SECTION 22 05 17 – SLEEVES AND SLEEVE SEALS FOR PLUMBING PIPING
CONTRACT KENS-EAST-2

PART 1 GENERAL

1.01 SUMMARY

A. The Contractor shall provide all labor, materials, equipment, incidentals, and appurtenances as shown, specified and required, to furnish, install and test all sleeves and sleeve seals for plumbing piping, complete and operational.

B. The following index of this Section is presented for convenience:

1.02 PAYMENT

A. No separate payment shall be made for performing any Work required under this Section. All costs for Work required by this Section shall be included in the applicable lump sum, unit price(s) or allowance(s) as set forth in Section 01 27 00 – Measurement and Payment.

1.03 RELATED SECTIONS

A. Section 01 61 50 – General Product Requirements

1.04 REFERENCES

A. Reference Standards:

1. ASTM A53/A53M Steel Pipe Sleeves
2. ASTM D1785 PVC Pipe Sleeves
3. New York State Building Code.

1.05 DESCRIPTION

A. This Section includes requirements for providing sleeves and sleeve seals in accordance with applicable standards and regulations. In addition:

1. Sleeves and sleeve seals shall be furnished complete with all accessories, attachments, fastenings, and other appurtenances as specified and/or as may be required for a satisfactory installation.
2. Sleeves and sleeve seals shall conform to the requirements of the New York State Building Code.

1.06 QUALITY ASSURANCE

A. The Work of this Section shall be performed by a plumber licensed by the local authority having jurisdiction.

1.07 SUBMITTALS

A. Submittals shall comply with the requirements of the Contract Documents. In addition, submittals shall include, but not be limited to:

1. Product data:

a. Provide catalogue cuts of all sleeves and sleeve seals, showing: sizes, rough-in dimensions.

1.08 DELIVERY, STORAGE, AND HANDLING

A. The Contractor shall deliver materials provided under this Section in accordance with the requirements of the Contract Documents. In addition:

1. Equipment shall be delivered to the Site to ensure uninterrupted progress of the Work.

B. The Contractor shall store and handle materials provided under this Section in accordance with the requirements of the Contract Documents. In addition:

1. Sleeves and sleeve seals shall be handled in such a manner that they may be transported and unloaded without being over-stressed, deformed or otherwise damaged.
2. Sleeves and sleeve seals shall be protected from corrosion and deterioration, and shall be stored in a dry area.

3. Sleeves and sleeve seals shall be properly protected from damage during construction, and shall be cleaned in accordance with manufacturer's instructions prior to installation.

C. To avoid unnecessary handling, sleeves and sleeve seals shall be unloaded as close to the place where they are to be installed as is practical. Interiors shall be kept free from dirt and foreign matter.

1.09 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES

A. Not Used

1.10 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS

A. Not Used

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Wall sleeve annular seals shall be as manufactured by:

1. Link Seal®, as manufactured by Thunderline Corp., Stafford, TX.
2. MetraSeal, as manufactured by The Metraflex Corp., Chicago, IL.
3. The Pipe Seal, as manufactured by Flexicraft Industries, Chicago, IL.
4. Or approved equal.

2.02 MATERIALS / EQUIPMENT

A. Sleeves:

1. Materials of construction:

a. Cast-Iron Pipe Sleeves: Cast-Iron Pipe Sleeves: Cast or fabricated of cast or ductile iron and equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop.

b. Galvanized-Steel Sheet Sleeves: 0.0239-inch minimum thickness; round tube closed with welded longitudinal joint.

c. PVC Pipe Sleeves: ASTM D1785, Schedule 40.

d. Molded-PVC Sleeves: With nailing flange for attaching to wooden forms.

e. Molded-PE or -PP Sleeves: Removable, tapered-cup shaped, and smooth outer surface with nailing flange for attaching to wooden forms.

B. Sleeve-Seal Systems:

1. General:

a. Modular sealing-element unit, designed for field assembly, for filling annular space between piping and sleeve.

b. Designed to form a hydrostatic seal of 20 psig minimum.

2. Materials of Construction:

a. Sealing Elements: EPDM-rubber interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size.

b. Pressure Plates: Carbon steel.

c. Connecting Bolts and Nuts: Carbon steel, with corrosion-resistant coating, ASTM B633 of length required to secure pressure plates to sealing elements.

C. Sleeve-Seal Fittings:

1. Description: Manufactured plastic, sleeve-type, waterstop assembly made for imbedding in concrete slab or wall.

2. Plastic or rubber waterstop collar with center opening to match piping OD.

D. Grout:

1. General:

a. Nonshrink, for interior and exterior sealing openings in non-fire-rated walls or floors.

2. Materials of Construction:

a. Standard: ASTM C1107/C1107M, Grade B, post-hardening and volume-adjusting, dry, hydraulic-cement grout.

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

c. Packaging: Premixed and factory packaged.

2.03 FABRICATION / ASSEMBLING / FINISHES

A. Not Used.

2.04 SOURCE QUALITY CONTROL / SHOP TESTS

A. Not Used

PART 3 EXECUTION

3.01 EXAMINATION / PREPARATION

A. Not Used

3.02 INSTALLATION

A. 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 walls as new walls are constructed.

   a. Cut sleeves to length for mounting flush with both surfaces.

   b. Using grout seal the space outside of sleeves in 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-inch annular 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.

5. Fire-Resistance-Rated Penetrations, Horizontal Assembly Penetrations, and Smoke Barrier Penetrations: Maintain indicated fire or smoke rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with fire- and smoke-stop materials. Comply with requirements for firestopping and fill materials specified in Section 079000 "Joint Protection."

B. Sleeve-Seal-System

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.

C. Sleeve-Seal-Fitting Installation

1. Install sleeve-seal fittings in new walls and slabs as they are constructed.

2. Assemble fitting components of length to be flush with both surfaces of concrete slabs and walls. Position waterstop flange to be centered in concrete slab or wall.

3. Secure nailing flanges to concrete forms.

4. Use grout to seal the space around outside of sleeve-seal fittings.

D. Sleeve and Sleeve-Seal Schedule

1. Exterior Concrete Walls above Grade:

a. Piping Smaller Than NPS 6 : Steel pipe sleeves.

b. Piping NPS 6 and Larger: Steel pipe sleeves.

2. Interior Partitions:

a. Piping Smaller Than NPS 6: Steel pipe sleeves.

b. Piping NPS 6 and Larger: Galvanized-steel sheet sleeves.

3.03 FIELD TESTING / QUALITY CONTROL

A. Perform the following tests and inspections:

1. Leak Test: After allowing for a full cure, test sleeves and sleeve seals for leaks. Repair leaks and retest until no leaks exist.

3.04 STARTUP / DEMONSTRATION

A. Not Used

3.05 ADJUSTING / PROTECTION / CLEANUP

1. All parts and components shall be adjusted as required to provide correct operation.

END OF SECTION

SECTION 22 05 18 – ESCUTCHEONS FOR PLUMBING PIPING
CONTRACT KENS-EAST-2

PART 1 GENERAL

1.01 SUMMARY

A. The Contractor shall provide all labor, materials, equipment, incidentals, and appurtenances as shown, specified and required, to furnish, install and test all escutcheons for plumbing piping, complete and operational.

B. The following index of this Section is presented for convenience:

1.02 PAYMENT

A. No separate payment shall be made for performing any Work required under this Section. All costs for Work required by this Section shall be included in the applicable lump sum, unit price(s) or allowance(s) as set forth in Section 01 27 00 – Measurement and Payment.

1.03 RELATED SECTIONS

A. Section 01 61 50 – General Product Requirements

1.04 REFERENCES

A. Abbreviations and Acronyms:

1. Not Used.

B. Reference Standards:

1. New York State Building Code.

1.05 DESCRIPTION

A. This Section includes requirements for escutcheons in accordance with applicable standards and regulations. In addition:

1. Escutcheons shall be furnished complete with all accessories, attachments, fastenings, and other appurtenances as specified and/or as may be required for a satisfactory installation.

2. Escutcheons shall conform to the requirements of the New York State Building Code.

1.06 QUALITY ASSURANCE

A. The Work in this Section shall be performed by a plumber licensed by the local authority having jurisdiction.

1.07 SUBMITTALS

A. Submittals shall comply with the requirements of the Contract Documents. In addition, submittals shall include, but not be limited to:

1. Product data:

a. Provide catalogue cuts of all escutcheons, showing: sizes, rough-in dimensions.

1.08 DELIVERY, STORAGE, AND HANDLING

A. The Contractor shall deliver materials provided under this Section in accordance with the requirements of the Contract Documents. In addition:

1. Equipment shall be delivered to the Site to ensure uninterrupted progress of the Work.

B. The Contractor shall store and handle materials provided under this Section in accordance with the requirements of the Contract Documents. In addition:

1. Escutcheons shall be handled in such a manner that they may be transported and unloaded without being over-stressed, deformed or otherwise damaged.

2. Escutcheons shall be protected from corrosion and deterioration, and shall be stored in a dry area.

3. Escutcheons shall be properly protected from damage during construction, and shall be cleaned in accordance with manufacturer's instructions prior to installation.

C. To avoid unnecessary handling, escutcheons shall be unloaded as close to the place where they are to be installed as is practical. Interiors shall be kept free from dirt and foreign matter.

1.09 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES

A. Not Used

1.10 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS

A. Not Used

PART 2 PRODUCTS

2.01 MANUFACTURERS

1. Not Used

2.02 MATERIALS / EQUIPMENT

A. Escutcheons:

1. Materials of construction:

a. One-Piece, Steel Type: With polished, chrome-plated finish and setscrew fastener.

b. One-Piece, Stainless-Steel Type: With polished stainless-steel finish.

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

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

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

f. Split-Plate, Stamped-Steel Type: With polished, chrome-plated finish; concealed hinge; and spring-clip fasteners.

2.03 FABRICATION / ASSEMBLING / FINISHES

A. Not Used.

2.04 SOURCE QUALITY CONTROL / SHOP TESTS

A. Not Used

PART 3 EXECUTION

3.01 EXAMINATION / PREPARATION

A. Not Used

3.02 INSTALLATION

A. 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 piping and with OD that completely covers opening.

a. Piping with Fitting or Sleeve Protruding from Wall: One-piece, deep pattern.

b. Chrome-Plated Piping: One-piece cast brass with polished, chrome-plated finish.

c. Insulated Piping: One-piece steel with polished, chrome-plated finish.

d. Insulated Piping: One-piece stainless steel with polished stainless-steel finish.

e. Insulated Piping: One-piece cast brass with polished, chrome-plated finish.

f. Bare Piping at Wall and Floor Penetrations in Finished Spaces: One-piece steel with polished, chrome-plated finish.

g. Bare Piping at Wall and Floor Penetrations in Finished Spaces: One-piece stainless steel with polished stainless-steel finish.

h. Bare Piping at Wall and Floor Penetrations in Finished Spaces: One-piece cast brass with polished, chrome-plated finish.

i. Bare Piping at Wall and Floor Penetrations in Finished Spaces: One-piece stamped steel or split-plate, stamped steel with concealed hinge with polished, chrome-plated finish.

j. Bare Piping at Ceiling Penetrations in Finished Spaces: One-piece steel with polished, chrome-plated finish.

k. Bare Piping at Ceiling Penetrations in Finished Spaces: One-piece stainless steel with polished stainless-steel finish.

l. Bare Piping at Ceiling Penetrations in Finished Spaces: One-piece cast brass with polished, chrome-plated finish.

m. Bare Piping at Ceiling Penetrations in Finished Spaces: One-piece stamped steel or split-plate, stamped steel with concealed hinge with polished, chrome-plated finish.

n. Bare Piping in Unfinished Service Spaces: One-piece steel with polished, chrome-plated finish.

o. Bare Piping in Unfinished Service Spaces: One-piece cast brass with polished, chrome-plated finish.

p. Bare Piping in Unfinished Service Spaces: One-piece stamped steel or split-plate, stamped steel with concealed hinge with polished, chrome-plated finish.

q. Bare Piping in Equipment Rooms: One-piece steel with polished, chrome-plated finish.

r. Bare Piping in Equipment Rooms: One-piece cast brass with polished, chrome-plated finish.

s. Bare Piping in Equipment Rooms: One-piece stamped steel or split-plate, stamped steel with concealed hinge with polished, chrome-plated finish.

3.03 FIELD TESTING / QUALITY CONTROL

A. Not Used.

3.04 STARTUP / DEMONSTRATION

A. Not Used

3.05 ADJUSTING / PROTECTION / CLEANUP

1. All parts and components shall be adjusted as required to provide correct operation.

END OF SECTION

NO TEXT ON THIS PAGE

SECTION 22 05 19 – METERS AND GAGES FOR PLUMBING PIPING
CONTRACT KENS-EAST-2

PART 1 GENERAL

1.01 SUMMARY

a. The Contractor shall provide all labor, materials, equipment, incidentals, and appurtenances as shown, specified and required, to furnish, install and test all meters and gages for plumbing piping, complete and operational.

b. The following index of this Section is presented for convenience:

1.02 PAYMENT

a. No separate payment shall be made for performing any Work required under this Section. All costs for Work required by this Section shall be included in the applicable lump sum, unit price(s) or allowance(s) as set forth in Section 01 27 00 – Measurement and Payment.

1.03 RELATED SECTIONS

a. Section 01 61 50 – General Product Requirements

b. Section 22 11 13 "Facility Water Distribution Piping" for domestic water meters and combined domestic and fire-protection water-service meters outside the building.

c. Section 22 11 19 "Domestic Water Piping Specialties" for water meters.

1.04 REFERENCES

a. Reference Standards:

1.	ASME B40.200	Threads for threaded end valves.
2.	ASME B16.1	Flanges on iron valves.
3.	ASME B16.5	Flanges on steel valves.
4.	ASME B16.10 and ASME B16.34	Ferrous valve dimensions and design criteria.
5.	ASME B16.18	Solder-joint connections.
6.	ASME B31.9	Building services piping valves.
7.	NSF 61 and NSF 372	Valve materials for potable-water service.

1.05 DESCRIPTION

a. This Section includes requirements for providing ball valves in accordance with applicable standards and regulations. In addition:

1. Meters and gages shall be furnished complete with all accessories, attachments, fastenings, and other appurtenances as specified and/or as may be required for a satisfactory installation.

2. Meters and gages shall conform to the requirements of the New York State Building Code.

1.06 QUALITY ASSURANCE

a. The Work of this Section shall be performed by a plumber licensed by the local authority having jurisdiction.

1.07 SUBMITTALS

a. Submittals shall comply with the requirements of the Contract Documents. In addition, submittals shall include, but not be limited to:

1. Product data:

a. Provide catalogue cuts of all meters and gages, showing: sizes, rough-in dimensions.

b. Informational Submittals

1. Product Certificates: For each type of meter and gage.

c. CLOSEOUT SUBMITTALS

1. Operation and Maintenance Data: For meters and gages to include in operation and maintenance manuals.

1.08 DELIVERY, STORAGE, AND HANDLING

a. Nots used.

1.09 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES

a. Not Used

1.10 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS

a. Not Used

PART 2 PRODUCTS

2.01 MANUFACTURERS

a. Direct-Mounted, Metal-Case, Dial Type Pressure Gages shall be as manufactured by:

1. AMETEK, Inc.; U.S. Gauge
2. Ashcroft Inc.
3. Marsh Bellofram
4. Trerice, H.O. Co.
5. Weiss Instruments, Inc.
6. Or approved equal.

b. Test Plugs shall be manufactured by:

1. Flow Design, Inc.
2. Terice. H.O. Co.
3. Weiss Instruments, Inc.
4. Or approved equal.

Mueller Industries, Inc., Memphis, TN

2.02 MATERIALS / EQUIPMENT

a. PRESSURE GAGES

1. Direct-Mounted, Metal-Case, Dial-Type Pressure Gages:

a. Standard: ASME B40.100.

b. Case: Liquid-filled type(s); cast aluminum or drawn steel; 6-inch nominal diameter.

c. Pressure-Element Assembly: Bourdon tube unless otherwise indicated.

d. Pressure Connection: Brass, with NPS 1/4 or NPS 1/2, ASME B1.20.1 pipe threads and bottom-outlet type unless back-outlet type is indicated.

e. Movement: Mechanical, with link to pressure element and connection to pointer.

f. Dial: Nonreflective aluminum with permanently etched scale markings graduated in psi and kPa.

g. Pointer: Dark-colored metal.

h. Window: Glass.

i. Ring: Stainless steel.

j. Accuracy: Grade A, plus or minus 1 percent of middle half of scale range.

b. GAGE ATTACHMENTS

1. Snubbers: ASME B40.100, brass; with NPS 1/4 or NPS 1/2, ASME B1.20.1 pipe threads and piston-type surge-dampening device. Include extension for use on insulated piping.

2. Valves: Brass or stainless-steel needle, with NPS 1/4 or NPS 1/2, ASME B1.20.1 pipe threads

c. TEST PLUGS

1. Description: Test-station fitting made for insertion into piping tee fitting.

2. Body: Brass or stainless steel with core inserts and gasketed and threaded cap. Include extended stem on units to be installed in insulated piping.

3. Thread Size: NPS 1/4 or NPS 1/2, ASME B1.20.1 pipe thread.

4. Minimum Pressure and Temperature Rating: 500 psig at 200 deg F

5. Core Inserts: Chlorosulfonated polyethylene synthetic and EPDM self-sealing rubber

2.03 FABRICATION / ASSEMBLING / FINISHES

a. Not Used.

2.04 SOURCE QUALITY CONTROL / SHOP TESTS

a. Not Used

PART 3 EXECUTION

3.01 EXAMINATION / PREPARATION

a. Not Used.

3.02 INSTALLATION

a. Install direct-mounted pressure gages in piping tees with pressure gage located on pipe at the most readable position.

b. Install valve and snubber in piping for each pressure gage for fluids.

c. Install pressure gages in the following location:

1. Building water service entrance into building.

d. CONNECTIONS

1. Install meters and gages adjacent to machines and equipment to allow service and maintenance of meters, gages, machines, and equipment.

e. PRESSURE-GAGE SCHEDULE

1. Pressure gages at discharge of each water service into building shall be one of the following:

2. Liquid-filled, direct-mounted, metal case.

3. Sealed, direct-mounted, plastic case.

f. PRESSURE-GAGE SCALE-RANGE SCHEDULE

1. Scale Range for Domestic Water Service Piping: 0 to 100 psi and 0 to 600Kpa.

3.03 FIELD TESTING / QUALITY CONTROL

a. Not Used.

3.04 STARTUP / DEMONSTRATION

a. Not Used

3.05 ADJUSTING / PROTECTION / CLEANUP

a. Adjust faces of meters and gages to proper angle for best visibility.

END OF SECTION

NO TEXT ON THIS PAGE

SECTION 22 05 23.12 – BALL VALVES FOR PLUMBING PIPING
CONTRACT KENS-EAST-2

PART 1 GENERAL

1.01 SUMMARY

A. The Contractor shall provide all labor, materials, equipment, incidentals, and appurtenances as shown, specified and required, to furnish, install and test all ball valves for plumbing piping, complete and operational.

B. The following index of this Section is presented for convenience:

1.02 PAYMENT

A. No separate payment shall be made for performing any Work required under this Section. All costs for Work required by this Section shall be included in the applicable lump sum, unit price(s) or allowance(s) as set forth in Section 01 27 00 – Measurement and Payment.

1.03 RELATED SECTIONS

A. Section 01 61 50 – General Product Requirements

1.04 REFERENCES

A. Abbreviations and Acronyms:

1.	CWP	Cold working pressure:
2.	CABO	Council of American Building Officials
3.	GPF	Gallons per Flush
4.	USCS	U.S. Department of Commerce Commercial Standard

B. Reference Standards:

1.	ASME B1.20.1	Threads for threaded end valves.
2.	ASME B16.1	Flanges on iron valves.
3.	ASME B16.5	Flanges on steel valves.
4.	ASME B16.10 and ASME B16.34	Ferrous valve dimensions and design criteria.
5.	ASME B16.18	Solder-joint connections.
6.	ASME B31.9	Building services piping valves.
7.	NSF 61 and NSF 372	Valve materials for potable-water service.

1.05 DESCRIPTION

A. This Section includes requirements for providing ball valves in accordance with applicable standards and regulations. In addition:

1. Ball valves shall be furnished complete with all accessories, attachments, fastenings, and other appurtenances as specified and/or as may be required for a satisfactory installation.

2. Ball valves shall conform to the requirements of the New York State Building Code.

1.06 QUALITY ASSURANCE

A. The Work of this Section shall be performed by a plumber licensed by the local authority having jurisdiction.

1.07 SUBMITTALS

A. Submittals shall comply with the requirements of the Contract Documents. In addition, submittals shall include, but not be limited to:

1. Product data:

a. Provide catalogue cuts of all ball valves, showing: sizes, rough-in dimensions.

1) Certification that products comply with NSF 61 and NSF 372

1.08 DELIVERY, STORAGE, AND HANDLING

A. Prepare valves for shipping as follows:

1. Protect internal parts against rust and corrosion.

2. Protect threads, flange faces, and soldered ends.

3. Set ball valves open to minimize exposure of functional surfaces.

B. Use the following precautions during storage:

1. Maintain valve end protection.

2. Store valves indoors and maintain at higher-than-ambient-dew-point temperature. If outdoor storage is necessary, store valves off the ground in watertight enclosures.

C. Use sling to handle large valves; rig sling to avoid damage to exposed parts. Do not use operating handles or stems as lifting or rigging points.

1.09 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES

A. Not Used

1.10 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS

A. Not Used

PART 2 PRODUCTS

2.01 MANUFACTURERS

1. Not Used

2.02 MATERIALS / EQUIPMENT

A. GENERAL REQUIREMENTS FOR VALVES

1. Source Limitations for Valves: Obtain each type of valve from single source from single manufacturer.

2. ASME Compliance:

a. ASME B1.20.1 for threads for threaded end valves.

b. ASME B16.1 for flanges on iron valves.

c. ASME B16.5 for flanges on steel valves.

d. ASME B16.10 and ASME B16.34 for ferrous valve dimensions and design criteria.

e. ASME B16.18 for solder-joint connections.

f. ASME B31.9 for building services piping valves.

g. NSF Compliance: NSF 61 and NSF 372 for valve materials for potable-water service.

3. Bronze valves shall be made with dezincification-resistant materials. Bronze valves made with copper alloy (brass) containing more than 15 percent zinc are not permitted.

4. Valve Pressure-Temperature Ratings: Not less than indicated and as required for system pressures and temperatures.

5. Valve Sizes: Same as upstream piping unless otherwise indicated.

6. Valve Actuator Types:

a. Gear Actuator: For quarter-turn valves NPS 4 and larger.

b. Handlever: For quarter-turn valves smaller than NPS 4.

7. Valves in Insulated Piping:

a. Include 2-inch stem extensions.

b. Extended operating handles of nonthermal-conductive material and protective sleeves that allow operation of valves without breaking vapor seals or disturbing insulation.

c. Memory stops that are fully adjustable after insulation is applied.

B. BRASS BALL VALVES

1. Brass Ball Valves, One-Piece:

a. Description:

1) Standard: MSS SP-110.

2) CWP Rating: 400 psig.

3) Body Design: One piece.

4) Body Material: Forged brass or bronze.

5) Ends: Threaded and soldered.

6) Seats: PTFE.

7) Stem: Brass or stainless steel.

8) Ball: Chrome-plated brass or stainless steel.

9) Port: Reduced.

2. Brass Ball Valves, Two-Piece with Full Port and Brass Trim, Threaded or Soldered Ends:

a. Description:

1) Standard: MSS SP-110 or MSS SP-145.

2) CWP Rating: 600 psig.
3) Body Design: Two piece.
4) Body Material: Forged brass.
5) Ends: Threaded and soldered.
6) Seats: PTFE.
7) Stem: Brass.
8) Ball: Chrome-plated brass.
9) Port: Full.

3. Brass Ball Valves, Two-Piece with Full Port and Brass Trim, Press Ends:
   a. Description:
      1) Standard: MSS SP-110 or MSS SP-145.
      2) CWP Rating: Minimum 200 psig.
      3) Body Design: Two piece.
      4) Body Material: Forged brass.
      5) Ends: Press.
      6) Press Ends Connections Rating: Minimum 200 psig.
      7) Seats: PTFE or RPTFE.
      8) Stem: Brass.
      9) Ball: Chrome-plated brass.
      10) Port: Full.
      11) O-Ring Seal: Buna-N or EPDM.
4. Brass Ball Valves, Two-Piece with Full Port and Stainless-Steel Trim, Threaded or Soldered Ends:
   a. Description:
      1) Standard: MSS SP-110 or MSS SP-145.
      2) CWP Rating: 600 psig.
      3) Body Design: Two piece.
      4) Body Material: Forged brass.
      5) Ends: Threaded and soldered.
      6) Seats: PTFE.
      7) Stem: Stainless steel.
      8) Ball: Stainless steel, vented.

9) Port: Full.

5. Brass Ball Valves, Two-Piece with Full Port and Stainless-Steel Trim, Press Ends:
   a. Description:
      1) Standard: MSS SP-110 or MSS SP-145.
      2) CWP Rating: Minimum 200 psig.
      3) Body Design: Two piece.
      4) Body Material: Forged brass.
      5) Ends: Press.
      6) Press Ends Connections Rating: Minimum 200 psig.
      7) Seats: PTFE or RPTFE.
      8) Stem: Stainless steel.
      9) Ball: Stainless steel, vented.
      10) Port: Full.
      11) O-Ring Seal: Buna-N or EPDM.
6. Brass Ball Valves, Two-Piece with Regular Port and Brass Trim:
   a. Description:
      1) Standard: MSS SP-110.
      2) CWP Rating: 600 psig.
      3) Body Design: Two piece.
      4) Body Material: Forged brass.
      5) Ends: Threaded and soldered.
      6) Seats: PTFE.
      7) Stem: Brass.
      8) Ball: Chrome-plated brass.
      9) Port: Regular.
7. Brass Ball Valves, Two-Piece with Regular Port and Stainless-Steel Trim:
   a. Description:
      1) Standard: MSS SP-110.
      2) CWP Rating: 600 psig.
      3) Body Design: Two piece.
      4) Body Material: Brass or bronze.

5) Ends: Threaded and soldered.
6) Seats: PTFE.
7) Stem: Stainless steel.
8) Ball: Stainless steel, vented.
9) Port: Regular.

8. Brass Ball Valves, Three-Piece with Full Port and Brass Trim:
   a. Description:
      1) Standard: MSS SP-110.
      2) CWP Rating: 600 psig.
      3) Body Design: Three piece.
      4) Body Material: Forged brass.
      5) Ends: Threaded and soldered.
      6) Seats: PTFE.
      7) Stem: Brass.
      8) Ball: Chrome-plated brass.
      9) Port: Full.
9. Brass Ball Valves, Three-Piece with Full Port and Stainless-Steel Trim:
   a. Description:
      1) Standard: MSS SP-110.
      2) CWP Rating: 600 psig.
      3) Body Design: Three piece.
      4) Body Material: Forged brass.
      5) Ends: Threaded and soldered.
      6) Seats: PTFE.
      7) Stem: Stainless steel.
      8) Ball: Stainless steel, vented.
      9) Port: Full.

C. BRONZE BALL VALVES
1. Bronze Ball Valves, One-Piece with Bronze Trim:
   a. Description:
      1) Standard: MSS SP-110.

2) CWP Rating: 400 psig.
3) Body Design: One piece.
4) Body Material: Bronze.
5) Ends: Threaded.
6) Seats: PTFE.
7) Stem: Bronze.
8) Ball: Chrome-plated brass.
9) Port: Reduced.

2. Bronze Ball Valves, One-Piece with Stainless-Steel Trim:
   a. Description:
      1) Standard: MSS SP-110.
      2) CWP Rating: 600 psig.
      3) Body Design: One piece.
      4) Body Material: Bronze.
      5) Ends: Threaded.
      6) Seats: PTFE.
      7) Stem: Stainless steel.
      8) Ball: Stainless steel, vented.
      9) Port: Reduced.
3. Bronze Ball Valves, Two-Piece with Full Port, and Bronze or Brass Trim, Threaded or Soldered Ends:
   a. Description:
      1) Standard: MSS SP-110 or MSS-145.
      2) CWP Rating: 600 psig.
      3) Body Design: Two piece.
      4) Body Material: Bronze.
      5) Ends: Threaded and soldered.
      6) Seats: PTFE.
      7) Stem: Bronze or brass.
      8) Ball: Chrome-plated brass.
      9) Port: Full.

4. Bronze Ball Valves, Two-Piece with Full Port, and Bronze or Brass Trim, Press Ends:
    a. Description:
        1) Standard: MSS SP-110 or MSS-145.
        2) CWP Rating: Minimum 200 psig.
        3) Body Design: Two piece.
        4) Body Material: Bronze.
        5) Ends: Press.
        6) Press Ends Connections Rating: Minimum 200 psig.
        7) Seats: PTFE or RTPFE.
        8) Stem: Bronze or brass.
        9) Ball: Chrome-plated brass.
        10) Port: Full.
        11) O-Ring Seal: EPDM or Buna-N.
5. Bronze Ball Valves, Two-Piece with Full Port and Stainless-Steel Trim:
    a. Description:
        1) Standard: MSS SP-110 or MSS-145.
        2) CWP Rating: 600 psig.
        3) Body Design: Two piece.
        4) Body Material: Bronze.
        5) Ends: Threaded or soldered.
        6) Seats: PTFE.
        7) Stem: Stainless steel.
        8) Ball: Stainless steel, vented.
        9) Port: Full.
6. Bronze Ball Valves, Two-Piece with Regular Port and Bronze or Brass Trim:
    a. Description:
        1) Standard: MSS SP-110.
        2) CWP Rating: 600 psig.
        3) Body Design: Two piece.
        4) Body Material: Bronze.

5) Ends: Threaded.
6) Seats: PTFE.
7) Stem: Bronze or brass.
8) Ball: Chrome-plated brass.
9) Port: Regular.

7. Bronze Ball Valves, Two-Piece with Regular Port and Stainless-Steel Trim:
   a. Description:
      1) Standard: MSS SP-110.
      2) CWP Rating: 600 psig.
      3) Body Design: Two piece.
      4) Body Material: Bronze.
      5) Ends: Threaded.
      6) Seats: PTFE.
      7) Stem: Stainless steel.
      8) Ball: Stainless steel, vented.
      9) Port: Regular.
8. Bronze Ball Valves, Three-Piece with Full Port and Bronze or Brass Trim:
   a. Description:
      1) Standard: MSS SP-110.
      2) CWP Rating: 600 psig.
      3) Body Design: Three piece.
      4) Body Material: Bronze.
      5) Ends: Threaded.
      6) Seats: PTFE.
      7) Stem: Bronze or brass.
      8) Ball: Chrome-plated brass.
      9) Port: Full.
9. Bronze Ball Valves, Three-Piece with Full Port and Stainless-Steel Trim:
   a. Description:
      1) Standard: MSS SP-110.
      2) CWP Rating: 600 psig.

3) Body Design: Three piece.
4) Body Material: Bronze.
5) Ends: Threaded.
6) Seats: PTFE.
7) Stem: Stainless steel.
8) Ball: Stainless steel, vented.
9) Port: Full.

10. Bronze Ball Valves, Three-Piece with Regular Port and Bronze Trim:
    a. Description:
        1) Standard: MSS SP-110.
        2) CWP Rating: 600 psig.
        3) Body Design: Three piece
        4) Body Material: Bronze
        5) Ends: Threaded or soldered.
        6) Seats: PTFE.
        7) Stem: Bronze.
        8) Ball: Chrome-plated brass.
        9) Port: Regular.
11. Bronze Ball Valves, Three-Piece with Regular Port and Stainless-Steel Trim:
    a. Description:
        1) Standard: MSS SP-110.
        2) CWP Rating: 600 psig.
        3) Body Design: Three piece.
        4) Body Material: Bronze.
        5) Ends: Threaded or soldered.
        6) Seats: PTFE.
        7) Stem: Stainless steel.
        8) Ball: Stainless steel, vented.
        9) Port: Regular.
12. Bronze Ball Valves, Two-Piece, Safety-Exhaust:
    a. Description:

b. Standard: MSS SP-110.

c. CWP Rating: 600 psig.

d. Body Design: Two piece.

e. Body Material: Bronze, ASTM B584, Alloy C844.

f. Ends: Threaded.

g. Seats: PTFE.

h. Stem: Stainless steel.

i. Ball: Chrome-plated brass, with exhaust vent opening for pneumatic applications.

j. Port: Full.

2.03 FABRICATION / ASSEMBLING / FINISHES

A. Not Used.

2.04 SOURCE QUALITY CONTROL / SHOP TESTS

A. Not Used

PART 3 EXECUTION

3.01 EXAMINATION / PREPARATION

A. Examine valve interior for cleanliness, freedom from foreign matter, and corrosion. Remove special packing materials, such as blocks, used to prevent disc movement during shipping and handling.

B. Operate valves in positions from fully open to fully closed. Examine guides and seats made accessible by such operations.

C. Examine threads on valve and mating pipe for form and cleanliness.

D. Examine mating flange faces for conditions that might cause leakage. Check bolting for proper size, length, and material. Verify that gasket is of proper size, that its material composition is suitable for service, and that it is free from defects and damage.

E. Do not attempt to repair defective valves; replace with new valves, at no extra cost to the City.

3.02 INSTALLATION

A. VALVE INSTALLATION

1. Install valves with unions or flanges at each piece of equipment arranged to allow service, maintenance, and equipment removal without system shutdown.

2. Locate valves for easy access and provide separate support where necessary.

3. Install valves in horizontal piping with stem at or above center of pipe.

4. Install valves in position to allow full stem movement.

5. Install valve tags. Comply with requirements in Section 40 05 97 - Identification for Process Equipment KEC-2 for valve tags and schedules.

B. GENERAL REQUIREMENTS FOR VALVE APPLICATIONS

1. If valves with specified CWP ratings are unavailable, the same types of valves with higher CWP ratings may be substituted.

2. Select valves with the following end connections:

a. For Copper Tubing, NPS 2 and Smaller: Threaded ends except where solder-joint valve-end option or press-end option is indicated in valve schedules below.

b. For Copper Tubing, NPS 2-1/2 to NPS 4 : Flanged ends except where threaded valve-end option is indicated in valve schedules below.

c. For Copper Tubing, NPS 5 and Larger: Flanged ends.

d. For Steel Piping, NPS 2 and Smaller: Threaded ends.

e. For Steel Piping, NPS 2-1/2 to NPS 4 : Flanged ends except where threaded valve-end option is indicated in valve schedules below.

f. For Steel Piping, NPS 5 and Larger: Flanged ends

C. DOMESTIC COLD-WATER VALVE SCHEDULE

1. Pipe NPS 2 and Smaller:

a. Brass ball valve, one piece. Provide with threaded-joint ends.

b. Bronze ball valve, one piece with bronze trim. Provide with threaded-joint ends.

c. Brass ball valves, two-piece with full port and brass trim. Provide with threaded or press connection-joint ends.

d. Bronze ball valves, two-piece with full port and bronze or brass trim. Provide with threaded or press connection-joint ends.

e. Brass ball valves, three-piece with full port and brass trim.

f. Bronze ball valves, three-piece with full port and bronze or brass trim.

g. Bronze ball valves, two-piece with regular port and bronze trim.

3.03 FIELD TESTING / QUALITY CONTROL

A. Perform the following tests and inspections:

1. Leak Test: After allowing for a full cure, test ball valves for leaks. Repair leaks and retest until no leaks exist.

3.04 STARTUP / DEMONSTRATION

A. Not Used

3.05 ADJUSTING / PROTECTION / CLEANUP

1. All parts and components shall be adjusted as required to provide correct operation.

END OF SECTION

SECTION 22 05 23.14 – CHECK VALVES FOR PLUMBING PIPING
CONTRACT KENS-EAST-2

PART 1 GENERAL

1.01 SUMMARY

A. The Contractor shall provide all labor, materials, equipment, incidentals, and appurtenances as shown, specified and required, to furnish, install and test all check valves for plumbing piping, complete and operational.

B. The following index of this Section is presented for convenience:

1.02 PAYMENT

A. No separate payment shall be made for performing any Work required under this Section. All costs for Work required by this Section shall be included in the applicable lump sum, unit price(s) or allowance(s) as set forth in Section 01 27 00 – Measurement and Payment.

1.03 RELATED SECTIONS

A. Section 01 61 50 – General Product Requirements

1.04 REFERENCES

A. Abbreviations and Acronyms:

1.	CWP	Cold working pressure:

B. Reference Standards:

1.	ASME B1.20.1	Threads for threaded end valves.
2.	ASME B16.1	Flanges on iron valves.
3.	ASME B16.5	Flanges on steel valves.
4.	ASME B16.10 and ASME B16.34	Ferrous valve dimensions and design criteria.
5.	ASME B16.18	Solder-joint connections.
6.	ASME B31.9	Building services piping valves.
7.	NSF 61 and NSF 372	Valve materials for potable-water service.

1.05 DESCRIPTION

A. This Section includes requirements for providing check valves in accordance with applicable standards and regulations. In addition:

1. Ball valves shall be furnished complete with all accessories, attachments, fastenings, and other appurtenances as specified and/or as may be required for a satisfactory installation.
2. Ball valves shall conform to the requirements of the New York State Building Code.

1.06 QUALITY ASSURANCE

A. The Work of this Section shall be performed by a plumber licensed by the local authority having jurisdiction.

1.07 SUBMITTALS

A. Submittals shall comply with the requirements of the Contract Documents. In addition, submittals shall include, but not be limited to:

1. Product data:
   a. Provide catalogue cuts of all ball valves, showing: sizes, rough-in dimensions.
      1) Certification that products comply with NSF 61 and NSF 372

1.08 DELIVERY, STORAGE, AND HANDLING

A. Prepare valves for shipping as follows:

1. Protect internal parts against rust and corrosion.
2. Protect threads, flange faces, and soldered ends.
3. Set ball valves open to minimize exposure of functional surfaces.

B. Use the following precautions during storage:

1. Maintain valve end protection.
2. Store valves indoors and maintain at higher-than-ambient-dew-point temperature. If outdoor storage is necessary, store valves off the ground in watertight enclosures.

C. Use sling to handle large valves; rig sling to avoid damage to exposed parts. Do not use operating handles or stems as lifting or rigging points

1.09 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES

A. Not Used

1.10 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS

A. Not Used

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Bronze swing check valves shall be as manufactured by:

1. Crane Co.; Crane Valve Group; Crane Valves.
2. Crane Co.; Crane Valve Group; Jenkins Valves.
3. Crane Co.; Crane Valve Group; Stockham Division.
4. Milwaukee Valve Company.
5. Red-White Valve Corporation.
6. Watts Regulator Co.; a division of Watts Water Technologies, Inc.
7. Or approved equal.

2.02 MATERIALS / EQUIPMENT

A. GENERAL REQUIREMENTS FOR VALVES

1. Source Limitations for Valves: Obtain each type of valve from single source from single manufacturer.
2. ASME Compliance:
   a. ASME B1.20.1 for threads for threaded end valves.
   b. ASME B16.1 for flanges on iron valves.

c. ASME B16.10 and ASME B16.34 for ferrous valve dimensions and design criteria.

d. ASME B16.18 for solder-joint connections.

e. ASME B31.9 for building services piping valves.

3. AWWA Compliance: Comply with AWWA C606 for grooved-end connections.

4. Drinking Water System Components - Health Effects and Drinking Water System Components - Lead Content Compliance: NSF 61 and NSF 372.

5. Bronze valves shall be made with dezincification-resistant materials. Bronze valves made with copper alloy (brass) containing more than 15 percent zinc are not permitted.

6. Valve Pressure-Temperature Ratings: Not less than indicated and as required for system pressures and temperatures.

7. Valve Sizes: Same as upstream piping unless otherwise indicated.

8. Valve Bypass and Drain Connections: MSS SP-45.

B. BRONZE SWING CHECK VALVES

1. Bronze Swing Check Valves with Bronze Disc, Class 125:

a. Description:

1) Standard: MSS SP-80, Type 3.

2) CWP Rating: 200 psig.

3) Body Design: Horizontal flow.

4) Body Material: ASTM B62, bronze.

5) Ends: Threaded or soldered. See valve schedule articles.

6) Disc: Bronze.

2. Bronze Swing Check Valves with Nonmetallic Disc, Class 125:

a. Description:

1) Standard: MSS SP-80, Type 4.

2) CWP Rating: 200 psig.

3) Body Design: Horizontal flow.

4) Body Material: ASTM B62, bronze.

5) Ends: Threaded or soldered. See valve schedule articles.

6) Disc: PTFE.

3. Bronze Swing Check Valves with Bronze Disc, Class 150:

a. Description:

1) Standard: MSS SP-80, Type 3.

2) CWP Rating: 300 psig.

3) Body Design: Horizontal flow.

4) Body Material: ASTM B62, bronze.

5) Ends: Threaded or soldered. See valve schedule articles.

6) Disc: Bronze.

4. Bronze Swing Check Valves with Nonmetallic Disc, Class 150:

a. Description:

1) Standard: MSS SP-80, Type 4.

2) CWP Rating: 300 psig.

3) Body Design: Horizontal flow.

4) Body Material: ASTM B62, bronze.

5) Ends: Threaded or soldered. See valve schedule articles.

6) Disc: PTFE.

5. Bronze Swing Check Valves, Press Ends:

a. Description:

1) Standard: MSS SP-80 and MSS SP-139.

2) CWP Rating: Minimum 200 psig.

3) Body Design: Horizontal flow.

4) Body Material: ASTM B584, bronze.

5) Ends: Press.

6) Press Ends Connection Rating: Minimum 200 psig.

7) Disc: Brass or bronze.

2.03 FABRICATION / ASSEMBLING / FINISHES

A. Not Used.

2.04 SOURCE QUALITY CONTROL / SHOP TESTS

A. Not Used

PART 3 EXECUTION

3.01 EXAMINATION / PREPARATION

A. Examine valve interior for cleanliness, freedom from foreign matter, and corrosion. Remove special packing materials, such as blocks, used to prevent disc movement during shipping and handling.

B. Operate valves in positions from fully open to fully closed. Examine guides and seats made accessible by such operations.

C. Examine threads on valve and mating pipe for form and cleanliness.

D. Examine mating flange faces for conditions that might cause leakage. Check bolting for proper size, length, and material. Verify that gasket is of proper size, that its material composition is suitable for service, and that it is free from defects and damage.

E. Do not attempt to repair defective valves; replace with new valves, at no additional cost to the city.

3.02 INSTALLATION

A. VALVE INSTALLATION

1. Install valves with unions or flanges at each piece of equipment arranged to allow service, maintenance, and equipment removal without system shutdown.

2. Locate valves for easy access and provide separate support where necessary.

3. Install valves in horizontal piping with stem at or above center of pipe.

4. Install valves in position to allow full stem movement.

5. Check Valves: Install check valves for proper direction of flow.

   a. Swing Check Valves: In horizontal position with hinge pin level.

6. Install valve tags. Comply with requirements in Section 40 05 97 “Identification for Process Equipment" for valve tags and schedules.

B. GENERAL REQUIREMENTS FOR VALVE APPLICATIONS

1. If valves with specified CWP ratings are unavailable, the same types of valves with higher CWP ratings may be substituted.

2. Select valves with the following end connections:

   a. For Copper Tubing, NPS 2 and Smaller: Threaded ends except where solder-joint valve-end option or press-end option is indicated in valve schedules below.

   b. For Steel Piping, NPS 2 and Smaller: Threaded ends.

3. For Grooved-End Copper Tubing: Grooved.

C. DOMESTIC COLD-WATER VALVE SCHEDULE

1. Pipe NPS 2 and Smaller:

a. Bronze swing check valves with bronze disc, Class 125, with threaded end connections.

b. Bronze swing check valves with press-end connections.

3.03 FIELD TESTING / QUALITY CONTROL

A. Perform the following tests and inspections:

1. Leak Test: After allowing for a full cure, test ball valves for leaks. Repair leaks and retest until no leaks exist.

3.04 STARTUP / DEMONSTRATION

A. Not Used

3.05 ADJUSTING / PROTECTION / CLEANUP

1. All parts and components shall be adjusted as required to provide correct operation.

END OF SECTION

NO TEXT ON THIS PAGE

PART 1 GENERAL

1.01 SUMMARY

A. This Section includes water-distribution piping and related components outside the building for water service.

B. Utility-furnished products include water meters that will be furnished to the Site, ready for installation.

C. The following index of this Section is presented for convenience:

1.02 PAYMENT

A. No separate payment shall be made for performing any Work required under this Section. All costs for Work required by this Section shall be included in the applicable lump sum, unit price(s) or allowance(s) as set forth in Section 01 27 00 – Measurement and Payment.

1.03 RELATED SECTIONS

A. Not Used.

1.04 REFERENCES

A. Abbreviations and Acronyms:

1. EPDM: Ethylene propylene diene terpolymer rubber.

B. Reference Standards:

1. New York State Building Code.

1.05 DESCRIPTION

A. This Section includes requirements for providing hangers and support in accordance with applicable standards and regulations. In addition:

1. Hangers and support shall be furnished complete with all accessories, attachments, fastenings, and other appurtenances as specified and/or as may be required for a satisfactory installation.

2. Hangers and support shall conform to the requirements of the New York State Building Code, and NFPA.

1.06 QUALITY ASSURANCE

A. Regulatory Requirements:

1. Comply with all requirements of utility company supplying water. Include tapping of water mains and backflow prevention.

2. Comply with standards of authorities having jurisdiction for potable-water-service piping, including materials, installation, testing, and disinfection.

3. Comply with standards of authorities having jurisdiction for fire-suppression water-service piping, including materials, hose threads, installation, and testing.

B. Piping materials shall bear label, stamp, or other markings of specified testing agency.

C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

1.07 SUBMITTALS

A. ACTION SUBMITTALS

1. Product Data: For each type of product indicated.

2. Shop Drawings: Detail precast concrete vault assemblies and indicate dimensions, method of field assembly, and components.

3. Wiring Diagrams: Power, signal, and control wiring for alarms.

B. INFORMATIONAL SUBMITTALS

1. Coordination Drawings: For piping and specialties including relation to other services in same area, drawn to scale. Show piping and specialty sizes and valves, meter and specialty locations, and elevations.
2. Field quality-control test reports.

C. CLOSEOUT SUBMITTALS

1. Operation and Maintenance Data: For water valves and specialties to include in emergency, operation, and maintenance manuals.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Preparation for Transport: Prepare valves, including fire hydrants, according to the following:

1. Ensure that valves are dry and internally protected against rust and corrosion.
2. Protect valves against damage to threaded ends and flange faces.
3. Set valves in best position for handling. Set valves closed to prevent rattling.

B. During Storage: Use precautions for valves, including fire hydrants, according to the following:

1. Do not remove end protectors unless necessary for inspection; then reinstall for storage.
2. Protect from weather. Store indoors and maintain temperature higher than ambient dew-point temperature. Support off the ground or pavement in watertight enclosures when outdoor storage is necessary.

C. Handling: Use sling to handle valves and fire hydrants if size requires handling by crane or lift. Rig valves to avoid damage to exposed parts. Do not use handwheels or stems as lifting or rigging points.

D. Deliver piping with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe-end damage and to prevent entrance of dirt, debris, and moisture.

E. Protect stored piping from moisture and dirt. Elevate above grade. Do not exceed structural capacity of floor when storing inside.

F. Protect flanges, fittings, and specialties from moisture and dirt.

1.09 PROJECT CONDITIONS

A. Not Used

1.10 COORDINATION

A. Coordinate connection to water main with utility company.

1.11 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES

A. Not Used

1.12 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS

A. Not Used

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Water Meters shall be as manufactured by:

1. Badger Meter, Inc.
2. Hays Fluid Controls.
3. Master Meter, Inc.
4. Mueller Company; Water Products Division.
5. Schlumberger Limited; Water Division.
6. Sensus Metering Systems.
7. Or approved equal.

2.02 MATERIALS / EQUIPMENT

A. PIPING MATERIALS

1. Comply with requirements in "Piping Application" Article for applications of pipe, tube, fitting materials, and joining methods for specific services, service locations, and pipe sizes.
2. Potable-water piping and components shall comply with NSF 14, NSF 61, and NSF 372. Include marking "NSF-pw" on piping.

B. COPPER TUBE AND FITTINGS

1. Hard Copper Tube: ASTM B88, Type K (ASTM B88M, Type A), water tube, drawn temper.
    a. Copper, Solder-Joint Fittings: ASME B16.18, cast-copper-alloy or ASME B16.22, wrought-copper, solder-joint pressure type. Furnish only wrought-copper fittings if indicated.
2. Bronze Flanges: ASME B16.24, Class 150, with solder-joint end. Furnish Class 300 flanges if required to match piping.
3. Copper Unions:
    a. MSS SP-123.
    b. Cast-copper-alloy, hexagonal-stock body.
    c. Ball-and-socket, metal-to-metal seating surfaces.
    d. Solder-joint or threaded ends.
4. Copper, Brass or Bronze, Pressure-Seal-Joint Fittings:

a. Fittings: Cast-brass, cast-bronze, or wrought-copper with EPDM O-ring seal in each end. Sizes NPS 2-1/2 and larger with stainless steel grip ring and EPDM O-ring seal.

b. Minimum 200-psig working-pressure rating at 250 deg F.

C. JOINING MATERIALS

1. Refer to Section 330500 "Common Work Results for Utilities" for commonly used joining materials.

2. Brazing Filler Metals: AWS A5.8, BCuP Series.

D. PIPING SPECIALTIES

1. Transition Fittings: Manufactured fitting or coupling same size as, with pressure rating at least equal to and ends compatible with, piping to be joined.

2. Split-Sleeve Pipe Couplings:

a. Description: Metal, bolted, split-sleeve-type, reducing or transition coupling with sealing pad and closure plates, O-ring gaskets, and bolt fasteners.

1) Standard: AWWA C219.

2) Sleeve Material: Carbon steel.

3) Sleeve Dimensions: Of thickness and width required to provide pressure rating.

4) Gasket Material: O-rings made of EPDM rubber, unless otherwise indicated.

5) Pressure Rating: 150 psig minimum.

6) Metal Component Finish: Corrosion-resistant coating or material.

3. Dielectric Fittings:

a. General Requirements: Assembly of copper alloy and ferrous materials with separating nonconductive insulating material. Include end connections compatible with pipes to be joined.

b. Dielectric Unions:

1) Description:

a) Standard: ASSE 1079.

b) Pressure Rating:150 psig at 180 deg F.

c) End Connections: Solder-joint copper alloy and threaded ferrous.

c. Dielectric Flanges:

1) Description:

a) Standard: ASSE 1079.

b) Factory-fabricated, bolted, companion-flange assembly.

c) Pressure Rating: 175 psig minimum at180 deg F.

d) End Connections: Solder-joint copper alloy and threaded ferrous; threaded solder-joint copper alloy and threaded ferrous.

d. Dielectric-Flange Insulating Kits:

1) Description:

a) Nonconducting materials for field assembly of companion flanges.

b) Pressure Rating: 150 psig .

c) Gasket: Neoprene or phenolic.

d) Bolt Sleeves: Phenolic or polyethylene.

e) Washers: Phenolic with steel backing washers.

e. Dielectric Nipples:

1) Description:

a) Standard: IAPMO PS 66.

b) Electroplated steel nipple complying with ASTM F1545.

c) Pressure Rating: 300 psig at 225 deg F.

d) End Connections: Male threaded or grooved.

e) Lining: Inert and noncorrosive, propylene.

E. DETECTOR CHECK VALVES

1. Description: Galvanized cast-iron body, bolted cover with air-bleed device for access to internal parts, and flanged ends. Include one-piece bronze disc with bronze bushings, pivot, and replaceable seat. Include threaded bypass taps in inlet and outlet for bypass meter connection. Set valve to allow minimal water flow through bypass meter when major water flow is required.

a. Standards: UL 312 and FMG approved.

b. Pressure Rating: 175 psig.

c. Water Meter: AWWA C700, disc type, at least one-fourth size of detector check valve. Include meter, bypass piping, gate valves, check valve, and connections to detector check valve.

2. Description: Iron body, corrosion-resistant clapper ring and seat ring material, flanged ends, with connections for bypass and installation of water meter.

a. Standards: UL 312 and FMG approved.

b. Pressure Rating: 175 psig.

F. WATER METERS

1. Water meters will be furnished by utility company.

2. Turbine-Type Water Meters:

1) Description:

a) Standard: AWWA C701.

b) Pressure Rating: 150-psig working pressure.

c) Body Design: Turbine; totalization meter.

d) Registration: In gallons or cubic feet as required by utility company.

e) Case: Bronze.

f) End Connections for Meters NPS 2 and Smaller: Threaded.

g) End Connections for Meters NPS 2-1/2 and Larger: Flanged.

3. Compound-Type Water Meters:

1) Description:

a) Standard: AWWA C702.

b) Pressure Rating: 150-psig working pressure.

c) Body Design: With integral mainline and bypass meters; totalization meter.

d) Registration: In gallons or cubic feet as required by utility company.

e) Case: Bronze.

f) Pipe Connections: Flanged.

4. Remote Registration System:

1) Description: Utility company standard; direct-reading type. Include meter modified with signal-transmitting assembly, low-voltage connecting wiring, and remote register assembly.

a) Standard: AWWA C706.

b) Registration: Flow in gallons or cubic feet.

5. Remote Registration System:

1) Description: Utility company standard; encoder type. Include meter modified with signal-transmitting assembly, low-voltage connecting wiring, and remote register assembly.

a) Standard: AWWA C707.

b) Registration: Flow in gallons or cubic feet.

6. Data-Acquisition Units: Comply with utility company requirements for type and quantity.

7. Visible Display Units: Comply with utility company requirements for type and quantity.

G. DETECTOR-TYPE WATER METERS

1. Description: Main line, proportional meter with second meter on bypass. Register flow in [gallons (liters)] [cubic feet (cubic meters)].

a. Standards: AWWA C703, UL listed, and FMG approved.

b. Pressure Rating: 150 psig (1035 kPa).

c. Bypass Meter: [AWWA C701, turbine] [AWWA C702, compound]-type, bronze case.

1) Size: At least one-half nominal size of main-line meter.

2. Description: Main-line turbine meter with strainer and second meter on bypass. Register flow in [gallons (liters)] [cubic feet (cubic meters)].

a. Standards: AWWA C703, UL listed, and FMG approved.

b. Pressure Rating: 175 psig (1207 kPa).

c. Bypass Meter: AWWA C701, turbine-type, bronze case.

1) Size: At least NPS 2 (DN 50).

3. Remote Registration System:

a. Description: Utility company standard; direct-reading type. Include meter modified with signal-transmitting assembly, low-voltage connecting wiring, and remote register assembly.

1) Standard: AWWA C706.

2) Registration: Flow in [gallons (liters)] [cubic feet (cubic meters)].

4. Remote Registration System:

a. Description: Utility company standard; encoder type. Include meter modified with signal-transmitting assembly, low-voltage connecting wiring, and remote register assembly.

1) Standard: AWWA C707.

2) Registration: Flow in [gallons (liters)] [cubic feet (cubic meters)].

3) Data-Acquisition Units: Comply with utility company requirements for type and quantity.

4) Visible Display Units: Comply with utility company requirements for type and quantity.

H. Water Control Valves:

1. Description: Pilot-operation, diaphragm-type, single-seated main water control valve with AWWA C550 or FDA-approved, interior epoxy coating. Include small pilot control valve, restrictor device, specialty fittings, and sensor piping.

2. Pressure Rating: Initial pressure of 150 psig minimum.

3. Main Valve Body: Cast- or ductile-iron body with AWWA C550 or FDA-approved, interior epoxy coating; or stainless-steel body.

4. Pattern: Globe-valve design.

5. Trim: Stainless steel.

6. End Connections: Threaded for NPS 2 and smaller; flanged for NPS 2-1/2 and larger.

I. BACKFLOW PREVENTERS

1. Reduced-Pressure-Principle Backflow Preventers:

a. Standard: ASSE 1013 or AWWA C511.

b. Operation: Continuous-pressure applications.

c. Pressure Loss: 12 psig maximum, through middle 1/3 of flow range.

d. Body: Bronze for NPS 2 and smaller; cast iron with interior lining complying with AWWA C550 or that is FDA approved for NPS 2-1/2 and larger.

e. End Connections: Threaded for NPS 2 and smaller; flanged for NPS 2-1/2 (DN 65) and larger.

f. Configuration: Designed for horizontal, straight through flow.

g. Accessories:

h. Valves: Ball type with threaded ends on inlet and outlet of NPS 2 and smaller; OS&Y gate type with flanged ends on inlet and outlet of NPS 2-1/2 and larger.

i. Air-Gap Fitting: ASME A112.1.2, matching backflow preventer connection.

J. PROTECTIVE ENCLOSURES

1. Freeze-Protection Enclosures:

a. Description: Insulated enclosure designed to protect aboveground water piping, equipment, or specialties from freezing and damage, with heat source to maintain minimum internal temperature of 40 deg F when external temperatures reach as low as minus 34 deg F.

1) Standard: ASSE 1060.

2) Class I-V: For pressure or atmospheric vacuum breaker equipment or devices. Include drain opening in housing.

b. Housing: Reinforced aluminum construction.

1) Size: Of dimensions indicated, but not less than those required for access and service of protected unit.

2) Drain opening for units with drain connection.

3) Access doors with locking devices.

4) Insulation inside housing.

5) Anchoring devices for attaching housing to concrete base.

c. Electric heating cable or heater with self-limiting temperature control.

K. Enclosure Bases:

1. Description: 4-inch minimum thickness precast concrete, of dimensions required to extend at least 6 inches beyond edges of enclosure housings. Include openings for piping.

2.03 FABRICATION / ASSEMBLING / FINISHES

A. Not Used.

2.04 SOURCE QUALITY CONTROL / SHOP TESTS

A. Not Used

PART 3 EXECUTION

3.01 EXAMINATION / PREPARATION

A. Comply with requirements in Section 078413 "Penetration Firestopping" for firestopping materials and installation, for penetrations through fire-rated walls, ceilings, and assemblies.

B. Strength of Support Assemblies: Where not indicated, select sizes of components, so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lb.

3.02 INSTALLATION

A. Piping Installation:

1. Water-Main Connection: Arrange with utility company for tap of size and in location indicated in water main.
2. Water-Main Connection: Tap water main according to requirements of water utility company and of size and in location indicated.
3. Make connections larger than NPS 2 with tapping machine according to the following:
4. Install tapping sleeve and tapping valve according to MSS SP-60.
5. Install tapping sleeve on pipe to be tapped. Position flanged outlet for gate valve.
6. Use tapping machine compatible with valve and tapping sleeve; cut hole in main. Remove tapping machine and connect water-service piping.
7. Install gate valve onto tapping sleeve. Comply with MSS SP-60. Install valve with stem pointing up and with valve box.
8. Make connections NPS 2 and smaller with drilling machine according to the following:
9. Install service-saddle assemblies and corporation valves in size, quantity, and arrangement required by utility company standards.
10. Install service-saddle assemblies on water-service pipe to be tapped. Position outlets for corporation valves.
11. Use drilling machine compatible with service-saddle assemblies and corporation valves. Drill hole in main. Remove drilling machine and connect water-service piping.
12. Install corporation valves into service-saddle assemblies.
13. Install manifold for multiple taps in water main.
14. Install curb valve in water-service piping with head pointing up and with service box.

15. Comply with NFPA 24 for fire-service-main piping materials and installation.
16. Install copper tube and fittings according to CDA's "Copper Tube Handbook."
17. Install ductile-iron, water-service piping according to AWWA C600 and AWWA M41.
18. Install fiberglass AWWA pipe according to AWWA M45.
19. Bury piping with depth of cover over top at least 30 inches, with top at least 12 inches below level of maximum frost penetration, and according to the following:
20. Under driveways: With at least 36 inches cover over top.
21. Under railroad tracks: With at least 48 inches cover over top.
22. In loose gravelly soil and rock: With at least 12 inches additional cover.
23. Install piping by tunneling or jacking, or combination of both, under streets and other obstructions that cannot be disturbed.
24. Extend water-service piping and connect to water-supply source and building-water-piping systems at outside face of building wall in locations and pipe sizes indicated.
25. Terminate water-service piping at building wall until building-water-piping systems are installed. Terminate piping with caps, plugs, or flanges as required for piping material. Make connections to building-water-piping systems when those systems are installed.
26. Sleeves are specified in Section 220517 "Sleeves and Sleeve Seals for Plumbing Piping."
27. Mechanical sleeve seals are specified in Section 220517 "Sleeves and Sleeve Seals for Plumbing Piping."
28. Install underground piping with restrained joints at horizontal and vertical changes in direction. Use restrained-joint piping, thrust blocks, anchors, tie-rods and clamps, and other supports.
29. See Section 221116 "Domestic Water Piping" for potable-water piping inside the building.

B. Hangers and Support Installation

1. Install seismic-restraint devices, hangers, supports, and anchor devices in accordance with the requirements of the following Section(s):
    a. Section 23 05 48 "Vibration and Seismic Controls for HVAC."
2. Install the following pipe attachments:

a. Adjustable steel clevis hangers for individual horizontal piping less than 20 feet long.

b. Adjustable roller hangers and spring hangers for individual horizontal piping 20 feet or longer.

c. Pipe Roller: MSS SP-58, Type 44 for multiple horizontal piping 20 feet or longer, supported on a trapeze.

d. Spring hangers to support vertical runs.

3. Provide copper-clad hangers and supports for hangers and supports in direct contact with copper pipe.

4. Install hangers for copper tubing with maximum spacing and minimum rod diameters to comply with MSS-58, local codes, and authorities having jurisdiction requirements, whichever are most stringent.

5. Install hangers for PVC piping with maximum horizontal spacing and minimum rod diameters to comply with manufacturer's written instructions, local codes, and authorities having jurisdiction requirements, whichever are most stringent.

6. Install hangers for fiberglass piping with maximum horizontal spacing and minimum rod diameters to comply with manufacturer's written instructions, locally enforced codes, and authorities having jurisdiction requirements, whichever are most stringent.

7. Support horizontal piping within 12 inches of each fitting and coupling.

8. Support vertical runs of copper tubing to comply with MSS-58, locally enforced codes, and authorities having jurisdiction requirements, whichever are most stringent.

C. JOINT CONSTRUCTION

1. See Section 330500 "Common Work Results for Utilities" for basic piping joint construction.

2. Make pipe joints according to the following:

3. Copper-Tubing, Pressure-Sealed Joints: Join copper tube and pressure-seal fittings with tools and procedures recommended by pressure-seal-fitting manufacturer. Leave insertion marks on pipe after assembly.

4. Ductile-Iron Piping, Gasketed Joints for Water-Service Piping: AWWA C600 and AWWA M41.

5. Ductile-Iron Piping, Gasketed Joints for Fire-Service-Main Piping: UL 194.

6. Ductile-Iron Piping, Grooved Joints: Cut-groove pipe. Assemble joints with grooved-end, ductile-iron-piping couplings, gaskets, lubricant, and bolts according to coupling manufacturer's written instructions.

7. Install dielectric fittings in piping at connections of dissimilar metal piping and tubing.
8. Dielectric Fittings for NPS 2 and Smaller: Use dielectric unions.
9. Dielectric Fittings for NPS 2-1/2 to NPS 4 : Use dielectric flange kits.
10. Dielectric Fittings for NPS 5 and Larger: Use dielectric flange kits.

D. ANCHORAGE INSTALLATION

1. Anchorage, General: Install water-distribution piping with restrained joints. Anchorages and restrained-joint types that may be used include the following:
2. Concrete thrust blocks.
3. Locking mechanical joints.
4. Set-screw mechanical retainer glands.
5. Bolted flanged joints.
6. Heat-fused joints.
7. Pipe clamps and tie rods.
8. Install anchorages for tees, plugs and caps, bends, crosses, valves, and hydrant branches. Include anchorages for the following piping systems:
9. Gasketed-Joint, Ductile-Iron, Water-Service Piping: According to AWWA C600.
10. Apply full coat of asphalt or other acceptable corrosion-resistant material to surfaces of installed ferrous anchorage devices.
11. VALVE INSTALLATION
12. AWWA Gate Valves: Comply with AWWA C600 and AWWA M44. Install each underground valve with stem pointing up and with valve box.
13. AWWA Valves Other Than Gate Valves: Comply with AWWA C600 and AWWA M44.
14. MSS Valves: Install as component of connected piping system.
15. Corporation Valves and Curb Valves: Install each underground curb valve with head pointed up and with service box.
16. Pressure-Reducing Valves: Install in vault or aboveground between shutoff valves. Install full-size valved bypass.
17. Relief Valves: Comply with AWWA C512. Install aboveground with shutoff valve on inlet.

E. WATER METER INSTALLATION

1. Install water meters, piping, and specialties according to utility company's written instructions.
2. Water Meters: Install turbine-type water meters, NPS 2 and smaller, in meter boxes with shutoff valves on water meter inlets. Include valves on water meter outlets and valved bypass around meters unless prohibited by authorities having jurisdiction.
3. Water Meters: Install turbine-type water meters, NPS 3 and larger, in meter vaults. Include shutoff valves on water meter inlets and outlets and valved bypass around meters. Support meters, valves, and piping on brick or concrete piers.
4. Water Meters: Install detector-type water meters in meter vault according to AWWA M6. Include shutoff valves on water meter inlets and outlets and full-size valved bypass around meters. Support meters, valves, and piping on brick or concrete piers.

F. ROUGHING-IN FOR WATER METERS

1. Rough-in piping and specialties for water meter installation according to utility company's written instructions.

G. BACKFLOW PREVENTER INSTALLATION

1. Install backflow preventers of type, size, and capacity indicated. Include valves and test cocks. Install according to requirements of plumbing and health department and authorities having jurisdiction.
2. Do not install backflow preventers that have relief drain in vault or in other spaces subject to flooding.
3. Do not install bypass piping around backflow preventers.
4. Support NPS 2-1/2 and larger backflow preventers, valves, and piping near floor and on brick or concrete piers.

H. PROTECTIVE ENCLOSURE INSTALLATION

1. Install concrete base level and with top approximately 2 inches above grade.
2. Install protective enclosure over valves and equipment.
3. Anchor protective enclosure to concrete base.

3.03 FIELD TESTING / QUALITY CONTROL

A. Not Used.

3.04 STARTUP / DEMONSTRATION

A. Not Used

3.05 ADJUSTING / PROTECTION / CLEANUP

1. Clean and disinfect water-distribution piping as follows:

2. Purge new water-distribution piping systems and parts of existing systems that have been altered, extended, or repaired before use.

3. Use purging and disinfecting procedure prescribed by authorities having jurisdiction or, if method is not prescribed by authorities having jurisdiction, use procedure described in NFPA 24 for flushing of piping. Flush piping system with clean, potable water until dirty water does not appear at points of outlet.

4. Use purging and disinfecting procedure prescribed by authorities having jurisdiction or, if method is not prescribed by authorities having jurisdiction, use procedure described in AWWA C651 or do as follows:

    a. Fill system or part of system with water/chlorine solution containing at least 50 ppm of chlorine; isolate and allow to stand for 24 hours.

    b. Drain system or part of system of previous solution and refill with water/chlorine solution containing at least 200 ppm of chlorine; isolate and allow to stand for 3 hours.

    c. After standing time, flush system with clean, potable water until no chlorine remains in water coming from system.

    d. Submit water samples in sterile bottles to authorities having jurisdiction. Repeat procedure if biological examination shows evidence of contamination.

5. Prepare reports of purging and disinfecting activities.

END OF SECTION

SECTION 22 11 16 – DOMESTIC WATER PIPING
CONTRACT KENS-EAST-2

PART 1 GENERAL

1.01 SUMMARY

A. This Section includes domestic water piping and related components.

B. The following index of this Section is presented for convenience:

1.02 PAYMENT

A. No separate payment shall be made for performing any Work required under this Section. All costs for Work required by this Section shall be included in the applicable lump sum, unit price(s) or allowance(s) as set forth in Section 01 27 00 – Measurement and Payment.

1.03 RELATED SECTIONS

A. Section 09 91 00 – Painting.

B. Section 33 01 10.60 – Disinfection of Piping, Tanks, Structures, and Equipment.

C. Section 33 05 05 – Buried Piping Installation.

D. Section 33 06 01 – Schedule for Buried Piping.

E. Section 40 05 05 – Exposed Piping Installation.

F. Section 40 05 06 – Couplings, Adapters, and Specials for Process Piping

G. Section 40 05 07 – Hangers and Supports for Process Piping

H. Section 40 06 01 – Schedule for Exposed Piping.

I. Section 40 42 13 – Process Piping Insulation.

1.04 REFERENCES

A. Abbreviations and Acronyms:

1. EPDM: Ethylene propylene diene terpolymer rubber.

B. Reference Standards:

1.	ASTM B32	Standard Specification for Solder Metal
2.	ASTM B42	Standard Specification for Seamless Copper Pipe, Standard Sizes
3.	ASTM B43	Standard Specification for Seamless Red Brass Pipe, Standard Sizes
4.	ASTM B61	Standard Specification for Steam or Valve Bronze Castings
5.	ASTM B62	Standard Specification for Composition Bronze or Ounce Metal Castings
6.	ASTM B88	Standard Specification for Seamless Copper Water Tube
7.	ASTM B251	Standard Specification for General Requirements for Wrought Seamless Copper and Copper-Alloy Tube
8.	ASTM B302	Standard Specification for Threadless Copper Pipe, Standard Sizes
9.	ASME B1.20.1	Pipe Threads, General Purpose, Inch
10.	ASME B16.15	Cast Copper Alloy Threaded Fittings: Classes 125 and 250
11.	ASME B16.18	Cast Copper Alloy Solder Joint Pressure Fittings
12.	ASME B16.22	Wrought Copper and Copper Alloy Solder-Joint Pressure Fitting
13.	ASME B16.24	Cast Copper Alloy Pipe Flanges, Flanged Fittings, and Valves: Classes 150, 300, 600, 900, 1500 and 2500

14. ASME B31.1 Power Piping

15. ASME Boiler and Pressure Vessel Code Section VIII – Rules for Construction of Pressure Vessels, Division 1, Appendix 26

16. NSF 61 Drinking Water System Components Health Effects

17. Standards of the EJMA.

18. New York State Building Code.

1.05 DESCRIPTION

A. This Section includes requirements for providing domestic water piping and accessories in accordance with applicable standards and regulations. In addition:

1. Domestic water piping shall be furnished complete with all accessories, attachments, fastenings, and other appurtenances as specified and/or as may be required for a satisfactory installation.

2. Domestic water piping shall conform to the requirements of the New York State Building Code.

3. Domestic water piping, fittings, appurtenances, and specials shall be furnished and installed complete with all necessary jointing materials, wall castings, wall sleeves, specials, adapters, and other appurtenances as shown on the Contract Drawings, as specified herein, and/or as necessary and required for a complete installation.

a. Hangers and support for copper and brass iron process pipe shall be provided as specified in Section 40 05 07, Hangers and Supports for Process Piping.

4. Where shown on the Contract Drawings, the Contractor shall provide all labor and materials for making connections between copper and brass process pipe and existing lines(s) installed under other contracts, including all specials required to connect copper and brass process pipe to pipe of dissimilar material(s).

1.06 QUALITY ASSURANCE

A. Qualifications of Manufacturer:

1. The manufacturer shall have a minimum of five (5) years of experience in the design and fabrication of copper and brass process pipe, fittings, appurtenances, and specials of similar size, capacity, and type to those shown on the Contract Drawings and specified in the Contract Documents, and shall show evidence of at least five (5) substantially similar installations in satisfactory operation.

B. Supply and Compatibility:

1. All domestic water pipe, fittings, appurtenances, and specials included in this section shall be provided by the Contractor through a single, qualified copper and brass process pipe manufacturer.
2. The pipe and fittings shall be designed, fabricated, and installed in accordance with standards referenced herein.
3. The manufacturer shall verify compatibility between the copper and brass process pipe, fittings, appurtenances, specials, and other Work.

C. Regulatory Requirements:

1. Domestic water pipe and fittings shall conform to the New York State Plumbing Code.
2. Use only NSF61-approved materials in potable water lines.
3. Comply with requirements of utility company supplying water. Include tapping of water mains and backflow prevention.
4. Comply with standards of authorities having jurisdiction for potable-water-service piping, including materials, installation, testing, and disinfection.

D. Piping materials shall bear label, stamp, or other markings of specified testing agency.

1.07 SUBMITTALS

A. Action Submittals

1. Product Data: For each type of product indicated.
2. Shop Drawings: Detail precast concrete vault assemblies and indicate dimensions, method of field assembly, and components.
3. Wiring Diagrams: Power, signal, and control wiring for alarms.

B. Informational Submittals

1. Coordination Drawings: For piping and specialties including relation to other services in same area, drawn to scale. Show piping and specialty sizes and valves, meter and specialty locations, and elevations.
2. Field quality-control test reports.

C. Closeout Submittals

1. Operation and Maintenance Data: For water valves and specialties to include in emergency, operation, and maintenance manuals.

1.08 DELIVERY, STORAGE, AND HANDLING

A. The Contractor shall deliver materials provided under this Section in accordance with the requirements of the Contract Documents.

B. The Contractor shall store and handle materials provided under this Section in accordance with the requirements of the Contract Documents.

1.09 COORDINATION

A. Coordinate connection to water main with utility company.

1.10 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES

A. Not Used

1.11 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS

A. Not Used

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Copper process pipe and fittings:

1. Copper process pipe shall be as manufactured by:

a. Mueller Industries, Inc., Memphis, TN.

b. Or approved equal.

2. Copper process fittings shall be as manufactured by:

a. NIBCO, Inc., Elkhart, IN.

b. Or approved equal.

3. Flared Tube Fittings shall be as manufactured by:

a. Mueller Industries, Inc., Memphis, TN.

b. Or approved equal.

4. Triple-Lok Style Fittings shall be as manufactured by:

a. Triple-Lok Fittings as manufactured by Parker Hannifin Corp., Cleveland, OH.

b. Or approved equal.

2.02 MATERIALS / EQUIPMENT

A. Piping Materials

1. Comply with requirements in "Piping Application" Article for applications of pipe, tube, fitting materials, and joining methods for specific services, service locations, and pipe sizes.

2. Potable-water piping and components shall comply with NSF 14, NSF 61, and NSF 372. Include marking "NSF-pw" on piping.

B. Copper Tuber and Fittings

1. Soft Copper Tube: ASTM B88, Type K water tube, annealed temper.

a. Copper, Solder-Joint Fittings: ASME B16.18, cast-copper-alloy or ASME B16.22, wrought-copper, solder-joint pressure type. Furnish only wrought-copper fittings if indicated.

2. Hard Copper Tube: ASTM B88, Type L (ASTM B88M, Type B), water tube, drawn temper.

a. Copper, Solder-Joint Fittings: ASME B16.18, cast-copper-alloy or ASME B16.22, wrought-copper, solder-joint pressure type. Furnish only wrought-copper fittings if indicated.

3. Bronze Flanges: ASME B16.24, Class 150, with solder-joint end. Furnish Class 300 flanges if required to match piping.

4. Copper Unions:

a. MSS SP-123.

b. Cast-copper-alloy, hexagonal-stock body.

c. Ball-and-socket, metal-to-metal seating surfaces.

d. Solder-joint or threaded ends.

5. Copper, Brass or Bronze, Pressure-Seal-Joint Fittings:

a. Fittings: Cast-brass, cast-bronze, or wrought-copper with EPDM O-ring seal in each end. Sizes NPS 2-1/2 (DN 65) and larger with stainless steel grip ring and EPDM O-ring seal.

b. Minimum 200-psig working-pressure rating at 250 deg F (121 deg C).

C. Joining Materials

1. Refer to Section 330500 "Common Work Results for Utilities" for commonly used joining materials.

2. Pipe-Flange Gasket Materials: AWWA C110, rubber, flat face, 1/8-inch thick or ASME B16.21, nonmetallic and asbestos free, unless otherwise indicated; full-face or ring type unless otherwise indicated.

3. Metal, Pipe-Flange Bolts and Nuts: ASME B18.2.1, carbon steel unless otherwise indicated.

4. Solder Filler Metals: ASTM B 32, lead-free alloys. Include water-flushable flux according to ASTM B 813.

5. Brazing Filler Metals: AWS A5.8/A5.8M, BCuP Series, copper-phosphorus alloys for general-duty brazing unless otherwise indicated.

D. Piping Specialties

1. Transition Fittings: Manufactured fitting or coupling same size as, with pressure rating at least equal to and ends compatible with, piping to be joined.

E. Split-Sleeve Pipe Couplings:

a. Description: Metal, bolted, split-sleeve-type, reducing or transition coupling with sealing pad and closure plates, O-ring gaskets, and bolt fasteners.

1) Standard: AWWA C219.

2) Sleeve Material: Manufacturer's standard.

3) Sleeve Dimensions: Of thickness and width required to provide pressure rating.

4) Gasket Material: O-rings made of EPDM rubber, unless otherwise indicated.

5) Pressure Rating: 150 psig minimum.

6) Metal Component Finish: Corrosion-resistant coating or material.

2. Dielectric Fittings:

a. General Requirements: Assembly of copper alloy and ferrous materials with separating nonconductive insulating material. Include end connections compatible with pipes to be joined.

b. Dielectric Unions:

1) Description:

a) Standard: ASSE 1079.

b) Pressure Rating: 150 psig at 180 deg F.

c) End Connections: Solder-joint copper alloy and threaded ferrous.

c. Dielectric Flanges:

1) Description:

a) Standard: ASSE 1079.

b) Factory-fabricated, bolted, companion-flange assembly.

c) Pressure Rating: 175 psig minimum at 180 deg F .

d) End Connections: Solder-joint copper alloy and threaded ferrous; threaded solder-joint copper alloy and threaded ferrous.

d. Dielectric-Flange Insulating Kits:

1) Description:

a) Nonconducting materials for field assembly of companion flanges.

b) Pressure Rating: 150 psig.

c) Gasket: Neoprene or phenolic.

d) Bolt Sleeves: Phenolic or polyethylene.

e) Washers: Phenolic with steel backing washers.

e. Dielectric Nipples:

1) Description:

a) Standard: IAPMO PS 66.

b) Electroplated steel nipple complying with ASTM F1545.

c) Pressure Rating: 300 psig at 225 deg F.

d) End Connections: Male threaded or grooved.

e) Lining: Inert and noncorrosive, propylene.

2.03 FABRICATION / ASSEMBLING / FINISHES

A. Not Used.

2.04 SOURCE QUALITY CONTROL / SHOP TESTS

A. Not Used

PART 3 EXECUTION

3.01 EXAMINATION / PREPARATION

A. Damaged pipe will be rejected and shall be replaced at the Contractor's expense.

B. Comply with requirements in Section 078413 "Penetration Firestopping" for firestopping materials and installation, for penetrations through fire-rated walls, ceilings, and assemblies.

C. Strength of Support Assemblies: Where not indicated, select sizes of components, so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lb.

3.02 INSTALLATION

A. Piping Installation:

1. Water-Main Connection: Arrange with utility company for tap of size and in location indicated in water main.

2. Water-Main Connection: Tap water main according to requirements of water utility company and of size and in location indicated.

3. Make connections larger than NPS 2 with tapping machine according to the following:
4. Install tapping sleeve and tapping valve according to MSS SP-60.
5. Install tapping sleeve on pipe to be tapped. Position flanged outlet for gate valve.
6. Use tapping machine compatible with valve and tapping sleeve; cut hole in main. Remove tapping machine and connect water-service piping.
7. Install gate valve onto tapping sleeve. Comply with MSS SP-60. Install valve with stem pointing up and with valve box.
8. Make connections NPS 2 and smaller with drilling machine according to the following:
9. Install service-saddle assemblies and corporation valves in size, quantity, and arrangement required by utility company standards.
10. Install service-saddle assemblies on water-service pipe to be tapped. Position outlets for corporation valves.
11. Use drilling machine compatible with service-saddle assemblies and corporation valves. Drill hole in main. Remove drilling machine and connect water-service piping.
12. Install corporation valves into service-saddle assemblies.
13. Install manifold for multiple taps in water main.
14. Install curb valve in water-service piping with head pointing up and with service box.
15. Comply with NFPA 24 for fire-service-main piping materials and installation.
16. Install PE corrosion-protection encasement according to ASTM A674 or AWWA C105.
17. Install copper tube and fittings according to CDA's "Copper Tube Handbook."
18. Bury piping with depth of cover over top at least 30 inches, with top at least 12 inches below level of maximum frost penetration, and according to the following:
19. Under Driveways: With at least 36 inches cover over top.
20. Install piping by tunneling or jacking, or combination of both, under streets and other obstructions that cannot be disturbed.
21. Extend water-service piping and connect to water-supply source and building-water-piping systems at outside face of building wall in locations and pipe sizes indicated.

22. Terminate water-service piping at building wall until building-water-piping systems are installed. Terminate piping with caps, plugs, or flanges as required for piping material. Make connections to building-water-piping systems when those systems are installed.

23. Sleeves are specified in Section 220517 "Sleeves and Sleeve Seals for Plumbing Piping."

24. Mechanical sleeve seals are specified in Section 220517 "Sleeves and Sleeve Seals for Plumbing Piping."

25. Install underground piping with restrained joints at horizontal and vertical changes in direction. Use restrained-joint piping, thrust blocks, anchors, tie-rods and clamps, and other supports.

B. Installations of hangers and supports:

1. Install the following pipe attachments:

2. Adjustable steel clevis hangers for individual horizontal piping less than 20 feet long.

3. Adjustable roller hangers and spring hangers for individual horizontal piping 20 feet or longer.

4. Pipe Roller: MSS SP-58, Type 44 for multiple horizontal piping 20 feet or longer, supported on a trapeze.

5. Spring hangers to support vertical runs.

6. Provide copper-clad hangers and supports for hangers and supports in direct contact with copper pipe.

7. Install hangers for copper tubing with maximum spacing and minimum rod diameters to comply with MSS-58, locally enforced codes, and authorities having jurisdiction requirements, whichever are most stringent.

8. Support horizontal piping within 12 inches of each fitting and coupling.

9. Support vertical runs of copper tubing to comply with MSS-58, locally enforced codes, and authorities having jurisdiction requirements, whichever are most stringent.

C. Joint Construction:

1. See Section 330500 "Common Work Results for Utilities" for basic piping joint construction.

2. Make pipe joints according to the following:

a. Copper-Tubing, Pressure-Sealed Joints: Join copper tube and pressure-seal fittings with tools and procedures recommended by pressure-seal-fitting manufacturer. Leave insertion marks on pipe after assembly.

3. Ductile-Iron Piping, Gasketed Joints for Water-Service Piping: AWWA C600 and AWWA M41.

4. Ductile-Iron Piping, Gasketed Joints for Fire-Service-Main Piping: UL 194.

5. Ductile-Iron Piping, Grooved Joints: Cut-groove pipe. Assemble joints with grooved-end, ductile-iron-piping couplings, gaskets, lubricant, and bolts according to coupling manufacturer's written instructions.

6. Install dielectric fittings in piping at connections of dissimilar metal piping and tubing.

7. Dielectric Fittings for NPS 2 and Smaller: Use dielectric unions.

8. Dielectric Fittings for PS 2-1/2 to NPS 4: Use dielectric flange kits.

9. Dielectric Fittings for NPS 5 and Larger: Use dielectric flange kits.

3.03 FIELD TESTING / QUALITY CONTROL

A. Not Used.

3.04 STARTUP / DEMONSTRATION

A. All potable water pipes shall be disinfected before they are placed into service, as specified in Section 33 01 10.60, Disinfection of Piping, Tanks, Structures, and Equipment.

3.05 ADJUSTING / PROTECTION / CLEANUP

1. During construction, all piping shall be thoroughly cleaned before placement and the lines kept free from foreign matter of whatever origin. The pipes shall be left thoroughly clean to the satisfaction of the Engineer.

2. Clean and disinfect water-distribution piping as follows:

3. Purge new water-distribution piping systems and parts of existing systems that have been altered, extended, or repaired before use.

4. Use purging and disinfecting procedure prescribed by authorities having jurisdiction or, if method is not prescribed by authorities having jurisdiction, use procedure described in NFPA 24 for flushing of piping. Flush piping system with clean, potable water until dirty water does not appear at points of outlet.

5. Use purging and disinfecting procedure prescribed by authorities having jurisdiction or, if method is not prescribed by authorities having jurisdiction, use procedure described in AWWA C651 or do as follows:

   a. Fill system or part of system with water/chlorine solution containing at least 50 ppm of chlorine; isolate and allow to stand for 24 hours.

   b. Drain system or part of system of previous solution and refill with water/chlorine solution containing at least 200 ppm of chlorine; isolate and allow to stand for 3 hours.

c. After standing time, flush system with clean, potable water until no chlorine remains in water coming from system.

d. Submit water samples in sterile bottles to authorities having jurisdiction. Repeat procedure if biological examination shows evidence of contamination.

6. Prepare reports of purging and disinfecting activities.

END OF SECTION

PART 1 GENERAL

1.01 SUMMARY

A. The Contractor shall provide all labor, materials, equipment, incidentals, and appurtenances as shown, specified and required, to furnish, install and test all plumbing fixtures, complete and operational.

B. The following index of this Section is presented for convenience:

1.02 PAYMENT

A. No separate payment shall be made for performing any Work required under this Section. All costs for Work required by this Section shall be included in the applicable lump sum, unit price(s) or allowance(s) as set forth in Section 01 27 00 – Measurement and Payment.

1.03 RELATED SECTIONS

A. Section 09 91 00 – Painting.

B. Section 22 05 19 - "Meters and Gauges for Plumbing Piping" for thermometers, pressure gauges, and flow meters in domestic water piping.

C. Section 22 11 16 "Domestic Water Piping" for water meters.

D. Section 22 40 00 "Plumbing Fixtures" for water tempering equipment.

E. Section 33 01 10.60 – Disinfection of Piping, Tanks, Structures, and Equipment.

F. Section 33 05 05 – Buried Piping Installation.

G. Section 33 06 01 – Schedule for Buried Piping.

H. Section 40 05 05 – Exposed Piping Installation.

I. Section 40 05 06 – Couplings, Adapters, and Specials for Process Piping

J. Section 40 05 07 – Hangers and Supports for Process Piping

K. Section 40 06 01 – Schedule for Exposed Piping.

L. Section 40 42 13 – Process Piping Insulation.

1.04 REFERENCES

A. Referenced Standards:

1. NSF 61 Drinking Water System Components Health Effects

2. New York State Building Code.

1.05 DESCRIPTION

A. This Section includes requirements for providing domestic water piping specialties in accordance with applicable standards and regulations. In addition:

Domestic water piping specialties shall be furnished complete with all accessories, attachments, fastenings, and other appurtenances as specified and/or as may be required for a satisfactory installation.

Domestic water piping specialties shall conform to the requirements of the New York State Building Code.

1.06 QUALITY ASSURANCE

A. Qualifications of Manufacturer:

1. The manufacturer shall have a minimum of five (5) years of experience in the design and fabrication of copper and brass process pipe, fittings, appurtenances, and specials of similar size, capacity, and type to those shown on the Contract Drawings and specified in the Contract Documents, and shall show evidence of at least five (5) substantially similar installations in satisfactory operation.

B. Supply and Compatibility:

1. All domestic water pipe, fittings, appurtenances, and specials included in this section shall be provided by the Contractor through a single, qualified copper and brass process pipe manufacturer.
2. The pipe and fittings shall be designed, fabricated, and installed in accordance with standards referenced herein.

C. Regulatory Requirements:

Comply with requirements of utility company supplying water. Include tapping of water mains and backflow prevention.

Comply with standards of authorities having jurisdiction for potable-water-service piping, including materials, installation, testing, and disinfection.

Comply with standards of authorities having jurisdiction for fire-suppression water-service piping, including materials, hose threads, installation, and testing.

D. Piping materials shall bear label, stamp, or other markings of specified testing agency.

E. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

F. Comply with ASTM F645 for selection, design, and installation of thermoplastic water piping.

1.07 SUBMITTALS

A. ACTION SUBMITTALS

Product Data: For each type of product.

Shop Drawings: For domestic water piping specialties.

Include diagrams for power, signal, and control wiring.

B. INFORMATIONAL SUBMITTALS

Test and inspection reports.

Field quality-control reports.

C. CLOSEOUT SUBMITTALS

Operation and Maintenance Data: For domestic water piping specialties, including emergency, operation, and maintenance manuals

1.08 DELIVERY, STORAGE, AND HANDLING

A. Not Used.

1.09 COORDINATION

A. Coordinate connection to water main with utility company.

1.10 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES

A. Not Used

1.11 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS

A. Not Used

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Backflow Preventers:

Reduced-Pressure-Principle Backflow Preventers:

a. Ames Co.
b. Conbraco Industries, Inc.
c. FEBCO; SPX Valve & Control
d. Watts Industries, Inc.; Water Product Div.
e. Zurn Plumbing Products Group; Wilkins Div.
f. Or approved equal.

B. Water Pressure-Reducing Valves:

a. Ames Co.
b. Conbraco Industries, Inc.
c. FEBCO; SPX Valve & Control
d. Watts Industries, Inc.; Water Product Div.
e. Zurn Plumbing Products Group; Wilkins Div.
f. Or approved equal.

C. Strainers for Domestic Water Piping

D. Y-Pattern Strainers

a. Ames Co.
b. Conbraco Industries, Inc.
c. FEBCO; SPX Valve & Control
d. Watts Industries, Inc.; Water Product Div.
e. Zurn Plumbing Products Group; Wilkins Div.
f. Or approved equal.

E. Yard Hydrants

Nonfreeze Yard Hydrants : YH

a. Jay R. Smith Mfg. Co.;

b. Woodford Co.;

c. Watts Industries, Inc.; Water Product Div.;

d. Zurn Plumbing Products Group; Wilkins Div.

e. Or approved equal.

F. Water Meters

1. Water meters will be furnished by utility company.

2. Manufacturers:

a. Elster Amco Water, LLC;

b. Badger Meter, Inc.;

c. Hays Fluid Controls;

d. Master Meter, Inc;

e. Mueller Company; Water Products Division;

f. Schlumberger Limited; Water Division;

g. Sensus Metering Systems;

h. Or approved equal.

G. Protective Enclosures

Freeze-Protection Enclosures

a. Hubbell Hot-Box;

b. Or approved equal

2.02 MATERIALS / EQUIPMENT

A. General Requirements for Piping Specialties

Domestic water piping specialties intended to convey or dispense water for human consumption are to comply with the SDWA, requirements of authorities having jurisdiction, and NSF 61 and NSF 372, or to be certified in compliance with NSF 61 and NSF 372 by an American National Standards

Institute (ANSI)-accredited third-party certification body that the weighted average lead content at wetted surfaces is less than or equal to 0.25 percent.

B. Performance Requirements:

Minimum Working Pressure for Domestic Water Piping Specialties: 125 psig unless otherwise indicated.

C. Backflow Preventers

a. Manufacturers: Subject to compliance with requirements, provide products by one of the following (or an approved equal):

1) Ames Co.
2) Conbraco Industries, Inc.
3) FEBCO; SPX Valve & Control
4) Watts Industries, Inc.; Water Product Div.
5) Zurn Plumbing Products Group; Wilkins Div.

b. Reduced-Pressure-Principle Backflow Preventers.

c. Standard: ASSE 1013.

d. Operation: Continuous-pressure applications.

e. Pressure Loss: 12 psig maximum, through middle 1/3 of flow range.

f. End Connections: Threaded for NPS 2 and smaller; flanged for NPS 2-1/2 and larger.

g. Configuration: Designed for horizontal, straight through.

h. Accessories:

i. Valves: Ball type with threaded ends on inlet and outlet of NPS 2 and smaller; OS&Y gate type with flanged ends on inlet and outlet of NPS 2-1/2 and larger.

j. Air-Gap Fitting: ASME A112.1.2, matching backflow preventer connection.

CI. Water Pressure-Reducing Valves

Water Regulators:

a. Standard: ASSE 1003.

b. Pressure Rating: Initial working pressure of 150 psig (1035 kPa).

c. Size: 2” NPS

d. Design Flow Rate: 27 gpm

e. Design Inlet Pressure: 140 psig.

f. Design Outlet Pressure Setting: 80 psig

g. Body: Bronze with chrome-plated finish for NPS 2 and smaller.

h. End Connections: Threaded or solder for NPS 2 and smaller; flanged or solder for NPS 2-1/2 and NPS 3.

E. Strainers for Domestic Water Piping

F. Y-Pattern Strainers

Pressure Rating: 125 psig minimum unless otherwise indicated.

Body: Bronze for NPS 2 and smaller

End Connections: Threaded for NPS 2 and smaller; flanged for NPS 2-1/2 and larger.

Screen: Stainless steel with round perforations unless otherwise indicated.

Perforation Size:

a. Strainers NPS 2 and Smaller: 0.020 inch

Drain: Pipe plug.

G. Yard Hydrants

Nonfreeze Yard Hydrants : YH

a. Standard: ASME 1057.

b. Type: Nonfreeze, exposed.

c. Operation: Wheel handle or lever.

d. Head: Cast iron or brass, with pail hook.

e. Inlet: NPS 3/4.

f. Length: As required for burial of valve and canister below frost line.

g. Outlet: Garden-hose thread complying with ASME B1.20.7.

h. Drain: Designed with hole to drain into ground when shut off.

i. Vacuum Breaker:

1) Removable hose-connection backflow preventer complying with ASSE 1052.

2) Garden-hose thread complying with ASME B1.20.7 on outlet for field installation.

H. Water Meters

1. Water meters will be furnished by utility company.

2. Manufacturers:

a. Elster Amco Water, LLC

b. Badger Meter, Inc.

c. Hays Fluid Controls.

d. Master Meter, Inc.

e. Mueller Company; Water Products Division.

f. Schlumberger Limited; Water Division.

g. Sensus Metering Systems.

h. Or approved equal.

3. Turbine-Type Water Meters:

1) Description:

a) Standard: AWWA C701.

b) Pressure Rating: 150-psig working pressure.

c) Body Design: Turbine; totalization meter.

d) Registration: In gallons or cubic feet as required by utility company.

e) Case: Bronze.

f) End Connections for Meters NPS 2 and Smaller: Threaded.

g) End Connections for Meters NPS 2-1/2 and Larger: Flanged.

4. Compound-Type Water Meters:

1) Description:

a) Standard: AWWA C702.

b) Pressure Rating: 150-psig working pressure.

c) Body Design: With integral mainline and bypass meters; totalization meter.

d) Registration: In gallons or cubic feet as required by utility company.

e) Case: Bronze.

f) Pipe Connections: Flanged.

5. Remote Registration System:

1) Description: Utility company standard; direct-reading type. Include meter modified with signal-transmitting assembly, low-voltage connecting wiring, and remote register assembly.

a) Standard: AWWA C706.

b) Registration: Flow in gallons or cubic feet.

6. Remote Registration System:

1) Description: Utility company standard; encoder type. Include meter modified with signal-transmitting assembly, low-voltage connecting wiring, and remote register assembly.

a) Standard: AWWA C707.

b) Registration: Flow in gallons or cubic feet.

7. Data-Acquisition Units: Comply with utility company requirements for type and quantity.

8. Visible Display Units: Comply with utility company requirements for type and quantity.

I. Protective Enclosures

1. Freeze-Protection Enclosures:

a. Description: Insulated enclosure designed to protect aboveground water piping, equipment, or specialties from freezing and damage, with heat source to maintain minimum internal temperature of 40 deg F when external temperatures reach as low as minus 34 deg F.

1) Standard: ASSE 1060.

2) Class I-V: For pressure or atmospheric vacuum breaker equipment or devices. Include drain opening in housing.

b. Housing: Reinforced aluminum construction.

1) Size: Of dimensions indicated, but not less than those required for access and service of protected unit.

2) Drain opening for units with drain connection.

3) Access doors with locking devices.

4) Insulation inside housing.

5) Anchoring devices for attaching housing to concrete base.

c. Electric heating cable or heater with self-limiting temperature control.

J. Enclosure Bases:

1. Description: 4-inch minimum thickness precast concrete, of dimensions required to extend at least 6 inches beyond edges of enclosure housings. Include openings for piping.

2.03 FABRICATION / ASSEMBLING / FINISHES

A. Not Used.

2.04 SOURCE QUALITY CONTROL / SHOP TESTS

A. Not Used

PART 3 EXECUTION

3.01 EXAMINATION / PREPARATION

A. Comply with requirements in Section 078413 "Penetration Firestopping" for firestopping materials and installation, for penetrations through fire-rated walls, ceilings, and assemblies.

B. Strength of Support Assemblies: Where not indicated, select sizes of components, so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lb .

3.02 INSTALLATION

A. Valve installation:

1. AWWA Gate Valves: Comply with AWWA C600 and AWWA M44. Install each underground valve with stem pointing up and with valve box.

2. AWWA Valves Other Than Gate Valves: Comply with AWWA C600 and AWWA M44.

3. MSS Valves: Install as component of connected piping system.

4. Corporation Valves and Curb Valves: Install each underground curb valve with head pointed up and with service box.

B. Pressure-Reducing Valves: Install in vault or aboveground between shutoff valves. Install full-size valved bypass.

C. Relief Valves: Comply with AWWA C512. Install aboveground with shutoff valve on inlet.

D. Water Meter Installation

1. Install water meters, piping, and specialties according to utility company's written instructions.

2. Water Meters: Install detector-type water meters in meter vault according to AWWA M6. Include shutoff valves on water meter inlets and outlets and full-size valved bypass around meters. Support meters, valves, and piping on brick or concrete piers.

E. Rough-in for Water Meters

1. Rough-in piping and specialties for water meter installation according to utility company's written instructions.

F. Backflow Preventer Installation

1. Install backflow preventers of type, size, and capacity indicated. Include valves and test cocks. Install according to requirements of plumbing and health department and authorities having jurisdiction.
2. Do not install backflow preventers that have relief drain in vault or in other spaces subject to flooding.
3. Do not install bypass piping around backflow preventers.
4. Support NPS 2-1/2 and larger backflow preventers, valves, and piping near floor and on brick or concrete piers.

G. Protective Enclosure Installation

1. Install concrete base level and with top approximately 4 inches above grade.
2. Install protective enclosure over valves and equipment.
3. Anchor protective enclosure to concrete base.

H. Yard Hydrants: Install with 1 cu. yd. of crushed gravel around drain hole. Set yard hydrants with riser pipe in concrete or pavement.

I. Piping Connections

Drawings indicate general arrangement of piping, fittings, and specialties.

When installing piping specialties adjacent to equipment and machines, allow space for service and maintenance.

J. Electrical Connections

Connect wiring in accordance with Section 260519 "Low-Voltage Electrical Power Conductors and Cables."

Ground equipment in accordance with Section 260526 "Grounding and Bonding for Electrical Systems."

Install electrical devices furnished by manufacturer, but not factory mounted, in accordance with NFPA 70 and NECA 1.

K. Control Connections

Connect control wiring in accordance with Section 260523 "Control-Voltage Electrical Power Cables."

L. Identifications

Plastic Labels for Equipment: Install engraved plastic-laminate equipment nameplate or sign on or near each of the following:

a. Yard hydrants.

Distinguish among multiple units, inform operator of operational requirements, indicate safety and emergency precautions, and warn of hazards and improper operations, in addition to identifying unit. Nameplates and signs are specified in Section 400597 "Identification for Piping and Equipment."

3.03 FIELD TESTING / QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.

B. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect components, assemblies, and equipment installations, including connections.

C. Perform the following tests and inspections with the assistance of a factory-authorized service representative.

D. Test each pressure vacuum breaker and reduced-pressure-principle backflow preventer according to authorities having jurisdiction and the device's reference standard.

E. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.

F. Operational Test: After electrical circuitry has been energized, start units to confirm unit operation.

G. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

H. Domestic water piping specialties will be considered defective if they do not pass tests and inspections.

I. Prepare test and inspection reports.

3.04 STARTUP / DEMONSTRATION

A. Not Used

3.05 ADJUSTING / PROTECTION / CLEANUP

A. ADJUSTING

Set field-adjustable pressure set points of water pressure-reducing valves.

Set field-adjustable flow set points of balancing valves.

Set field-adjustable temperature set points of temperature-actuated, water mixing valves.

Adjust each pressure vacuum breaker and reduced-pressure-principle backflow preventer in accordance with manufacturer's written instructions, authorities having jurisdiction and the device's reference standard.

END OF SECTION

PART 1 GENERAL

1.01 SUMMARY

A. This Section includes domestic water piping and related components.

B. The following index of this Section is presented for convenience:

1.02 PAYMENT

A. No separate payment shall be made for performing any Work required under this Section. All costs for Work required by this Section shall be included in the applicable lump sum, unit price(s) or allowance(s) as set forth in Section 01 27 00 – Measurement and Payment.

1.03 RELATED SECTIONS

A. Section 09 91 00 – Painting.

B. Section 22 11 16 – Domestic Water Piping.

C. Section 33 01 10.60 – Disinfection of Piping, Tanks, Structures, and Equipment.

D. Section 33 05 05 – Buried Piping Installation.

E. Section 33 06 01 – Schedule for Buried Piping.

F. Section 40 05 05 – Exposed Piping Installation.

G. Section 40 05 06 – Couplings, Adapters, and Specials for Process Piping

H. Section 40 05 07 – Hangers and Supports for Process Piping

I. Section 40 06 01 – Schedule for Exposed Piping.

J. Section 40 42 13 – Process Piping Insulation.

1.04 REFERENCES

A. Abbreviations and Acronyms:

1. Not Used.

B. Reference Standards:

1. NSF 61 Drinking Water System Components Health Effects

2. Standards of the EJMA.

3. New York State Building Code.

1.05 DESCRIPTION

A. This Section includes requirements for providing electric, domestic water-heaters and accessories in accordance with applicable standards and regulations. In addition:

1. Electric, domestic water-heaters shall be furnished complete with all accessories, attachments, fastenings, and other appurtenances as specified and/or as may be required for a satisfactory installation.

2. Electric, domestic water-heaters shall conform to the requirements of the New York State Building Code.

3. Electric, domestic water-heaters, fittings, appurtenances, and specials shall be furnished and installed complete with all necessary jointing materials, wall castings, wall sleeves, specials, adapters, and other appurtenances as shown on the Contract Drawings, as specified herein, and/or as necessary and required for a complete installation.

4. Where shown on the Contract Drawings, the Contractor shall provide all labor and materials for making connections between copper and brass process pipe and existing lines(s) installed under other contracts, including all specials required to connect copper and brass process pipe to pipe of dissimilar material(s).

1.06 QUALITY ASSURANCE

A. Qualifications of Manufacturer:

1. The manufacturer shall have a minimum of five (5) years of experience in the design and fabrication of copper and brass process pipe, fittings, appurtenances, and specials of similar size, capacity, and type to those shown on the Contract Drawings and specified in the Contract Documents and shall show evidence of at least five (5) substantially similar installations in satisfactory operation.

B. Supply and Compatibility:

1. All electric, domestic-water heaters, appurtenances, and specials included in this section shall be provided by the Contractor through a single, qualified copper and brass process pipe manufacturer.

2. The domestic water heaters shall be designed, fabricated, and installed in accordance with standards referenced herein.

3. The manufacturer shall verify compatibility between the domestic water heater, fittings, appurtenances, specials, and other Work.

C. Regulatory Requirements:

1. Electric, domestic water heaters shall conform to the New York State Plumbing Code.

2. Use only NSF61-approved materials in potable water lines.

D. Piping materials shall bear label, stamp, or other markings of specified testing agency.

1.07 SUBMITTALS

A. Action Submittals

1. Product Data: For each type of product indicated.

2. Shop Drawings: Detail precast concrete vault assemblies and indicate dimensions, method of field assembly, and components.

3. Wiring Diagrams: Power, signal, and control wiring for alarms.

B. Informational Submittals

1. Coordination Drawings: Equipment room drawing or BIM model, drawn to scale, on which the items described in this Section are shown and coordinated with all building trades.

2. Seismic Qualification Data: Certificates, for commercial domestic-water heaters, accessories, and components, from manufacturer.

a. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.

b. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.

c. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.

3. Product Certificates: For each type of commercial and tankless, electric, domestic-water heater.

4. Domestic-Water Heater Labeling: Certified and labeled by testing agency acceptable to authorities having jurisdiction.

5. Source quality-control reports.

6. Field quality-control reports.

7. Sample Warranty: For special warranty.

C. Closeout Submittals

1. Operation and Maintenance Data: For water valves and specialties to include in emergency, operation, and maintenance manuals.

1.08 DELIVERY, STORAGE, AND HANDLING

A. The Contractor shall deliver materials provided under this Section in accordance with the requirements of the Contract Documents.

B. The Contractor shall store and handle materials provided under this Section in accordance with the requirements of the Contract Documents.

1.09 COORDINATION

A. Coordinate sizes and locations of concrete bases with actual equipment provided.

1.10 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES

A. Not Used

1.11 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS

A. Warranty: The Contractor shall obtain from the Manufacturer and provide to DEP the Manufacturer's standard warranty, in an acceptable form, warranting against defects in design, materials, abnormal aging, and workmanship.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Electric, Tankless, Domestic-Water Heaters:

1. Bradley Corporation Menomonee Falls, WI;

2. Eemax, Inc., Waterbury, CT;

3. Or approved equal.

2.02 MATERIALS / EQUIPMENT

A. Electric Domestic-Water Heaters:

1. Thermostat-Control, Electric, Tankless, Domestic-Water Heaters:

2. Source Limitations: Obtain domestic-water heaters from single source from single manufacturer.
3. Standard: UL 499 for electric, tankless, (domestic-water-heater) heating appliance.
4. Construction: Copper piping or tubing complying with NSF 61 and NSF 372 barrier materials for potable water, without storage capacity.
    a. Connections: ASME B1.20.1 pipe thread.
    b. Pressure Rating: 150 psig.
    c. Heating Element: Resistance heating system.
    d. Temperature Control: Thermostat.
    e. Safety Control: High-temperature-limit cutoff device or system.
    f. Jacket: Aluminum or steel with enameled finish.
5. Support: Bracket for wall mounting.
6. Capacity and Characteristics:
    a. Flow Rate: 20 gpm at 40 deg F temperature rise.
        1) Temperature Setting: 80 deg F:
            a) Power Demand: 126 kW
            b) Electrical Characteristics:
                (1) Volts: 480 V.
                (2) Phases: Three.
                (3) Hertz: 60 Hz.
                (4) Full-Load Amperes: 152 A.

B. Pressure-Reducing Valves: ASSE 1003 for water. Set at 25-psig- (172.5-kPa-) maximum outlet pressure unless otherwise indicated.

C. Combination Temperature-and-Pressure Relief Valves: ASME rated and stamped. Include relieving capacity at least as great as heat input, and include pressure setting less than working-pressure rating of domestic-water heater. Select relief valves with sensing element that extends into storage tank.

D. Pressure Relief Valves: ASME rated and stamped. Include pressure setting less than working-pressure rating of domestic-water heater.

E. Vacuum Relief Valves: ANSI Z21.22/CSA 4.4.

F. Shock Absorbers: ASSE 1010 or PDI-WH 201, Size A water hammer arrester.

G. Domestic-Water Heater Stands: Manufacturer's factory-fabricated steel stand for floor mounting, capable of supporting domestic-water heater and water. Include

dimension that will support bottom of domestic-water heater a minimum of 18 inches above the floor.

H. Domestic-Water Heater Mounting Brackets: Manufacturer's factory-fabricated steel bracket for wall mounting, capable of supporting domestic-water heater and water

2.03 FABRICATION / ASSEMBLING / FINISHES

A. Not Used.

2.04 SOURCE QUALITY CONTROL / SHOP TESTS

A. Factory Tests: Test and inspect domestic-water heaters specified to be ASME-code construction, in accordance with ASME Boiler and Pressure Vessel Code.

B. Hydrostatically test commercial domestic-water heaters to minimum of one and one-half times pressure rating before shipment.

C. Electric, domestic-water heaters will be considered defective if they do not pass tests and inspections.

D. Prepare test and inspection reports.

PART 3 EXECUTION

3.01 EXAMINATION / PREPARATION

A. Damaged equipment will be rejected and shall be replaced at the Contractor's expense.

B. Comply with requirements in Section 078413 "Penetration Firestopping" for firestopping materials and installation, for penetrations through fire-rated walls, ceilings, and assemblies.

C. Strength of Support Assemblies: Where not indicated, select sizes of components, so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lb.

3.02 INSTALLATION

A. Electric, Tankless, Domestic-Water Heater Mounting: Install electric, tankless, domestic-water heaters on wall bracket or with support legs.

1. Maintain manufacturer's recommended clearances.

2. Arrange units so controls and devices that require servicing are accessible.

3. Place and secure anchorage devices. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

4. Install anchor bolts to elevations required for proper attachment to supported equipment.

5. Anchor domestic-water heaters to substrate.

B. Install electric, domestic-water heaters level and plumb, in accordance with layout drawings, original design, and referenced standards. Maintain manufacturer's recommended clearances. Arrange units so controls and devices needing service are accessible.

1. Install shutoff valves on domestic-water-supply piping to domestic-water heaters and on domestic-hot-water outlet piping. Comply with requirements for shutoff valves.

C. Install combination temperature-and-pressure relief valves in water piping for electric, domestic-water heaters without storage. Extend domestic-water heater relief-valve outlet, with drain piping same as domestic-water piping in continuous downward pitch, and discharge by positive air gap onto closest floor drain.

D. Install thermometers on outlet piping of electric, domestic-water heaters. Comply with requirements for thermometers specified in Section 220519 "Meters and Gages for Plumbing Piping."

E. Assemble and install inlet and outlet piping manifold kits for multiple electric, domestic-water heaters. Fabricate, modify, or arrange manifolds for balanced water flow through each electric, domestic-water heater. Include shutoff valve and thermometer in each domestic-water heater inlet and outlet, and throttling valve in each electric, domestic-water heater outlet. Comply with requirements for valves specified.

F. Fill electric, domestic-water heaters with water.

G. Install dielectric fittings in all locations where piping of dissimilar metals is to be joined. The wetted surface of the dielectric fitting contacted by potable water shall contain less than 0.25 percent of lead by weight.

3.03 PIPING CONNECTIONS:

A. Comply with requirements for piping specified in Section 221116 "Domestic Water Piping." Drawings indicate general arrangement of piping, fittings, and specialties.

B. Where installing piping adjacent to electric, domestic-water heaters, allow space for service and maintenance of water heaters. Arrange piping for easy removal of domestic-water heaters.

3.04 FIELD TESTING / QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.

B. Testing Agency: Engage a qualified testing agency to perform tests and inspections.

C. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect components, assemblies, and equipment installations, including connections.

D. Perform tests and inspections with the assistance of a factory-authorized service representative.

E. Tests and Inspections:

1. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.

2. Operational Test: After electrical circuitry has been energized, start units to confirm proper operation.

3. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

F. Electric, domestic-water heaters will be considered defective if they do not pass tests and inspections.

G. Prepare test and inspection reports.

3.05 STARTUP / DEMONSTRATION

A. Engage a factory-authorized service representative to train owner's maintenance personnel to adjust, operate, and maintain commercial and tankless, electric, domestic-water heaters. Training shall be a minimum of one hour(s).

3.06 ADJUSTING / PROTECTION / CLEANUP

1. During construction, all equipment shall be thoroughly cleaned before placement and the lines kept free from foreign matter of whatever origin. The pipes shall be left thoroughly clean to the satisfaction of the Engineer.

END OF SECTION

SECTION 22 40 00 – PLUMBING FIXTURES
CONTRACT KENS-EAST-2

PART 1 GENERAL

1.01 SUMMARY

A. The Contractor shall provide all labor, materials, equipment, incidentals, and appurtenances as shown, specified and required, to furnish, install and test all emergency plumbing fixtures, complete and operational.

B. The following index of this Section is presented for convenience:

C. Plumbing fixtures shall be as indicated in the Plumbing Fixture Schedule as shown on the Contract Drawings.

1.02 PAYMENT

A. No separate payment shall be made for performing any Work required under this Section. All costs for Work required by this Section shall be included in the applicable lump sum, unit price(s) or allowance(s) as set forth in Section 01 27 00 – Measurement and Payment.

1.03 RELATED SECTIONS