

MECHANICAL SPECIFICATIONS

Section

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15010 BASIC MECHANICAL REQUIREMENTS

GENERAL
All work shall conform to mandated version of IBC, SMACNA, UPC, IMC, NFPA, IFC, IFGC, IECC and all other applicable codes enforced by the authorities having jurisdiction.
The scope of the work shall include mechanical systems as shown on the plans. The Contractor shall provide all supervision, labor, material, equipment, machinery, plant and any and all other items as indicated on the drawings as required for complete systems.
Contractor shall give all necessary notices, obtain and pay for all permits and pay all government sales taxes, fees and other costs incurred in connection with the work, file all necessary plans, prepare all documents and obtain all required certificates of inspections for his work and deliver same to the Engineer before request for acceptance and final payment for the work.
All materials installed shall bear the UL label and shall be new and of the best quality.
The Contractor shall follow drawings in laying out work, check drawings of other trades and verify on-site conditions in which work will be installed. The Contractor shall protect all work, material and existing furnishings from damage by his work or workmen and shall be liable for all damage thus caused.
Provide two sets of operations and maintenance manual and two sets of as built record drawings within 60 days of substantial completion of project. All work shall be guaranteed in writing to be free of defective work, materials or parts for a period of one year after substantial completion of work.

15060 HANGERS AND SUPPORTS

GENERAL
Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components. Design seismic restraint system per IBC in accordance with SMACNA Seismic Design Guide for service zones as identified by current IBC.
PRODUCTS
Manufactured Units Hangers, Supports and Components: Factory fabricated according to MSS SP-58.
EXECUTION
Hanger and Support applications to comply with MSS SP-69 for pipe hanger selections and applications.
Hanger and Support installation to comply with MSS SP-69 and SP-89. Install hangers, supports, clamps and attachments as required to properly support piping from bulking structure.

15081 DUCT INSULATION

GENERAL
Insulation materials shall be Mineral-Fiber Blanket Thermal Insulation: Glass fibers bonded with a thermosetting resin. Comply with ASTM C 553, Type II, without facing and with all-service jacket manufactured from Kraft paper, reinforcing scrim, aluminum foil and vinyl film, Field-Applied Jackets to comply with ASTM C 921, Type I, Aluminum Jacket; Smooth finish.
ACCESSORIES AND ATTACHMENTS
Vapor Retarders: Mastics: Materials recommended by insulation material manufacturer.
DUCT SYSTEM APPLICATIONS
Material: Mineral-fiber blanket, One layer, Foil and paper field-applied jacket, vapor retarder is required.
Reference energy code compliance notes for required duct insulation thickness.

15083 PIPE INSULATION

GENERAL
Insulation installed indoors shall have a flame spread rating of 25 or less and a smoke developed rating of 50 or less.
INSULATION MATERIALS
Mineral fiber insulation shall have glass fibers bonded with a thermosetting resin complying with ASTM C 547, type 1, with factory-applied all-purpose vapor retarder jacket.
FIELD APPLIED JACKETS
Provide standard PVC fitting covers.
GENERAL APPLICATION REQUIREMENTS
Apply insulation continuously through hangers, walls and floors in accordance with manufacturers written instructions.
INSULATION APPLICATION SCHEDULE
Refrigerant Suction
Provide 1/2" thick flexible elastomeric insulation.

15670 CONDENSING UNITS

AIR-COOLED CONDENSING UNIT
Factory-assembled and tested air-cooled condensing units consisting of compressor, condenser coil, fan, motor, refrigerant reservoir and operating controls.
Compressor: Hermetically sealed with built-in overload and vibration isolation.
Condenser: Coil shall have copper tubes and aluminum fins.
Factory or Field Installed Accessories:
1. Low-voltage thermostat and subbase.
2. Head pressure control to modulate condenser fan motor speed for low ambient conditions.
3. Low-voltage control transformer.
4. Coil grounds.
5. Anti cycle timer.
6. Crankcase heater.
7. High and low pressure switches.

15675 PACKAGED TERMINAL AIR CONDITIONERS

GENERAL
Factory-assembled and tested through the wall air conditioner consisting of compressor, fans, controls, coils and outside air damper.
Compressor: Hermetically sealed with built-in overload and vibration isolation.
Condenser/ Evaporator coils: Coils shall have copper tubes and aluminum fins.
Condenser/ Evaporator fans: Direct drive with a permanent split capacitor two-speed motor, Condenser fan will be a propeller type and the indoor evaporator fan will be a centrifugal blower type.
Unit Chassis: unit will be a slide-out design with room cabinet installed.
Factory Installed Accessories:
1. Outside air damper.
2. Unit controls with off/ fan/ low cool/ high cool/ low heat/ high heat options.
3. Fan cycle switch.
4. Room freeze protection.
5. Compressor time delay.
6. Wall sleeve.

15763 FAN COIL UNITS

GENERAL
Many additional features, which vary with each manufacturer, are available for this product. Include all features for fan-coil units required for Project, and identify additional features for specific units in the Fan-Coil-Unit Schedule on Drawings.
Provide with single point electrical connection.
Description: Factory-packaged and -tested units rated according to ARI 440, ASHRAE 33, and UL 1995.
COIL SECTION INSULATION
1/2-inch thick
DRAIN PANS
Insulated galvanized steel with plastic liner formed to slope from all directions to the drain connection as required by ASHRAE 62.
CABINETS
Steel with baked-enamel finish in manufacturer's standard paint color.
FILTERS
1" Throw away.
ELECTRIC-RESISTANCE HEATING COILS
Nickel-chromium heating wire, free of expansion noise and hum, mounted in ceramic inserts in a galvanized-steel housing; with fuses in terminal box for overcurrent protection and limit controls for high-temperature protection of heaters. Terminate elements in stainless-steel machine-staked terminals secured with stainless- steel hardware.
DIRECT-DRIVEN FANS
Double width, forward curved, centrifugal; with permanently lubricated, multispeed motor resiliently mounted in the fan inlet.
CONTROLS
Include control components required for satisfactory operation of furnaces and auxiliary equipment in all seasons including:
1. Control Transformer: 24 V a.c. output, factory installed and wired in furnace.
2. Thermostat: Provide 7 day programmable thermostat, Honeywell T7300 or equivalent.
3. Relays: As required to achieve specified operation.
COOLING FEATURES
Evaporator Coil: Conform to ARI 210-240 "Unitary Air Conditioning and Air Source Heat Pump Equipment." Matched with furnace as recommended by furnace manufacturer.

15815 METAL DUCTS

SHEET METAL MATERIALS
Sheet metal in thickness per SMACNA, packaged and marked as specified in ASTM A 700.
DUCT LINER
Comply with NFPA Standard 90A, 1.1/2", .75 PCF density.
Materials: ASTM C 1071, with coated surface exposed to airstream to prevent erosion of glass fibers.
SEALING MATERIALS
Joint and Seam Tape: 2" wide, glass-fiber-fabric reinforced.
Joint and Seam Sealant: One-part, nonsag, solvent-release-curing, polymeric butyl sealant.
FIRE-STOPPING
Fire-Resistant Sealant: U.L. listed for application one-part elastomeric sealant formulated for use in a through-penetration fire-stop system.
DUCT FABRICATION
Galvanized sheet steel in accordance with SMACNA "HVAC Duct Construction Standards - Metal and Flexible."
HANGING AND SUPPORTING
Support systems indicated in SMACNA "HVAC Duct Construction Standards - Metal and Flexible."
PRESSURE CLASSIFICATION
Design all supply, return and exhaust air systems at 2" w.c.

15820 DUCT ACCESSORIES

DAMPERS
Spin In Damper: Low pressure manual damper with conical inlet fitting, 3/8" bar shaft with locking operator and elevated mounting for 1-1/2" insulation.
TURNING VANES
Fabricated turning vanes in accordance with SMACNA "HVAC Duct Construction Standards - Metal and Flexible."
DUCT ACCESS DOORS
Provide same or greater gauge as ductwork, insulated doors for insulated ductwork.
FLEXIBLE CONNECTIONS
Neoprene-coated flameproof fabric crimped into duct flanges for attachment to duct and equipment.
Flex Duct: Insulated flex for 8" w.g., with liner.
INSTALLATION OF DUCTWORK ACCESSORIES
Install ductwork accessories in accordance with manufacturer's installation instructions, with applicable portions of details of construction as shown in SMACNA Standards and in accordance with recognized industry practices to ensure that products serve intended function.

15835 UNIT HEATERS

ELECTRICAL UNIT HEATERS
Heating Elements: Nickel-chromium heating wire elements. Finish surface temperature does not exceed 550°F at any point during normal operation.
Heating Circuit Protection: One-time fuses in terminal box for over current protection and limit controls.
Fan and Motor: Direct-drive propeller fan and manufacturer's standard motor.
Discharge Configuration: Vertical discharge with radial louver diffuser.
Optional Accessories: Include the following:
1. Time switch
2. Integral thermostat.
3. Safety-switch disconnect on cover of terminal box.
4. Mercury contacts.
5. Fan-delay relay.

15870 POWER VENTILATORS

CEILING-MOUNTED VENTILATORS
Centrifugal fan designed for installation in ceiling, wall or concealed inline applications.

15990 TESTING, ADJUSTING AND BALANCING

GENERAL
The requirements and procedures total mechanical systems testing, adjusting and balancing requirements include measurement and establishment of the fluid quantities of the mechanical systems as required to meet design specifications and recording and reporting the results.
Test, adjust and balance the following mechanical systems:
1. Supply air systems, all pressure ranges.
2. Return air systems.
3. Exhaust air systems.
4. Verify temperature control system operation.
PERFORMING TESTING, ADJUSTING AND BALANCING.
Perform testing and balancing procedures on each system identified in accordance with the detailed procedures outlined in the referenced standards.
RECORD AND REPORT DATA
Record all data obtained during testing, adjusting and balancing in accordance with, and on the forms recommended by the referenced standards, and as approved on the sample report forms.
DEMONSTRATION
Training: Train the owner's maintenance personnel on trouble-shooting procedures and testing, adjusting and balancing procedures.

ENERGY CODE COMPLIANCE NOTES:

1. MECHANICAL SYSTEMS HAVE BEEN DESIGNED UNDER THE 2012 IECC.
2. LOAD CALCULATIONS HAVE BEEN PERFORMED IN ACCORDANCE WITH ASHRAE FUNDAMENTALS HANDBOOK (IECC C403.2.1).
3. DOMESTIC HOT WATER AND HOT WATER RETURN PIPING INSULATION THICKNESS SHALL BE 1" THICK (IECC C404.5).
4. REFERENCE DUCT INSULATION SCHEDULE FOR R VALUES OF DUCTWORK REQUIRED (IECC C403.2.7).
5. DUCT SEALING SHALL BE PERFORMED IN ACCORDANCE WITH SMACNA HVAC DUCT CONSTRUCTION STANDARDS - METAL AND FLEXIBLE. DUCTS SHALL HAVE A SEAL CLASS 'B' WITH ALL TRANSVERSE JOINTS AND LONGITUDINAL SEAMS SEALED (IECC C403.2.7).
6. ALL THERMOSTATS CONTROLLING HVAC SYSTEMS SHALL BE 7-DAY, SOLID STATE, PROGRAMMABLE THERMOSTATS WITH NIGHT SETBACK CAPABILITIES.
7. CONTRACTOR SHALL PROVIDE A COMPLETE SET OF AS BUILT RECORD DRAWINGS, OPERATION AND MAINTENANCE MANUALS AND HVAC SYSTEM BALANCE REPORTS TO OWNER AFTER SUBSTANTIAL COMPLETION OF PROJECT (IECC C408.2.5).

DUCT INSULATION SCHEDULE

AREA	INSULATION
EXTERIOR VENTILATED ATTIC	R-8
UNVENTED ATTIC ABOVE INSULATED CEILING	R-5
UNVENTED ATTIC WITH ROOF INSULATION	R-5
CRAWL SPACES	R-5
UNCONDITIONED SPACES	R-5
RETURN AIR PLENUM SPACES	NONE
INDIRECTLY CONDITIONED SPACE *	NONE
EXPOSED LOCATIONS	NONE
BURRED	R-5
UNTEMPERED OUTSIDE AIR-MINIMUM	R-5

* INDIRECTLY CONDITIONED SPACES INCLUDE AREAS ABOVE GRID CEILINGS WITH HARD DUCTED RETURNS AND INSULATION ON ROOF ABOVE.

TYPICAL DUCT WRAP R VALUES		
THICKNESS	DENSITY	INSTALLED R VALUE (AT 25% COMPRESSION)
1"	.75 PCF	2.8
1 1/2"	.75 PCF	4.2
2"	.75 PCF	5.6
2 1/2"	.75 PCF	6.0

LOAD CALCULATION SUMMARY FORM

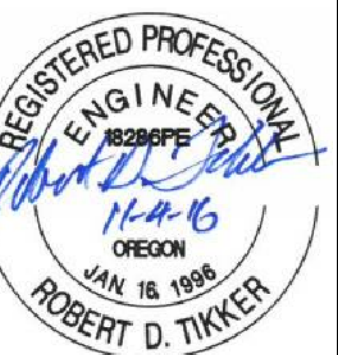
ZONE	EQUIPMENT	SF	COOLING LOAD W/ FRESH AIR (MBH)	HEATING LOAD W/ FRESH AIR (MBH)
1	FE-1	970	17.2	21.1
2	FE-2	1280	20.5	23.2

LOAD CALCULATIONS HAVE BEEN DETERMINED IN ACCORDANCE WITH THE PROCEDURES DESCRIBED IN 2007 ASHRAE/ACCA STANDARD 183



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NEW DEVELOPMENT
THE 27 ELM
 A HUNTER RENAISSANCE DEVELOPMENT
 REDMOND OREGON



SPEC SHEET

Sheet Title

AS NOTED

Scale

1602

Project Number

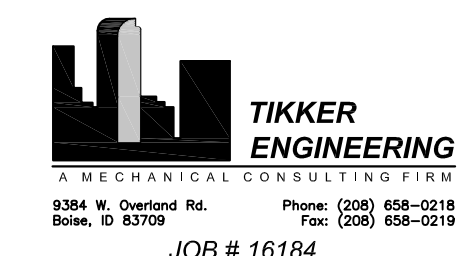
NOVEMBER 8, 2016

Date

M5.00 - SPEC SHEET.DWG

File Name

Revisions



M5.00