

PLUMBING SPECIFICATIONS

DOMESTIC WATER PIPING - COPPER TUBE AND FITTINGS

- A. HARD COPPER TUBE: ASTM B 88, TYPE L (ASTM B 88M, TYPE B) WATER TUBE, DRAIN TEMPER.
 - 1. CAST-COPPER SOLDER-JOINT FITTINGS: ASME B16.18, PRESSURE FITTINGS.
 - 2. WROUGHT-COPPER SOLDER-JOINT FITTINGS: ASME B16.22, WROUGHT-COPPER PRESSURE FITTINGS.
 - 3. BRONZE FLANGES: ASME B16.24, CLASS 150, WITH SOLDER-JOINT ENDS.
 - 4. COPPER UNIONS: MSS J-23, CAST-COPPER-ALLOY, HEXAGONAL-STOCK BODY, WITH BALL-AND-SOCKET, METAL-TO-METAL SEATING SURFACES, AND SOLDER-JOINT OR THREADED ENDS.
- B. SOFT COPPER TUBE: ASTM B 88, TYPE K (ASTM B 88M, TYPE A) AND ASTM B 88, TYPE L (ASTM B 88M, TYPE B) WATER TUBE, ANNEALED TEMPER.
 - 1. COPPER SOLDER-JOINT FITTINGS: ASME B16.22, WROUGHT-COPPER PRESSURE FITTINGS.
 - 2. COPPER PRESSURE-SEAL-JOINT FITTINGS: ASME B16.22, WROUGHT-COPPER PRESSURE FITTINGS.
- C. MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY ONE OF THE FOLLOWING:
 - 1. HBCO INC.
 - 2. WEGA; PLUMBING AND HEATING SYSTEMS.
 - 3. NPS 2 (DN 50) AND SMALLER: WROUGHT-COPPER FITTING WITH EPDM-RUBBER O-RING SEAL IN EACH END.
 - 4. NPS 3 AND NPS 4 (DN 80 AND DN 100): CAST-BRONZE OR WROUGHT-COPPER FITTING WITH EPDM-RUBBER O-RING SEAL IN EACH END.
- D. ELECTRICAL FITTINGS
 - 1. GENERAL REQUIREMENTS: ASSEMBLY OF COPPER ALLOY AND FERROUS MATERIALS WITH SEPARATING NONCONDUCTIVE INSULATING MATERIAL. INCLUDE END CONNECTIONS COMPATIBLE WITH PIPING TO BE JOINED.
- E. DRAWING PLANS, SCHEMATICS, AND DIAGRAMS INDICATE GENERAL LOCATION AND ARRANGEMENT OF DOMESTIC WATER PIPING. INDICATED LOCATIONS AND ARRANGEMENTS ARE USED TO SIZE PIPE AND CALCULATE FRICTION LOSS, EXPANSION, AND OTHER DESIGN CONSIDERATIONS. INSTALL PIPING AS INDICATED UNLESS DEVIATIONS TO LAYOUT ARE APPROVED ON COORDINATION DRAWINGS.
- F. INSTALL COPPER TUBING UNDER BUILDING SLAB ACCORDING TO CDA'S "COPPER TUBE HANDBOOK".
- G. INSTALL SHUTOFF VALVE IMMEDIATELY UPSTREAM OF EACH ELECTRIC FITTING.
- H. INSTALL DOMESTIC WATER PIPING LEVEL WITH 0.125 PERCENT SLOPE DOWNWARD TOWARD DRAIN AND FLOOR.
- I. INSTALL PIPING CONCEALED FROM VIEW AND PROTECTED FROM PHYSICAL CONTACT BY BUILDING OCCUPANTS UNLESS OTHERWISE INDICATED AND EXCEPT IN EQUIPMENT ROOMS AND SERVICE STAIRS.
- J. INSTALL PIPING INDICATED TO BE EXPOSED AND PIPING IN EQUIPMENT ROOMS AND SERVICE AREAS AT RIGHT ANGLES OR PARALLEL TO BUILDING WALLS. DIAGONAL RUNS ARE PROHIBITED UNLESS SPECIFICALLY INDICATED OTHERWISE.
- K. INSTALL PIPING ABOVE ACCESSIBLE CEILINGS TO ALLOW SUFFICIENT SPACE FOR CEILING PANEL REMOVAL, AND COORDINATE WITH OTHER SERVICES OCCUPYING THAT SPACE.
- L. INSTALL SPRING ADJACENT TO EQUIPMENT AND SPECIALTIES TO ALLOW SERVICE AND MAINTENANCE.
- M. INSTALL PIPING TO PERMIT VALVE SERVICING.
 - 1. INSTALL VALVES, UNIONS, CONNECTIONS, AND VALVES WITH PRESSURE RATINGS THE SAME AS OR HIGHER THAN SYSTEM PRESSURE RATING USED IN APPLICATIONS BELOW UNLESS OTHERWISE INDICATED.
- N. INSTALL PIPING FREE OF SAGS AND BENDS.
 - 1. INSTALL FITTINGS FOR CHANGES IN DIRECTION AND BRANCH CONNECTIONS.
- O. INSTALL UNIONS IN COPPER TUBING AT FINAL CONNECTION TO EACH PIECE OF EQUIPMENT, MACHINE, AND SPECIALTY.
- P. INSTALL SLEEVES FOR PIPING PENETRATIONS OF WALLS, CEILINGS, AND FLOORS.
- R. INSTALL ESCUTCHEONS FOR PIPING PENETRATIONS OF WALLS, CEILINGS, AND FLOORS.
- S. INSTALL SHUTOFF VALVE CLOSE TO WATER MAIN ON EACH BRANCH AND RISER SERVING PLUMBING FIXTURES OR EQUIPMENT, AND ON EACH BRANCH AND RISER TO EACH END ON EACH WATER SUPPLY TO PLUMBING FIXTURES THAT DO NOT HAVE SUPPLY STOPS. USE BALL VALVES FOR PIPING NPS 2 (DN 50) AND SMALLER. USE GATE VALVES FOR PIPING NPS 2-1/2 (DN 65) AND LARGER.
- T. HANGER AND SUPPORT INSTALLATION: SUPPORT VERTICAL PIPING AND TUBING AT BASE AND AT EACH FLOOR.
 - 1. ROD DIAMETERS MAY BE REDUCED ONE SIZE FOR DOUBLE-ROD HANGERS, TO A MINIMUM OF 3/8 INCH (10 MM).
- U. INSTALL HANGERS FOR COPPER TUBING WITH THE FOLLOWING MAXIMUM HORIZONTAL SPACING AND MINIMUM ROD DIAMETERS:
 - 1. NPS 3/4 (DN 20) AND SMALLER: 60 INCHES (1500 MM) WITH 3/8-INCH (10-MM) ROD.
 - 2. NPS 1 AND NPS 1-1/4 (DN 25 AND DN 32): 72 INCHES (1800 MM) WITH 3/8-INCH (10-MM) ROD.
 - 3. NPS 1-1/2 AND NPS 2 (DN 40 AND DN 50): 96 INCHES (2400 MM) WITH 3/8-INCH (10-MM) ROD.
 - 4. NPS 2-1/2 (DN 65): 108 INCHES (2700 MM) WITH 1/2-INCH (13-MM) ROD.
 - 5. NPS 3 TO NPS 5 (DN 80 TO DN 125): 10 FEET (3 M) WITH 1/2-INCH (13-MM) ROD.
 - 6. NPS 6 (DN 150): 10 FEET (3 M) WITH 5/8-INCH (16-MM) ROD.
 - 7. NPS 8 (DN 200): 10 FEET (3 M) WITH 3/4-INCH (19-MM) ROD.
- V. INSTALL SUPPORTS FOR VERTICAL COPPER TUBING EVERY 10 FEET (3 M).
- X. FIELD QUALITY CONTROL PERFORM TESTS AND INSPECTIONS.
 - 1. PIPING INSPECTIONS:
 - 1. DO NOT ENCLOSE, COVER, OR PUT PIPING INTO OPERATION UNTIL IT HAS BEEN INSPECTED AND APPROVED BY AUTHORITIES HAVING JURISDICTION AT LEAST ONE DAY BEFORE INSTALLATION, NOTIFY AUTHORITIES HAVING JURISDICTION AT LEAST ONE DAY BEFORE INSPECTION MUST BE MADE. PREPARE TESTS SPECIFIED BELOW IN PRESENCE OF AUTHORITIES HAVING JURISDICTION.
 - 2. ROUGH-IN-INSPECTION: ARRANGE FOR INSPECTION OF PIPING BEFORE CONCEALING OR CLOSING-IN AFTER ROUGH-IN AND BEFORE SETTING FIXTURES.
 - 3. FINAL INSPECTION: ARRANGE FINAL INSPECTION FOR AUTHORITIES HAVING JURISDICTION TO OBSERVE TESTS SPECIFIED BELOW AND TO ENSURE COMPLIANCE WITH REQUIREMENTS.
 - 4. REINSPECTION: IF AUTHORITIES HAVING JURISDICTION FIND THAT PIPING WILL NOT PASS TESTS OR INSPECTIONS, MAKE REQUIRED CORRECTIONS AND ARRANGE FOR REINSPECTION.
 - 5. REPORTS: PREPARE INSPECTION REPORTS AND HAVE THEM SIGNED BY AUTHORITIES HAVING JURISDICTION.
- Y. PIPING TESTS:
 - 1. FILL DOMESTIC WATER PIPING. CHECK COMPONENTS TO DETERMINE THAT THEY ARE NOT AIR BOUND AND THAT PIPING IS FULL OF WATER.
 - 2. TEST FOR LEAKS AND DEFECTS IN NEW PIPING AND PARTS OF EXISTING PIPING THAT HAVE BEEN ALTERED, EXTENDED, OR REPAIRED. IF TESTING IS PERFORMED IN SEGMENTS, SUBMIT A SEPARATE REPORT FOR EACH TEST, COMPLETE WITH DIAGRAM OF PORTION OF PIPING TESTED.
 - 3. LEAK: NEW, ALTERED, EXTENDED, OR REPLACED DOMESTIC WATER PIPING UNCOVERED AND UNCONCEALED UNTIL IT HAS BEEN TESTED AND APPROVED. EXPOSE WORK THAT WAS COVERED OR CONCEALED BEFORE IT WAS TESTED.
 - 4. CAP AND SUBJECT PIPING TO STATIC WATER PRESSURE OF 50 PSIG (345 KPA) ABOVE OPERATING PRESSURE, WITHOUT EXCEEDING PRESSURE RATING OF PIPING SYSTEM MATERIALS. ISOLATE TEST SOURCE AND ALLOW TO STAND FOR FOUR HOURS. LEAKS AND LOSS IN TEST PRESSURE CONSTITUTE DEFECTS THAT MUST BE REPAIRED.
 - 5. REPAIR LEAKS AND DEFECTS WITH NEW MATERIALS AND RETEST PIPING OR PORTION THEREOF UNTIL SATISFACTORY RESULTS ARE OBTAINED.
 - 6. PREPARE REPORTS FOR TESTS AND FOR CORRECTIVE ACTION REQUIRED.
- Z. DOMESTIC WATER PIPING WILL BE CONSIDERED DEFECTIVE IF IT DOES NOT PASS TESTS AND INSPECTIONS.
 - 1. PREPARE TEST AND INSPECTION REPORTS.
- AA. CLEAN AND DISINFECT POTABLE AND NON-POTABLE DOMESTIC WATER PIPING AS FOLLOWS:
 - 1. AC. PURGE NEW PIPING AND PARTS OF EXISTING PIPING THAT HAVE BEEN ALTERED, EXTENDED, OR REPAIRED BEFORE USING.
 - 2. USE PURGING AND DISINFECTING PROCEDURES PRESCRIBED BY AUTHORITIES HAVING JURISDICTION; IF METHODS ARE NOT PRESCRIBED, USE PROCEDURES DESCRIBED IN EITHER AWWA C651 OR AWWA C652 OR FOLLOW PROCEDURES DESCRIBED BELOW:
 - 1. FLUSH PIPING SYSTEM WITH CLEAN, POTABLE WATER UNTIL DIRTY WATER DOES NOT APPEAR AT OUTLETS.
 - 2. FLUSH SYSTEM WITH CLEAN, POTABLE WATER UNTIL NO CHLORINE IS IN WATER COMING FROM SYSTEM AFTER THE STANDING TIME.
 - 3. SUBMIT WATER SAMPLES IN STERILE BOTTLES TO AUTHORITIES HAVING JURISDICTION. REPEAT PROCEDURES IF BIOLOGICAL EXAMINATION SHOWS CONTAMINATION.
- AB. UNDER-BUILDING-SLAB, DOMESTIC WATER PIPING, NPS 2 (DN 50) AND SMALLER, SHALL BE THE FOLLOWING:
 - 1. SOFT COPPER TUBE, ASTM B 88, TYPE L (ASTM B 88M, TYPE B); WROUGHT-COPPER SOLDER-JOINT FITTINGS, AND BRAZED JOINTS.
- AC. ABOVEGROUND DOMESTIC WATER PIPING, NPS 2 (DN 50) AND SMALLER, SHALL BE THE FOLLOWING:
 - 1. HARD COPPER TUBE, ASTM B 88, TYPE L (ASTM B 88M, TYPE B); WROUGHT-COPPER SOLDER-JOINT FITTINGS, AND SOLDERED JOINTS.
 - 2. COPPER PRESS FITTINGS: AT THE CONTRACTOR'S OPTION ON THE DOMESTIC HOT AND COLD WATER PIPING, COILING COIL, COMPENSATE DRAIN IN COPPER LINES 1/2" DIAMETER UP THROUGH 2-1/2" DIAMETER MECHANICAL PRESS 2-1/2 (DN 65) AND LARGER.
 - 3. THROTTLING DUTY: USE BALL VALVES FOR PIPING NPS 2 (DN 50) AND SMALLER. USE BALL VALVES WITH FLANGED ENDS FOR PIPING NPS 2-1/2 (DN 65) AND LARGER.
 - 4. HOT-WATER CIRCULATION AND RELIEF DUTY: CALIBRATED BALANCING VALVES. DRAIN DUTY: HOSE-END DRAIN VALVES.
- AD. USE CHECK VALVES TO MAINTAIN CORRECT DIRECTION OF DOMESTIC WATER FLOW TO AND FROM EQUIPMENT.
- AE. IRON GROOVED-END VALVES MAY BE USED WITH GROOVED-END PIPING.

- AK. WATER HAMMER ARRESTERS
 - 1. MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY ONE OF THE FOLLOWING:
 - A. AMTROL, INC.
 - B. JOSAM COMPANY.
 - C. WFAF, INC.
 - D. PIP INC.
 - E. SIOUX CHIEF MANUFACTURING COMPANY, INC.
 - F. WATTS DRUM COMPANY, DIVISION OF SMITH INDUSTRIES, INC.
 - G. TYLER PIPE, WADE DIV.
 - H. WATTS DRUM PRODUCTS, INC.
 - 2. STANDARD: ASSE 101 OR PDI-WH201.
 - 3. PIPE: COPPER SUEB (C) MATERIALS; CAST-IRON PIPE AND FITTINGS; GASKETS; AND GASKETED JOINTS.
 - 4. SIZES: ASSE 1010, SIZES AA AND A THROUGH F OR PDI-WH 201, SIZES A THROUGH F.
 - 2. INSTALL WATER HAMMER ARRESTERS IN WATER PIPING ACCORDING TO PDI-WH 201.
 - 3. INSTALL AIR VENTS AT HIGH POINTS OF WATER PIPING. INSTALL DRAIN PIPING AND DISCHARGE OUT FLOOR DRAIN.
- BA. SANITARY WASTE AND STORM PIPING
 - A. HUB-AND-SPOUT, CAST-IRON SOIL PIPE AND FITTINGS
 - 1. PIPE AND FITTINGS: ASTM A 74, SERVICE CLASS(E).
 - 2. GASKETS: ASTM C 564, RUBBER.
 - B. HUBLESS, CAST-IRON SOIL PIPE AND FITTINGS
 - 1. PIPE AND FITTINGS: ASTM A 888 OR OSP1 301.
 - 2. STANDARDS: ASME A112.31, CAST-IRON SOIL PIPE FOR CLEANOUT TEST TEST.
 - 3. SAME AS CONNECTED DRAINAGE PIPING.
 - C. OSP: HUBLESS-PIPING FITTINGS
 - 1. MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY ONE OF THE FOLLOWING:
 - 1. ANACO-HUSKY, SD-4000.
 - 2. WFAF, INC.
 - 3. MISSION RUBBER COMPANY; A DIVISION OF MCP INDUSTRIES, INC.
 - 4. CLAMP-ALL CORP.
 - 5. STANDARDS: ASSE 1027 AND OSP1 310.
 - 6. DESCRIPTION: STAINLESS-STEEL COATED SHELDED WITH STAINLESS-STEEL BANDS AND TIGHTENING DEVICES; AND ASTM C 564, RUBBER SLEEVE WITH INTEGRAL, CENTER PIPE STOP.
 - D. DRAWING PLANS, SCHEMATICS, AND DIAGRAMS INDICATE GENERAL LOCATION AND ARRANGEMENT OF PIPING SYSTEMS. INDICATED LOCATIONS AND ARRANGEMENTS ARE USED TO SIZE PIPE AND CALCULATE FRICTION LOSS, EXPANSION, PUMP SIZING, AND OTHER DESIGN CONSIDERATIONS. INSTALL PIPING AS INDICATED UNLESS DEVIATIONS TO LAYOUT ARE APPROVED ON COORDINATION DRAWINGS.
 - E. INSTALL PIPING IN CONCEALED LOCATIONS UNLESS OTHERWISE INDICATED AND EXCEPT IN EQUIPMENT ROOMS AND SERVICE AREAS.
 - F. INSTALL PIPING INDICATED TO BE EXPOSED AND PIPING IN EQUIPMENT ROOMS AND SERVICE AREAS AT RIGHT ANGLES OR PARALLEL TO BUILDING WALLS. DIAGONAL RUNS ARE PROHIBITED UNLESS SPECIFICALLY INDICATED OTHERWISE.
 - G. INSTALL PIPING ABOVE ACCESSIBLE CEILINGS TO ALLOW SUFFICIENT SPACE FOR CEILING PANEL REMOVAL.
 - H. INSTALL PIPING TO PERMIT VALVE SERVICING.
 - 1. INSTALL VALVES, UNIONS, CONNECTIONS, AND VALVES WITH PRESSURE RATINGS THE SAME AS OR HIGHER THAN SYSTEM PRESSURE RATING USED IN APPLICATIONS BELOW UNLESS OTHERWISE INDICATED.
 - I. INSTALL PIPING FREE OF SAGS AND BENDS.
 - 1. INSTALL FITTINGS FOR CHANGES IN DIRECTION AND BRANCH CONNECTIONS.
 - J. INSTALL PIPING TO ALLOW APPLICATION OF INSULATION.
 - K. MAKE CHANGES IN DIRECTION FOR SOIL AND WASTE, DRAINAGE AND VENT PIPING USING APPROPRIATE BRANCHES, BENDS, AND LONG-LENGTH FITTINGS.
 - L. SHORT-SWEEP 1/4 BENDS MAY BE USED ON VERTICAL STACKS IF CHANGE IN DIRECTION OF FLOW IS FROM HORIZONTAL TO VERTICAL. USE LONG-TURN, DOUBLE V-BRANCH AND 1/8-BEND FITTINGS IF TWO FITTINGS ARE INSTALLED BACK TO BACK OR SIDE BY SIDE WITH COMMON DRAIN PIPE. STRAIGHT TEES, ELBOWS AND CROSSES MAY BE USED ON VENT LINES. DO NOT CHANGE DIRECTION OF FLOW MORE THAN 90 DEGREES. USE PROPER SIZE OF STANDARD INCREASERS AND REDUCERS IF PIPING OF DIFFERENT SIZES ARE CONNECTED. REDUCING SIZE OF DRAINAGE PIPING IN DIRECTION OF FLOW IS PROHIBITED.
 - M. LAY BURIED BUILDING DRAINAGE PIPING BEGINNING AT LOW POINT OF EACH SYSTEM. INSTALL TRIPLE TO GRABES AND ALIGNMENT INDICATED, WITH UNBROCKED PORTION OF INVERT. PLACE HUB ENDS OF PIPING UPSTREAM. INSTALL REQUIRED GASKETS ACCORDING TO MANUFACTURER'S WRITTEN INSTRUCTIONS FOR USE OF LUBRICANTS, CEMENTS, AND OTHER INSTALLATION REQUIREMENTS. MAINTAIN SMBB IN PIPING AND PULL PAST EACH JOINT AS COMPLETED.
 - N. INSTALL SOIL AND WASTE DRAINAGE AND VENT PIPING AT THE FOLLOWING MINIMUM SLOPES UNLESS OTHERWISE INDICATED:
 - 1. BUILDING SANITARY DRAIN: 2 PERCENT DOWNWARD IN DIRECTION OF FLOW FOR PIPING NPS 3 (DN 80) AND SMALLER; 1 PERCENT DOWNWARD IN DIRECTION OF FLOW FOR PIPING NPS 4 (DN 100) AND LARGER.
 - 2. HORIZONTAL SANITARY DRAINAGE PIPING: 1 PERCENT DOWNWARD IN DIRECTION OF FLOW.
 - 3. VENT PIPING: 1 PERCENT DOWN TOWARD VERTICAL FIXTURE VENT OR TOWARD VENT STACK.
 - O. INSTALL CAST-IRON SOIL PIPING ACCORDING TO OSP1'S "CAST IRON SOIL PIPE AND FITTINGS HANDBOOK", CHAPTER IV, "INSTALLATION OF CAST IRON SOIL PIPE AND FITTINGS."
 - P. DO NOT ENCLOSE, COVER, OR PUT PIPING INTO OPERATION UNTIL IT IS INSPECTED AND APPROVED BY AUTHORITIES HAVING JURISDICTION AT LEAST ONE DAY BEFORE INSTALLATION, NOTIFY AUTHORITIES HAVING JURISDICTION AT LEAST ONE DAY BEFORE INSPECTION MUST BE MADE. PREPARE TESTS SPECIFIED BELOW IN PRESENCE OF AUTHORITIES HAVING JURISDICTION.
 - Q. INSTALL ESCUTCHEONS FOR PIPING PENETRATIONS OF WALLS, CEILINGS, AND FLOORS.
 - R. INSTALL ESCUTCHEONS FOR PIPING PENETRATIONS OF WALLS, CEILINGS, AND FLOORS.
- S. HANGER AND SUPPORT INSTALLATION
 - 1. COMPLY WITH REQUIREMENTS FOR PIPE HANGERS AND SUPPORT DEVICES AND INSTALLATION.
 - 1. BUILDING SANITARY DRAIN: 2 PERCENT DOWNWARD IN DIRECTION OF FLOW FOR PIPING NPS 3 (DN 80) AND SMALLER; 1 PERCENT DOWNWARD IN DIRECTION OF FLOW FOR PIPING NPS 4 (DN 100) AND LARGER.
 - 2. HORIZONTAL SANITARY DRAINAGE PIPING: 1 PERCENT DOWNWARD IN DIRECTION OF FLOW.
 - 3. VENT PIPING: 1 PERCENT DOWN TOWARD VERTICAL FIXTURE VENT OR TOWARD VENT STACK.
- T. DO NOT ENCLOSE, COVER, OR PUT PIPING INTO OPERATION UNTIL IT IS INSPECTED AND APPROVED BY AUTHORITIES HAVING JURISDICTION AT LEAST ONE DAY BEFORE INSTALLATION, NOTIFY AUTHORITIES HAVING JURISDICTION AT LEAST ONE DAY BEFORE INSPECTION MUST BE MADE. PREPARE TESTS SPECIFIED BELOW IN PRESENCE OF AUTHORITIES HAVING JURISDICTION.
- U. INSTALL ESCUTCHEONS FOR PIPING PENETRATIONS OF WALLS, CEILINGS, AND FLOORS.
- V. INSTALL ESCUTCHEONS FOR PIPING PENETRATIONS OF WALLS, CEILINGS, AND FLOORS.
- AA. PREPARE TEST AND INSPECTION REPORTS.

- AF. ABOVEGROUND, SOIL AND WASTE PIPING 6" AND SMALLER SHALL BE ANY OF THE FOLLOWING:
 - 1. SERVICE CLASS, CAST-IRON SOIL PIPE AND FITTINGS; GASKETS; AND GASKETED JOINTS.
 - 2. HUBLESS, CAST-IRON SOIL PIPE AND FITTINGS HEAVY-DUTY HUBLESS-PIPING COUPLINGS; AND COUPLED JOINTS.
- AG. ABOVEGROUND, SOIL AND WASTE PIPING 8" AND LARGER SHALL BE ANY OF THE FOLLOWING:
 - 1. SERVICE HEIGHT (SV) HUB AND SPOUT CAST IRON SOIL PIPE FITTINGS
- AH. ABOVEGROUND, VENT PIPING 6" AND SMALLER SHALL BE ANY OF THE FOLLOWING:
 - 1. HUBLESS, CAST-IRON SOIL PIPE AND FITTINGS; OSP HUBLESS-PIPING COUPLINGS; AND COUPLED JOINTS.
- AI. ABOVEGROUND, VENT PIPING 8" AND LARGER SHALL BE ANY OF THE FOLLOWING:
 - 1. SERVICE CLASS, CAST-IRON SOIL PIPE AND FITTINGS; GASKETS; AND GASKETED JOINTS.
 - 2. SOLID WALL PVC PIPE, PVC SOCKET FITTINGS, AND SOLVENT-CEMENTED JOINTS
- AA. CLEANOUTS
 - A. EXPOSED METAL CLEANOUTS:
 - 1. MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY ONE OF THE FOLLOWING:
 - 1. JOSAM COMPANY; JOSAM DIV.
 - 2. MFAF, INC.
 - 3. SMITH, JAY R. MFG. CO.; DIVISION OF SMITH INDUSTRIES, INC.
 - 4. ZURN PLUMBING PRODUCTS GROUP; SPECIFICATION DRAINAGE OPERATION. STANDARD: ASME A112.36.2M FOR THREADED, ADJUSTABLE HOUSING CLEANOUT. SIZE: SAME AS CONNECTED BRANCH.
 - 2. STANDARD: ASME A112.31.
 - 3. SAME AS CONNECTED BRANCH.
 - 4. FRAME AND COVER MATERIAL, AND FINISH: ROUGH BRONZE.
 - 5. CLOSURE: STAINLESS STEEL WITH SEAL.
 - B. METAL FLOOR CLEANOUTS:
 - 1. MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY ONE OF THE FOLLOWING:
 - 1. JOSAM COMPANY; JOSAM DIV.
 - 2. MFAF, INC.; DIVISION OF SMITH INDUSTRIES, INC.
 - 3. TYLER PIPE, WADE DIV.
 - 4. A. MFAF, INC.
 - 2. STANDARD: ASME A112.31.
 - 3. SAME AS CONNECTED BRANCH.
 - 4. HOUSING: STAINLESS STEEL.
 - 5. CLOSURE: STAINLESS STEEL WITH SEAL.
 - C. CAST-IRON WALL CLEANOUTS:
 - 1. MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY ONE OF THE FOLLOWING:
 - 1. JOSAM COMPANY; JOSAM DIV.
 - 2. MFAF, INC.
 - 3. SMITH, JAY R. MFG. CO.; DIVISION OF SMITH INDUSTRIES, INC.
 - 4. TYLER PIPE, WADE DIV.
 - 5. ZURN PLUMBING PRODUCTS GROUP; SPECIFICATION DRAINAGE OPERATION. STANDARD: ASME A112.36.2M, INCLUDE WALL ACCESS.
 - 2. STANDARD: ASME A112.31.
 - 3. SAME AS CONNECTED DRAINAGE PIPING.
 - D. INSTALL CLEANOUTS IN ABOVEGROUND PIPING AND BUILDING DRAIN PIPING ACCORDING TO THE FOLLOWING, UNLESS OTHERWISE INDICATED:
 - 1. SIZE SAME AS DRAINAGE PIPING TO 4" NPS 4 (DN 100). USE NPS 4 (DN 100) FOR LARGER DRAINAGE PIPING UNLESS LARGER CLEANOUT IS INDICATED.
 - 2. LOCATE AT EACH CHANGE IN DIRECTION OF PIPING GREATER THAN 45 DEGREES.
 - 3. LOCATE AT MINIMUM INTERVALS OF 50 FEET (15 M) FOR PIPING NPS 4 (DN 100) AND SMALLER AND 100 FEET (30 M) FOR LARGER PIPING.
 - 4. LOCATE AT BASE OF EACH VERTICAL SOIL PIPE AND WASTE STACK.
 - E. FLOOR CLEANOUTS FOR PIPING BELOW FLOORS, INSTALL CLEANOUT DECK PLATES WITH TOP FLUSH WITH FINISHED FLOOR.
 - F. FOR CLEANOUTS LOCATED IN CONCEALED PIPING, INSTALL CLEANOUT WALL ACCESS COVERS, OF TYPES INDICATED WITH FRAME AND COVER FLUSH WITH FINISHED WALL.
 - G. INSTALL FLOOR DRAINS AT LOW POINTS OF SURFACE AREAS TO BE DRAINED. SET GRATES OF DRAINS FLUSH WITH FINISHED FLOOR, UNLESS OTHERWISE INDICATED.
 - H. INSTALL FLASHING ASSEMBLIES ON SANITARY STACK VENTS AND VENT STACKS THAT EXTEND THROUGH ROOF.
 - I. ASSEMBLE OPEN DRAIN FITTINGS AND INSTALL WITH TOP OF HUB 2 INCHES (51 MM) ABOVE FINISHED FLOOR.
 - J. INSTALL DEEP-SEAL TRAPS ON FLOOR DRAINS AND OTHER WASTE OUTLETS, IF INDICATED.
 - K. INSTALL FLOOR-DRAIN, TRAP-SEAL PRIMER FITTINGS ON INLET TO FLOOR DRAINS THAT REQUIRE TRAP-SEAL PRIMER CONNECTION.
 - L. EXCEPTION: FITTING MAY BE OMITTED IF TRAP HAS TRAP-SEAL PRIMER CONNECTION.
 - M. SIZE: SAME AS FLOOR DRAIN INLET.
 - N. INSTALL CARBON-STEEL PIPE HANGERS AND SUPPORT DEVICES AND INSTALLATION.
 - 1. ASSEMBLE OPEN DRAIN FITTINGS AND INSTALL WITH TOP OF HUB 2 INCHES (51 MM) ABOVE FINISHED FLOOR.
 - 2. INSTALL STAINLESS-STEEL PIPE HANGERS FOR HORIZONTAL PIPING IN CORROSIVE ENVIRONMENTS.
 - 3. INSTALL CARBON-STEEL PIPE SUPPORT CLAMPS FOR VERTICAL PIPING IN CORROSIVE ENVIRONMENTS.
 - 4. INSTALL STAINLESS-STEEL PIPE SUPPORT CLAMPS FOR VERTICAL PIPING IN NONCORROSIVE ENVIRONMENTS.
 - 5. THICKNESS: MSS TYPE 8 OR TYPE 42, CLAMPS.
 - 6. INSTALL INDIVIDUAL, STRAIGHT, HORIZONTAL PIPING RUNS:
 - 7. 100 FEET (30 M) AND LESS: MSS TYPE 1, ADJUSTABLE, STEEL GLEEVES HANGERS.
 - 8. LONGER THAN 100 FEET (30 M): MSS TYPE 43, ADJUSTABLE ROLLER HANGERS.
 - 9. LONGER THAN 100 FEET (30 M) IF INDICATED: MSS TYPE 49, SPRING CONTROL ROLLS.
 - 10. MULTIPLE, STRAIGHT, HORIZONTAL PIPING RUNS 100 FEET (30 M) OR LONGER: MSS TYPE 44, PIPE ROLLS.
 - 11. BASE OF VERTICAL PIPING: MSS TYPE 52, SPRING HANGERS.
- AA. TEST PIPING, HORIZONTAL PIPING AND TUBING WITHIN 12 INCHES (300 MM) OF EACH FITTING, VALVE, AND COUPLING.
 - 1. USE CARRIER SUPPORTS WITH WASTE FITTING AND SEAL FOR BACK-OUTLET FIXTURES.
 - 2. USE CARRIER VERTICAL PIPING AND TUBING AT BASE AND AT EACH FLOOR.
 - 3. USE CHAIR-TYPE CARRIER SUPPORTS WITH RECTANGULAR STEEL UPRIGHS FOR ACCESSIBLE FIXTURES.
- AB. INSTALL WACK-OUTLETS, WALL-MOUNTING FIXTURES UNTO WASTE FITTING SEALS AND ATTACH TO SUPPORTS.
- AC. INSTALL FLOOR-MOUNTING FIXTURES ON CEILING FLOORS OR OTHER ATTACHMENTS TO PIPING OR BUILDING SUBSTRATE.
 - 1. INSTALL WALL-MOUNTING FIXTURES WITH TUBULAR WASTE PIPING ATTACHED TO SUPPORTS.
 - 2. INSTALL FLOOR-MOUNTING, BACK-OUTLET WATER CLOSETS ATTACHED TO BUILDING FLOOR SUBSTRATE AND WALL BRACKET AND INTO WASTE FITTING SEALS.
 - 3. INSTALL COUNTER-MOUNTING FIXTURES IN AND ATTACHED TO CASEWORK.
 - 4. INSTALL FIXTURES LEVEL AND PLUMB ACCORDING TO ROUGH-IN DRAWINGS.
 - 5. INSTALL WATER-SUPPLY PIPING WITH STOP ON EACH SUPPLY TO EACH FIXTURE TO BE CONNECTED TO WATER DISTRIBUTION PIPING. ATTACH SUPPLIES TO SUPPORTS OR SUBSTRATE WITHIN PIPE SPACES BEHIND FIXTURES. INSTALL STOPS IN LOCATIONS WHERE THEY CAN BE EASILY REACHED FOR OPERATION.
 - 6. INSTALL ACCESSORIES COMPATIBLE WITH INSULATION MATERIALS AND SUITABLE FOR THE SERVICE. INSTALL ACCESSORIES THAT DO NOT CORRODE, SOFTEN, OR OTHERWISE ATTACK INSULATION OR JACKET IN EITHER HOT OR DRY STATE.
 - 7. INSTALL INSULATION WITH LONGITUDINAL SEAMS AT TOP AND BOTTOM OF HORIZONTAL RUNS.
 - 8. INSTALL MULTIPLE LAYERS OF INSULATION WITH LONGITUDINAL AND END SEAMS STAGGERED.
 - 9. DO NOT WELD BRACKETS, CLIPS, OR OTHER ATTACHMENT DEVICES TO PIPING, FITTINGS, AND TUBING.
 - 10. KEEP INSULATION MATERIALS DRY DURING APPLICATION AND FINISHING.
 - 11. INSTALL TANKS FOR ACCESSIBLE WATER TANK-TYPE WATER SYSTEMS; BOND SEAMS AND JOINTS WITH ADHESIVE RECOMMENDED BY INSULATION MATERIAL MANUFACTURER.
 - 12. INSTALL INSULATION WITH LEAST NUMBER OF JOINTS PRACTICAL.
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