

SECTION 15B: PLUMBING (continued):

15B PENETRATIONS

PROVIDE SLEEVES FOR PIPES PASSING THROUGH ABOVE GRADE CONCRETE OR MASONRY WALLS, CONCRETE FLOOR OR ROOF SLABS. SLEEVES ARE NOT REQUIRED FOR CORE DRILLED HOLES IN EXISTING MASONRY WALLS, CONCRETE FLOORS OR ROOFS. PROVIDE 1/2" GALVANIZED STEEL SLEEVES FOR SLEEVES 6" AND SMALLER. PROVIDE GALVANIZED SHEET METAL SLEEVES FOR LARGER THAN 6" SCHEDULE 40 PVC SLEEVES ARE ACCEPTABLE FOR INSTALLATION IN AREAS WITHOUT RETURN AIR PLenums.

SEAL ELEVATED FLOOR, EXTERIOR WALL AND ROOF PENETRATIONS WATER-TIGHT AND WEATHER-TIGHT WITH NON-SHRINK, NON-HARDENING COMMERCIAL SEALANT. PACK WITH MINERAL WOOL AND SEAL BOTH ENDS WITH MINIMUM OF 1/2" OF SEALANT.

SEAL AROUND PENETRATIONS OF FIRE RATED ASSEMBLIES. COORDINATE FIRE RATINGS AND LOCATIONS WITH THE ARCHITECTURAL DRAWINGS. REFER TO ARCHITECTURAL SPECIFICATIONS FOR FIRE STOPPING. PROVIDE A PRODUCT SCHEDULE FOR UL LISTING, LOCATION, WALL OR FLOOR RATING AND INSTALLATION DRAWING FOR EACH PENETRATION FIRE STOP SYSTEM.

EXTEND PIPE INSULATION FOR INSULATED PIPE THROUGH FLOOR, WALL AND ROOF PENETRATIONS, INCLUDING FIRE RATED WALLS AND FLOORS. THE VAPOR BARRIER SHALL BE MAINTAINED THROUGH SLEEVE FOR A MINIMUM OF 1" ANNUAL CLEAR SPACE BETWEEN INSIDE OF SLEEVE AND OUTSIDE OF INSULATION.

SEAL CONCRETE OR MASONRY EXTERIOR WALL PENETRATIONS BELOW GRADE WITH "WALL PIPES" AND MECHANICAL SLEEVE SEALS. PROVIDE CAST IRON "WALL PIPES" WITH INTEGRAL SLEEVE SEAL MANUFACTURED BY JOSAM, JAY R. SMITH, WADE, WATTS OR ZURN. PROVIDE MODULAR MECHANICAL SLEEVE SEALS, MANUFACTURED BY THUNDERLINE / LINK SEAL, CALPICO, INC. AND METRAFLEX.

SEAL ELEVATED CONCRETE SLAB WITH WATER PROOF MEMBRANE PENETRATIONS WITH "WALL PIPES" AND WATER PROOF SEALANT. SECURE WATER-PROOF MEMBRANE FLASHING WITH "WALL PIPE" CLAMPING FLANGE AND CLAMPING RING. PROVIDE CAST IRON "WALL PIPES" WITH INTEGRAL WATERSTOP RING MANUFACTURED BY JOSAM, JAY R. SMITH, WADE, WATTS OR ZURN.

PROVIDE SLEEVES FOR HORIZONTAL PIPE PASSING THROUGH OR UNDER FOUNDATION. SLEEVES SHALL BE CAST IRON SOIL PIPE TWO NOMINAL PIPE SIZES LARGER THAN THE PIPE SERVED.

PROVIDE SCHEDULE 40 PVC PIPE SLEEVES FOR VERTICAL PRESSURE PIPE PASSING THROUGH CONCRETE SLAB ON GRADE. SLEEVES SHALL BE ONE NOMINAL PIPE SIZE LARGER THAN PIPE SERVED AND TWO PIPE SIZES LARGER THAN PIPE SERVED FOR DUCTILE IRON PIPES WITH RESTRAINING RODS. SEAL WATER-TIGHT WITH SILICONE CAULK.

PROVIDE 1/2" THICK CELLULAR FOAM INSULATION AROUND PERIMETER OF NON-PRESSURE PIPE PASSING THRU CONCRETE SLAB ON GRADE. INSULATION SHALL EXTEND TO 2" ABOVE AND BELOW THE CONCRETE SLAB.

15B ELECTRICAL WIRING

LINE VOLTAGE WIRING SHALL BE PROVIDED BY DIVISION 16. LINE VOLTAGE CONTROL, AND INTERLOCK WIRING FOR PLUMBING SYSTEMS SHALL ALSO BE PROVIDED BY DIVISION 16. CONTRACTOR. LOW VOLTAGE CONTROL WIRING SHALL BE PROVIDED BY THE DIVISION 15 CONTRACTOR. FURNISH WIRING DIAGRAMS TO THE DIVISION 16 CONTRACTOR AS REQUIRED FOR PROPER EQUIPMENT COORDINATION WITH THE DIVISION 16 CONTRACTOR THE ACTUAL WIRE SIZING AMPS FOR PLUMBING EQUIPMENT (FROM THE EQUIPMENT NAMEPLATE) TO ENSURE PROPER INSTALLATION.

15B EQUIPMENT FURNISHED BY OTHERS

FURNISH AND INSTALL ROUGHED-IN WASTES, VENTS AND WATER SERVICES. PROVIDE FINAL CONNECTION TO KITCHEN EQUIPMENT, FURNISHED BY OTHERS, IN LOCATIONS AS INDICATED ON THE DRAWINGS. PROVIDE ACCESSORY ITEMS THAT ARE REQUIRED BUT NOT FURNISHED WITH THE EQUIPMENT, INCLUDING TRAPS, STOP VALVES, PRY'S, INDIRECT DRAIN FROM EQUIPMENT TO FLOOR DRAINS, AND ACCESSORY ITEMS INDICATED OR REQUIRED FOR THE PROPER OPERATION OF THE COMPLETE SYSTEM AT THE TERMINATION OF THE WORK.

DIVISION 15 CONTRACTOR SHALL BE RESPONSIBLE FOR CORRECT ROUGH-IN DIMENSIONS, AND SHALL VERIFY SAME WITH ARCHITECT AND/OR EQUIPMENT SUPPLIER PRIOR TO SERVICE INSTALLATIONS.

15B UTILITY CONNECTIONS

PROVIDE UTILITY CONNECTIONS REQUIRED AND INDICATED ON THE DRAWINGS. INSTALL INTERIOR AND EXTERIOR CONNECTIONS TO GAS, WATER AND EXISTING SERVICES. VERIFY THE LOCATION AND FUNCTIONING, IN COMPLIANCE WITH THE REQUIREMENTS OF THE CODES HAVING JURISDICTION AND THE SERVING UTILITY INVOLVED. VERIFY THE EXACT LOCATION OF UTILITY MAINS, SERVICES, AND CONNECTION POINTS BEFORE MAKING PROPER CONNECTION IN THE FIELD PRIOR TO INSTALLATION. WORK IN CONJUNCTION WITH THE UTILITY INVOLVED IN THE INSTALLATION OF THE UTILITY. VERIFY THAT INSTALLATION INTO THE EXISTING UTILITY MAINS, SERVICE LINES, AND CONNECTION POINTS AT THE INDICATED INVERT ELEVATION POINT PRIOR TO INSTALLATION. IF THE INSTALLATION WILL NOT FIT INTO THE INDICATED INVERT ELEVATION POINT WHILE MAINTAINING PROPER FALL, NOTIFY THE ARCHITECT AND THE ENGINEER SO THAT AN ALTERNATIVE MAY BE DETERMINED.

PROVIDE SERVICE PIPING AND ACCESSORIES REQUIRED TO COMPLETE UTILITY CONNECTIONS THAT ARE NOT FURNISHED BY THE SERVING UTILITY. COORDINATE WITH THE SERVING UTILITY COMPANY REGARDING ITEMS FURNISHED, WORK PERFORMED, AND PERMITS AND INSPECTIONS REQUIRED. PAY ASSOCIATED FEES OR CHARGES.

15B MISCELLANEOUS REMODELING WORK

PROVIDE ITEMS OF PLUMBING SYSTEMS MODIFICATION REQUIRED BECAUSE OF BUILDING REMODELING, AS NOTED ON THE DRAWINGS. NECESSARY FOR PROPER OPERATION. MATCH EXISTING MATERIALS AND CONSTRUCTION TECHNIQUES WHEN MODIFYING EXISTING SYSTEMS. COORDINATE REQUIREMENTS WITH GENERAL CONTRACTOR AND ARCHITECT.

NEW FLOOR DRAINS SHALL BE CONNECTED TO THE EXISTING SANITARY DRAINAGE SYSTEM AS SHOWN ON THE DRAWINGS OR AS SHOWN ON EXISTING CONSTRUCTION DRAWINGS. MATCH EXISTING SUB-FLOOR. REFER TO ARCHITECTURAL SPECIFICATIONS FOR FINISH FLOOR PATCHING REQUIREMENTS.

EXISTING PLUMBING FIXTURES WHERE SHOWN ON THE DRAWINGS TO BE REUSED SHALL BE CLEANED, PAIRED, PROVIDED WITH NEW WASHERS, ETC AS REQUIRED TO PUT INTO GOOD OPERATING CONDITION.

MAKE CONNECTION OF PIPE TO EXISTING WASTE, WATER AND VENT SERVICES. STANDARDS, FITTINGS AND JOINING PRACTICES.

15B BUILDING OPERATION

COMPLY WITH THE SCHEDULE OPERATIONS AS OUTLINED IN THE ARCHITECTURAL PORTIONS OF THIS SPECIFICATION. BUILDING SHALL BE IN OPERATIONAL WORK-DAY HOURS. INTERRUPT WORK DURING INTERRUPTION OF BUILDING OPERATION AT A TIME WHEN THE BUILDING IS NOT IN OPERATION, AND WITH WRITTEN APPROVAL OF BUILDING OWNER AND/OR LOCAL HEALTH DEPARTMENT. COORDINATE WITH THE OWNER AND/OR TENANT A MINIMUM OF SEVEN DAYS IN ADVANCE OF WORK.

15B SYSTEM TESTING AND ADJUSTING

UPON COMPLETION OF EACH PHASE OF THE INSTALLATION, TEST EACH SYSTEM IN CONFORMANCE WITH LOCAL CODE REQUIREMENTS AND AS NOTED BELOW. FURNISH LABOR AND EQUIPMENT REQUIRED TO TEST PLUMBING WORK INSTALLED UNDER THIS CONTRACT. AND ASSUME COSTS INVOLVED IN MAKING THE TESTS, AND REPAIRING AND/OR REPLACING DAMAGED RESULTING THEREFROM.

NOTIFY THE ARCHITECT AND THE AUTHORITY HAVING JURISDICTION, THREE (3) WORKING DAYS PRIOR TO MAKING PLUMBING SYSTEM TESTS. LEAVE CONCEALED WORK UNTESTED UNTIL THE REQUIRED TESTS HAVE BEEN COMPLETED, BUT IF NECESSARY DUE TO CONSTRUCTION PROCEDURE, TESTS ON PORTIONS OF THE WORK MAY BE MADE, AND WHEN SATISFACTORY, THE WORK MAY BE CONCEALED. INSULATION, INSULATION IS INSTALLED AND BEFORE BACKFALL, PIPES, JOINTS, FLANGES, VALVE STEMS, ETC. SHALL BE LEAK TIGHT. REPAIR OR REPLACE SYSTEM DEFECTS WITH NEW MATERIALS. CALCULATING OF DEFECTIVE JOINTS, CRACKS OR HOLES WILL NOT BE PERMITTED. REPEAT TESTS AFTER DEFECTS HAVE BEEN ELIMINATED. MAKE TESTS IN THE PRESENCE OF THE ADMINISTRATIVE AUTHORITY AND/OR THE OWNER'S AUTHORIZED REPRESENTATIVE.

UPON COMPLETION OF THE SYSTEMS INSTALLATION, AND PRIOR TO ACCEPTANCE BY THE ARCHITECT AND ENGINEER, MAKE GENERAL OPERATING TESTS TO DEMONSTRATE THAT EQUIPMENT AND SYSTEMS ARE IN PROPER WORKING ORDER, AND ARE FUNCTIONING IN CONFORMANCE WITH THE INTENT OF THE DRAWINGS AND SPECIFICATIONS. AS A PART OF THESE TESTS, OPEN EVERY WATER OUTLET TO ENSURE COMPLETE SYSTEM FLUSHING, REMOVE AND CLEAN FAUCET AERATORS, CLEAN STRAINERS, LIGHT PILOT LIGHTS, AND OPERATE EVERY PIECE OF EQUIPMENT FURNISHED UNDER THIS CONTRACT TO DEMONSTRATE PROPER FUNCTIONING.

TEST THE DRAINAGE AND VENT SYSTEM BY PLUGGING OPENINGS IN THE DRAINAGE AND VENT SYSTEM. FILL THE SYSTEM WITH WATER. TEST RESULTS WILL BE SATISFACTORY IF THE WATER LEVEL REMAINS STATIONARY FOR NOT LESS THAN ONE (1) HOUR. SUBJECT THE DRAINAGE AND VENT SYSTEM TO A PRESSURE DIFFERENTIAL OF AT LEAST TEN (10) FEET OF WATER. IF LEAKS DEVELOP, REPAIR THEM AND REPEAT THE TEST.

TEST THE DOMESTIC WATER SYSTEM BY FILLING IT WITH WATER AND THEN ISOLATING THE SYSTEM FROM ITS SOURCE. KEEP THE SYSTEM CLOSED FOR A PERIOD OF TWENTY-FOUR HOURS, WITH NO MORE THAN 24" OF WATER HEAD AT A MINIMUM. TEST THIS TEST PERIOD SHALL NOT EXCEED 10 PSIG. TEST WATER PIPING TO A 125 PSI HYDROSTATIC PRESSURE.

FOR LOW PRESSURE NATURAL GAS SYSTEMS, SUBJECT THE PIPE TO 10 PSIG AIR PRESSURE FOR A PERIOD OF ONE HOUR. THE RESULTANT PRESSURE DIFFERENTIAL FOR THIS PERIOD SHALL BE 0 PSIG. TEST PER GAS COMPANY REQUIREMENTS WHERE REQUIRED.

15B GUARANTEE

THE WORK TO BE PERFORMED UNDER THIS CONTRACT SHALL INCLUDE THE FURNISHING, INSTALLATION, AND CONNECTION OF PLUMBING SYSTEMS INDICATED ON THE DRAWINGS AND IN THE SPECIFICATIONS. BY SIGNING THE CONTRACT, THE CONTRACTOR ACKNOWLEDGES THAT HE HAS ACQUIRED HIMSELF WITH THE SITE AND THE EXISTING CONDITIONS UNDER WHICH THE WORK IS TO BE PERFORMED, AND THE DRAWINGS AND SPECIFICATIONS PERTAINING THEREON, AND INDICATES THAT HE WILL COMPLY WITH THE REQUIREMENTS AND INTENT OF PERTINENT DOCUMENTS IN THE PERFORMANCE OF THE WORK.

GUARANTEE THAT THE PLUMBING INSTALLED UNDER THIS CONTRACT IS FREE OF DEFECTS IN WORKMANSHIP AND MATERIALS FOR A PERIOD OF ONE (1) YEAR FROM THE DATE OF ACCEPTANCE BY THE OWNER. THIS SHALL INCLUDE, BUT NOT BE LIMITED TO, THE PRESSURE DIFFERENTIAL FOR THIS SYSTEM AS INTENDED WITHOUT LEAKS, EXCESSIVE NOISE, OR WATER HAMMER.

IF DEFECTS OCCUR DURING THE ONE YEAR GUARANTEE PERIOD, REPAIR OR REPLACE SUCH DEFECTS AT NO EXPENSE TO THE OWNER, AND TO THE SATISFACTION OF THE OWNER, ARCHITECT AND ENGINEER.

15B PLUMBING PIPING

15B PIPING MATERIALS

MATERIALS SPECIFIED OR NOTED ON THE DRAWINGS ARE SUBJECT TO THE APPROVAL OF LOCAL CODE AUTHORITIES. VERIFY APPROVAL BEFORE INSTALLING ANY MATERIAL OR JOINING METHOD.

DOMESTIC WATER (COLD, HOT): DOMESTIC WATER PIPING INSTALLED ABOVE THE FLOOR SLAB INSIDE THE BUILDING SHALL BE TYPE "L" HARD TEMPER COPPER TUBE WITH WROUGHT COPPER FITTINGS AND SOLDERED CONNECTIONS MADE UP WITH 95/5 SOLDER. BRAZED MECHANICALLY FORMED TEE CONNECTIONS (T-DRILL) MAY BE USED IN COPPER LINES WHERE APPROVED BY CODE. CONNECTION SHALL BE MADE WITH BRASS OR SILVER (SILFOS) JOINTS IN CONFORMANCE WITH MANUFACTURER'S INSTRUCTIONS.

UNDERGROUND DOMESTIC WATER PIPING 2" AND SMALLER SHALL BE TYPE "K" SOFT TEMPER COPPER TUBING WITH FLARED COPPER ALLOY FITTINGS AND CONNECTIONS, OR TYPE "K" HARD TEMPER COPPER TUBING WITH CONVENTIONAL WROUGHT COPPER FITTINGS AND SILVER SOLDER (SILFOS) JOINTS. UNDERGROUND COPPER PIPING JOINTS AS POSSIBLE. A BUILDING SERVICE ENTRANCE, NO JOINTS SHALL BE INSTALLED UNDER OR WITHIN 5 FEET OF THE BUILDING. SHALL DOWN WATER PIPING BELOW GRADE INSIDE BUILDING TO DEPTH TO PROTECT FROM FREEZING.

INTERIOR WASTE AND VENT BELOW SLAB: WASTE AND VENT PIPE BELOW SLAB INSIDE BUILDING SHALL BE SERVICE CAST IRON SOIL PIPE WITH HUB AND SPIGOT FITTINGS OR NEOPRENE GASKET JOINT MEETING ASTM A748 MANUFACTURED BY THE TRADEMARK OF THE CISPI AND NIBCO. WASTE AND VENT PIPE IS NOT PERMITTED BELOW BASE SLAB. PVC SCHEDULE 40 DWV ASTM D2685 PIPE WITH ASTM 2865 SOCKET FITTINGS WITH SOLVENT WELDED JOINTS IS ALSO PERMITTED WHERE APPROVED BY CODE. (NOTE: PVC PIPING IS NOT ALLOWED IN CEILING RETURN AIR PLENUMS)

NATURAL GAS: GAS PIPING ABOVE GROUND SHALL BE SCHEDULE 40 BLACK STEEL WITH MALLEABLE IRON SCREWED FITTINGS, OR STANDARD WELDED FITTINGS. CONNECTIONS TO PLUMBING FIXTURES AND EQUIPMENT: 1-1/4" AND LARGER WASTE CONNECTIONS FROM FIXTURE TRAPS TO CAST IRON PIPE SHALL BE DWV COPPER WITH WROUGHT COPPER FITTINGS AND SILVER SOLDER (SILFOS) JOINTS OR COMPRESSION JOINTS AT FIXTURE TRAP CONNECTIONS AND THREADED JOINTS AT CONNECTIONS TO CAST IRON PIPE.

INDIRECT AND CONDENSATE DRAIN INSIDE BUILDING: INDIRECT AND CONDENSATE DRAIN PIPE INSTALLED INSIDE THE BUILDING SHALL BE TYPE SCHEDULE 40 PVC PIPE AND FITTINGS WITH SOLVENT WELDED JOINTS WHERE ALLOWED BY CODE. PVC PIPING IS NOT ALLOWED IN CEILING RETURN AIR PLENUMS. INSTALL CLEANOUTS AT ELBOWS GREATER THAN 45 DEGREES.

INDIRECT AND CONDENSATE DRAIN OUTSIDE BUILDING: INDIRECT AND CONDENSATE DRAIN PIPE INSTALLED OUTSIDE THE BUILDING ABOVE GROUND SHALL BE SCHEDULE 40 PVC PIPE AND FITTINGS WITH SOLVENT WELDED JOINTS WHERE ALLOWED BY CODE. TERMINATE CONDENSATE AT THE MOP SINK AND THE INDIRECT DRAINS WHERE INDICATED ON THE PLANS. INSTALL CLEANOUTS AT ELBOWS GREATER THAN 45 DEGREES.

15B PIPING AND EQUIPMENT INSULATION

DOMESTIC COLD WATER, HOT WATER, INDIRECT AND CONDENSATE DRAIN PIPE (WITHIN BUILDING) 1" ONE-PIECE FIBERGLASS COVERING WITH FIRE-RESISTANT JACKET WITH SELF-SEALING PENETRATIONS OF INSULATION AND VAPOR BARRIER BY CERTAINTED, OWENS-CORNING OR ARMSTRONG. FOR HOT PIPING, PROVIDE PIPE HANGERS AND RISER CLAMPS SIZED FOR THE OUTSIDE DIAMETER OF PIPING. BUTT INSULATION TO HANGER OR RISER CLAMP FOR VERTICAL PIPE. SEAL EXPOSED INSULATION WITH INSULATION SEALER. EXCEPTION FOR VERTICAL PIPING: PROVIDE CLAMPS SIZED FOR THE OUTSIDE DIAMETER OF THE VERTICAL PIPE AND EXTEND CLAMP THROUGH INSULATION. SEAL PENETRATIONS OF INSULATION AND VAPOR BARRIER WITH WET COAT OF VAPOR BARRIER LAP CEMENT. FOR COLD 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 OR FLEXIBLE UNICELLULAR PIPING INSULATION MEETING ASTM C 534-01A, TYPE I WITH INTEGRAL HIGH DENSITY PVC SURFING. INSULATION TO HANGER OR RISER CLAMP BY COOPER B-LINE / ARMCCELL OR APPROVED EQUAL. INSULATION SHALL BE CONTINUOUS ALONG THE PIPE SURFACE, EXCEPT AT VALVES, UNIONS, AND WHERE PIPING IS EXPOSED AT FIXTURES. PROVIDE FIBERGLASS INSULATION ON VENT PIPING WITHIN SIX FEET OF VENT THROUGH THE ROOF. PROVIDE FIBERGLASS INSULATION ON DOMESTIC COLD AND HOT WATER PIPES. EQUIPMENT FURNISHED UNDER THIS CONTRACT TO DEMONSTRATE PROPER FUNCTIONING.

COVER FITTINGS WITH ZESTON, KNAUF, OR EQUAL ONE-PIECE PVC PREMOULDED INSULATING COVERS. FITTING COVERS, JACKETS AND ADHESIVES SHALL NOT EXCEED FLAME SPREAD RATING OF 25 AS DETERMINED BY UL. FITTING COVERS SHALL BE 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 PREMOULDED INSULATING FITTINGS ARE NOT APPROVED BY LOCAL AUTHORITIES, MITER INSULATION AT FITTINGS.

15B PIPING JOINTS

COPPER TUBING: JOINTS IN HARD TEMPER TUBING SHALL BE SOLDERED JOINTS USING LEAD-FREE 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 FLARE 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 BEYOND THE FITTINGS. MAKE JOINTS TIGHT WITH GRAPHITE BASE SPECIFICATIONS. BY SIGNING THE CONTRACT 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 REMEDY WILL BE PERMITTED FOR CORRECTION OF DEFECTIVE JOINTS.

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

CAST IRON PIPE ABOVE GRADE: JOINTS IN HUBLESS PIPE SHALL BE STANDARD CISPI 310 NSF CERTIFIED BY ANCO, DEARBORN, MISSION OR TYLER. JOINTS IN STORM PIPING, INCLUDING CONNECTIONS TO FLOOR DRAINS, SHALL BE HEAVY DUTY COUPLERS MEETING ASTM C1540 AND FN 680, ANACO HUSKY #30-4000 OR CLAMP-ALL TM TORQUE 125 IN. LB.

PVC PIPE: CLEAN JOINTS FREE FROM DEBRIS AND MOISTURE. APPLY PRIMER TO WASTE AND VENT PIPE JOINTS. USE SOLVENT CEMENT MEETING ASTM D2564 AND MAKE JOINTS 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 FERROCO, PROFLEX 3000 SERIES OR MISSION FLXSEAL MR36 SERIES WITH FERROCO ADAPTER COUPLINGS WITH FLASHING DOWN INTO STACKS AND HOSE CLAMPS FOR CONNECTING DISSIMILAR PIPES ABOVE GRADE. PROVIDE FERROCO, 1056 SERIES OR MISSION SEWER COUPLINGS WITH FERROCO ADAPTER COUPLINGS AND HOSE CLAMPS FOR CONNECTING DISSIMILAR PIPES BELOW GRADE AND CAST STAINLESS STEEL BANDS WITH MASTIC.

15B PIPING INSTALLATION

GENERAL: CLEAN PIPE THOROUGHLY PRIOR TO INSTALLATION. REMOVE ENDS OF PIPE TO REMOVE BURRS. CUT PIPE ACCURATELY TO LENGTH AND REMOVE THE EXCESS TO PROVIDE THE REQUIRED CLEARANCE FOR INSTALLATION OF COVERINGS WHERE REQUIRED. PIPE SHALL NOT BE SPRUNG OR BENT. IF A PIPE IS BENT, VERIFY THAT IT IS SUPPORTED BY THE BUILDING STRUCTURE WITHIN THE AS SPECIFIED BELLS. CHROME-PLATED ESCUTCHEONS ON PIPES PASSING THROUGH CEILINGS, FLOORS OR WALLS OF FINISHED SPACES SHALL BE INSTALLED TO PROTECT FROM PENETRATIONS USING PIPE SLEEVES. DO NOT GROUT IN PLACE. LESS REPAIRED FOR STRUCTURAL FIRE INTEGRITY. INSTALL UNDER OR WITHIN 5 FEET OF THE BUILDING. SHALL DOWN WATER PIPING BELOW GRADE INSIDE BUILDING TO DEPTH TO PROTECT FROM FREEZING. UNDERGROUND COPPER PIPING JOINTS AS POSSIBLE. A BUILDING SERVICE ENTRANCE, NO JOINTS SHALL BE INSTALLED UNDER OR WITHIN 5 FEET OF THE BUILDING. SHALL DOWN WATER PIPING BELOW GRADE INSIDE BUILDING TO DEPTH TO PROTECT FROM FREEZING.

HANGER & SUPPORTS: PIPE HANGERS SHALL BE AS DESCRIBED IN THE SPECIFICATIONS BY B-LINE OR EQUAL BY ANVIL, MICHIGAN, TRUSCON, 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 WHERE REQUIRED TO PROVIDE 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 THEM TO STRUCTURE. PROVIDE 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 ADJUSTABLE BAND SWIVEL RING TYPE. SUPPORT EXPOSED COPPER TUBE 2" AND SMALLER TO WALLS OR IN CHASES WITH B-LINE #B319BCT COPPER COATED EXTENSION SPLIT RING PIPE CLAMPS, 3/8" THREADED ROD AND B-LINE #B319BCT 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, SEAL 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. RISER CLAMPS TO SUPPORT VERTICAL PIPE SHALL BE B-LINE #B3373 GALVANIZED STEEL.

CAST IRON PIPE: ADJUSTABLE BAND HANGERS FOR 2" AND SMALLER. CLEVIS HANGERS FOR 3" AND LARGER SHALL BE B-LINE #B3170 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. 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 EQUIPMENT WITH DRAIN CONNECTIONS INCLUDE MOP TRAPS NOT FURNISHED IN COMBINATION WITH FIXTURES AND EQUIPMENT. PLACE TRAP AS CLOSE TO THE FIXTURE OR DRAIN AS POSSIBLE. EXPOSED TRAPS IN FINISHED SPACES SHALL BE CHROME-PLATED BRASS.

PROVIDE CONVENTIONAL "P" TYPE TRAP, WATER-SEALED SELF-CLEANING DESIGN. FULL "S" TRAPS OR TRAP STANDARDS SHALL BE USED ON 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 NOT INTEGRAL WITH THE FIXTURE OR FLOOR DRAIN OR INSTALLED BELOW THE BASE SLAB SHALL BE PROVIDED WITH AN ACCESSIBLE CLEANOUT OF ADEQUATE SIZE. PROVIDE TRAP AND PIPING AT THE FIXTURES SHALL BE VALVED AT EACH FIXTURE. PROVIDE ACCESSIBLE CLEANOUT OF ADEQUATE SIZE. PROVIDE TRAP AND PIPING AT THE FIXTURES SHALL BE VALVED AT EACH FIXTURE.

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. LAY PIPE AT UNIFORM SLOPE, FREE FROM SAGS, WITH HUB END UPSTREAM. MAKE CHANGES IN DIRECTION FROM HORIZONTAL TO VERTICAL AT FIXTURE BRANCHES AND OTHER BRANCH MAKE CHANGES IN DIRECTION FROM VERTICAL TO HORIZONTAL OR HORIZONTAL TO HORIZONTAL WITH LONG RADIUS FITTINGS. LONG SWEEPING "ELLS", COMBINATION "Y" AND 1/8" BEND FITTINGS, OR 45 DEGREE "ELLS" (1/8" BEND FITTINGS), 1/8" BEND OR 1/16" BEND AND "Y" 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" APART. CLOSE GRADE AT A MINIMUM. PROVIDE 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.

DRINKING WATER, WASTE AND WASTE LINES TO SINKS AND SADDLE HUBS AND BANDS ARE NOT PERMITTED. LOCATE AND INSTALL SOIL AND WASTE LINES AS INDICATED ON THE DRAWINGS. DETERMINE EXACT LOCATION AND SURE A MANNER AS TO MAINTAIN PROPER CLEARANCE. PRIOR TO INSTALLATION OF ANY BUILDING DRAIN PIPE, VERIFY ELEVATION OF CONNECTION POINT OF EXISTING SEWER, SERVICE LINE OR EXISTING TENANT CONNECTIONS INDICATED ON THE DRAWINGS. IF THE INSTALLATION WILL NOT FIT 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. LAY PIPE AT UNIFORM SLOPE FREE FROM SAGS. SUPPORT PIPE WITHIN 12" OF EACH JOINT. MAKE CHANGES IN DIRECTION FROM HORIZONTAL TO VERTICAL AT FIXTURE BRANCHES AND OTHER BRANCH MAKE CHANGES IN DIRECTION FROM VERTICAL TO HORIZONTAL OR HORIZONTAL TO HORIZONTAL WITH LONG RADIUS FITTINGS. LONG SWEEPING "ELLS", COMBINATION "Y" AND 1/8" BEND FITTINGS, OR 45 DEGREE "ELLS" (1/8" BEND FITTINGS), 1/8" BEND OR 1/16" BEND AND "Y" FITTINGS. PROVIDE "Y" FITTINGS AND UNIONS INVERT IN THE SYSTEM. DRINKING WATER, WASTE AND WASTE LINES TO SINKS AND SADDLE HUBS AND BANDS ARE NOT PERMITTED. LOCATE AND INSTALL SOIL AND WASTE LINES AS INDICATED ON THE DRAWINGS. DETERMINE EXACT LOCATIONS IN SUCH A MANNER AS TO MAINTAIN PROPER CLEARANCE.

PLUMBING & CONNECT PLUMBING VENT PIPES TO FIXTURE DRAIN PIPES AS INDICATED ON THE DRAWINGS OR AS REQUIRED BY THE PRACTICES ADOPTED AND ENFORCED BY THE LOCAL CODES OFFICIAL. AND EXTEND VENT PIPES FULL SIZE THROUGH THE ROOF LINE. GRADE PIPE TO A UNIFORM SLOPE SO AS TO DRAIN BACK TO GRAVITY TO THE DRAINAGE PIPING SYSTEM. TURN WITH 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 TO ADAPTER GASKETS AND HOSE CLAMPS. VENT FLOOR DRAINS INDIVIDUALLY OR CONNECT THEM TO A HORIZONTALLY VENTED LINE AS SHOWN ON THE DRAWINGS.

DOMESTIC WATER: ARRANGE COLD & 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 FACE OF WALL AND INSTALL INSULATION BATT 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 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.

RESIDUAL IS LOWERED TO INCOMING CITY WATER LEVEL.

15B 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, COCK AND CONTROL DEVICE IN EACH PLUMBING PIPING SYSTEM; EXCLUDE CHECK VALVES, VALVES WITH FACTORY-FACILITATED FITTING WITH COPPER FITTINGS FOR CONVENIENCE AND LAWN-WATERING HOSE BIBBS, AND SHUT-OFF VALVES AT PLUMBING FIXTURES AND SIMILAR ROUGH-IN CONNECTIONS OF END-USE FIXTURES AND UNITS.

15B PLUMBING SPECIALTIES

15B WATER HAMMER ARRESTORS AND TRAPS

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, PROFLO, SIOUX CHEF, WADE, WATTS, OR ZURN, STAINLESS STEEL, BELLOWS TYPE, OR O-RING SEALED AND LUBRICATED ACETAL PISTON. INSTALL WATER HAMMER ARRESTORS PER THE MANUFACTURER'S INSTRUCTIONS. INSTITUTE PDI WH-201 INSTALLATION INSTRUCTIONS. INSTALLATION OF ARRESTORS AT BATTERIES OF FIXTURES PRECLUDES THE INDICATED DISTRIBUTION BOX WHERE MORE THAN ONE TRAP IS INDICATED TO BE PROMED ON THE DRAWINGS. PROVIDE ACCESS PANEL WHERE REQUIRED.

PROVIDE WATER-SEAL TRAPS ON FLOOR DRAINS, FIXTURES AND EQUIPMENT WITH DRAIN CONNECTIONS. PROVIDE TRAPS NOT FURNISHED IN COMBINATION WITH FIXTURES AND EQUIPMENT. PLACE TRAP AS CLOSE TO THE FIXTURE OR DRAIN AS POSSIBLE. EXPOSED TRAPS IN FINISHED SPACES SHALL BE CHROME-PLATED BRASS.

PROVIDE CONVENTIONAL "P" TYPE TRAP, WATER-SEALED SELF-CLEANING DESIGN. FULL "S" TRAPS OR TRAP STANDARDS SHALL BE USED ON 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 NOT INTEGRAL WITH THE FIXTURE OR FLOOR DRAIN OR INSTALLED BELOW THE BASE SLAB SHALL BE PROVIDED WITH AN ACCESSIBLE CLEANOUT OF ADEQUATE SIZE. PROVIDE TRAP AND PIPING AT THE FIXTURES SHALL BE VALVED AT EACH FIXTURE. PROVIDE ACCESSIBLE CLEANOUT OF ADEQUATE SIZE. PROVIDE TRAP AND PIPING AT THE FIXTURES SHALL BE VALVED AT EACH FIXTURE.

15B CLEANOUTS & FLOOR DRAINS

CLEANOUTS SHALL BE IN ACCORDANCE TO SECTION 708 OF FBCP. PROVIDE LONG SWEEP FITTINGS FOR CLEANOUT. PROVIDE STAINLESS STEEL SINKS AS SCHEDULED ON THE DRAWINGS. PROVIDE MOP SINKS AS SCHEDULED ON THE DRAWINGS.

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 BEGINNING OF RUNS OR CHANGE IN DIRECTION AND COMBINATION WYE AND EIGHT BEND FITTINGS IN HORIZONTAL RUNS. INSTALL CLEANOUTS WITH A MINIMUM OF 18" CLEAR ALL AROUND. CONSULT LOCAL CODES FOR OTHER REQUIREMENTS FOR ANY SYSTEM MAINTENANCE. INSTALL PLUG WITH TEFLON JOINT COMPOUND.

FLOOR CLEANOUTS: SHALL BE AS SCHEDULED ON THE DRAWINGS. INSTALL CLEANOUTS AT POINTS AS NOTED ON THE DRAWINGS. AT THE BEGINNING OF RUNS OR CHANGE IN DIRECTION AND COMBINATION WYE AND EIGHT BEND FITTINGS IN HORIZONTAL RUNS. INSTALL CLEANOUTS WITH A MINIMUM OF 18" CLEAR ALL AROUND. CONSULT LOCAL CODES FOR OTHER REQUIREMENTS FOR ANY SYSTEM MAINTENANCE. INSTALL PLUG WITH TEFLON JOINT COMPOUND.

15B VALVES & UNIONS

PLUMBING SYSTEM VALVES SHALL BE CRANE COMPANY OR NIBCO OF MODELS HEREIN SPECIFIED, OR APPROVED EQUAL BY HAMMOND, MILWAUKEE, STOCKHAM OR MUELLER VALVES. VALVES SHALL BE OF THE BEST QUALITY, DESIGNED FOR 125 PSI STEAM WORKING PRESSURE. PROVIDE UNIONS OF THE HOT AND COLD WATER LINES AT THE WATER HEATER CONNECTIONS AND OTHER ITEMS OF EQUIPMENT, AT BRANCHES FROM MAINS AND CHECK STOPS WITH STRAINERS. SET TEMPERATURE AS INDICATED OR REQUIRED BY THE INSTALLATION TO ALLOW EASE OF FUTURE MAINTENANCE.

PLUMBING SYSTEM VALVES SHALL BE CRANE COMPANY OR NIBCO OF MODELS HEREIN SPECIFIED, OR APPROVED EQUAL BY HAMMOND, MILWAUKEE, STOCKHAM OR MUELLER VALVES. VALVES SHALL BE OF THE BEST QUALITY, DESIGNED FOR 125 PSI STEAM WORKING PRESSURE. PROVIDE UNIONS OF THE HOT AND COLD WATER LINES AT THE WATER HEATER CONNECTIONS AND OTHER ITEMS OF EQUIPMENT, AT BRANCHES FROM MAINS AND CHECK STOPS WITH STRAINERS. SET TEMPERATURE AS INDICATED OR REQUIRED BY THE INSTALLATION TO ALLOW EASE OF FUTURE MAINTENANCE.

CHECK VALVES: CHECK VALVES SHALL BE CLASS 125. CHECK VALVES FOR INSTALLATION IN HORIZONTAL PIPE RUNS SHALL BE OF THE "VERTICAL LIFT" SPRING LOADED DESIGN. VERTICAL CHECK VALVES 2" AND SMALLER SHALL BE CRANE #373 OR NIBCO #1818 BRON BODY FLANGED VALVE WITH BRASS TRIM. CHECK VALVES FOR INSTALLATION IN VERTICAL PIPE RUNS SHALL BE OF THE "VERTICAL LIFT" SPRING LOADED DESIGN. VERTICAL CHECK VALVES 2" AND SMALLER SHALL BE CRANE #28 OR NIBCO #1818 BRON BODY FLANGED VALVE WITH BRASS TRIM. CHECK VALVES 3" AND LARGER SHALL BE CENTER GUIDED.

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