

GENERAL

15101 CODES AND PERMITS

1. THE FOLLOWING CODES WILL BE COMPLIED WITH WHEN DESIGNING AND INSTALLING COMPONENTS AND SYSTEMS UNDER DIVISION 15 - MECHANICAL: OSHA, BOCA, IMC ASHRAE, SMACNA, NFPA, STATE AND LOCAL ENERGY CODES.
2. STATE AND LOCAL MECHANICAL PERMITS WILL BE THE RESPONSIBILITY OF THE MECHANICAL CONTRACTOR
3. VENTILATION RATES ARE IN COMPLIANCE WITH ASHRAE 62.1 2007.

15102 DESIGN CONDITIONS

1. CLIMATIC DESIGN CONDITIONS WILL BE BASED ON PORTLAND, ME. AND THE SURROUNDING AND ARE AS FOLLOWS:

WINTER: -10° F
SUMMER: 87° F DB AND 71° F WB

INTERIOR CONDITIONS OF ALL SPACES:
WINTER: 70 ° F +/-2° F
SUMMER: 73° F +/-2° F

15103 CONTRACTOR REQUIREMENTS

1. MECHANICAL CONTRACTOR TO HAVE LICENSED PROFESSIONAL ENGINEER ON STAFF
2. MECHANICAL CONTRACTOR TO HAVE A SERVICE DEPARTMENT OPERATING TWENTY-FOUR HOURS A DAY, SEVEN DAYS A WEEK.

15110 BASIC MECHANICAL REQUIREMENTS

1. ALL DRAWINGS SHALL BE SEALED BY A PROFESSIONAL ENGINEER LICENSED IN THE STATE OF MAINE
2. THESE DRAWINGS ARE DIAGRAMMATIC; IT IS THE INSTALLER'S RESPONSIBILITY TO VERIFY ALL CONDITIONS IN THE FIELD TO INSURE THE SYSTEMS CAN BE INSTALLED AS SHOWN. ANY CONFLICTS WITH THE BUILDING STRUCTURE OR OTHER BUILDING SYSTEMS MUST BE RESOLVED PRIOR TO COMMENCING WORK.
3. IT IS THE INTENTION OF THESE DRAWINGS TO SHOW A COMPLETE HVAC SYSTEM INSTALLED IN ACCORDANCE WITH ALL APPLICABLE CODES AND REGULATIONS. ANY DISCREPANCIES SHOULD BE BROUGHT TO THE ATTENTION OF THE DESIGN ENGINEER OF RECORD FOR RESOLUTION.
4. ALL EQUIPMENT MUST BE INSTALLED IN STRICT ACCORDANCE WITH THE MANUFACTURERS RECOMMENDATIONS. ANY DISCREPANCIES SHOULD BE BROUGHT TO THE ATTENTION OF THE DESIGN ENGINEER OF RECORD FOR RESOLUTION
5. ALL MOTORS FURNISHED SHALL MEET NEMA REQUIREMENTS AND SHALL HAVE AN OPERATING TEMPERATURE OF NOT TO EXCEED 40° C ABOVE AMBIENT TEMPERATURE AND BE SO MARKED. EXCEPT AS NOTED ALL MOTORS SHALL BE OF THE OPEN DRIP-PROOF TYPE. MOTORS MAY BE FURNISHED OF THE FULLY ENCLOSED TYPE IF IT IS THE STANDARD EQUIPMENT.
6. NAMEPLATES BEARING MANUFACTURER'S NAME OR IDENTIFIABLE TRADEMARK SHALL BE SECURELY AFFIXED IN A CONSPICUOUS PLACE ON EQUIPMENT, OR OTHERWISE PERMANENTLY MARKED.
7. FLEXIBLE METAL CONDUIT SHALL BE USED FOR ALL CONNECTIONS TO MOTORS AND VIBRATING EQUIPMENT.
8. CIRCULATION PUMPS (WHEN APPLICABLE) SHALL BE SIZED WITH A MINIMUM OF A 10% SAFETY FACTOR IN FLOW RATES.
9. AIR SIDE HVAC SYSTEMS TO BE DESIGNED AT AN NC LEVEL 35 OR LESS
10. REFER TO EQUIPMENT SCHEDULES FOR EQUIPMENT REQUIREMENTS AND SPECIFICATIONS. NO SUBSTITUTIONS OR DEVIATIONS FROM THESE SCHEDULES ARE PERMITTED UNLESS AGREED TO IN WRITING BY THE DESIGN ENGINEER OF RECORD.

SECTION 15810 DUCTWORK

PART 1 - GENERAL

1.01 SUMMARY

- A. SECTION INCLUDES: THIS SPECIFICATION, IN CONJUNCTION WITH THE CONTRACT DOCUMENTS AND DESIGN DRAWINGS, PROVIDES THE MINIMUM REQUIREMENTS FOR MATERIALS AND OPERATIONS USED IN THE FABRICATION AND INSTALLATION OF DUCTWORK, SYSTEMS COVERED BY THIS DOCUMENT INCLUDE HEATING, VENTILATING, AIR CONDITIONING AND EXHAUST.

1.02 REFERENCES

- A. THE LATEST EDITION OF THE FOLLOWING CODES AND STANDARDS SHALL BE USED, WHERE DIFFERENCES BETWEEN STANDARDS AND THIS SPECIFICATION EXIST, THIS SPECIFICATION SHALL TAKE PRECEDENCE.
- B. SHEET METAL AND AIR CONDITIONING CONTRACTORS' NATIONAL ASSOCIATION (SMACNA)
- C. NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)
- D. AMERICAN SOCIETY OF HEATING, REFRIGERATION, AND AIR CONDITIONING ENGINEERS (ASHRAE)

PART 2 - PRODUCTS

2.01 MATERIALS, GENERAL

RIGID DUCTS, CASINGS AND FITTINGS SHALL BE MADE FROM GALVANIZED STEEL SHEETS OF LOCK FORM QUALITY PER ASTM A653 WITH A G90 ZINC COATING (0.50 OZ/FT2 BOTH SIDES), UNLESS OTHERWISE SHOWN OR NOTED ON THE DESIGN DRAWINGS. SHEETS SHALL BE FREE OF PITS, BLISTERS, SLIVERS, AND UNGALVANIZED SPOTS.

- A. SUPPORTS: ANGLE IRON, CHANNELS, RODS AND RELATED SUPPORTING MATERIALS SHALL BE GALVANIZED OR RED OXIDE COATED.
- B. FASTENERS: USE GALVANIZED RIVETS, SCREWS AND BOLTS THROUGHOUT, EXCEPT ON STAINLESS STEEL DUCTWORK, USE SS FASTENERS.
- C. REINFORCEMENT: PROVIDE GALVANIZED STEEL OR STAINLESS STEEL REINFORCEMENT SHAPES AND PLATES WHERE REQUIRED.
- D. THE RODS: USE GALVANIZED STEEL, 1/4 INCH MINIMUM DIAMETER FASTENERS FOR DUCTWORK 36 INCH OR LESS IN LENGTH; USE 3/8 INCH MINIMUM DIAMETER FOR LENGTHS LONGER THAN 36 IN.
- E. FLEXIBLE DUCT - SUPPLY & RETURN AIR (INSULATED, LOW PRESSURE): DUCT TO BE A FACTORY FABRICATED ASSEMBLY WITH A LAMINATED INNER LINER OF ALUMINUM FOIL, FIBERGLASS AND POLYESTER, A GALVANIZED STEEL HELIX COIL FORMED TO THE INNER LINER, A FIBERGLASS INSULATION BLANKET, AND A POLYETHYLENE OUTER JACKET. FLEXIBLE DUCT SHALL BE RATED FOR 2.0" W.G. POSITIVE PRESSURE.
- F. MECHANICAL LINER AND FASTENERS:
 1. LINERS: INTERNAL DUCT LINERS SHALL BE 1/4 INCH THICK FIBERGLASS TYPE I OR II PER ASTM 1071 AND HAVE A THERMAL CONDUCTIVITY (K-VALUE) OF 0.26 AT 75 DEG. F. LINERS SHALL COMPLY WITH NFPA 90A AND 90B AND WITH NAIMA AH124 AND HAVE A MAXIMUM FLAME-SPREAD INDEX OF 25 AND SMOKE-DEVELOPED INDEX OF 50 WHEN TESTED ACCORDING TO ASTM E84. LINERS SHALL BE TREATED WITH AN EPA APPROVED BIOCIDES TO RESIST BACTERIAL AND FUNGAL GROWTH. ALL SURFACES EXPOSED TO THE AIR STREAM SHALL BE COATED TO PREVENT EROSION OF GLASS FIBERS.
 2. MECHANICAL FASTENERS: GALVANIZED STEEL, SUITABLE FOR ADHESIVE, MECHANICAL OR WELDING ATTACHMENT (SELF-STICK ADHESIVE FASTENERS ARE NOT PERMITTED), PROVIDE FASTENERS THAT WILL NOT DAMAGE THE LINER WHEN APPLIED AS RECOMMENDED BY THE MANUFACTURER, THAT DO NOT CAUSE LEAKAGE WITHIN THE DUCT AND THAT WILL SUSTAIN A 50-POUND TENSILE DEAD LOAD PERPENDICULAR TO DUCT WALL.
 3. LINER ADHESIVE: NON-OXIDIZING, VINYL ACRYLIC, WATER-BASED ADHESIVE USED TO BOND INSULATION TO SHEET METAL SURFACES. OPERATIONAL TEMPERATURE RANGE: -20 TO +160° F; CURING TIME 24 HOURS. MANUFACTURED BY UNITED MCGILL, TYPE UNI-TACK, COMPLY WITH NFPA 90A AND 90B AND WITH ASTM C916

2.02 DESIGN AND CONSTRUCTION

A. GENERAL:

- 1. CONSTRUCT ALL DUCTS, CASINGS AND FITTINGS OF RIGID, GALVANIZED STEEL, UNLESS OTHERWISE SHOWN OR NOTED IN THE CONTRACT DOCUMENTS OR DESIGN DRAWINGS.
- 2. CONTRACTOR IS RESPONSIBLE FOR COORDINATION BETWEEN THE DUCTWORK TRADE AND THE OTHER MECHANICAL, ELECTRICAL AND ARCHITECTURAL TRADES.
- 3. INSULATION SHALL BE AS SPECIFIED IN SECTION 15081 AND TABLE 1
- 4. INSTALL INTERNAL DUCT LINERS AS SPECIFIED PER SECTION 15081 AND TABLE 1. INSTALL LINERS PER NAIMA DUCT LINER GUIDELINES.
- B. DUCTWORK PRESSURE CLASSIFICATION UNLESS OTHERWISE INDICATED ON THE CONSTRUCTION DRAWINGS, DUCTWORK SHALL BE CONSTRUCTED TO MEET THE APPROPRIATE PRESSURE CLASS DEFINED BELOW.
 1. DUCTWORK FROM THE SUPPLY AIR FAN TO THE TERMINAL VELOCITY REDUCTION DEVICE (VAV BOX) OR ZONE-TEMPERING COIL SHALL BE FABRICATED TO MEET MINIMUM 2" W.G. INTERNAL PRESSURE.
 2. RETURN AIR DUCTWORK SHALL BE FABRICATED TO MEET MINIMUM 2" W.G. INTERNAL PRESSURE.
- C. RECTANGULAR DUCTWORK:
 1. SHALL CONFORM TO SMACNA HVAC DUCT CONSTRUCTION STANDARDS, METAL AND FLEXIBLE OR SMACNA RECTANGULAR INDUSTRIAL DUCT CONSTRUCTION STANDARDS. MITERED ELBOWS TO HAVE SINGLE WALL TURNING VANES.
- D. ROUND DUCTWORK:
 1. SPIRAL LOCKSEAM OR LONGITUDINAL WELDED SEAM AS MANUFACTURED BY UNITED MCGILL SHEET METAL COMPANY OR EQUAL. MODELS UNISEAL, UNICOAT, OR LONGITUDINAL SEAM.
 2. MINIMUM GALVANIZED STEEL OR STAINLESS STEEL GAUGES, HANGER SPACING, AND REINFORCEMENT SHALL BE PER SMACNA HVAC DUCT CONSTRUCTION STANDARDS
 3. FITTINGS: FITTINGS SHALL HAVE A WALL THICKNESS NOT LESS THAN THAT REQUIRED FOR LONGITUDINAL-SEAM STRAIGHT DUCT.
 4. ELBOWS:
 - A. ELBOWS FOR ROUND DUCTS SHALL HAVE A MINIMUM CENTERLINE RADIUS OF 1-1/2 TIMES THE DIAMETER OF THE DUCT AND SHALL BE CONSTRUCTED WITHOUT SPLITTERS.

2.03 DAMPERS

- A. OUTSIDE AIR DAMPERS: DAMPERS SHALL BE LOW-LEAKAGE TYPE; GREENHECK MODEL V023 OR EQUAL
- B. MANUAL BALANCING DAMPERS (SUPPLY AIR AND GENERAL EXHAUST SYSTEMS): DAMPERS MAY BE FACTORY OR CONTRACTOR FABRICATED PER SMACNA DUCT CONSTRUCTION STANDARDS.

2.04 HANGERS AND SUPPORTS

- A. GENERAL: REFER TO SMACNA DUCT CONSTRUCTION STANDARDS - METAL AND FLEXIBLE, RECTANGULAR INDUSTRIAL DUCT CONSTRUCTION STANDARDS, AND ROUND INDUSTRIAL DUCT CONSTRUCTION STANDARDS RESPECTIVELY FOR RECTANGULAR AND ROUND DUCTWORK FOR INSTALLATION OF HANGERS AND SPACING
- 1. STRAPS AND ANGLES SHALL BE MANUFACTURED FROM GALVANIZED STEEL: RODS SHALL BE MANUFACTURED FROM UNCOATED OR GALVANIZED STEEL.
- 2. PERFORATED IRON BAND FOR DUCT SUPPORT IS PROHIBITED.
- 3. WIRE FOR DUCT SUPPORT IS PROHIBITED.

2.05 SEALANTS

- A. DUCT SEALER SHALL BE WATER BASED SEALER FOR INDOOR / OUTDOOR USE. U.L. CLASSIFIED AND PAINTABLE AS MANUFACTURED BY DURODYNE MODEL SAS OR EQUAL.
- B. SELF-ADHERING VINYL COATED FABRIC DUCT TAPE IS NOT PERMITTED, EXCEPT TO TEMPORARILY SEAL THE DUCT OPENINGS FOR CONTAMINATION PREVENTION.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. FLEXIBLE DUCTS:
 1. PROVIDE FLEXIBLE DUCT IN FULLY EXTENDED CONDITION, FREE FROM KINKS.
 2. USE ONLY THE MINIMUM LENGTH REQUIRED TO MAKE THE CONNECTION.
 3. DO NOT EXCEED 8'-0" IN LENGTH, FULLY EXTENDED.
- B. INSULATION:
 1. WHERE HORIZONTAL SUPPORT IS REQUIRED, HANGER OR SADDLE MATERIAL SHALL BE WIDE ENOUGH SO THAT IT DOES NOT REDUCE THE INTERNAL DIAMETER OF THE DUCT AND SHALL BE A MINIMUM 1" WIDE BANDING MATERIAL HANGERS AT NOT MORE THAN 2'-6" CENTERS. MAXIMUM ALLOWABLE SAG 1/2" PER FOOT OF SUPPORT SPACING. FLEXIBLE DUCT SHALL EXTEND STRAIGHT FOR SEVERAL INCHES FROM A CONNECTION BEFORE BENDING.
 5. MAKE JOINTS AND CONNECTIONS WITH 1/2" WIDE POSITIVE LOCKING STEEL, NYLON OR PLENUM RATED STRAPS. CONNECTIONS SHALL BE PER SMACNA DUCT CONSTRUCTION STANDARDS.
 6. USE INSULATED FLEX WHERE INSULATED DUCT IS REQUIRED.
- C. METAL DUCTWORK:
 1. INSTALL WITH A MINIMUM OF 4" SEPARATION FROM EARTH TO THE DUCT OR INSULATION FINISH.
 2. SECURELY FASTEN AT EACH CHANGE IN DIRECTION.
 3. INSTALL BRANCH CONNECTIONS AND COUPLINGS TIGHT TO THE DUCT WALL SURFACE WITH A MINIMUM OF PROJECTION INTO DUCT. SECURE WITH SHEET METAL SCREWS AT INTERVALS OF 12 INCHES WITH A MINIMUM OF 3 SCREWS IN EACH CONNECTION.
 - C. INSULATION: SHALL BE INSTALLED AS DETAILED IN SECTION 15081, "DUCT INSULATION". THE INSULATION, FACINGS, TAPES AND ADHESIVES APPLIED TO THE EXTERIOR SURFACES OF DUCTS LOCATED WITHIN THE BUILDINGS SHALL HAVE A COMPOSITE FLAME SPREAD OF 25 OR LESS AND A SMOKE DEVELOPED RATING OF 50 OR LESS.
 - D. SEALING DUCTWORK:
 1. 0"-2" W.G. CLASSIFICATION: TRANSVERSE JOINTS SHALL BE SEALED AS PER SMACNA GUIDELINES FOR SEAL CLASS A USING PRODUCTS LISTED IN SECTION 2. GAS FIRED EQUIPMENT

3.02 GAS FIBERED EQUIPMENT

- A. COMBUSTION AIR AND VENTING OF GAS-FIRED EQUIPMENT SHALL CONFORM TO THE REQUIREMENTS OF THE INTERNATIONAL MECHANICAL CODE.

3.03 DUCT LINERS

- A. INSTALL DUCT LINERS AT LOCATIONS AS SHOWN ON THE DRAWINGS AND IN ACCORDANCE WITH NAIMA FIBROUS GLASS DUCT LINER STANDARD. APPLY WITH A SINGLE LAYER OF INDICATED THICKNESS.

3.04 HANGERS AND SUPPORTS

- A. HANGERS SHALL BE INSTALLED PLUMB AND SHALL PRESENT A NEAT APPEARANCE.
- B. STRAP HANGERS SHALL EXTEND THE FULL DEPTH OF THE DUCT, BEND AND EXTEND 1" INCH UNDER AND AGAINST THE BOTTOM OF THE DUCT.
- C. ATTACH HANGERS TO THE DUCTS USING RIVETS OR SCREWS OF APPROPRIATE SIZES 6 INCHES ON CENTER (MINIMUM OF 2 EACH SIDE) AND ON THE BOTTOM RETURN.

D. ALL DUCTS SHALL BE RIGIDLY SUPPORTED.

- 1. WHERE VERTICAL DUCTS PASS THROUGH FLOORS OR ROOFS, SUPPORTING ANGLES SHALL BE ATTACHED TO DUCTS AND TO THE STRUCTURE.
- 2. PLACE SUPPORTING ANGLES ON AT LEAST TWO SIDES OF THE DUCT.

3.05 CONNECTORS

- A. PROVIDE FLEXIBLE CONNECTIONS, NOT LESS THAN 4 INCHES WIDE, CONSTRUCTED OF APPROVED FIREPROOF, WATERPROOF, NON-ASBESTOS, AND GLASS FABRIC, AT THE INLET AND OUTLET CONNECTION OF EACH FAN UNIT. SECURELY FASTENED TO THE UNIT AND TO THE DUCTWORK BY A GALVANIZED IRON BAND PROVIDED WITH TIGHTENING SCREWS. THERE SHALL BE NO METAL-TO-METAL CONTACT AT FLEXIBLE CONNECTIONS. THERE SHALL BE NO STRETCHING OF THE FLEXIBLE MATERIAL AT FLEXIBLE CONNECTIONS. THIS CONNECTION SHALL BE UL LISTED, TO MEET NFPA 90 REQUIREMENTS AND THE FOLLOWING APPLICATIONS:
 1. INDOOR SUPPLY/RETURN AIR: NEOPRENE COATED GLASS FABRIC, MINIMUM 30 OZ./SQ.YD., VENT/FABRICS - "VENTGLAS" OR DURODYNE - "NEOPRENE".
 2. OUTDOOR SUPPLY/RETURN AIR: UV RESISTANT HYALON COATED GLASS FABRIC, MINIMUM 24 OZ./SQ.YD., VENT/FABRICS - "VENTLOW" OR DURODYNE - "DUROLON".

3.08 DAMPERS

- A. BALANCING DAMPERS: SHALL BE INSTALLED WHERE SHOWN ON DRAWINGS AND AS MAY BE REQUIRED TO BALANCE SYSTEM.

SECTION 15855

DIFFUSERS, REGISTERS AND GRILLES

1. PROVIDE SUPPLY DIFFUSERS, RETURN GRILLES AND EXHAUST OUTLETS OF SIZE, TYPE AND DESIGN AS SHOWN ON DRAWINGS. ACCEPTABLE MANUFACTURERS SHALL BE TITUS; PRICE IS A VIABLE ALTERNATIVE BUT ONLY IF APPROVED IN WRITING BY THE DESIGN ENGINEER OF RECORD.
2. EQUIPMENT SHALL BE TESTED AND RATED PER ASHRAE 91-70.
3. EQUIPMENT SHALL HANDLE AIR QUANTITIES AT OPERATING VELOCITIES.
 - A. WITH MAXIMUM DIFFUSION WITHIN SPACE SUPPLIED OR EXHAUSTED.
 - B. WITHOUT OBJECTIONABLE AIR MOVEMENT AS DETERMINED BY ENGINEER.
 - C. WITH SOUND PRESSURE LEVEL NOT TO EXCEED NC 35.
4. DIFFUSERS WITHIN SAME ROOM OR AREA SHALL BE OF SAME TYPE AND STYLE TO PROVIDE ARCHITECTURAL UNIFORMITY.
5. FINISH SHALL BE AS DIRECTED BY ARCHITECT AND/OR OWNER
6. COORDINATE DIFFUSERS, REGISTERS AND GRILLES WITH CEILING AND WALL CONSTRUCTION. REFER TO ARCHITECTURAL DRAWINGS (AS APPLICABLE FOR EXACT LENGTHS AND FOR FRAMING AND MITERING ARRANGEMENTS THAT MAY DIFFER FROM THOSE SHOWN ON HVAC DRAWINGS.

SECTION 15081

DUCT INSULATION

PART 1 - GENERAL

1.01 SUMMARY

- A. SECTION INCLUDES SEMI-RIGID AND FLEXIBLE INSULATION FOR DUCTS, PLENUMS, AND BREECHINGS; INSULATING CEMENTS; FIELD-APPLIED JACKETS, ACCESSORIES; AND SEALING COMPOUNDS.

1.02 REFERENCES

- A. AMERICAN SOCIETY OF TESTING AND MATERIALS (ASTM); ASHRAE 90.1

PART 2 - PRODUCTS

2.01 INSULATION MATERIALS

- A. MINERAL-FIBER BOARD THERMAL INSULATION: GLASS FIBERS BONDED WITH A THERMOSETTING RESIN. COMPLY WITH ASTM C 612, TYPE IB, FOR USE TO 450 DEG. F, WITH A FACTORY-APPLIED JACKET MANUFACTURED FROM FOIL, REINFORCING SCRIM, AND KRAFT PAPER (FSK), MINIMUM DENSITY OF 3 LB./CU.FT., MAXIMUM CONDUCTIVITY OF 0.40 (BTU-IN./HR.-SQ.FT.-DEG. F) AT 300 DEG. F.

- B. MINERAL-FIBER BLANKET THERMAL INSULATION: GLASS FIBERS BONDED WITH A THERMOSETTING RESIN. COMPLY WITH ASTM C 553, TYPE II, FOR USE TO 450 DEG. F, WITH A FACTORY-APPLIED JACKET MANUFACTURED FROM FOIL, REINFORCING SCRIM, AND KRAFT PAPER (FSK), MINIMUM DENSITY OF 3/4 LB./CU.FT., MAXIMUM CONDUCTIVITY OF 0.43 (BTU-IN./HR.-SQ.FT.-DEG. F) AT 200 DEG. F.

- C. FIBERGLASS "PIPE & TANK" INSULATION: SEMI-RIGID FIBERGLASS BOARD INSULATION, COMPLY WITH ASTM C 795, TYPE II, FOR USE TO 850 DEG. F WITH A FACTORY-APPLIED JACKET MANUFACTURED FROM FOIL, REINFORCING SCRIM, AND KRAFT PAPER (FSK), MAXIMUM CONDUCTIVITY OF 0.45 (BTU-IN./HR.-SQ.FT.-DEG. F) AT 300 DEG. F.

- D. CALCIUM SILICATE INSULATION: FLAT, CURVED, AND GROOVED-BLOCK SECTIONS OF NONCOMBUSTIBLE, INORGANIC HYDROUS CALCIUM SILICATE WITH A NONASBESTOS FIBROUS REINFORCEMENT. COMPLY WITH ASTM C 533, TYPE I.

- E. VAPOR-RETARDER MASTICS: FIRE- AND WATER-RESISTANT, VAPOR-RETARDER MASTIC FOR INDOOR APPLICATIONS. COMPLY WITH MIL-C-19565C, TYPE II.

DUCTWORK DESCRIPTION	PRESS CLASS	LINER	INSULATION
SUPPLY (OUTSIDE CONDITIONED SPACE)	2" WG	1" FIRST 6' OF DUCTWORK	1.5" FOIL FACED INSULATION (MINIMUM R-4); IF IN ATTIC THEN WRAP WITH R-8 DUCT WRAP
SUPPLY (EXPOSED INSIDE CONDITIONED SPACE)	2" WG	NONE	NONE
RETURN	2" WG	1" FIRST 6' OF DUCTWORK	NONE REQUIRED UNLESS IN ATTIC THEN WRAP WITH R-8 DUCT WRAP
GREASE MUA SUPPLY	2" WG	1" FIRST 6' OF DUCTWORK	1.5" FOIL FACED INSULATION (MINIMUM R-4); IF IN ATTIC THEN WRAP WITH R-8 DUCT WRAP
GREASE HOOD EXHAUST	16 GA WELDED BL. OR FACTORY DUCT	NONE	3" OF GREASE RATED ZERO CLEARANCE WRAP
BATHROOM EXHAUST	2" WG	NONE	NONE REQUIRED
OUTDOOR AIR	2" WG	NONE	3" FOIL FACED INSULATION (MINIMUM R-8)
ALL OUTDOOR / EXTERIOR DUCT	2" WG	1" FIRST 6' OF DUCTWORK	2" FSK BOARD (MINIMUM R-8) WITH FLEXGLAD WRAP (OR APPROVED EQUIVLENT)

SECTION 15304

GAS PIPING

1. GAS PIPING TO BE SCH. 40 STEEL UTILIZING WELDED CONNECTIONS OR MALLEABLE FITTINGS, CORRUGATED STAINLESS STEEL TUBING (CSST) PROHIBITED UNLESS APPROVED IN WRITING BY THE DESIGN ENGINEER OF RECORD
2. INSTALL GAS PIPING IN ACCORDANCE WITH NFPA 54 AND / OR AUTHORITY HAVING JURISDICTION
3. MECHANICAL CONTRACTOR RESPONSIBLE FOR ALL GAS PIPING DOWNSTREAM OF THE BUILDING REGULATOR PROVIDED BY THE GAS COMPANY
4. EXTERIOR GAS PIPING SHALL BE PAINTED AND ALL PIPING SHALL BE LABELED "GAS" IN CONSPICUOUS LOCATIONS PER CODE
5. GAS PIPING SERVING SEPARATE AREAS OF THE BUILDING SHALL BE IDENTIFIED IN AN APPROVED MANNER AND IN ACCORDANCE WITH NFPA CODE REQUIREMENTS
6. ALL GAS PIPING SHALL BE TESTED IN ACCORDANCE WITH NFPA 54 REQUIREMENTS. PRESSURE TESTING SHALL BE COMPLETED USING AIR AT A MINIMUM OF 5 PSIG USING A PRESSURE GAUGE RATED FOR 10 PSIG FOR A MINIMUM PERIOD OF 24 HOURS. DURING THIS PRESSURE TEST ALL JOINTS AND CONNECTIONS SHALL BE EXAMINED.

SECTION 15985

CONTROLS AND SEQUENCE OF OPERATION

CONTROLS TO BE STAND ALONE WITH WALL MOUNTED THERMOSTATS

SECTION 15501

STARTUP, TESTING AND BALANCING

A. GENERAL

1. PROVIDE QUALIFIED PERSONNEL, EQUIPMENT, APPARATUS AND SERVICES FOR PROPER START UP AND TESTING / BALANCING OF MECHANICAL SYSTEMS. ALL SYSTEMS SHALL BE STARTED UP AND BALANCED TO PERFORMANCE SHOWN ON SCHEDULES, AS SPECIFIED, AS REQUIRED BY CODES, STANDARDS, REGULATIONS AND AUTHORITIES HAVING JURISDICTION INCLUDING CITY, TOWN OR COUNTY INSPECTORS, OWNERS AND ARCHITECT. NOTE THAT SOME START-UP PROCEDURES MAY REQUIRE THE COOPERATION OF THE BALANCING CONTRACTOR, THE EQUIPMENT MANUFACTURER'S REPRESENTATIVE, THE MECHANICAL CONTRACTOR AND THE CONTROLS CONTRACTOR.

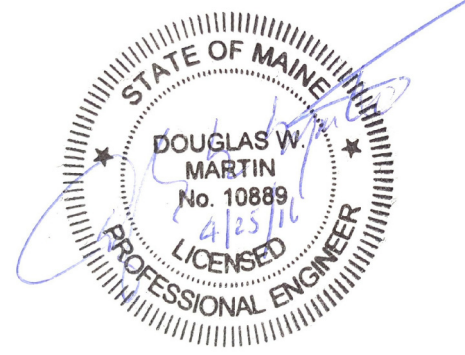
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DESIGN CONSULTANTS



PERMIT SET

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REVISIONS

SAFELITE AUTOGLASS

**421 WARREN AVENUE
PORTLAND, ME**

MECHANICAL SPECIFICATIONS

Date: 4.25.16
Project #: 61257
Scale:
Drawn by: MGR/ASG
Checked by: DWM

M-4