SPECIFICATION SECTION XXX

PRODUCT: LYNC AEGIS A AIR SOURCE HEAT PUMP WATER HEATER

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 WORK INCLUDED

A. Contractor shall furnish a R744 refrigerant single pass air source heat pump water heater for the generation of primary loop hot water up to 180°F and domestic hot water up to 160°F or 170°F depending on the Heat Exchanger Module selected. The system shall be factory packaged, factory fabricated, assembled, charged, and tested. Standard package systems include a semi-hermetic compressor, user and source side heat exchangers and either two or three axial fans.

B. The heat pump water heating system shall be supplied complete and pre-assembled entirely by one manufacturer.

C. The heat pump water heating system shall have an optional coil coating treatment option for coastal areas.

D. The system shall have an optional cool recovery option available for the simultaneous production of cold water along with domestic hot water.

1.3 SUBMITTALS

A. Submit shop drawings and product data as specified. Include scope of supply, installation instructions, description of operation and standard of construction. Include mechanical layout drawings, flow schematic drawing and symbols.

B. Submit electrical power distribution, signal, symbols, and control wiring.

C. Submit manufacturer’s certified capacity data.

D. Submit manufacturer’s installation, start-up, and service instructions.

E. Submit operation and maintenance manuals, including replacement and spare parts lists and maintenance procedures.

1.4 QUALITY ASSURANCE AND COMPLIANCE

A. Reference Standards

1. UL 1995 / CSA C22.2 No. 236 Safety for Heating and Cooling Equipment
2. ASHRAE 90.1 Energy Standard for Buildings Except Low-Rise Residential Buildings
3. International Building Code (IBC)
4. International Plumbing Code (IPC)
5. Uniform Plumbing Code (UPC)
6. ANSI/ASHRAE Standard 135 BACnet – A Data Communication Protocol for Building Automation
7. UL 916 Energy Management Systems (EMS)

B. Each submittal shall be provided with documentation certifying that all materials, products, components, and test reports comply with the design requirements for this project.

C. Furnish all equipment, materials, and accessories new and free from defects.

PART 2 – PRODUCTS

2.1 CONSTRUCTION

A. The system shall be constructed of sheet metal, with RAL 9018 epoxy-polyester coating with removeable panels for ease of access during maintenance and installation.

B. All refrigerant piping shall be TIG welded stainless steel.

C. The system shall be suitable for indoor or outdoor installation and shall operate at ambient temperatures as low as -4 °F without the need for supplemental heat and as high as 113 °F.

D. The heat pump water heating system shall have an optional coil coating treatment option for coastal or poor air quality areas to protect against salt spray.

E. The system shall have an optional cool recovery option available for the simultaneous production of hot and cold water.

2.2 COMPONENTS

A. COMPRESSOR

1. Compressor shall be a semi-hermetic piston type purposely designed to be used for heating with refrigerant R744. The compressor shall be equipped with thermal protection, oil level indicator light and crankcase electrical heater and is mounted on rubber vibration dampers to reduce the transmission of vibrations to the unit. The compressor shall also be equipped with an internal oil cooling system.

B. SOURCE SIDE HEAT EXCHANGER (EVAPORATOR)

1. The source side heat exchanger shall consist of a coil with copper pipes and aluminum fins with a large exchange surface. De-icing resistance electric heaters shall be integrated into the evaporator to be used during defrost cycles. An antifreeze resistance heater shall be fitted at the bottom of the condensation collection tray to ensure the outflow of water is towards the drain. The finned tube bundle shall be protected by metal mesh. The spacing between fins shall be 4.1mm.

C. USER SIDE HEAT EXCHANGER (GAS COOLER)

1. The user side heat exchanger shall consist of brazed plates made of AISI 316 stainless steel with closed cell thermal insulation along with a temperature probe for frost protection, connected to the control. The exchange of heat shall take place in countercurrent to optimize the coefficient of performance (COP) and to allow the unit to reach high temperatures.

D. OPTIONAL: COOL RECOVERY

1. If selected, the cool recovery option provides a water source heat exchanger (evaporator), three-way water valve, flow switch, inlet and outlet temperature sensor, and control logic to select between air-source and water-source operation.
2. The cool recovery heat exchanger shall consist of brazed plates made of AISI 316 stainless steel with closed cell thermal insulation. The exchange of heat shall take place in countercurrent flow to optimize the unit COP.

E. OPTIONAL: HIGH SOURCE WATER TEMPERATURE KIT

1. The Cold-Water Recovery option is a prerequisite to use this kit on Air-Source equipment. In applications where the incoming source water temperature is continuously above 86°F and below 130°F for any duration of time the High Source Water Inlet Temperature Kit shall be required. This kit shall include a 3-way modulating valve, circulation pump, and relay that is field installed. The 3-way valve shall blend the source water into the source water loop by using a signal from the heat pump water heater.

F. FANS

1. Axial fans shall be directly coupled to the 6-pole electric motor with external rotor, protection rating IP 54. Each fan shall be housed in shaped nozzles and include a

protective safety grille in compliance with UNI EN 294.

2. OPTIONAL: An optional electrically commutated (EC) fan can be provided instead of the standard alternating current (AC) fans. EC fans are standard on 250 model.

G. REFRIGERATION CIRCUIT

1. Circuit shall include the compressor, system side plate heat exchanger (gas cooler), regenerative heat exchanger, source side finned tube bundle (evaporator), inlet valves, electronic thermostatic expansion valve, high and low pressure switches, low pressure safety valve, high pressure safety valve, liquid receiver, and service taps.

H. REFRIGERANT TYPE

1. System shall operate on the refrigerant type R744, also known as carbon dioxide (CO_2), and shall have a global warming potential (GWP) of 1 and an ozone depletion potential (ODP) of 0.

I. HYDRAULIC CIRCUIT

1. Primary and domestic (secondary) circulator/pumps are provided on the associated heat exchanger module. The circulators will be directly controlled by the PLC. Depending on the required water outlet set point, the flow rate will vary to reach the set temperature and to maximize the COP value.
2. If the secondary pump delay function is enabled, the circulation pump on the secondary side of the heat exchanger module shall remain off until the sensor on the primary inlet side of the heat exchanger module detects the temperature required by the system.

J. ELECTRICAL PANEL

1. Electrical panel shall be able to control the utility set point temperature and manage the primary and domestic (secondary) circulator/pumps.

2. Panel shall consist of a circuit breaker and isolating switch and fuses to protect the auxiliary and power circuits, compressor contractor, fan revolution regulator for condensation control, a pump relay or motor protection and contractor, and a microprocessor control with display of the main functions.

K. DYNAMIC DEFROST PROTECTION

1. Heat pump must have dynamic defrost cycle based on evaporation temperature with option for fixed defrost temperature option.

2. Defrost must be accomplished by integral resistance heating elements. Units that defrost based on a reverse cycle will not be accepted.

3. Unit must include an antifreeze resistance heating element fitted at the bottom of the

condensation collection tray to ensure the outflow of water towards the drain.

4. Water lines inside of heat pump must have integrated heat trace on the supply and return water lines to prevent freezing water lines when equipment is on standby.

L. ELECTRONIC HIGH PRESSURE CONTROL VALVE

1. The valve shall have a maximum operating temperature of 2031 psi and a maximum operating pressure difference of at least 1233 psi.

2. Control valve shall ensure precise control even in operation at part loads.

3. Control valve shall be constructed without the use of gears.

M. CIRCULATION PUMP

1. The circulation pumps shall be mounted on the heat exchanger module associated with the heat pump. These pumps will be single speed with a separate modulating control valve to vary the water flow to meet the target temperature set points.

N. ELECTRONIC CONTROL SYSTEM

1. The controller shall provide the option for external control by a central Building Management System.

2. Control system shall feature an LCD touchscreen display, digital and probe inputs, analog and digital outputs, ethernet, USB, and mini-USB ports, and an internal clock.

O. COMMUNICATIONS

1. The heat pump water heater shall be an integrated component of a high-speed, peer-to-peer internetwork of ANSI/ASHRAE Standard 135, BACnet using native BACnet communications via RTU or IP/MSTP. System shall also support Modbus networking.

2. The integrated LCD display shall provide fast commissioning via user-friendly menu driven configuration.

P. OPTIONAL AEGIS SEQUENCING CONTROLLER

1. Sequencer can control between two and six separate units installed in parallel.

2. Single point of connection for all system temperature sensors

3. System can manage secondary side (DHW) pump.

4. Device can detect the thermal demand of the tank system, in order to activate the

suitable number of units.

5. Automatically rotate lead-lag units to balance total run hours.

6. Includes (9) 10 kΩ RTD temperature probes for installation in tanks and return piping to detect the water temperature stratification in the tank system.

7. Digital I/O to dialogue with third party systems.

8. Capable of operating on 120 VAC or 240 VAC single phase power. Maximum current draw 0.5 A.

9. Sequencer communicates with Aegis heat pumps via Modbus IP ethernet connection.

10. UL listed enclosure with IP 66 protection.

11. The sequencer shall provide the option for external control by a central Building Management System (BMS) via Modbus TCP or BACnet IP.

PART 3 – EXECUTION

3.1 INSTALLATION

A. PIPING AND CONNECTIONS

1. All package piping shall be completed by the manufacturer prior to shipping. Field connections to be made by installing contractor.

2. Connection dimensions for the domestic water in, domestic water out, cool recovery water in, and cool recovery water out shall be of the following dimensions:

Model	Domestic Water In	Domestic Water Out	Cool Recovery Water In	Cool Recovery Water Out	Condensate Drain
250	1.5”	1.5”	1.5”	1.5”	1.3”
350	1.5”	1.5”	1.5”	1.5”	1.3”
500	1.5”	1.5”	2”	2”	1.3”

3.2 START-UP AND TRAINING

A. Engage a factory-authorized service representative to provide startup of the heat pump water heater, inspect components, assemblies, and equipment installations, including connections, and to assist in testing and training upon completion of the startup.

3.3 WARRANTY

A. For warranty information, please refer to Lync Heat Pump Water Heater warranty document.

END OF SECTION