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SECTION 220553

IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Nameplates.

B. Tags.

C. Pipe Markers.

1.2 REFERENCE STANDARDS

A. ASME A13.1 - Scheme for the Identification of Piping Systems; The American Society of Mechanical Engineers; 2007.

1.3 SUBMITTALS

A. See Division 1 Section - Administrative Requirements, for submittal procedures.

B. List: Submit list of wording, symbols, letter size, and color coding for mechanical identification.

C. Chart and Schedule: Submit valve chart and schedule, including valve tag number, location, function, and valve manufacturer's name and model number.

D. Product Data: Provide manufacturers catalog literature for each product required.

E. Project Record Documents: Record actual locations of tagged valves.

PART 2 PRODUCTS

2.1 NAMEPLATES

A. Description: Laminated three-layer plastic with engraved letters.
   1. Letter Color: White.
   2. Letter Height: 1/4 inch.
   3. Background Color: Black.

2.2 TAGS

A. Plastic Tags: Laminated three-layer plastic with engraved black letters on light contrasting background color. Tag size minimum 1-1/2 inch diameter.

B. Metal Tags: Brass with stamped letters; tag size minimum 1-1/2 inch diameter with smooth edges.

C. Chart: Typewritten letter size list in anodized aluminum frame.

2.3 PIPE MARKERS

A. Comply with ASME A13.1.

B. Plastic Tape Pipe Markers: Flexible, vinyl film tape with pressure sensitive adhesive backing and printed markings.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install plastic nameplates with corrosive-resistant mechanical fasteners, or adhesive. Apply with sufficient adhesive to ensure permanent adhesion and seal with clear lacquer.

B. Install tags with corrosion resistant chain.

C. Install plastic pipe markers in accordance with manufacturer's instructions.

D. Install plastic tape pipe markers complete around pipe in accordance with manufacturer's instructions.

E. Identify equipment with plastic nameplates. Small devices, such as in-line pumps, may be identified with tags.

F. Identify control panels and major control components outside panels with plastic nameplates.

G. Identify valves in main and branch piping with tags.

H. Identify piping, concealed or exposed, with plastic pipe markers. Use tags on piping 3/4 inch diameter and smaller. Identify service, flow direction, and pressure. Install in clear view and align with axis of piping. Locate identification not to exceed 20 feet on straight runs including risers and drops, adjacent to each valve and Tee, at each side of penetration of structure or enclosure, and at each obstruction.

END OF SECTION

SECTION 220719

PLUMBING PIPING INSULATION

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Piping insulation.

B. Jackets and accessories.

1.2 REFERENCE STANDARDS

A. ASTM 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 C195 - Standard Specification for Mineral Fiber Thermal Insulating Cement; 2007 (Reapproved 2013).

C. ASTM C449 - Standard Specification for Mineral Fiber Hydraulic-Setting Thermal Insulating and Finishing Cement; 2007 (Reapproved 2013).

D. ASTM C534/C534M - Standard Specification for Preformed Flexible Elastomeric Cellular Thermal Insulation in Sheet and Tubular Form; 2014.

E. ASTM C547 - Standard Specification for Mineral Fiber Pipe Insulation; 2015.

F. ASTM C795 - Standard Specification for Thermal Insulation for Use in Contact with Austenitic Stainless Steel; 2008 (Reapproved 2013).

G. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2015a.

H. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials; 2014.

I. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials; Current Edition, Including All Revisions.

1.3 SUBMITTALS

A. Product Data: Provide product description, thermal characteristics, list of materials and thickness for each service

B. Manufacturer's Instructions: Indicate installation procedures that ensure acceptable workmanship and installation standards will be achieved.

PART 2 PRODUCTS

2.1 REQUIREMENTS FOR ALL PRODUCTS OF THIS SECTION

A. Surface Burning Characteristics: Flame spread index/Smoke developed index of 25/50, maximum, when tested in accordance with ASTM E84 or UL 723.

2.2 GLASS FIBER

A. Manufacturers:
   1. Knauf Insulation: www.knaufusa.com.
   2. Johns Manville Corporation: www.jm.com.
   3. Owens Corning Corp: www.owenscorning.com.
   4. CertainTeed Corporation: www.certainteed.com.

B. Insulation: ASTM C547 and ASTM C795; rigid molded, noncombustible.
   1. 'K' value: ASTM C177, 0.24 at 75 degrees F.
   2. Maximum service temperature: 250 degrees F.
   3. Maximum moisture absorption: 0.2 percent by volume.

C. Insulation: ASTM C547 and ASTM C795; semi-rigid, noncombustible, end grain adhered to jacket.
   1. 'K' value: ASTM C177, 0.24 at 75 degrees F.
   2. Maximum service temperature: 250 degrees F.
   3. Maximum moisture absorption: 0.2 percent by volume.

D. Vapor Barrier Jacket: White Kraft paper with glass fiber yarn, bonded to aluminized film; moisture vapor transmission when tested in accordance with ASTM E96/E96M of 0.02 perm-inches.

E. Vapor Barrier Lap Adhesive:
   1. Compatible with insulation.

F. Insulating Cement/Mastic:
   1. ASTM C195; hydraulic setting on mineral wool.

G. Fibrous Glass Fabric:
   1. Cloth: Untreated; 9 oz/sq yd weight.
   2. Blanket: 1.0 lb/cu ft density.
   3. Weave: 5x5.

H. Indoor Vapor Barrier Finish:
   1. Cloth: Untreated; 9 oz/sq yd weight.
   2. Vinyl emulsion type acrylic, compatible with insulation, black color.

I. Insulating Cement:
   1. ASTM C449/C449M.

2.3 FLEXIBLE ELASTOMERIC CELLULAR INSULATION

A. Manufacturer:
   1. Armacell International: www.armacell.com/#sle.
   2. K-Flex USA: www.kflexusa.com.

B. Insulation: Preformed flexible elastomeric cellular rubber insulation complying with ASTM C534 Grade 1; use molded tubular material wherever possible.
   1. Minimum Service Temperature: -40 degrees F.
   2. Maximum Service Temperature: 220 degrees F.
   3. Connection: Waterproof vapor barrier adhesive.

C. Elastomeric Foam Adhesive: Air dried, contact adhesive, compatible with insulation.

2.4 JACKETS

A. PVC Plastic.
   1. Jacket: One piece molded type fitting covers and sheet material, off-white color.
      a. Minimum Service Temperature: 0 degrees F.
      b. Maximum Service Temperature: 150 degrees F.
      c. Moisture Vapor Permeability: 0.002 perm inch, maximum, when tested in accordance with ASTM E96/E96M.
      d. Thickness: 10 mil.
      e. Connections: Brush on welding adhesive.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that piping has been tested before applying insulation materials.

B. Verify that surfaces are clean and dry, with foreign material removed.

3.2 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Exposed Piping: Locate insulation and cover seams in least visible locations.

C. Insulated pipes conveying fluids below ambient temperature: Insulate entire system including fittings, valves, unions, flanges, strainers, flexible connections, pump bodies, and expansion joints.

D. Glass fiber insulated pipes conveying fluids below ambient temperature:
   1. Provide vapor barrier jackets, factory-applied or field-applied. Secure with self-sealing longitudinal laps and butt strips with pressure sensitive adhesive.

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.

E. Glass fiber insulated pipes conveying fluids above ambient temperature:
1. Provide standard jackets, with or without vapor barrier, factory-applied or field-applied. Secure with self-sealing longitudinal laps and butt strips with pressure sensitive adhesive.
2. Insulate fittings, joints, and valves with insulation of like material and thickness as adjoining pipe. Finish with glass cloth and adhesive or PVC fitting covers.

F. Inserts and Shields:
1. Application: Piping 2-1/2 inches diameter or larger.
2. Shields: Galvanized steel between pipe hangers or pipe hanger rolls and inserts.
3. Insert location: Between support shield and piping and under the finish jacket.

G. Continue insulation through walls, sleeves, pipe hangers, and other pipe penetrations. Finish at supports, protrusions, and interruptions. At fire separations, refer to Firestopping Section.

H. Exterior Applications: Provide vapor barrier jacket. Insulate fittings, joints, and valves with insulation of like material and thickness as adjoining pipe. Provide PVC jacket.

3.3 SCHEDULES

A. Domestic Hot and Recirculated Hot Water:
1. Glass Fiber Insulation:
a. Pipe Size Range: 1/2 through 1-1/4 inch.
b. Thickness: 1 inch.
2. Glass Fiber Insulation:
a. Pipe Size Range: Above 1-1/4 inch
b. Thickness: 1-1/2 inch

B. Domestic Cold Water:
1. Glass Fiber Insulation:
a. Pipe Size Range: 1/2 through 1-1/4 inch.
b. Thickness: 1/2 inch.
2. Glass Fiber Insulation:
a. Pipe Size Range: Above 1-1/4 inch
b. Thickness: 1 inch

C. Other Systems:
1. Drains from water coolers: 1/2" elastomeric

END OF SECTION

SECTION 221005

PLUMBING PIPING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Pipe, pipe fittings, valves, and connections for piping systems.
   1. Sanitary sewer.
   2. Domestic water.
   3. Gas.
   4. Flanges, unions, and couplings.
   5. Pipe hangers and supports.
   6. Valves.
   7. Flow controls.
   8. Check.
   9. Water pressure reducing valves.
   10. Relief valves.
   11. Sleeves
   12. Sleeve seals
   13. Grout
   14. Escutcheons

1.2 RELATED REQUIREMENTS

A. Section - Firestopping.

B. Section 220553 - Identification for Plumbing Piping and Equipment.

C. Section 220719 - Plumbing Piping Insulation.

1.3 REFERENCE STANDARDS

A. ANSI Z21.22 - American National Standard for Relief Valves and Automatic Gas Shutoff Devices for Hot Water Supply Systems; 1999, and addenda A&B (R2004).

B. ANSI Z223.1 - National Fuel Gas Code; 2015.

C. ASME B16.3 - Malleable Iron Threaded Fittings: Classes 150 and 300; 2011.

D. ASME B16.18 - Cast Copper Alloy Solder Joint Pressure Fittings; 2012.

E. ASME B16.22 - Wrought Copper and Copper Alloy Solder-Joint Pressure Fittings; 2013.

F. ASME B31.1 - Power Piping; 2014.

G. ASME B31.9 - Building Services Piping; 2014.

H. ASSE 1003 - Performance Requirements for Water Pressure Reducing Valves for Domestic Water Distribution Systems; 2009.

I. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2012.

J. ASTM A74 - Standard Specification for Cast Iron Soil Pipe and Fittings; 2015.

K. ASTM A234/A234M - Standard Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Service; 2015.

L. ASTM B32 - Standard Specification for Solder Metal; 2008 (Reapproved 2014).

M. ASTM B42 - Standard Specification for Seamless Copper Pipe, Standard Sizes; 2015a.

N. ASTM B88 - Standard Specification for Seamless Copper Water Tube; 2014.

O. ASTM B813 - Standard Specification for Liquid and Paste Fluxes for Soldering of Copper and Copper Alloy Tube; 2010.

P. ASTM B828 - Standard Practice for Making Capillary Joints by Soldering of Copper and Copper Alloy Tube and Fittings; 2002 (Reapproved 2010).

Q. ASTM D2564 - Standard Specification for Solvent Cements for Poly(Vinyl Chloride) (PVC) Plastic Piping Systems; 2012.

R. ASTM D2665 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Drain, Waste, and Vent Pipe and Fittings; 2014.

S. ASTM D2729 - Standard Specification for Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings; 2011.

T. ASTM D2855 - Standard Practice for Making Solvent-Cemented Joints with Poly(Vinyl Chloride) (PVC) Pipe and Fittings; 1996 (Reapproved 2010).

U. ASTM F876 - Standard Specification for Crosslinked Polyethylene (PEX) Tubing; 2013a.

V. ASTM F877 - Standard Specification for Crosslinked Polyethylene (PEX) Plastic Hot- and Cold-Water Distribution Systems; 2011.

W. ASTM F708 - Standard Practice for Design and Installation of Rigid Pipe Hangers; 1992 (Reapproved 2008).

X. ASTM F 2389-06 - Standard Specification for Pressure-rated Polypropylene (PP) Piping Systems

Y. CSA B137.11 - Polypropylene (PP-R) Pipe and Fittings for Pressure Applications

Z. NSF/ANSI 14 - Plastic Piping System Components and Related Materials

AA. NSF/ANSI 61 - Drinking Water Systems Components - Health Effects

AB. AWWA C550 - Protective Interior Coatings for Valves and Hydrants; 2013.

AC. AWWA C651 - Disinfecting Water Mains; 2005.

AD. CISPI 301 - Standard Specification for Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste and Vent Piping Applications; 2009.

AE. CISPI 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.

AF. ICC-ES AC01 - Acceptance Criteria for Expansion Anchors in Masonry Elements; 2012.

AG. MSS SP-58 - Pipe Hangers and Supports - Materials, Design, Manufacture, Selection, Application, and Installation; 2009.

AH. MSS SP-67 - Butterfly Valves; 2011.

AI. MSS SP-70 - Cast Iron Gate Valves, Flanged and Threaded Ends; 2011.

AJ. MSS SP-71 - Cast Iron Swing Check Valves, Flanged and Threaded Ends; 2011.

AK. MSS SP-78 - Cast Iron Plug Valves, Flanged and Threaded Ends; 2011.

AL. MSS SP-80 - Bronze Gate, Globe, Angle and Check Valves; 2013.

AM. MSS SP-110 - Ball Valves Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends; 2010.

AN. NSF 372 - Drinking Water System Components - Lead Content; 2011.

AO. PPI TR-4 - PPI Listing of Hydrostatic Design Basis (HDB), Hydrostatic Design Stress (HDS), Strength Design Basis (SDB), Pressure Design Basis (PDB), and Minimum Required Strength (MRS) Ratings For Thermoplastic Piping Materials or Pipe; 2013.

1.4 SUBMITTALS

A. See Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on pipe materials, pipe fittings, valves, and accessories. Provide manufacturers catalog information. Indicate valve data and ratings.

C. Project Record Documents: Record actual routing of piping. Record actual locations of valves.

1.5 QUALITY ASSURANCE

A. Perform Work in accordance with City of Steamboat Springs standards.

B. Where joining systems specific to a piping manufacturer are used, personnel shall receive factory authorized training prior to installation, and submit evidence of such training for review.

C. Valves: Manufacturer's name and pressure rating marked on valve body.

D. Welding Materials and Procedures: Conform to ASME BPVC-IX and applicable state labor regulations.

E. Welder Qualifications: Certified in accordance with ASME BPVC-IX.

F. Identify pipe with marking including size, ASTM material classification, ASTM specification, potable water certification, water pressure rating.

1.6 REGULATORY REQUIREMENTS

A. Perform Work in accordance with State of Colorado, plumbing code.

B. Conform to applicable code for installation of backflow prevention devices.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Accept valves on site in shipping containers with labeling in place. Inspect for damage.

B. Provide temporary protective coating on cast iron and steel valves.

C. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.

D. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the work, and isolating parts of completed system.

1.8 FIELD CONDITIONS

A. Do not install underground piping when bedding is wet or frozen.

PART 2 PRODUCTS

2.1 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.

B. Reference PART 3 EXECUTION for product applications. Listing of products herein does not imply acceptance of use in all sizes or locations.

2.2 SANITARY SEWER PIPING, BURIED WITHIN 5 FEET OF BUILDING

A. PVC Pipe: ASTM D2665 or ASTM D3034.
   1. Fittings: PVC.
   2. Joints: Solvent welded, with ASTM D2564 solvent cement.

2.3 SANITARY SEWER PIPING, ABOVE GRADE

A. Cast Iron Pipe: CISPI 301, hubless, service weight.
   1. Fittings: Cast iron.
   2. Joints: CISPI 310, neoprene gaskets and stainless steel clamp-and-shield assemblies.

B. PVC Pipe: ASTM D2729.
   1. Fittings: PVC.
   2. Joints: Solvent welded, with ASTM D2564 solvent cement.

2.4 WATER PIPING, BURIED WITHIN 5 FEET OF BUILDING

A. Copper Pipe: ASTM B42, hard drawn.
   1. Fittings: ASME B16.18, cast copper alloy or ASME B16.22 wrought copper and bronze.
   2. Joints: ASTM B 32, alloy Sn95 solder.

B. PE Pipe: ASTM D2239, or ASTM D2447 Schedule 40.
   1. Fittings: ASTM D2609, PE.

2. Joints: Mechanical with stainless steel clamp.

2.5 WATER PIPING, ABOVE GRADE

A. Copper Tube: ASTM B88 (ASTM B88M), Type L (B), Drawn (H).
   1. Fittings: ASME B16.18, cast copper alloy or ASME B16.22, wrought copper and bronze.
   2. Joints: ASTM B32, alloy Sn95 solder.

B. Cross-Linked Polyethylene (PEX) Pipe: ASTM F876 or ASTM F877.
   1. Manufacturers:
      a. Uponor, Inc: www.uponorengineering.com/#sle.
      b. Viega LLC: www.viega.com/#sle.
   2. PPI TR-4 Pressure Design Basis:
      a. 100 psig at maximum 180 degrees F.
   3. Fittings: Brass and copper.

C. Polypropylene Pipe: Pipe shall be manufactured from a PP-R or PP-RCT resin meeting the short-term properties and long-term strength requirements of ASTM F 2389. The pipe shall contain no rework or recycled materials except that generated in the manufacturer's own plant from resin of the same specification from the same raw material. All pipe shall be made in a multi-layer extrusion process. Domestic hot water shall contain a fiber layer (faser) to restrict thermal expansion. All pipe shall comply with the rated pressure requirements of ASTM F 2389. All pipe shall be certified by NSF International as complying with NSF 14, NSF 61, and ASTM F 2389 or CSA B137.11.
   1. Pipe shall be Niron Clima Pipe as manufactured by Nupi Americas or equivalent approved by Engineer.
   2. Fittings shall be manufactured from a PP-R or PP-RCT resin meeting the short-term properties and long-term strength requirements of ASTM F 2389. The fittings shall contain no rework or recycled materials except that generated in the manufacturer's own plant from resin of the same specification from the same raw material. All fittings shall be certified by NSF International as complying with NSF 14, NSF 61, and ASTM F 2389 or CSA B137.11.
   3. Valves shall be manufactured from resin meeting the short-term properties and long-term strength requirements of ASTM F 2389. The valves shall contain no rework or recycled materials except that generated in the manufacturer's own plant from resin of the same specification from the same raw material.
   4. Manufacturer shall warrantee pipe and fittings for 30 years to be free of defects in materials or workmanship. Warrantee shall cover labor and material costs of repairing and/or replacing defective materials and repairing any incidental damage caused by failure of the piping system do to defects in materials or workmanship.

D. Mechanical joint system: Manufacturer's fittings and joining methods, for pipe materials and sizes.
   1. Viega

2.6 NATURAL GAS PIPING, ABOVE GRADE

A. Steel Pipe: ASTM A53/A53M Schedule 40 black.
   1. Fittings: ASME B16.3, malleable iron, or ASTM A234/A234M, wrought steel welding type.
   2. Joints: Threaded or welded to ASME B31.1.

2.7 FLANGES, UNIONS, AND COUPLINGS

A. Unions for Pipe Sizes 3 Inches and Under:
   1. Ferrous pipe: Class 150 malleable iron threaded unions.
   2. Copper tube and pipe: Class 150 bronze unions with soldered joints.

B. Dielectric Connections: Union with galvanized or plated steel threaded end, copper solder end, water impervious isolation barrier.

2.8 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.

B. Plumbing Piping - Drain, Waste, and Vent:
1. Conform to ASME B31.9.
2. Hangers for Pipe Sizes 1/2 Inch to 1-1/2 Inches: Carbon steel, adjustable swivel, split ring.
3. Hangers for Pipe Sizes 2 Inches and Over: Carbon steel, adjustable, clevis.
4. Multiple or Trapeze Hangers: Steel channels with welded spacers and hanger rods.
5. Wall Support for Pipe Sizes to 3 Inches: Cast iron hook.
6. Wall Support for Pipe Sizes 4 Inches and Over: Welded steel bracket and wrought steel clamp.
7. Vertical Support: Steel riser clamp.

C. Plumbing Piping - Water:
1. Conform to ASME B31.9.
2. Hangers for Pipe Sizes 1/2 Inch to 1-1/2 Inches: Malleable iron, adjustable swivel, split ring.
3. Hangers for Cold Pipe Sizes 2 Inches and Over: Carbon steel, adjustable, clevis.
4. Hangers for Hot Pipe Sizes 2 Inches to 4 Inches: Carbon steel, adjustable, clevis.
5. Multiple or Trapeze Hangers: Steel channels with welded supports or spacers and hanger rods.
6. Multiple or Trapeze Hangers for Hot Pipe Sizes 6 Inches and Over: Steel channels with welded supports or spacers and hanger rods, cast iron roll.
7. Wall Support for Pipe Sizes to 3 Inches: Cast iron hook.
8. Wall Support for Pipe Sizes 4 Inches and Over: Welded steel bracket and wrought steel clamp.
9. Vertical Support: Steel riser clamp.

D. Hanger Fasteners: Attach hangers to structure using appropriate fasteners, as follows:
1. Masonry Wedge Expansion Anchors: Complying with ICC-ES AC01.
2. Other Types: As required.

2.9 GATE VALVES

A. Manufacturers:
1. Tyco Flow Control: www.tycoflowcontrol.com.
2. Conbraco Industries: www.conbraco.com.
3. Nibco, Inc: www.nibco.com.
4. Milwaukee Valve Company: www.milwaukeevalve.com.
5. Substitutions: See Section 016000 - Product Requirements.

B. Up To and Including 3 Inches:
1. 1, Class 125, bronze body, bronze trim, rising stem, handwheel, inside screw, solid wedge disc, solder ends.

C. 2 Inches and Larger:
1. 1, Class 125, iron body, bronze trim, outside screw and yoke, handwheel, solid wedge disc, flanged ends. Provide chain-wheel operators for valves 6 inches and larger mounted over 8 feet above floor.

2.10 BALL VALVES

A. Manufacturers:
1. Tyco Flow Control: www.tycoflowcontrol.com.
2. Conbraco Industries: www.conbraco.com.
3. Nibco, Inc: www.nibco.com.
4. Milwaukee Valve Company: www.milwaukeevalve.com.
5. Substitutions: See Section 016000 - Product Requirements.

B. Construction, 4 Inches and Smaller: MSS SP-110, Class 150, 400 psi CWP, bronze, two piece body, chrome plated brass ball, regular port, teflon seats and stuffing box ring, blow-out proof stem, lever handle with balancing stops, solder ends with union.

2.11 PLUG VALVES

A. Construction 2-1/2 Inches and Larger: 1, 175 psi CWP, cast iron body and plug, pressure lubricated, teflon or Buna N packing, flanged or grooved ends. Provide lever operator with set screw.

2.12 BUTTERFLY VALVES

A. Manufacturers:
1. Tyco Flow Control: www.tycoflowcontrol.com.
2. Hammond Valve: www.hammondvalve.com.
3. Crane Co.: www.cranevalve.com.
4. Milwaukee Valve Company: www.milwaukeevalve.com.
5. Substitutions: See Section 016000 - Product Requirements.

B. Construction 1-1/2 Inches and Larger: MSS SP-67, 200 psi CWP, cast or ductile iron body, nickel-plated ductile iron disc, resilient replaceable EPDM seat, wafer ends, extended neck, 10 position lever handle.

C. Provide gear operators for valves 8 inches and larger, and chain-wheel operators for valves mounted over 8 feet above floor.

2.13 FLOW CONTROLS

A. Manufacturers:
1. Tyco Flow Control: www.tycoflowcontrol.com.
2. ITT Bell & Gossett: www.bellgossett.com.
3. Griswold Controls: www.griswoldcontrols.com.
4. Taco, Inc: www.taco-hvac.com.

B. Construction: Class 125, Brass or bronze body with union on inlet and outlet, temperature and pressure test plug on inlet and outlet, blowdown/backflush drain.

C. Calibration: Control flow within 5 percent of selected rating, over operating pressure range of 10 times minimum pressure required for control, maximum minimum pressure 3.5 psi.

2.14 SWING CHECK VALVES

A. Manufacturers:
1. Tyco Flow Control: www.tycoflowcontrol.com.
2. Hammond Valve: www.hammondvalve.com.
3. Nibco, Inc: www.nibco.com.
4. Milwaukee Valve Company: www.milwaukeevalve.com.
5. Substitutions: See Section 016000 - Product Requirements.

B. Up to 2 Inches:
1. 1, Class 125, bronze body and cap, bronze swing disc with rubber seat, solder ends.

C. Over 2 Inches:
1. 1, Class 125, iron body, bronze swing disc, renewable disc seal and seat, flanged or grooved ends.

2.15 SPRING LOADED CHECK VALVES

A. Manufacturers:
1. Tyco Flow Control: www.tycoflowcontrol.com.
2. Hammond Valve: www.hammondvalve.com.
3. Crane Co.: www.cranevalve.com.
4. Milwaukee Valve Company: www.milwaukeevalve.com.

B. Class 125, iron body, bronze trim, stainless steel springs, bronze disc, Buna N seals, wafer style ends.

2.16 WATER PRESSURE REDUCING VALVES

A. Manufacturers:
   1. Amtrol Inc: www.amtrol.com.
   2. Cla-Val Co: www.cla-val.com.
   3. Watts Regulator Company: www.wattsregulator.com.

B. Up to 2 Inches:
   1. ASSE 1003, bronze body, stainless steel, and thermoplastic internal parts, fabric reinforced diaphragm, strainer, threaded single union ends.

C. Over 2 Inches:
   1. ASSE 1003, cast iron body with interior lining complying with AWWA C550, bronze fitted, elastomeric diaphragm and seat disc, flanged.

2.17 RELIEF VALVES

2.18 RELIEF VALVES

A. Temperature and Pressure Relief:
   1. Manufacturers:
      a. Cla-Val Co: www.cla-val.com.
      b. Henry Technologies: www.henrytech.com.
      c. Watts Regulator Company: www.wattsregulator.com.
   2. AGA Z21.22 certified, bronze body, teflon seat, stainless steel stem and springs, automatic, direct pressure actuated, temperature relief maximum 210 degrees F, capacity ASME (BPV IV) certified and labelled.

2.19 SLEEVES

A. Galvanized-Steel-Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, zinc coated, with plain ends.

2.20 SLEEVE-SEAL SYSTEMS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

B. Description: Modular sealing-element unit, designed for field assembly, for filling annular space between piping and sleeve.
   1. Sealing Elements: EPDM-rubber interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size of pipe.
   2. Pressure Plates: Carbon steel.
   3. Connecting Bolts and Nuts: Carbon steel, with corrosion-resistant coating, of length required to secure pressure plates to sealing elements.

2.21 GROUT

A. Standard: ASTM C 1107/C 1107M, Grade B, post-hardening and volume-adjusting, dry, hydraulic-cement grout.

B. Characteristics: Nonshrink; recommended for interior and exterior applications.

C. Design Mix: 5000-psi, 28-day compressive strength.

D. Packaging: Premixed and factory packaged.

2.22 ESCUTCHEONS

A. One-Piece, Cast-Brass Type: With polished, chrome-plated finish and setscrew fastener.

B. One-Piece, Deep-Pattern Type: Deep-drawn, box-shaped brass with chrome-plated finish and spring-clip fasteners.

C. One-Piece, Stamped-Steel Type: With chrome-plated finish and spring-clip fasteners.

D. Split-Casting Brass Type: With polished, chrome-plated finish and with concealed hinge and setscrew.

E. Split-Plate, Stamped-Steel Type: With chrome-plated finish, exposed-rivet hinge, and spring-clip fasteners.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that excavations are to required grade, dry, and not over-excavated.

3.2 PREPARATION

A. Ream pipe and tube ends. Remove burrs.

B. Remove scale and dirt, on inside and outside, before assembly.

C. Prepare piping connections to equipment with flanges or unions.

3.3 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Provide non-conducting dielectric connections wherever jointing 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.

G. Provide clearance in hangers and from structure and other equipment for installation of insulation and access to valves and fittings.

H. Provide access where valves and fittings are not exposed.

I. Install vent piping penetrating roofed areas to maintain integrity of roof assembly.

J. Where pipe support members are welded to structural building framing, scrape, brush clean, and apply one coat of zinc rich primer to welding.

K. Provide support for utility meters in accordance with requirements of utility companies.

L. TRENCHING

1. Notify Architect of unexpected subsurface conditions and discontinue affected Work in area until notified to resume work.
2. Slope banks of excavations deeper than 4 feet to angle of repose or less until shored.
3. Do not interfere with 45 degree bearing splay of foundations.
4. Cut trenches wide enough to allow inspection of installed utilities.
5. Hand trim excavations. Remove loose matter.
6. Remove large stones and other hard matter that could damage piping or impede consistent backfilling or compaction.
7. Remove excavated material that is unsuitable for re-use from site.
8. Remove excess excavated material from site.

M. BACKFILLING

1. Fill up to subgrade elevations unless otherwise indicated.
2. Employ a placement method that does not disturb or damage other work.
3. Systematically fill to allow maximum time for natural settlement. Do not fill over porous, wet, frozen or spongy subgrade surfaces.
4. Maintain optimum moisture content of fill materials to attain required compaction density.
5. Sand Fill: Place and compact materials in equal continuous layers not exceeding 6 inches compacted depth.

N. Install bell and spigot pipe with bell end upstream.

O. Install valves with stems upright or horizontal, not inverted.

P. Pipe vents from gas pressure reducing valves to outdoors and terminate in weather proof hood.

Q. Install water piping to ASME B31.9.

R. 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.

S. PVC Pipe: Make solvent-welded joints in accordance with ASTM D2855.

T. Do not use PVC piping in return air plenums.

U. PP Piping: Install fittings and joints using socket-fusion, elecrofusion, or butt-fusion as applicable for the fitting type. All fusion-well joints shall be made in accordance with the pipe and fitting manufacturer's specifications and product standards.

V. The use of PEX piping shall be limited to 1" and smaller unless noted otherwise.

W. SLEEVE INSTALLATION
   1. Install sleeves for piping passing through penetrations in floors, partitions, roofs, and walls.
   2. For sleeves that will have sleeve-seal system installed, select sleeves of size large enough to provide 1-inch annular clear space between piping and concrete slabs and walls.
      a. Sleeves are not required for core-drilled holes.
   3. Install sleeves in concrete floors, concrete roof slabs, and concrete walls as new slabs and walls are constructed.
      a. Permanent sleeves are not required for holes in slabs formed by molded-PE or -PP sleeves.
      b. Cut sleeves to length for mounting flush with both surfaces.
         1) Exception: Extend sleeves installed in floors of mechanical equipment areas or other wet areas 2 inches above finished floor level.
      c. Using grout, seal the space outside of sleeves in slabs and walls without sleeve-seal system.
   4. Install sleeves for pipes passing through interior partitions.
      a. Cut sleeves to length for mounting flush with both surfaces.
      b. Install sleeves that are large enough to provide 1/4-inchannular clear space between sleeve and pipe or pipe insulation.
      c. Seal annular space between sleeve and piping or piping insulation; use joint sealants appropriate for size, depth, and location of joint. Comply with requirements for sealants specified in other sections.
   5. Fire-Barrier Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with firestop materials. Comply with requirements for firestopping specified in other sections.

X. SLEEVE-SEAL-SYSTEM INSTALLATION
   1. Install sleeve-seal systems in sleeves in exterior concrete walls and slabs-on-grade at service piping entries into building.
   2. Select type, size, and number of sealing elements required for piping material and size and for sleeve ID or hole size. Position piping in center of sleeve. Center piping in penetration, assemble sleeve-seal system components, and install in annular space between piping and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make a watertight seal.

Y. ESCUTCHEONS
   1. Install escutcheons for piping penetrations of walls, ceilings, and finished floors.
   2. Install escutcheons with ID to closely fit around pipe, tube, and insulation of insulated piping and with OD that completely covers opening.
      a. Escutcheons Schedule:
         1) Piping with Fitting or Sleeve Protruding from Wall: One-piece, deep-pattern type.
         2) Insulated Piping: One-piece, stamped-steel type or split-plate, stamped-steel type with exposed-rivet hinge.
         3) Bare Piping at Wall and Floor Penetrations in Finished Spaces: One-piece, cast-brass or split-casting brass type with polished, chrome-plated finish.

4) Bare Piping at Ceiling Penetrations in Finished Spaces: One-piece, cast-brass or split-casting brass type with polished, chrome-plated finish.
5) Bare Piping in Unfinished Service Spaces: One-piece, stamped-steel type or split-plate, stamped-steel type with exposed-rivet hinge.
6) Bare Piping in Equipment Rooms: One-piece, stamped-steel type or split-plate, stamped-steel type with exposed-rivet hinge.

Z. Inserts:
1. Provide inserts for placement in concrete formwork.
2. Provide inserts for suspending hangers from reinforced concrete slabs and sides of reinforced concrete beams.
3. Provide hooked rod to concrete reinforcement section for inserts carrying pipe over 4 inches.
4. Where concrete slabs form finished ceiling, locate inserts flush with slab surface.

AA. Pipe Hangers and Supports:
1. Install in accordance with ASME B31.9.
2. Support horizontal piping as scheduled.
3. Install hangers to provide minimum 1/2 inch space between finished covering and adjacent work.
4. Place hangers within 12 inches of each horizontal elbow.
5. Use hangers with 1-1/2 inch minimum vertical adjustment. Design hangers for pipe movement without disengagement of supported pipe.
6. Where several pipes can be installed in parallel and at same elevation, provide multiple or trapeze hangers.
7. Provide copper plated hangers and supports for copper piping.
8. Provide hangers adjacent to motor driven equipment with vibration isolation; refer to Section 220548.
9. Support cast iron drainage piping at every joint.

3.4 APPLICATION

A. Install unions downstream of valves and at equipment or apparatus connections.

B. Install brass male adapters each side of valves in copper piped system. Solder adapters to pipe.

C. Install gate or ball valves for shut-off and to isolate equipment, part of systems, or vertical risers.

D. Provide spring loaded check valves on discharge of water pumps.

E. Provide flow controls in water recirculating systems where indicated.

3.5 TOLERANCES

A. Drainage Piping: Establish invert elevations within 1/2 inch vertically of location indicated and slope to drain at minimum of 1/8 inch per foot slope.

3.6 DISINFECTION OF DOMESTIC WATER PIPING SYSTEM

A. Prior to starting work, verify system is complete, flushed and clean.

B. Ensure Ph of water to be treated is between 7.4 and 7.6 by adding alkali (caustic soda or soda ash) or acid (hydrochloric).

C. Inject disinfectant, free chlorine in liquid, powder, tablet or gas form, throughout system to obtain 50 to 80 mg/L residual.

D. Bleed water from outlets to ensure distribution and test for disinfectant residual at minimum 15 percent of outlets.

E. Maintain disinfectant in system for 24 hours.

F. If final disinfectant residual tests less than 25 mg/L, repeat treatment.

G. Flush disinfectant from system until residual equal to that of incoming water or 1.0 mg/L.

H. Take samples no sooner than 24 hours after flushing, from 10 percent of outlets and from water entry, and analyze in accordance with AWWA C651.

3.7 SCHEDULES

A. Pipe Hanger Spacing:
   1. Metal Piping:
      a. Pipe size: 1/2 inches to 1-1/4 inches:
         1) Maximum hanger spacing: 6.5 ft.
         2) Hanger rod diameter: 3/8 inches.
      b. Pipe size: 1-1/2 inches to 2 inches:
         1) Maximum hanger spacing: 10 ft.
         2) Hanger rod diameter: 3/8 inch.
      c. Pipe size: 2-1/2 inches to 3 inches:
         1) Maximum hanger spacing: 10 ft.
         2) Hanger rod diameter: 1/2 inch.
      d. Pipe size: 4 inches to 6 inches:
         1) Maximum hanger spacing: 10 ft.
         2) Hanger rod diameter: 5/8 inch.
   2. Plastic Piping:
      a. All Sizes:
         1) Maximum hanger spacing: 6 ft.
         2) Hanger rod diameter: 3/8 inch.

B. Pipe Materials:
   1. Domestic Water:
      a. Stubouts to fixtures shall be copper.
      b. Pipe sizes 1/2" to 1": Any material listed for use in Part 2.
      c. Pipe sizes 1-1/4" and larger: Any material listed for use in Part 2, except PEX is not acceptable.
   2. Sanitary Drain and Vent: Any material listed for use in Part 2.
      a. PVC shall not be used in return air plenums.
   3. Natural Gas: Any materials listed for use in Part 2.

END OF SECTION

SECTION 221006

PLUMBING PIPING SPECIALTIES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Cleanouts.

B. Water hammer arrestors.

C. Mixing valves.

D. Interceptors.

E. Thermostatic mixing valves.

1.2 REFERENCE STANDARDS

A. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; 2010.

B. ASSE 1012 - Backflow Preventer with Intermediate Atmospheric Vent; 2009.

C. PDI-WH 201 - Water Hammer Arresters; 2010.

1.3 SUBMITTALS

A. Product Data: Provide component sizes, rough-in requirements, service sizes, and finishes.

B. Certificates: Certify that grease interceptors meet or exceed specified requirements.

PART 2 PRODUCTS

2.1 CLEANOUTS

A. Manufacturers:
   1. Jay R. Smith Manufacturing Company: www.jayrsmith.com/#sle.
   2. Josam Company: www.josam.com/#sle.
   3. Zurn Industries, Inc: www.zurn.com/#sle.
   4. Sioux Chief Manufacturing.

B. Cleanouts at Exterior Surfaced Areas:
   1. Round cast nickel bronze access frame and non-skid cover.

C. Cleanouts at Exterior Unsurfaced Areas:
   1. Line type with lacquered cast iron body and round epoxy coated gasketed cover.

D. Cleanouts at Interior Finished Floor Areas (FFCO):
   1. Lacquered cast iron body with anchor flange, threaded top assembly, and round gasketed scored cover in service areas and round gasketed depressed cover to accept floor finish in finished floor areas.

E. Cleanouts at Interior Finished Wall Areas (FWCO):
   1. Line type with lacquered cast iron body and round epoxy coated gasketed cover, and round stainless steel access cover secured with machine screw.

F. Cleanouts at Interior Unfinished Accessible Areas: Caulked or threaded type.

2.2 BACKFLOW PREVENTERS

A. Manufacturers:
   1. Conbraco Industries: www.conbraco.com/#sle.
   2. Watts Regulator Company: www.wattsregulator.com/#sle.
   3. Zurn Industries, Inc: www.zurn.com.

B. Reduced Pressure Backflow Preventers:
   1. ASSE 1013; bronze body with bronze internal parts and stainless steel springs; two independently operating, spring loaded check valves; diaphragm type differential pressure relief valve located between check valves; third check valve that opens under back pressure in case of diaphragm failure; non-threaded vent outlet; assembled with two gate valves, strainer, and four test cocks.

2.3 DOUBLE CHECK VALVE ASSEMBLIES

A. Manufacturers:
   1. Conbraco Industries: www.conbraco.com/#sle.
   2. Watts Regulator Company: www.wattsregulator.com/#sle.
   3. Zurn Industries, Inc: www.zurn.com/#sle.

B. Double Check Valve Assemblies:
   1. ASSE 1012; Bronze body with corrosion resistant internal parts and stainless steel springs; two independently operating check valves with intermediate atmospheric vent.

2.4 WATER HAMMER ARRESTORS

A. Manufacturers:
   1. Sioux Chief Manufacturing

B. Water Hammer Arrestors:
   1. Stainless steel or Copper construction, piston type sized in accordance with PDI-WH 201, precharged suitable for operation in temperature range 34 to 250 degrees F and maximum 150 psi working pressure.

2.5 MIXING VALVES

A. Thermostatic Mixing Valves:
   1. Accessories:
      a. Check valve on inlets.
      b. Volume control shut-off valve on outlet.
      c. Stem thermometer on outlet.
      d. Strainer stop checks on inlets.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Extend cleanouts to finished floor or wall surface. Lubricate threaded cleanout plugs with mixture of graphite and linseed oil. Ensure clearance at cleanout for rodding of drainage system.

C. Encase exterior cleanouts in concrete flush with grade.

D. Install floor cleanouts at elevation to accommodate finished floor.

E. Install approved portable water protection devices on plumbing lines where contamination of domestic water may occur.

F. Pipe relief from backflow preventer to nearest drain.

G. Install water hammer arrestors on cold water supply piping to flush valve or solenoid operated fixtures.
.

H. Install cleanouts at locations required by the International Plumbing Code (IPC), whether or not specifically indicated on the drawings. Such locations include, but are not limited to the following:
   1. Base of waste or soil stacks.
   2. Junction of building drain and building sewer (utilize 2-way cleanout at this location).

END OF SECTION

SECTION 223000

PLUMBING EQUIPMENT

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Water Heaters:
   1. Residential gas fired.
   2. Residential electric.

B. Pumps.
   1. Circulators.

1.2 SUBMITTALS

A. Product Data:
   1. Provide dimension drawings of water heaters indicating components and connections to other equipment and piping.
   2. Indicate pump type, capacity, power requirements.
   3. Provide certified pump curves showing pump performance characteristics with pump and system operating point plotted. Include NPSH curve when applicable.
   4. Provide electrical characteristics and connection requirements.

B. Shop Drawings:
   1. Indicate dimensions of tanks, tank lining methods, anchors, attachments, lifting points, tappings, and drains.

C. Project Record Documents: Record actual locations of components.

D. Operation and Maintenance Data: Include operation, maintenance, and inspection data, replacement part numbers and availability, and service depot location and telephone number.

E. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.3 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.

1.4 CERTIFICATIONS

A. Water Heaters: NSF approved.

B. Gas Water Heaters: Certified by CSA International to 1 or 2, as applicable.

1.5 WARRANTY

A. Provide five year manufacturer warranty for domestic water heaters.

PART 2 PRODUCTS

2.1 WATER HEATERS

A. Residential Gas Fired:
   1. Type: Automatic, natural gas-fired, vertical storage.
   2. Performance: On drawings.
   3. Controls: Automatic water thermostat and built-in gas pressure regulator; temperature range adjustable from 120 to 170 degrees F, cast iron or sheet metal burner, safety pilot and thermocouple.
   4. Accessories:
      a. Water Connections: Brass.
      b. Dip Tube: Brass.
      c. Drain valve.
      d. Anode: Magnesium.

B. Residential Electric:
   1. Type: Automatic, electric, vertical storage.
   2. Performance: On drawings
   3. Electrical Characteristics: On drawings
   4. Tank: Glass lined welded steel, thermally insulated with one inch thick glass fiber; encased in corrosion-resistant steel jacket; baked-on enamel finish.
   5. Controls: Automatic water thermostat with externally adjustable temperature range from 120 to 170 degrees F, flanged or screw-in nichrome elements, enclosed controls and electrical junction box and operating light. Wire double element units so elements do not operate simultaneously.
   6. Accessories:
      a. Water Connections: Brass.
      b. Dip Tube: Brass.
      c. Drain valve.
      d. Anode: Magnesium.
      e. Temperature and Pressure Relief Valve: ASME labeled.

2.2 DIAPHRAGM-TYPE COMPRESSION TANKS

A. Manufacturers:
   1. Amtrol Inc: www.amtrol.com/#sle.

B. Construction: Welded steel, tested and stamped in accordance with ASME BPVC-VIII-1; supplied with National Board Form U-1, rated for working pressure of 125 psig, with flexible EPDM diaphragm sealed into tank, and steel legs or saddles.

C. Accessories: Pressure gage and air-charging fitting, tank drain; precharge to 12 psig.

2.3 IN-LINE CIRCULATOR PUMPS

A. Casing: Bronze, rated for 125 psig working pressure, with stainless steel rotor assembly.

B. Impeller: Bronze.

C. Shaft: Alloy steel with integral thrust collar and two oil lubricated bronze sleeve bearings.

D. Seal: Carbon rotating against a stationary ceramic seat.

E. Drive: Flexible coupling.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install plumbing equipment in accordance with manufacturer's instructions, as required by code, and complying with conditions of certification, if any.

B. Coordinate with plumbing piping and related fuel piping work to achieve operating system.

C. Pumps:
   1. Ensure pumps operate at specified system fluid temperatures without vapor binding and cavitation, are non-overloading in parallel or individual operation, and operate within 25 percent of midpoint of published maximum efficiency curve.

END OF SECTION

SECTION 224000

PLUMBING FIXTURES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Fixtures

1.2 RELATED REQUIREMENTS

A. Section 221005 - Plumbing Piping.

B. Section 221006 - Plumbing Piping Specialties.

1.3 REFERENCE STANDARDS

A. ASHRAE Std 18 - Methods of Testing for Rating Drinking-Water Coolers with Self-Contained Mechanical Refrigeration; 2008.

B. ASME A112.6.1M - Supports for Off-the-Floor Plumbing Fixtures for Public Use; 1997 (Reaffirmed 2002).

C. ASME A112.18.1 - Plumbing Supply Fittings; 2012.

D. ASME A112.19.2 - Ceramic Plumbing Fixtures; 2013.

E. ASME A112.19.3 - Stainless Steel Plumbing Fixtures (Designed for Residential Use); 2008 (R2013).

F. ASME A112.19.5 - Flush Valves and Spuds for Water Closets, Urinals, and Tanks; 2011.

1.4 SUBMITTALS

A. See Division 1 Section - Administrative Requirements, for submittal procedures.

B. Product Data: Provide catalog illustrations of fixtures, sizes, rough-in dimensions, utility sizes, trim, and finishes.

C. Manufacturer's Instructions: Indicate installation methods and procedures.

D. Maintenance Data: Include fixture trim exploded view and replacement parts lists.

E. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

F. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.

1. Extra Faucet Washers: Two sets of each type and size.
2. Flush Valve Service Kits: Two for each type and size.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Accept fixtures on site in factory packaging. Inspect for damage.

B. Protect installed fixtures from damage by securing areas and by leaving factory packaging in place to protect fixtures and prevent use.

1.6 WARRANTY

A. Provide five year manufacturer warranty for electric water cooler.

PART 2 PRODUCTS

2.1 FIXTURES

A. Scheduled on drawings

B. Substitutions permitted, provided products are functionally and materially equivalent to those scheduled. Substitutions must be approvded by Engineer.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that walls and floor finishes are prepared and ready for installation of fixtures.

B. Verify that electric power is available and of the correct characteristics.

C. Confirm that millwork is constructed with adequate provision for the installation of counter top lavatories and sinks.

3.2 PREPARATION

A. Rough-in fixture piping connections in accordance with minimum sizes indicated in fixture rough-in schedule for particular fixtures.

3.3 INSTALLATION

A. Install each fixture with trap, easily removable for servicing and cleaning.

B. Provide chrome plated rigid or flexible supplies to fixtures with loose key stops, reducers, and escutcheons.

C. Install components level and plumb.

D. Install and secure fixtures in place with wall supports and bolts.

E. Seal fixtures to wall and floor surfaces with sealant, color to match fixture.

3.4 INTERFACE WITH WORK OF OTHER SECTIONS

A. Review millwork shop drawings. Confirm location and size of fixtures and openings before rough-in and installation.

3.5 ADJUSTING

A. Adjust stops or valves for intended water flow rate to fixtures without splashing, noise, or overflow.

3.6 CLEANING

A. Clean plumbing fixtures and equipment.

3.7 PROTECTION

A. Protect installed products from damage due to subsequent construction operations.

B. Do not permit use of fixtures by construction personnel.

C. Repair or replace damaged products before Date of Substantial Completion.

3.8 SCHEDULES

A. On Drawings

END OF SECTION