

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, DRAWN 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 SP-98, 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: MANUFACTURERS' SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY ONE OF THE FOLLOWING:
 1. NIBCO INC.
 2. VEGA 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.

- C. DIELECTRIC FITTINGS
 1. GENERAL REQUIREMENTS: ASSEMBLY OF COPPER, ALLOY AND FERROUS MATERIALS WITH SEPARATING NONCONDUCTIVE INSULATING MATERIALS. INCLUDE END CONNECTIONS COMPATIBLE WITH PIPES TO BE JOINED.

- D. 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 DRAWING.

- E. INSTALL COPPER TUBING UNDER BUILDING SLAB ACCORDING TO CDA'S "COPPER TUBE HANDBOOK".

- F. INSTALL SHUTOFF VALVE IMMEDIATELY UPSTREAM OF EACH DIELECTRIC FITTING.
 1. INSTALL DOMESTIC WATER PIPING LEVEL WITH 0.125 PERCENT SLOPE DOWNWARD TOWARD DRAIN AND PLUMBING.

- G. INSTALL PIPING CONCEALED FROM VIEW AND PROTECTED FROM PHYSICAL CONTACT BY BUILDING OCCUPANTS UNLESS OTHERWISE INDICATED AND EXCEPT IN EQUIPMENT ROOMS AND SERVICE AREAS.

- H. INSTALL PIPING INDICATED TO BE EXPOSED AND PIPING IN EQUIPMENT ROOMS AND SERVICE AREAS AT RIGHT ANGLES TO PARALLEL, BOLDING WALLS. DIAGONAL RUNS ARE PROHIBITED UNLESS SPECIFICALLY INDICATED OTHERWISE.

- I. INSTALL PIPING ADJACENT TO ACCESSIBLE CEILING TO ALLOW SUFFICIENT SPACE FOR CEILING PANEL REMOVAL, AND COORDINATE WITH OTHER SERVICES OCCUPYING THAT SPACE.

- J. INSTALL PIPING ADJACENT TO EQUIPMENT AND SPECIALTIES TO ALLOW SERVICE AND MAINTENANCE.

- K. INSTALL PIPING TO PERMIT VALVE SERVICING.
 1. INSTALL NIPPLES, UNIONS, SPECIAL FITTINGS, AND VALVES WITH PRESSURE RATINGS THE SAME AS OR HIGHER THAN SYSTEM PRESSURE RATINGS USED IN APPLICATIONS BELOW UNLESS OTHERWISE INDICATED.

- L. INSTALL PIPING FREE OF SAGS AND BENDS.
 1. INSTALL UNIONS IN COPPER TUBING AT FINAL CONNECTION TO EACH PEE OF EQUIPMENT, MACHINE, AND SPECIALTY.
 2. INSTALL FITTINGS FOR PIPING PENETRATIONS OF WALLS, CEILINGS, AND FLOORS.
 3. INSTALL ESCUTOCHOS FOR PIPING PENETRATIONS OF WALLS, CEILINGS, AND FLOORS.

- M. INSTALL SHUTOFF VALVE CLOSE TO WATER MAIN ON EACH BRANCH AND RISER SERVING PLUMBING FIXTURES OR EQUIPMENT, ON EACH WATER SUPPLY TO EQUIPMENT, AND 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.

- N. HANGER AND SUPPORT INSTALLATION: SUPPORT VERTICAL PIPING AND TUBING AT BASE AND AT EACH FLOOR.
 1. HANGER AND SUPPORT TO BE REDUCED ONE SIZE FOR DOUBLE-ROD HANGERS, TO A MINIMUM OF 3/8 INCH (10 MM).

- O. VERTICAL HANGERS FOR COPPER TUBING WITH THE FOLLOWING MAXIMUM HORIZONTAL SPACING AND MINIMUM ROD DIAMETER:
 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 6 (DN 75 TO DN 150): 10 FEET (3 M) WITH 1/2-INCH (13-MM) ROD.
 6. NPS 8 (DN 200): 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.

- W. INSTALL SUPPORTS FOR VERTICAL COPPER TUBING EVERY 10 FEET (3 M).

- X. FIELD QUALITY CONTROL: PERFORM TESTS AND INSPECTIONS.
 1. DO NOT ENCLOSE, COVER, OR PUT PIPING INTO OPERATION UNTIL IT HAS BEEN INSPECTED AND APPROVED BY AUTHORITIES HAVING JURISDICTION.
 2. DURING INSTALLATION, NOTIFY AUTHORITIES HAVING JURISDICTION AT LEAST ONE DAY BEFORE INSPECTION MUST BE MADE. PERFORM TESTS SPECIFIED BELOW IN PRESENCE AND RECORD OF INSPECTOR HAVING JURISDICTION.
 1. INITIAL INSPECTION: ARRANGE FOR INSPECTION OF CAST IRON SOIL PIPE AND FITTINGS. ARRANGE FOR INSPECTION OF PIPING BELOW CONCEALED AND BEHIND SETTING FIXTURES.
 2. FINAL INSPECTION: ARRANGE FOR INSPECTION OF PIPING BEHIND CONCEALED AND BEHIND SETTING FIXTURES.
 3. FINAL INSPECTION: ARRANGE FOR INSPECTION OF PIPING BEHIND CONCEALED AND BEHIND SETTING FIXTURES.
 4. FINAL INSPECTION: ARRANGE FOR INSPECTION OF PIPING BEHIND CONCEALED AND BEHIND SETTING FIXTURES.
 3. REINSPECTION: IF AUTHORITIES HAVING JURISDICTION FIND THAT PIPING WILL NOT PASS TESTS OR ON REINSPECTION, MAKE REQUIRED CORRECTIONS AND ARRANGE FOR REINSPECTION.
 4. 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. LEAVE 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 TEST. ISOLATE TEST SOURCE AND ALLOW TO STAND FOR FOUR HOURS. LEAKS AND LOSS TEST. ISOLATE TEST SOURCE AND ALLOW TO STAND FOR FOUR HOURS. LEAKS AND LOSS TEST. ISOLATE TEST SOURCE AND ALLOW TO STAND FOR FOUR HOURS. LEAKS AND LOSS TEST.
 5. REPAIR LEAKS AND DEFECTS WITH NEW MATERIALS AND RETEST PIPING ON 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 INSPECTION HANGERS FOR CAST-IRON SOIL PIPING WITH THE FOLLOWING MAXIMUM HORIZONTAL SPACING AND MINIMUM ROD DIAMETER:
 1. NPS 1-1/2 AND NPS 2 (DN 40 AND DN 50): 60 INCHES (1500 MM) WITH 3/8-INCH (10-MM) ROD.
 2. NPS 3 (DN 80): 60 INCHES (1500 MM) WITH 1/2-INCH (13-MM) ROD.
 3. NPS 4 AND NPS 5 (DN 100 AND DN 125): 60 INCHES (1500 MM) WITH 5/8-INCH (16-MM) ROD.
 4. NPS 6 AND NPS 8 (DN 150 AND DN 200): 60 INCHES (1500 MM) WITH 3/4-INCH (19-MM) ROD.

- AA. PREPARE TEST AND INSPECTION REPORTS.

- AB. CLEAN AND DISINFECT POTABLE AND NON-POTABLE DOMESTIC WATER PIPING AS FOLLOWS:
 1. PURGE NEW PIPING AND PARTS OF EXISTING PIPING THAT HAVE BEEN ALTERED, EXTENDED, OR REPAIRED BEFORE USE.
 2. USE PURGING AND DISINFECTING PROCEDURES PRESCRIBED BY AUTHORITIES HAVING JURISDICTION. IF METHODS ARE NOT PRESCRIBED, USE PROCEDURES DESCRIBED IN EITHER ANMA C015 OR ANMA C016 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.

- AC. UNDER-BUILDING-SLAB, DOMESTIC WATER PIPING, NPS 2 (DN 50) AND SMALLER, SHALL BE THE FOLLOWING COPPER TUBE, ASTM B 88, TYPE L (ASTM B 88M, TYPE B); WROUGHT-COPPER SOLDER-JOINT FITTINGS, AND BRAZED JOINTS.

- AD. 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 BRAZED JOINTS.
 2. COPPER PRESS FITTINGS: AT THE CONTRACTOR'S OPTION ON THE DOMESTIC HOT AND COLD WATER PIPING, COOLING COIL CONDENSATE DRAINS IN COPPER UNIONS 1/2" DIAMETER. SUBMIT REPORTS FOR TESTS AND INSPECTIONS. COMPLETE WITH DIAGRAM OF PORTION OF PIPING TESTED.
 3. COPPER PRESS FITTINGS: AT THE CONTRACTOR'S OPTION ON THE DOMESTIC HOT AND COLD WATER PIPING, COOLING COIL CONDENSATE DRAINS IN COPPER UNIONS 1/2" DIAMETER. SUBMIT REPORTS FOR TESTS AND INSPECTIONS. COMPLETE WITH DIAGRAM OF PORTION OF PIPING TESTED.
 4. LEAVE UNCOVERED AND UNCONCEALED NEW, ALTERED, EXTENDED, OR REPAIRED WORK THAT WAS COVERED OR CONCEALED BEFORE IT WAS TESTED.
 5. REPAIR LEAKS AND DEFECTS WITH NEW MATERIALS AND RETEST PIPING ON PORTION THEREOF UNTIL SATISFACTORY RESULTS ARE OBTAINED.
 6. PREPARE REPORTS FOR TESTS AND FOR CORRECTIVE ACTION REQUIRED.

- AE. ABOVEGROUND DOMESTIC WATER PIPING, NPS 2-1/2 TO NPS 4 (DN 65 TO DN 100), SHALL BE OF THE FOLLOWING:
 1. HARD COPPER TUBE: ASTM B 88, TYPE L (ASTM B 88M, TYPE B); CAST-COPPER SOLDER-JOINT FITTINGS, AND BRAZED JOINTS.
 2. GALVANIZED-STEEL PIPE: GROOVED-JOINT, GALVANIZED-STEEL-PIPE APPURTENANCES, AND GROOVED JOINTS.

- AH. DRAWINGS INDICATE VALVE TYPES TO BE USED. WHEN SPECIFIC VALVE TYPES ARE NOT INDICATED, THE FOLLOWING REQUIREMENTS APPLY.
 1. SHUTOFF DUTY: USE BALL VALVES FOR PIPING NPS 2 (DN 50) AND SMALLER. USE GATE VALVES WITH FLANGED ENDS FOR PIPING NPS 2-1/2 (DN 65) AND LARGER.
 2. 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.
 3. HOT-WATER CIRCULATION PIPING, BALANCING DUTY: CALIBRATED BALANCING VALVES. DRAIN DUTY: HOSE-END DRAIN VALVES.

- AI. USE CHECK VALVES TO MAINTAIN CORRECT DIRECTION OF DOMESTIC WATER FLOWING TO AND FROM EQUIPMENT.

- AJ. 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. SERVICE CLASSIFIED HUB AND SPOCKET CAST IRON SOIL PIPE FITTINGS.
 - D. PRR INC.
 - E. ZURN CHEF MANUFACTURING COMPANY, INC.
 - F. SMITH, JAY R. MFG. CO.; DIVISION OF SMITH INDUSTRIES, INC.
 - G. TYLER PIPE WARE, DIV.
 - H. WATTS DRAINAGE PRODUCTS, INC.
 2. STANDARD: ASSE 101 OR PDH-WH01.
 3. TYPE: COPPER SUBE WITH PISTON.
 4. SIZE: ASSE 1010, SIZES AA AND A THROUGH F OR PDH-WH 201, SIZES A THROUGH F.

- AL. INSTALL WATER HAMMER ARRESTERS IN WATER PIPING ACCORDING TO PDH-WH 201. INSTALL AIR VENTS AT HIGH POINTS OF WATER PIPING. INSTALL DRAIN PIPING AND DISCHARGE INTO FLOOR DRAIN.

SANITARY WASTE AND STORM PIPING

- A. HUB-AND-SPOCKET, CAST-IRON SOIL PIPE AND FITTINGS
 1. SERVICE CLASS: ASTM A 74, SERVICE CLASS(E).
 2. GASKETS: ASTM C 564, RUBBER.

- B. HUBLESS, CAST-IRON SOIL PIPE AND FITTINGS
 1. SERVICE CLASS: ASTM A 74, SERVICE CLASS(E).
 2. GASKETS: ASTM C 564, RUBBER.

- C. ZURN PLUMBING PRODUCTS GROUP: SPECIFICATION DRAWING OPERATION. STANDARD: ASME A112.36.2M FOR CAST IRON FOR CLEANOUT TEST TEE.

- D. BODY MATERIAL: HUB-AND-SPOCKET, CAST-IRON SOIL PIPE T-BRANCH AS REQUIRED TO MATCH CONNECTED PIPING.

- E. THE FOLLOWING COUPLERS, PLUGS, AND FITTINGS:
 1. ANACO-HUSKY, 30-4000.
 2. MISSOURI RUBBER COMPANY; A DIVISION OF MCP INDUSTRIES, INC.
 3. CLAMP-HALL CORP.
 4. STANDAURUM; ASTM C 1277 AND CSPH 310.
 5. DESCRIPTION: STAINLESS-STEEL CORRUGATED SHIELD WITH STAINLESS-STEEL BANDS AT RIGHT ANGLE TO PIPING. USE RUBBER SLEEVE WITH INTEGRAL CENTER PIPE STOP.

- C. 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, AND OTHER DESIGN CONSIDERATIONS. INSTALL PIPING AS INDICATED UNLESS DEVIATIONS TO LAYOUT ARE APPROVED ON COORDINATION DRAWINGS.

- D. CLAMPING ON COORDINATION DRAWINGS.
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- E. ADJUSTABLE HOUSING MATERIAL: CAST IRON FOR CLEANOUT TEST TEE. FRAME AND COVER MATERIAL AND FINISH: ROUGH BRONZE.

- F. INSTALL PIPING ADJACENT TO ACCESSIBLE CEILING TO ALLOW SUFFICIENT SPACE FOR CEILING PANEL REMOVAL.

- G. INSTALL PIPING TO PERMIT VALVE SERVICING.
 1. INSTALL PIPING AT INDICATED SLOPES.
 2. INSTALL PIPING FREE OF SAGS AND BENDS.
 3. INSTALL FITTINGS FOR PIPING PENETRATIONS OF WALLS, CEILINGS, AND FLOORS.
 4. INSTALL ESCUTOCHOS FOR PIPING PENETRATIONS OF WALLS, CEILINGS, AND FLOORS.

- H. INSTALL PIPING TO ALLOW APPLICATION OF INSULATION.
 1. INSTALL PIPING FREE OF SAGS AND BENDS.
 2. INSTALL FITTINGS FOR PIPING PENETRATIONS OF WALLS, CEILINGS, AND FLOORS.
 3. INSTALL ESCUTOCHOS FOR PIPING PENETRATIONS OF WALLS, CEILINGS, AND FLOORS.

- I. MAKE CHANGES TO SANITARY WASTE DRAINAGE AND VENT PIPING USING APPROPRIATE BRANCHES, BENDS, AND LONG-SWEEP BENDS. SANITARY TEES AND SWEEP BENDS 1/4 BENDS SHOULD BE USED ON VERTICAL STACKS IF CHANGE IN DIRECTION OF FLOW IS HORIZONTAL TO VERTICAL. USE LONG-TURN, DOUBLE V-BRANCH AND 1/8-BEND FITTINGS IF TWO FIXTURES ARE INSTALLED TO BACK OR SIDE BY SIDE WITH FRAME AND COVER MATERIAL AND FINISH: ROUGH BRONZE.

- J. INSTALL SLEEVES FOR PIPING PENETRATIONS OF WALLS, CEILINGS, AND FLOORS.
 1. INSTALL ESCUTOCHOS FOR PIPING PENETRATIONS OF WALLS, CEILINGS, AND FLOORS.

- K. MANUFACTURERS' WRITTEN INSTRUCTIONS FOR USE OF LUBRICANTS, CEMENTS, AND OTHER INSTALLATION REQUIREMENTS. MAINTAIN SHAPE IN PIPING AND PAST PLANT AS COMPLETED.

- L. 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 PIPE ACCORDING TO CSPH "CAST IRON SOIL PIPE AND FITTINGS HANDBOOK", CHAPTER 18, "INSTALLATION OF CAST IRON SOIL PIPE AND FITTINGS".
 1. INITIAL INSPECTION: ARRANGE FOR INSPECTION OF PIPING BELOW CONCEALED AND BEHIND SETTING FIXTURES. ARRANGE FOR INSPECTION OF PIPING BELOW CONCEALED AND BEHIND SETTING FIXTURES.
 2. FINAL INSPECTION: ARRANGE FOR INSPECTION OF PIPING BELOW CONCEALED AND BEHIND SETTING FIXTURES.
 3. FINAL INSPECTION: ARRANGE FOR INSPECTION OF PIPING BELOW CONCEALED AND BEHIND SETTING FIXTURES.

- P. HANGER AND SUPPORT INSTALLATION.
 1. INSTALL CARBON-STEEL PIPE HANGERS FOR HORIZONTAL PIPING IN NONCORROSIVE ENVIRONMENTS.
 2. INSTALL STAINLESS-STEEL PIPE HANGERS FOR HORIZONTAL PIPING IN CORROSIVE ENVIRONMENTS.
 3. INSTALL CARBON-STEEL PIPE SUPPORT CLAMPS FOR VERTICAL PIPING IN NONCORROSIVE ENVIRONMENTS.
 4. INSTALL STAINLESS-STEEL PIPE SUPPORT CLAMPS FOR VERTICAL PIPING IN CORROSIVE ENVIRONMENTS.
 5. MSS TYPE 8 OR TYPE 42, CLAMPS.
 6. INSTALL INDIVIDUAL, STRAIGHT, HORIZONTAL PIPING RUNS:
 7. 100 FEET (30 M) AND LESS: MSS TYPE L, ADJUSTABLE, STEEL, CLEVIS HANGERS.
 8. LONGER THAN 100 FEET (30 M): MSS TYPE AS, ADJUSTABLE ROLLER HANGERS.
 9. LONGER THAN 100 FEET (30 M) IF INDICATED: MSS TYPE 48, SPRING CUSHION ROLLS.
 10. MULTIPLE, STRAIGHT, HORIZONTAL PIPING RUNS 100 FEET (30 M) OR LONGER: MSS TYPE 48, SPRING CUSHION ROLLS.
 11. BASE OF VERTICAL PIPING: MSS TYPE 52, SPRING HANGERS.

- T. SUPPORT HORIZONTAL PIPING TO TUBING WITH 12 INCHES (300 MM) OF EACH FITTING, VALVE, AND COUPLING.

- U. SUPPORT VERTICAL PIPING AND TUBING AT BASE AND AT EACH FLOOR.
 1. HANGER AND SUPPORT TO BE REDUCED ONE SIZE FOR DOUBLE-ROD HANGERS, WITH 3/8-INCH (10-MM) MINIMUM ROD.

- W. INSTALL HANGERS FOR CAST-IRON SOIL PIPING WITH THE FOLLOWING MAXIMUM HORIZONTAL SPACING AND MINIMUM ROD DIAMETER:
 1. NPS 1-1/2 AND NPS 2 (DN 40 AND DN 50): 60 INCHES (1500 MM) WITH 3/8-INCH (10-MM) ROD.
 2. NPS 3 (DN 80): 60 INCHES (1500 MM) WITH 1/2-INCH (13-MM) ROD.
 3. NPS 4 AND NPS 5 (DN 100 AND DN 125): 60 INCHES (1500 MM) WITH 5/8-INCH (16-MM) ROD.
 4. NPS 6 AND NPS 8 (DN 150 AND DN 200): 60 INCHES (1500 MM) WITH 3/4-INCH (19-MM) ROD.

- X. DURING INSTALLATION, NOTIFY AUTHORITIES HAVING JURISDICTION AT LEAST 24 HOURS BEFORE INSPECTION MUST BE MADE. PERFORM TESTS SPECIFIED BELOW IN PRESENCE OF AUTHORITIES HAVING JURISDICTION.
 1. INITIAL INSPECTION: ARRANGE FOR INSPECTION OF PIPING BELOW CONCEALED AND BEHIND SETTING FIXTURES.
 2. FINAL INSPECTION: ARRANGE FOR FINAL INSPECTION BY AUTHORITIES HAVING JURISDICTION TO OBSERVE. TESTS SPECIFIED BELOW AND TO ENSURE COMPLIANCE WITH REQUIREMENTS.
 3. REINSPECTION: IF AUTHORITIES HAVING JURISDICTION FIND THAT PIPING WILL NOT PASS TEST OR ON REINSPECTION, MAKE REQUIRED CORRECTIONS AND ARRANGE FOR REINSPECTION.
 4. REPORTS: PREPARE INSPECTION REPORTS AND HAVE THEM SIGNED BY AUTHORITIES HAVING JURISDICTION.

- AA. TEST SANITARY DRAINAGE AND VENT PIPING ACCORDING TO PROCEDURES OF AUTHORITIES HAVING JURISDICTION OR, IN ABSENCE OF PUBLISHED PROCEDURES, AS FOLLOWS:
 1. 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.
 2. LEAVE UNCOVERED AND UNCONCEALED NEW, ALTERED, EXTENDED, OR REPAIRED WORK THAT WAS COVERED OR CONCEALED BEFORE IT WAS TESTED.
 3. REPAIR LEAKS AND DEFECTS WITH NEW MATERIALS AND RETEST PIPING ON PORTION THEREOF UNTIL SATISFACTORY RESULTS ARE OBTAINED.
 4. PREPARE REPORTS FOR TESTS AND FOR CORRECTIVE ACTION REQUIRED.

- AB. 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.

- AC. REPAIR LEAKS AND DEFECTS WITH NEW MATERIALS AND RETEST PIPING, OR PORTION THEREOF, UNTIL SATISFACTORY RESULTS ARE OBTAINED.

- AD. PREPARE REPORTS FOR TESTS AND REQUIRED CORRECTIVE ACTION.

- AF. ABOVEGROUND, SOIL AND WASTE PIPING 6" AND SMALLER SHALL BE ANY OF THE FOLLOWING:
 1. SERVICE CLASS: WROUGHT-COPPER SOLDER-JOINT FITTINGS, AND GASKETS. 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 CLASS: WROUGHT-COPPER SOLDER-JOINT FITTINGS, AND GASKETS. JOINTS: 2. HUBLESS, CAST-IRON SOIL PIPE AND FITTINGS; CSPH HUBLESS-PIPING COUPLINGS; AND COUPLED JOINTS.

- AH. ABOVEGROUND, VENT PIPING 6" AND SMALLER SHALL BE ANY OF THE FOLLOWING:
 1. HUBLESS, CAST-IRON SOIL PIPE AND FITTINGS; CSPH 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 GASKETS. JOINTS: 2. HUBLESS, CAST-IRON SOIL PIPE AND FITTINGS; GASKETS; AND GASKETS. JOINTS: 3. SOLID WALL PVC PIPE, FPO SOCKET FITTINGS, AND SOLVENT-CEMENTED JOINTS.

- AL. UNDERGROUND, SOIL, WASTE, AND VENT PIPING 1/2" AND SMALLER SHALL BE ANY OF THE FOLLOWING:
 1. SERVICE CLASS, CAST-IRON SOIL PIPE AND FITTINGS; GASKETS; AND GASKETS. JOINTS: 2. SOLID WALL PVC PIPE, FPO SOCKET FITTINGS, AND SOLVENT-CEMENTED JOINTS.

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. SMITH, JAY R. MFG. CO.; DIVISION OF SMITH INDUSTRIES, INC.
 3. TYLER PIPE WARE, DIV.
 4. ZURN PLUMBING PRODUCTS GROUP; SPECIFICATION DRAWING OPERATION. STANDARD: ASME A112.36.2M FOR CAST IRON FOR CLEANOUT TEST TEE.
 2. BODY MATERIAL: HUB-AND-SPOCKET, CAST-IRON SOIL PIPE T-BRANCH AS REQUIRED TO MATCH CONNECTED PIPING.
 3. THE FOLLOWING COUPLERS, PLUGS, AND FITTINGS:
 1. ANACO-HUSKY, 30-4000.
 2. MISSOURI RUBBER COMPANY; A DIVISION OF MCP INDUSTRIES, INC.
 3. CLAMP-HALL CORP.
 4. STANDAURUM; ASTM C 1277 AND CSPH 310.
 5. DESCRIPTION: STAINLESS-STEEL CORRUGATED SHIELD WITH STAINLESS-STEEL BANDS AT RIGHT ANGLE TO PIPING. USE RUBBER SLEEVE WITH INTEGRAL CENTER PIPE STOP.

- C. 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, AND OTHER DESIGN CONSIDERATIONS. INSTALL PIPING AS INDICATED UNLESS DEVIATIONS TO LAYOUT ARE APPROVED ON COORDINATION DRAWINGS.

- D. CLAMPING ON COORDINATION DRAWINGS.
 1. CLAMPING ON COORDINATION DRAWINGS. CLAMPING ON COORDINATION DRAWINGS. CLAMPING ON COORDINATION DRAWINGS.

- E. ADJUSTABLE HOUSING MATERIAL: CAST IRON FOR CLEANOUT TEST TEE. FRAME AND COVER MATERIAL AND FINISH: ROUGH BRONZE.

- F. INSTALL PIPING ADJACENT TO ACCESSIBLE CEILING TO ALLOW SUFFICIENT SPACE FOR CEILING PANEL REMOVAL.

- G. INSTALL PIPING TO PERMIT VALVE SERVICING.
 1. INSTALL PIPING AT INDICATED SLOPES.
 2. INSTALL PIPING FREE OF SAGS AND BENDS.
 3. INSTALL FITTINGS FOR PIPING PENETRATIONS OF WALLS, CEILINGS, AND FLOORS.
 4. INSTALL ESCUTOCHOS FOR PIPING PENETRATIONS OF WALLS, CEILINGS, AND FLOORS.

- H. INSTALL PIPING TO ALLOW APPLICATION OF INSULATION.
 1. INSTALL PIPING FREE OF SAGS AND BENDS.
 2. INSTALL FITTINGS FOR PIP