

# SPECIFICATIONS AND NOTES

## GENERAL

- 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.
- RENOVATION WORK WILL TAKE PLACE IN AN OCCUPIED HOSPITAL. INSTALLATIONS SHALL NOT AFFECT ONGOING OPERATIONS. HOURS AVAILABLE TO PERFORM WORK AND DISRUPTION TO OPERATION OF SYSTEMS AND UTILITIES WILL NEED TO BE COORDINATED WITH MERCY HOSPITAL.
- OBTAIN NECESSARY PERMITS AND PAY ASSOCIATED FEES.
- COORDINATE ANY SERVICE DISRUPTIONS WITH THE OWNER. INSTALL ALL COMPONENTS IN ACCORDANCE WITH MANUFACTURER RECOMMENDATIONS, ALL LOCAL CODES AND STANDARDS, AND MERCY HOSPITAL REQUIREMENTS. 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 THROUGH FIRE RATED WALLS AND FLOORS WITH FIRE SEALANT.
- OBSERVE THE OWNER'S CLEANLINESS PROTOCOLS.

## FIRE PROTECTION

- RE-WORK EXISTING SPRINKLER HEAD LOCATIONS AS REQUIRED TO FIT NEW CEILING GRID. MAKE MODIFICATIONS TO EXISTING SPRINKLER SYSTEM IN CONFORMANCE WITH NFPA 13 AND AUTHORITY WITH JURISDICTION REQUIREMENTS AS REQUIRED.
- COORDINATE ANY SYSTEM IMPAIRMENTS WITH MERCY HOSPITAL. BEFORE SHUTTING OFF A SECTION OF THE SPRINKLER SYSTEM TO MAKE SPRINKLER TIE-INS, NOTIFY THE LOCAL FIRE DEPARTMENT, PLAN THE WORK CAREFULLY, AND ASSEMBLE ALL MATERIALS TO ENABLE COMPLETION IN THE SHORTEST TIME POSSIBLE. WORK STARTED ON CONNECTIONS SHOULD BE COMPLETED WITHOUT INTERRUPTION AND PROTECTION RESTORED AS PROMPTLY AS POSSIBLE. DURING THE IMPAIRMENT, PROVIDE EMERGENCY HOSE EXTINGUISHERS AND MAINTAIN EXTRA WATCH SERVICE IN THE AFFECTED AREAS.

## MECHANICAL VIBRATION AND SEISMIC CONTROLS

- MECHANICAL EQUIPMENT, PIPING, AND DUCTWORK SHALL BE MOUNTED ON VIBRATION ISOLATORS TO PREVENT THE TRANSMISSION OF VIBRATION AND MECHANICALLY TRANSMITTED SOUND TO THE BUILDING STRUCTURE.
- MECHANICAL SYSTEMS SHALL BE SEISMICALLY BRACED TO ALLOW THEM TO REMAIN IN PLACE WITHOUT SEPARATION OF ANY PART WHEN SUBJECTED TO THE SEISMIC FORCES SPECIFIED AND THE SYSTEMS WILL BE FULLY OPERATIONAL AFTER THE SEISMIC EVENT. MECHANICAL SYSTEMS WILL INCLUDE ALL NEW EQUIPMENT, DUCTWORK AND PIPING.
- REQUIREMENTS:
  - APPLICABLE CODE: INTERNATIONAL BUILDING CODE 2009.
  - GENERAL: PERFORMANCE REQUIREMENTS TO BE USED IN THE DESIGN OF SEISMIC CONTROLS SHALL USE DESIGN FORCES CALCULATED AS FOLLOWS:
    - OCCUPANCY CATEGORY: IV.
    - SEISMIC DESIGN CATEGORY: C.
    - COMPONENT IMPORTANCE FACTOR (IP): 1.5.

## PIPING INSULATION

- FLEXIBLE ELASTOMERIC THERMAL INSULATION, EQUAL TO NOMACO K-FLEX LS, 25 FLAME SPREAD, 50 SMOKE DEVELOPED. COOLING COIL CONDENSATE: 2" THICKNESS OUTSIDE OF BUILDING AND 1" THICKNESS INSIDE OF BUILDING. APPLY CONTINUOUS PVC JACKETING ON OUTDOOR INSTALLATIONS. REFRIGERANT SUCTION PIPING: 1" THICKNESS.

## PIPING

- ALL PIPING SHALL BE PRESSURE TESTED. SUPPORT ALL PIPING IN ACCORDANCE WITH MSS STANDARD PRACTICE SP-69. PROVIDE ADJUSTABLE CLEVIS HANGERS, WITH INSULATION SHIELDS AS REQUIRED.
- FORCED DWV AND INDIRECT WASTE: COPPER TUBE, TYPE L; COPPER PRESSURE FITTINGS; SOLDERED JOINTS.

## 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.
- PROVIDE VOLUME DAMPERS AT ALL BRANCH DUCTS.
- INSULATE SUPPLY DUCTWORK WITH 1-1/2" FIBERGLASS BLANKET WITH VAPOR BARRIER JACKET EQUAL TO SCHULLER MICROLITE TYPE 75, ASTM C533, WITH FSK FACING.
- SEAL NEW AND EXISTING DUCTWORK (WHERE POSSIBLE) TO SMACNA SEAL CLASS A STANDARDS.

## INSULATED FLEXIBLE DUCTS

- ALUMINUM LAMINATE AND POLYESTER FILM WITH LATEX ADHESIVE SUPPORTED BY HELICALLY WOUND SPRING STEEL WIRE, FIBERGLASS INSULATION, POLYETHYLENE VAPOR BARRIER FILM. R-VALUE = 4.2, UL 181, CLASS 1.

## IDENTIFICATION

- PIPE-MARKING LABELS: FURNISH AND INSTALL IN ACCORDANCE WITH ANSI/OSHA REQUIREMENTS. IDENTIFY VALVES WITH TAGS. IDENTIFY ALL EQUIPMENT SUCH AS AIR CONDITIONING UNITS, VAV BOXES AND CONDENSING UNITS WITH TAGS.

## TESTING, ADJUSTING, AND BALANCING (T-A-B)

- TEST, ADJUST, AND BALANCE EQUIPMENT AND DISTRIBUTION SYSTEMS IN ACCORDANCE WITH NEBB OR AABC PROCEDURAL STANDARDS.
- T-A-B ALL NEW AND REVISED AIR INLETS AND OUTLETS, INCLUDING DESIGN AND ACTUAL CFM.

## MEDICAL GAS AND VACUUM PIPING

- PROVIDE ALL PIPING COMPLETE WITH FITTINGS, VALVES, HANGERS, SUPPORTS, GUIDES, SLEEVES, AND ACCESSORIES.
- INSTALL ALL MEDICAL GAS PIPING TO NFPA 99, LEVEL 1 REQUIREMENTS.
- PROVIDE MEDICAL GAS OUTLETS, ZONE VALVE BOX, AND AREA ALARM PANEL AS SHOWN ON THE DRAWINGS. ACCEPTABLE MANUFACTURERS ARE: BEACON MEDAES AS REQUIRED BY MERCY HOSPITAL.
- OXYGEN PIPING SHALL BE TYPE "L" COPPER, CLEANED AND SEALED FOR OXYGEN SERVICE. MEDICAL VACUUM PIPING SHALL BE TYPE "L" COPPER.
- ALL JOINTS SHALL BE BRAZED. BRAZING FILLER METALS SHALL BE AWS A5.8, BCUP SERIES ALLOYS. FLUX IS PROHIBITED UNLESS USED WITH BRONZE FITTINGS.
- VALVES SHALL BE FACTORY CLEANED FOR OXYGEN SERVICE, EXCEPT FOR VALVES IN VACUUM PIPING.
- ZONE VALVES: MSS SP-110, 3-PIECE-BODY, FULL-PORT COPPER-ALLOY BALL VALVE RATED FOR 300-PSIG MINIMUM WORKING PRESSURE; WITH CHROME-PLATED BRASS BALL, PTFE OR TFE SEATS, BLOWOUT-PROOF STEM, THREADED OR SOLDER-JOINT ENDS, AND HANDLE DESIGNED FOR QUARTER TURN BETWEEN OPENED AND CLOSED POSITIONS.
  - INCLUDE UNION-TYPE BODY WITH BOLTED SWING-AWAY CENTER SECTION.
  - INCLUDE FACTORY-INSTALLED ASTM B 819, TYPE K OR L, COPPER-TUBE EXTENSIONS WITH PRESSURE GAUGE FOR PRESSURE SYSTEMS AND VACUUM GAUGE FOR VACUUM SYSTEMS. ZONE VALVE BOXES: FORMED STEEL FOR RECESSED MOUNTINGS, WITH HOLES FOR MEDICAL GAS PIPING AND ANCHORS. INCLUDE BOXES FOR SINGLE- OR MULTIPLE-VALVE INSTALLATION WITH PRESSURE GAGE AND IN SIZES TO PERMIT MANUAL OPERATION OF VALVES.
  - INTERIOR FINISH: FACTORY-APPLIED WHITE ENAMEL.
  - COVER PLATE: ANODIZED ALUMINUM WITH FRANGIBLE OR REMOVABLE WINDOWS.
  - VALVE-BOX WINDOWS: CLEAR OR TINTED TRANSPARENT PLASTIC WITH LABELING THAT INCLUDES ROOMS SERVED, ACCORDING TO NFPA 99.
- INTERRUPTION OF EXISTING MEDICAL GAS SERVICE:
  - CONTRACTOR SHALL NOT INTERRUPT MEDICAL GAS SERVICE TO OCCUPIED FACILITIES. UNDER NO CONDITIONS SHALL MEDICAL GAS SERVICE VALVES (EXISTING OR NEW) BE CLOSED BY THE CONTRACTOR.
  - OWNER SHALL BE RESPONSIBLE FOR ISOLATING PORTIONS OF EXISTING SYSTEMS AND CLOSING SERVICE VALVES AS REQUIRED; INCLUDING VERIFYING PROPER SERVICE VALVE OR ZONE VALVE LABELING, AND EXACT AREAS AND ROOMS CONTROLLED.
- MEDICAL GAS SYSTEM ISOLATION:
  - TOTAL ISOLATION BETWEEN NEW SYSTEMS AND EXISTING SYSTEMS SHALL BE MAINTAINED UNTIL ALL NEW PIPING IS TESTED FOR LEAKS AND TESTED FOR CROSS CONNECTIONS PER NFPA 99 BY THE CONTRACTOR.
- ALL MEDICAL GAS AND VACUUM PIPING SHALL BE TESTED AND CERTIFIED AS REQUIRED IN NFPA 99.

# AUTOMATIC TEMPERATURE CONTROLS

## GENERAL SCOPE OF THE CONTROL WORK:

- THE TEMPERATURE CONTROL WORK ON THE PROJECT SHALL BE AN EXTENSION OF THE EXISTING SIEMENS DDC SYSTEM.
- PROVIDE NEW CONTROLS INCLUDING CONTROL VALVES, PRESSURE SENSORS, HUMIDITY SENSORS, SPACE TEMPERATURE SENSORS, AND VAV BOX CONTROLLERS AS INDICATED ON THE DRAWINGS. PROVIDE TEMPERATURE SENSORS, WHERE INDICATED OR AS REQUIRED TO MEET THE SEQUENCES.

## GENERAL SYSTEM STARTUP:

- THE MECHANICAL AND PLUMBING SYSTEMS, INCLUDING THE HUMIDIFIERS, VAV TERMINALS, AC UNITS, AND TERMINAL EQUIPMENT, SHALL BE CYCLED THROUGH THE ACTION OF THE DDC SYSTEM AS DESCRIBED HEREIN. SUBMIT PROPOSED SEQUENCE OF OPERATION, POINTS LIST AND SCHEMATIC DIAGRAM FOR EQUIPMENT NOT INCLUDED IN THOSE SEQUENCE OF OPERATIONS.

# SEQUENCES OF OPERATION

## VAV BOX W/ HOT WATER REHEAT (EXISTING):

- GENERAL ZONE CONTROL:
  - DEDICATED, SINGLE SENSOR ZONES SHALL BE CONTROLLED FROM SENSORS AS SHOWN ON THE "M" DRAWINGS. ZONE SENSORS SHALL HAVE THE CAPABILITY OF EITHER AN AVERAGE SENSOR INPUT OR ANY ONE INDIVIDUAL SENSOR INPUT. PROGRAMMING SHALL BE FULL AVERAGED INPUT. THE VARIABLE VOLUME TERMINAL BOX (TV) IS CONTROLLED INDEPENDENT OF SYSTEM PRESSURE FLUCTUATIONS.
  - OCCUPIED ZONE CONTROL:
    - THE VAV IS CONTROLLED BETWEEN MAXIMUM AND MINIMUM SUPPLY AIR VOLUME SETTINGS. THE CONTROLLER MONITORS THE ROOM TEMPERATURE SENSOR AND AIR VELOCITY SENSOR AND MODULATES THE SUPPLY AIR DAMPER IN SEQUENCE WITH THE REHEAT VALVE, AND RADIATION VALVE TO MAINTAIN THE ROOM TEMPERATURE AT SETPOINT.
  - HEATING MODE:
    - THE ZONE HEATING MODE IS DEFINED AS ANY SENSED TEMPERATURE LESS THAN 1 DEGREE BELOW SETPOINT. IN HEATING MODE, THE FINNED TUBE RADIATION WILL MODULATE BASED ON THE OUTSIDE AIR REHEAT SCHEDULE. THE VAV TERMINAL SHALL MODULATE TO MINIMUM AND THE REHEAT VALVES SHALL MODULATE TO MAINTAIN SPACE SETPOINT.
  - COOLING MODE:
    - THE ZONE COOLING MODE IS DEFINED AS ANY SENSED TEMPERATURE GREATER THAN 1 DEGREE ABOVE SETPOINT. IN COOLING MODE, THE RADIATION SHALL BE DE-ENERGIZED TO PROVIDE NO HEAT TO THE SPACE. THE VAV TERMINAL DAMPER SHALL MODULATE TO MAINTAIN SPACE SETPOINT.
  - UNOCCUPIED ZONE CONTROL:
    - THE TERMINAL UNITS SHALL BE CONTROLLED SAME AS OCCUPIED MODE IN EITHER HEATING OR COOLING MODE USING THE NIGHT SETPOINT. THE UNOCCUPIED TIMES IN THESE ZONES SHALL BE SCHEDULED THROUGH THE BUILDING AUTOMATION SYSTEM. THE ZONE MAY RESET TO THE OCCUPIED MODE FOR A PREDETERMINED TIME PERIOD UPON A SIGNAL FROM THE CONTROL SYSTEM.

## EQUIPMENT ROOM - SPLIT SYSTEMS:

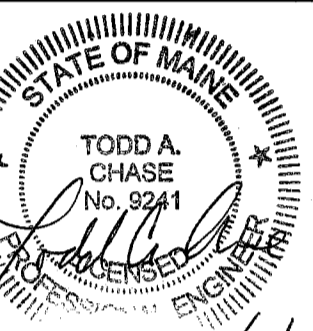
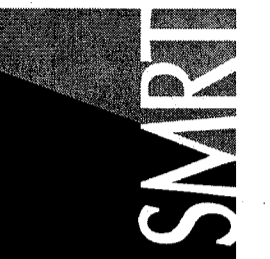
- GENERAL ZONE CONTROL:
  - DEDICATED, SINGLE SENSOR ZONES SHALL BE CONTROLLED FROM MITSUBISHI RAR-21 CONTROLLER.
  - AS SHOWN ON THE "M" DRAWINGS. COOLING MODE: THE DUCTLESS SPLIT SYSTEM SHALL OPERATE ON A LEAD-LAG CONFIGURATION.
  - UNITS SHALL ALTERNATE LEAD-LAG POSITION EVERY 28-DAYS.

## NOTE:

- SEE SHEET M-001 FOR LEGEND AND ABBREVIATIONS.

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9-12-12

CURRENT ISSUE STATUS:

REV	DATE	DESCRIPTION
0	9-12-12	ISSUED FOR CONSTRUCTION

GRAPHIC SCALE:  
0" 1"

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JC/DRAWN BY: MBD  
A/E OF RECORD: TAC  
CAD FILE: M-002-12076.DWG  
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MECHANICAL  
SPECIFICATIONS

SHEET No.  
M-002