

SECTION 22 0523  
GENERAL-DUTY VALVES FOR PLUMBING PIPING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. APPLICATIONS.
- B. GENERAL REQUIREMENTS.
- C. BALL VALVES.
- D. CHECK VALVES.

1.02 REFERENCE STANDARDS

- A. ASME B16.18 - CAST COPPER ALLOY SOLDER JOINT PRESSURE FITTINGS; 2012.
- B. ASTM B62 - STANDARD SPECIFICATION FOR COMPOSITION BRONZE OR OUNCE METAL CASTINGS; 2017.
- C. MSS SP-45 - BYPASS AND DRAIN CONNECTIONS; 2003 (REAFFIRMED 2008).
- D. MSS SP-80 - BRONZE GATE, GLOBE, ANGLE AND CHECK VALVES; 2013.
- E. MSS SP-110 - BALL VALVES THREADED, SOCKET-WELDING, SOLDER JOINT, GROOVED AND FLARED ENDS; 2010.
- F. NSF 61 - DRINKING WATER SYSTEM COMPONENTS - HEALTH EFFECTS; 2017.
- G. NSF 372 - DRINKING WATER SYSTEM COMPONENTS - LEAD CONTENT; 2016.

1.03 QUALITY ASSURANCE

- A. MANUFACTURER:
  - 1. OBTAIN VALVES FOR EACH VALVE TYPE FROM SINGLE MANUFACTURER.
  - 2. COMPANY MUST SPECIALIZE IN MANUFACTURING PRODUCTS SPECIFIED IN THIS SECTION, WITH NOT LESS THAN THREE YEARS OF DOCUMENTED EXPERIENCE.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. PREPARE VALVES FOR SHIPPING AS FOLLOWS:
  - 1. MINIMIZE EXPOSURE OF OPERABLE SURFACES BY SETTING PLUG AND BALL VALVES TO OPEN POSITION.
  - 2. PROTECT VALVE PARTS EXPOSED TO PIPED MEDIUM AGAINST RUST AND CORROSION.
  - 3. PROTECT VALVE PIPING CONNECTIONS SUCH AS GROOVES, WELD ENDS, THREADS, AND FLANGE FACES.
  - 4. SECURE CHECK VALVES IN EITHER THE CLOSED POSITION OR OPEN POSITION.
- B. USE THE FOLLOWING PRECAUTIONS DURING STORAGE:
  - 1. MAINTAIN VALVE END PROTECTION AND PROTECT FLANGES AND SPECIALTIES FROM DIRT.
  - 2. PROVIDE TEMPORARY INLET AND OUTLET CAPS.
  - 3. MAINTAIN CAPS IN PLACE UNTIL INSTALLATION.
  - 4. STORE VALVES IN SHIPPING CONTAINERS AND MAINTAIN IN PLACE UNTIL INSTALLATION.
  - 5. STORE VALVES INDOORS IN DRY ENVIRONMENT.
  - 6. STORE VALVES OFF THE GROUND IN WATERTIGHT ENCLOSURES WHEN INDOOR STORAGE IS NOT AN OPTION.

PART 2 PRODUCTS

2.01 APPLICATIONS

- A. PROVIDE THE FOLLOWING VALVES FOR THE APPLICATIONS IF NOT INDICATED ON DRAWINGS:
  - 1. SHUTOFF: BALL.
  - 2. THROTTLING: BALL.
- B. SUBSTITUTIONS OF VALVES WITH HIGHER CWP CLASSES OR SWP RATINGS FOR SAME VALVE TYPES ARE PERMITTED WHEN SPECIFIED CWP RATINGS OR SWP CLASSES ARE NOT AVAILABLE.
- C. REQUIRED VALVE END CONNECTIONS FOR NON-WATER TYPES:
  - 1. COPPER TUBE:

- A. 2 NPS (50 DN) AND SMALLER: THREADED ENDS EXCEPT WHERE SOLDER-JOINT VALVE-END OPTION IS INDICATED IN VALVE SCHEDULES BELOW.
- B. 2-1/2 NPS (65 DN) TO 2 NPS (100 DN): GROOVED OR FLANGED ENDS EXCEPT WHERE THREADED VALVE-END OPTION IS INDICATED IN VALVE SCHEDULES BELOW.
- D. DOMESTIC, HOT AND COLD WATER VALVES:
  - 1. 2 NPS (50 DN) AND SMALLER:

- A. BRONZE: PROVIDE WITH SOLDER-JOINT ENDS.
- B. BALL: TWO PIECE, FULL PORT, BRONZE WITH STAINLESS-STEEL TRIM.

2.02 GENERAL REQUIREMENTS

- A. VALVE PRESSURE AND TEMPERATURE RATINGS: NO LESS THAN RATING INDICATED; AS REQUIRED FOR SYSTEM PRESSURES AND TEMPERATURES.
- B. VALVE SIZES: MATCH UPSTREAM PIPING UNLESS OTHERWISE INDICATED.
- C. VALVES IN INSULATED PIPING: WITH 2 NPS (50 DN) STEM EXTENSIONS AND THE FOLLOWING FEATURES:
  - 1. BALL VALVES: EXTENDED OPERATING HANDLE OF NON-THERMAL-CONDUCTIVE MATERIAL, AND PROTECTIVE SLEEVE THAT ALLOWS OPERATION OF VALVE WITHOUT BREAKING THE VAPOR SEAL OR DISTURBING INSULATION.
  - 2. MEMORY STOPS: FULLY ADJUSTABLE AFTER INSULATION IS INSTALLED.

- D. VALVE-END CONNECTIONS:
  - 1. SOLDER JOINT CONNECTIONS: ASME B16.18.
- E. GENERAL ASME COMPLIANCE:
  - 1. SOLDER-JOINT CONNECTIONS: ASME B16.18.
- F. VALVE MATERIALS FOR POTABLE WATER: NSF 61 AND NSF 372.

- G. BRONZE VALVES:
  - 1. FABRICATE FROM DEZINCIFICATION RESISTANT MATERIAL.
  - 2. COPPER ALLOYS CONTAINING MORE THAN 15 PERCENT ZINC ARE NOT PERMITTED.
- H. VALVE BYPASS AND DRAIN CONNECTIONS: MSS SP-45.
- I. SOURCE LIMITATIONS: OBTAIN EACH VALVE TYPE FROM A SINGLE MANUFACTURER.

2.03 BRONZE BALL VALVES

- A. TWO PIECE, FULL PORT WITH STAINLESS STEEL TRIM:
  - 1. COMPLY WITH MSS SP-110.
  - 2. SWP RATING: 150 PSIG (1035 KPA).
  - 3. CWP RATING: 600 PSIG (4140 KPA).
  - 4. BODY: LEAD FREE BRONZE.
  - 5. ENDS: THREADED.
  - 6. SEATS: PTFE.
  - 7. STEM: STAINLESS STEEL.
  - 8. BALL: STAINLESS STEEL, VENTED.
- A. MANUFACTURERS:
  - A. CRANE.
  - B. NIBCO.
  - C. WATTS.

2.04 BRONZE SWING CHECK VALVES

- A. CLASS 125: CWP RATING: 200 PSIG (1380 KPA).
  - 1. COMPLY WITH MSS SP-80, TYPE 3.
  - 2. DESIGN: HORIZONTAL FLOW.
  - 3. BODY: LEAD FREE BRONZE, ASTM B62.
  - 4. ENDS: THREADED AS INDICATED.
  - 5. DISC: BRONZE.
  - 6. MANUFACTURERS:
    - A. CRANE.
    - B. NIBCO.
    - C. WATTS.

PART 3 EXECUTION

3.01 EXAMINATION

- A. DISCARD ALL PACKING MATERIALS AND VERIFY THAT VALVE INTERIOR, INCLUDING SEATS AND FLANGES ARE COMPLETELY CLEAN WITHOUT SIGNS OF OIL, GREASE, OR DEGRADATION THAT RESULT IN LEAKAGE.
- B. VERIFY VALVE PARTS TO BE FULLY OPERATIONAL IN ALL POSITIONS. BALL VALVES SHOULD BE FULLY OPEN.
- C. CONFIRM GASKET MATERIAL TO BE SUITABLE FOR THE SERVICE, TO BE THE CORRECT SIZE, AND WITHOUT DEFECTS THAT COULD COMPROMISE SEAT TIGHTNESS.
- D. SHOULD VALVE IS DETERMINED TO BE DEFECTIVE, REPLACE WITH NEW VALVE.

3.02 INSTALLATION

- A. PROVIDE UNIONS OR FLANGES WITH VALVES TO FACILITATE EQUIPMENT REMOVAL AND MAINTENANCE WHILE MAINTAINING SYSTEM OPERATION AND FULL ACCESSIBILITY FOR SERVICING.
- B. PROMOTE SEPARATE VALVE SUPPORT AS REQUIRED AND LOCATE VALVE WITH STEM AT OR ABOVE CENTER OF PIPING, MAINTAINING UNIMPEDED STEM MOVEMENT.
- C. INSTALL CHECK VALVES WHERE NECESSARY TO MAINTAIN DIRECTION OF FLOW AS FOLLOWS:
  - 1. LIFT CHECK: INSTALL WITH STEM PLUMB AND VERTICAL.
  - 2. SWING CHECK: INSTALL HORIZONTAL MAINTAINING HINGE PIN LEVEL.

SECTION 22 0719

PLUMBING PIPING INSULATION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. PIPING INSULATION.

1.02 REFERENCE STANDARDS

- A. MSS C177 - STANDARD TEST METHOD FOR STEADY-STATE HEAT FLUX MEASUREMENTS AND THERMAL TRANSMISSION PROPERTIES BY MEANS OF THE GUARDED-HOT-PLATE APPARATUS; 2013.
- B. ASTM C449 - STANDARD SPECIFICATION FOR MINERAL FIBER HYDRAULIC-SETTING THERMAL INSULATING AND FINISHING CEMENT; 2007 (REAPPROVED 2013).
- C. ASTM C547 - STANDARD SPECIFICATION FOR MINERAL FIBER PIPE INSULATION; 2017.
- D. ASTM C795 - STANDARD SPECIFICATION FOR THERMAL INSULATION FOR USE IN CONTACT WITH AUSTENITIC STAINLESS STEEL; 2008 (REAPPROVED 2013).
- E. ASTM E84 - STANDARD TEST METHOD FOR SURFACE BURNING CHARACTERISTICS OF BUILDING MATERIALS; 2016.
- F. ASTM E96/E96M - STANDARD TEST METHODS FOR WATER VAPOR TRANSMISSION OF MATERIALS; 2016.
- G. UL 723 - STANDARD FOR TEST FOR SURFACE BURNING CHARACTERISTICS OF BUILDING MATERIALS CURRENT EDITION, INCLUDING ALL REVISIONS.

1.03 QUALITY ASSURANCE

- A. MANUFACTURER QUALIFICATIONS: COMPANY SPECIALIZING IN MANUFACTURING THE PRODUCTS SPECIFIED IN THIS SECTION WITH NOT LESS THAN THREE YEARS OF DOCUMENTED EXPERIENCE.
- B. APPLICATOR QUALIFICATIONS: COMPANY SPECIALIZING IN PERFORMING THE TYPE OF WORK SPECIFIED IN THIS SECTION WITH MINIMUM 3 YEARS OF EXPERIENCE.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. ACCEPT MATERIALS ON SITE, LABELED WITH MANUFACTURER'S IDENTIFICATION, PRODUCT DESCRIPTION, AND THICKNESS.
- B. MAINTAIN AMBIENT CONDITIONS REQUIRED BY MANUFACTURERS OF EACH PRODUCT.
- C. MAINTAIN TEMPERATURE BEFORE, DURING, AND AFTER INSTALLATION FOR MINIMUM OF 24 HOURS.

PART 2 PRODUCTS

2.01 REGULATORY REQUIREMENTS

- A. SURFACE BURNING CHARACTERISTICS: FLAME SPREAD INDEX/SMOKE DEVELOPED INDEX OF 25/50, MAXIMUM, WHEN TESTED IN ACCORDANCE WITH ASTM E84 OR UL 723.

2.02 GLASS FIBER

A. MANUFACTURERS:

- 1. CERTAINTED CORPORATION: WWW.CERTAINTED.COM.
- 2. JOHNS MANVILLE CORPORATION: WWW.JM.COM.
- 3. KNAUF INSULATION: EXTERIOR/1000 DEGREE PIPE INSULATION: WWW.KNAUFINSULATION.COM/SL/E.
- 4. OWENS CORNING CORPORATION: FIBERGLAS PIPE INSULATION AS: WWW.OCBUILDINGSPEC.COM/SL/E.

- B. INSULATION: ASTM C547 AND ASTM C795; SEMI-RIGID, NONCOMBUSTIBLE, END GRAIN ADHESIVE TO JACKET.
  - 1. "K" (KSF) VALUE: ASTM C177, 0.24 AT 75 DEGREES F (0.035 AT 24 DEGREES C).
  - 2. MAXIMUM SERVICE TEMPERATURE: 650 DEGREES F (343 DEGREES C).
  - 3. MAXIMUM MOISTURE ABSORPTION: 0.2 PERCENT BY VOLUME.

- C. VAPOR BARRIER JACKET: WHITE KRAFT PAPER WITH GLASS FIBER YARN, BONDED TO ALUMINUM FLUX; MOISTURE VAPOR TRANSMISSION WHEN TESTED IN ACCORDANCE WITH ASTM E96/E96M OF 0.02 PERM-INCHES (0.028 NG/PA S M).

- D. THE WIRE: 0.048 INCH (1.22 MM) STAINLESS STEEL WITH TWISTED ENDS ON MAXIMUM 12 INCH (300 MM) CENTERS.

- E. VAPOR BARRIER LAP ADHESIVE: COMPATIBLE WITH INSULATION.
- F. INSULATING CEMENT: ASTM C449.

PART 3 EXECUTION

3.01 EXAMINATION

- A. VERIFY THAT PIPING HAS BEEN TESTED BEFORE APPLYING INSULATION MATERIALS.
- B. VERIFY THAT SURFACES ARE CLEAN AND DRY, WITH FOREIGN MATERIAL REMOVED.

3.02 INSTALLATION

- A. INSTALL IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.
- B. INSTALL IN ACCORDANCE WITH NORTH AMERICAN INSULATION MANUFACTURERS ASSOCIATION (NAIMA) NATIONAL INSULATION STANDARDS.
- C. EXPOSED PIPING: LOCATE INSULATION AND COVER SEAMS IN LEAST VISIBLE LOCATIONS.
- D. INSULATED PIPES CONVEYING FLUIDS BELOW AMBIENT TEMPERATURE: INSULATE ENTIRE SYSTEM INCLUDING FITTINGS, VALVES, UNIONS, FLANGES, STRAINERS, FLEXIBLE CONNECTIONS, PUMP BODIES, AND EXPANSION JOINTS.

- E. GLASS FIBER INSULATED PIPES CONVEYING FLUIDS BELOW AMBIENT TEMPERATURE:
  - 1. PROVIDE VAPOR BARRIER JACKETS, FACTORY-APPLIED OR FIELD-APPLIED. SECURE WITH SELF-SEALING LONGITUDINAL LAP AND BUTT STRIPS WITH PRESSURE SENSITIVE ADHESIVE. SECURE WITH OUTWARD CLINCH EXPANDING STAPLES AND VAPOR BARRIER MASTIC.
  - 2. INSULATE FITTINGS, JOINTS, AND VALVES WITH MOLDED INSULATION OF LIKE MATERIAL AND THICKNESS AS ADJACENT PIPE. FINISH WITH GLASS CLOTH AND VAPOR BARRIER ADHESIVE OR PVC FITTING COVERS.

3.03 SCHEDULES

- A. PLUMBING SYSTEMS:
  - 1. DOMESTIC HOT WATER SUPPLY:
- A. GLASS FIBER INSULATION:
  - 1) PIPE SIZE RANGE: 1/2 INCH (15 MM) AND UP.
  - 2) THICKNESS: 1 INCH (25 MM).
- 2. DOMESTIC COLD WATER:
  - 1) PIPE SIZE RANGE: 1/2 INCH (15 MM) AND UP.
  - 2) THICKNESS: 1 1/2 INCH (40 MM).

SECTION 22 1005

PLUMBING PIPING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. PIPE, PIPE FITTINGS, SPECIALTIES, AND CONNECTIONS FOR PLUMBING SYSTEMS:
  - 1. SANITARY SEWER.
  - 2. DOMESTIC WATER.
  - 3. PIPE HANGERS AND SUPPORTS.
  - 4. MANUFACTURED SLEEVE-SEAL SYSTEMS.

1.02 RELATED REQUIREMENTS

- A. SECTION 08 3100 - ACCESS DOORS AND PANELS.
- B. SECTION 22 0516 - EXPOSED PIPING AND LOOPS FOR PLUMBING PIPING.

1.03 REFERENCE STANDARDS

- A. ANSI Z21.22 - AMERICAN NATIONAL STANDARD FOR RELIEF VALVES AND AUTOMATIC GAS SHUTOFF DEVICES FOR HOT WATER SUPPLY SYSTEMS; 2015.
- B. ASME B16.18 - CAST COPPER ALLOY SOLDER JOINT PRESSURE FITTINGS; 2012.
- C. ASME B16.2 - WROUGHT COPPER AND COPPER ALLOY SOLDER-JOINT PRESSURE FITTINGS; 2016.
- D. ASME B31.9 - PLUMBING SERVICES PIPING; 2014.
- E. ASTM B31 - STANDARD SPECIFICATION FOR SOLDER METAL; 2008 (REAPPROVED 2014).
- F. ASTM B313 - STANDARD SPECIFICATION FOR SEAMLESS COPPER WATER TUBE; 2016.
- G. ASTM B88M - STANDARD SPECIFICATION FOR SEAMLESS COPPER WATER TUBE (METRIC); 2016.
- H. ASTM B813 - STANDARD SPECIFICATION FOR LIQUID AND PASTE FLUXES FOR SOLDERING OF COPPER AND COPPER ALLOY TUBE; 2016.
- I. ASTM B828 - STANDARD PRACTICE FOR MAKING CAPILLARY JOINTS BY SOLDERING OF COPPER AND COPPER ALLOY TUBE AND FITTINGS; 2016.
- J. ASTM D1785 - STANDARD SPECIFICATION FOR POLY(VINYL CHLORIDE) (PVC) PLASTIC PIPE, SCHEDULES 40, 80, AND 120; 2015, WITH EDITORIAL REVISION (2018).
- K. ASTM D2241 - STANDARD SPECIFICATION FOR POLY(VINYL CHLORIDE) (PVC) PRESSURE-RATED PIPE (SDR SERIES); 2015.
- L. ASTM D2486 - STANDARD SPECIFICATION FOR POLY(VINYL CHLORIDE) (PVC) PLASTIC PIPE FITTINGS; SCHEDULE 40; 2017.
- M. ASTM D2564 - STANDARD SPECIFICATION FOR SOLVENT CEMENTS FOR POLY(VINYL CHLORIDE) (PVC) PLASTIC PIPING SYSTEMS; 2012.
- N. ASTM D2855 - STANDARD PRACTICE FOR THE TWO-STEP (PRIMER & SOLVENT CEMENT) METHOD OF JOINING POLY(VINYL CHLORIDE) (PVC) OR CHLORINATED POLY(VINYL CHLORIDE) (CPVC) PIPE AND PIPING COMPONENTS WITH TAPERED SOCKETS; 2015.
- O. AWWA C851 - DISINFECTING WATER MAINS; 2014.
- P. CSPI 301 - STANDARD SPECIFICATION FOR HUBLESS CAST IRON SOIL PIPE AND FITTINGS FOR SANITARY AND STORM DRAIN, WASTE AND VENT PIPING APPLICATIONS; 2009 (REVISED 2012).
- Q. CSPI 310 - SPECIFICATION FOR COUPLING FOR USE IN CONNECTION WITH HUBLESS CAST

- IRON SOIL PIPE AND FITTINGS FOR SANITARY AND STORM DRAIN, WASTE, AND VENT PIPING APPLICATIONS; 2011 (REVISED 2012).
- R. MSS SP-58 - PIPE HANGERS AND SUPPORTS - MATERIALS, DESIGN, MANUFACTURE, SELECTION, APPLICATION, AND INSTALLATION; 2009.
- S. NSF 61 - DRINKING WATER SYSTEM COMPONENTS - HEALTH EFFECTS; 2017.
- T. NSF 372 - DRINKING WATER SYSTEM COMPONENTS - LEAD CONTENT; 2016.

1.04 QUALITY ASSURANCE

- A. PERFORM WORK IN ACCORDANCE WITH APPLICABLE CODES.
- B. VALVES: MANUFACTURER'S NAME AND PRESSURE RATING MARKED ON VALVE BODY.
- C. IDENTIFY PIPE WITH MARKING INCLUDING SIZE, ASTM MATERIAL CLASSIFICATION, ASTM SPECIFICATION, POTABLE WATER CERTIFICATION, WATER PRESSURE RATING.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. PROVIDE TEMPORARY END CAPS AND CLOSURES ON PIPING AND FITTINGS. MAINTAIN IN PLACE UNTIL INSTALLATION.
- B. PROTECT PIPING SYSTEMS FROM ENTRY OF FOREIGN MATERIALS BY TEMPORARY COVERS, COMPLETING SECTIONS OF THE WORK, AND ISOLATING PARTS OF COMPLETED SYSTEM.

1.06 FIELD CONDITIONS

- A. DO NOT INSTALL UNDERGROUND PIPING WHEN BEDDING IS WET OR FROZEN.

PART 2 PRODUCTS

2.01 GENERAL REQUIREMENTS

- A. POTABLE WATER SUPPLY SYSTEMS: PROVIDE PIPING, PIPE FITTINGS, AND SOLDER AND FLUX (IF USED), THAT COMPLY WITH NSF 61 AND NSF 372 FOR MAXIMUM LEAD CONTENT; LABEL PIPE AND FITTINGS.

2.02 SANITARY SEWER PIPING, ABOVE GRADE

- A. CAST IRON PIPE: CSPI 301, HUBLESS, SERVICE WEIGHT.
  - 1. FITTINGS: CAST IRON.
  - 2. JOINTS: CSPI 310, NEOPRENE GASKETS AND STAINLESS STEEL CLAMP-AND-SHIELD ASSEMBLIES.
- B. PVC PIPE: ASTM D1785 SCHEDULE 40, OR ASTM D2241 SDR 26 WITH NOT LESS THAN 150 PSI (1.034 KPA) PRESSURE RATING.
  - 1. FITTINGS: ASTM D2486, PVC.
  - 2. JOINTS: SOLVENT WELDED, WITH ASTM D2564 SOLVENT CEMENT.

2.03 DOMESTIC WATER PIPING, ABOVE GRADE

- A. COPPER TUBE: ASTM B88 (ASTM B88M), TYPE K (A), DRAWN (H).
  - 1. FITTINGS: ASME B16.18, CAST COPPER ALLOY OR ASME B16.22, WROUGHT COPPER AND BRONZE.
  - 2. JOINTS: ASTM B32, ALLOY S995 SOLDER.

2.04 PIPE HANGERS AND SUPPORTS

- A. PROVIDE HANGERS AND SUPPORTS THAT COMPLY WITH MSS SP-58.
  - 1. IF TYPE OF HANGER OR SUPPORT FOR A PARTICULAR SITUATION IS NOT INDICATED, SELECT APPROPRIATE TYPE USING MSS SP-58 RECOMMENDATIONS.
  - 2. OVERHEAD SUPPORTS: INDIVIDUAL STEEL ROD HANGERS ATTACHED TO STRUCTURE OR TO TRAPEZE HANGERS.
  - 3. TRAPEZE HANGERS: WELDED STEEL CHANNEL FRAMES ATTACHED TO STRUCTURE.
  - 4. VERTICAL PIPE SUPPORT: STEEL RISER CLAMP.
  - 5. FLOOR SUPPORTS: CONCRETE PIER OR STEEL PEDESTAL WITH FLOOR FLANGE; FIXTURE ATTACHMENT.

B. PLUMBING PIPING - DRAIN, WASTE, AND VENT:

- 1. HANGERS FOR PIPE SIZES 1/2 INCH (15 MM) TO 1-1/2 INCHES (40 MM): MALLEABLE IRON, ADJUSTABLE SWIVEL, SPLIT RING.
- 2. HANGERS FOR PIPE SIZES 2 INCHES (50 MM) AND OVER: CARBON STEEL, ADJUSTABLE, CLEVIS.

- 3. WALL SUPPORT FOR PIPE SIZES TO 3 INCHES (80 MM): CAST IRON HOOK.
- 4. FLOOR SUPPORT: CAST IRON ADJUSTABLE PIPE SADDLE, LOCK NUT, NIPPLE, FLOOR FLANGE, AND CONCRETE PIER OR STEEL SUPPORT.

C. PLUMBING PIPING - WATER:

- 1. HANGERS FOR PIPE SIZES 1/2 INCH (15 MM) TO 1-1/2 INCHES (40 MM): MALLEABLE IRON, ADJUSTABLE SWIVEL, SPLIT RING.
- 2. HANGERS FOR COLD PIPE SIZES 2 INCHES (50 MM) AND OVER: CARBON STEEL, ADJUSTABLE, CLEVIS.
- 3. HANGERS FOR HOT PIPE SIZES 2 INCHES (50 MM) TO 4 INCHES (100 MM): CARBON STEEL, ADJUSTABLE, CLEVIS.

- 4. WALL SUPPORT FOR PIPE SIZES TO 3 INCHES (80 MM): CAST IRON HOOK.
- 5. FLOOR SUPPORT FOR COLD PIPE: CAST IRON ADJUSTABLE PIPE SADDLE, LOCK NUT, NIPPLE, FLOOR FLANGE, AND CONCRETE PIER OR STEEL SUPPORT.

2.05 MANUFACTURED SLEEVE-SEAL SYSTEMS

- A. MANUFACTURERS:
  - 1. THE METAFLEX COMPANY; METRASOLE: WWW.METAFLEX.COM/SL/E.
- B. MODULAR/MECHANICAL SEAL:
  - 1. SYNTHETIC RUBBER INTERLOCK JOINTS CONTAINING FULL ANNUAL SPACE BETWEEN PIPE AND WALL/CASING OPENING.
  - 2. PROVIDE WATERTIGHT SEAL BETWEEN PIPE AND WALL/CASING OPENING.
  - 3. ELASTICITY: PIPE SIZE AND MATERIAL IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.
  - 4. GLASS REINFORCED PLASTIC PRESSURE END PLATES.

2.06 RELIEF VALVES

- A. PRESSURE:
  - 1. MANUFACTURERS:
    - A. CLA-WAL CO: WWW.CLA-WAL.COM.
    - B. WATTS REGULATOR COMPANY: WWW.WATTSREGULATOR.COM.
- B. ANTI-SIPHON: AGA CERTIFIED, BRONZE BODY, TEFLOM SEAT, STEEL STEM AND SPRINGS, AUTOMATIC, DIRECT PRESSURE ACTUATED.

B. TEMPERATURE AND PRESSURE:

- 1. MANUFACTURERS:
  - A. CLA-WAL CO: WWW.CLA-WAL.COM.
  - B. WATTS REGULATOR COMPANY: WWW.WATTSREGULATOR.COM.
- 2. ANSI Z21.22, AGA CERTIFIED, BRONZE BODY, TEFLOM SEAT, STAINLESS STEEL STEM AND SPRINGS, AUTOMATIC, DIRECT PRESSURE ACTUATED, TEMPERATURE RELIEF: MAXIMUM 210 DEGREES F (98.9 DEGREES C), CAPACITY ASME BPVC-M CERTIFIED AND LABELLED.

PART 3 EXECUTION

3.01 EXAMINATION

- A. VERIFY THAT EXCAVATIONS ARE TO REQUIRED GRADE, DRY, AND NOT OVER-EXCAVATED.

3.02 PREPARATION

- A. REAM PIPE AND TUBE ENDS. REMOVE BURRS. BEVEL PLAIN END FERROUS PIPE.
- B. REMOVE SCALE AND DIRT, ON INSIDE AND OUTSIDE, BEFORE ASSEMBLY.
- C. PREPARE PIPING CONNECTIONS TO EQUIPMENT WITH FLANGES OR UNIONS.

3.03 INSTALLATION

- A. INSTALL IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.
- B. PROVIDE NON-CONDUCTING DIELECTRIC CONNECTIONS WHEREVER JOINING DISSIMILAR METALS.
- C. ROUTE PIPING IN ORDERLY MANNER AND MAINTAIN GRADIENT. ROUTE PARALLEL AND PERPENDICULAR TO WALLS.
- D. INSTALL PIPING TO MAINTAIN HEADROOM, CONSERVE SPACE, AND NOT INTERFERE WITH USE OF SPACE.

- E. GROUP PIPING WHENEVER PRACTICAL AT COMMON ELEVATIONS.
- F. INSTALL PIPING TO ALLOW FOR EXPANSION AND CONTRACTION WITHOUT STRESSING PIPE, JOINTS, OR CONNECTED EQUIPMENT. REFER TO SECTION 22 0516.
- G. PROVIDE CLEARANCE IN HANGERS AND FROM STRUCTURE AND OTHER EQUIPMENT FOR INSTALLATION OF INSULATION AND ACCESS TO WALLS AND FITTINGS.
- H. PROVIDE ACCESS WHERE VALVES AND FITTINGS ARE NOT EXPOSED.
- I. COORDINATE SIZE AND LOCATION OF ACCESS DOORS WITH SECTION 08 3100.
- J. INSTALL VENT PIPING PENETRATING ROOFED AREAS TO MAINTAIN INTEGRITY OF ROOF ASSEMBLY.
- K. PROVIDE SUPPORT FOR UTILITY METERS IN ACCORDANCE WITH REQUIREMENTS OF UTILITY COMPANIES.

- L. INSTALL VALVES WITH STEMS UPRIGHT OR HORIZONTAL, NOT INVERTED. REFER TO SECTION 22 0523.
- M. COPPER PIPE AND TUBE: MAKE SOLDERED JOINTS IN ACCORDANCE WITH ASTM B828, USING SPECIFIED SOLDER, AND FLUX MEETING ASTM B813; IN POTABLE WATER SYSTEMS USE FLUX ALSO COMPLYING WITH NSF 61 AND NSF 372.
- N. PVC PIPE: MAKE SOLVENT-WELDED JOINTS IN ACCORDANCE WITH ASTM D2855.
- O. SLEEVE PIPES PASSING THROUGH PARTITIONS, WALLS AND FLOORS.
- P. PIPE HANGERS AND SUPPORTS:
  - 1. INSTALL IN ACCORDANCE WITH ASME B31.9.
  - 2. PLACE HANGERS WITHIN 12 INCHES (300 MM) OF EACH HORIZONTAL ELBOW.
  - 3. WHERE SEVERAL PIPES CAN BE INSTALLED IN PARALLEL AND AT SAME ELEVATION, PROVIDE

MULTIPLE OR TRAPEZE HANGERS.

P. MANUFACTURED SLEEVE-SEAL SYSTEMS:

- 1. INSTALL MANUFACTURED SLEEVE-SEAL SYSTEMS IN SLEEVES LOCATED IN GRADE SLABS AND EXTERIOR CONCRETE WALLS AT PIPING ENTRANCES INTO BUILDING.
- 2. PROVIDE SEALING ELEMENTS OF THE SIZE, QUANTITY, AND TYPE REQUIRED FOR THE PIPING AND SLEEVE INNER DIAMETER OR PENETRATION DIAMETER.
- 3. LOCATE PIPING IN CENTER OF SLEEVE OR PENETRATION.
- 4. INSTALL FIELD ASSEMBLED SLEEVE-SEAL SYSTEM COMPONENTS IN ANNUAL SPACE BETWEEN SLEEVE AND PIPING.
- 5. TIGHTEN BOLTING FOR A WATER-TIGHT SEAL.
- 6. INSTALL IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.

3.04 APPLICATION

- A. INSTALL UNIONS DOWNSTREAM OF VALVES AND AT EQUIPMENT OR APPARATUS CONNECTIONS.
- B. INSTALL BRASS MALE ADAPTERS EACH SIDE OF VALVES IN COPPER PIPE SYSTEM. SOLDER ADAPTERS TO PIPE.
- C. INSTALL BALL VALVES FOR SHUT-OFF AND TO ISOLATE EQUIPMENT, PART OF SYSTEMS, OR VERTICAL RISERS.
- D. INSTALL BALL VALVES FOR THROTTLING, BYPASS, OR MANUAL FLOW CONTROL SERVICES.

3.05 TOLERANCES

- A. DRAINAGE PIPING: ESTABLISH INVERT ELEVATIONS WITHIN 1/2 INCH (10 MM) VERTICALLY OF LOCATION INDICATED AND TO DRAIN AT MINIMUM OF 1/4 INCH PER FOOT (1:50) SLOPE.
- B. WATER PIPING: SLOPE AT MINIMUM OF 1/32 INCH PER FOOT (1:400) AND ARRANGE TO DRAIN AT LOW POINTS.

3.06 DISINFECTION OF DOMESTIC WATER PIPING SYSTEM

- A. PRIOR TO STARTING WORK, VERIFY SYSTEM IS COMPLETE, FLUSHED AND CLEAN.
- B. INJECT DISINFECTANT, FREE CHLORINE IN LIQUID, POWDER, TABLET OR GAS FORM, THROUGHOUT SYSTEM TO OBTAIN 50 TO 80 MG/L RESIDUAL.
- C. BLEED WATER FROM OUTLETS TO ENSURE DISTRIBUTION AND TEST FOR DISINFECTANT RESIDUAL AT MINIMUM 15 PERCENT OF OUTLETS.
- D. MAINTAIN DISINFECTANT IN SYSTEM FOR 24 HOURS.
- E. IF FINAL DISINFECTANT RESIDUAL TESTS LESS THAN 25 MG/L, REPEAT TREATMENT.
- F. FLUSH DISINFECTANT FROM SYSTEM UNTIL RESIDUAL EQUAL TO THAT OF INCOMING WATER OR 1.0 MG/L.

3.07 SCHEDULES

- A. PIPE HANGER SPACING:
  - 1. METAL PIPING:
    - A. PIPE SIZE: 1/2 INCHES (15 MM) TO 1-1/4 INCHES (32 MM):
      - 1) MAXIMUM HANGER SPACING: 6.5 FT (2 M).
      - 2) HANGER ROD DIAMETER: 3/8 INCHES (9 MM).
    - B. PIPE SIZE: 1-1/2 INCHES (40 MM) TO 2 INCHES:
      - 1) MAXIMUM HANGER SPACING: 10 FT (3 M).
      - 2) HANGER ROD DIAMETER: 3/8 INCHES (9 MM).
    - C. PIPE SIZE: 2-1/2 INCHES (65 MM) TO 3 INCHES (75 MM):
      - 1) MAXIMUM HANGER SPACING: 10 FT (3 M).
      - 2) HANGER ROD DIAMETER: 1/2 INCH (13 MM).
  - A. ALL SIZES:
    - 1) MAXIMUM HANGER SPACING: 6 FT (1.8 M).
    - 2) HANGER ROD DIAMETER: 3/8 INCH (9 MM).

SECTION 22 1001

PLUMBING SPECIALTIES

PART 1 GENERAL

1.01 SECTION INCLUDES

- C. MIXING VALVES.

1.02 REFERENCE STANDARDS

- A. NSF 61 - DRINKING