SPEED COMPRESSORS AND ELECTRONIC EXPANSION VALVES.																														
8. MANUFACTURER SHALL INCLUDE FIVE YEAR PARTS ONLY WARRANTY ON ALL PARTS INCLUDING REFRIGERATION COMPONENTS, REFRIGERANT CHARGE, AND CONTROLS.																														
9. EQUIPMENT STARTUP SERVICE BY OTHERS.																														
10. TOP DISCHARGE CONNECTION.																														
11. LEFT NON-DUCTED RETURN CONFIGURATION.																														
12. FURNISH WITH FACTORY WIRED INTERNAL 460V 3 PHASE NEUTRAL WIRE FOR EXISTING FIELD WIRING WITHOUT EXTERNAL 460V 3 PHASE NEUTRAL WIRE.																														

WATER-TO-WATER HEAT PUMP SCHEDULE																																					
COOLING LOAD										HEATING LOAD																											
TAG	MFR.	MODEL	TOTAL COOL (MBH)	EWT / LWT (DEG F)	FLUID	SOURCE					HEAT EXTRACT (MBH)					EWT / LWT (DEG F)	FLUID	SOURCE					HEAT EXTRACT (MBH)					EWT / LWT (DEG F)	FLUID	FLOW (GPM)	WPD (FT)	COP	ELEC (V/PH)	FLA	MIN. CIR. AMPS	MAX. CUR. AMP	REMARKS
						FLOW (GPM)	WPD (FT)	HEAT EXTRACT (MBH)	EWT / LWT (DEG F)	FLUID	FLOW (GPM)	WPD (FT)	EER	TOTAL HEAT (MBH)	EWT / LWT (DEG F)			FLUID	FLOW (GPM)	WPD (FT)	HEAT EXTRACT (MBH)	EWT / LWT (DEG F)	FLUID	FLOW (GPM)	WPD (FT)	HEAT EXTRACT (MBH)	EWT / LWT (DEG F)										
PHASE 2																																					
HP-7	WATER/JURNACE	NXW 600	564	55 / 45	30% PG	116	10.4	726	90 / 100	WATER	145	8.1	11.9	752	100 / 110	30% PG	155	13.4	581	70 / 60	WATER	116	7.4	4.4	460/3	79.4	89.3	125	1	2, 3, 4, 5, 6, 7							
HP-8	WATER/JURNACE	NXW 600	564	55 / 45	30% PG	116	10.4	726	90 / 100	WATER	145	8.1	11.9	752	100 / 110	30% PG	155	13.4	581	70 / 60	WATER	116	7.4	4.4	460/3	79.4	89.3	125	1	2, 3, 4, 5, 6, 7							
HP-9	WATER/JURNACE	NXW 600	564	55 / 45	30% PG	116	10.4	726	90 / 100	WATER	145	8.1	11.9	752	100 / 110	30% PG	155	13.4	581	70 / 60	WATER	116	7.4	4.4	460/3	79.4	89.3	125	1	2, 3, 4, 5, 6, 7							
HP-10	WATER/JURNACE	NXW 600	564	55 / 45	30% PG	116	10.4	726	90 / 100	WATER	145	8.1	11.9	752	100 / 110	30% PG	155	13.4	581	70 / 60	WATER	116	7.4	4.4	460/3	79.4	89.3	125	1	2, 3, 4, 5, 6, 7							
HP-11	WATER/JURNACE	NXW 600	564	55 / 45	30% PG	116	10.4	726	90 / 100	WATER	145	8.1	11.9	752	100 / 110	30% PG	155	13.4	581	70 / 60	WATER	116	7.4	4.4	460/3	79.4	89.3	125	1	2, 3, 4, 5, 6, 7							
HP-12	WATER/JURNACE	NXW 600	564	55 / 45	30% PG	116	10.4	726	90 / 100	WATER	145	8.1	11.9	752	100 / 110	30% PG	155	13.4	581	70 / 60	WATER	116	7.4	4.4	460/3	79.4	89.3	125	1	2, 3, 4, 5, 6, 7							
HP-13	WATER/JURNACE	NXW 600	564	55 / 45	30% PG	116	10.4	726	90 / 100	WATER	145	8.1	11.9	752	100 / 110	30% PG	155	13.4	581	70 / 60	WATER	116	7.4	4.4	460/3	79.4	89.3	125	1	2, 3, 4, 5, 6, 7							
HP-14	WATER/JURNACE	NXW 600	564	55 / 45	30% PG	116	10.4	726	90 / 100	WATER	145	8.1	11.9	752	100 / 110	30% PG	155	13.4	581	70 / 60	WATER	116	7.4	4.4	460/3	79.4	89.3	125	1	2, 3, 4, 5, 6, 7							
HP-15	WATER/JURNACE	NXW 600	564	55 / 45	30% PG	116	10.4	726	90 / 100	WATER	145	8.1	11.9	752	100 / 110	30% PG	155	13.4	581	70 / 60	WATER	116	7.4	4.4	460/3	79.4	89.3	125	1	2, 3, 4, 5, 6, 7							
HP-16	WATER/JURNACE	NXW 600	564	55 / 45	30% PG	116	10.4	726	90 / 100	WATER	145	8.1	11.9	752	100 / 110	30% PG	155	13.4	581	70 / 60	WATER	116	7.4	4.4	460/3	79.4	89.3	125	1	2, 3, 4, 5, 6, 7							
HP-17	WATER/JURNACE	NXW 600	564	55 / 45	30% PG	116	10.4	726	90 / 100	WATER	145	8.1	11.9	752	100 / 110	30% PG	155	13.4	581	70 / 60	WATER	116	7.4	4.4	460/3	79.4	89.3	125	1	2, 3, 4, 5, 6, 7							
PHASE 3																																					
HP-18	WATER/JURNACE	NXW 600	604	55 / 45	WATER	121	7.8	726	90 / 100	WATER	151	10.1	13.7	794	100 / 110	WATER	159	10.4	617	70 / 60	WATER	124	7.8	4.5	460/3	79.4	89.3	125	1	2, 3, 4, 5, 6, 7							
HP-19	WATER/JURNACE	NXW 600	604	55 / 45	WATER	121	7.8	726	90 / 100	WATER	151	10.1	13.7	794	100 / 110	WATER	159	10.4	617	70 / 60	WATER	124	7.8	4.5	460/3	79.4	89.3	125	1	2, 3, 4, 5, 6, 7							
HP-20	WATER/JURNACE	NXW 600	604	55 / 45	WATER	121	7.8	726	90 / 100	WATER	151	10.1	13.7	794	100 / 110	WATER	159	10.4	617	70 / 60	WATER	124	7.8	4.5	460/3	79.4	89.3	125	1	2, 3, 4, 5, 6, 7							
HP-21	WATER/JURNACE	NXW 600	604	55 / 45	WATER	121	7.8	726	90 / 100	WATER	151	10.1	13.7	794	100 / 110	WATER	159	10.4	617	70 / 60	WATER	124	7.8	4.5	460/3	79.4	89.3	125	1	2, 3, 4, 5, 6, 7							
HP-22	WATER/JURNACE	NXW 600	604	55 / 45	WATER	121	7.8	726	90 / 100	WATER	151	10.1	13.7	794	100 / 110	WATER	159	10.4	617	70 / 60	WATER	124	7.8	4.5	460/3	79.4	89.3	125	1	2, 3, 4, 5, 6, 7							
HP-23	WATER/JURNACE	NXW 600	604	55 / 45	WATER	121	7.8	726	90 / 100	WATER	151	10.1	13.7	794	100 / 110	WATER	159	10.4	617	70 / 60	WATER	124	7.8	4.5	460/3	79.4	89.3	125	1	2, 3, 4, 5, 6, 7							
HP-24	WATER/JURNACE	NXW 600	604	55 / 45	WATER	121	7.8	726	90 / 100	WATER	151	10.1	13.7	794	100 / 110	WATER	159	10.4	617	70 / 60	WATER	124	7.8	4.5	460/3	79.4	89.3	125	1	2, 3, 4, 5, 6, 7							
HP-25	WATER/JURNACE	NXW 600	604	55 / 45	WATER	121	7.8	726	90 / 100	WATER	151	10.1	13.7	794	100 / 110	WATER	159	10.4	617	70 / 60	WATER	124	7.8	4.5	460/3	79.4	89.3	125	1	2, 3, 4, 5, 6, 7							
REMARKS:																																					
1. FURNISH WITH FACTORY WIRED ELECTRICAL DISCONNECT.																																					
2. FURNISH WITH PACKAGED CONTROLS WITH BACKUP BATTERY INTERFACE.																																					
3. FURNISH WITH ELECTRICAL PANEL OVER PROTECTION.																																					
4. FURNISH WITH COMPRESSOR SOUND BLANKETS.																																					
5. FURNISH WITH FLOW PROVING SWITCH.																																					
6. MANUFACTURER SHALL INCLUDE FIVE YEAR PARTS ONLY WARRANTY ON ALL PARTS INCLUDING REFRIGERATION COMPONENTS, REFRIGERANT CHARGE, AND CONTROLS.																																					
7. MANUFACTURER SHALL INCLUDE STARTUP SERVICE.																																					