

15B 2-2 PIPING AND EQUIPMENT INSULATION

DOMESTIC COLD WATER, HOT WATER, INJECT AND CONDENSATE DRAIN PIPE (WITHIN BUILDING) 1" ONE-PIECE FIBERGLASS COVERING WITH FIRE-RESISTANT LACQUER WITH SELF-SEALING LAP TO PROVIDE A CONTINUOUS VAPOR BARRIER BY CERTAINTED, OWENS-CORNING OR ARMSTRONG. FOR PIPING AT HANGERS PROVIDE 8" LONG SECTIONS OF HIGH DENSITY, HIGH TEMPERATURE CALCIUM SILICATE BY JOHNS-MANVILLE, FIBERGLASS BY KNAUF, OR 8" LONG STYROFOAM BILLETS BY DOW. INSULATION SHALL BE CONTINUOUS ALONG THE PIPE SURFACE, EXCEPT AT VALVES, UNIONS, AND WHERE PIPING IS EXPOSED AT FIXTURES. PROVIDE 1" FIBERGLASS INSULATION ON VENT PIPING WITHIN SIX FEET OF VENT THROUGH THE OF ROOF. PROVIDE FIBERGLASS INSULATION ON DOMESTIC COLD AND HOT WATER PIPES INSTALLED IN WALLS AND CHASES. PROVIDE FIBERGLASS INSULATION ON DOMESTIC COLD AND HOT WATER PIPES INSTALLED IN WALLS AND CHASES. PROVIDE INSULATION PROTECTION SHIELD AT EACH HANGER FOR INSULATED PIPING.

COVER FITTINGS WITH ZESTON, KNAUF, OR EQUAL ONE-PIECE PVC PREMOLDED INSULATING COVERS. FITTING COVERS, JACKETS AND ADHESIVES SHALL NOT EXCEED FLAME SPREAD RATING OF 25 AND SMOKE DEVELOPMENT RATING OF 50 PER ASTM E84. AT ALL ELBOWS AND TEES, FILL VOIDS BETWEEN COVERS AND PIPING WITH FIBERGLASS INSULATION AND TAPE JOINTS. INSTALL PIPE INSULATION IN COMPLIANCE WITH MANUFACTURER'S RECOMMENDATIONS. WHERE PREMOLDED INSULATING FITTINGS ARE NOT APPROVED BY LOCAL AUTHORITIES, WITER INSULATION AT FITTINGS.

15B 2-3 PIPING JOINTS

COPPER TUBING: JOINTS IN HARD TEMPER TUBING SHALL BE SOLDERED JOINTS USING LEAD-FREE 95/5 SOLDER EXCEPT WHERE TUBING IS INSTALLED BELOW GRADE OR BELOW THE BASE SLAB, IN WHICH CASE JOINTS SHALL BE SOLDERED WITH SILVER SOLDER (SILFOS). JOINTS IN SOFT TEMPER COPPER TUBING SHALL BE OF THE FLARED TYPE INSTALLED IN COMPLIANCE WITH THE FITTING MANUFACTURER'S RECOMMENDATIONS.

THREADED STEEL PIPE: THREADED JOINTS SHALL BE FULL AND CLEAN, CUT WITH NOT MORE THAN THREE (3) THREADS EXPOSED BEFORE THE FITTINGS. MAKE JOINTS TIGHT WITH GRAPHITE BASE PIPE JOINT COMPOUND AND PAINT EXPOSED THREADS OF FERROUS PIPE WITH ACID-RESISTING PAINT AFTER PIPING HAS BEEN TESTED AND PROVEN TIGHT. NO CAULKING, LAMP-WICK OR OTHER MATERIAL WILL BE PERMITTED FOR CORRECTION OF DEFECTIVE JOINTS.

WELDED STEEL PIPE: WELDED JOINTS SHALL BE OF THE BUTT WELDED SINGLE "V" TYPE. BEVEL PIPE AT A 45 DEGREE ANGLE TO WITHIN 1/16" OF THE INSIDE WALL, AND BUILD UP THE WELD TO ONE FOURTH GREATER DEPTH THAN THE PIPE WALL THICKNESS. WELDING SHALL BE EITHER ELECTRIC OR OXY-ACETYLENE, PERFORMED IN CONFORMANCE WITH THE ASME CODE FOR PRESSURE PIPE WELDING, AND ONLY BY EXPERIENCED CERTIFIED WELDERS.

CAST IRON PIPE BELOW GRADE: JOINTS IN BELL AND SPIGOT CAST IRON WASTE AND VENT PIPE SHALL BE NEOPRENE COMPRESSION GASKETS, TYPICAL OR EQUAL.

CAST IRON PIPE ABOVE GRADE: JOINTS IN HUBLESS PIPE SHALL BE STANDARD CISPI 310-85 COUPLING BY ANACO HUSKY OR APPROVED EQUAL. JOINTS IN STORM PIPING 6" AND LARGER SHALL BE HEAVY DUTY COUPLINGS MEETING ASTM C584 AND FM 1580, ANACO HUSKY 374-4000 OR CLAMP-ALL "H TORQUE" 125 IN. LB.

PVC PIPE: CLEAN JOINTS FREE FROM DEBRIS AND MOISTURE. APPLY PVC PRIMER MEETING ASTM F556 TO EACH JOINT. APPLY SOLVENT CEMENT MEETING ASTM D2584 AND MAKE JOINT WHILE WET AND IN ACCORDANCE WITH ASTM D2855.

PIPE ADAPTERS: MAKE CONNECTION OF NEW WASTE PIPE TO NEW OR EXISTING DISSIMILAR WASTE PIPE USING ADAPTER COUPLINGS. PROVIDE FERROD, PROFLEX 3000 SERIES OR MISSION FLEXSEAL M956 SERIES WITH NEOPRENE ADAPTER GASKET WITH STAINLESS STEEL SHIELD AND HOSE CLAMPS FOR CONNECTING DISSIMILAR PIPES ABOVE GRADE. PROVIDE FERROD, 1056 SERIES OR MISSION SEWER COUPLINGS WITH NEOPRENE ADAPTER GASKET AND HOSE CLAMPS FOR CONNECTING DISSIMILAR PIPES BELOW GRADE AND COAT STAINLESS STEEL BANDS WITH MASTIC.

15B 2-4 PIPING INSTALLATION

GENERAL: CLEAN PIPE THOROUGHLY PRIOR TO INSTALLATION. REAM ENDS OF PIPE TO REMOVE BURRS. CUT PIPE ACCURATELY TO MEASUREMENTS TAKEN ON THE JOB. INSTALL WITH ADEQUATE CLEARANCE FOR INSTALLATION OF COVERS WHERE REQUIRED. PIPE SHALL NOT BE SPRUNG OR BENT. NEATLY ALIGN PIPE. CONNECT IT SECURELY, AND SUPPORT IT FROM THE BUILDING STRUCTURE WITH HANGERS AS SPECIFIED BELOW. PROVIDE CHROME-PLATED ESCUDOITHONS ON PIPES PASSING THROUGH CEILING, FLOORS OR WALLS OF FINISHED SPACES. RUN PIPES FREELY THROUGH FLOOR AND WALL PENETRATIONS USING PIPE SLEEVES. DO NOT GROUT IN PLACE UNLESS REQUIRED FOR STRUCTURAL FIRE INTEGRITY. INSTALL PIPE CONCEALED IN FINISHED SPACES WHEREVER POSSIBLE. USE A DIELECTRIC UNION WHERE FERROUS AND COPPER PIPE CONNECT. DIELECTRIC UNION SHALL HAVE A ZINC-PLATED STEEL BODY, A THREADED NYLON INSERT, AND INSULATING PRESSURE GASKET. NO FERROUS METAL--TO-COPPER CONNECTION MADE WITHOUT INSULATING UNIONS WILL BE ALLOWED.

HANGER & SUPPORTS: PIPE HANGERS SHALL BE AS DESCRIBED IN THE SPECIFICATIONS BY B-LINE OR EQUAL BY ANVIL, MICRON, TRUSSON, OR UNISTRUT. CONNECT HANGERS TO THE STRUCTURE WITH SIDE BEAM CONNECTORS AND ALL THREAD HANGER RODS. PROVIDE ENGINEERED SUPPORT STRUTS BETWEEN JOISTS AND OTHER STRUCTURAL MEMBERS AS REQUIRED TO PROVIDE A RIGID HANGING INSTALLATION. DO NOT HANG PIPES FROM OTHER PIPES, CONDUIT OR DUCTWORK. PROVIDE HANGER RODS AND SPACER HANGERS AT INTERVALS AS SPECIFIED IN "HANGER SPACING". PROVIDE SUPPORT WITHIN 1" OF EACH ELBOW AND TEE. PROVIDE SUPPORTS WITHIN 1' OF EACH EQUIPMENT CONNECTION. PROVIDE TWO NUTS ON THREADED SUPPORTS TO SECURELY FASTEN THE SUPPORT. INSTALL HANGER TYPES OR SUPPORTS FOR VARIOUS PIPING AS FOLLOWS:

COPPER TUBE: ADJUSTABLE BAND HANGERS FOR BARE COPPER TUBE 3" AND SMALLER SHALL BE B-LINE #B3170 CT COPPER PLATED ADJUSTABLE BAND SWIVEL RING TYPE. ADJUSTABLE BAND HANGERS FOR INSULATED COPPER TUBE AND 3" SMALLER SHALL BE B-LINE #B3170 NF ADJUSTABLE BAND SWIVEL RING TYPE. CLEVIS HANGERS FOR INSULATED COPPER TUBE 4" AND LARGER SHALL BE B-LINE #B3100 GALVANIZED STEEL CLEVIS TYPE. SUPPORT EXPOSED COPPER TUBE 2" AND SMALLER TO WALLS OR IN CHASES WITH B-LINE #B3158BCT COPPER COATED EXTENSION SPLIT RING PIPE CLAMPS, 3/8" THREADED ROD AND B-LINE #B3190T CEILING FLANGES. SUPPORT COPPER TUBE IN CHASES AND WALLS AT PLUMBING FIXTURES WITH PLASTIC OR COPPER BRACKETS SECURED TO STRUCTURE AND U-BOLTS SIZED TO BARE ON THE PIPE. RISER CLAMPS TO SUPPORT VERTICAL COPPER TUBE SHALL BE B-LINE #B3373CT COPPER COATED STEEL, CUT INSULATION, SEA VAPOR BARRIER, AND ATTACH TO BARE TUBE.

STEEL PIPE: ADJUSTABLE BAND HANGERS FOR 2" AND SMALLER SHALL BE B-LINE #B3170 NF ADJUSTABLE BAND SWIVEL RING TYPE. CLEVIS HANGERS FOR 2-1/2" AND LARGER SHALL BE B-LINE #B3100 GALVANIZED STEEL CLEVIS TYPE. RISER CLAMPS TO SUPPORT VERTICAL PIPE SHALL BE B-LINE #B3373 GALVANIZED STEEL.

CAST IRON PIPE: ADJUSTABLE BAND HANGERS FOR 2" AND SMALLER, COPPER VALVES FOR 3" AND LARGER SHALL BE B-LINE #B3100 GALVANIZED STEEL CLEVIS TYPE. RISER CLAMPS TO SUPPORT VERTICAL PIPE SHALL BE B-LINE #B3373 GALVANIZED STEEL.

PVC PIPE: ADJUSTABLE BAND HANGERS FOR 3" AND SMALLER, CLEVIS HANGERS FOR 4" AND LARGER SHALL BE B-LINE #B3100 GALVANIZED STEEL CLEVIS TYPE. RISER CLAMPS TO SUPPORT VERTICAL PIPE SHALL BE B-LINE #B3373 GALVANIZED STEEL.

INSULATION PROTECTION SHIELDS: B-LINE #B3151 OF 18 GAUGE GALVANIZED SHEET METAL. SHIELD SHALL COVER HALF OF THE CIRCUMFERENCE OF THE PIPE AND SHALL BE OF LENGTH INDICATED BY MANUFACTURER FOR PIPE SIZE AND THICKNESS OF INSULATION.

HANGER SPACING, ROD SIZES & CONNECTORS: CONNECT RODS TO STEEL BEAMS OR JOISTS WITH B-LINE #B3031 OR #B3033BEAM CLAMPS AS REQUIRED. CONNECT RODS TO CONCRETE WITH B-LINE #B3014 MALLEABLE IRON SINGLE TYPE INSERTS WITH MALLEABLE IRON NUT. CONNECT RODS IN WOOD CONSTRUCTION WITH B-LINE #B3058 SIDE BEAM CONNECTORS. AND SUPPORT PIPING WITH SPACERS AND ROD SIZES AS FOLLOWS:

COPPER TUBE: 1-1/2" AND SMALLER - EVERY 6" WITH 3/8" HANGER RODS, 2" - EVERY 10" WITH 3/8" HANGER RODS, 2-1/2" AND 3" - EVERY 10" WITH 1/2" HANGER RODS, 4" - EVERY 10" WITH 3/8" HANGER RODS. SUPPORT VERTICAL COPPER TUBE EVERY 10'.

STEEL PIPE: 1" AND SMALLER - EVERY 6" WITH 3/8" HANGER RODS, 1-1/2" AND 2" - EVERY 10" WITH 3/8" HANGER RODS, 2-1/2" AND 3" - EVERY 10" WITH 1/2" HANGER RODS, 4" - EVERY 10" WITH 3/8" HANGER RODS. SUPPORT VERTICAL STEEL PIPE EVERY 10'.

CAST IRON PIPE: EVERY 10" AND WITHIN 1' OF EACH JOINT, 2" AND SMALLER WITH 3/8" HANGER RODS, 3" WITH 1/2" HANGER RODS, 4" WITH 3/8" HANGER RODS, 6" WITH 3/4" HANGER RODS, 8" AND LARGER WITH 1/2" HANGER RODS. SUPPORT VERTICAL CAST IRON PIPE EVERY 15'.

PVC PIPE: SUPPORT ALL PIPES SIZES EVERY 4', 1-1/2" AND SMALLER WITH 3/8" HANGER RODS, 2" WITH 1/2" HANGER RODS, 2-1/2" AND 3" WITH 1/2" HANGER RODS, 4" AND LARGER WITH 5/8" HANGER RODS. SUPPORT VERTICAL PVC PIPE EVERY 4'.

SUPPORTS ON FLOOR: SUPPORT PIPING FROM THE FLOOR WHERE REQUIRED FOR FERROUS PIPE OR INSULATED COPPER TUBE. SHALL BE B-LINE B3088 GALVANIZED STEEL, WITH PIPE SADDLE, THREADED SHANK FOR HEIGHT ADJUSTMENT AND FLOOR STAND SECURED TO THE FLOOR.

BELOW GROUND INSTALLATION FOR SOIL, WASTE AND STORM: INSTALL SOIL AND WASTE PIPING TO A UNIFORM SLOPE OF NOT LESS THAN 1/8" PER FOOT FOR PIPING 4" OR LARGER, AND NOT LESS THAN 1/4" PER FOOT FOR PIPING 3" OR SMALLER. SLOPE STORM PIPING AT 1/8" (1/4") PER FOOT. LAY PIPE AT UNIFORM SLOPE, FREE FROM SAGS, WITH HUB END UPSTREAM. MAKE CHANGES IN DIRECTION FROM HORIZONTAL TO VERTICAL, AT FITTURE BRANCHES AND OTHER BRANCH CONNECTIONS WITH SANITARY "TEES" OR SHORT SWEEP "TEES". MAKE CHANGES IN DIRECTION FROM VERTICAL TO HORIZONTAL OR HORIZONTAL TO HORIZONTAL, WITH LONG RADIUS FITTINGS, LONG SWEEPING "TEES", COMBINATION "Y" AND "1/8 BEND" FITTINGS, OR 45 DEGREE "TEES" (1/8 BEND FITTINGS), 1/8 BEND OR 1/16 BEND AND "T" FITTINGS. INSTALL PIPE WITH THE BARREL OF THE PIPE ON FIRM, SOLID EARTH FOR ITS ENTIRE LENGTH, AND EXCAVATE HOLES FOR THE PIPE BELLS. LAY PIPE IN A STRAIGHT LINE AND INSTALL WITH UNIFORM GRADE TO LINE WITH BATTEN BOARDS SET NOT MORE THAN 24" 0" APART. CLOSE OPEN ENDS OF PIPE WITH A STOPPER WHEN PIPE LAYING IS NOT IN PROGRESS. CENTER SPIGOTS ACCURATELY IN BELLS FOR UNIFORM CAULKING. PROVIDE A SMOOTH AND UNIFORM INVERT IN THE SYSTEM. DRILLING OR TAPPING OF SOIL AND WASTE LINES, AND SADDLE HUBS AND BANDS ARE NOT PERMITTED. LOCATE AND INSTALL SOIL AND WASTE LINES AS INDICATED ON THE DRAWINGS. DETERMINE EXIST LOCATIONS IN CONFORMANCE WITH THE ASME CODE PRIOR TO INSTALLATION OF ANY BUILDING DRAIN PIPE, VERY VERIFICATION OF CONNECTION POINT OF EXISTING SEWER, SERVICE LINE OR EXISTING TENANT CONNECTIONS INDICATED ON THE DRAWINGS. IF THE INSTALLATION WILL NOT TIE INTO THE INDICATED INVERT ELEVATION POINT WHILE MAINTAINING PROPER FALL, NOTIFY ARCHITECT SO THAT AN ALTERNATIVE MAY BE DETERMINED.

ABOVE GROUND INSTALLATION FOR SOIL, WASTE AND STORM: INSTALL SOIL AND WASTE PIPING TO A UNIFORM SLOPE OF NOT LESS THAN 1/8" PER FOOT FOR PIPING 4" OR LARGER, AND NOT LESS THAN 1/4" PER FOOT FOR PIPING 3" OR SMALLER. SLOPE STORM PIPING AT 1/8" PER FOOT. LAY PIPE AT UNIFORM SLOPE, FREE FROM SAGS. SUPPORT PIPE WITHIN 12" OF EACH JOINT WITH COPPER TUBING OR HORIZONTAL TO VERTICAL, AT FITTURE BRANCHES AND OTHER BRANCH CONNECTIONS WITH SANITARY "TEES" OR SHORT SWEEP "TEES". MAKE CHANGES IN DIRECTION FROM VERTICAL TO HORIZONTAL OR HORIZONTAL TO HORIZONTAL, WITH LONG RADIUS FITTINGS, LONG SWEEPING "TEES", COMBINATION "Y" AND "1/8 BEND" FITTINGS, OR 45 DEGREE "TEES" (1/8 BEND FITTINGS), 1/8 BEND OR 1/16 BEND AND "T" FITTINGS. PROVIDE A SMOOTH AND UNIFORM INVERT IN THE SYSTEM. DRILLING OR TAPPING OF SOIL AND WASTE LINES, AND SADDLE HUBS AND BANDS ARE NOT PERMITTED. LOCATE AND INSTALL SOIL AND WASTE LINES AS INDICATED ON THE DRAWINGS. DETERMINE EXIST LOCATIONS IN SUCH A MANNER AS TO MAINTAIN PROPER CLEARANCE.

PLUMBING VENT: CONNECT PLUMBING VENT PIPES TO FIXTURE DRAIN PIPES AS INDICATED ON THE DRAWINGS OR AS REQUIRED BY THE INSTALLATION PRACTICES ADOPTED AND ENFORCED BY LOCAL CODES OFFICIAL, AND EXTEND VENT PIPES FULL SIZE THROUGH THE ROOF LINE. GRADE PIPE TO A UNIFORM SLOPE SO AS TO DRAIN BACK BY GRAVITY TO THE DRAINAGE PIPING SYSTEM. VENTS PASSING THROUGH THE ROOF SHALL BE MINIMUM 3" SIZE EXCEPT IN TROPICAL CLIMATES, PER LOCAL CODES. TURN FLASHING DOWN INTO STACKS AT LEAST 2", AND EXTEND FLASHING 24" IN ALL DIRECTIONS FROM THE PIPE AT THE ROOF LINE. APPLY WHITE LEAD PIPE DOPE ON MALE STEEL PIPE THREADS. TURN THROUGH ROOFS SHALL MAINTAIN A DISTANCE OF 10"-0" HORIZONTAL AND 3"-0" ABOVE ANY BUILDING OPENING OR FRESH AIR INLET. VENT LINES SHALL BE AIR AND WATER TIGHT. VENT FLOOR DRAINS INDIVIDUALLY OR CONNECT THEM TO A HORIZONTALLY VENTED LINE AS SHOWN ON THE DRAWINGS.

DOMESTIC WATER: ARRANGE COLD, HOT, AND HOT WATER RECIRCULATION PIPING TO DRAIN AT THE LOWEST POINT IN EACH SYSTEM. INSTALL AT LEAST ONE PIPE UNION ADJACENT TO ALL SHUTOFF VALVES, AT CONNECTION POINTS OF EACH PIECE OF EQUIPMENT, AND ELSEWHERE IN THE SYSTEM WHERE REQUIRED TO ALLOW PROPER MAINTENANCE. PROVIDE UNIONS OF THE GROUND JOINT TYPE. MAKE ALLOWANCE FOR EXPANSION AND CONTRACTION WHERE REQUIRED BY THE INSTALLATION. WHERE WATER PIPING OCCURS IN EXTERIOR WALLS, HOLD PIPE AS CLOSE AS POSSIBLE TO THE INTERIOR WALL FACE OF EXTERIOR WALLS. BAIT OR OTHER INSULATION (MINIMUM R8) BETWEEN PIPING AND THE EXTERIOR WALL FACE.

NATURAL GAS: PITCH NATURAL GAS PIPING, AND PROVIDE ACCESSIBLE DIRT LEGS AT THE LOW POINTS. TAKE BRANCH PIPES OFF THE TOP OR SIDES OF MAIN PIPES, TO PREVENT ACCUMULATION OF WATER IN THE BRANCHES. INSTALL GAS PIPING VALVES AND UNIONS ONLY IN ACCESSIBLE LOCATIONS. DO NOT INSTALL GAS PIPE BELOW THE BASE SLAB.

15B 2-5 PIPING SANITIZATION

SANITIZE THE ENTIRE DOMESTIC WATER PIPING SYSTEM (COLD, HOT, AND HOT WATER RETURN) WITH A SOLUTION CONTAINING NOT LESS THAN 50 PPM AVAILABLE CHLORINE. KEEP SOLUTION IN THE SYSTEM FOR A MINIMUM OF 24 HOURS, WITH EACH VALVE BEING OPERATED SEVERAL TIMES DURING THE PERIOD. AFTER COMPLETION, FLUSH SYSTEM WITH CITY WATER UNTIL CHLORINE RESIDUAL IS LOWERED TO INCOMING CITY WATER LEVEL.

15B 2-6 PIPE AND VALVE MARKERS

PROVIDE MANUFACTURER'S STANDARD PRE-PRINTED, SEMI-RIGID SNAP-ON OR PERMANENT ADHESIVE, PRESSURE-SENSITIVE VINYL PIPE MARKERS. PIPE MARKERS SHALL BE COLOR-CODED COMPLYING WITH ANSI A13.1.

INSTALL PIPE MARKERS ON EACH PLUMBING PIPING SYSTEM AND INCLUDE ARROWS TO SHOW NORMAL DIRECTION OF FLOW.

LOCATE PIPE MARKERS AND COLOR BANDS WHEREVER PIPING IS EXPOSED TO VIEW IN OCCUPIED SPACES, MACHINE ROOMS, ACCESSIBLE MAINTENANCE SPACES (SHAFTS, TUNNELS, PLENUMS) AND EXTERIOR NON-CONCEALED LOCATIONS.

PROVIDE PLASTIC LAMINATE OR BRASS VALVE TAG ON EVERY VALVE, COOK AND CONTROL DEVICE IN EACH PLUMBING PIPING SYSTEM. EXCLUDE CHECK VALVES, VALVES WITH FACTORY FABRICATED EQUIPMENT UNITS, PLUMBING FIXTURE FAUCETS, CONVENIENCE AND LAUNDRY WATERING HOSE BIBBS, AND SHUT-OFF VALVES AT PLUMBING FIXTURES AND SIMILAR ROUGH-IN CONNECTIONS OF END-USE FIXTURES AND UNITS.

15B3 PLUMBING SPECIALTIES

15B 3-1 AIR CHAMBERS, WATER HAMMER ARRESTORS, AND TRAPS

PROVIDE AIR CHAMBERS, FULL SIZE OF THE SUPPLY PIPE AND MINIMUM 18" LONG OR PER LOCAL AUTHORITIES REQUIREMENTS, AT SUPPLY PIPES TERMINATING AT FIXTURES TO PREVENT WATER HAMMER. PROVIDE WATER HAMMER ARRESTORS AT VALVES OR BATTERIES OF FIXTURES AS INDICATED ON THE DRAWINGS TO PREVENT WATER HAMMER. ARRESTORS SHALL BE JOSAM, SMITH PRECISION PLUMBING PRODUCTS, EQUAL BY MCGUIRE, OR ZURN, STAINLESS STEEL BELLOW TYPE, OR O-RING SEALS AND LIGHT METAL PISTON. INSTALL WATER HAMMER ARRESTORS PER THE SCHEMATIC AND DRAINAGE SUBSTITUTE FDI WH-201 INSTALLATION INSTRUCTIONS. INSTALLATION OF ARRESTORS AT BATTERIES OF FIXTURES PRECLUDES THE REQUIREMENT FOR INDIVIDUAL ARRESTORS AT EACH BATTERY FIXTURE.

PROVIDE WATER TRAPS AT FLOOR DRAINS, FIXTURES AND EQUIPMENT WITH DRAIN CONNECTIONS, INCLUDING TRAPS NOT FINISHED IN COMBINATION WITH FIXTURES AND EQUIPMENT UNITS, SHALL BE CHROME-PLATED BRASS.

PROVIDE CONVENTIONAL TYPE, WATER-SEALED SELF-CLEANING DESIGN, FULL "S" TRAP, OR SFP STANDARD TRAP, TO BE USED ONLY WHERE SPECIFICALLY CALLED FOR ON THE DRAWINGS OR ELSEWHERE IN THIS SPECIFICATION. TRAP WATER SEALS SHALL NOT BE LESS THAN 2" AND DEEP SEAL TRAPS SHALL BE PROVIDED WHERE SPECIFIED OR INDICATED. EACH TRAP SHALL BE INTEGRAL WITH THE FIXTURE OR FLOOR DRAIN OR INSTALLED BELOW THE BASE SLAB SHALL AN ACCESSIBLE CLEANOUT OF ADEQUATE SIZE. PROVIDE TRAP PRIMERS WHERE REQUIRED BY CODE AND WHERE INDICATED ON THE DRAWINGS.

15B 3-2 CLEANOUTS, FLOOR DRAINS AND ROOF DRAINS

CLEANOUTS, FLOOR DRAINS AND ROOF DRAINS SHALL BE BY ONE MANUFACTURER IF POSSIBLE. ACCEPTABLE MANUFACTURERS ARE JOSAM, SMITH, WADE, WAITS, AND ZURN. PROVIDE LONG SWEEP FITTINGS FOR CLEANOUT EXTENSIONS, SHORT SWEEPS AT START OF RUNS OR CHANGE IN DIRECTION AND COMBINATION WYE AND LEFT BEND FITTINGS IN HORIZONTAL RUNS. INSTALL CLEANOUTS WITH A MINIMUM OF 18" CLEAR ALL AROUND, CONSULT LOCAL CODES FOR OTHER REQUIREMENTS, FOR EASY SYSTEM MAINTENANCE. INSTALL PLUG WITH TEFLOJ JON COMPOUND.

FLOOR DRAINS: SHALL BE AS SCHEDULED ON THE DRAWINGS.

FLOOR CLEANOUTS: SHALL BE AS SCHEDULED ON THE DRAWINGS. INSTALL CLEANOUTS AT POINTS AS NOTED ON THE DRAWINGS, AT THE BUILDING EXIT; AT A MINIMUM OF EVERY 50 FEET IN HORIZONTAL SOIL AND WASTE LINES; AND AT TURNS OF PIPE GREATER THAN 45 DEGREES. CLEANOUTS SHALL BE FULL SIZE OF THE PIPE UP TO 4", AND 4" SIZE FOR PIPES LARGER THAN 4". DETERMINE THE TYPE OF FLOOR COVERING TO BE USED AT EACH FLOOR CLEANOUT LOCATION AND PROVIDE TOP WITH VARIATIONS SUITABLE FOR FLOOR COVERING. CARPET MARKERS, RECESSED FOR TILE AND SCORED FOR UNFINISHED FLOOR. ROUGH-IN AND INSTALL EACH FLOOR CLEANOUT FLUSH WITH THE FINISHED FLOOR CONSTRUCTION.

EXTERIOR CLEANOUTS: SHALL BE AS SCHEDULED ON THE DRAWINGS. INSTALL CLEANOUTS AT POINTS AS NOTED ON THE DRAWINGS, AT THE BUILDING EXIT; AT A MINIMUM OF EVERY 100 FEET IN HORIZONTAL SOIL, WASTE AND STORM SERVICE LINES. EMBED EACH EXTERIOR CLEANOUT IN AN 18" X 18" X 8" BLOCK OF CONCRETE, FLUSH WITH FINISHED GRADE.

WALL CLEANOUTS: SHALL BE AS SCHEDULED ON THE DRAWINGS. INSTALL WALL CLEANOUTS AT POINTS AS NOTED ON THE DRAWINGS; AT THE FOOT OF EACH SOIL, WASTE OR INTERIOR DOWNSPOUT STACK; AT HORIZONTAL SOIL AND WASTE BRANCHES LONGER THAN THE FEET NOT SERVED BY A FLOOR CLEANOUT; CONSULT LOCAL CODES FOR INSTALLATION AT SPECIFIC FIXTURE TYPES. INSTALL WALL CLEANOUTS ABOVE THE FLOOR DR. OF THE FIXTURE SERVED WITHIN FOUR FEET OF THE FLOOR AND INSTALL EXTENSIONS FROM THE CLEANOUT TEE TO THE WALL TO LOCATE THE PLUG WITHIN 2" OF THE WALL WHERE REQUIRED. INSTALL CLEANOUTS ON URINALS AND SINKS WHERE REQUIRED BY CODE.

15B 3-3 VALVES, STRAINERS, HOSE BIBBS, AND UNIONS

PLUMBING SYSTEM VALVES SHALL BE CRANE COMPANY OR NIBCO OF MODELS HERETO SPECIFIED, OR APPROVED EQUAL BY HAMMOND, WALMORTH, STOCKHAM OR MUELLER VALVES. VALVES SHALL BE OF THE BEST QUALITY, DESIGNED FOR 125 PSI STEAM WORKING PRESSURE. INSTALL VALVES ON THE HOT AND COLD WATER LINES AT THE WATER HEATER CONNECTIONS AND OTHER ITEMS OF EQUIPMENT, AT BRANCHES FROM MAINS SERVING GROUPS OF FIXTURES, AND AT OTHER PLACES INDICATED OR REQUIRED BY THE INSTALLATION TO ALLOW EASE OF FUTURE MAINTENANCE.

GATE VALVES: CLASS 125, SIZE 2-1/2" AND SMALLER SHALL BE CRANE #1701 OR NIBCO T113, NON-RISING STEM, SCREWED BRASS BODY AND PARTS, WITH WEDGE DISC. GATE VALVES 3" AND LARGER SHALL BE CRANE #465-1/2 OR NIBCO #617-0, O.S. & Y, IRON BODY FLANGED WEDGE GATE WITH BRASS SEATS AND STEM.

BALL VALVES (MAY BE USED IN LIEU OF GATE VALVES UP TO 2"): 2" AND SMALLER, NIBCO #1580; TWO PIECE BRONZE BODY, WITH SCREWED ENDS, CHROME PLATED BRONZE BALL WITH CONVENTIONAL PORT, 400 PSI, BLOW-OFF PROOF STEM.

GLOBE VALVES: GLOBE VALVES SHALL BE CLASS 125, GLOBE VALVES 2-1/2" AND SMALLER SHALL BE CRANE #1310 OR NIBCO #T-211, SCREWED BRASS BODY AND BRASS DISC. GLOBE VALVES 3" AND LARGER SHALL BE CRANE #351 IRON BODY FLANGED VALVE WITH BRASS TRIM.

CHECK VALVES: CHECK VALVES SHALL BE CLASS 125. CHECK VALVES FOR INSTALLATION IN HORIZONTAL PIPE RUNS SHALL BE OF THE "SWING DISC" DESIGN. HORIZONTAL CHECK VALVES 2-1/2" AND SMALLER SHALL BE CRANE #137 OR NIBCO #T-413 WITH SCREWED BRONZE BODY AND BRONZE DISC. HORIZONTAL CHECK VALVES 3" AND LARGER SHALL BE CRANE #373 OR NIBCO F-918 IRON BODY FLANGED VALVE WITH BRASS TRIM. CHECK VALVES FOR INSTALLATION IN VERTICAL PIPE RUNS SHALL BE OF THE "VERTICAL LIFT" DESIGN. VERTICAL CHECK VALVES 2-1/2" AND SMALLER SHALL BE CRANE #29 OR NIBCO #T-480 WITH SCREWED BRONZE BODY AND BRONZE DISC. VERTICAL CHECK VALVES 3" AND LARGER SHALL BE CENTER GUIDED.

GAS COOKS: GAS COOKS 2-1/2" AND SMALLER SHALL BE HOMESTEAD #611, SCREWED IRON BODY WITH BRASS TRIM AND FLAT HEAD. GAS COOKS 3" AND LARGER SHALL BE HOMESTEAD #612 FLANGED SEMI-STEEL BODY WITH IRON TRIM AND SQUARE HEAD. APPROVED EQUAL ARE MCDONALD, ROCKWELL-NOROSTROM OR DEZURIK.

THERMOSTATIC MIXING VALVES: THERMOSTATIC MIXING VALVES SHALL BE POWERS AS DESCRIBED ON THE DRAWINGS OR EQUAL BRADLEY, LEONARD, JAMLER, SYMONDS OR WAITS MEETING ASSE 1018 WITH BRASS BODY, NON-CORROSIVE INTERNAL PARTS, TAMPER RESISTANT TEMPERATURE ADJUSTMENT, UNION INLETS AND CHECK STOPS WITH STRAINERS. SET TEMPERATURE AT 100F FOR HAND WASHING.

GAS LINE PRESSURE REGULATORS: GAS LINE PRESSURE REGULATORS SHALL BE BY EQUI-METER, FISHER, MAXITROL OR AMERICAN METER COMPANY WITH CAPACITIES AS SCHEDULED ON THE DRAWINGS. REGULATORS SHALL BE SINGLE STAGE, STEEL JACKETED, CORROSION-RESISTANT TYPE WITH INTERSTITIAL RELIEF VALVE WITH ATMOSPHERIC VENT, ELEVATION COMPENSATOR, WITH THREADED ENDS, FOR INLET AND OUTLET.

STRAINERS: STRAINERS 2-1/2" AND SMALLER SHALL BE WAITS #745 WITH SCREWED IRON BODY, BRASS CAP AND MONEL 40 WESH SCREEN. STRAINERS 3" AND LARGER SHALL BE WAITS #77F-D WITH FLANGED IRON BODY, BOLTED IRON CAP AND STAINLESS STEEL SCREEN WITH 1/16" PERFORATIONS. STRAINERS SIZE 3" AND LARGER SHALL HAVE A 1" BLOW-OFF LINE WITH A 1" GATE VALVE CONNECTED TO THE BLOW-OFF CONNECTION AND SHALL BE EXTENDED TO THE NEAREST FLOOR DRAIN.

DRAIN VALVES AND INTERIOR HOSE BIBBS: WOODFORD #24P OR WAITS #5C8-6 WITH ROUGH BRASS BODY, 1/2" SCREWED INLET, WITH 3/4" HOSE THREAD OUTLET, SCREW-ON VACUUM BREAKER, WHEEL HANDLE AND COMPOSITION DISC.

EXPOSED INTERIOR HOSE BIBBS: CHICAGO #952 OR 1&S BRASS #B720 WITH CHROME PLATED BRASS BODY, 3/4" SCREWED INLET, 3/4" HOSE THREAD OUTLET, INTEGRAL VACUUM BREAKER, WHEEL HANDLE AND COMPOSITION DISC.

WALL HYDRANTS: SMITH #5609-QT "NON-FREEZE" SURFACE TYPE WITH CAST BRONZE MAIN NICKEL PLATED FACE, WITH INTEGRAL VACUUM BREAKER, 3/4" HOSE CONNECTION, ADJUSTABLE WALL CLAMP, REMOVABLE KEY HANDLE OPERATOR, EQUAL BY WOODFORD, JOSAM, PACE, WADE, WAITS OR ZURN. PROVIDE ACCESSIBLE STOP VALVE AND WATER HAMMER ARRESTOR INSIDE BUILDING.

15B 3-6 SYSTEM ACCESSORIES

THERMOMETERS SHALL BE AMERICAN "S" BI-METALLIC TYPE WITH REMOVABLE SOCKET, AND SHALL BE INSTALLED WHERE INDICATED OR REQUIRED.

PRESSURE GAUGES SHALL BE ASHCOFT "S" DIAL TYPE WITH SHUT-OFF COOK, AND SHALL BE INSTALLED WHERE INDICATED OR REQUIRED.

TRAP PRIMERS SHALL BE AS SPECIFIED ON THE DRAWINGS, PRECISION PLUMBING PRODUCTS "PRIME RITE" OR TRAP PRIMER BY MIFAB OR GLEUOX CHIEF WITH BRASS BODY AND INTEGRAL VACUUM BREAKER. PROVIDE PROTECTION BOX WHERE MORE THAN ONE TRAP IS INDICATED TO BE PRIMED ON THE DRAWINGS. PROVIDE ACCESS PANEL WHERE REQUIRED.

ICE WATER CONNECTION BOXES SHALL BE AS SPECIFIED ON THE DRAWINGS, GUY GRAY #1077 OR APPROVED EQUAL WITH 20 GAUGE STEEL BODY, WALL FLANGE AND WATER LOCK DOWN.

15B4 PLUMBING FIXTURES AND EQUIPMENT

15B 4-1 PLUMBING FIXTURES

FURNISH AND INSTALL COMMERCIAL GRADE PLUMBING FIXTURES, SEE THE DRAWINGS FOR QUANTITIES AND DESCRIPTIONS. PROVIDE CHINA FIXTURES AS SCHEDULED BY AMERICAN-STANDARD. PROVIDE STAINLESS STEEL SINKS AS SCHEDULED BY ELKAY. PROVIDE ELECTRIC WATER COOLERS AS SCHEDULED BY ELKAY. PROVIDE MOP SINKS AS SCHEDULED BY STERN-WILLIAMS OR EQUAL. BY ACDORN ENGINEERING CO., FAT OR FLORESTONE. PROVIDE FIXTURES OF SAME MANUFACTURER WHERE POSSIBLE.

FIXTURES SHOWN ON THE DRAWINGS OR SPECIFIED HEREIN SHALL BE FURNISHED AND INSTALLED, SET FIRM AND TRUE, CONNECTED TO REQUIRED PIPING SERVICES, THOROUGHLY CLEANED, LEFT CLEAN AND READY FOR USE. EXPOSED FITTINGS AND PIPING AT THE FIXTURES SHALL BE CHROME-PLATED, AND WATER SUPPLY PIPING SHALL BE VALVED AT EACH FIXTURE.

VITREOUS CHINA FIXTURES SHALL BE OF THE BEST GRADE VITREOUS WARE, WITHOUT PIT HOLES OR BLEMISHES, AND THE OUTLINES SHALL BE GENERALLY TRUE. THE ENGINEER RESERVES THE RIGHT TO REJECT ANY PIECES WHICH, IN HIS OPINION, ARE FAULTY. FIXTURES SET AGAINST WALLS SHALL HAVE GROUND BACKS AND SHALL BE CAULKED WITH SILICONE SEALANT OF A MATCHING COLOR.

15B 4-2 PLUMBING FIXTURE TRIM

FAUCETS AND TRIM IN CONTACT WITH DRINKING WATER SHALL MEET OR EXCEED THE SAFE WATER DRINKING ACT (SWDA) LEAD-FREE STANDARDS OF ANSI/NSF STANDARD 61, SECTION 9.

FIXTURE TRIM SHALL HAVE THE MANUFACTURER'S NAME STAMPED CLEARLY AND VISIBLY ON EACH ITEM.

PROVIDE FAUCETS AS SCHEDULED ON DRAWINGS: BY CHICAGO, SPEAKMEN, ZURN, OR 1&S BRASS.

FIXTURE P-TRAPS SHALL BE 17 GAUGE BRASS BODY WITH CLEANOUT, 17 GAUGE SEAMLESS TUBULAR WALL BEND WITH CAST BRASS SLP NUT, SHALLOW STEEL FLANGE, ALL CHROME PLATED, BY MCGUIRE, BRASS CRAFT, DEARBORN BRASS, EBC, PROFLO, WAITS BRASS AND TUBULAR OR ZURN.

LAVATORY, SINK AND WATER CLOSET SUPPLIES SHALL BE SOLID BRASS ANGLE OR STRAIGHT TYPE WITH FULL TURN BRASS STEM, WHEEL HANDLE OR LOOSE KEY TYPES AS NOTED ON DRAWINGS, SHALLOW STEEL FLANGE, 3/8" COPPER RISER FLANGE, ALL CHROME PLATED, FINAL CONNECTION AS REQUIRED: BY MCGUIRE, BRASS CRAFT, EBC OR ZURN.

LAVATORY DRAINS SHALL BE GRID TYPE CHROME PLATED 17 GAUGE BRASS OPEN GRID WITH 1-1/4" X 6" LONG SEAMLESS BRASS TAILPIECE AND BRASS LOCKNUT WITH HEAVY RUBBER BASIN WASHER AND FIBER FRICTION WASHER, BY MCGUIRE, BRASS CRAFT, DEARBORN BRASS, EBC, PROFLO, WAITS BRASS AND TUBULAR OR ZURN.

SINK DRAINS SHALL BE BASKET TYPE WITH CHROME PLATED FORGED BRASS BASKET STRAINER AND STRAINER BODY WITH 1-1/2" X 4" LONG SEAMLESS BRASS TAILPIECE AND CAST BRASS LOCK AND COUPLING NUTS BY MCGUIRE, BRASS CRAFT, DEARBORN BRASS, EBC, PROFLO OR ZURN.

PROVIDE HANDICAP INSULATION KITS FOR LAVATORIES AND SINKS ON EXPOSED WATER AND WASTE PIPES AND FITTINGS, INCLUDING OFFSET DRAIN AND CONTINUOUS WASTE COVERS WHERE REQUIRED: BY BROCAR, MCGUIRE, PLUMBEXER "PRO-2000", TRAP-WRAP OR TRU-BRO.

15B 4-3 WATER HEATER

WATER HEATER SHALL BE BY A.O.SMITH, BRADFORD-WHITE, LOCHINVAR, STATE, RHEEM OR RUUD WITH CAPACITY AS SCHEDULED ON THE DRAWINGS. UNIT SHALL BE ELECTRIC, GLASSINED TANK TYPE COMPLETE WITH STEEL JACKET, FIBERGLASS INSULATION, MAGNESIUM ANODE, INTEGRAL THERMOSTATS AND CONTROLS, AND TEMPERATURE & PRESSURE RELIEF VALVE. WATER HEATER SHALL BE UL LISTED AND MEET ASHRAE 90.1B STANDARDS FOR THERMAL EFFICIENCY AND STANDBY HEAT LOSS.

RELIEF VALVE: WATER HEATER RELIEF VALVE SHALL BE OF THE TEST LEVER TYPE, WITH AUTOMATIC RESET, COMBINATION TEMPERATURE AND PRESSURE RELIEF, APPROVED AND STAMPED BY THE AMERICAN GAS ASSOCIATION. IT SHALL BE INSTALLED DIRECTLY ON THE HEATER TANK, OR IN THE HOT WATER OUTLET, NOT MORE THAN 3' FROM THE TANK. TEMPERATURE SHALL BE NORMALLY SET TO RELIEVE AT 210F AND THE PRESSURE RELIEF SHALL BE AT 125 PSI. THE RELIEF VALVE DISCHARGE LINE SHALL BE PIPED DOWN AND TERMINATE 6" ABOVE A FLOOR DRAIN.

VACUUM RELIEF VALVE: WAITS #N36 OR WILKINS #VR-10 WITH BRONZE BODY AND SILICON DISC. VALVE SHALL OPEN AT 0.5HG VACUUM AND BE RATED FOR 200 PSIG WORKING PRESSURE AND 2500F TEMPERATURE. INSTALL IN COLD WATER SUPPLY TO EACH WATER HEATER DOWNSTREAM OF THE SHUTOFF AND CHECK VALVES.

15B 4-5 COMPRESSED AIR SYSTEMS

COMPRESSED AIR PIPING SHALL BE COPPER PIPE WITH APPROPRIATE FITTINGS. INSTALLATION SHALL BE IN CONFORMANCE WITH SECTION 15B2-4 PIPING INSTALLATION, OF THIS SPECIFICATION.

INSTALL TANK AND PIPE THE AIR COMPRESSOR FURNISHED BY THE OWNER, AS INDICATED ON THE DRAWINGS. INSTALL VALVES, FILTERS, REGULATORS, AND OTHER FITTINGS FURNISHED BY THE OWNER AS A PART OF THE COMPRESSED AIR SYSTEM. AT THE COMPLETION OF THE WORK LEAVE A COMPLETE AND OPERATING SYSTEM, CONFORMING TO THE LATEST EDITION OF THE OSHA CODE. TERMINATE PIPING DROPS WITH BALL VALVES, QUICK DISCONNECT FITTINGS, AND DIRT LEG AS DETAILED ON THE DRAWINGS.

15B 4-6 WASTE OIL TANK AND PIPING

OIL TANK SHALL HAVE CAPACITY AS NOTED ON THE DRAWINGS AND SHALL BE COATED STEEL OR FIBERGLASS TYPE FOR UNDERGROUND SERVICE, COATED WITH CAPPED PIPING. PUMPING OUT TANK, INLET CONNECTION, AND VENT CONNECTION SIZES AS NOTED ON THE DRAWINGS. INSTALL TANK UNDERGROUND IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS. PROVIDE CONCRETE FILL-DOWN SLAB TO PREVENT LEAKING. WASTE OIL PIPING SHALL BE BROWN SLAB, SHALL BE DOUBLE WALL FIBERGLASS BY A. O. SMITH. DRAINAGE FITTINGS INSTALLED TO ALLOW ADDITIONAL UNDESIRABLE WASTE OIL SYSTEM IN COMPLETE CONFORMANCE WITH AGREEMENTS OF EPA AND OTHER APPLICABLE GOVERNING AGENCIES.

15B 4-7 SAND & OIL INTERCEPTOR

PROVIDE RECAST CONCRETE INTERCEPTOR BY LOCAL MANUFACTURER, AS DETAILED ON THE DRAWINGS, CONFORMING TO REQUIREMENTS OF THE LOCAL CODE AND LOCAL SEWER DISTRICT.

THIS SHEET IS PART OF THE CONSTRUCTION DOCUMENTS. OTHER SHEETS INCLUDING SPECIFICATIONS APPLY. THAT SHOWN HEREON IS SCHEMATIC IN NATURE AND NOT TO BE USED AS A SHOP DRAWING. THEREFORE, INCLUDE ALL MODIFICATIONS REQUIRED TO CONFORM TO SITE CONDITIONS AND THE EQUIPMENT AND MATERIAL USED. VERIFY LOCATIONS AND DIMENSIONS OF ALL ARCH