

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.

15102 DESIGN CONDITIONS

1. CLIMATIC DESIGN CONDITIONS WILL BE BASED ON PORTLAND, MAINE AND THE SURROUNDING AND ARE AS FOLLOWS:
WINTER: -10° F
SUMMER: 87° F DB AND 71° F WB

DESIGN INTERIOR CONDITIONS: 70 DEG F +/-2

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.

3. MECHANICAL CONTRACTOR SHALL SUBMIT SHOP DRAWINGS ON ALL MAJOR COMPONENTS TO OWNER FOR REVIEW AND APPROVAL.

4. MECHANICAL CONTRACTOR SHALL SUBMIT A COMPLETE SET OF "FOR CONSTRUCTION" DRAWINGS IN AUTOCAD FORMAT SEALED BY A PROFESSIONAL ENGINEER LICENSED IN THE STATE OF MAINE.

15110 BASIC MECHANICAL REQUIREMENTS

1. 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 STRUCTURE OR OTHER BUILDING SYSTEMS MUST BE RESOLVED PRIOR TO COMMENCING WORK.

2. 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 ENGINEERING DEPARTMENTS' ATTENTION.

3. ALL EQUIPMENT MUST BE INSTALLED IN STRICT ACCORDANCE WITH THE MANUFACTURERS' INSTALLATION INSTRUCTIONS. ANY DISCREPANCIES SHOULD BE BROUGHT TO THE ENGINEERING DEPARTMENTS' ATTENTION.

4. ALL MOTORS FURNISHED SHALL MEET NEMA REQUIREMENTS AND SHALL HAVE AN OPERATING TEMPERATURE OF NOT TO EXCEED 40° 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.

5. NAMEPLATES BEARING MANUFACTURERS NAME OR IDENTIFIABLE TRADEMARK SHALL BE SECURELY AFFIXED IN A CONSPICUOUS PLACE ON EQUIPMENT, OR OTHERWISE PERMANENTLY MARKED.

6. FLEXIBLE METAL CONDUIT SHALL BE USED FOR ALL CONNECTIONS TO MOTORS AND VIBRATING EQUIPMENT.

7. CIRCULATION PUMPS TO BE SIZED WITH A MINIMUM OF A 10% SAFETY FACTOR IN FLOW RATES.

8. AIR SIDE HVAC SYSTEMS TO BE DESIGN AT A MAXIMUM MC LEVEL OF 30.

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 90 ZINC COATING @ 90 OZ/FT² BOTH SIDES, UNLESS OTHERWISE SHOWN ON THE CONTRACT DOCUMENTS. SHEETS SHALL BE FREE OF PITS, BUSTERS, 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 1/2" W.G. POSITIVE PRESSURE.

F. MECHANICAL LINER AND FASTENERS:

1. LINERS: INTERNAL DUCT LINERS SHALL BE 1 INCH THICK FIBERGLASS TYPE 1 OR 1 PER ASTM 1071 AND HAVE A THERMAL CONDUCTIVITY (K) VALUED @ 0.26 AT 75 DEG. F. LINERS SHALL COMPLY WITH NFPA 90A AND 90B AND WITH MINIMUM 4" 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: -30 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 IN THE CONTRACT DOCUMENTS.

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 15901, "DUCT INSULATION".

4. INSTALL INTERNAL DUCT LINERS ON DUCTS INDICATED TO HAVE LINERS ON THE CONSTRUCTION DRAWINGS. INSTALL LINERS PER NAMA 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 WILL 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 UNSEAL, UNCOAT, 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 1/4 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; GREENHOCK MODEL VCD-23 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. RETURN AIR DUCTWORK 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 DUKRODNE 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. DO NOT EXCEED 8' 0" IN LENGTH, FULLY EXTENDED.

3. 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' 0" CENTERS. MAXIMUM ALLOWABLE SAG 1/4" PER FOOT OF SUPPORT SPACING. FLEXIBLE DUCT SHALL EXTEND STRAIGHT FOR SEVERAL INCHES FROM A CONNECTION BEFORE BENDING.

4. MAKE JOINTS AND CONNECTIONS WITH 1/2" WIDE POSITIVE LOCKING STEEL WELD OR FLEMING RATED BOLTS. CONNECTIONS SHALL BE PER SMACNA DUCT CONSTRUCTION STANDARDS.

5. USE INSULATED FLEX WHERE INSULATED DUCT IS REQUIRED.

B. 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 JOINTS 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 15901, "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. 1/2" W.G. CLASSIFICATION: TRANSVERSE JOINTS SHALL BE SEALED AS PER SMACNA GUIDELINES FOR SEAL CLASS A USING PRODUCTS LISTED IN SECTION 2.

2. GAS FRED EQUIPMENT

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

3.02 DUCT LINERS

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

3.03 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 8 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.

3.04 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 90A REQUIREMENTS AND THE FOLLOWING APPLICATIONS:

1. INDOOR SUPPLY/RETURN AIR: NEOPRENE COATED GLASS FABRIC, MINIMUM 30 OZ./SQ.YD., VENTIFABRICS - "VENTILAS" OR DURODYNE - "NEOPRENE".

2. OUTDOOR SUPPLY/RETURN AIR: U.V. RESISTANT HYDROLON COATED GLASS FABRIC, MINIMUM 24 OZ./SQ.YD., VENTIFABRICS - "VENTILON" OR DURODYNE - "DUROLOX".

3.08 DAMPERS

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

SECTION 15985 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, ANEKOSTAR, KRUEGER, OR METALABE.

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 OBSTACLES OR AIR MOVEMENT AS DETERMINED BY ENGINEER.

C. WITH SOUND PRESSURE LEVEL NOT TO EXCEED NC 30.

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.

6. COORDINATE DIFFUSERS, REGISTERS AND GRILLES WITH CEILING AND WALL CONSTRUCTION. REFER TO ARCHITECTURAL DRAWINGS FOR CEILING LENGTHS AND FOR FRAMING AND MITERING ARRANGEMENTS THAT MAY DIFFER FROM THOSE SHOWN ON HVAC DRAWINGS.

SECTION 15986 DIFFUSERS, REGISTERS AND GRILLES

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SECTION 15988 DIFFUSERS, REGISTERS AND GRILLES

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SECTION 15990 DIFFUSERS, REGISTERS AND GRILLES

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FAN SCHEDULE									
TAG	Service	Manufacturer	Model Number	Volume	SP	Speed	Power	Electric	Notes
				CFM	(in. wg.)	(rpm)		V/Ph/Hz	
EF-1	BATHROOMS/MECH. ROOM	Panasonic	FV-13VKM3	135	0.25	917	21.5 W	120/1/60	

RTU SCHEDULE															
TAG	Nominal Cooling Capacity (Tons)	Service	Manufacturer	Model Number	Airflow CFM	Minimum O.A. Setting CFM	Available E.S.P (in. WG)	Unit Weight (Lbs.)	Curb Weight (Lbs.)	V/Ph/Hz	MCA	Max. Fuse Size or Max. Circuit Breaker	Evaporator Fan Motor HP	Heating Output Capacity (Btuh)	Gas Connection (in.)
RTU-1	25	CLIMBING AREA	TRANE	YHH300F3RHA	11,000	TBD	1	2,793	N/A	208-230/3/60	116	150	7.5	324,000	3/4"
RTU-2	5	LOWER LEVEL	TRANE	YHC060F3RHA	2,000	TBD	1	864	78	208-230/3/60	27.4	40	4	104,000	1/2"
RTU-3	3	OFFICE	TRANE	YHC036F3RHA	1,200	TBD	1	692	61	208-230/3/60	19.6	30	2.7	96,000	1/2"

SECTION 15995 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, ANEKOSTAR, KRUEGER, OR METALABE.

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 OBSTACLES OR AIR MOVEMENT AS DETERMINED BY ENGINEER.

C. WITH SOUND PRESSURE LEVEL NOT TO EXCEED NC 30.

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.

6. COORDINATE DIFFUSERS, REGISTERS AND GRILLES WITH CEILING AND WALL CONSTRUCTION. REFER TO ARCHITECTURAL DRAWINGS FOR CEILING LENGTHS AND FOR FRAMING AND MITERING ARRANGEMENTS THAT MAY DIFFER FROM THOSE SHOWN ON HVAC DRAWINGS.

SECTION 15996 DIFFUSERS, REGISTERS AND GRILLES

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SECTION 16000 DIFFUSERS, REGISTERS AND GRILLES

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PIPING INSULATION DATA				
SERVICE	INSULATION MATERIAL	VAPOR BARRIER REQUIRED	INSULATION WALL THICKNESS AT THE GIVEN PIPE DIAMETERS	
			<1"	1" to <1.5"
Hydronic Heating Systems (Hot Water Supply and Return)				
Fluid Design Operating Temperature Range: 141° F to 200° F	Glass Fiber	Yes	1.0"	1.0"
Air Conditioning Condensate Drain Line Located Inside	Elastomeric Foam	N/A	0.5"	0.5"
	Glass Fiber	Yes	0.5"	0.5"
Cooling Systems (Chilled Water)				
Fluid Design Operating Temperature Range: 40° F to 60° F	Elastomeric Foam	N/A	0.5"	0.5"
	Glass Fiber	Yes	0.5"	0.5"

SECTION 16001 EQUIPMENT

ALL EQUIPMENT TO BE AS SCHEDULED PER M-3

RD&G SCHEDULE									
Tag	Manufacturer	Model	Neck Size (in)	Throw	CFM Range	Noise Criteria	Delta P (in.)	Style	
S-1	TBD	TBD	TBD	TBD	50-250	<25	TBD	Side Wall Supply Grille	
S-2	TBD	TBD	TBD	TBD	200-400	<25	TBD	Spiral Diffuser	
S-3	TBD	TBD	TBD	TBD	2500-3500	<25	TBD		