# MECHANICAL SPECIFICATIONS

PART 1 - GENERAL

A. CONTRACTOR DEFINITION - THE PERSON WHO AGREES TO FURNISH AND INSTALL THE WORK OF THIS SECTION FOR A PRICE. THE CONTRACTOR IS REFERENCED IN STATEMENTS LIKE "VERIFY DIMENSIONS BEFORE CONSTRUCTION".

B. DISCREPANCIES - CONTACT ARCHITECT FOR CLARIFICATION OF CONTRACT DOCUMENTS BEFORE BIDDING.

C. CODES AND STANDARDS - COMPLY WITH STANDARD BUILDING CODE.

D. PERMITS AND FEES - OBTAIN REQUIRED PERMITS. PAY REQUIRED FEES.

E. MECHANICAL DRAWINGS - AVOID INTERFERENCES.

F. SHOP DRAWINGS - SUBMIT REQUIRED DRAWINGS IN A SINGLE BROCHURE. SUBMIT ON HVAC UNITS INCLUDING SPLIT SYTEMS, EXHAUST FANS, THERMOSTATS AND INSULATION.

G. ELECTRICAL COORDINATION - GIVE WIRING DIAGRAMS FOR MECHANICAL EQUIPMENT TO ELECTRICAL CONTRACTOR.

H. GUARANTEE - REPLACE OR REPAIR ANY ITEM FOUND DEFECTIVE DURING FIRST YEAR OF OPERATION WITHOUT COST TO OWNER.

PART 2 PRODUCTS

MOTORS AND STARTERS

A. PROVIDE MOTORS AND STARTERS IN DIVISION 15 AND INSTALL IN DIVISION 16.

B. PROVIDE HIGH EFFICIENCY MOTORS. CHOOSE FROM GENERAL ELECTRIC ENERGY SAVER, RELIANCE ELECTRIC XE, OR CENTURY E PLUS. METAL NAME PLATES REQUIRED.

PART 3 EXECUTION

A. COORDINATION OF WORK - THE CONTRACTOR IS RESPONSIBLE TO COORDINATE DIVISION 15 WORK. PROVIDE A COMPLETE AND FUNCTIONING SYSTEM.

B. SPACE CONDITIONS

1. ALL APPARATUS, DUCTWORK, PIPING ETC., MUST FIT INTO THE AVAILABLE SPACES IN THE BUILDING AND BE INTRODUCED INTO THE BUILDING AT SUCH TIME AND MANNER AS TO CAUSE NO DAMAGE.
2. THE CONTRACTOR SHALL BE FAMILIAR WITH THE MECHANICAL, ELECTRICAL, STRUCTURAL, AND ARCHITECTURAL DRAWINGS, AND WITH THE PROJECT SCHEDULE OF OPERATIONS, AND INSTALL HIS WORK TO CONFORM TO THE LIMITATIONS.
3. LEAVE ALL EQUIPMENT AND APPARATUS NORMALLY REQUIRING OPERATION, SERVICE, OR MAINTENANCE READILY ACCESSIBLE.
4. VERIFY BUILDING DIMENSIONS BEFORE BEGINNING WORK.
5. DRAWINGS ARE SCHEMATIC. ALL INLET DEVICES TO BE 10'-0" FROM ANY OUTLET DEVICE.
6. WALLS TO STRUCTURE TO HAVE RETURN AIR OPENINGS IN PLENUM SPACE. FIRE RATED WALLS TO HAVE FIRE DAMPERS IN RAO'S.

C. MISCELLANEOUS REQUIREMENTS

1. CUT, PATCH, AND REPAIR AS REQUIRED. DO NOT DAMAGE THE BUILDING.
2. PROVIDE TOUCH-UP PAINTING OF SURFACES DAMAGED AS A RESULT OF DIVISION 15 WORK, AND ANY OTHER PAINTING EXPRESSLY REQUIRED.
3. TAKE ALL PRECAUTIONS NECESSARY FOR PROPER PROTECTION OF EQUIPMENT, APPARATUS AND MATERIALS. FAILURE TO DO SO WILL BE CAUSE FOR REJECTION OF ANY ITEM COMING UNDER QUESTION.

INSULATION

PART 1 - GENERAL

A. PRODUCT MARKING

1. ALL PRODUCTS OR THEIR SHIPPING CARTONS SHALL BEAR A LABEL INDICATING THAT THEY MEET THE SPECIFIED FIRE AND SMOKE HAZARD RATINGS.

B. SUBMITTALS

1. INSULATION SPECIFICATION OR DATA SHEETS
2. MANUFACTURER'S PUBLISHED RECOMMENDATIONS FOR APPLICATION

C. SCOPE

1. INSULATE CONDENSATE DRAIN PIPING BRANCH LINES
2. INSULATE REFRIGERANT SUCTION LINES
3. INSULATE SUPPLY DUCTS, RETURN DUCTS, AND OUTSIDE AIR DUCTS OVER DROPPED CEILING SPACES.
4. DO NOT INSULATE EXPOSED DUCTWORK (WHERE APPLICABLE).

PART 2 - PRODUCTS

A. FIRE AND SMOKE HAZARD RATINGS

1. ALL INSULATION, UNLESS SPECIFICALLY EXCEPTED, SHALL HAVE COMPOSITE (INSULATION, JACKET OR FACING, AND ADHESIVE USED TO ADHERE THE FACING OR JACKET TO THE INSULATION) FIRE AND SMOKE HAZARD RATINGS (AS TESTED BY PROCEDURE COMPLYING WITH NFPA 255) NOT EXCEEDING:

| | |
|---|---|
| FLAME SPREAD | 25 |
| SMOKE DEVELOPED | 50 |

2. ACCESSORIES, SUCH AS ADHESIVES, MASTICS, CEMENTS, AND TAPES SHALL HAVE THE SAME COMPONENT RATINGS AS LISTED ABOVE.

B. DUCTWORK - INSULATE WITH 2 INCH THICK FIBER GLASS DUCT WRAP ONE POUND DENSITY.

C. REFRIGERANT LINES - INSULATE WITH ONE INCH RUBATEX.

D. CONDENSATE - INSULATE WITH HALF INCH RUBATEX.

PART 3 - EXECUTION

A. APPLICATION OF INSULATION - GENERAL

1. INSULATION SHALL BE APPLIED ON CLEAN, DRY SURFACES. INSPECTION AND RELEASE FOR INSULATION APPLICATION AS REQUIRED.
2. ALL INSULATION SHALL BE CONTINUOUS THROUGH WALL AND CEILING OPENINGS AND SLEEVES.
3. INSULATION ON ALL COLD SURFACES WHERE VAPOR BARRIER JACKETS ARE USED, SHALL BE APPLIED WITH A CONTINUOUS UNBROKEN VAPOR SEAL. HANGERS, SUPPORTS, ANCHORS, OR OTHER ITEMS THAT ARE SECURED DIRECTLY TO COLD SURFACES MUST BE INSULATED AND VAPOR-SEALED TO PREVENT CONDENSATION.
4. INSULATION SHALL BE PROTECTED FROM PHYSICAL DAMAGE AT POINTS OF SUPPORT WHERE THE INSULATION MUST CARRY THE LOAD IMPOSED BY THE SUPPORT.

AIR DISTRIBUTION SYSTEMS

PART 1 - GENERAL

A. FURNISH AND INSTALL SHEETMETAL DUCTWORK, PLENUMS, GRILLES, REGISTERS, FITTINGS AND RELATED SHEETMETAL WORK.

B. APPLICABLE CONSTRUCTION STANDARDS

1. NFPA BULLETIN NO. 90 A
2. SHEET METAL AND AIR CONDITIONING CONTRACTOR'S NATIONAL ASSOCIATION "DUCT MANUAL AND SHEET METAL CONSTRUCTION FOR VENTILATING AND AIR CONDITIONING SYSTEMS," SECTIONS 1 AND 2 (SMACNA).
3. ASHRAE FUNDAMENTALS AND EQUIPMENT GUIDE AND DATA BOOK

C. SYSTEM CLASSIFICATION - LOW PRESSURE.

PART 2 - PRODUCTS

A. FANS

CABINET FANS

1. ABOVE CEILING CABINET FAN WITH ACOUSTIC LINING AND WALL SWITCH.
2. ROOF OR WALL CAPS AS INDICATED ON PLAN.
3. DIRECT DRIVE FANS WITH SPEED CONTROL ULESS NOTED.
4. MANUFACTURER: PENN, COOK, GREENECK.

B. DUCTWORK

1. USE ROUND OR SPIRAL DUCTWORK UNLESS NOTED.
2. DUCTWORK SHALL BE GALVANIZED STEEL SHEETS OF LOCK FORMING QUALITY WITH A GALVANIZED COATING OF 1-1/4 OUNCES TOTAL FOR BOTH SIDES OF ONE SQUARE FOOT.
3. FLEXIBLE CONNECTIONS 30 OUNCE U.L. APPROVED, GLASS FABRIC NEOPRENE COATED ON BOTH SIDES; VENT-FABRICS, INC., VENTGLAS COMPLETE WITH ATTACHMENT ACCESSORIES.
4. FLEXIBLE DUCTWORK INSULATED TYPE - THERMAFLEX M-KE-10 OR EQUIVALENT FLEXMASTER OR WIREMOLD CONFORMING TO NFPA-90A.
5. LOW PRESSURE SPIN-IN TAKE-OFF FITTINGS - GENFLEX TYPE OR FLEXMASTER.
6. FIRE DAMPERS -GALVANIZED STEEL WITH BLADE OUT OF AIR STREAM. FIRE DAMPERS ARE LOW PRESSURE RUSKIN TYPE IBD2-LR OR EQUAL. PROVIDE DUCT ACCESS DOOR FOR ACCESS TO DAMPER.
7. GRILLES, REGISTERS AND DIFFUSERS

SUPPLY DIFFUSERS

1. CEILING

SQUARE CONE FACE CEILING DIFFUSER WITH VOLUME CONTROL DAMPER AND FACTORY INSTALLED R-6 FOIL-BACKED INSULATION CONTINUOUSLY GLUED AND SEALED AROUND OUTER PERIMETER OF OUTER CONE TO FORM VAPOR SEAL AND FIT CONTOUR OF DIFFUSER BACK.

2. MANUFACTURER: TITUS, KRUGER, ANEMOSTAT.

RETURN GRILLES

1. CEILING

EGGCRATE RETURN GRILLE TO FIT LAY-IN CEILING. ALUMINUM GRID AND BORDER. ALUMINUM 1/2 X 1/2 X 1/2 CORE.

2. MANUFACTURER: TITUS, KRUGER, ANEMOSTAT.

8. LOUVERS

1. LOUVERS AND DAMPERS IEL-4 OR EQUAL RUSKIN OR AIROLITE.
2. GALVANIZED STEEL 16 GAGE PREPARED FOR PAINTING.
3. BOX FRAME, 4 INCH DEPTH, 37 DEGREE BLADE. BIRD SCREEN WITH 1/2 INCH OPENINGS.

PART 3 - EXECUTION

A. FANS

1. PROVIDE SAFE AND FUNCTIONAL OPERATION.
2. PREVENT VIBRATION, NOISE AND LEAKS.

B. DUCTWORK

1. INSTALL DUCT NEATLY, HANG PROPERLY AND AVOID INTERFERENCES. DUCT TO BE SMOOTH ON THE INSIDE.
2. PROVIDE FOR DUCT SYSTEM EXPANSION.
3. SEAL SLEEVE SPACE WITH FIBERGLASS OR FIRE FOAM.
4. INSTALL BALANCING DAMPERS AND ACCESS DOORS.
5. CONNECT TO EQUIPMENT WITH FLEXIBLE MATERIAL.
6. USE INSULATED FLEX DUCT TO CONNECT TO SUPPLY DIFFUSERS. MAXIMUM LENGTH 12 FEET. AVOID SHARP BENDS.
7. INSTALL SMOKE DETECTORS IN RETURN DUCTS OF UNITS ABOVE 2000 CFM.
8. LINE ALL DUCT FROM UNIT TO 10' OR FIRST TURN.

ELECTRIC HEAT PUMP SPLIT SYSTEM

PART 1 - GENERAL

A. SPLIT SYSTEM CONSISTS OF INSIDE UNIT WITH COOLING COIL, FAN SECTION, FILTER SECTION, ELECTRIC HEATING COIL BACKUP HEAT AND MOUNTING KIT AND OUTSIDE HEAT PUMP UNIT.

B. FURNISH AND INSTALL INDOOR UNITS AS SHOWN IN MECHANICAL SPACE. EQUIPMENT SCHEDULES ARE BASED ON CARRIER. PROVIDE FIRE DAMPERS IF REQUIRED WHERE DUCTWORK PASSES THROUGH RATED CEILING OR WALLS.

C. COMPLY WITH NFPA 90 AND ASHRAE 90.1.

PART 2 - PRODUCTS

A. OUTDOOR HEAT PUMP UNITS HAVE A PAINTED, GALVANIZED STEEL CASING.

B. COMPRESSORS TO BE OPERABLE AT 30F.

C. INSIDE UNITS HAVE DIRECT DRIVE FANS.

D. FURNISH PROGRAMMABLE THERMOSTAT 2 STAGES OF HEATING /COOLING AUTO CHANGE OVER TO CONTROL SPACE.

E. MANUFACTURER: CARRIER, LENNOX, OR EQUAL.

PART 3 - EXECUTION

A. COORDINATE INSTALLATION OF INSIDE AND OUTSIDE UNITS.

B. INSTALL REFRIGERANT LINES. INSTALL CONDENSTATE DRAIN LINES WITH TRAP AND RUN TO NEAREST PLG. VENT IF ALLOWED OR NEAREST APPROVED FIXTURE.

C. PROVIDE MANUFACTURER LONG-LINE APPLICATION KIT FOR REFRIGERANT PIPING LENGTHS GREATER THAN 50 FT.

D. TEST AND BALANCE SYSTEM TO AIR QUANTITIES SHOWN. NO REPORT.

PACKAGED ROOFTOP UNIT

PART 1 - GENERAL

A. PACKAGED, SINGLE ZONE ROOFTOP HEAT PUMP UNITS OF THE SIZE AND CAPACITIES SHOWN ON THE DRAWINGS.

B. UNITS SHALL BE COMPLIANT WITH ASHRAE 90.1.

C. MANUFACTURERS: LENNOX, CARRIER, MCQUAY.

PART 2 - PRODUCT

UNIT DESCRIPTION

A. MOUNT UNITS ON THE FULL PERIMETER ROOF CURB THAT THE MANUFACTURER FURNISHES WITH THE UNIT. THE UNIT SHALL INCLUDE WEATHERPROOF HOUSING, AIR COOLED CONDENSING AND DX REFRIGERATION SYSTEM, COIL SECTION, SLOPED CONDENSATE DRAIN PAN, ELECTRIC RESISTANCE HEATERS, FILTERS, AND ALL OPERATING AND SAFETY CONTROLS.

B. MANUFACTURER'S ALTERNATE BELT DRIVE MOTOR SHALL BE FACTORY INSTALLED.

C. THE COMPRESSOR SHALL BE ISOLATED FROM VIBRATION, AND THE FAN MOTORS SHALL BE RESILIENTLY MOUNTED.

D. THE UNIT SHALL BE FACTORY WIRED, CHARGED, AND TESTED AND BE ARI CERTIFIED. IT SHALL BE FURNISHED WITH A NON-FUSED DISCONNECT SWITCH, SHORT CIRCUIT FUSE PROTECTION OF ALL INTERNAL ELECTRICAL COMPONENTS, AND ALL NECESSARY MOTOR STARTERS, CONTRACTORS, AND OVERCURRENT PROTECTION.

E. UNITS SHALL BE EQUIPPED WITH FACTORY INSTALLED ECONOMIZERS INCLUDING ALL HARDWARE AND CONTROLS TO PROVIDE COOLING WITH UP TO 100% OUTDOOR AIR.

F. UNITS SHALL BE EQUIPPED WITH BAROMETRIC RELIEF DAMPER CAPABLE OF RELIEVING UP TO 100% OF RETURN AIR.

G. COMPRESSORS SHALL BE WARRANTED AGAINST FAILURE FOR A PERIOD OF 5 YEARS. IT SHALL HAVE A TIMER LOCK-OUT TO PREVENT SHORT CYCLING.

H. ACCESS DOORS SHALL HAVE VINYL OR NEOPRENE GASKETS. THE EXTERIOR CABINET SHALL BE PHOSPHATIZED AND COATED WITH BAKED-ON ENAMEL PAINT. THE UNIT CABINET SHALL BE COMPLETELY INSULATED WITH NEOPRENE COASTED GLASS FIBER A MINIMUM OF 1" THICK THAT IS SECURED WITH ADHESIVE AND MECHANICAL FASTENERS.

I. EVAPORATOR AND CONDENSER COILS SHALL BE COPPER TUBE AND EXTENDED SURFACE ALUMINUM FINS.

J. THE UNIT CONTROLS SHALL INCLUDE A LOW AND HIGH REFRIGERANT PRESSURE CUT-OUT. A THERMOSTAT AND SWITCHING SUBBASE SHALL BE PROVIDED AND INSTALLED AS SHOWN ON THE PLANS. THE THERMOSTAT SHALL PROVIDE STAGES OF COOLING AND HEATING CONTROL TO MATCH THOSE OF THE RTU WHICH IT CONTROLS, AND SHALL BE THE AUTOMATIC CHANGEOVER TYPE, WITH FAN CONTROL SUBBASE TO INCLUDE MANUAL SYSTEM SWITCH (HEAT-OFF-AUTO-COOL), AND FAN SWITCH (AUTO-ON.

PART 3 - EXECUTION

INSTALLATION

A. LOCATE THE UNIT AS SHOWN ON THE DRAWINGS.

B. PROPERLY CONNECT AND COORDINATE ALL CONTROLS AS REQUIRED BY THE CONTROL SECTION OF THIS DIVISION.

C. CORRECT AND PAINT ANY DAMAGE TO FINS, GUARDS, OR HOUSING AS NECESSARY.

D. LINE THE UNIT ROOF CURB AND THE ROOF BELOW THE UNIT WITH 2" OF ACOUSTICAL FIBERGLASS MATERIAL.

E. THE MANUFACTURER SHALL PROVIDE 2" HIGH EFFICIENCY THROWAWAY FILTERS TO BE USED DURING CONSTRUCTION. BEFORE FINAL INSPECTION, INSTALL NEW FILTERS.

CONTROLS

PART 1 - GENERAL

A. SUBMIT ON PROGRAMMABLE THERMOSTATS.
B. SUBMIT ON HUMIDITY CONTROLS AND SENSORS.
C. MORNING WARM UP, NIGHT SETBACK, AND UNOCCUPIED: BUILDING TO HAVE OUTSIDE AIR DAMPER CLOSED.
D. MOTOR OPERATED O.A. DAMPER REQUIRED.
E. CONTROL OUTSIDE AIR MOTOR OPERATED DAMPERS WITH DUAL PURPOSE THERMOSTAT AND CARBON DIOXIDE SENSORS.
F. OA DAMPERS SHALL OPEN FULLY WHEN CO2 SENSOR INDICATES CO2 ABOVE 1000 PPM (PARTS PER MILLION).
G. OA MOD SHALL CLOSE COMPLETELY WHEN CO2 SENSOR INDICATES 400 PPM. PROPORTIONAL CONTROL BETWEEN 400 & 1000 PPM.
H. INTERLOCK OA MOD WITH UNIT FANS.

PART 2 - PRODUCTS

A. THERMOSTATS TO BE HONEYWELL OR EQUAL.

PART 3 - EXECUTION

SEQUENCE OF OPERATION

A. OCCUPIED

1. COOLING
   AS ZONE TEMPERATURE RISES ONE DEGREE ABOVE COOL SET POINT COOLING IS CALLED.
2. HEATING
   AS ZONE TEMPERATURE FALLS ONE DEGREE BELOW HEAT SET POINT HEATING IS CALLED.
3. ZONE SUPPLY FANS RUN WHEN BUILDING IS OCCUPIED.

D. UNOCCUPIED

1. NIGHT SETBACK AT UNIT PROGRAM TIME.
2. MORNING WARM UP AT UNIT PROGRAM TIME.
3. NO HEATING IF SPACE ABOVE 50 F. NO COOLING IF SPACE BELOW 90 F.

TEST AND BALANCE

PART 1 - GENERAL

A. TEST AND BALANCE AIR FLOWS TO AIR QUANTITIES SHOWN.

B. TEST EXHAUST FANS.

PART 2 - PRODUCTS

A. USE INDEPENDENT TEST AND BALANCE AGENCY.

B. USE MEMBER OF AABC, EQUIPPED WITH REQUIRED AND CALIBRATED TEST EQUIPMENT.

C. FURNISH WRITTEN REPORT.

PART 3 - EXECUTION

A. COOPERATE WITH T & B AGENCY.

B. MAKE REQUIRED ADJUSTMENTS PROMPTLY.

C. COORDINATE TEST AND BALANCE WITH OWNER.

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REVISIONS
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new facility for:
washington seventh day baptist church
CRITTENDEN @ 16TH, WASHINGTON, D.C.

project no. 2K70609
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date: AUG. 18, 2008
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