Reviewed for Code Compliance
Inspection Division
Department of Public Safety
Date: 05/17/17

SUBMITTALS

1. SUBMIT MANUFACTURER'S PRODUCT DATA, INSTALLATION INSTRUCTIONS, AND OPERATION AND MAINTENANCE DATA, INCLUDING SPARE PARTS LISTS, FOR EACH MATERIAL AND PRODUCT USED FOR APPROVAL BY DESIGN ENGINEER. SUBMIT ON THE FOLLOWING EQUIPMENT:
1.1. SPLIT HEAT PUMP SYSTEM (CU-1, HP-1, HP-2)
1.2. ENERGY RECOVERY VENTILATOR (ERV-1)
1.3. EXHAUST GRILLE (E-1)
1.4. ELECTRIC CEILING HEATER (ECH-1)
1.5. THERMOSTATS
1.6. LOCK BOX
1.7. PIPING
1.8. DUCTWORK
1.9. INSULATION

2. PROVIDE THREE (3) OPERATION AND MAINTENANCE MANUALS THAT INCLUDE SHOP DRAWINGS, WIRING DIAGRAMS, SPARE PARTS LISTS, AS-BUILT DRAWINGS, AND MANUFACTURER'S INSTRUCTIONS. O&M MANUALS SHALL ADHERE TO ASHRAE GUIDELINE 4-2008.

DUCTWORK

1. FABRICATE DUCTS WITH GALVANIZED SHEET STEEL.
2. DUCT STATIC PRESSURE CLASS: 2 IN WG
3. MINIMUM DUCT SEAL CLASS, CONFORM TO ASHRAE 90.1-2007 STANDARDS:
3.1. SUPPLY AIR DUCTS: CLASS C
3.2. RETURN DUCTS: CLASS C
3.3. EXHAUST DUCTS: CLASS C
4. DUCT ACCESSORIES:
4.1. INSTALL DUCT ACCESSORIES IN ACCORDANCE WITH DUCT MATERIAL (GALVANIZED STEEL).
4.2. INSTALL MOTORIZED DAMPERS AT OUTLET OF EXHAUST FAN AS CLOSE AS POSSIBLE TO THE EXHAUST FAN UNLESS OTHERWISE INDICATED.
5. PROVIDE R-5 MINERAL-FIBER BLANKET INSULATION ON SUPPLY, RETURN, AND EXHAUST DUCTWORK.

EXHAUST GRILLE (E-1)

1. FURNISH AND INSTALL EXHAUST GRILLE OF THE SIZE AND MOUNTING TYPE INDICATED ON THE PLAN AND OUTLET SCHEDULE. GRILLE SHALL BE OF ALUMINUM CONSTRUCTION, CONSISTING OF ALUMINUM 1 IN. X 1 IN. X 1 IN. GRID (EGGCRATE CORE) AND AN EXTRUDED ALUMINUM BORDER. THE GRILLE SHALL BE FINISHED IN ALUMINUM POWDER COAT. PAINT FINISH SHALL PASS 500 HOURS OF SALT SPRAY EXPOSURE WITH NO MEASURABLE CREEP IN ACCORDANCE WITH ASTM D1654 AND 1000 HOURS WITH NO RUSTING OR BLISTERING AS PER ASTM D610 AND ASTM D714.
2. ACCESSORIES:
2.1. THE INTEGRAL VOLUME CONTROL DAMPER SHALL BE OF THE OPPOSED BLADE TYPE AND SHALL BE CONSTRUCTED OF COATED STEEL / ALUMINUM.

ELECTRIC CEILING HEATER ECH-1

1. THE HEATING EQUIPMENT SHALL INCLUDE A CEILING MOUNTED ELECTRIC AUTOMATIC FAN FORCED HEATER. THE HEATER SHALL BE DESIGNED FOR CEILING RECESSED MOUNTING. HEATERS SHALL BE UL LISTED.
2. HEATER ASSEMBLY: THE HEATER ASSEMBLY, WHICH FITS IN THE BACK BOX, SHALL CONSIST OF A FAN PANEL UPON WHICH IS MOUNTED ALL OF THE OPERATIONAL PARTS OF THE HEATER.
3. HEATING ELEMENT: THE HEATING ELEMENT SHALL BE OF THE NON-GLOWING DESIGN CONSISTING OF 80/20 INCH RESISTANCE WIRE ENCLOSED IN A STEEL SHEATH TO WHICH PLATE FINS ARE COPPER-BRAZED. IT SHALL BE WARRANTED FOR 5 YEARS.
4. FAN MOTOR: THE FAN MOTOR SHALL BE TOTALLY ENCLOSED AND PERMANENTLY LUBRICATED.
5. FAN DELAY SWITCH: FAN CONTROL SHALL BE OF BI-METALLIC, SNAP-ACTION TYPE AND SHALL ACTIVATE FAN AFTER HEATING ELEMENT REACHES OPERATING TEMPERATURE. THE FAN SHALL CONTINUE TO OPERATE AFTER THE THERMOSTAT IS SATISFIED AND UNTIL THE HEATING ELEMENT IS COOL.
6. THERMAL CUTOUT: A THERMAL CUTOUT SHALL BE BUILT INTO THE SYSTEM TO SHUT OFF THE HEATER IN THE EVENT OF OVERHEATING.
7. DISCONNECT SWITCH: A DOUBLE-POLE SINGLE THROW DISCONNECT SWITCH SHALL BE FACTORY INSTALLED FOR POSITIVE DISCONNECT OF POWER SUPPLY. IT WILL BE COMPLETELY CONCEALED BEHIND THE FACEPLATE. COORDINATE WITH ELECTRICAL DRAWINGS.
8. BACK BOX: THE BACK BOX SHALL BE DESIGNED FOR DUTY AS A RECESSED ROUGH-IN BOX IN FRAME INSTALLATIONS. THE BACK BOX SHALL BE 20-GAUGE GALVANIZED STEEL AND SHALL CONTAIN KNOCKOUTS THROUGH WHICH POWER LEADS ARE BROUGHT.
9. FACEPLATE: THE LOUVERED FACEPLATE SHALL BE OF COMMERCIAL GRADE, COLD-ROLLED STEEL, PHOSPHATIZED, THEN ELECTROSTATICALLY PAINTED NAVAJO WHITE BY A BAKED ENAMEL PROCESS. THE FACEPLATE SHALL BE SECURED TO THE HEATING UNIT WITH SCREWS.
10. THREE-PIECE DESIGN: THE HEATER SHALL BE MADE UP OF A BACK BOX, A HEATER ASSEMBLY AND A FACEPLATE.

ENERGY RECOVERY VENTILATOR (ERV-1)

1. CORE – CROSS FLOW ERV CORE THAT TRANSFERS BOTH HEAT AND WATER VAPOR WHILE ISOLATING THE TRANSFER OF INDOOR POLLUTANTS.
1.1. MODERATES EXTREMES OF HUMIDITY YEAR ROUND
1.2. NO CONDENSATE FORMATION
1.3. NO FROST FORMATION IN ALL BUT THE MOST SEVERE CLIMATES
1.4. CORE DOES NOT ACT AS A FILTER, FOR LONG SERVICE LIFE

2. BLOWER/MOTOR PACKAGES – TWO MOTORIZED IMPELLER BLOWERS WITH STEEL BACKWARD INCLINED BLADES. MOTORS ARE PERMANENTLY LUBRICATED, SEALED BEARINGS FOR MAINTENANCE-FREE OPERATION AND LONG LIFE.

3. CABINET – CASE CONSTRUCTED OF 22 GAUGE STEEL WITH LAPPED CORNERS AND ZINC PLATED SCREW FASTENERS. BOTH INLETS HAVE AN AERODYNAMIC, DRAWN METAL RING FORMED INTO THE CABINET. THERE ARE TWO INTEGRAL MOUNTING FLANGES. DOORS ARE MOUNTED TO THE CABINET WITH DEMOUNTABLE HINGES AND CAM LATCHES AND ARE FULLY INSULATED WITH 1 INCH, EXPANDED POLYSTYRENE FOAM INSULATION FACED WITH A CLEANABLE FOIL FACE ON ALL EXPOSED SURFACES. CABINET AND DOOR FINISHED WITH TEXTURED, POWDER COAT PAINT. CABINET AND DOOR CONSTRUCTED OF GALVANIZED METAL FOR CORROSION PROTECTION.

4. FILTERS – EACH AIRSTREAM IS FILTERED BY MERV-8, SPUN POLYESTER, DISPOSABLE FILTERS.

5. DUCT CONNECTIONS – PLASTIC DOUBLE COLLAR DUCT CONNECTIONS ARE PROVIDED FOR EACH AIRSTREAM. THE INNER COLLAR ACCEPTS 6 INCH DUCT.

6. WARRANTY – UNIT PROTECTED BY A 10 YEAR WARRANTY ON THE ERV CORE AND A 5 YEAR WARRANTY ON ALL OTHER PARTS.

7. WEATHERHOODS – MULTI LOUVER DESIGN; 6 INCH BACKDRAFT DAMPERS FOR HORIZONTAL APPLICATION IN OA AND EA POSITIONS. COLOR TO MATCH EXTERIOR SIDING.

8. CONTROLS – UNIT TO HAVE A LINE CORD AND AN ONBOARD LOW VOLTAGE CONTROL PACKAGE ALLOWING ANY SWITCH THAT CLOSES ACROSS THE TWO CONTROL TERMINALS TO TURN THE UNIT ON.
8.1. OPERATES ON A TIME OF DAY SCHEDULE, PROGRAMMABLE AT SWITCH.

SPLIT HEAT PUMP SYSTEM (CU-1, HP-1, HP-2)

1. SYSTEM DESCRIPTION:
1.1. THE AIR-CONDITIONING EVAPORATOR SYSTEM SHALL BE A MINI-SPLIT SYSTEM. THE CASSETTE SHALL CONSIST OF A CEILING RECESSED INDOOR CASSETTE SECTION. THE EVAPORATOR WILL COME WITH WIRED WALL CONTROLLERS.

2. QUALITY ASSURANCE:
2.1. THESE UNITS SHALL BE LISTED BY ETL AND BEAR THE ETL LABEL.
2.2. UNITS SHALL BE RATED IN ACCORDANCE TO ARI STANDARD 210 AND BEAR THE ARI LABEL.
2.3. UNITS SHALL BE MANUFACTURED IN A FACILITY THAT HAS MET ISO 9002 AND ISO 14001 INTERNATIONAL STANDARDS.
2.4. A FULL CHARGE OF R-410A FOR A 66', 98', OR 164' LINE SET SHALL BE PROVIDED IN THE CONDENSER SECTION. (REFERENCE CONDENSER INSTALLATION MANUAL FOR PROPER CHARGING INFORMATION.)
2.5. A DRY AIR HOLDING CHARGE WILL BE PROVIDED IN THE EVAPORATOR SECTION.
2.6. SYSTEM SEER WILL BE BETWEEN 14.7 – 21.5 DEPENDING ON EVAPORATOR COMBINATION SET UP.

3. HANDLING AND STORAGE:
3.1. THE WIRED WALL CONTROLLERS SHALL BE PACKAGED INSIDE THE CARTON WITH THE EVAPORATOR SECTION.
3.2. UNIT SHALL BE HANDLED AND STORED ACCORDING TO MANUFACTURING SPECIFICATIONS.

4. WARRANTY:
4.1. THE UNITS SHALL HAVE A MANUFACTURER'S WARRANTY ON ALL PARTS FOR A PERIOD OF FIVE (5) YEARS FROM DATE OF INSTALLATION. THE COMPRESSOR SHALL HAVE A WARRANTY OF SEVEN (7) YEARS FROM THE DATE OF INSTALLATION. IF ANY SHOULD NOT FUNCTION PROPERLY DURING THIS PERIOD, IT SHALL BE REPAIRED OR REPLACED AT THE DISCRETION OF THE MANUFACTURER. THIS WARRANTY DOES NOT INCLUDE LABOR.
4.2. MANUFACTURER SHALL HAVE MORE THAN NINE (9) YEARS PERFORMANCE EXPERIENCE IN THE US MARKET.

5. PERFORMANCE:
5.1. EACH SYSTEM SHALL PERFORM AS SHOWN ON DRAWINGS.

6. INDOOR UNITS:
6.1. GENERAL: THE INDOOR UNIT SHALL BE FACTORY ASSEMBLED, WIRED AND RUN TESTED. CONTAINED WITHIN THE UNIT SHALL BE FACTORY WIRING, PIPING, CONTROL CIRCUITRY AND FAN MOTOR. THE UNIT SHALL HAVE SELF DIAGNOSTIC FUNCTION, 3 MINUTE TIME DELAY, AN AUTO RESTART FUNCTION AND AN EMERGENCY OPERATION MANUAL RUN SWITCH. INDOOR UNIT REFRIGERATION PIPING SHALL BE CHARGED WITH A DRY AIR HOLDING CHARGE INSTEAD OF R-410A.
6.2. CASSETTE
6.2.1. CABINET:
6.2.1.1. DEPENDING ON THE EVAPORATOR TYPE, THE CABINET SHALL HAVE A WHITE FINISH SMOOTH EASY TO CLEAN SURFACE WITH AND INDICATOR LIGHTS TO VERIFY FUNCTIONING AND TROUBLESHOOTING.
6.2.1.2. RETURN AIR SHALL ENTER THROUGH THE TOP OF THE CABINET.
6.2.2. FAN:
6.2.2.1. EVAPORATOR FAN SHALL BE DIRECT DRIVE DC MOTOR.
6.2.2.2. FAN SHALL BE DYNAMICALLY BALANCED AND RUN WITH PERMANENTLY LUBRICATED BEARINGS.
6.2.2.3. A MOTORIZED 4-WAY AIR LOUVER SHALL PROVIDE AUTOMATIC CHANGES IN AIR DIRECTION TO PROVIDE A MORE UNIFORM PATTERN OF AIR DISTRIBUTION FOR WALL MOUNTED EVAPORATORS.
6.2.2.4. INDOOR FAN SHALL PROVIDE 4 SPEEDS, HIGH, MEDIUM, LOW, AND QUIET.
6.3. FILTER:
6.3.1. UNIT SHALL INCLUDE A FACTORY SUPPLIED WASHABLE FILTER FOR RETURN AIR.
6.4. COIL:
6.4.1. EVAPORATOR SHALL BE NONFERROUS CONSTRUCTION WITH ALUMINUM PLATE FINS ON COPPER TUBING.
6.4.2. ALL TUBING SHALL BE FACTORY BRAZED AND LEAK CHECKED PRIOR TO PACKAGING AT THE FACTORY.
6.5. ELECTRICAL:
6.5.1. POWER REQUIREMENT SHALL BE 208-230/60/1
6.5.2. INDOOR UNIT WILL NOT HAVE ANY SUPPLEMENTAL ELECTRIC STRIP TYPE HEAT.
6.6. CONTROL:
6.1.1. THIS UNIT SHALL HAVE A WIRED CONTROL TO PERFORM INPUT FUNCTION NECESSARY FOR OPERATION OF UNIT.
6.1.2. UNIT WILL HAVE A DRY MODE SETTING TO HELP REMOVE HUMIDITY.
6.1.3. TEMPERATURE SETPOINT SHALL BE FROM 60°F-80°F IN TWO (2) DEGREE INCREMENTS.
6.1.4. MICROPROCESSOR LOCATED IN THE INDOOR UNIT SHALL HAVE THE CAPABILITY TO SENSE RETURN AIR TEMPERATURE, COIL TEMPERATURE AND PROCESS THE COMMANDS FROM THE WIRED WALL CONTROLLERS TO OPERATE THE OUTDOOR UNIT AS REQUIRED. UNIT SHALL BE CAPABLE OF AUTOMATIC RESTART WHEN POWER IS RETURNED AFTER A POWER OUTAGE.
6.1.5. CONTROL SIGNAL SHALL BE SENT BETWEEN THE INDOOR UNIT AND OUTDOOR UNIT ON THE SAME WIRING DELIVERING VOLTAGE TO THE INDOOR UNIT.

7. OUTDOOR UNIT:
7.1. GENERAL:
7.1.1. THE OUTDOOR UNIT IS DESIGNED SPECIFICALLY FOR THE MATCHING INDOOR UNIT. THE UNIT IS EQUIPPED WITH CIRCUIT BOARD THAT INTERFACES WITH THE INDOOR UNIT. OUTDOOR UNIT CONTAINS A HIGH EFFICIENCY INVERTER TYPE COMPRESSOR. UNIT IS TO BE FACTORY ASSEMBLED, WIRED, PIPED AND RUN TESTED PRIOR TO LEAVING THE FACTORY.
7.2. UNIT CABINET:
7.2.1. CABINET WILL BE CONSTRUCTED OUT OF GALVANIZED METAL WITH A BAKED ENAMEL FINISH.
7.2.2. FAN GUARD WILL BE LOUVERED TO PREVENT ENTRANCE OF FOREIGN OBJECTS.
7.3. FAN:
7.3.1. UNIT WILL HAVE A DIRECT DRIVE PROPELLER TYPE FAN.
7.3.2. MOTOR FOR FAN WILL BE DC VOLTAGE PERMANENTLY LUBRICATED AND BALANCED PRIOR TO ASSEMBLY.
7.3.3. UNIT WILL HAVE A HORIZONTAL DISCHARGE AIR FLOW.
7.4. COIL:
7.4.1. CONDENSER COIL SHALL BE NONFERROUS CONSTRUCTION WITH ALUMINUM PLATE FIN ON COPPER TUBING.
7.4.2. REFRIGERANT FLOW LEAVING THE CONDENSER COIL SHALL BE CONTROLLED BY A METERING DEVICE.
7.5. COMPRESSOR:
7.5.1. COMPRESSOR SHALL BE A ROTARY TYPE OR SCROLL TYPE MOUNTED IN SUCH A WAY TO PREVENT NOISE AND VIBRATION TRANSMISSION OUTSIDE THE CABINET.
7.5.2. UNIT WILL BE PRE-CHARGED WITH R410A REFRIGERANT TO ACCOMMODATE A 66', 98', OR 164' LINE SET DEPENDING ON CONDENSER MODEL WITHOUT THE ADDITION OR REMOVAL OF REFRIGERANT.
7.5.3. UNIT WILL BE CAPABLE OF A MAXIMUM 131', 164', 230', OR 377' (DEPENDING ON CONDENSER (49' MAX HEIGHT DIFFERENCE) LINE SET WITHOUT THE NEED TO TRAP, CHANGE LINE SIZES OR ADD OIL TO THE SYSTEM. REFER TO INSTALL MANUAL FOR EACH SYSTEM'S SPECIFIC INSTALLATION DETAILS.
7.6. ELECTRICAL:
7.6.1. THE UNIT ELECTRICAL REQUIREMENTS SHALL BE 208-230/60/1.
7.6.2. THE OUTDOOR UNIT SHALL BE CONTROLLED BY A MICROPROCESSOR.
7.6.3. CONTROL VOLTAGE TO AND FROM THE INDOOR UNIT SHALL OCCUR ON THE SAME WIRING DELIVERING POWER.

PIPE MATERIALS AND INSULATION

1. REFRIGERANT PIPING: TYPE ACR.
2. JOINTS: BRAZED OR SOLDERED.
3. PROVIDE MINIMUM 1.5 INCH CLOSED CELL INSULATION FOR REFRIGERANT PIPING.

TESTING, ADJUSTING AND BALANCING (TAB)

1. TAB AGENT SHALL BE PROVIDED BY THE CONTRACTOR.
2. TEST, ADJUST, AND BALANCE ALL NEW EQUIPMENT AND DISTRIBUTION SYSTEMS IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS, BUILDING OWNER REQUIREMENTS, AND NEBB OR AABC PROCEDURAL STANDARDS.
3. THE TAB AGENCY SHALL ASSIST THE CONTROLS CONTRACTOR IN VERIFYING THE OPERATION AND CALIBRATION OF ALL HVAC AND TEMPERATURE CONTROL SYSTEMS.
4. PRESSURE TEST REFRIGERANT PIPING AND COMPLY WITH ASME B31.3, CHAPTER VI.
4.1. LINE TEST PRESSURE FOR REFRIGERANT R-410A: 535 PSIG FOR SUCTION LINES AND HOT-GAS AND LIQUID LINES.

AUTOMATIC TEMPERATURE CONTROLS

1. INSTALL CONTROLS WIRING AND CONDUIT IN ACCORDANCE WITH THE NATIONAL ELECTRIC CODE AND AUTHORITY HAVING JURISDICTION (AHJ).
2. ALL NEW CONTROLS SHALL BE DDC AND INSTALLED IN METAL CONDUIT.
3. INSTALL THERMOSTATS 4 FEET 6 INCHES ABOVE FINISHED FLOOR OR AS DIRECTED OTHERWISE BY THE BUILDING OWNER.
4. ENGAGE A FACTORY-AUTHORIZED SERVICE REPRESENTATIVE TO TRAIN OWNER'S MAINTENANCE PERSONNEL TO ADJUST, OPERATE, AND MAINTAIN HVAC INSTRUMENTATION AND CONTROLS.

COMMISSIONING

1. CONTRACTOR SHALL COMMISSION ALL SYSTEMS TO ENSURE PROPER OPERATION.

ISSUED FOR BID
NOT FOR CONSTRUCTION
JANUARY 5, 2017

NOTE:
GENERAL NOTES, ABBREVIATIONS AND SYMBOLS APPLY TO MECHANICAL DRAWINGS MARKED M#. HOWEVER, ALL ABBREVIATIONS AND SYMBOLS MAY NOT BE APPLICABLE TO THIS PARTICULAR PROJECT. THEY ARE PROVIDED FOR GENERAL REFERENCE ONLY.

STATE OF MAINE
EMILY PINYARD
No. 12126
LICENSED
PROFESSIONAL ENGINEER
01/05/17

REV	DESCRIPTION	DWN	APP	DATE
C	RE-ISSUED FOR BID	MBD	ERP	01/05/17
B	RE-ISSUED FOR BID	MBD	ERP	10/28/16
A	ISSUED FOR BID	MBD	ERP	9/02/16

ecomaine
64 BLUEBERRY ROAD, PORTLAND, ME

SCALE HOUSE WITH
INSULATED BLOCK CONSTRUCTION

MECHANICAL SPECIFICATIONS

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SHEET 27 OF 40
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