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PART 2 – PRODUCTS

2.01 DIFFUSERS, REGISTERS AND GRILLES

AIR DISTRIBUTION EQUIPMENT SHALL BE OF SIZES AND CAPACITIES INDICATED.

A. REGISTERS, GRILLES, AND DIFFUSERS OF THE SIZES SHOWN ON THE DRAWINGS AND DESCRIBED HEREIN SHALL BE FURNISHED AND INSTALLED. ALL GRILLES, DIFFUSERS, AND REGISTERS SHALL BE COMPLETE WITH FRAMES WITH RUBBER GASKETS SUITABLE FOR THE AREA AND WALL CONSTRUCTION WHERE SHOWN ON THE DRAWINGS.

B. FINISH FOR ALL REGISTERS, DIFFUSERS, GRILLES, ETC., SHALL BE OFF-WHITE UNLESS OTHERWISE SELECTED BY THE OWNER. APPROVED MANUFACTURERS FOR ALL AIR DISTRUBUTION PRODUCTS SHALL BE PRICE INDUSTRIES, NAILOR, METAL AIR, TUTTLE & BAILEY, J&J, CARNES, HART AND COOLEY, OR ANEMOSTAT.

C. SUPPLY AIR SHALL BE INTRODUCED INTO CONDITIONED SPACE IN SUCH A MANNER THAT CONDITIONED AIR AND ROOM AIR IS RAPIDLY AND EVENLY MIXED, RESULTING IN EQUALIZATION OF TEMPERATURE AND DRAFTLESS AIR DISTRIBUTION THROUGHOUT ZONES OF OCCUPANCY WITH TEMPERATURE DIFFERENTIALS UP TO 25 DEGREES F FOR BOTH COOLING AND HEATING AIR. QUANTITIES AND THROWS SHALL BE AS INDICATED.

D. VELOCITY OF MOVING AIR BELOW 5 FOOT LEVEL, DURING COOLING CYCLE, SHALL NOT EXCEED LIMITS OF EITHER 50 FPM AT 1.5 DEGREES F BELOW AVERAGE ROOM TEMPERATURE OR 70 FPM AT 1 DEGREE F BELOW AVERAGE ROOM TEMPERATURE. VELOCITY OF MOVING AIR AT THE 1FOOT LEVEL, DURING HEATING CYCLE, SHALL NOT BE LESS THAN 10 FPM. TEMPERATURE DIFFERENCE AT OR BELOW THE 5 FOOT LEVEL SHALL NOT EXCEED THE FOLLOWING: 2 DEGREES F BELOW AVERAGE ROOM TEMPERATURE AT 30 FPM, 1.5 DEGREES F BELOW AVERAGE ROOM TEMPERATURE AT 50 FPM, 1.0 DEGREES F BELOW AVERAGE ROOM TEMPERATURE AT 70 FPM. SOUND PRESSURE LEVEL IN ALL OCTAVE BANDS FOR EACH DIFFUSER SHALL NOT EXCEED NC35 NOISE CRITERIA CURVE AT TASK LEVEL WHEN UNITS OPERATE AT DESIGNED CAPACITIES.

E. CEILING DIFFUSERS, GRILLES AND REGISTERS SHALL BE INDEPENDENTLY SUPPORTED FROM THE STRUCTURE SO THAT THEY ARE NOT DEPENDING ON THE CEILING FOR SUPPORT.

F. CEILING DUFFUSERS MAY BE ROUND NECKED OR EQUIVALENT SIZE SQUARE NECK. PROVIDE SQUARE TO ROUND NECK ADAPTER AS NECESSARY. FLEX DUCT SHALL TYPICALLY CONNECT DIRECTLY TO THE DIFFUSER USING A 1-1/2" RADIUS FLEXIBLE DUCT ELBOW. IF SPACE DOES NOT ALLOW FOR A FULL 1-1/2" RADIUS TO BE PROVIDED, THEN A LINED SHEET METAL BOOT SHALL BE PROVIDED. THE FLEXIBLE DUCT SHALL BE CONNECTED TO THE SIDE OF THE SHEET METAL BOOT. THE FLEXIBLE DUCT SHALL NOT BE CONNECT TO THE TOP OF THE SHEET METAL BOOT.

G. CEILING SUPPLY AIR DIFFUSERS SHALL BE LOUVERED FACED DIRECTIONAL DIFFUSER MODEL SMD MANUFACTURED BY PRICE INDUSTRIES, WITH BORDER TYPE 36 FOR LAY IN CEILING OR BORDER TYPE 1 FOR SURFACE MOUNTING IN OTHER THAN LAY IN CEILINGS, BAKED ENAMEL FINISH, BLOW AND PATTERN SHOWN ON THE DRAWINGS.

H. SUPPLY, EXHAUST, TRANSFER AND RETURN AIR GRILLES MOUNTED ON WALLS 6 FEET ABOVE THE FLOOR SHALL BE PRICE INDUSTRIES MODEL 635, WITH 45-DEGREE DEFLECTION, 1/2" BLADE SPACING, HORIZONTAL EXTRUDED ALUMINUM BLADES, BAKED ENAMEL FINISH.

I. SUPPLY, EXHAUST, TRANSFER AND RETURN AIR GRILLES MOUNTED ON WALLS LOWER THAN 6 FEET ABOVE THE FLOOR SHALL BE SIGHT-PROOF, HEAVY DUTY GYMNASIUM TYPE EQUAL TO PRICE INDUSTRIES MODEL 91 WITH HORIZONTAL 45-DEGREE DEFLECTION BLADES, 3/8" BLADE SPACING, BAKED ENAMEL FINISH.

J. CEILING RETURN, EXHAUST AND TRANSFER AIR GRILLES SHALL BE PRICE INDUSTRIES MODEL PDR OR PDDR PERFORATED DIFFUSER WITH REMOVABLE PERFORATED FACEPLATE FOR LAY IN T-BAR APPLICATION, BAKED ENAMEL FINISH.

K. CEILING RETURN, EXHAUST AND TRANSFER AIR GRILLES FOR SURFACE MOUNTING IN OTHER THAN LAY IN CEILINGS SHALL BE PRICE INDUSTRIES MODEL 10F, WITH PERFORATED REMOVEABLE FACEPLATE, BAKED ENAMEL FINISH.

2.02 DUCTS AND SHEET METAL WORK

A. PROVIDE DUCTS, PLENUMS, ACCESS DOORS, FRESH AIR INTAKES, AND EXHAUSTS AS INDICATED AND REQUIRED. ALL DUCTWORK SHALL BE CONSTRUCTED, ERECTED AND TESTED IN ACCORDANCE WITH THE MOST RESTRICTIVE OF LOCAL REGULATIONS, PROCEDURES DETAILED IN THE ASHRAE HANDBOOK OF FUNDAMENTALS OR THE APPLICABLE STANDARDS ADOPTED BY THE SHEET METAL AND AIR CONDITIONING CONTRACTORS NATIONAL ASSOCIATION. PROVIDE PREFABRICATED SPIRAL LOCKSEAM DUCTS AND FITTINGS AND RECTANGULAR DUCTS OF GALVANIZED STEEL. ALUMINUM FLEXIBLE DUCTWORK OR GYPSUM BOARD DUCTWORK IS NOT ACCEPTABLE.

B. ALL CONNECTIONS TO MAIN DUCTS SHALL BE MADE WITH LOW LOSS FITTINGS.

C. FLAT DUCT SURFACES SHALL BE CRIMPED DIAGONALLY REGARDLESS OF SIZE. LONGITUDINAL JOINTS IN ALL DUCT SIZES MAY BE FLAT LOCK JOINTS. TRANSVERSE JOINTS AND INTERMEDIATE BRACING SHALL BE CONSTRUCTED OF GALVANIZED SHEET METAL OR GALVANIZED STRUCTURAL ANGLES IN ACCORDANCE WITH REQUIREMENTS OF ASHRAE GUIDE AND PUBLIC AUTHORITIES HAVING JURISDICTION.

D. TRANSVERSE JOINTS ON ALL DUCTS SHALL BE SEALED WITH MASTIC OR TAPE.

E. LONGITUDINAL JOINTS ON DUCTS WITH INTERNAL STATIC PRESSURES IN EXCESS OF 0.75 INCHES OF WATER PRESSURE SHALL BE SEALED WITH MASTIC OR TAPE.

F. LOCK JOINTS SHALL BE HAMMERED TO MAKE THEM AIRTIGHT. INSIDE OF DUCT SHALL PRESENT A SMOOTH SURFACE TO FLOW AIR.

G. CHANGES IN SIZE OF DUCTS SHALL INCREASE GRADUALLY WITH A SLOPE OF NOT MORE THAN 12 INCHES IN 5 FEET WHERE POSSIBLE, BUT NOT MORE THAN 12 INCHES IN 3 FEET IN ANY EVENT.

H. TURNS SHALL BE MADE WITH A THROAT RADIUS OF NOT LESS THAN THE DUCT WIDTH.

I. PLENUMS SHALL BE MADE OF 18 GAUGE GALVANIZED SHEET STEEL REINFORCED HORIZONTALLY ON A MAXIMUM OF 48" CENTERS BY 1-1/2" X 1-1/4" X 1/8" GALVANIZED ANGLES AND REINFORCED VERTICALLY BY 1-1/2" STANDING SEAMS.

2.03 VOLUME DAMPERS

A. DAMPERS USED IN LOW VELOCITY BRANCH DUCTS TO CONTROL THE VOLUME OR AIR FLOW SHALL BE YOUNG NO. 817 VOLUME DAMPER OR EQUAL. AN OPERATING HEAD SHALL BE PLACE ON THE SIDE OF THE DUCT AND SHALL BE LOCKED IN POSITION BY A SET KEY WHERE THE DAMPER IS ACCESSIBLE. WHERE THE DAMPER IS NOT ACCESSIBLE, YOUNG NO. 817A OR 817B VOLUME CONTROL DAMPER OR EQUAL, CONSISTING OF AN END BEARING OR MITER GEAR, COUPLING, 3/8-INCH SQUARE SHAFT, AND REGULATOR FOR OPERATING THE UNIT FROM THE CEILING SHALL BE PROVIDED.

2.04 INSULATION

A. THERMAL DUCT INSULATION: INSULATE ALL SUPPLY AND RETURN AIR DUCTS, UNLESS OTHERWISE SPECIFIED WITH KNAUF OR EQUAL, MICROLITE FIBERGLASS DUCT INSULATION, FOIL FACED, 3/4 LB. DENSITY, 1-1/2" THICK INSULATION WRAPPED ENTIRELY AROUND DUCT WITH JOINTS LAPPED AT LEAST 2" AND SECURED WITH 16 GAUGE GALVANIZED WIRE ON 12" CENTERS. INSULATION SHALL COVER ALL SURFACES INCLUDING STANDING SEAMS. THERMAL RESISTIVE VALUE OF DUCT WRAP SHALL BE A MINIMUM OF R-5.

B. RECTANGULAR SUPPLY DUCTS AND RETURN AIR DUCTS LOCATED IN UNCONDITIONED SPACES SHALL BE LINED WITH KNAUF LINACOUSTIC OR EQUAL, 1 INCH, 1-1/2 LB, THERMAL RESISTIVE VALUE OF DUCT LINER SHALL BE A MINIMUM OF R-4.2. RECTANGULAR SUPPLY DUCTS AND RETURN AIR DUCTS LOCATED OUTSIDE THE BUILDING ENVELOPE SHALL BE LINED WITH KNAUF LINACOUSTIC OR EQUAL, 2 INCH, 1-1/2 LB, THERMAL RESISTIVE VALUE OF DUCT LINER SHALL BE A MINIMUM OF R-8. DENSITY COATED FIBERGLASS DUCT LINER COMPLYING WITH FRICTION CORRECTION FACTOR NOT GREATER THAN 1.1 AT A VELOCITY OF 3000 FPM. APPLY INSULATION TO INSIDE OF DUCTS WITH AN APPROVED FIRE RETARDANT ADHESIVE TO PROVIDE 100% COVERAGE AND A SMOOTH SURFACE. IN DUCTS WITH ONE SIDE MORE THAN 12", SECURE INSULATION WITH MECHANICAL FASTENERS IN ADDITION TO ADHESIVE, SPACED AT 14" CENTERS IN BOTH DIRECTIONS. MECHANICAL FASTENERS SHALL BE FLUSH WITH THE LINER SURFACE AND SHALL START WITHIN 2" OF THE LEADING EDGE OF EACH SECTION, AND WITHIN 3" OF THE LEADING EDGE OF ALL CROSS JOINTS OF THE LINER SHALL BE HEAVILY COATED WITH AN APPROVED FIRE RESISTANT ADHESIVE. THE DUCT LINER SHALL BE CUT TO ASSURE SNUG CLOSING CORNER JOINTS, THE BLACK SURFACE OF THE LINER SHALL FACE THE AIR STREAM, TRANSVERSE JOINTS SHALL BE NEATLY BUTTED AND ALL DAMAGED AREAS SHALL BE HEAVILY COATED WITH AN APPROVED ADHESIVE.

C. ALL DUCT INSULATION SHALL HAVE AN NRC RATING OF NOT LESS THAN 0.60 AND A K FACTOR OF NOT MORE THAN 0.27. DUCT DIMENSIONS SHALL BE INCREASED 2 INCHES ON EACH SIDE FROM THOSE SHOWN ON DRAWINGS TO ACCOMODATE INSULATION.

2.07 SIDEWALL MOUNTED CENTRIFUGAL DOMED EXHAUST FAN

A. SIDEWALL MOUNTED EXHAUST FANS OF THE CAPACITY SHOWN ON THE DRAWINGS SHALL BE FURNISHED AND INSTALLED. FANS SHALL BE BELT DRIVEN COMPLETE WITH BACKDRAFT DAMPERS AND SPUN ALUMINUM DOMED HOUSING. BLOWER SHALL BE NON-OVERLOADING BACKWARD INCLINED. THE MOTOR AND BEARING SHALL NOT COME INTO CONTACT WITH THE DISCHARGE AIR AND SHALL BE READILY ACCESSIBLE WITHOUT REMOVAL OF FAN OR HOUSING FROM LOCATION. A DISCONNET SWITCH AND SELF FLASHING PREFABRICATED CURB SHALL BE SUPPLIED WITH THE FAN. FAN SHALL BE COMPLETE WITH INSECT SCREEN. FANS SHALL BE GREENHECK, PENN, COOK, ACME OR JENN.

2.06 TURNING VANES

A. TURNING VANES SHALL BE FURNISHED AND INSTALLED IN ALL 90-DEGREE TURNS IN SUPPLY, RETURN, MIXED AIR AND FRESH AIR DUCTS, AND ELSEWHERE AS SHOWN ON THE DRAWINGS. MATERIAL OF TURNING VANES SHALL MATCH DUCTWORK. VANES ARE TO BE SINGLE BLADE, OF SIZE, SPACING, GAUGE, AND FABRICATION IN ACCORDANCE WITH SMACNA RECCOMENDATIONS.

2.07 EVAPORATIVE COOLER (SIDE DISCHARGE)

A. FURNISH AND INSTALL ROOF MOUNTED SIDE DISCHARGE EVAPORATIVE COOLER OF SIZE AND CAPACITY SHOWN ON THE DRAWINGS. UNIT SHALL BE PRE-WIRED AND PRE-PIPED COMPLETE WITH CENTRIFUGAL FAN, V-BELT DRIVE, MOTOR, EVAPORATIVE PADS, SUMP, WATER DISTRIBUTION AND RECIRCULATION SYSTEM, FLOAT OPERATED VALVE, SPRAY ASSEMBLY, OVERFLOW AND DRAIN ASSEMBLY. UNIT TO INCLUDE ELECTRONIC CONTROL BOX WITH ALL INTERNAL WIRING COMPLETE SO THAT THE ONLY FIELD WIRING WILL BE POWER WIRING TO UNIT AND CONTROL WIRING TO T-STAT. THE CABINET SHALL BE CONSTRUCTED OF EITHER STAINLESS STEEL, HOT DIPPED GALVANIZED STEEL WITH POLYBOND FINISH, COMPLETE WITH NECESSARY GALVANIZED SUPPORTS AND BRACES. PROVIDE BLEED OFF KIT AND PIPE TO NEAREST ROOF DRAIN WITH 1/4" COPPER TUBING.

B. EVAPORATIVE COOLERS SHALL BE ARCTIC CIRCLE, MASTER COOL, OR ESSICK AIR PRODUCTS.

2.08 ALUMINUM LOUVERS

A. LOUVERS ARE TO BE FURNISHED BY THIS CONTRACTOR. CONNECTIONS TO LOUVERS SHALL BE MADE BY THIS CONTRACTOR. LOUVERS SHALL BE FIXED DRAINABLE TYPE 6 INCHES THICK OF 12-GUAGE EXTRUDED ALUMINUM. LOUVER SHALL BE AMCA CERTIFIED RATED FOR NO WATER CARRY-OVER AT FREE AREA VELOCITIES LESS THAN 100 FPM. IN NO CASE SHALL FREE AREA BE LESS THAN 50% OF THE FACE AREA. FRAMES SHALL BE BOX CHANNEL OR FLANGE TYPE AS SELECTED BY ARCHITECT FOR MOUNTING IN A WALL. A 1/4-INCH GALVANIZED MESH INSECT SCREEN SHALL BE PROVIDED BEHIND LOUVER. ALUMINUM LOUVERS SHALL BE ANODIZED IN COLOR SELECTED BY ARCHITECT. LOUVERS TO BE AIROLITE (K6776), VENCO, RUSKIN, CESCO, AMERICAN WARMING AND VENTILATING, AIR BALANCE, OR LOUVERS AND DAMPERS.

2.09 ROOFTOP PACKAGE HEAT PUMP UNIT

BRYANT MODEL OF SIZE AND CAPACITY INDICATED. UNITS SHALL BE COMPLETELY ASSEMBLED AND TESTED COMPLETE WITH REFRIGERANT CHARGE AND READY TO OPERATE. TOTAL UNIT SHALL BE U.L. LISTED AND CARRY A U.L. LABEL.

A. CABINET SHALL BE CONSTRUCTED OF GALVANIZED STEEL, BONDERIZED AND COATED WITH A BAKED ENAMEL FINISH. CABINET INTERIOR SHALL BE INSULATED WITH 1 INCH THICK NEOPRENE COATED FIBERGLASS. CABINET PANELS SHALL BE EASILY REMOVABLE FOR SERVICE TO ALL OPERATING COMPONENTS.

B. INDOOR AIR FANS SHALL BE FORWARD-CURVE CENTRIFUGAL, BELT DRIVEN MULTI-SPEED TYPE. OUTDOOR FANS SHALL BE OF PROPELLER TYPE WITH DIRECT-DRIVEN PERMANENTLY LUBRICATED MOTORS. ALL FANS SHALL BE DYNAMICALLY BALANCED.

C. INDOOR AND OUTDOOR COILS SHALL BE OF NONFERROUS CONSTRUCTION WITH ALUMINUM PLATE FINS MECHANICALLY BONDED TO SEAMLESS COPPER TUBES WITH ALL JOINTS BRAZED.

D. COMPRESSORS SHALL BE WELDED, FULLY HERMETIC WITH CRANKCASE HEATERS. COMPRESSORS SHALL HAVE A FIVE YEAR WARRANTY AND BE CAPABLE OF OPERATING TO 25 DEGREES F OUTDOOR TEMPERATURE.

E. HEATING/COOLING SYSTEM SHALL BE PROTECTED WITH HIGH PRESSURE STATS, LOW PRESSURE STATS, LOSS OF CHARGE PROTECTION, INDOOR COIL FREEZE-STATS AND CURRENT AND TEMPERATURE SENSITIVE OVERLOAD DEVICES. CONTROLS SHALL BE PROVIDED TO PREVENT COMPRESSOR SHORT CYCLING AND AUTOMATICALLY PREVENT COMPRESSOR RESTART AT LEAST 5 MINUTES AFTER SHUTDOWN. CONDENSATE DRAINS OFF DRAIN PANS SHALL BE TRAPPED OUTSIDE THE UNIT CASING.

F. REFRIGERANT CIRCUIT COMPONENTS SHALL INCLUDE THE FOLLOWING: ACUTROL – MULTIPLE INDEPENDENT FEED SYSTEM, FILTER DRIER, SERVICE GAUGE CONNECTIONS ON SUCTION, DISCHARGE AND LIQUID LINES TO CHARGE, EVACUATE, AND CONTAIN REFRIGERANT, REVERSING VALVE AND ACCUMULATOR.

G. FACTORY THERMOSTATS TO PROVIDE STAGED HEATING AND COOLING, AUTOMATIC CHANGEOVER AND FAN CONTROL.

H. PROVIDE FILTER SECTION WITH 2 INCH FILTERS. FILTERS MUST HAVE AN AVERAGE ATMOSPHERIC DUST SPOT EFFICIENCY OF 50% PER ASHRAE STANDARD 52.1 TEST METHODS.

J. PROVIDE WITH INTEGRATED ECONOMIZER CAPABLE OF SIMULTANEOUS ECONOMIZER AND COMPRESSOR OPERATION.

2.10 HIGH WALL FAN COIL UNIT

A. FURNISH AND INSTALL INDOOR, WALL-MOUNTED, DIRECT EXPANSION, FAN COIL UNIT TO BE USED WITHOUT DUCTWORK. UNIT SHALL CONSIST OF TANGENTIAL, DIRECT-DRIVE FAN, FAN MOTOR, COOLING COIL, PIPING CONNECTORS, ELECTRICAL CONTROLS, MICROPROCESSOR CONTROL SYSTEM, INTEGRAL TEMPERATURE SENSING, AND FACTORY-SUPPLIED MOUNTING BRACKET. UNIT SHALL BE CAPABLE OF BEING USED IN A REFRIGERANT CIRCUIT WITH A MATCHING AIR-COOLED OUTDOOR CONDENSING UNIT. CABINET DISCHARGE AND INLET GRILLES SHALL BE ATTRACTIVELY STYLED, HIGH IMPACT POLYSTYRENE. CABINET SHALL BE FULLY INSULATED FOR IMPROVED THERMAL AND ACOUSTIC PERFORMANCE. FAN SHALL BE TANGENTIAL DIREC-DRIVE BLOWER TYPE WITH AIR INTAKE AT THE UPPER FRONT FACE OF THE UNIT AND DISCHARGE AT THE BOTTOM FRONT. AUTOMATIC, MOTOR-DRIVEN VERTICAL AIR SWEEP SHALL BE PROVIDED STANDARD. AIR SWEEP OPERATION SHALL BE USER SELECTABLE. HORIZONTAL DIRECTION MAY BE MANUALLY ADJUSTED AND VERTICAL AIR SWEEP MAY BE MANUALLY SET. COIL SHALL BE COPPER TUBE WITH ALUMINUM FINS AND GALVANIZED STEEL TUBE SHEETS. FINS SHALL BE BONDED TO THE TUBES BY MECHANICAL EXPANSION. A DRIP PAN UNDER THE COIL SHALL HAVE A DRAIN CONNECTION FOR HOSE ATTACHMENT TO REMOVE CONDENSATE. CONDENSATE PAN SHALL HAVE INTERNAL TRAP AND AUXILIARY DRIP PNA UNDER COIL HEADER. THE SIZE 009 AND 012 UNITS SHALL USE CAPILLARY TUBES IN THE OUTDOOR UNIT FOR REFRIGERANT CONTROL, AND THE SIZE 018,024 UNITS SHALL USE AN ACCESSORY ACCURATER PISTON REFRIGERANT METERING DEVICE IN THE INDOOR UNIT. CONTROLS SHALL CONSIST OF A MICROPROCESSOR-BASED CONTROL SYSTEM WHICH SHALL PROVIDE THE FOLLOWING FUNCTIONS AS A MINIMUM: AUTOMATIC RESTART, A TIMER FUNCTION, TEMPERATURE-SENSING CONTROLS, EVAPORATIVE COIL FREEZE PROTECTION, WIRELESS INFRARED REMOTE CONTROL, AUTO STOP FEATURES, AUTOMATIC AIRSWEEP CONTROL, DEHUMIDIFICATION MODE, FAN-ONLY OPERATION, DIAGNOSTICS, USER-SELECTABLE FAN SPEED CONTROL, AND COMPRESSOR RESTART TIME DELAY. UNIT SHALL BE RATED PER ARI STANDARDS 210/240 AND SHALL BE LISTED IN THE ARI DIRECTORY AS A MATCHED SYSTEM. UNITS SHALL BE UL AND CSA LISTED. PROVIDE BRYANT, TRANE, CARRIER, OR YORK.

2.11 OUTDOOR CONDENSING UNIT

A. FURNISH AND INSTALL AN AIR-TO-AIR COOLING UNIT IN COMBINATION WITH A FAN COIL UNIT IN THE LOCATION AND MANNER SHOWN ON THE PLAN DRAWINGS. THE UNIT SHALL BE DESIGNED AND TESTED FOR USE WITH REFRIGERANT R-22 AND SHALL BE EQUIPPED WITH REFRIGERANT LINE FITTINGS WHICH PERMIT SWEAT CONNECTIONS. THE COIL SHALL BE CONSTRUCTED OF ALUMINUM PLATE FINS MECHANICALLY BONDED TO COPPER TUBING WITH ALL JOINTS BRAZED. OUTDOOR UNITS SHALL CONTAIN A ROTARY OR SCROLL COMPRESSOR WITH A CRANKCASE HEATER (NON-SCROLL COMPRESSOR UNITS), OIL SYSTEM, OPERATING OIL CHARGE, INTERNAL MOTOR PROTECTION AND SPRING ISOLATION. OUTDOOR FANS SHALL BE DIRECT-DRIVE PROPELLER TYPE, SHALL DISCHARGE AIR HORIZONTALLY, SHALL BE TOTALLY ENCOSED, AND SHALL HAVE PERMANENTLY LUBRICATED SLEEVE BEARINGS. CONTROLS AND PROTECTIVE DEVICES SHALL INCLUDE TIME-DELAY RESTART, AUTOMATIC RESTART ON POWER FAILURE, 3-POLE CONTACTORS (3-PHASE UNITS), SAFETY LOCKOUT IF ANY SAFETY IS OPEN, HIGH- AND LOW- PRESSURE SWITCHES, AUTOMATIC CONDESER-FAN MOTOR PROTECTION, START CAPACITOR AND RELAY (SINGLE-PHASE UNITS WITHOUT SCROLLING COMPRESSORS), SYSTEM DIAGNOSTICS, HIGH CONDENSING TEMPERATURE PROTECTION, COMPRESSOR MOTOR CURRENT AND TEMPERATURE OVERLOAD PROTECTION, HIGH PRESSURE RELIEF, AND CONDENSOR FAN FAILURE PROTECTION. A 24-V TRANSFORMER SHALL BE FACTORY INSTALLED AND WIRED ON OUTDOOR CONDENSING UNITS FOR EXTERNAL CONTROL CIRCUIT, WHICH SHALL SUPPLY LINE VOLTAGE TO FAN COIL. UNIT PERFORMANCE SHALL BE CERTIFIED IN ACCORDANCE WITH ARI STANDARDS 210/240 AND 270. UNIT SHALL BE CONTRUSTED IN ACCORDANCE WITH ASHRAE 15, NEC AND CSA. UNIT SHALL CARRY THE UL LISTING LABEL. PROVIDE BRYANT, TRANE, CARRIER, OR YORK.

2.12 HIGH EFFICIENCY BRANCH TAKE-OFFS

A. EXPANDED THROAT HIGH EFFICIENCY TAKEOFFS SHALL BE USED FOR ALL BRANCH TAKEOFFS UNLESS SHOWN OTHERWISE ON THE DRAWINGS. AN OPPOSED BLADE VOLUME DAMPER WITH LOCKING QUADRANT SHALL BE PROVIDED AT EACH BRANCH TAKEOFF. WHERE DAMPERS ARE NOT ACCESSIBLE FOR ADJUSTMENT FROM ABOVE, CONCEALED CEILING REGULATORS WITH ADJUSTABLE CHROME-PLATED COVERS SHALL BE PROVIDED. HIGH EFFICIENCY TAKE-OFFS SHALL BE HERCULES OR DANIEL.

2.13 CEILING MOUNTED FAN

A. CEILING TYPE EXHAUST FANS OF SIZE AND CAPACITY SHOWN ON DRAWINGS SHALL BE FURNISHED AND INSTALLED. FANS SHALL BE DIRECT DRIVE OF RPM SHOWN AND SHALL BE COMPLETE WITH FAN HOUSING, INLET GRILLE, BACKDRAFT DAMPER AND MOTOR. NOISE LEVEL SHALL NOT EXCEED 3.8 SONES. AIR QUANTITIES SHALL BE CERTIFIED BY AMCA. FANS SHALL BE PENN, COOK, ACME, GREENHECK, JENN, PACE OR EQUAL OF BROAN.

2.14 USED OIL FURNACE

1.1 SCOPE: THIS SPECIFICATION COVERS BUT IS NOT LIMITED TO THE FURNISHING OF A CB-2500, 250,000 BTU/HR'S (INPUT) CENTRAL FURNACE PACKAGE. THIS PACKAGE WILL INCLUDE THE FOLLOWING:
* ONE (1) CB-2500, 250,000 BTU/HR'S INPUT CENTRAL FURNACE

1.2 CODES AND REGULATIONS: THE INSTALLATION OF THIS APPLIANCE SHALL BE MADE IN ACCORDANCE WITH THE MANUFACTURERS' INSTRUCTIONS, AS WELL AS IN ACCORDANCE WITH ALL FEDERAL, STATE, REGIONAL, OR LOCAL LAWS AND / OR REGULATIONS ACCEPTABLE TO THE AUTHORITY HAVING JURISDICTION (AHJ) AND SHALL BE ACCOMPLISHED ONLY BY A QUALIFIED, CERTIFIED, AND COMPETENT HEATING TECHNICIAN EXPERIENCED IN MAKING SUCH INSTALLATIONS AS PER NFPA 31 – CHAPTER 4 – SECTIONS 4.3.2 AND 4.3.3 AND THE CODES AND REGULATIONS THAT ARE LISTED IN PART 1 – SECTIONS 1.4 THROUGH 1.4.4 OF THIS BID SPECIFICATION AS APPLICABLE.

1.2.1 THE DESIGN, MATERIALS AND WORKMANSHIP OF THE APPLIANCE, BURNER UNIT, AND THE VARIOUS OTHER ACCESSORIES FURNISHED BY CLEAN BURN, INC., AS WELL AS THE INSTALLATION OF THE APPLIANCE, SHALL FULLY COMPLY WITH THE REQUIREMENTS OF UL STANDARD 296A (UNDERWRITER'S LABORATORIES FILE # MH15393 (N) AND / OR UNDERWRITER'S LABORATORIES OF CANADA FILE # CMP217) AND NFPA 31 – CHAPTER 12 – SECTIONS 12.1 THROUGH 12.4.3.

1.2.2 THE INSTALLATION SHALL FULLY COMPLY WITH THE FOLLOWING NFPA CODES: 30 – FLAMMABLE AND COMBUSTIBLE LIQUIDS, 30A – MOTOR FUEL DISPENSING FACILITIES AND REPAIR GARAGES, 31 – STANDARD FOR THE INSTALLATION OF OIL-BURNING EQUIPMENT, 70 – NATIONAL ELECTRICAL CODE, 88A – STANDARD FOR PARKING STRUCTURES, 88B – STANDARD FOR REPAIR GARAGES, AND 211 – STANDARD FOR CHIMNEYS, FIREPLACES, VENTS, AND SOLID-FUEL BURNING APPLIANCES AS APPLICABLE.

1.2.3 THE INSTALLATION SHALL FULLY COMPLY WITH THE FOLLOWING INTERNATIONAL CODES: INTERNATIONAL BUILDING CODE, INTERNATIONAL MECHANICAL CODE, INTERNATIONAL FIRE CODE, AND THE INTERNATIONAL FUEL GAS CODE AS APPLICABLE.

1.2.4 THE INSTALLATION SHALL FULLY COMPLY WITH THE FOLLOWING CAN / CSA STANDARDS: (WHEN INSTALLING THE APPLIANCE IN CANADA): B139-00 (APPROVED OCTOBER 2001) – INSTALLATION CODE FOR OIL- BURNING EQUIPMENT, B140.0-M87 (REAFFIRMED 2001) – GENERAL REQUIREMENTS FOR OIL-BURNING EQUIPMENT, AND C22.1-02 – CANADIAN ELECTRICAL CODE – PART 1 AS APPLICABLE. 3

1.3 RIGGING AND UNLOADING: VENDORS SHALL DELIVER TO THE SITE ALL EQUIPMENT, COMPONENTS, AND DEVICES SPECIFIED HEREIN. RIGGING AND / OR OFF-LOADING WILL BE THE RESPONSIBILITY OF THE PURCHASER OR THE PURCHASERS DESIGNATED AGENT.

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