E. SWING CHECK VALVES

1) 2 INCHES AND SMALLER, BRONZE SWING CHECK VALVES, MSS SP-80, CLASS 150 PSI STEAM, 300 PSI COLD WORKING PRESSURE (CWP), ASTM B 62 CAST – BRONZE BODY AND CAP, "Y" PATTERN, STAINLESS STEEL FREE FLOATING HINGE PIN, THREADED CAP, REGRINDING SEAT, BRONZE DISC, THREADED (STEEL PIPING) END CONNECTION OR SOLDERED (COPPER PIPING) END CONNECTION AS REQUIRED BY PIPING SYSTEM.

A. MANUFACTURERS – BRONZE CHECK VALVES, HORIZONTAL AND VERTICAL, HORIZONTAL, CRANE CO.; CRANE VALVE GROUP; JENKINS VALVES, CRANE VALVES, STOCKHAM DIVISION, GRINNELL CORPORATION, WALWORTH COMPANY, NIBCO INC, VERTICAL, CINCINNATI VALVE CO

2) 2½ INCH TO 12 INCH, ASME B16.10, IRON SWING CHECK VALVES, CLASS 125 PSI STEAM, 200 PSI COLD WORKING PRESSURE (CWP), CAST IRON BODY AND CAP, REPLACEABLE BRONZE SEAT RING, 6 INCH AND SMALLER: SOLID BRONZE DISC, 8 INCH AND LARGER: CAST IRON DISC WITH BRONZE FACING, REPLACEABLE BRASS HINGE PIN, FLANGED ENDS

A. MANUFACTURERS – IRON SWING CHECK VALVES, CRANE CO.; CRANE VALVE GROUP; JENKINS VALVES, STOCKHAM DIVISION, GRINNELL CORPORATION, CINCINNATI VALVE CO., NIBCO INC.

F. BALANCING VALVES

1) 2 INCH AND SMALLER, 300 PSI COLD WORKING PRESSURE (CWP) UP TO 250°F, BRONZE BODY, "Y" PATTERN GLOBE STYLE DESIGN, EPDM O-RING SEALS. 4 TURN DIGITAL HANDWHEEL FOR BALANCING, HIDDEN MEMORY FEATURE WITH LOCKING TAMPER-PROOF SETTING.

2) 2½ INCH AND LARGER , 300 PSI COLD WORKING PRESSURE (CWP) UP TO 250°F, BRONZE BODY, "Y" PATTERN GLOBE STYLE DESIGN, EPDM O-RING SEALS. 8, 12, OR 16 TURN DIGITAL HANDWHEEL FOR BALANCING, HIDDEN MEMORY FEATURE WITH LOCKING TAMPER-PROOF SETTING. ANSI CLASS 125 FLANGED END CONNECTIONS

3) MANUFACTURERS – BALANCING VALVES, TOUR AND ANDERSSON, MACON, ARMSTRONG.

G. Y STRAINERS

1) SYSTEMS OF STEEL CONSTRUCTION, WORKING PRESSURE: TO 250 PSIG, NON-SHOCK. SIZES: 1/4 INCH TO 2 INCH: ANSI 250 LB. CLASS. CONNECTIONS: THREADED. BODY: CAST IRON, ASTM A126, CLASS B. WITH MACHINED SEAT FOR SCREEN RETENTION, GALVANIZED AS REQUIRED TO MATCH CONNECTING PIPING. CAP: BRONZE, GASKETED. SCREEN: 20 MESH, 304 STAINLESS STEEL, ASTM 240. FREE AREA NOT LESS THAN 2-1/2 TIMES INLET AREA. BLOWOFF OUTLET: WITH FEMALE NPT TAPPING., MUELLER MODEL NO. 11 MFCB.

2) SYSTEMS OF STEEL CONSTRUCTION: WORKING PRESSURE: TO 250 PSIG, NON-SHOCK SIZES 2-1/2 INCH TO 24 INCH: CLASS 250. CONNECTIONS: FLANGED. BODY: CAST IRON, ASTM A126, CLASS B. WITH MACHINED SEAT FOR SCREEN RETENTION, GALVANIZED AS REQUIRED TO MATCH CONNECTING PIPING. COVER FLANGE: CAST IRON, ASTM A126, CLASS B, WITH MACHINED SEAT FOR SCREEN RETENTION. WITH FEMALE TAPPED NPT BLOWOFF CONNECTION. WITH EPDM O-RING SEAL. SCREEN TO 8 INCH: 1/8 INCH PERFORATIONS, 304 STAINLESS STEEL, ASTM 240. FREE AREA NOT LESS THAN 2-1/2 TIMES INLET AREA. SCREEN 10 INCH AND LARGER: 5/32 INCH PERFORATIONS, 304 STAINLESS STEEL, ASTM 240. FREE AREA NOT LESS THAN 2-1/2 TIMES INLET AREA. MAGNETS: PROVIDE MAGNETS FOR STRAINERS. ALL 8 INCH AND LARGER. AT EACH PUMP SUCTION. WITH CONTINUOUS MAGNETIC FIELD AROUND ENTIRE CIRCUMFERENCE OF SCREEN. WITH REMOVABLE CAST ALNICO NO. 5 CHANNEL MAGNETS WITH ACCEPTABLE BASKETS CONSTRUCTED OF MAGNETIC ALLOY. SECURED WITH STAINLESS STEEL RETAINING LUGS AND THREADED RODS. BLOWOFF OUTLET: WITH FEMALE NPT TAPPING., MUELLER MODEL NO. 752.

3) SYSTEMS OF COPPER CONSTRUCTION, WORKING PRESSURE: TO 250 PSIG, NON-CHOCK. SIZES 1/4 INCH TO 2 INCH: CLASS 250. CONNECTIONS: THREADED. BODY: BRONZE, ASTM B62, WITH MACHINED SEAT FOR SCREEN RETENTION. CAP: BRONZE, ASTM B62, WITH MACHINED SEAT FOR SCREEN RETENTION. SCREEN: 20 MESH, 304 STAINLESS STEEL, ASTM 240. FREE AREA NOT LESS THAN 2-1/2 TIME INLET AREA. BLOWOFF OUTLET: WITH FEMALE NPT TAPPING, MUELLER MODEL NO. 352M.

H. PROVIDE 1/2 INCH DRAIN VALVE WITH CAPPED HOSE CONNECTION AT ALL LOW POINTS. PROVIDE 3/4 INCH GATE VALVE TO DRAIN SYSTEMS IN EQUIPMENT ROOMS.

I. PROVIDE MANUAL AIR VENTS LINE SIZE AIR CHAMBER WITH 1/2 INCH GLOBE VALVE AT ALL HIGH POINTS AND WHERE FLOW DIRECTION CHANGES FROM HORIZONTAL TO DOWNWARD.

J. PITCH WATER PIPING EXCEPT AS NOTED:

1) UP TO 1 INCH: 1 INCH IN 40 FEET.

2) 1-1/2 INCH AND LARGER: 1 INCH IN 100 FEET.

K. CONDENSATE DRAIN PIPING

1) PIPE: ASTM B88, HARD DRAWN COPPER TUBING TYPE "L".

2) FITTINGS: SOLDERED JOINT FITTINGS, 95/5 SOLDER.

3) PITCH, EXCEPT AS NOTED:

A. 1 INCH IN 4 FEET PREFERRED.

B. 1 INCH IN 8 FEET MINIMUM.

16. ELECTRICAL WORK

A. GENERAL:

1) ELECTRICAL POWER WIRING SHALL BE PROVIDED BY THE ELECTRICAL CONTRACT. CONTROL WIRING SHALL BE PROVIDED BY THE HVAC CONTRACT. CONTROL WIRING SHALL BE DEFINED AS ANY WIRING 120V AND BELOW INSTALLED FOR PURPOSES OTHER THAN PROVIDING PRIMARY ELECTRICAL POWER TO EQUIPMENT.

2) ALL ELECTRICAL CONTROL WIRING SHALL COMPLY WITH LOCAL ELECTRICAL CODE, ALL AUTHORITIES HAVING JURISDICTION AND THE PROJECT ELECTRICAL SPECIFICATIONS.

3) MECHANICAL CONTRACTOR TO OBTAIN QUANTITY OF CONTROLLERS REQUIRED AND COORDINATE WITH ELECTRICAL CONTRACTOR FOR ALL OPERATING REQUIREMENTS, INTERLOCKS AND CONNECTIONS FOR STARTERS.

4) THE MECHANICAL CONTRACTOR SHALL PREPARE AND SUBMIT FOR APPROVAL POINT TO POINT, COMPLETELY COORDINATED WIRING DIAGRAMS AND INDICATE ALL SOURCE POWER REQUIREMENTS AND ALL FIELD WIRING TO BE PERFORMED BY THE ELECTRICAL CONTRACTOR.

17. EQUIPMENT, DUCT, AND PIPING TAGS AND LABELS

A. METAL LABELS FOR EQUIPMENT:

1. INSTALL LABELS ON EACH MAJOR ITEM OF MECHANICAL EQUIPMENT.

2. MATERIAL AND THICKNESS: BRASS, 0.032-INCH MINIMUM THICKNESS, AND HAVING PREDRILLED OR STAMPED HOLES FOR ATTACHMENT HARDWARE.

3. MINIMUM LABEL SIZE: LENGTH AND WIDTH VARY FOR REQUIRED LABEL CONTENT, BUT NOT LESS THAN 2-1/2 BY 3/4 INCH.

4. MINIMUM LETTER SIZE: 1/4 INCH FOR NAME OF UNITS IF VIEWING DISTANCE IS LESS THAN 24 INCHES (600 MM), 1/2 INCH FOR VIEWING DISTANCES UP TO 72 INCHES, AND PROPORTIONATELY LARGER LETTERING FOR GREATER VIEWING DISTANCES. INCLUDE SECONDARY LETTERING TWO-THIRDS TO THREE-FOURTHS THE SIZE OF PRINCIPAL LETTERING.

5. FASTENERS: STAINLESS-STEEL RIVETS OR SELF-TAPPING SCREWS.

6. ADHESIVE: CONTACT-TYPE PERMANENT ADHESIVE, COMPATIBLE WITH LABEL AND WITH SUBSTRATE.

7. LABEL CONTENT: INCLUDE EQUIPMENT'S DRAWING DESIGNATION OR UNIQUE EQUIPMENT NUMBER, DRAWING NUMBERS WHERE EQUIPMENT IS INDICATED (PLANS, DETAILS, AND SCHEDULES), PLUS THE SPECIFICATION SECTION NUMBER AND TITLE WHERE EQUIPMENT IS SPECIFIED.

8. EQUIPMENT LABEL SCHEDULE: FOR EACH ITEM OF EQUIPMENT TO BE LABELED, ON 8-1/2-BY-11-INCH BOND PAPER. TABULATE EQUIPMENT IDENTIFICATION NUMBER AND IDENTIFY DRAWING NUMBERS WHERE EQUIPMENT IS INDICATED (PLANS, DETAILS, AND SCHEDULES), PLUS THE SPECIFICATION SECTION NUMBER AND TITLE WHERE EQUIPMENT IS SPECIFIED. EQUIPMENT SCHEDULE SHALL BE INCLUDED IN OPERATION AND MAINTENANCE DATA.

B. PIPE AND DUCT LABELS

1) PIPE AND DUCT LABELS SHALL BE INSTALLED AT MAXIMUM INTERVALS OF 50 FEET ON STRAIGHT RUNS AND 25 FEET IN AREAS OF CONGESTED PIPING AND EQUIPMENT.

2) GENERAL REQUIREMENTS FOR MANUFACTURED PIPE LABELS: PREPRINTED, COLOR-CODED, WITH LETTERING INDICATING SERVICE, AND SHOWING FLOW DIRECTION.

3) SELF-ADHESIVE PIPE AND DUCT LABELS: PRINTED PLASTIC WITH CONTACT-TYPE, PERMANENT-ADHESIVE BACKING.

4) PIPE AND DUCT LABEL CONTENTS: INCLUDE IDENTIFICATION OF PIPING SERVICE USING SAME DESIGNATIONS OR ABBREVIATIONS AS USED ON DRAWINGS, PIPE SIZE, AND AN ARROW INDICATING FLOW DIRECTION.

A. FLOW-DIRECTION ARROWS: INTEGRAL WITH PIPING OR DUCT SYSTEM SERVICE LETTERING TO ACCOMMODATE BOTH DIRECTIONS, OR AS SEPARATE UNIT ON EACH PIPE OR DUCT LABEL TO INDICATE FLOW DIRECTION.

B. LETTERING SIZE: AT LEAST 1-1/2 INCHES HIGH.

C. VALVE TAGS

1) INSTALL TAGS ON VALVES AND CONTROL DEVICES IN PIPING SYSTEMS, EXCEPT CHECK VALVES; VALVES WITHIN FACTORY-FABRICATED EQUIPMENT UNITS; SHUTOFF VALVES; FAUCETS; CONVENIENCE AND LAWN-WATERING HOSE CONNECTIONS; AND HVAC TERMINAL DEVICES AND SIMILAR ROUGHING-IN CONNECTIONS OF END-USE FIXTURES AND UNITS. LIST TAGGED VALVES IN A VALVE SCHEDULE.

2) VALVE TAGS: STAMPED OR ENGRAVED WITH 1/4-INCH LETTERS FOR PIPING SYSTEM ABBREVIATION AND 1/2-INCH NUMBERS.

A. TAG MATERIAL: BRASS, 0.032-INCH MINIMUM THICKNESS, AND HAVING PREDRILLED OR STAMPED HOLES FOR ATTACHMENT HARDWARE.

B. FASTENERS: BRASS WIRE-LINK OR BEADED CHAIN; OR S-HOOK.

3) PROVIDE SUPPLEMENTAL STEEL AS REQUIRED TO ADEQUATELY SUPPORT THE EQUIPMENT LOAD.

4) EQUIPMENT SHALL BE INSTALLED WITH VIBRATION ISOLATION, REFER TO VIBRATION ISOLATION SECTION.

D. RIGGING

1) THIS CONTRACTOR SHALL PROVIDE ALL REQUIRED RIGGING, HOISTING AND BRACING TO INSTALL THE EQUIPMENT AS INDICATED ON THE PLANS. THIS WORK SHALL BE PERFORMED BY AN INSURED CERTIFIED LICENSED RIGGING COMPANY THAT IS EXPERIENCED IN RIGGING EQUIPMENT OF THE TYPE INDICATED FOR THE AREAS SHOWN ON THE CONSTRUCTION DOCUMENTS. THIS CONTRACTOR SHALL SUBMIT RIGGING PLANS FOR APPROVAL PRIOR TO PROCEEDING WITH THE WORK.

2) ALL PERMITS REQUIRED FROM THE AUTHORITIES AND AGENCIES INVOLVED TO PERFORM THE RIGGING ARE THE RESPONSIBILITIES OF THIS CONTRACTOR.

3) ALL STRUCTURAL SUPPORTS, MODIFICATIONS OR ADDITIONS ARE TO BE SUBMITTED TO THE STRUCTURAL ENGINEER FOR APPROVAL PRIOR TO PROCEEDING WITH THE WORK. ALL SUPPLEMENTAL STRUCTURAL SUPPORTS, ELEVATOR CHARGES /MODIFICATIONS, BRACING AND PROTECTION REQUIRED FOR THE RIG IS THE RESPONSIBILITY OF THIS CONTRACTOR.

4) THE RIGGING CONTRACTOR SHALL HIRE AND PAY FOR ALL CHARGES AND SERVICES OF THE BUILDING ELEVATOR CONTRACTOR FOR THE RIGGING OF THE EQUIPMENT.

18. AUTOMATIC CONTROLS – GENERAL REQUIREMENTS

A. WORK INCLUDED

1) FURNISH AND INSTALL AS HEREIN SPECIFIED, A COMPLETE AUTOMATIC TEMPERATURE CONTROL SYSTEM. MANUFACTURER SHALL BE SUBMITTED WITH BID AND APPROVED BY ENGINEER BEFORE BID AWARD. THE ATC CONTRACTOR SHALL BE AN INDEPENDENT CONTRACTOR NOT AFFILIATED WITH THE MECHANICAL CONTRACTOR:

2) PROVIDE A SUBMITTAL THAT MEETS THE REQUIREMENTS BELOW FOR APPROVAL.

3) PROVIDE POWER FOR PANELS AND CONTROL DEVICES FROM A SOURCE DESIGNATED BY THE ELECTRICAL CONTRACTOR.

4) COORDINATE INSTALLATION SCHEDULE WITH THE MECHANICAL CONTRACTOR AND GENERAL CONTRACTOR.

5) FURNISH, MOUNT, AND WIRE ALL ASSOCIATED PANELS AND DEVICES FOR THE SYSTEM TO BE COMPLETELY OPERATIONAL REGARDLESS OF FUNCTION OR VOLTAGE, UNLESS OTHERWISE STATED.

B. SUBMITTALS

1) PRODUCT DATA: INCLUDE MANUFACTURER'S TECHNICAL LITERATURE FOR EACH CONTROL DEVICE INDICATED, LABELED WITH SETTING OR ADJUSTABLE RANGE OF CONTROL. INDICATE DIMENSIONS, CAPACITIES, PERFORMANCE CHARACTERISTICS, ELECTRICAL CHARACTERISTICS, FINISHES FOR MATERIALS, AND INSTALLATION AND STARTUP INSTRUCTIONS FOR EACH TYPE OF PRODUCT INDICATED.

2) SHOP DRAWINGS: DETAIL EQUIPMENT ASSEMBLIES AND INDICATE DIMENSIONS, WEIGHTS, LOADS, REQUIRED CLEARANCES, METHOD OF FIELD ASSEMBLY, COMPONENTS, AND LOCATION AND SIZE OF EACH FIELD CONNECTION.

A. SCHEMATIC FLOW DIAGRAMS SHOWING FANS, COILS, DAMPERS, VALVES, AND CONTROL DEVICES.

B. WIRING DIAGRAMS: POWER, SIGNAL, AND CONTROL WIRING.

C. DETAILS OF CONTROL PANEL FACES, INCLUDING CONTROLS, INSTRUMENTS, AND LABELING.

C. QUALITY ASSURANCE

1) INSTALLER QUALIFICATIONS: A QUALIFIED INSTALLER WHO IS AN AUTHORIZED REPRESENTATIVE OF THE AUTOMATIC CONTROL SYSTEM MANUFACTURER FOR BOTH INSTALLATION AND MAINTENANCE OF UNITS REQUIRED FOR THIS PROJECT.

2) COMPLY WITH ALL CURRENT GOVERNING CODES, ORDINANCES, AND REGULATIONS INCLUDING UL, NFPA, THE LOCAL BUILDING CODE, NEC, ETC.

3) MATERIALS AND EQUIPMENT SHALL BE THE CATALOGUED PRODUCTS OF MANUFACTURERS REGULARLY ENGAGED IN PRODUCTION AND INSTALLATION OF AUTOMATIC TEMPERATURE CONTROL SYSTEMS AND SHALL BE MANUFACTURER'S LATEST STANDARD DESIGN THAT COMPLIES WITH THE SPECIFICATION REQUIREMENTS.

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