

SECTION 15010 – MECHANICAL GENERAL REQUIREMENTS

GENERAL: THE WORK COVERED BY THIS SPECIFICATION SHALL INCLUDE THE FURNISHING OF ALL MATERIALS, LABOR, TRANSPORTATION, TOOLS, PERMITS, FEES, INSPECTIONS, UTILITIES AND INCIDENTALS NECESSARY FOR THE COMPLETE INSTALLATION OF ALL MECHANICAL WORK REQUIRED BY THE CONTRACT DRAWINGS.

CODES: THE MECHANICAL DRAWINGS ARE DIAGRAMMATIC IN CHARACTER AND CANNOT SHOW EVERY CONNECTION IN DETAIL OR EVERY PIPE OR DUCT IN ITS EXACT LOCATION. THESE DETAILS ARE SUBJECT TO THE REQUIREMENTS OF ORDINANCES AND ALSO STRUCTURAL AND ARCHITECTURAL CONDITIONS. THE CONTRACTOR SHALL CAREFULLY INVESTIGATE STRUCTURAL AND FINISH CONDITIONS AND SHALL COORDINATE WITH THE SEPARATE TRADES IN ORDER TO AVOID INTERFERENCE BETWEEN THE VARIOUS PHASES OF WORK. WORK SHALL BE LAID OUT SO THAT IT WILL BE CONCEALED IN FURRED CHASES OR ABOVE CEILINGS, ETC., IN FINISHED PORTIONS OF THE BUILDING, UNLESS SPECIFICALLY NOTED OR INDICATED TO BE EXPOSED. WORK SHALL BE INSTALLED TO AVOID CRIPPLING OF STRUCTURAL MEMBERS. ALL WORK SHALL BE RUN PARALLEL OR PERPENDICULAR TO THE LINES OF THE BUILDING UNLESS OTHERWISE NOTED. THE APPROXIMATE LOCATION OF EACH ITEM IS INDICATED ON THE DRAWINGS. THESE DRAWINGS ARE NOT INTENDED TO GIVE COMPLETE AND EXACT DETAILS IN REGARD TO LOCATION. EXACT LOCATIONS ARE TO BE DETERMINED BY ACTUAL MEASUREMENTS OF THE BUILDING. CONTRACTOR SHALL COMPLY WITH ALL REQUIREMENTS OF THE FOLLOWING: INTERNATIONAL BUILDING CODE (2006 EDITION), INTERNATIONAL MECHANICAL CODE (2006 EDITION), THE INTERNATIONAL PLUMBING CODE (2006 EDITION), INTERNATIONAL ENERGY CONSERVATION CODE (2006 EDITION) AND THE INTERNATIONAL FIRE CODE (2006 EDITION) AS AMENDED BY THE LOCAL GOVERNING AGENCY.

EQUIPMENT INSTALLATION: PROVIDE AND INSTALL UNIONS AT PROPER POINTS TO PERMIT REMOVAL OF PIPE AND EQUIPMENT WITHOUT DAMAGE TO OTHER PARTS OF THE SYSTEM. ALL EQUIPMENT SHALL BE INSTALLED IN A MANNER TO PERMIT ACCESS TO PARTS REQUIRING SERVICE WITHOUT DISASSEMBLY OF OTHER EQUIPMENT.

EXCAVATION AND BACKFILL: THE CONTRACTOR SHALL PROVIDE ALL EXCAVATION REQUIRED FOR THE INSTALLATION OF HIS WORK. BACKFILL, COMPACT AND REPAIR CONCRETE OR PAVING TO MATCH EXISTING FINISH AS CLOSELY AS POSSIBLE.

EXISTING FACILITIES: LOSS OR DAMAGE TO EXISTING FACILITY CAUSED BY THE CONTRACTOR SHALL BE REPAIRED OR REPLACED BY THE CONTRACTOR TO THE OWNER'S SATISFACTION AND AT NO COST TO THE OWNER. THE CONTRACTOR SHALL COORDINATE ALL WORK REQUIRED IN EXISTING AREAS WITH THE OWNER AND SHALL ARRANGE FOR ALL TEMPORARY UTILITY SERVICES, PROTECTION OF THE FACILITY AND ITS CONTENTS, BARRICADES, SAFETY DEVICES, ETC., REQUIRED TO ACCOMPLISH THE WORK. THE CONTRACTOR SHALL REMOVE AND REINSTALL EXISTING CONSTRUCTION IF REQUIRED TO ACCOMPLISH THE WORK. NOTIFY THE OWNER AT LEAST TWO DAYS IN ADVANCE OF ALL REQUIRED SERVICE OUTAGES.

SUBSTITUTIONS: EQUIPMENT OF EQUAL QUALITY TO THAT SPECIFIED MAY BE SUBSTITUTED PROVIDED IT MEETS OR EXCEEDS THE CAPACITY SCHEDULED, IS OF SIMILAR CONSTRUCTION, AND WILL FIT IN THE SPACE ALLOTTED WITH AMPLE SERVICE CLEARANCE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE COORDINATION WITH ALL OTHER TRADES (SUCH AS ELECTRICAL AND STRUCTURAL) OF ANY PRODUCT REQUIRING A CHANGE IN THE WORK OF THAT TRADE. THE CONTRACTOR SHALL ALSO BE RESPONSIBLE FOR ANY ADDITIONAL COSTS ASSOCIATED WITH SUCH A CHANGE. MATERIALS OF CONSTRUCTION SHALL BE AS SPECIFIED.

SUPPORTS, ANCHORS AND SLEEVES: SUPPORT HORIZONTAL PIPING WITH STEEL CLEVIS HANGERS AND VERTICAL PIPING WITH RISER CLAMPS. PROVIDE COPPER PLATED HANGERS AND CLAMPS FOR COPPER PIPING OR WRAP THE COPPER PIPE AT HANGERS WITH TWO LAYERS OF PVC TAPE OR EQUIVALENT. HANGER SPACING AND ROD SIZE SHALL BE IN ACCORDANCE WITH THE LOCAL CODE AND/OR ASHRAE STANDARDS. SUPPORT DUCTWORK IN ACCORDANCE WITH SMACNA STANDARDS. PROVIDE MINIMUM 18 GAUGE GALVANIZED STEEL SLEEVES FOR DUCTWORK, GALVANIZED STEEL OR LEAD FLASHINGS, ESCUTCHEONS AND SEAL ALL WALL, ROOF, AND FLOOR PENETRATIONS. THROUGH PENETRATIONS OF FIRE RATED ASSEMBLIES SHALL BE PER MANUFACTURER'S UL LISTED DETAILS AND INSTRUCTIONS, EQUAL OF HILTI. PIPING SHALL BE PROVIDED WITH STANDARD WEIGHT STEEL PIPE OF SIZE TO PASS PIPE AND INSULATION. PIPE SLEEVES ARE NOT REQUIRED IF PENETRATIONS ARE CORE DRILLED. PIPING SHALL NOT BE SUPPORTED FROM PENETRATION.

SHOP DRAWINGS: PROVIDE SIX (6) COPIES OF SHOP DRAWINGS AND MANUFACTURER'S DATA ON ALL PLUMBING TRIM, EQUIPMENT, MECHANICAL DEVICES AND FIRE PROTECTION SYSTEM FOR APPROVAL.

WARRANTY: PROVIDE ONE YEAR WARRANTY FROM DATE OF FINAL ACCEPTANCE ON ALL LABOR AND MATERIALS PROVIDED UNDER THIS CONTRACT. PROVIDE AN ADDITIONAL FIVE YEAR WARRANTY ON THE MOTOR-COMPRESSOR UNITS FOR ALL CHILLERS.

OPERATION AND MAINTENANCE MANUAL: PROVIDE A COMPLETE INDEXED, BOUND MANUAL OF ALL EQUIPMENT REQUIRING MAINTENANCE.

TRAINING: CONTRACTOR SHALL PROVIDE A MINIMUM OF EIGHT (8) HOURS TRAINING TO THE OWNER ON THE OPERATION OF ALL EQUIPMENT.

CLEAN-UP: CONTRACTOR SHALL MAINTAIN PREMISES IN CLEAN CONDITION AT END OF EACH DAY AND THOROUGHLY CLEAN-UP AT END OF CONSTRUCTION.

SECTION 15300 – FIRE PROTECTION

GENERAL: THE EXISTING FIRE PROTECTION SYSTEM IS A WET PIPE AUTOMATIC SPRINKLER SYSTEM.

QUALITY ASSURANCE: DESIGN INSTALLATION TO MEET REQUIREMENTS OF NFPA 13, INSURANCE UNDERWRITERS, THE REQUIREMENTS SPECIFIED HEREINAFTER AND THE LOCAL FIRE CODE.

THE SYSTEM SHALL BE DESIGNED AND INSTALLED BY A FIRE PROTECTION CONTRACTOR LICENSED IN THE STATE OF ARIZONA AND EXPERIENCED IN THIS TYPE OF SYSTEM DESIGN AND INSTALLATION WITH A MINIMUM OF FIVE YEARS EXPERIENCE. EVIDENCE TO SUPPORT THE ABOVE REQUIREMENTS MAY BE REQUESTED, AND ANY PROPOSED INSTALLER WHO CANNOT SHOW SUITABLE EXPERIENCE WILL BE REJECTED.

SUBMITTALS: SUBMIT SHOP DRAWINGS IN ACCORDANCE WITH THE GENERAL REQUIREMENT.

SHOP DRAWINGS: SHOP DRAWINGS SHALL BE SUBMITTED PRIOR TO FABRICATION TO THE ARCHITECT FOR REVIEW AND APPROVAL AND/OR ACCEPTANCE.

THE SHOP DRAWINGS SHALL INCLUDE DETAIL PLANS OF SPRINKLER SYSTEMS INCLUDING CALCULATIONS, SECTIONS AND PLOT PLAN INDICATING THE LOCATIONS OF UNDERGROUND SUPPLY CONNECTIONS, CONTROL VALVES, FIRE DEPARTMENT CONNECTIONS AND OTHER EQUIPMENT TO BE USED.

ACCEPTABLE MANUFACTURERS: PRODUCTS MANUFACTURED BY AUTOMATIC SPRINKLER, ITT GRINNELL, VIKING, CENTRAL, OR APPROVED EQUAL MEETING THESE SPECIFICATIONS ARE ACCEPTABLE.

ALL MATERIALS AND EQUIPMENT USED IN THE INSTALLATION OF THE FIRE PROTECTION SYSTEM SHALL BE LISTED AS APPROVED BY THE UNDERWRITERS LABORATORIES, INC., LIST OF INSPECTED FIRE PROTECTION EQUIPMENT AND MATERIALS, AND THE FACTORY MUTUAL TESTING LABORATORIES LIST OF APPROVED EQUIPMENT. FIRE PROTECTION DEVICES AND DEVICES INVOLVING FIRE HAZARD SHALL BE THE LATEST DESIGN OF THE MANUFACTURER.

SPRINKLER PIPING AND PIPE FITTING:

ABOVEGROUND PIPING: PIPING, FITTINGS, VALVES, AND INSTALLATION SHALL BE AS SPECIFIED IN NFPA 13.

SPRINKLER HEADS: UNLESS OTHERWISE SPECIFIED OR INDICATED ON THE DRAWINGS, SPRINKLER HEADS SHALL BE UPRIGHT OR PENDANT, QUICK-RESPONSE AUTOMATIC CLOSED-TYPE EXCEPT THAT SPRINKLER HEADS TO BE INSTALLED IN THE VICINITY OF HEATING EQUIPMENT AND LIGHTS, SHALL BE OF THE TEMPERATURE RATINGS REQUIRED FOR SUCH LOCATIONS BY NFPA 13.

INSTALLATION: THE SPRINKLER SYSTEM SHALL BE DESIGNED AND SIZED BASED ON NFPA 13 REQUIREMENTS.

THE FIRE SPRINKLERED AREA IS INDICATED FOR THE CONTRACTORS REFERENCE. ACTUAL NUMBER OF SPRINKLER HEADS, HEAD SPACING, PIPE ROUTING, COVERAGE, ETC., AS REQUIRED BY THE APPLICABLE AUTHORITIES AND/OR ARCHITECTURAL AND STRUCTURAL CONDITIONS, SHALL BE THE CONTRACTORS RESPONSIBILITY.

HEADS SHALL BE LOCATED IN A SYMMETRICAL PATTERN RELATED TO CEILING FEATURES SUCH AS BEAMS, LIGHT FIXTURES, DIFFUSERS, ETC., AND WHERE APPLICABLE, HEADS SHALL BE LOCATED SYMMETRICAL WITH THE GRID CEILING. HEADS SHALL BE ARRANGED IN A MANNER ACCEPTABLE TO THE ARCHITECT.

THE CONTRACTOR SHALL PROVIDE SPARE HEADS EQUAL TO ONE PERCENT OF THE TOTAL NUMBER OF HEADS INSTALLED UNDER THE CONTRACT, BUT NOT LESS THAN 10.

TESTS: UPON COMPLETION AND PRIOR TO ACCEPTANCE OF THE INSTALLATION, THE CONTRACTOR SHALL SUBJECT THE SYSTEM TO THE TESTS REQUIRED BY THE NATIONAL FIRE PROTECTION ASSOCIATION STANDARD NO. 13, AND LOCAL FIRE DEPARTMENT.

SECTION 15400 – PLUMBING

DOMESTIC WATER PIPING ABOVE GRADE SHALL BE TYPE "L" HARD TEMPER COPPER PIPE WITH WROUGHT FITTINGS AND 95-5 LEAD FREE SOLDER JOINTS.

LPG PIPING SHALL BE SCHEDULE 40 BLACK STEEL WITH MALLEABLE IRON FITTINGS. PROVIDE LISTED LPG VALVES, UNIONS AND DIRT LEGS AT ALL APPLIANCES.

CONDENSATE DRAIN PIPING SHALL BE TYPE DWV COPPER WITH CAST BRASS FITTINGS AND SOLDERED CONNECTIONS. AT CONNECTION TO EACH UNIT PROVIDE DIELECTRIC UNION, TRAP AND OPEN BREATHER TEE ON DISCHARGE SIDE OF TRAP. INSULATE ALL CONDENSATE DRAIN LINES ABOVE CEILINGS AND IN STUD SPACES WITH 1/2" THICK ARMSTRONG "ARMAFLEX" INSULATION OR EQUAL.

INSULATION: INSULATE ALL SERVICE HOT WATER SUPPLY AND HOT WATER RETURN PIPING WITH 1" THICK GLASS FIBER SECTIONAL PIPE INSULATION WITH ALL SERVICE JACKET. INSTALL INSULATION IN ACCORDANCE WITH MANUFACTURER'S PRINTED INSTRUCTIONS. PROVIDE SHEET METAL SADDLES AT HANGER LOCATIONS. TEST PIPING SYSTEMS PRIOR TO THE APPLICATION OF INSULATION.

PIPING SPECIALTIES: INSTALL DIELECTRIC UNIONS OR FLANGES WHERE COPPER OR BRASS PIPING CONNECTS TO FERROUS PIPING OR EQUIPMENT. INSTALL VACUUM BREAKERS ON EACH WATER SUPPLY LINE SERVING PLUMBING FIXTURES, EQUIPMENT OR OTHER DEVICE HAVING A WATER SUPPLY BELOW THE RIM OF THE FIXTURE. INSTALL WATER HAMMER ARRESTORS (EQUAL TO J.R. SMITH #5000) WITH ACCESS DOORS (EQUAL TO J.R. SMITH SERIES #4760) WHERE SHOWN ON PLAN.

VALVES: VALVES FOR DOMESTIC HOT AND COLD WATER SHALL BE AS MANUFACTURED BY STOCKHAM, NIBCO, MILWAUKEE OR JENKINS.

BALL VALVES SHALL BE ASTM B-62 BRONZE BODY AND FULL PORT BALL, ASTM B-371 ALLOY 694 SILICON BRASS STEM, PTFE SEAT, PACKING AND GASKET, THREADED ENDS, TWO PIECE BODY AND CAP.

CHECK VALVES SHALL BE CLASS 125, ASTM B-62 BRONZE BODY, BRONZE DISC, SWING CHECK DESIGN, THREADED OR SOLDERED ENDS.

EXECUTION: SLOPE DRAINAGE PIPING INSIDE AND OUTSIDE OF BUILDING IN ACCORDANCE WITH REQUIREMENTS OF THE GOVERNING PLUMBING CODES.

WHERE VALVE INSTALLATION IS CONCEALED IN PIPE CHASES, PROVIDE J.R. SMITH SERIES 4760 OR APPROVED EQUAL ACCESS DOORS WITH CONCEALED HINGE AND KEY OPERATED LOCKS. DOORS SHALL BE LARGE ENOUGH TO SERVICE VALVES AND SHALL BE INSTALLED FLUSH WITH FINISHED WALLS OR CEILINGS.

INSTALL WATER PIPING TO AVOID CONTACT WITH STRUCTURE WHEN POSSIBLE TO PREVENT EXCESSIVE WATER HAMMER NOISE TRANSMISSION.

WRAP METALLIC PIPE IN CONTACT WITH CONCRETE BLOCK, SLABS OR STUCCO WITH 10 MIL THICK PVC TAPE TO PREVENT CORROSION.

FLUSH PIPING CLEAN WITH WATER AFTER INSTALLATION.

TEST PIPING PRIOR TO COVERING OR BACKFILLING.

TEST WATER PIPING AT 100 PSIG FOR A CONTINUOUS PERIOD OF NOT LESS THAN FOUR (4) HOURS. DURING THIS TIME, CAREFULLY INSPECT THE SYSTEM FOR LEAKS. IF NECESSARY, REPAIR LEAKS AND TEST AGAIN UNTIL NO LEAKAGE IS DETECTED.

TEST LPG PIPING AT 30 PSIG FOR A CONTINUOUS PERIOD OF NOT LESS THAN FOUR (4) HOURS. DURING THIS TIME, CAREFULLY INSPECT THE SYSTEM FOR LEAKS. IF NECESSARY, REPAIR LEAKS AND TEST AGAIN UNTIL NO LEAKAGE IS DETECTED.

SECTION 15500 – HEATING, VENTILATING AND AIR CONDITIONING

EQUIPMENT: EQUIPMENT CAPACITIES AND CHARACTERISTICS SHALL BE AS SCHEDULED ON THE DRAWINGS. INSTALL AS INDICATED ON DRAWINGS AND AS PER MANUFACTURER'S PRINTED INSTRUCTIONS. AIR CONDITIONING EQUIPMENT MANUFACTURED BY TRANE, YORK, CARRIER, OR MCQUAY ARE ACCEPTABLE. EXHAUST FANS MANUFACTURED BY GREENHECK, COOK, PENN, JENN AIRE OR ACME ARE ACCEPTABLE. TERMINAL UNITS MANUFACTURED BY KRUEGER, TITUS, PRICE OR NAILOR ARE ACCEPTABLE.

DUCTWORK:

DUCT SIZES: DIMENSIONS ON DRAWINGS ARE SHEET METAL DUCT SIZES. DO NOT INCREASE DUCT SIZE FOR ACOUSTICALLY LINED OR INTERNALLY INSULATED DUCTS.

ROUND DUCTWORK: GALVANIZED STEEL LOCK FORMING QUALITY, MINIMUM 0.028 INCH THICK CONTINUOUS SPIRAL SEAM. FABRICATE ROUND DUCT ELBOWS OF MINIMUM FIVE (5) PIECE CONSTRUCTION.

GALVANIZED DUCTWORK: GALVANIZED STEEL LOCK FORMING QUALITY HAVING ZINC COATING OF 1.25 OUNCES PER SQUARE FOOT FOR EACH SIDE PER ASTM A525 G90. ALL DUCTWORK TO BE GALVANIZED UNLESS OTHERWISE NOTED. ALL DUCTWORK EXPOSED TO WEATHER SHALL BE SEALED (JOINTS AND SEAMS) WITH SILICONE SEALANT. ALL DUCTWORK JOINTS, LONGITUDINAL AND TRANSVERSE SEAMS, AND CONNECTIONS IN DUCTWORK MUST BE SECURELY SEALED USING WELDMENTS; MECHANICAL FASTENERS WITH SEALS, GASKETS, OR MASTICS; MESH AND MASTIC SEALING SYSTEMS; OR TAPES. TAPES AND MASTICS MUST BE LISTED AND LABELED IN ACCORDANCE WITH UL 181A OR UL 181B.

DUCT GAUGES: FABRICATION AND SUPPORT SHALL BE IN ACCORDANCE WITH SMACNA STANDARDS.

FLEXIBLE DUCTS: FLEXIBLE DUCTS SHALL BE INSULATED (MAXIMUM 1" THICK, WITH THERMAL RESISTANCE EQUAL TO A MINIMUM OF R3.5) AND HAVE A FOIL SCRIM VAPOR BARRIER. FLEXIBLE DUCTWORK SHALL BE LISTED AS UL 181 CLASS 1 FLEXIBLE AIR DUCT AND SHALL COMPLY WITH NFPA STANDARDS. PROVIDE FLEXIBLE DUCTWORK AS MANUFACTURED BY MANVILLE, OWEN CORNING, THERMOFLEX, OR EQUAL.

KITCHEN EXHAUST DUCTS: MINIMUM 16 GAUGE BLACK IRON OR 18 GAUGE STAINLESS STEEL WITH WELDED JOINTS. ALL EXPOSED DUCT SHALL BE STAINLESS STEEL.

INSULATION: WRAP ALL SUPPLY AND RETURN DUCTWORK WITH A MAXIMUM 1-1/2" THICK, FLEXIBLE FIBERGLASS INSULATION HAVING A FACTORY APPLIED FOIL SCRIM KRAFT VAPOR BARRIER. INSULATION SHALL HAVE A MINIMUM THERMAL RESISTANCE OF R3.5 AT 75 F MEAN TEMPERATURE. INSTALL INSULATION AS PER MANUFACTURER'S INSTRUCTIONS. DUCT WRAP SHALL BE INSTALLED SO AS TO PROVIDE A UNIFORM THICKNESS. INSULATION SHALL NOT BE COMPRESSED AT THE CORNER.

DUCT ACCESSORIES:

ACCESS DOORS: FABRICATE RIGID AND CLOSE FITTING DOORS OF GALVANIZED STEEL WITH SEALING GASKETS AND QUICK FASTENING LOCKING DEVICES. FOR INTERNALLY LINED OR INSULATED DUCTWORK, INSTALL MINIMUM ONE INCH THICK INSULATION WITH SHEET METAL COVER. ACCESS DOORS SHALL BE MINIMUM 12" SQUARE.

DAMPERS: FABRICATE BALANCING DAMPERS OF GALVANIZED STEEL, MINIMUM 16 GAUGE AND PROVIDE WITH LOCKING QUADRANTS. UNLESS INDICATED OTHERWISE, DAMPERS SHALL BE OPPOSED BLADE TYPE.

FLEXIBLE CONNECTION: PROVIDE FLEXIBLE CONNECTIONS AT THE INLET AND OUTLET OF ALL AIR MOVING DEVICES. FABRICATE OF NEOPRENE COATED FLAMEPROOF FABRIC APPROXIMATELY 4-INCH WIDE TIGHTLY CRIMPED INTO METAL EDGING STRIP AND ATTACH TO DUCTING AND EQUIPMENT BY SCREWS OR BOLTS AT 6-INCH INTERVALS. FLEXIBLE CONNECTIONS TO BE ASSEMBLED PER MANUFACTURER'S INSTRUCTIONS FOR OPTIMUM SHAPE.

TURNING VANES: FABRICATE TURNING VANES AND RAILS OF 24 GAUGE GALVANIZED STEEL AND ASSEMBLE RATTLE FREE. TURNING VANES SHALL BE SINGLE THICKNESS PREFABRICATED OR ASSEMBLED PER MANUFACTURER'S INSTRUCTIONS FOR OPTIMUM SHAPE.

FILTERS: FILTERS SHALL BE 2" THICK PLEATED TYPE, DISPOSABLE, 30% TO 35% EFFICIENT (MERV 8 MINIMUM), FARR 30/30 OR EQUAL. FILTERS SHALL BE IN PLACE WHENEVER SYSTEMS ARE IN OPERATION.

AIR DEVICES: AIR DISTRIBUTION DEVICES SHALL BE AS SCHEDULED ON THE DRAWINGS AND EQUAL TO KRUEGER, TITUS, PRICE, OR NAILOR.

TESTING AND BALANCING: AIR AND HYDRONIC SYSTEMS SHALL BE BALANCED BY CERTIFIED TESTING & BALANCING CONTRACTOR IN ACCORDANCE WITH AABC STANDARDS AND METHODS. SUBMIT BALANCE REPORTS ON AABC STANDARD FORMS FOR APPROVAL.

HYDRONIC PIPING: HYDRONIC PIPING SHALL BE SCHEDULE 40 BLACK STEEL PIPE PLAIN ENDS OR GROOVED ENDS. FITTINGS SHALL BE BLACK IRON WITH WELDED JOINTS, MALLEABLE IRON WITH THREADED JOINTS OR DUCTILE IRON WITH RIGID OR FLEXIBLE COUPLINGS. PIPING 2" AND SMALLER CAN BE TYPE L HARD DRAWN COPPER WITH WROUGHT COPPER FITTINGS AND SOLDER JOINTS.

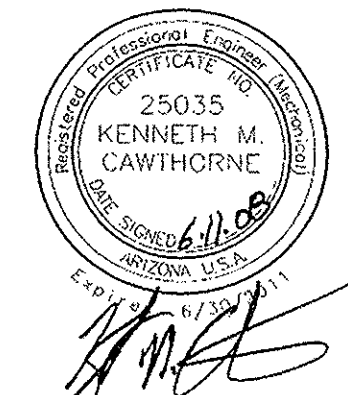
HYDRONIC VALVES: ALL VALVES SHALL BE MANUFACTURED BY KITZ, STOCKHAM, NIBCO, MILWAUKEE, OR JENKINS. FOR PIPING 2-1/2" AND SMALLER: PROVIDE FULL PORT TWO PIECE BALL VALVES. FOR PIPING 3" AND LARGER: PROVIDE FULL LUG BUTTERFLY VALVES.

HYDRONIC PIPING INSULATION: INSULATE ALL CHILLED WATER PIPING 1-1/2" DIAMETER AND LESS WITH 1" THICK NOMINAL 5 PCF DENSITY FIBERGLASS PIPE INSULATION AT 75°F MEAN TEMPERATURE OF 0.26 BTU/IN./SQ.FT./DEGREEF/HR. INSULATION JACKET SHALL BE FACTORY APPLIED ALL SERVICE JACKET (ASJ). CHILLED WATER PIPING 2" DIAMETER AND GREATER SHALL HAVE MINIMUM 1-1/2" THICK INSULATION. VALVES, JOINTS, AND FITTINGS SHALL BE INSULATED WITH FLEXIBLE FIBERGLASS INSULATION OF EQUAL THICKNESS WITH PVC JACKET EQUAL OF ZESTON.

HYDRONIC PIPE IDENTIFICATION: PROVIDE PIPE MARKERS WITH DIRECTIONAL ARROWS EQUAL OF SEATON OR BRADY SNAP-ON OR STRAP-ON TYPE PLASTIC MARKERS AT MAXIMUM 10' INTERVALS ON ALL NEW AND EXISTING PIPING IN THE MECHANICAL ROOM.

HYDRONIC PIPING TESTING: TEST HYDRONIC WATER PIPING TO A HYDROSTATIC PRESSURE OF 1-1/2 TIMES NORMAL OPERATING PRESSURE, 100 PSIG MINIMUM, FOR A CONTINUOUS PERIOD OF NOT LESS THAN EIGHT (8) HOURS. DURING THIS TIME, CAREFULLY INSPECT THE SYSTEM FOR LEAKS. IF NECESSARY, REPAIR LEAKS IN A MANNER ACCEPTABLE TO THE ARCHITECT AND TEST AGAIN UNTIL NO LEAKAGE IS DETECTED. FOR PIPING INSTALLED IN CONCEALED SPACES OR BURIED, TEST PIPING BEFORE SYSTEM IS CONCEALED OR BACKFILLED. TEST PIPING PRIOR TO THE APPLICATION OF INSULATION.

HYDRONIC PIPING FLUSH AND CHEMICALS: ALL HYDRONIC PIPING SHALL BE THOROUGHLY FLUSHED OF ALL DEBRIS USING A LIQUID ALKALINER CLEANER FORMULATED WITH SOAPS, SYNTHETIC DETERGENTS AND DISPERSANTS. PROVIDE A NONCHROMATE ORGANIC CORROSION INHIBITOR (BORON NITRATE) BEFORE START-UP.



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REV	DATE	DESCRIPTION	BY
APPROVED		STRUCTURAL ARCHITECTURAL MECHANICAL ELECTRICAL	
DEPARTMENT OF HEALTH AND HUMAN SERVICES INDIAN HEALTH SERVICE ENGINEERING SERVICES DALLAS DALLAS TEXAS			
SELLS HOSPITAL HVAC PHASE III SELLS, ARIZONA			
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SCALE	AS NOTED	DATE	13 JUNE 2008
MECHANICAL SPECIFICATIONS			
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