1. Section 400506   
   Couplings, Adapters, and Specials for Process Piping
   1. PART 1  GENERAL
      1. SECTION INCLUDES
         1. Check valves.
         2. Backflow preventers.
         3. Pressure reducing valves.
         4. Pressure relief valves.
         5. Air release devices.
         6. Vacuum breakers.
         7. Sample ports.
         8. Strainers.
         9. Flanges, unions, and couplings.
         10. Valved drains.
         11. Piping and equipment insulation.
         12. Electrical heat tracing tape.
      2. RELATED REQUIREMENTS
         1. Section 134713 - Cathodic Protection:  Cathodic protection for buried steel, ductile iron, gray iron, and stainless steel components.
         2. Section 400552 - Process Valves:  Valves for process control.
         3. Section 402340 - Sanitary Wastewater Process Piping:  Requirements for connections to piping.
         4. Section 460106 - Operation and Maintenance Manual:  Operating and Maintenance Data.
         5. Section 460500 - Common Work Results For Water and Wastewater Equipment:  Requirements applicable to all equipment.
      3. REFERENCE STANDARDS
         1. ASME B1.20.1 - Pipe Threads, General Purpose, Inch; 2013 (Reaffirmed 2018).
         2. ASME B1.20.2M - Pipe Threads, 60 Deg, General Purpose; 2006 (Reaffirmed 2011).
         3. ASME B16.1 - Gray Iron Pipe Flanges and Flanged Fittings: Classes 25, 125, and 250; 2020.
         4. ASME B16.5 - Pipe Flanges and Flanged Fittings: NPS 1/2 through NPS 24 Metric/Inch Standard; 2020.
         5. ASME B31.3 - Process Piping; 2024.
         6. ASSE 1001 - Performance Requirements for Atmospheric Type Vacuum Breakers; 2021.
         7. ASSE 1012 - Performance Requirements for Backflow Preventers with an Intermediate Atmospheric Vent; 2021.
         8. ASSE 1013 - Performance Requirements for Reduced Pressure Principle Backflow Prevention Assemblies; 2021.
         9. ASSE 1015 - Performance Requirements for Double Check Backflow Prevention Assemblies; 2021.
         10. ASSE 1020 - Performance Requirements for Pressure Vacuum Breaker Assemblies; 2020.
         11. ASTM A47/A47M - Standard Specification for Ferritic Malleable Iron Castings; 1999, with Editorial Revision (2022).
         12. ASTM C552 - Standard Specification for Cellular Glass Thermal Insulation; 2022.
         13. ASTM F1199 - Standard Specification for Cast (All Temperatures and Pressures) and Welded Pipe Line Strainers (150 psig and 150°F Maximum); 2021.
         14. ASTM F1200 - Standard Specification for Fabricated (Welded) Pipe Line Strainers (Above 150 psig and 150°F (1 MPa and 65°C)); 2021a.
         15. AWWA C508 - Swing-Check Valves for Waterworks Service, 2-In. Through 48-In. (50-mm Through 1,200-mm) NPS; 2017.
         16. AWWA C510 - Double Check-Valve Backflow Prevention Assembly; 2017 (Reaffirmed 2021).
         17. AWWA C511 - Reduced-Pressure Principle Backflow Prevention Assembly; 2017 (Reaffirmed 2021).
         18. AWWA C606 - Grooved and Shouldered Joints; 2022.
      4. SUBMITTALS
         1. See Section 013000 - Administrative Requirements,  and Section 460500 for submittal procedures.
         2. Product Data:  Manufacturer's data sheets for each item of equipment and material provided, showing compliance with requirements; include materials, pressure ratings, seats and seals, clearances for operation and maintenance, and other characteristics.
         3. Operating and Maintenance Data:  See Section 460106.
         4. Maintenance Materials:
            1. For Each Type and Size of Valve:

Lubricator, lubricant of appropriate temperature rating, lubricator/isolating valve.

Gaskets; 2 each.

O-ring seals; 2 each.

Diaphragms (molded); 2 each.

All other parts made of elastomeric materials; 2 each.

Stem packing; 2 each.

Seat rings; 2 each and seat ring pulling tool.

* + - * 1. One set of special tools necessary for adjustment, operation, maintenance and disassembly.
    1. QUALITY ASSURANCE
       1. Manufacturer Qualifications:  Company specializing in manufacturing the Products specified in this section with not less than one years documented experience.
  1. PART 2  PRODUCTS
     1. GENERAL REQUIREMENTS
        1. Valve and Equipment Inlet, Outlet, and End Connections:  To suit pipe jointing method specified for pipe in which item is to be installed.
     2. BACKFLOW PREVENTERS
        1. Manufacturers:
           1. Zurn Industries, Inc:  www.zurn.com/#sle.
     3. PRESSURE REDUCING VALVES
        1. Manufacturers:
           1. Zurn Industries, LLC; ZW209:  www.zurn.com/#sle.
        2. Size 1/2 inch (15 mm, DN) and Larger:
           1. Inlet:  Up to \_\_\_\_ gpm (\_\_\_\_ Lpm) at inlet pressure of  \_\_\_\_ psi (\_\_\_\_ kPa).
           2. Outlet:  Pressure set at \_\_\_\_ psi (\_\_\_\_ kPa).
           3. Function:  Normally open to maintain constant downstream pressure regardless of fluctuations in flow or upstream pressure and prevent backflow; externally mounted strainers with cocks.
           4. Operation:  Direct operated, diaphragm actuated, pilot controlled
           5. Body:  Angle design; cast iron.
           6. Trim and Stem:  Stainless steel.
     4. VENTING DEVICES
        1. Manufacturers:
           1. Zurn Industries, Inc:  www.zurn.com/#sle.
  2. PART 3  EXECUTION
     1. EXAMINATION
        1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
     2. PREPARATION
        1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
     3. INSTALLATION
        1. Install in accordance with manufacturer's instructions.
        2. Automatic Valve Systems:  Provide the services of equipment manufacturer's technician to supervise installation, adjustment, start-up, demonstration, and testing.
        3. Backflow Preventers:  Install in accordance with applicable codes.
           1. Install with nameplate and test cocks accessible from front of unit, with a minimum clearance between port and grade of 12 inches (305 mm).  Avoid vertical installation.
        4. Sample Ports:  Locate where easily accessible; avoid potential stagnant points and other areas where sample taken might not be typical.
        5. Insulation:  Install insulation and jacketing weather tight and in accordance with manufacturer's instructions.
        6. Heat Tracing Tape:  Install in accordance with manufacturer's instructions.
     4. FIELD QUALITY CONTROL - PRIOR TO STARTUP
        1. Demonstrate proper operation of each equipment item.
        2. Valves:  Demonstration may occur while testing pipelines or as a separate step.
           1. Exception:  Demonstrate operation of air and vacuum relief valves as the pipe is being filled to verify venting and seating.
           2. Show that valves open and close smoothly with operating pressure on one side and atmospheric pressure on the other, and in both directions for two-way valve applications.
           3. Count and record the number of turns required to open and close each valve, and account for any discrepancies with manufacturer's data.
        3. Relief and Regulating Valves:  Set, verify, and record pressure settings.
        4. Self-Actuating Valves:  Demonstrate at both maximum and minimum operating ranges and reset upon completion to design value.
     5. Owner PERSONNEL TRAINING
        1. See Section 460500 for additional requirements.
        2. Content:  For identical equipment in multiple locations, identify all locations and any variations in function.
        3. Operating Personnel Training:
           1. Sessions:  One.
           2. Trainees:  Two.
           3. Training Hours:  1, minimum, per unique equipment item.
        4. Maintenance Personnel Training:
           1. Sessions:  One.
           2. Trainees:  Two.
           3. Training Hours:  1, minimum, per unique equipment item.
     6. FIELD QUALITY CONTROL - AFTER STARTUP
        1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

1. END OF SECTION