

MECHANICAL SPECIFICATIONS:

GENERAL

- CONTRACTOR SHALL VISIT THE SITE TO DETERMINE PRE-EXISTING CONDITIONS AND ALL WORK NECESSARY, PRIOR TO BIDDING. VERIFY ALL MEASUREMENTS AND EXISTING CONDITIONS IN THE FIELD. GENERAL SCHEMATIC LAYOUT IS INDICATED; ALL OFFSETS, OBSTRUCTIONS, AND EXISTING CONFIGURATIONS AND CONSTRAINTS MUST BE FIELD VERIFIED.
- OBTAIN NECESSARY PERMITS AND PAY ASSOCIATED FEES.
- COORDINATE ANY SERVICE DISRUPTIONS WITH THE OWNER.
- INSTALL ALL COMPONENTS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS AND ALL LOCAL CODES AND STANDARDS.
- DRAWINGS ARE DIAGRAMMATIC ONLY; FIELD-VERIFY ALL EXISTING CONDITIONS. COORDINATE INSTALLATIONS WITH OTHER TRADES. COORDINATE ELECTRICAL POWER REQUIREMENTS FOR ALL MOTORS.
- THE INTENTION OF THESE CONTRACT DOCUMENTS IS TO CALL FOR FINISHED WORK, FULLY TESTED AND READY FOR OPERATION. ANY COMPONENTS OR LABOR NOT MENTIONED IN THE CONTRACT DOCUMENTS BUT REQUIRED FOR FUNCTIONING SYSTEMS SHALL BE PROVIDED. SHOULD THERE APPEAR TO BE ANY DISCREPANCIES OR QUESTIONS OF INTENT, THE CONTRACTOR SHALL REFER THE MATTER TO THE ARCHITECT FOR DECISION BEFORE START OF ANY RELATED WORK.
- PERFORM WORK IN ACCORDANCE WITH LOCAL CODES.
- SEAL ALL DUCT AND PIPE PENETRATIONS WITH FIRE SEALANT.
- OBSERVE THE OWNER'S CLEANLINESS PROTOCOLS.
- CONTRACTOR TO FILL OUT AND SUBMIT MMC FORM FOR NEW PROJECT EQUIPMENT PRIOR TO SUBSTANTIAL COMPLETION. SEE SAMPLE FORM ON M-601. BLANK FORM WILL BE PROVIDED TO MECHANICAL CONTRACTOR IN EXCEL FORMAT AFTER CONTRACT IS AWARDED.

METAL DUCTWORK

- GALVANIZED STEEL DUCTWORK: ASTM A653 GALVANIZED STEEL SHEET, LOCK-FORMING QUALITY, AND G90 ZINC COATING. ALL DUCTWORK SHALL BE FURNISHED AND INSTALLED IN ACCORDANCE WITH SMACNA STANDARDS. CONSTRUCT DUCT SYSTEMS SO THAT LEAKAGE DOES NOT EXCEED ONE PERCENT OF THE TOTAL AIR QUANTITIES. SEAL ALL DUCT JOINTS WITH GASKETED CONNECTIONS, DUCTMATE, OR EQUAL. PROVIDE VOLUME DAMPERS AT ALL BRANCH DUCTS.

MECHANICAL INSULATION

- ALL SUPPLY DUCTS SHALL BE EXTERNALLY INSULATED WITH FIBERGLASS DUCT WRAP EQUAL TO SCHULLER MICOLITE TYPE 75, ASTM C533, NONCOMBUSTIBLE BLANKET, 1-1/2" THICK.
- ALL CHILLED WATER PIPING SHALL BE INSULATED WITH 1" THICK FIBERGLASS PIPE INSULATION WITH FSK JACKET AND VAPOR BARRIER.
- ALL HOT WATER PIPING SHALL BE INSULATED WITH 1" THICK FIBERGLASS PIPE INSULATION WITH FSK JACKET.
- ALL COOLING COIL CONDENSATE PIPING SHALL BE INSULATED WITH 1/2" FIBERGLASS INSULATION WITH FSK JACKET.

HUMIDIFIERS

- A. DESCRIPTION: STEAM VALVE, SEPARATOR, AND DISPERSION TUBE EXTENDING ACROSS ENTIRE WIDTH OF DUCT AND EQUIPPED WITH MOUNTING BRACKETS FOR BOTH ENDS OF TUBE.
- B. DISPERSION TUBE: ASTM A, TYPE 304 STAINLESS STEEL, JACKETED. SIMILAR TO DRI-STEAM MINI-BANK.
- C. CONTROL VALVE: NORMALLY CLOSED VALVE, WITH SEAT AND STEM MATCHED TO DELIVER REQUIRED STEAM FLOW.
- ACTUATOR: ELECTRIC, MODULATING, WITH SPRING RETURN.
- F. STEAM TRAP: INVERTED-BUCKET TYPE, SIZED FOR MAXIMUM CONDENSATE FLOW.
- G. OPTIONAL ACCESSORIES: INCLUDE THE FOLLOWING:
- ROOM MOUNTED HUMIDISTAT.
 - DUCT-MOUNTED, HIGH-LIMIT HUMIDISTAT.
 - IN-LINE STRAINER.
 - AIRFLOW SWITCH TO PREVENT HUMIDIFIER OPERATION WHEN THERE IS NO AIRFLOW.

AUTOMATIC TEMPERATURE CONTROLS

- THE CONTROLS FOR THIS PROJECT WILL BE AN EXTENSION OF THE EXISTING HONEYWELL CONTROL SYSTEM. ALL NEW CONTROLLERS SHALL BE HONEYWELL COMFORT POINT OPEN CONTROLLERS.
- PROVIDE CONTROLS TO MEET THE SEQUENCE OF OPERATIONS. MONITOR FIRE DAMPER STATUS THRU BMS AS INDICATED.
- THERMOSTAT: ZONE THERMOSTAT SHALL BE SIMILAR TO EXISTING WITH SETPOINT ADJUSTMENT, NIGHT SETBACK OVERRIDE AND CANCEL BUTTONS, AND A COMMUNICATIONS JACK.
- CONTROLS TESTING SHALL BE ACCOMPLISHED ON EACH CONTROL DEVICE. ACTUATORS SHOULD BE CHECKED AND ADJUSTED FOR START AND EXTENT OF TRAVEL. ALL RELAYS AND ADAPTERS SHOULD BE CHECKED SHOULD FOR PROPER OPERATION. CONTROLLERS SHOULD BE CHECKED FOR PROPER ACTION. ALL SYSTEM INTERLOCKS, INTERCONNECTIONS, AND SAFETY DEVICES SHOULD BE CHECKED FOR PROPER FUNCTION.
- ALL CONTROL DEVICES SHALL BE ADJUSTED AND CALIBRATED. ALL CONTROL SETTINGS SHOULD BE VERIFIED BY COMPARING ACTUAL INPUT AND OUTPUT VALUES TO CALIBRATED VALUES.
- FURNISH ALL COMPONENTS AS REQUIRED FOR COMPLETE AND FUNCTIONING SYSTEM. PROVIDE DDC CONTROL WITH FULLY MODULATING ACTUATORS.
- COORDINATE SENSOR LOCATIONS.
- START-UP: PROVIDE ALL REQUIRED SOFTWARE MODIFICATIONS AND DE-BUGGING. ALLOW SUFFICIENT TIME FOR START-UP PRIOR TO PLACING CONTROL SYSTEMS IN PERMANENT OPERATION. ALLOW FOR COORDINATION WITH THE TESTING, ADJUSTING, AND BALANCING CONTRACTOR. ASSISTANCE SHALL BE PROVIDED AS REQUIRED FOR REPROGRAMMING, COORDINATION, AND PROBLEM RESOLUTION.
- REMOVE ALL UNUSED OLD CONTROLS, DEVICES, WIRING AND EBI POINTS AT PROJECT COMPLETION.
- PROVIDE IN-SERVICE/TRAINING WITH INSTALLATION OF ANY NEW EQUIPMENT.
- PROVIDE CONTROLS TO MEET MMC FACILITIES ENGINEERING STANDARDS TO INCLUDE, BUT NOT LIMITED TO:
 - EBTRON AIR SENSORS IN AHU DUCTWORK
 - PIPE CONDUITS INTO SIDES AND BOTTOMS OF CONTROL CABINETS.

HYDRONIC PIPING

- PROVIDE ALL PIPING COMPLETE WITH FITTINGS, VALVES, STRAINERS, MOTORIZED VALVE OPERATORS, STRAINERS, HANGERS, SUPPORTS, GUIDES, SLEEVES, AND ACCESSORIES.
- ALL PRESSURIZED PIPING TO BE TESTED HYDROSTATICALLY TO 150 PSI OR 150% OF OPERATING PRESSURE, WHICHEVER IS GREATER, BUT NEVER EXCEED TEST PRESSURE ANSI B16.1 BASIS. TEST DURATION TO BE 2 HOURS WITH NO PRESSURE CHANGE CORRECTED FOR TEMPERATURE CHANGE.
- REPAIR OR REPLACE LEAKS OR DEFECTS WITHOUT ADDITIONAL COST.
- PROVIDE DIELECTRIC NIPPLES WHERE DISSIMILAR METALS ARE TO BE JOINED. DIELECTRIC UNIONS ARE NOT ACCEPTABLE.
- PROVIDE ADEQUATE SUPPORT FOR PIPE AND CONTENTS TO PREVENT SAGGING, VIBRATION, OR SWAYING AND ALLOW FOR EXPANSION AND CONTRACTION. PROVIDE SUPPLEMENTAL STEEL AS REQUIRED WHERE STRUCTURE CANNOT SUPPORT POINT LOADS.
- PROVIDE CONTINUOUS 1" FIBERGLASS INSULATION FOR ALL HEATING HOT WATER PIPING.
- ALL INSULATION SHALL HAVE COMPOSITE FIRE AND SMOKE HAZARD RATINGS THAT SHALL NOT EXCEED A FLAME SPREAD OF 25 AND A SMOKE DEVELOPED RATING OF 50.
- HYDRONIC PIPING SHALL BE COPPER, TYPE L, HARD DRAWN IN ACCORDANCE WITH ASTM B88, AND LEAD-FREE SOLDER JOINTS, OR THREADED STEEL.
- INSPECTIONS AND TESTS SHALL BE PERFORMED ON THE PIPING INSTALLATION AS REQUIRED BY CODE.

TESTING, ADJUSTING, AND BALANCING

- TESTING AND BALANCING CONTRACT SHALL BE THROUGH THE GENERAL CONTRACTOR. SEE ARCHITECTURAL SPECIFICATIONS.
- CONTRACTOR SHALL PROVIDE TESTING, ADJUSTING, AND BALANCING FOR ALL AIR SYSTEMS AND HYDRONIC SYSTEMS.
- ADJUST ALL AIRFLOWS TO PLUS/MINUS 5% OF VALUES SHOWN ON THE DRAWINGS.
- TAB CONTRACTOR SHALL CONFIRM THAT ALL EQUIPMENT IS INSTALLED CORRECTLY AND STARTED UP CORRECTLY PRIOR TO BALANCING.
- TAB CONTRACTOR SHALL CONFIRM THAT CONTROLS AND TERMINAL BOXES ARE CALIBRATED PRIOR TO BALANCING.
- TAB CONTRACTOR SHALL SUBMIT A TAB REPORT AT THE COMPLETION OF WORK.

MECHANICAL IDENTIFICATION

- PROVIDE PIPE LABELS ON ALL PIPING.
- PROVIDE A TAG ON ALL EQUIPMENT
- PROVIDE DUCT LABELS ON ALL SUPPLY, RETURN, AND EXHAUST DUCTWORK.
- PROVIDE VALVE TAGS ON ALL VALVES. PROVIDE A VALVE TAG SCHEDULE.

MECHANICAL EQUIPMENT

- PROVIDE AND INSTALL MECHANICAL EQUIPMENT AS SCHEDULED, UNLESS NOTED OTHERWISE.
- PROVIDE IN-SERVICE/TRAINING WITH INSTALLATION OF ANY NEW EQUIPMENT.

TERMINAL BOXES

- PROVIDE AND INSTALL TERMINAL BOXES WITH HOT WATER REHEAT COILS AS SCHEDULED.
- TERMINAL BOXES SHALL BE DOUBLE WALLED, WITH SOLID SHEET METAL INTERIOR LINER COVERING ALL INSULATION.
- BASIS OF DESIGN: TRANE MODEL VCVF.

STEAM SYSTEM:

- A. LOW PRESSURE, NOT EXCEEDING 15 PSIG:
- LOW PRESSURE STEAM PIPE: STEEL, SCHEDULE 40 ERW, WELDED OR SEAMLESS IN ACCORDANCE WITH ASTM A53 OR AL20.
 - LOW PRESSURE CONDENSATE RETURN PIPE: STEEL, SCHEDULE 80, IN ACCORDANCE WITH ASTM A120.
 - FITTINGS:
 - 2 IN. AND SMALLER: SCREWED JOINTS, 125 LB WSP CAST IRON FITTINGS.
 - 2-1/2 AND LARGER: 150 LB WSP FLANGED OR BUTT-WELDED FITTINGS.
- B. LOW PRESSURE STEAM VALVES:
- 2 IN. AND SMALLER: SCREWED ENDS, 150 LB WSP
 - GATE VALVE: BRONZE THREADED ENDS SOLID WEDGE, INSIDE SCREW TRAVELING STEM UNION BONNET SIMILAR TO JENKINS FIG. 47U.
 - GLOBE VALVE: BRONZE, REGRIND-RENEW, 500 BRINELL STAINLESS STEEL PLUG DISC AND 425 BRINELL SEAT RING, UNION BONNET. 150 LB WSP SIMILAR TO JENKINS FIG. 546P.
 - SWING CHECK VALVE: 300 LB WSP, BRONZE BODY, REGRIND BRONZE DISC SIMILAR TO JENKINS FIG. 762A.
 - Y-TYPE STRAINER: 316 STAINLESS STEEL SCREEN, SCREWED WITH FACED CAP STRAIGHT THREAD AND GASKET SIMILAR TO MUELLER STEAM NO. 11.
 - 2-1/2 IN. AND LARGER: FLANGED ENDS, 125 LB WSP CAST IRON.
 - GATE VALVE: IRON BODY, BRONZE MOUNTED, SOLID WEDGE OS&Y RISING SPINDLE SIMILAR TO JENKINS FIG. 651-C.
 - GLOBE VALVE: TO 4 IN. 250 LB WSP REGRIND-RENEW IRON BODY GLOBE, 500 BRINELL STAINLESS STEEL PLUG AND DISCS, OS&Y SIMILAR TO JENKINS FIG. 923P.
 - SWING CHECK VALVE: IRON BODY REGRIND-RENEW, BRONZE DISK, SIMILAR TO JENKINS FIG. 624.
 - Y-TYPE STRAINER: 316 STAINLESS STEEL SCREEN FLANGED WITH BOLTED COVER SIMILAR TO MUELLER STEAM SPECIALTY MUESSCO NO 751 OR NO 752.

STEAM SYSTEM:

- D. SILENT CHECK VALVES, SPRING LOADED, GLOBE TYPE, FLANGED:
- TO 250 PSIG CHECK VALVES SHALL BE IRON BODY, BRONZE TRIM. SIMILAR TO MUESSCO TYPE 103AP OR 107-AP.
- F. LUBRICATED PLUG VALVES:
- SCREWED ENDS UP TO 2 IN., FLANGED 2-1/2 IN. AND LARGER.
 - SYSTEM LESS THAN 100 PSIG, VALVE SHALL BE MINIMUM 200 LB WOG CLASS CAST IRON BODY. ROCKWELL-NORDSTROM NUMBERS 114, 115, 185 AND 149.
 - Y-TYPE STRAINERS:
 - PROVIDE SCREWED ENDS TO 2 IN. AND FLANGED 2-1/2 IN. AND LARGER WITH BODY AS FOLLOWS:
 - TO 100 PSIG: 125 LB WSP CLASS, CAST IRON.
 - SCREENS TO BE 316 STAINLESS STEEL.
 - PROVIDE SCREWED WITH FACED CAP, STRAIGHT THREAD AND GASKET, SIMILAR TO MUELLER STEAM SPECIALTY MUESSCO NO. 11. PROVIDE FLANGED WITH BOLTED COVER SIMILAR TO MUELLER STEAM SPECIALTY MUESSCO NO. 751 OR NO. 752.
- F. STEAM TRAPS:
- TRAPS: 125 PSIG WORKING PRESSURE, BASED AT 300 PERCENT MAXIMUM LOAD, MAXIMUM 1 PSIG PRESSURE DIFFERENTIAL, 1/2 IN. MINIMUM SIZE AND CONDENSATE AT STEAM TEMPERATURE.
 - THERMOSTATIC TRAPS: BODY AND CAP SHALL BE CAST BRASS, OR STAINLESS STEEL. THERMOSTATIC ELEMENT SHALL BE PHOSPHOR BRONZE, MONEL METAL, OR STAINLESS STEEL WITH BALANCED PRESSURE CORRUGATED BELLOWS OR DUPLEX DIAPHRAGM. THERMOSTATIC TRAPS SHALL BE REPLACEABLE AS UNIT WITHOUT FIELD ADJUSTMENT. VALVE HEADS SHALL BE PERMANENTLY ADJUSTED, SELF-ALIGNING, STAINLESS STEEL. VALVE SEAT SHALL BE RENEWABLE, SHARP EDGED, STAINLESS STEEL, SIMILAR TO SARCO CO.: TYPE TB-25.
 - FLOAT AND THERMOSTATIC TRAPS: BODY SHALL BE CAST IRON. BELLOWS SHALL BE BALANCED PRESSURE, BRONZE, MONEL METAL, OR STAINLESS STEEL. FLOAT SHALL BE STAINLESS STEEL OR SEAMLESS COPPER. WATER VALVE AND SEAT SHALL BE STAINLESS STEEL. VALVE OPERATING PARTS SHALL BE DOUBLE FULCRUM TYPE, STAINLESS STEEL. AUTOMATIC AIR VENTS SHALL BE MULTIPLE BELLOWS, STAINLESS STEEL VALVE AND SEAT. INTEGRAL PARTS SHALL BE REMOVABLE AND REPLACEABLE WITHOUT BREAKING PIPE CONNECTIONS. PROVIDE TRAPS SIMILAR TO SARCO CO. FTB.
 - INVERTED BUCKET TRAPS: BODY AND CAP SHALL BE CAST IRON. INLET SHALL BE WROUGHT IRON. VALVE AND SEAT SHALL BE CHROME STEEL. GUIDE PIN ASSEMBLY, LEVER, BUCKET, VALVE RETAINER AND BODY THIMBLE SHALL BE STAINLESS STEEL. STRAINER BUSHING GASKET AND COVER BASKET SHALL BE NON-ASBESTOS TYPE ELASTOMETER. INTERNAL PARTS SHALL BE REMOVABLE AND REPLACEABLE WITHOUT BREAKING PIPE CONNECTIONS. CAST IRON TRAPS SIMILAR TO SARCO B SERIES.
- F. PITCH STEAM AND CONDENSATE 1 IN. IN 40 FT DOWN IN DIRECTION OF FLOW. STEAM RISER BRANCHES AND UNDRIPPED CONNECTIONS 1 IN. IN 10 FT UP IN DIRECTION OF STEAM FLOW.
- G. INSTALL PIPING TO PERMIT FREE EXPANSION AND CONTRACTION WITHOUT DAMAGING PIPING OR CONSTRUCTION. PROVIDE 3 ELBOW TYPE SWING JOINTS AT CONNECTION TO EQUIPMENT AND PIPING SYSTEMS. PROVIDE 12 IN. LONG DIRT POCKETS AT BOTTOM OF EACH RISER SAME SIZE AS RISER. PROVIDE DRIPS AT MAXIMUM 75 FT INTERVALS, AT BOTTOM OF VERTICAL LINES AND AT RISING POINTS IN PIPING.
- H. INSULATION: FIBERGLASS WITH JACKET WITH VAPOR RETARDER. APPLY THE FOLLOWING INSULATION THICKNESSES:
 - PIPING UP TO 1 1/2": 1.5" THICKNESS.
 - PIPING 2" AND GREATER: 3.0" THICKNESS.

FIRE DAMPERS

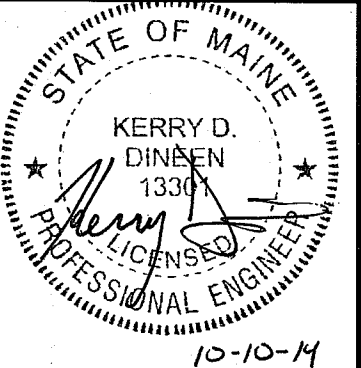
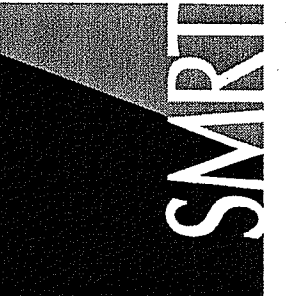
- UL LISTED, GALVANIZED STEEL CONSTRUCTION, MULTI-BLADED TYPE, SPRING LOADED, EQUIPPED WITH FUSIBLE LINK, CONFORMING TO NFPA STANDARD 90A. SIMILAR TO RUSKIN FD60, STYLEC, 1-1/2 HR RATED.
- PROVIDE END SWITCH TO REMOTELY INDICATE DAMPER POSITION.
- PROVIDE SLEEVE LENGTH AS REQUIRED TO SUIT FIELD CONDITIONS.

GENERAL DAMPERS

- DAMPERS SHALL BE AIRFOIL TYPE EXTRUDED ALUMINUM FOR SUPERIOR PRESSURE DROP AND LOW NOISE.
- FRAMES SHALL BE 5"x1"x0.125"(MINIUM THICKNESS) 6063T5 EXTRUDED ALUMINUM. BLADE SEALS SHALL BE FLEXIBLE FOR SUITABLE FOR -72F TO +275F. JAMB SEALS SHALL BE FLEXIBLE STAINLESS STEEL, COMPRESSION TYPE.
- DAMPER SHALL MEET LEAKAGE REQUIREMENTS OF LESS THAN 3CFM/FT² AT 1" OF STATIC PRESSURE.
- DAMPER ACTUATORS SHALL BE SPRING RETURN TYPE AND SIZED PER MANUFACTURES RECOMMENDATIONS.
- DAMPER SHALL BE RUSKIN MODEL CD50 OR SIMILAR.

144 Fore Street/P.O. Box 618
Portland, Maine 04104
Tel. (207) 772-3846
Fax. (207) 772-1070
www.smartinc.com

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MAINE MEDICAL CENTER
NUCLEAR MEDICINE RENOVATIONS - PHASE 2
PORTLAND, MAINE

ISSUED FOR CONSTRUCTION
10-10-14

REV	DATE	DESCRIPTION
0	10-10-14	ISSUED FOR CONSTRUCTION

GRAPHIC SCALE:
0" 1"

SCALE: NO SCALE
PROJECT MANAGER: DJV
JC/DRAWN BY: FV
A/E OF RECORD: KDD
CAD FILE: M-002-14113
PROJECT NO: 14113
DATE: 10-10-14

SHEET TITLE:
SPECIFICATIONS

SHEET No.
M-002
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