CODES AND PERMITS

1. THE FOLLOWING CODES WILL BE COMPLIED WITH WHEN DESIGNING AND INSTALLING COMPONENTS AND SYSTEMS UNDER DIVISION 15 - MECHANICAL: OHSA, 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 <u>DESIGN CONDITIONS</u>

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 +1-2

CONTRACTOR REQUIREMENTS

1. MECHANICAL CONTRACTOR TO HAVE LICENSED PROFESSIONAL ENGINEER ON

- 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 OF OTHER BUILDING SYSTEMS MUST BE RESOLVED PRIOR TO COMENCING 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 RECOMMENDATIONS. 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° 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. 5. NAMEPLATES BEARING MANUFACTURER'S 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 8. AIR SIDE HVAC SYSTEMS TO BE DESIGN AT A MAXIMUM NC LEVEL OF 30.

SECTION 15810

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.

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

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 (0.90 OZ/FT2 BOTH SIDES), UNLESS OTHERWISE SHOWN ON THE CONTRACT DOCUMENTS. 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. TIE 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 INCH THICK FIBERGLASS TYPE I OF 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 BIOCIDE 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

2.02 DESIGN AND CONSTRUCTION

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

3. INSULATION SHALL BE AS SPECIFIED IN SECTION 15081, "DUCT INSULATION." 4. INSTALL INTERNAL DUCT LINERS ON DUCTS INDICATED TO HAVE LINERS ON THE CONSTRUCTION DRAWINGS. 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 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

3. FITTINGS: FITTINGS SHALL HAVE A WALL THICKNESS NOT LESS THAN THAT REQUIRED FOR LONGITUDINAL-SEAM STRAIGHT DUCT. 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.

A. OUTSIDE AIR DAMPERS: DAMPERS SHALL BE LOW-LEAKAGE TYPE; GREENHECK 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 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 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

50 OR LESS.

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. 4. 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. 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. 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.

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

3. INSTALL BRANCH CONNECTIONS AND COUPLINGS TIGHT TO THE DUCT WALL

SURFACE WITH A MINIMUM OF PROJECTION INTO DUCT. SECURE WITH SHEE

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. 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

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 OUTLIFT 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 MEET NEPA 90 REQUIREMENTS AND THE FOLLOWING APPLICATIONS: 1. INDOOR SUPPLY/RETURN AIR: NEOPRENE COATED GLASS FABRIC, MINIMUM 30 OZ./SQ.YD., VENTFABRICS - "VENTGLAS" OR DURODYNE - "NEOPRENE". 2. OUTDOOR SUPPLY/RETURN AIR: U.V. RESISTANT HYPALON COATED GLASS FABRIC, MINIMUM 24 OZ/SQ.YD. VENTFABRICS - "VENTLON" OR DURODYNE -

3.08 DAMPERS A. BALANCING DAMPERS: SHALL BE INSTALLED WHERE SHOWN ON DRAWINGS AND

AS MAY BE REQUIRED TO BALANCE SYSTEM.

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

RE-TITUS PRICE ANEMOSTAT KRIJEGER OR METALAIRE 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 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 EXACT LENGTHS AND FOR FRAMING AND MITERING ARRANGEMENTS THAT MAY DIFFER FROM THOSE SHOWN ON HVAC DRAWINGS.

SECTION 15081 DUCT INSULATION

A. SECTION INCLUDES SEMIRIGID 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)

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 IN ROLL FORM. 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

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.

DUCT DATA										
DUCTWORK DESCRIPTION	PRESS CLASS	LINER	INSULATION							
SUPPLY	2" WG	1" FIRST 6" OF DUCTWORK	1.5" FOIL FACED INSULATION FOR NON-EXPOSED DUCTWORK							
RETURN	2" WG	1" FIRST 6" OF DUCTWORK	NONE							
HOOD SUPPLY	2" WG	1" FIRST 6' OF DUCTWORK	1.5" FOIL FACED INSULATION FOR NON-EXPOSED DUCTWORK							
HOOD EXHAUST	WIGA WELDED BLOR PACTORY DUCT	NONE	3" OF GREASE RATED ZERO CLEARANCE WRAP							
BATHROOM EXHAUST	2 WG	NONE	NONE							
EXPOSED SUPPLY	2" WG GALVINEAUSPIRAL	NONE	NONE							
OUTDOOR EXTERIOR	2" WG	1" FIRST 6" OF DUCTWORK	2" FSK BOARD WITH VENTURE CLAD JACKET OR EQUIVILENT							

SECTION 15301 HYDRONIC PIPING SYSTEM

CAST BRONZE OR WROUGHT COPPER SOLDER FITTINGS, SCHEDULE 40 CARBON STEEL PIPE WITH THREADED JOINTS AND MALLEABLE IRON FITTINGS, PEX OR OTHER ACCEPTABLE MATERIAL AS DETERMINED BY THE ENGINEER.

- HOT WATER SUPPLY AND RETURN TO BE: SCH 40 WITH THREADED, OR WELDED CONNECTIONS, TYPE L HARD COPPER, PEX OR OTHER ACCEPTABLE MATERIAL AS DETERMINED BY THE ENGINEER - CHILLED WATER SUPPLY AND RETURN TO BE: SDR11 HDPE,

SCH 80 PVC, SCH 40 STEEL WITH THREADED OR WELDED CONNECTIONS OR EQUIVILENT AS DETERMINED BY THE 2. ADJUSTABLE SWIVEL HANGERS: PIPE SIZES 2" AND LESS: CARPENTER AND PATERSON FIG. 800 CONFORMING TO MSS-SP-58 OVERSIZE FOR INSULATED PIPING SYSTEMS. PIPE SIZES LARGER

THAN 2": CARPENTER ANDS PATERSON FIG. 100, OVERSIZE FOR INSULATED PIPING SYSTEMS. 3. BALL VALVES: APOLLO 70-100 SERIES OR EQUAL, BRONZE BODY, FED. SPEC. WW-V-35, TYPE 11, CLASS (BRONZE), STYLE 3, BLOW-OUT PROOF STEM, 600 POUND W.O.G., SCREWED CONNECTION FOR STEEL PIPE, SWEAT CONNECTION FOR COPPER TUBE.

PROVIDE STEM EXTENSION TO ALLOW OPERATION WITHOUT INTERFERING WITH PIPE INSULATION. 4. GATE VALVES: NIBCO MODEL S-113 OR T-113, OR EQUAL, BRONZE

BODY FED. SPEC. WW-V- 54, WEDGE DISC, RISING STEM, SCREWED CONNECTION FOR STEEL PIPE, SWEAT CONNECTION FOR COPPER TUBE, 150-POUND CLASS. 5. OUTSIDE SCREW AND YOKE (OS&Y) GATE VALVES: NIBCO MODEL

F-617-0, IRON BODY, FED. SPEC. WW-V-58 WITH BRONZE TRIM, 125 POUND CLASS OR EQUAL. 6. CHECK VALVES: TACO MPV, FLOWCHECKS, OR EQUAL

ACCORDING TO PIPE SIZES. 7. THERMOMETERS: TRERICE MODEL V80445 OR ASHCROFT SERIES 600A-04. DIAL TYPE. MIL SPEC MIL-T-9955. 4-1/2" DIAMETER FACE. 8. PRESSURE GAUGES: TRERICE SERIES 800 OR ASHCROFT TYPE 1005, GRADE B. ANSI B40.1, 3-1/2" DIAMETER FACE INSTALLED WITH

SHUTOFF PETCOCK AND RESTRICTOR. PRESSURE RANGE: 0-60 PSIG WITH 5 PSI GRADUATIONS, 0-100 PSIG WITH 10 PSI GRADUATIONS FOR CONDENSER WATER PUMPS. 9. MANUAL AIR VENTS: BRASS BODY, FIBER DISCS, 125 PSI WORKING

PRESSURE, AND 240 DEGREE F MAXIMUM TEMPERATURE. ADJUSTABLE FOR QUICK VENTING AT SYSTEM START-UP. 10. AIR SEPERATOR TO TACO OR EQUIVILENT AS SCHEDULED.

SECTION 15302

A. HANGER AND SUPPORT INSTALLATION 1. VERTICAL PIPING: MSS TYPE 8 OR TYP3 42, CLAMPS. 2. INDIVIDUAL, STRAIGHT, HORIZONTAL PIPING RUNS: ACCORDING TO

THE FOLLOWING: A. 100 FEET OR LESS: MSS TYPE 1, ADJUSTABLE, STEEL CLEVIS

B. LONGER THAN 100 FEET: MSS TYPE 43, ADJUSTABLE ROLLER 3. INDIVIDUAL, STRAIGHT, HORIZONTAL PIPING RUNS: ACCORDING TO THE FOLLOWING:

4. ROD DIAMETER MAY BE REDUCED 1 SIZE FOR DOUBLE-ROD HANGERS, WITH 3/8" MINIMUM. RODS.

5. INSTALL HANGERS FOR COPPER PIPING WITH THE FOLLOWING MAXIMUM HORIZONTAL SPACING AND MUNUMUM ROD DIAMETERS: A. NPS 1-1/2 AND NPS 2: 60 INCHES WITH 3/8" ROD. B. NPS 3: 60 INCHES WITH 1/2" ROD. C. NPS 4 AND NPS 5: 60 INCHES WITH 5/8" ROD D. NPS 6: 60 INCHES WITH 1/4" ROD.

E. NPS 8 TO NPS 12: 60 INCEHS WITH 7/8" ROD

F. SPACING FOR 10 FOOT LENGTHS MAY BE INCREASED TO 10 FEET. SPACING FOR FITTINGS IS LIMITED TO 60 INCHES. 6. INSTALL SUPPORTS FOR VERTICAL COPPER PIPING EVERY 15

7.SUPPORT PIPING AND TUBING NOT LISTED ABOVE ACCORDING TO

MSS SP-69 AND MANUFACTURER'S WRITTEN INSTRUCTIONS. 1. HORIZONTAL PIPING SHALL BE SUPPORTED BY FORGED STEEL ADJUSTABLE CLEVIS TYPE "CARPERNTER & PATTERSON" FIG#100 OR 100SH OR APPROVED EQUAL. 2. HANGER RODS AND MAXIMUM SPACING SHALL BE AS FOLLOWS:

2 1/2" & 3" 3. PROVIDE ADDITIONAL SUPPORTS AT CHANGE OF DIRECTION, RUNOUTS, AND CONCENTRATED LOADS DUE TO VALVES, ETC. 4. VERTICAL PIPING SHALL BE SUPPORTED WITH BEARING PLATE ON STRUCTURAL SUPPORT. PROVIDE GUIDES AT EVERY SECOND FLOOR (SPACING NOT TO EXCEDD 25 FT.), SUPPORT AT TOP SHALL BE PROVIDED WITH SPRING HANGER HAVING A PROVISION FOR

8'-- 0"

PIPING INSULATION

EXPANSION.

1 1/2" 8 2"

1. ALL INSULATION MATERIALS INCLUDING JACKETS, FACING, ADHESIVE, COATING AND ACCESSORIES SHALL BE FIRE AND SMOKE HAZARD RATED AND LISTED BY UNDERWRITER'S LABORATORIES, INC. AND COMPLY WITH UL 723 (ASTM E-84). THE FUEL CONTRIBUTED AND SMOKE DEVELOPED SHALL NOT EXCEED 50 AND FLAME SPREAD SHALL NOT EXCEED 25.

B. PIPING INSULATION 1. INSULATION FOR PIPING SHALL BE MOLDED FIBERGLASS, MAXIMUM 0.23 K-FACTOR AT 75 °F MEAN TEMPERATURE, 1/2 LB. DENSITY WITH ALL PURPOSE JACKET (FIRE RETARDANT LAMINATE OF WHITE KRAFT FACING, GLASS SCRIM REINFORCING AND

ALUMINUM FOIL.) C. INSULATION INSTALLATION 1. THIS IS A FOUR PIPE SYSTEM. ALL CHLLED WATER PIPING SHALL BE INSULATED AS A CHILLED WATER SYSTEM WITH SPECIAL CARE TAKEN TO INSURE THE INSULATION SYSTEM IS

VAPOR TIGHT. ALL PUMP BODIES AND FITTINGS MUST BE FULLY

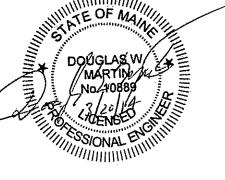
PIPING INSULATION DATA INSULATION WALL INSULATION HICKNESS AT THE GIVEN MATERIAL REQUIRED PIPE DIAMETERS <1" 1" to <1.5" 1.5" to 4 Hydronic Heating Systems (Hot Water Supply and Return) Temperature Range: 141° to 200° F 0.5" Conditioning Foam Condensate Drain Line Glass Fiber 0.5" 0.5" Located Inside Cooling Systems (Chilled Water) Range: 40° F 1

SECTION 15305 EQUIPMENT

ALL EQUIPMENT TO BE AS SCHEDULED PER M-3

1. PROVIDE QUALIFIED PERSONNEL, EQUIPMENT, APPARATUS AND SERVICES FOR START UP, TESTING AND BALANCING OF MECHANICAL SYSTEMS, 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 ATC START-UP PROCEDURES REQUIRE THE COOPERATION OF THE BALANCING CONTRACTOR, THE EQUIPMENT MANUFACTURER'S REPRESENTATIVE AND THE ATC CONTRACTOR.

DESIGN CONSULTANTS



PERMIT SET

This drawing is not intended, nor shall be used for, construction, unless the signed professional seal of a Registered Engineer or Consultant of W.H. Demmons Inc. is affixed.

REVISIONS

Checked by: DWM

HVAC SCHEDULES AND SPECIFICATIONS

Date: 3/20/14 Project #: 56923 Scale: 1/8"=1'-0 Drawn by: JLR/MGR

RD&G SCHEDULE											
			Neck Size								
Tag	Manufacturer	Model	(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	Drum Louver			
R-1	TBD	TBD	TBD	TBD	1800	<25	TBD	Side Wall Return Grille			
R-2	TBD	TBD	TBD	TBD	2750	<25	TBD	Side Wall Return Grille			
R-3	TBD	TBD	TBD	TBD	1200	<25	TBD	Side Wall Return Grille			

	Wodel Nulliber	Volume				Electric	······································
-		CFM	(in. wg.)	(rpm)		V/Ph/Hz	
Panasonic	FV-13VKM3	135	0.25	917	21.5 W	120/1/60	
ATHROOMS/MECH. ROOM	ATHROOMS/MECH. ROOM Panasonic	ATHROOMS/MECH. ROOM Panasonic FV-13VKM3					
	Panasonic	Panasonic FV-13VKM3				 	4

FAN SCHEDULE

												•	<u> </u>	(-3 IBD	IBD
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	Fan Motor	-	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"

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