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For more information, contact Caleffi North America, 3883 W. Milwaukee Rd., Milwaukee, WI 53208; Phone: (414) 238-2360; Fax: (414) 238-2366; Website: [www.caleffi.com](http://www.caleffi.com/); Email: [Woody.Dickinson@caleffi.com](mailto:Woody.Dickinson@caleffi.com).

For information about MasterSpec, contact Deltek at (800) 424-5080 or visit [masterspec.com](http://masterspec.com/).

SECTION 221119 - DOMESTIC WATER PIPING SPECIALTIES

**TIPS:**

To view non-printing **Editor's Notes** that provide guidance for editing, click on MasterWorks/Single-File Formatting/Toggle/Editor's Notes.

To read **detailed research, technical information about products and materials, and coordination checklists**, click on MasterWorks/Supporting Information.

**Access Product MasterSpec Sections:**

[<Double click here to view the list of manufacturer Sections available at ProductMasterSpec.com>](https://www.productmasterspec.com/default.aspx?orderby=manufacturer&view=)

Revise this Section by deleting and inserting text to meet Project-specific requirements.

1. GENERAL
   * + 1. SUMMARY
          1. Section Includes:

Vacuum breakers.

Backflow preventers.

Water pressure-reducing valves.

Automatic water shutoff valve systems.

Balancing valves.

Temperature-actuated, water mixing valves.

In-line check valves.

Strainers for domestic water piping.

Outlet boxes.

Hose stations.

Hose bibbs.

Wall hydrants.

Ground hydrants.

Post hydrants.

Roof hydrants.

Drain valves.

Water-hammer arresters.

Trap-seal primer device.

Trap-seal primer systems.

Flexible connectors.

Water meters.

Automatic air vent.

* + - * 1. Related Requirements:

Retain subparagraphs below to cross-reference requirements Contractor might expect to find in this Section but are specified in other Sections.

Section 211100 "Facility Fire-Suppression Water-Service Piping" for fire water-service backflow prevention devices.

Section 220519 "Meters and Gauges for Plumbing Piping" for thermometers, pressure gauges, and flow meters in domestic water piping.

Section 221116 "Domestic Water Piping" for water meters.

Section 223200 "Domestic Water Filtration Equipment" for water filters in domestic water piping.

Section 224300 "Healthcare Plumbing Fixtures" for thermostatic mixing valves for sitz baths, thermostatic mixing-valve assemblies for hydrotherapy equipment, and outlet boxes for dialysis equipment.

Section 224500 "Emergency Plumbing Fixtures" for water tempering equipment.

Section 224716 "Pressure Water Coolers" for water filters for water coolers.

Section 224723 "Remote Water Coolers" for water filters for water coolers.

Section 230923.18 "Leak Detection Instruments" for leak detection devices related to HVAC applications.

* + - 1. DEFINITIONS

Retain terms that remain after this Section has been edited for a project. Include only essential definitions or acronyms not well understood by the affected industry or trade.

* + - * 1. AMI: Advanced Metering Infrastructure.
        2. AMR: Automatic Meter Reading.
        3. FKM: A family of fluoroelastomer materials defined by ASTM D1418.
      1. ACTION SUBMITTALS

Action submittals are submittals requiring responsive action and return of reviewed documents to Contractor.

* + - * 1. Product Data: For each type of product.
        2. Shop Drawings: For domestic water piping specialties.

Include diagrams for power, signal, and control wiring.

* + - 1. INFORMATIONAL SUBMITTALS

Informational submittals are submittals that require review by Architect, but they do not require Architect's responsive action and return of reviewed documents to Contractor, provided submittals comply with requirements. If rejected, submittals with responsive action must be returned to Contractor.

* + - * 1. Test and inspection reports.

Retain "Field quality-control reports" Paragraph below if Contractor is responsible for field-quality control testing and inspecting.

* + - * 1. Field quality-control reports.
      1. CLOSEOUT SUBMITTALS
         1. Operation and Maintenance Data: For domestic water piping specialties to include in emergency, operation, and maintenance manuals.

1. PRODUCTS

Manufacturers and products listed in this Section are neither recommended nor endorsed by the AIA or Deltek. Before selecting manufacturers and products, verify availability, suitability for intended applications, and compliance with minimum performance requirements. For definitions of terms and requirements for Contractor's product selection, see Section 016000 "Product Requirements."

Product options commonly available from manufacturers are included in square brackets throughout the Section Text. Not every manufacturer listed can provide every option offered; verify availability with manufacturers. For definitions of terms and requirements for Contractor's product selection, see Section 016000 "Product Requirements."

* + - 1. GENERAL REQUIREMENTS FOR PIPING SPECIALTIES

Since January 2014, the U.S. Safe Drinking Water Act (SDWA) has required national compliance with less than or equal to 0.25 percent weighted average lead content at wetted surfaces for pipe, fittings, and devices intended to convey or dispense water for human consumption. The IPC and the UPC have the same requirements. Items in compliance with NSF 61 and NSF 372 also meet this requirement. Some manufacturers choose to meet this requirement through independent testing and have "Certified Lead-Free" products, which may or may not have NSF 61 or NSF 372 certification.

* + - * 1. 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.
      1. PERFORMANCE REQUIREMENTS

Coordinate this article with Section 221116 "Domestic Water Piping."

* + - * 1. Minimum Working Pressure for Domestic Water Piping Specialties: [**125 psig (860 kPa)**] <**Insert value**> unless otherwise indicated.
      1. VACUUM BREAKERS

Insert drawing designation. Use these designations on Drawings to identify each product.

Copy "Pipe-Applied, Atmospheric-Type Vacuum Breakers" Paragraph below and re-edit for each type of vacuum breaker required. If only one type is required, drawing designation may be omitted.

Pipe-applied, atmospheric-type vacuum breakers below are for moderate to high hazard and are available in NPS 1/4 to NPS 3 (DN 8 to DN 80). They are unsuitable for continuous pressure or for protection from backflow.

* + - * 1. Pipe-Applied, Atmospheric-Type Vacuum Breakers <**Insert drawing designation if any**>:

Retain "Manufacturers" Subparagraph and list of manufacturers below to require products from manufacturers listed or a comparable product from other manufacturers.

Manufacturers: Subject to compliance with requirements, provide products by one of the following:

Apollo Flow Controls; Conbraco Industries, Inc.

Cash Acme; a division of Reliance Worldwide Corporation.

FEBCO; A WATTS Brand.

WATTS.

Zurn Industries, LLC.

<**Insert manufacturer's name**>.

Standard: ASSE 1001.

Size: NPS 1/4 to NPS 3 (DN 8 to DN 80), as required to match connected piping.

Body: Bronze.

Inlet and Outlet Connections: Threaded.

Finish: [**Rough bronze**] [**Chrome plated**].

Copy "Hose-Connection Vacuum Breakers" Paragraph below and re-edit for each type of vacuum breaker required. If only one type is required, drawing designation may be omitted.

Hose-connection vacuum breakers below are for low hazard and are unsuitable for continuous pressure. Outlet size is garden-hose thread.

* + - * 1. Hose-Connection Vacuum Breakers <**Insert drawing designation if any**>:

Retain "Manufacturers" Subparagraph and list of manufacturers below to require products from manufacturers listed or a comparable product from other manufacturers.

Manufacturers: Subject to compliance with requirements, provide products by one of the following:

Apollo Flow Controls; Conbraco Industries, Inc.

Cash Acme; a division of Reliance Worldwide Corporation.

Champion - Arrowhead.

Legend Valve & Fitting, Inc.

MIFAB, Inc.

WATTS.

Woodford Manufacturing Company.

Zurn Industries, LLC.

<**Insert manufacturer's name**>.

Standard: ASSE 1011.

Body: Bronze, non-removable, with manual drain.

Outlet Connection: Garden-hose threaded complying with ASME B1.20.7.

Finish: [**Chrome or nickel plated**] [**Rough bronze**].

Copy "Pressure Vacuum Breakers" Paragraph below and re-edit for each type of vacuum breaker required. If only one type is required, drawing designation may be omitted.

Pressure vacuum breakers below are for moderate to high hazard and are available in NPS 1/2 to NPS 2 (DN 15 to DN 50).

* + - * 1. Pressure Vacuum Breakers <**Insert drawing designation if any**>:

Retain "Manufacturers" Subparagraph and list of manufacturers below to require products from manufacturers listed or a comparable product from other manufacturers.

Manufacturers: Subject to compliance with requirements, provide products by one of the following:

Apollo Flow Controls; Conbraco Industries, Inc.

FEBCO; A WATTS Brand.

WATTS.

Zurn Industries, LLC.

<**Insert manufacturer's name**>.

Standard: ASSE 1020.

Operation: Continuous-pressure applications.

Pressure Loss: [**5 psig (35 kPa)**] <**Insert value**> maximum, through middle third of flow range.

Size: <**Insert NPS (DN)**>.

Design Flow Rate: <**Insert gpm (L/sec)**>.

Selected Unit Flow Range Limits: <**Insert gpm (L/sec)**>.

Pressure Loss at Design Flow Rate: <**Insert psig (kPa)**>.

Accessories:

Valves: Ball type, on inlet and outlet.

Copy "Laboratory-Faucet Vacuum Breakers" Paragraph below and re-edit for each type of vacuum breaker required. If only one type is required, drawing designation may be omitted.

Laboratory-faucet vacuum breakers below are for moderate to low hazard and are available in NPS 1/4 and NPS 3/8 (DN 8 and DN 10).

* + - * 1. Laboratory-Faucet Vacuum Breakers <**Insert drawing designation if any**>:

Retain "Manufacturers" Subparagraph and list of manufacturers below to require products from manufacturers listed or a comparable product from other manufacturers.

[Manufacturers:](http://www.specagent.com/Lookup?ulid=2004) Subject to compliance with requirements, provide products by one of the following:

[Apollo Flow Controls; Conbraco Industries, Inc](http://www.specagent.com/Lookup?uid=123457159710).

[WATTS](http://www.specagent.com/Lookup?uid=123457159711).

[Zurn Industries, LLC](http://www.specagent.com/Lookup?uid=123457159713).

<**Insert manufacturer's name**>.

Standard: ASSE 1035.

Size: NPS 1/4 or NPS 3/8 (DN 8 or DN 10) matching faucet size.

Body: Bronze.

End Connections: Threaded.

Finish: Chrome plated.

Copy "Spill-Resistant Vacuum Breakers" Paragraph below and re-edit for each type of vacuum breaker required. If only one type is required, drawing designation may be omitted.

Spill-resistant vacuum breakers below are for high hazard and are available in NPS 3/8 to NPS 1 (DN 10 to DN 25).

* + - * 1. Spill-Resistant Vacuum Breakers <**Insert drawing designation if any**>:

Retain "Manufacturers" Subparagraph and list of manufacturers below to require products from manufacturers listed or a comparable product from other manufacturers.

Manufacturers: Subject to compliance with requirements, provide products by one of the following:

Apollo Flow Controls; Conbraco Industries, Inc.

Zurn Industries, LLC.

<**Insert manufacturer's name**>.

Standard: ASSE 1056.

Operation: Continuous-pressure applications.

Size: [**NPS 3/8 (DN 10)**] [**NPS 1/2 (DN 15)**] [**NPS 3/4 (DN 20)**] [**NPS 1 (DN 25)**].

Accessories:

Valves: Ball type, on inlet and outlet.

* + - 1. BACKFLOW PREVENTERS

Insert drawing designation. Use these designations on Drawings to identify each product.

Copy "Intermediate Atmospheric-Vent Backflow Preventers" Paragraph below and re-edit for each type of backflow preventer required. If only one type is required, drawing designation may be omitted.

Intermediate atmospheric-vent backflow preventers below are for moderate hazard and are available in NPS 1/2 and NPS 3/4 (DN 15 and DN 20).

* + - * 1. Intermediate Atmospheric-Vent Backflow Preventers <**Insert drawing designation if any**>:

Retain "Basis-of-Design Product" Subparagraph and list of manufacturers below to require a specific product or a comparable product from manufacturers listed.

For more information on 573 Series, see [www.caleffi.com/usa/en-us/catalogue/dual-check-backflow-preventer-573403a](https://www.caleffi.com/usa/en-us/catalogue/dual-check-backflow-preventer-573403a).

Basis-of-Design Product: Subject to compliance with requirements, provide product by Caleffi North America; 573 Series FlowShield DuC-AV or comparable product by one of the following:

Apollo Flow Controls; Conbraco Industries, Inc.

WATTS.

<**Insert manufacturer's name**>.

Standards:

ASSE 1012-2021, by ICC-ES, file PMG 1359.

CSA B64.3-94, file 219199.

NSF/ANSI/CAN 372 low-lead laws, as certified by ICC-ES.

NSF/ANSI/CAN 372, California HSC 116875, United States S.3874, Vermont Act 193, and Maryland HB 372 compliant, certified by ICC-ES, file PMG 1360.

Operation: Continuous-pressure applications.

Size: [**NPS 1/2 (DN 15)**] [**NPS 3/4 (DN 20)**].

Union End Connections: [**NPT female threaded**] [**Press**] [**Solder**].

Body Material: DZR low-lead brass.

In "Diaphragm and Seals" Subparagraph below, peroxide-cured EPDM is resistant to water treated with chlorine or chloramine for longer life expectancy.

Diaphragm and Seals: Peroxide-cured EPDM.

Filter: Stainless steel, 35 mesh (0.0474 mm).

Maximum Working Pressure: 175 psig (1207 kPa).

Working Temperature Range: 210 deg F (99 deg C).

"Flow Capacity" Subparagraph below indicates Cv, which is defined as flowing 1 gpm (0.23 cu. m/h) at 1 psi (0.07 bar) pressure drop for determining flow-resistance pump sizing.

Flow Capacity: Cv 0.7 (Kv 0.6).

Emergency Backpressure Temperature: 250 deg F (121 deg C).

Copy "Testable Reduced-Pressure-Principle Backflow Preventers" Paragraph below and re-edit for each type of backflow preventer required. If only one type is required, drawing designation may be omitted.

Testable reduced-pressure-principle backflow preventers below are for high hazard and are available in NPS 1/2 to NPS 2 (DN 15 to DN 50).

* + - * 1. Testable Reduced-Pressure-Principal Backflow Preventers <**Insert drawing designation if any**>:

Retain "Basis-of-Design Product" Subparagraph and list of manufacturers below to require a specific product or a comparable product from manufacturers listed.

For more information on 574 Series, see:

[www.caleffi.com/usa/en-us/catalogue/backflow-preventer-rpz-type-low-lead-12-574004a](https://www.caleffi.com/usa/en-us/catalogue/backflow-preventer-rpz-type-low-lead-12-574004a), [www.caleffi.com/usa/en-us/catalogue/backflow-preventer-rpz-type-low-lead-34-and-1-574050a](https://www.caleffi.com/usa/en-us/catalogue/backflow-preventer-rpz-type-low-lead-34-and-1-574050a), [www.caleffi.com/usa/en-us/catalogue/backflow-preventer-rpz-type-low-lead-114-574700a](https://www.caleffi.com/usa/en-us/catalogue/backflow-preventer-rpz-type-low-lead-114-574700a),

[www.caleffi.com/usa/en-us/catalogue/backflow-preventer-rpz-type-low-lead-112-574801a](http://www.caleffi.com/usa/en-us/catalogue/backflow-preventer-rpz-type-low-lead-112-574801a), and www.caleffi.com/usa/en-us/catalogue/backflow-preventer-rpz-type-low-lead-2-574900a.

Basis-of-Design Product: Subject to compliance with requirements, provide product by Caleffi North America; 574 Series FlowShield RP or comparable product by one of the following:

Apollo Flow Controls; Conbraco Industries, Inc.

WATTS.

<**Insert manufacturer's name**>.

Standards:

Listed and certified by ASSE to Standard 1013, Seal Number 1748.

CSA B64.4 and AWWA C500 compliant, certified by ICC-ES, file PMG 1433.

NSF/ANSI/CAN 61 compliant, certified by ICC-ES, file PMG 1512.

NSF/ANSI/CAN 372, California HSC 116875, United States S.3874, Vermont Act 193, and Maryland HB 372 compliant, certified by ICC-ES, file PMG 1360.

Valve:

Equipped with upstream, intermediate, and downstream pressure zone test top-mounted test ports for easy access.

Equipped with PVC discharge air gap assembly with collar fitting to discharge pipe.

Operation: Continuous-pressure applications.

Pressure Loss: [**14 psig (83 kPa)**] <**Insert value**> maximum, through middle third of flow range.

Size: [**NPS 1/2 (DN 15)**] [**NPS 3/4 (DN 20)**] [**NPS 1 (DN 25)**] [**NPS 1-1/4 (DN 32)**] [**NPS 1-1/2 (DN 40)**] [**NPS 2 (DN 50)**].

In "Body and Cover Material" Subparagraph below, not all manufacturers offer certified low-lead brass.

Body and Cover Material: DZR low-lead brass.

End Connections: [**NPT female** **threaded**] [**Press**].

In "Diaphragm and Seals" Subparagraph below, peroxide-cured EPDM is resistant to water treated with chlorine or chloramine for longer life expectancy.

Diaphragm and Seals: Peroxide-cured EPDM.

Configuration: Designed for horizontal installation only.

Maximum Working Pressure: 150 psig (1034 kPa).

Maximum Working Temperature: 150 deg F (66 deg C).

"Flow Capacity" Subparagraph below indicates Cv, which is defined as flowing 1 gpm (0.23 cu. m/h) at 1 psi (0.07 bar) pressure drop for determining flow-resistance pump sizing.

Flow Capacity:

NPS 1/2 (DN 15): Cv 3.5 (Kv 3.0).

NPS 3/4 (DN 20): Cv 8.0 (Kv 6.9).

NPS 1 (DN 25): Cv 12.0 (Kv 10.3).

NPS 1-1/4 (DN 32): Cv 19.5 (Kv 16.8).

NPS 1-1/2 (DN 40): Cv 32 (Kv 27.6).

NPS 2 (DN 50): Cv 51.0 (Kv 44.0).

Isolation Ball Valve: Inlet and outlet.

Ball Valve Body Material: Bronze.

Ball: Type 304 stainless steel.

Handle and Nut: Steel.

Seat Ring and Packing Gland: PTFE.

Stem: Low-lead brass.

Copy "Double-Check, Backflow-Prevention Assemblies" Paragraph below and re-edit for each type of backflow-prevention assembly required. If only one type is required, drawing designation may be omitted.

Double-check, backflow-prevention assemblies below are for low hazard and are available in NPS 3/4 to NPS 10 (DN 20 to DN 250).

* + - * 1. Double-Check, Backflow-Prevention Assemblies <**Insert drawing designation if any**>:

Retain "Manufacturers" Subparagraph and list of manufacturers below to require products from manufacturers listed or a comparable product from other manufacturers.

Manufacturers: Subject to compliance with requirements, provide products by one of the following:

Ames Fire & Waterworks; A WATTS Brand.

Apollo Flow Controls; Conbraco Industries, Inc.

FEBCO; A WATTS Brand.

WATTS.

Zurn Industries, LLC.

<**Insert manufacturer's name**>.

Standard: ASSE 1015.

Operation: Continuous-pressure applications unless otherwise indicated.

Pressure Loss: [**5 psig (35 kPa)**] <**Insert value**> maximum, through middle third of flow range.

Size: <**Insert NPS (DN)**>.

Design Flow Rate: <**Insert gpm (L/sec)**>.

Selected Unit Flow Range Limits: <**Insert gpm (L/sec)**>.

Pressure Loss at Design Flow Rate: <**Insert psig (kPa)**> for sizes NPS 2 (DN 50) and smaller; <**Insert psig (kPa)**> for NPS 2-1/2 (DN 65) and larger.

In "Body" Subparagraph below, not all manufacturers offer certified lead-free for "Bronze" option. If certified lead-free bronze is required, consult manufacturers.

Body: [**Bronze**] [**Cast silicon copper alloy**] [**Stainless steel**] for NPS 2 (DN 50) and smaller; [**ductile or cast iron with interior lining that complies with AWWA C550 or that is FDA approved**] [**stainless steel**] for NPS 2-1/2 (DN 65) and larger.

End Connections: Threaded for NPS 2 (DN 50) and smaller; [**flanged**] <**Insert type**> for NPS 2-1/2 (DN 65) and larger.

Configuration: Designed for [**horizontal, straight-through**] <**Insert configuration**> flow.

Accessories:

Valves NPS 2 (DN 50) and Smaller: Ball type with threaded ends on inlet and outlet.

Valves NPS 2-1/2 (DN 65) and Larger: Outside-screw and yoke-gate type with flanged ends on inlet and outlet.

Copy "Beverage-Dispensing-Equipment Backflow Preventers" Paragraph below and re-edit for each type of backflow preventer required. If only one type is required, drawing designation may be omitted.

Beverage-dispensing-equipment backflow preventers below are for moderate hazard and are available in NPS 1/4 and NPS 3/8 (DN 8 and DN 10).

* + - * 1. Beverage-Dispensing-Equipment Backflow Preventers <**Insert drawing designation if any**>:

Retain "Manufacturers" Subparagraph and list of manufacturers below to require products from manufacturers listed or a comparable product from other manufacturers.

Manufacturers: Subject to compliance with requirements, provide products by one of the following:

Apollo Flow Controls; Conbraco Industries, Inc.

WATTS.

Zurn Industries, LLC.

<**Insert manufacturer's name**>.

Standard: ASSE 1022.

Operation: Continuous-pressure applications.

Size: NPS 1/4 or NPS 3/8 (DN 8 or DN 10).

Not all manufacturers offer option in "Body" Subparagraph below. Consult manufacturers.

Body: [**Stainless steel or non-metallic**] <**Insert material**>.

End Connections: Threaded or flare.

Copy "Dual-Check-Valve Backflow Preventers" Paragraph below and re-edit for each type of backflow preventer required. If only one type is required, drawing designation may be omitted.

Dual-check-valve backflow preventers below are for low hazard and are available in NPS 1/2 to NPS 1-1/4 (DN 15 to DN 32).

* + - * 1. Dual-Check-Valve Backflow Preventers <**Insert drawing designation if any**>:

Copy "Dual-Check-Valve Backflow Preventers" Paragraph below and re-edit for each type of backflow preventer required. If only one type is required, drawing designation may be omitted.

Dual-check-valve backflow preventers below are for low hazard and are available in NPS 1/2 to NPS 1-1/4 (DN 15 to DN 32).

Retain "Basis-of-Design Product" Subparagraph and list of manufacturers below to require a specific product or a comparable product from manufacturers listed.

For more information on 3048 Series, see https://www.caleffi.com/usa/en-us/products/search?query=3048.

Basis-of-Design Product: Subject to compliance with requirements, provide product by Caleffi North America; 3048 Series FlowShield DuC or comparable product by one of the following:

Apollo Flow Controls; Conbraco Industries, Inc.

WATTS.

<**Insert manufacturer's name**>.

Standards:

ASSE 1024 and CSA 64.5.

ASTM F 1807 PEX crimp fittings.

ASTM F 1960 PEX expansion fittings.

NSF/ANSI/CAN 61 180 deg F (82 deg C) Commercial Hot) as certified by ICC-ES.

NSF/ANSI/CAN 372 low-lead laws, as certified by ICC-ES.

Meets codes IPC, IRC, and UPC.

Operation: Continuous-pressure applications.

Size: [**NPS 3/8 (DN 12)**] [**NPS 1/2 (DN 15)**] [**NPS 3/4 (DN 20)**] [**NPS 1 (DN 25)**].

Union End Connections: [**NPS 1/2 (DN 15)** **and** **NPS 3/4 (DN 20) for NPT female threaded**] **[NPT male threaded**] [**Press**] [**Solder**] [**PEX crimp**] [**PEX expansion**]; [**NPS 3/8 (DN 9) compression**].

Body Retaining Ring and Lock Nut Material: DZR low-lead brass.

Check Valve Material: EPDM, PPO.

Spring Material: Stainless Steel.

In "O-ring" Subparagraph below, peroxide-cured EPDM is resistant to water treated with chlorine or chloramine for longer life expectancy.

O-rings Material: Peroxide-Cured EPDM.

Maximum Working Pressure: 175 psi (12 bar).

Operating Temperature Range: 32 deg F to 180 deg F (0 deg C to 82 deg C).

"Flow Capacity" Subparagraph below indicates Cv, which is defined as flowing 1 gpm (0.23 cu. m/h) at 1 psi (0.07 bar) pressure drop for determining flow-resistance pump sizing.

Flow Capacity:

NPS 1/2 (DN 15): 8.0 Cv (7.0 Kv).

NPS 3/4 (DN 20): 9.5 Cv (8.2 Kv).

NPS 1 (DN 25): 10.5 Cv (9.0 Kv).

Isolation ball valve in "Isolation Ball Valves" Subparagraph below is optional and provided separately for field installation.

Isolation Ball Valves: Inlet and outlet low-lead brass.

Copy "Carbonated-Beverage-Dispenser, Dual-Check-Valve Backflow Preventers" Paragraph below and re-edit for each type of backflow preventer required. If only one type is required, drawing designation may be omitted.

Carbonated-beverage-dispenser, dual-check-valve backflow preventers below are for moderate hazard and are available in NPS 1/4 and NPS 3/8 (DN 8 and DN 10).

* + - * 1. Carbonated-Beverage-Dispenser, Dual-Check-Valve Backflow Preventers <**Insert drawing designation if any**>:

Retain "Manufacturers" Subparagraph and list of manufacturers below to require products from manufacturers listed or a comparable product from other manufacturers.

Manufacturers: Subject to compliance with requirements, provide products by the following:

WATTS.

<**Insert manufacturer's name**>.

Standard: ASSE 1032.

Operation: Continuous-pressure applications.

Size: NPS 1/4 or NPS 3/8 (DN 8 or DN 10).

Body: Stainless steel.

End Connections: Threaded or flare.

Copy "Hose-Connection Backflow Preventers" Paragraph below and re-edit for each type of backflow preventer required. If only one type is required, drawing designation may be omitted.

Hose-connection backflow preventers below are for high hazard. Outlet size is garden-hose thread. Caution: Availability is limited.

* + - * 1. Hose-Connection Backflow Preventers <**Insert drawing designation if any**>:

Retain "Manufacturers" Subparagraph and list of manufacturers below to require products from manufacturers listed or a comparable product from other manufacturers.

Manufacturers: Subject to compliance with requirements, provide products by one of the following:

Apollo Flow Controls; Conbraco Industries, Inc.

WATTS.

Woodford Manufacturing Company.

Zurn Industries, LLC.

<**Insert manufacturer's name**>.

Standard: ASSE 1052.

Operation: Up to 10-foot head of water (30-kPa) back pressure.

Inlet Size: NPS 3/4 (DN 20).

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

Capacity: At least 3-gpm (0.19-L/sec) flow.

Copy "Backflow-Preventer Test Kits" Paragraph below and re-edit for each type of test kit required. If only one type is required, drawing designation may be omitted.

Backflow-preventer test kits below are suitable for pressure vacuum breakers; reduced-pressure-principle backflow preventers; double-check, backflow-prevention assemblies; and double-check, detector-assembly backflow preventers.

* + - * 1. Backflow-Preventer Test Kits <**Insert drawing designation if any**>:

Retain "Manufacturers" Subparagraph and list of manufacturers below to require products from manufacturers listed or a comparable product from other manufacturers.

Manufacturers: Subject to compliance with requirements, provide products by one of the following:

Ames Fire & Waterworks; A WATTS Brand.

Apollo Flow Controls; Conbraco Industries, Inc.

FEBCO; A WATTS Brand.

WATTS.

Zurn Industries, LLC.

<**Insert manufacturer's name**>.

Description: Factory calibrated, with gauges, fittings, hoses, and carrying case with test-procedure instructions.

* + - 1. WATER PRESSURE-REDUCING VALVES

Insert drawing designation. Use these designations on Drawings to identify each product.

Copy "Water Regulators" Paragraph below and re-edit for each type of water regulator required. If only one type is required, drawing designation may be omitted.

Water regulators below are available in NPS 1/2 to NPS 3 (DN 15 to DN 80).

* + - * 1. Water Regulators <**Insert drawing designation if any**>:

Retain "Manufacturers" Subparagraph and list of manufacturers below to require products from manufacturers listed or a comparable product from other manufacturers.

Manufacturers: Subject to compliance with requirements, provide products by one of the following:

Apollo Flow Controls; Conbraco Industries, Inc.

Cash Acme; a division of Reliance Worldwide Corporation.

WATTS.

Zurn Industries, LLC.

<**Insert manufacturer's name**>.

Standard: ASSE 1003.

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

Size: <**Insert NPS (DN)**>.

Design Flow Rate: <**Insert gpm (L/sec)**>.

Design Inlet Pressure: <**Insert psig (kPa)**>.

Design Outlet Pressure Setting: <**Insert psig (kPa)**>.

Body: Bronze[**with chrome-plated finish**] for NPS 2 (DN 50) and smaller; [**bronze**] [**cast iron with interior lining that complies with AWWA C550 or that is FDA approved**] for NPS 2-1/2 and NPS 3 (DN 65 and DN 80).

Valves for Booster Heater Water Supply: Include integral bypass.

End Connections: [**Threaded**] [**Solder**] for NPS 2 (DN 50) and smaller; [**flanged**] [**solder**] for NPS 2-1/2 and NPS 3 (DN 65 and DN 80).

Copy "Pressure-Reducing Valves" Subparagraph below and re-edit for each type of pressure-reducing valves required. If only one type is required, drawing designation may be omitted.

Pressure-Reducing Valves <Insert drawing designation if any>:

Retain "Basis-of-Design Product" Subparagraph and list of manufacturers below to require a specific product or a comparable product from manufacturers listed.

For more information on 533H Series, see [www.caleffi.com/usa/en-us/catalogue/prescaltm-compact-533340ha](https://www.caleffi.com/usa/en-us/catalogue/prescaltm-compact-533340ha).

Basis-of-Design Product: Subject to compliance with requirements, provide product by Caleffi North America; [**533H**] [**535H**] Series PresCal or comparable product by one of the following:

Cash Acme; a division of Reliance Worldwide Corporation.

WATTS.

<**Insert manufacture's name**>.

Retain first 17 subparagraphs below if 533H Series is selected.

Standards:

ASSE 1003/CSA B356, NSF/ANSI/CAN 372 low-lead laws, as certified by ICC-ES.

NSF/ANSI/CAN 61, commercial hot water 180 deg F (82 deg C) as certified by ICC-ES.

Meets codes IPC, IRC, NPC, and UPC.

ASTM F1807 PEX crimp fittings.

ASTM F1960 PEX expansion fittings.

Body Material: DZR EcoBrass low-lead forged brass.

Size: [**NPS 1/2 (DN 15)**] [**NPS 3/4 (DN 20)**].

End Connections: Outlet, NPT female threaded and [**inlet, union, NPT female threaded**] [**inlet, union, solder**] [**inlet, union, press**] [**inlet, union, PEX crimp**] [**inlet, union, PEX expansion**].

Retain "Contour-Shaped Diaphragm and Seals" Subparagraph below for accurate regulation under frequent and sudden pressure fluctuations.

Peroxide-cured EPDM is resistant to water treated with chlorine or chloramine for longer life expectancy.

Contour-Shaped Diaphragm and Seals: Peroxide-cured EPDM.

Cover: Glass-reinforced nylon PA6G30.

Compensating Piston Rings: PTFE.

Operating Knob: Manual setting with adjustment screw for pressure set point under removable tamper-resistant cap.

Pressure gauge in "Pressure Gauge" Subparagraph below is optional and furnished with female threaded connection NPS 1/8 (DN 6).

Pressure Gauge: 0 to 100 psig (0 to 7 bar) pressure scale.

In "Cartridge" Subparagraph below, the cartridge is self-contained, removable for convenient in pipe cleaning or replacement.

Cartridge: Stainless steel mesh filter 0.51 mm (35 mesh) for maximum debris protection.

Material in "Cartridge Shuttle" Subparagraph below is polymer PPSG40, which minimizes the formation of lime deposits, reduces flow inconsistencies, and extends operating life.

Cartridge Shuttle: PPSG40.

Maximum Working Pressure: 250 psig (1379 kPa).

Maximum Working Temperature: 180 deg F (82 deg C).

Pressure Setting Range: 15 to 80 psig (103 to 552 kPa).

Factory Setting: 45 psig (310 kPa).

Design Flow Rate:

NPS 1/2 (DN 15) for flow range of 3 to 5.6 gpm (11 to 21 L/min).

NPS 3/4 (DN 20) for flow range of 5.6 to 10 gpm (21 to 38 L/min).

Ball valve in "Isolation Ball Valve" Subparagraph below is optional and provided separately for field installation.

Isolation Ball Valve: Inlet and outlet low-lead brass.

Retain 17 subparagraphs below if 535H Series is selected. For more information, see [www.caleffi.com/usa/en-us/catalogue/prescaltm-pressure-reducing-valve-low-lead-pre-adjustable-535940ha](https://www.caleffi.com/usa/en-us/catalogue/prescaltm-pressure-reducing-valve-low-lead-pre-adjustable-535940ha).

Standards:

ASSE 1003/CSA B356, NSF/ANSI/CAN 372 low-lead laws, as certified by ICC-ES.

NSF/ANSI/CAN 61, commercial hot water 180 deg F (82 deg C) as certified by ICC-ES.

Meets codes IPC, IRC, NPC, and UPC.

ASTM F1807 PEX crimp fittings.

ASTM F1960 PEX expansion fittings.

In "Plenum Rated" Subparagraph below, the UV-stabilized ABS gray protective cover is not compliant with UL 2043.

Plenum Rated: UL 2043.

Body Material: DZR low-lead forged brass.

Size: [**NPS 1/2 (DN 15)**] [**NPS 3/4 (DN 20)**] [**NPS 1 (DN 25)**] [**NPS 1-1/4 (DN 32)**] [**NPS 1-1/2 (DN 40)**] [**NPS 2 (DN 50)**].

Union End Connections, Inlet and Outlet:

NPS 1/2 (DN 15), [**NPT female threaded**] [**solder**] [**press**]**.**

NPS 3/4 (DN 20), [**NPT female threaded**] [**solder**] [**press**] [**PEX crimp**] [**PEX expansion**].

NPS 1 (DN 25), [**NPT female threaded**] [**solder**] [**press**] [**PEX crimp**] [**PEX expansion**].

[**NPS 1-1/4 (DN 32)**] [**NPS 1-1/2 (DN 40)**] [**NPS 2 (DN 50)**], [**NPT female threaded**] [**solder**] [**press**].

Retain "Contour-Shaped Diaphragm and Seals" Subparagraph below for accurate regulation under frequent and sudden pressure fluctuations.

Peroxide-cured EPDM is resistant to water treated with chlorine or chloramine for longer life expectancy.

Contour-Shaped Diaphragm and Seals: Peroxide-cured EPDM.

Housing: Glass-reinforced nylon PA66M40/1 with outdoor protective cover in UV-stabilized ABS, gray.

Compensating Piston Rings: PTFE.

Operating Knob: Manual setting for pressure set point with visible pounds per square inch gauge setting and tamper-resistant adjustment locking screw.

Pressure gauge in "Pressure Gauge" Subparagraph below is optional and furnished with female threaded connection NPS 1/8 (DN 6).

Pressure Gauge: 0 to 100 psig (0 to 670 bar) pressure scale.

Material in "Cartridge" Subparagraph below is polymer PPSG40, which minimizes the formation of lime deposits, reduces flow inconsistencies, and extends operating life.

Cartridge: Stainless steel mesh filter, 0.51 mm (35 mesh) for maximum debris protection.

Maximum Working Pressure: 300 psig (2068 kPa).

Maximum Working Temperature: 180 deg F (82 deg C).

Pressure Setting Range: 15 to 90 psig (103 to 1034 kPa).

Factory Setting: 45 psig (310 kPa).

Design Flow Rate:

NPS 1/2 (DN 15) for flow range of 4 to 7.3 gpm (15 to 28 L/min).

NPS 3/4 (DN 20) for flow range of 7 to 12.5 gpm (26 to 47 L/min).

NPS 1 (DN 25) for flow range of 10 to 19 gpm (37 to 72 L/min).

NPS 1-1/4 (DN 32) for flow range of 17 to 34 gpm (64 to 128 L/min).

NPS 1-1/2 (DN 40) for flow range of 27 to 44 gpm (90 to 167 L/min).

NPS 2 (DN 50) for flow range of 37 to 70 gpm (140 to 265 L/min).

Isolation ball valve in "Isolation Ball Valve" Subparagraph below is optional and provided separately for field installation. Isolation ball valve is only available in NPS 3/4 (DN 20).

Isolation Ball Valve: Inlet and outlet low-lead brass.

Copy "High-Performance, Piston-Type Pressure-Reducing Valves" Subparagraph below if only one type is required, drawing designation may be omitted.

High-Performance, Piston-Type Pressure-Reducing Valves <**Insert drawing designation if any**>:

Retain "Basis-of-Design Product" Subparagraph and list of manufacturers below to require a specific product or a comparable product from manufacturers listed.

536A Series PresCalHP is a heavy-duty piston-type pressure-reducing valve for high-rise buildings and other applications with extremely high supply pressure of 200 psig (1379 kPa) plus, and requires staged pressure control.

For more information on 536A Series, see [www.caleffi.com/usa/en-us/catalogue/prescaltm-hp-536043a-109](https://www.caleffi.com/usa/en-us/catalogue/prescaltm-hp-536043a-109).

Basis-of-Design Product: Subject to compliance with requirements, provide product by Caleffi North America; 536A Series PresCalHP <**Insert product name or designation**> or comparable product by one of the following:

Cash Acme; a division of Reliance Worldwide Corporation.

WATTS.

<**Insert manufacturer's name**>.

Standards:

Retain first subparagraph below for product with setting range 10 to 90 psig (69 to 621 kPa) only.

ASSE 1003/CSA B356.

NSF/ANSI/CAN 372 low-lead laws, as certified by ICC-ES.

NSF/ANSI/CAN 61, commercial hot water 180 deg F (82 deg C) as certified by ICC-ES.

Meets codes IPC, IRC, NPC, and UPC.

Body Material: DZR low-lead forged brass.

Size: [**NPS 1/2 (DN 15)**] [**NPS 3/4 (DN 20)**] [**NPS 1 (DN 5)**] [**NPS 1-1/4 (DN 32)**] [**NPS 1-1/2 (DN 40)**] [**NPS 2 (DN 50)**].

Size and End Connections, Union Inlet and Outlet:

In "Sizes" Subparagraph below, size NPS 2 (DN 50) is not compatible with product with setting range 10 to 90 psig (69 to 621 kPa) only.

Sizes: [**NPT female threaded**] [**Solder**] [**Press**]; [**NPS 1/2 (DN 15)**] [**NPS 3/4 (DN 20)**] [**NPS 1 (DN 25)**] [**NPS 1-1/4 (DN 32)**] [**NPS 1-1/2 (DN 40)**] [**NPS 2 (DN 50)**].

In "Seals" Subparagraph below, peroxide-cured EPDM is resistant to water treated with chlorine or chloramine for longer life expectancy.

Seals: Peroxide-cured EPDM.

Spring Case: Brass.

Valve Seat: Stainless steel.

Valve Plug: DZR, low-lead brass.

Stainless Steel Filter:

For valve sizes, 1/2 to 1 inch (15 to 25 mm), mesh size 0.51 mm.

For valve sizes, 1-1/4 to 2 inch (32 to 50 mm), mesh size 0.65 mm.

Operating Knob: Manual setting adjustment with included Allen wrench for pressure set point under removable tamper-resistant cap.

Pressure Gauge: Female threaded connection NPS 1/4 (DN 10) with metric adapter.

Setting range 10 to 90 psig (69 to 621 kPa); 0 to 100 psig (0 to 700 kPa) pressure gauge scale.

Setting range 90 to 150 psig (621 to 1034 kPa); 0 to 200 psig (0 to 1400 kPa) pressure gauge scale.

Two valve-body pressure-gauge connections, one on each side with plug for flexible mounting locations, NPS 1/8 (DN 6) metric straight thread.

Change first subparagraph below to 200 psig (1379 kPa) when NPS 1-1/4 to NPS 1-1/2 (DN 32 to DN 40) size press models are selected.

Maximum Working Pressure Upstream:

Setting Range: 10 to 90 psig (69 to 621 kPa); 300 psig (2070 kPa).

Setting Range: 90 to 150 psig (621 to 1034 kPa); 360 psig (2480 kPa).

Downstream Pressure Setting Range:

Setting Range: 10 to 90 psig (69 to 600 kPa).

Setting Range: 90 to 150 psig (620 to 1035 kPa).

Factory Setting:

Setting Range: 10 to 90 psig (69 to 621 kPa); 45 psig (310 kPa).

Setting Range: 90 to 150 psig (621 to 1034 kPa); 115 psig (800 kPa).

Maximum Working Temperature: 180 deg F (82 deg C).

Maximum Flow Rate: Based on 6 ft./sec (2.0 m/sec).

NPS 1/2 (DN 15) for flow of 7.3 gpm (27.6 L/min).

NPS 3/4 (DN 20) for flow of 12.5 gpm (47.3 L/min).

NPS 1 (DN 25) for flow of 19 gpm (72 L/min).

NPS 1-1/4 (DN 32) for flow of 34 gpm (128 L/min).

NPS 1-1/2 (DN 40) for flow of 44 gpm (167 L/min).

NPS 2 (DN 50) for flow of 70 gpm (265 L/min).

Copy "Water-Control Valves" Paragraph below and re-edit for each type of water-control valve required. If only one type is required, drawing designation may be omitted.

Water-control valves below are available in NPS 1-1/4 (DN 32) and larger.

* + - * 1. Water-Control Valves <**Insert drawing designation if any**>:

Retain "Manufacturers" Subparagraph and list of manufacturers below to require products from manufacturers listed or a comparable product from other manufacturers.

Manufacturers: Subject to compliance with requirements, provide products by one of the following:

Apollo Flow Controls; Conbraco Industries, Inc.

CLA-VAL.

Flomatic Corporation.

OCV Control Valves.

WATTS.

Zurn Industries, LLC.

<**Insert manufacturer's name**>.

Description: Pilot-operated, diaphragm-type, single-seated, main water-control valve.

Pressure Rating: Initial working pressure of 150 psig (1035 kPa) minimum with AWWA C550 or FDA-approved, interior epoxy coating. Include small pilot-control valve, restrictor device, specialty fittings, and sensor piping.

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

Size: <**Insert NPS (DN)**>.

Pattern: [**Angle**] [**Globe**]-valve design.

Trim: Stainless steel.

Design Flow: <**Insert gpm (L/sec)**>.

Design Inlet Pressure: <**Insert psig (kPa)**>.

Design Outlet Pressure Setting: <**Insert psig (kPa)**>.

End Connections: Threaded for NPS 2 (DN 50) and smaller; [**flanged**] <**Insert type**> for NPS 2-1/2 (DN 65) and larger.

* + - 1. AUTOMATIC WATER SHUTOFF VALVE SYSTEMS

Automatic water shutoff valve systems with actuators are generally available in NPS 3/4 to NPS 4 (DN 20 to DN 100); verify sizes with manufacturer. Automatic water shutoff valves are most commonly installed in domestic water piping, although they can be used for other applications where moisture detection is desired. Systems include remote water leak sensors to actuate the shutoff valve upon sensing water or possibly temperature. Some systems use a pipe-mounted flow sensor to detect unusual water flow. Variations of the valve are available for water mains, makeup supply branches, and appliances (clothes washers, water heaters, and icemakers). Multiple wired water leak sensors connected to a system allow for wider area coverage. Wireless water leak sensors allow more sensor connections than wired sensors. Relay contacts are used for secondary signaling, device control, and audible alarms. Valves must be paired with a wired or wireless leak detection system.

Retain "Manufacturers" Paragraph and list of manufacturers below to require products from manufacturers listed or a comparable product from other manufacturers.

* + - * 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

FloLogic, Inc.

OnSite PRO Inc.

QMI Manufacturing Inc.

Reliance Detection Technologies.

WaterCop.

<**Insert manufacturer's name**>.

Retain "Shutoff Control Ball Valves and Actuators" Paragraph below for ball valves NPS 1/2 through NPS 2 (DN 15 through DN 50).

Copy paragraph and re-edit for each type of shutoff control ball valve and actuator required. If only one type is required, drawing designation may be omitted.

Insert drawing designation. Use these designations on Drawings to identify each product.

* + - * 1. Shutoff Control Ball Valves and Actuators <**Insert drawing designation if any**>:

Size: [**NPS 1/2 (DN 15)**] [**NPS 3/4 (DN 20)**] [**NPS 1 (DN 25)**] [**NPS 1-1/4 (DN 32)**] [**NPS 1-1/2 (DN 40)**] [**NPS 2 (DN 50)**] <**Insert pipe size**>.

Design Flow Rate: <**Insert gpm (L/sec)**>.

Design Inlet Pressure: <**Insert psig (kPa)**>.

Control Valve: Two-piece, full-port brass ball valve, MSS SP-110.

End Connections: Threaded, female.

Retain "Fittings" Subparagraph below for hose-fed equipment application.

Fittings: One 3/8-by-1/2-inch (9.5-by-12.7-mm) male compression and one 3/8-by-1/2-inch (9.5-by-12.7-mm) female compression.

Seats: PTFE.

O-Rings: FKM.

Stem: Low-lead brass. Blowout proof.

CWP Rating: [**600 psig (4140 kPa)**] <**Insert value**>.

Manual-override control turn-knob for emergency operation of valve.

Valve Actuator: Motor operated, with or without gears, electric and electronic. Capable of closing valve against inlet pressure. Direct mount, fails closed.

Power Supply: [**Battery**] [**120 V ac**] [**120 V ac step-down transformer**][**with cord and plug**].

Manual Intervention: Allowed.

Position Indicator: Standard.

Retain "Actuator Enclosure" Subparagraph below for actuator enclosures.

Actuator Enclosure: Suitable for ambient conditions encountered by application.

Pair each automatic water shutoff valve with a wireless or wired leak detection system to actuate the valve actuator. Select a detection system for each application.

Retain "Wireless Leak Detection System" Subparagraph below for wireless leak detection system.

Wireless Leak Detection System:

Sensor-Water Flow Type: Pipe-mounted to detect water flow.

Sensor-Rope Type: Absorbent water sensing rope constructed from twisted metal conductor wires insulated from one another and surrounded by polyethylene mesh braid jacket to detect water presence.

Specific range may vary due to local structural conditions.

Wireless Signal Range: 100 ft. (30.5 m) minimum between sensors and receiver.

Self-monitoring enabled system; faults for lost communication between receiver and sensor(s).

Onboard Battery Backup: 48 hours of protection.[**Valve to close prior to backup failure.**]

LED Indicators: Wireless signal strength, communication loss, water fault, low-temperature fault, and low battery.

Retain "FCC-Approved Wireless Communication System" Subparagraph below for systems with this capability.

FCC-Approved Wireless Communication System: Between sensors, repeaters, and receivers.

Output Contacts: Interface with home security or BAS, cellular text notification service, or auto dialer accessories.

Retain "Wireless Signal Repeater" Subparagraph below for applications where sensor(s) and receiver exceed manufacturer's recommended distance.

Wireless Signal Repeater: Boosts signal performance between wireless sensors and receiver.

Push-button pairing and unpairing, into and out of the network.

Visual indication of wireless signal strength, low battery, and lost communication.

Standard wall outlet, 120 V ac, power.

Battery Backup: Two (2) AA batteries for battery backup to maintain system integrity during a power outage.

Wireless Water Switch: Allows manual override or wireless system functionality and closes the valve to shut off water flow.

Hard-Wired Water Switch: Allows manual override or wireless system functionality and closes the valve to shut off water flow.

Retain "Wired Leak Detection System" Subparagraph below for wired leak detection system.

Wired Leak Detection System:

Power Supply: Class II transformer with cord and plug, 120 V ac, UL listed.

Power Cord Length: [**12 ft. (3.66 m)**] <**Insert dimension**>.

Control Panel: LED power and LED valves indicator.

Alarms: Audible alarm[**, with external output**].

Output Contacts: Interface with home security or BAS, cellular text notification service, or auto dialer accessories.

Wired Sensors:

Quantity Per Receiver: [**One**] [**Two**] [**Three**] [**Four**] [**Five**] [**Six**].

Cable Length: [**8 ft. (2.44 m)**] [**25 ft. (7.62 m)**] [**50 ft. (15.2 m)**] [**100 ft. (30.5 m)**] <**Insert dimension**>.

"Cable Adder" Subparagraph below is for installations that require an additional distance between receiver and shutoff valve.

Cable Adder: [**10 ft. (3 m)**] [**25 ft. (7.62 m)**] [**50 ft. (15.2 m)**] [**100 ft. (30.5 m)**] <**Insert dimension**> in length.

Retain "Shutoff Control Butterfly Valve and Actuator" Paragraph below for butterfly valves NPS 2-1/2 through NPS 4 (DN 65 through DN 100). Confirm availability of product with manufacturers.

Copy paragraph and re-edit for each type of shutoff control butterfly valve and actuator required. If only one type is required, drawing designation may be omitted.

Insert drawing designation. Use these designations on Drawings to identify each product.

A limited number of manufacturers offer shutoff control butterfly valves and Actuators. Consult manufacturers.

* + - * 1. Shutoff Control Butterfly Valve and Actuator <**Insert drawing designation if any**>:

Size: [**NPS 2-1/2 (DN 65)**] [**NPS 3 (DN 80)**] [**NPS 4 (DN 100)**] <**Insert pipe size**>.

Compliance: MSS SP-67.

Full-port, epoxy-coated, ductile-iron lug body.

Seat: EPDM, minus 30 to plus 250 deg F (minus 34 to plus 121 deg C).

Face-to-Face Flange: ASME B16.5 flanges.

Disc Design: Floating stainless steel dual shaft.

Disc Material: Coated ductile iron.

Locating Pin: Carbon steel.

Bushings: PTFE.

O-Rings: EPDM.

Ten-position stop.

Manual-override control turn-knob for emergency operation of valve.

Valve Actuator: Motor operated, with or without gears, electric and electronic. Capable of closing valve against inlet pressure. Direct mount, fails closed.

Power Supply: [**Battery**] [**120 V ac**] [**120 V ac step-down transformer**][**with cord and plug**].

Manual Intervention: Allowed.

Position Indicator: Standard.

Retain "Actuator Enclosure" Subparagraph below for actuator enclosures.

Actuator Enclosure: Suitable for ambient conditions encountered by application.

Automatic water shutoff valves to be paired with a wireless or wired leak detection system to actuate the valve actuator. Select one for each application.

Retain "Wireless Leak Detection System" Subparagraph below for wireless leak detection system.

Wireless Leak Detection System:

Sensor-Water Flow Type: Pipe-mounted to detect water flow.

Sensor-Rope Type: Absorbent water sensing rope constructed from twisted metal conductor wires insulated from one another and surrounded by polyethylene mesh braid jacket to detect water presence.

Specific range may vary due to local structural conditions.

Wireless Signal Range: 100 ft. (30.5 m) minimum between sensors and receiver.

Self-monitoring enabled system; faults for lost communication between receiver and sensor(s).

Onboard Battery Backup: 48 hours of protection.[**Valve to close prior to backup failure.**]

LED Indicators: Wireless signal strength, communication loss, water fault, low-temperature fault, and low battery.

Retain "FCC-Approved Wireless Communication System" Subparagraph below for systems with this capability.

FCC-Approved Wireless Communication System: Between sensors, repeaters, and receivers.

Output Contacts: Interface with home security or BAS, cellular text notification service, or auto dialer accessories.

Retain "Wireless Signal Repeater" Subparagraph below for applications where sensor(s) and receiver exceed manufacturer's recommended distance.

Wireless Signal Repeater: Boosts signal performance between wireless sensors and receiver.

Push-button pairing and unpairing, into and out of the network.

Visual indication of wireless signal strength, low battery, and lost communication.

Standard wall outlet, 120 V ac, power.

Battery Backup: Two (2) AA batteries for battery backup to maintain system integrity during a power outage.

Wireless Water Switch: Allows manual override or wireless system functionality and closes the valve to shut off water flow.

Hard-Wired Water Switch: Allows manual override or wireless system functionality and closes the valve to shut off water flow.

Retain "Wired Leak Detection System" Subparagraph below for wired leak detection system.

Wired Leak Detection System:

Power Supply: Class II transformer with cord and plug, 120 V ac, UL listed.

Power Cord Length: [**12 ft. (3.66 m)**] <**Insert dimension**>.

Control Panel: LED power and LED valves indicator.

Alarms: Audible alarm[**, with external output**].

Output Contacts: Interface with home security or BAS, cellular text notification service, or auto dialer accessories.

Wired Sensors:

Quantity Per Receiver: [**One**] [**Two**] [**Three**] [**Four**] [**Five**] [**Six**].

Cable Length: [**8 ft. (2.44 m)**] [**25 ft. (7.62 m)**] [**50 ft. (15.2 m)**] [**100 ft. (30.5 m)**] <**Insert dimension**>.

"Cable Adder" Subparagraph below is for installations that require an additional distance between receiver and shutoff valve.

Cable Adder: [**10 ft. (3 m)**] [**25 ft. (7.62 m)**] [**50 ft. (15.2 m)**] [**100 ft. (30.5 m)**] <**Insert dimension**> in length.

Retain "Clothes Washer Shutoff Control Valve and Actuator" Paragraph below for control valves for clothes washers, shutting off both hot- and cold-water supplies.

Copy paragraph and re-edit for each type of shutoff control valve required. If only one type is required, drawing designation may be omitted.

Insert drawing designation. Use these designations on Drawings to identify each product.

* + - * 1. Clothes Washer Shutoff Control Valve and Actuator <**Insert drawing designation if any**>:

Brass or stainless steel ball valve.

End Connections: Male hose connections, NPS 3/4 (DN 20).

Pressure Rating: 400 psi (2758 kPa) at 32 to 150 deg F (0 to 65.6 deg C).

Valve Actuator:

Enclosure: Suitable for ambient conditions encountered by application.

Power Supply: [**Battery**] [**120 V ac**] [**120 V ac step-down transformer**][**with cord and plug**].

Position Indicator: Standard.

Wired Leak Detection System:

Water sensor with minimum 6-ft. (1.8-m) length of wire.

120 V ac step-down transformer with cord and plug.

LED operation and leak notification.

Audible alarm.

Power failure or manual disconnection of power causes valves to close.

* + - * 1. Accessories:

Retain "Electrical Plug Interrupter," "Gas Flow Interrupter," or "Step-Down Transformer" Subparagraph below for power-vented gas water heaters, requiring that electricity to the power venter is shut off when a water leak is detected.

Electrical Plug Interrupter: Plugs into standard 120 V ac wall outlet.

Gas Flow Interrupter: ECO connector with female spade connectors. Factory prewired, 8 ft. (2.44 m).

Gas Interface Cable: Interface cable with male and female connectors.

Step-Down Transformer: [**120**] [**208**] [**240**] V ac to 24 V ac with mounting plate, 12-ft. (3.66-m) plenum wire to power, and 8-ft. (2.44-m) plenum wire to sensor.

Liquid Level Sensors: Monitor fluid levels in addition to detecting plumbing leaks.

In "Auto Dialer" Subparagraph below, dialer requires a dedicated analog phone line.

Auto Dialer: Send and receive automatic alerts when a fault condition occurs. Standard output contacts trigger up to nine predetermined telephone number calls.

Prerecord message for future playback.

10-second recordable message.

Built-in tamper switch.

DC adaptor with battery backup.

Programmable as a silent (dialer only) or audible (siren and dialer) alarm.

Easy "Stop Call Sequence" - push "#" on phone to acknowledge the alarm and stop the dialing sequence.

In "Cellular Text Notification System" Subparagraph below, system requires a mobile wireless network service provider.

Cellular Text Notification System:

Event SMS text notification to up to three cell phones.

Battery Backup: Four (4) AA batteries.

12-ft. (3.66-m) interface cable to leak detection system.

Customized messaging.

<**Insert wireless network service provider**>.

* + - 1. BALANCING VALVES

Insert drawing designation. Use these designations on Drawings to identify each product.

Copy "Copper-Alloy Calibrated Balancing Valves" Paragraph below and re-edit for each type of balancing valve required. If only one type is required, drawing designation may be omitted.

* + - * 1. Copper-Alloy Calibrated Balancing Valves <**Insert drawing designation if any**>:

Retain "Manufacturers" Subparagraph and list of manufacturers below to require products from manufacturers listed or a comparable product from other manufacturers.

Manufacturers: Subject to compliance with requirements, provide products by one of the following:

Bell & Gossett; a Xylem brand.

IMI Hydronic Engineering Inc.

Nexus Valve, Inc.

NIBCO INC.

WATTS.

<**Insert manufacturer's name**>.

Type: [**Ball**] [**or**] [**Y-pattern globe**] valve with two readout ports and memory-setting indicator.

Body: [**Brass**] [**or**] [**bronze**].

Size: Same as connected piping, but not larger than NPS 2 (DN 50).

Accessories: Meter hoses, fittings, valves, differential pressure meter, and carrying case.

Copy "Memory-Stop Balancing Valves" Paragraph below and re-edit for each type of balancing valve required. If only one type is required, drawing designation may be omitted.

* + - * 1. Memory-Stop Balancing Valves <**Insert drawing designation if any**>:

Retain "Manufacturers" Subparagraph and list of manufacturers below to require products from manufacturers listed or a comparable product from other manufacturers.

Static, Variable-Orifice Balancing Valves <**Insert drawing designation if any**>:

Retain "Basis-of-Design Product" Subparagraph and list of manufacturers below to require a specific product or a comparable product from manufacturers listed.

Valve 142 Series is supplied with threaded connections. For more information, see [www.caleffi.com/usa/en-us/catalogue/flo-settm-static-balancing-valve-variable-orifice-low-lead-142241a](https://www.caleffi.com/usa/en-us/catalogue/flo-settm-static-balancing-valve-variable-orifice-low-lead-142241a).

Basis-of-Design Product: Subject to compliance with requirements, provide product by Caleffi North America; 142 Series Flo-Set or comparable product by one of the following:

WATTS.

Bell & Gossett; a Xylem brand.

<**Insert manufacturer's name**>.

Standard: NSF/ANSI/CAN 372 low-lead laws, as certified by ICC-ES.

Valve:

Provided with two pressure test ports.

Low-lead brass, peroxide-cured EPDM seals.

Knob: Precise valve flow adjustment with six full turns, PA6G30 polymer, and memory stop.

Maximum Working Pressure: 232 psig (1600 kPa).

Working Temperature Range: 15 to plus 250 deg F (Minus 10 to plus 121 deg C).

Body Bonnet and Valve Adjustment Plug Material: DZR low-lead brass.

In "Membrane and Sealing Gaskets" Subparagraph below, peroxide-cured EPDM is resistant to water treated with chlorine or chloramine for longer life expectancy.

Membrane and Sealing Gaskets: Peroxide-cured EPDM.

Connections: NPT female threaded.

Size: [**NPS 1/2 (DN 15)**] [**NPS 3/4 (DN 20)**] [**NPS 1 (DN 25)**] [**NPS 1-1/4 (DN 32)**] [**NPS 1-1/2 (DN 40)**] [**NPS 2 (DN 50)**].

"Flow Capacity" Subparagraph below indicates Cv, which is defined as flowing 1 gpm (0.23 cu. m/h) at 1 psi (0.07 bar) pressure drop for determining flow-resistance pump sizing.

Flow Capacity:

NPS 1/2 (DN 15); Cv 3.4 (Kv 2.9).

NPS 3/4 (DN 20); Cv 5.0 (Kv 4.3).

NPS 1 (DN 25); Cv 7.5 (Kv 6.5).

NPS 1-1/4 (DN 32); Cv 12.9 (Kv 11.1).

NPS 1-1/2 (DN 40); Cv 16.8 (Kv 14.5).

NPS 2 (DN 50); Cv 22.0 (Kv 19.0).

Insulation shell in '"Insulation shell" Subparagraph below is optional and provided separately for field installation.

Insulation shell.

Ball valve in "Isolation Ball Valve" Subparagraph below is optional and provided separately for field installation.

Isolation Ball Valve: Inlet and outlet low-lead brass.

Copy "Static, Fixed-Orifice Balancing Valves" Subparagraph below and re-edit for each type of balancing valve required. If only one type is required, drawing designation may be omitted.

Static, Fixed-Orifice Balancing Valves <**Insert drawing designation if any**>:

Retain "Basis-of-Design Product" Subparagraph and list of manufacturers below to require a specific product or a comparable product from manufacturers listed.

For more information on 130 Series, see [www.caleffi.com/usa/en-us/catalogue/flo-settm-static-balancing-valve-fixed-orifice-low-lead-130400a](https://www.caleffi.com/usa/en-us/catalogue/flo-settm-static-balancing-valve-fixed-orifice-low-lead-130400a).

Basis-of-Design Product: Subject to compliance with requirements, provide product by Caleffi North America; 130 Series Flo-Set or comparable product by one of the following:

Armstrong.

Red-White Valve Corp.

<**Insert manufacturer's name**>.

Standard: NSF/ANSI/CAN 372 low-lead laws, as certified by ICC-ES.

Valve:

Provided with two pressure test ports.

Low-lead brass, peroxide-cured EPDM.

Knob: Precise valve flow adjustment with six full turns, 10 decimal graduations; PA6G30 polymer, and memory stop feature.

Maximum Working Pressure: 232 psig (1600 kPa).

Working Temperature Range: Minus 4 to plus 250 deg F (Minus 20 to plus 121 deg C).

Body, Bonnet, and Control Stem Material: DZR low-lead brass.

In "Double O-Ring Seals" Subparagraph below, peroxide-cured EPDM is resistant to water treated with chlorine or chloramine for longer life expectancy. The O-rings isolate the control stem threads from system fluid, which prevents seizing from scale for long operating life.

Double O-Ring Seals: Peroxide-cured EPDM.

PTFE in "Stem Guide Bearing" Subparagraph below prevents noise and vibration.

Stem Guide Bearing: PTFE.

Characterized plug" in "Characterized Plug" Subparagraph below is stainless steel for smooth adjustment.

Characterized Plug: Stainless steel.

Valve Plug: Stainless steel.

Connections: NPT female threaded.

Size: [**NPS 1/2 (DN 15)**] [**NPS 3/4 (DN 20)**] [**NPS 1 (DN 25)**] [**NPS 1-1/4 (DN 32)**] [**NPS 1-1/2 (DN 40)**] [**NPS 2 (DN 50)**].

"Flow Capacity" Subparagraph below indicates Cv, which is defined as flowing 1 gpm (0.23 cu. m/h) at 1 psi (0.07 bar) pressure drop for determining flow-resistance pump sizing.

Flow Capacity:

NPS 1/2 (DN 15); Cv 3.7 (Kv 3.2).

NPS 3/4 (DN 20); Cv 5.1 (Kv 4.4).

NPS 1 (DN 25); Cv 8.8 (Kv 7.6).

NPS 1-1/4 (DN 32); Cv 14.0 (Kv 12.0).

NPS 1-1/2 (DN 40); Cv 19.7 (Kv 16.4).

NPS 2 (DN 50); Cv 30.5 (Kv 26.3).

Insulation shell in '"Insulation shell" Subparagraph below is optional and provided separately for field installation.

Insulation shell.

Copy "Automatic Flow Control Balancing Valves" Paragraph below and re-edit for each type of balancing valve required. If only one type is required, drawing designation may be omitted.

* + - * 1. Automatic Flow Control Balancing Valves <**Insert drawing designation if any**>:

Retain "Basis-of-Design Product" Subparagraph and list of manufacturers below to require a specific product or a comparable product from manufacturers listed.

FlowCal are pressure-independent, dynamic balancing valves for automatic fixed flow control. The 127AF Series is a compact in-line style with flow rates to 10 gpm (38 L/min). For more information, see www.caleffi.com/usa/en-us/catalogue/flowcaltm-compact-dynamic-balancing-valve-low-lead-127341af.

The 127AFC Series FlowCal Plus is a compact in-line style, flow rates to 10 gpm, with optional temperature gauge and inlet check valve. For more information, see [www.caleffi.com/usa/en-us/catalogue/flowcaltm-dynamic-balancing-valve-low-lead-127141afc](http://www.caleffi.com/usa/en-us/catalogue/flowcaltm-dynamic-balancing-valve-low-lead-127141afc).

Basis-of-Design Product: Subject to compliance with requirements, provide product by Caleffi North America; [**127AF Series FlowCal**] [**127AFC Series FlowCal Plus**] or comparable product by one of the following:

Hays Fluid Controls.

IMI Hydronic Engineering Inc.

<**Insert manufacturer's name**>.

Description: Pressure-independent dynamic automatic balancing valve maintains pre-determined constant flow in hydronic circuits such as controlling flow to fan coils, base boards, radiators, or plumbing fixtures in hot-water recirculation. This happens regardless of differential pressure changes across them, using a cartridge with spring-loaded piston and characterized orifices.

Standards:

NSF/ANSI/CAN 372 low-lead laws, as certified by ICC-ES.

ASTM F1807 PEX crimp fittings.

ASTM F1960 PEX expansion fittings.

Maximum Working Pressure: 232 psig (1600 kPa).

Working Temp Range: 32 to 212 deg F (0 to 100 deg C).

Sizes: [**NPS 1/2 (DN 15)**] [**NPS 3/4 (DN 20)**] [**NPS 1 (DN 25)**].

In "Seals" Subparagraph below, peroxide-cured EPDM is resistant to water treated with chlorine or chloramine for longer life expectancy.

Seals: Peroxide-cured EPDM.

Union End Connections, Inlet and Outlet: [**NPT female threaded**] [**Solder**] [**Press**] [**PEX crimp**] [**PEX expansion**].

Body Material: DZR low-lead brass.

Flow Cartridge: Selectable fixed-flow replaceable scale-resistant low-noise polymer.

Field balancing or adjustment is not required.

Internal chamber dampens vibrations triggered by fluid flow allowing low-noise operation.

"Built-in inlet check valve" Subparagraph below is for protecting against circuit thermosiphoning and is only available in the 127AFC series.

Built-in inlet check valve.

Built-in filter screen.

Flow Rate Range: Twenty-one fixed-rate flow settings ranging from 0.35 to 10 gpm (0.03 to 0.76 L/sec).

For "Differential Pressure Control Range" Subparagraph below, see manufacturer's technical literature.

Differential Pressure Control Range: 2 psi to 35 psig (13.8 kPa to 241 kPa).

In "Outlet Temperature Gauge Range" Subparagraph below, installation is optional.

Outlet Temperature Gauge Range: 30 to 210 deg F (0 to 100 deg C) 2-inches (51-mm) diameter, dual-scale temperature gauge.

Ball valve in "Isolation Ball Valves" Subparagraph below is optional and provided separately for field installation.

Isolation Ball Valves: Inlet and outlet low-lead brass.

Retain "Basis-of-Design Product" Subparagraph and list of manufacturers below to require a specific product or a comparable product from manufacturers listed.

FlowCal are pressure-independent, dynamic balancing valves for automatic fixed flow control. The 128AF Series is a Y-body style with flow rates to 10 gpm (38 L/min). For more information, see <http://get.caleffi.info/128AF>.

The 128AFC Series FlowCal Plus is a Y-body style, flow rates to 10 gpm (38 L/min), with optional temperature gauge and inlet check valve. For more information, see <http://get.caleffi.info/128AFC>.

Basis-of-Design Product: Subject to compliance with requirements provide product by Caleffi North America; [**128AF Series FlowCal**] [**128AFC Series FlowCal Plus**] or comparable product by one of the following;

Griswold.

Macon Balancing (Turnstall).

<**Insert manufacturer's name**>.

Description: Pressure-independent dynamic automatic balancing valve maintains predetermined constant flow in hydronic circuits such as controlling flow to fan coils, base boards, radiators, or plumbing fixtures in hot-water recirculation. This happens regardless of differential pressure changes across them, using a cartridge with spring-loaded piston and characterized orifices.

Standards:

NSF/ANSI/CAN 372 low-lead laws, as certified by ICC-ES.

ASTM F1807 PEX crimp fittings.

ASTM F1960 PEX expansion fittings.

Maximum Working Pressure: 400 psig (2760 kPa).

Working Temp Range: 32 to 212 deg F (0 to 100 deg C).

Sizes: [**NPS 1/2 (DN 15)**] [**NPS 3/4 (DN 20)**] [**NPS 1 (DN 25)**].

In "Seals" Subparagraph below, peroxide-cured EPDM is resistant to water treated with chlorine or chloramine for longer life expectancy.

Seals: Peroxide-cured EPDM.

Union End Connections, Inlet and Outlet: [**NPT female threaded**] [**Solder**] [**Press**] [**PEX crimp**] [**PEX expansion**].

Body and Drain Plug Material: DZR low-lead brass.

Flow Cartridge: Selectable fixed-flow replaceable scale-resistant low-noise polymer.

Field balancing or adjustment is not required.

Internal chamber dampens vibrations triggered by fluid flow allowing low-noise operation.

"Built-in inlet check valve" Subparagraph below is for protecting against circuit thermosiphoning, and is only available in the 128AFC series.

Built-in inlet check valve.

Flow Rate Range: Twenty-one fixed-rate flow settings ranging from 0.35 to 10 gpm (0.03 to 0.76 L/sec).

"Dual factory-installed pressure/temperature test ports" Subparagraph below is for verifying and certifying flow rates where required.

Dual factory-installed pressure/temperature test ports.

For "Differential Pressure Control Range" Subparagraph below, see manufacturer's technical literature.

Differential Pressure Control Range: 2 psi to 35 psid (13.8 kPa to 241 kPa).

In "Outlet Temperature Gauge Range" Subparagraph below, installation is optional.

Outlet Temperature Gauge Range: 30 to 210 deg F (0 to 100 deg C) 2-inches (51-mm) diameter, dual-scale temperature gauge.

Ball valve in "Isolation Ball Valves" Subparagraph below is optional and provided separately for field installation.

Isolation Ball Valves: Inlet and outlet low-lead brass.

Copy "Static Balancing Valves with Flowmeter" Subparagraph below and re-edit for each type of vacuum breaker required. If only one type is required, drawing designation may be omitted.

Static Balancing Valves with Flowmeter <**Insert drawing designation if any**>:

Retain "Basis-of-Design Product" Subparagraph and list of manufacturers below to require a specific product or a comparable product from manufacturers listed.

Valve 132 AFC Series QuickSetter Plus is equipped with an inlet flow check valve. For more information, see [www.caleffi.com/usa/en-us/catalogue/quicksettertm-balancing-valve-low-lead-132434afc](https://www.caleffi.com/usa/en-us/catalogue/quicksettertm-balancing-valve-low-lead-132434afc).

The 132AFC Series Quick-Setter Plus offers easy, accurate balancing in seconds with no instruments or graphs required.

Basis-of-Design Product: Subject to compliance with requirements, provide product by Caleffi North America; 132AFC Series QuickSetter Plus or comparable product by one of the following:

Legend Valve & Fitting, Inc.

TACO Comfort Solutions, Inc.

<**Insert manufacturer's name**>.

Description: Manual balancing valve with integral flow meter and sight gauge, combined with built in temperature gauge and check valve, designed for balancing domestic hot-water recirculation systems.

Standards:

NSF/ANSI/CAN 372 low-lead laws, as certified by ICC-ES.

ASTM F 1807 PEX crimp fittings.

ASTM F 1960 PEX expansion fittings.

Maximum Working Pressure: 150 psig (1000 kPa).

Working Temperature Range: 14 to 230 deg F (Minus 10 to plus 110 deg C).

Valve Body, Flow Meter Body, and Headwork: DZR low-lead brass.

Ball and Flow Meter Springs and Bypass Valve Stem: Stainless steel.

Ball Control Stem: Brass, chrome plated.

Ball Seal Seat: PTFE.

Control Stem Guide, Flow Meter Float, and Indicator Cover: Polysulfone.

Retain "Built-In Direct Reading Flowmeter" Subparagraph below to allow for non-requirement of a separate pressure drop instrument or manometer.

Built-In Direct Reading Flowmeter:

Detachable bypass channel for cleaning or replacement.

Memory sliding pointer providing flow rate memory indication.

In "Seals" Subparagraph below, peroxide-cured EPDM is resistant to water treated with chlorine or chloramine for longer life expectancy.

Seals: Peroxide-cured EPDM.

Ball/Magnet Flow Indicator: Sealed, isolated chamber, not in contact with system fluid to provide clear accurate readings.

Size and End Connections, Union Inlet and Outlet:

Sizes: [**PEX crimp**] [**PEX expansion**] [**Solder**] [**Press**]; [**NPS 1/2 (DN 15)**] [**NPS 3/4 (DN 20)**] [**NPS 1 (DN 25)**].

Flow Rate Range and Fully Open Flow Rates:

Flow Rate Range: 1/2 to 1-3/4 gpm (Cv 1.0).

Flow Rate Range: 2 to 7 gpm (Cv 6.3).

In "Outlet Temperature Gauge" Subparagraph below, installation is optional.

Outlet Temperature Gauge: 30 to 210 deg F (0 to 100 deg C) 2-inch (51mm) diameter dual-scale temperature gauge.

Insulation shell in '"Insulation shell" Subparagraph below is optional and provided separately for field installation.

Insulation shell.

Isolation ball valve in "Isolation Ball Valves" Subparagraph below is optional and provided separately for field installation.

Isolation Ball Valves: Inlet and outlet low-lead brass.

Copy "Adjustable Thermal Balancing Valve" Subparagraph below and re-edit for each type of vacuum breaker required. If only one type is required, drawing designation may be omitted.

Adjustable Thermal Balancing Valve <**Insert drawing designation if any**>:

Retain "Basis-of-Design Product" Subparagraph and list of manufacturers below to require a specific product or a comparable product from manufacturers listed.

Valves 1162 Series and 1166 Series are provided with thermostatic bypass for thermal disinfection. For more information, see [www.caleffi.com/usa/en-us/products/search/id/plumbing-components-47864?query=116](https://www.caleffi.com/usa/en-us/products/search/id/plumbing-components-47864?query=116).

If the 1163 Series is selected, the 656 Series thermoelectric actuator is required to be purchased.

Basis-of-Design Product: Subject to compliance with requirements, provide product by Caleffi North America; ThermoSetter [**1162**] [**1163**] [**1164**] [**1166**] Series or comparable product by one of the following:

ThermOmegaTech.

Viega.

<**Insert manufacturer's name**>.

Description: Adjustable thermal balancing valve used for automatic balancing of recirculation circuits in domestic hot-water systems. Modulates flow rate in each circuit so hot-water temperature at fixtures remains constant. Models available with disinfection bypass cartridge to perform thermal disinfection to prevent Legionella.

Standards:

NSF/ANSI/CAN 372 low-lead laws, as certified by ICC-ES.

NSF/ANSI/CAN 61, commercial hot water 180 deg F (82 deg C) as certified by ICC-ES.

Meets codes IPC and UPC.

Maximum Working Pressure: 230 psig (1586 kPa).

Adjustable Working Temperature Range by Sizes:

NPS 1/2 to NPS 3/4 (DN 15 to DN 20) for temperature range of 95 to 140 deg F (35 to 60 deg C).

NPS 1 and NPS 1-1/4 (DN 25 and DN 32) for temperature range of 95 to 150 deg F (35 to 65 deg C).

Retain first subparagraph below if 1164 Series is selected.

NPS 1/2 to NPS 3/4 (DN 15 to DN 20) for temperature range of 105 to 150 deg F (40 to 65 deg C).

Body Material: DZR low-lead brass.

Size and Connections:

NPT female threaded. [**NPS 1 (DN 25)**] [**NPS 1-1/4 (DN 40)**].

Union Inlet and Outlet: [**PEX crimp**] [**PEX expansion**] [**Solder**] [**Press**]; [**NPS 1/2 (DN 15)**] [**NPS 3/4 (DN 20)**].

In "Hydraulic Seals" Subparagraph below, peroxide-cured EPDM is resistant to water treated with chlorine or chloramine for longer life expectancy.

Hydraulic Seals: Peroxide-cured EPDM.

"Adjustable Balancing Cartridge" Subparagraph below controls temperature to set point. Separate pressure-drop instrument or manometer is not required. The adjustable balancing cartridge is removable for cleaning.

Adjustable Balancing Cartridge: Stainless steel and copper.

ABS Adjustable Knob: Temperature adjustment scale for manual setting and tamper-proof adjustment locking screw.

Retain first subparagraph below if 1161 Series, 1162 Series, or 1166 Series is selected.

Factory Setting: 130 deg F (55 deg C).

Retain first subparagraph below if 1164 Series is selected.

Factory Setting: 135 deg F (58 deg C).

Retain first subparagraph below if 1163 Series is selected. There is no factory setting to specify because controlled by a separately purchased thermo-electric actuator, Caleffi 656 Series is recommended.

Electrically actuated thermal disinfection bypass with separately purchased thermo-electric actuator.

Disinfection Temperature:

Retain first subparagraph below if 1162 Series is selected; retain second subparagraph if 1166 Series is selected.

160 deg F (70 deg C).

140 deg F (60 deg C).

Closing Temperature:

Retain first subparagraph below if 1162 Series is selected; retain second subparagraph if 1166 Series is selected.

170 deg F (75 deg C).

150 deg F (65 deg C).

"Flow Rating" Subparagraph below indicates Cv, which is defined as flowing 1 gpm (0.23 cu. m/h) at 1 psi (0.07 bar) pressure drop for determining flow-resistance pump sizing.

Flow Rating:

Retain first subparagraph below if size NPS 1/2 (DN 15) or NPS 3/4 (DN 32) 1161 Series, 1162 Series, 1163 Series, or 1166 Series is selected.

2.1 Cv (1.8 Kv) maximum, 1.2 Cv (1.0 Kv) disinfection, 0.23 Cv (0.2 Kv) minimum, 0.52 Cv (0.45 Kv) design.

Retain first subparagraph below if size NPS 1 (DN 25) or NPS 1-1/4 (DN 32) 1161 Series, 1162 Series, 1163 Series, or 1166 Series is selected.

4.4 Cv (3.8 Kv) maximum, 1.3 Cv (2.0 Kv) disinfection, 1.0 Cv (0.9 Kv) minimum, 1.9 Cv (1.6 Kv) design.

Retain first subparagraph below if 1164 Series is selected.

2.1 Cv (1.8 Kv) maximum, 0.35 Cv (0.3 Kv) minimum, 0.69 Cv (0.6 Kv) design.

In "Outlet Temperature Gauge" Subparagraph below, installation is optional to allow for circuit temperature verification.

Outlet Temperature Gauge: 2-inch diameter with optional dual-scale outlet, 30 to 180 deg F (0 to 80 deg C).

Retain "Check Valve" Subparagraph below to prevent circuit thermosiphoning.

Check Valve:

Standard for [**NPS 1/2 (DN 15)**] [**NPS 3/4 (DN 20)**].

Optional for . [NPS 1 (DN 25)] [NPS 1-1/4 (DN 40)] .

Insulation shell in subparagraph below is optional and provided separately for field installation.

Insulation shell.

Isolation ball valve in "Isolation Ball Valves" Subparagraph below is optional and provided separately for field installation or factory-installed assembly.

Isolation Ball Valves: Inlet and outlet low-lead brass.

* + - 1. TEMPERATURE-ACTUATED, WATER MIXING VALVES

Insert drawing designation. Use these designations on Drawings to identify each product.

Copy "Water-Temperature Limiting Devices" Paragraph below and re-edit for each type of limiting device required. If only one type is required, drawing designation may be omitted.

Water-temperature limiting devices below are not intended for service as master thermostatic mixing valves. Their primary function is to thermostatically regulate the temperature of water at a single fixture. Devices below are available in NPS 1/2 to NPS 1 (DN 15 to DN 25) and comply with ASSE 1070. They may additionally comply with ASSE 1016, ASSE 1017, or both.

* + - * 1. Water-Temperature Limiting Devices <**Insert drawing designation if any**>:

Retain "Manufacturers" Subparagraph and list of manufacturers below to require products from manufacturers listed or a comparable product from other manufacturers.

Manufacturers: Subject to compliance with requirements, provide products by one of the following:

Acorn Engineering Company; a Division of Morris Group International.

Apollo Flow Controls; Conbraco Industries, Inc.

Cash Acme; a division of Reliance Worldwide Corporation.

Leonard Valve Company.

POWERS; A WATTS Brand.

Symmons Industries, Inc.

TACO Comfort Solutions, Inc.

WATTS.

Zurn Industries, LLC.

<**Insert manufacturer's name**>.

Standard: ASSE 1070.

Pressure Rating: 125 psig (860 kPa).

Type: Thermostatically controlled, water mixing valve.

Material: Bronze body with corrosion-resistant interior components.

Connections: Threaded[**union**] inlets and outlet.

Accessories: Check stops on hot- and cold-water supplies, and adjustable, temperature-control handle.

Tempered-Water Setting: <**Insert deg F (deg C)**>.

Retain "Tempered-Water Design Flow Rate" Subparagraph below only if flow rate is not indicated on Drawings.

Tempered-Water Design Flow Rate: <**Insert gpm (L/sec)**>.

Valve Finish: [**Chrome plated**] [**Rough bronze**].

Copy "Primary, Thermostatic, Water Mixing Valves" Paragraph below and re-edit for each type of water mixing valve required. If only one type is required, drawing designation may be omitted.

Primary, thermostatic, water mixing valves below are available in NPS 3/4 to NPS 3 and possibly NPS 4 (DN 20 to DN 80 and possibly DN 100), but they are usually NPS 2 (DN 50) or smaller.

* + - * 1. Primary, Thermostatic, Water Mixing Valves - Adjustable <**Insert drawing designation if any**>:

Retain "Basis-of-Design Product" Subparagraph and list of manufacturers below to require a specific product or a comparable product from manufacturers listed.

Mixing valve 520 Series "AngleMix" is available in sizes NPS 1/2 (DN 15), NPS 3/4 (DN 20), and NPS 1 (DN 25).

520 Series "AngleMix" mixing valve is furnished with thermal shutoff. For more information, see [www.caleffi.com/usa/en-us/catalogue/anglemixtm-thermostatic-mixing-valve-temperature-gauge-520516a](https://www.caleffi.com/usa/en-us/catalogue/anglemixtm-thermostatic-mixing-valve-temperature-gauge-520516a).

Basis-of-Design Product: Subject to compliance with requirements, provide product by Caleffi North America; 520 Series AngleMix or comparable product by one of the following:

POWERS; A WATTS Brand.

Webstone Company, Inc.; A NIBCO Brand.

<**Insert manufacturer's name**>.

Description: Adjustable thermostatic water mixing valve made for precise, water temperature control for point-of-distribution domestic water systems. The angle-style body mounts directly to the top of water heaters; the mixed temperature outlet is in line with the hot-water inlet, eliminating a piping elbow and reducing space required for installation. The valve is furnished with a thermal shutoff that closes the hot-water supply in the event of cold-water failure preventing mixed water temperature. Also provided is a tight-closing hot inlet port to prevent temperature creep in the domestic water recirculation system without the need for return balancing valves.

Standards:

ASSE 1017/CSA B125.3, NSF/ANSI/CAN 372 low-lead laws, as certified by ICC ES. Models with inlet check valves additionally compliant to ASSE 1070 by ICC ES.

Meets codes IPC, IRC, UPC, and NPC.

ASTM F1807 PEX crimp fittings.

ASTM F1960 PEX expansion fittings.

Body Material: DZR low-lead brass.

Size: [**NPS 1/2 (DN 15)**] [**NPS 3/4 (DN 20)**] [**NPS 1 (DN 25)**].

Union Connections: [**NPT male** **threaded**] [**Solder**] [**Press**] inlets and outlet.

Spring: Stainless steel.

In "Shutter, Seats, and Slide Guides" Subparagraph below, the polymer polysulfone reduces seizing or erratic mixed temperatures caused by lime deposits for long operating life.

Shutter, Seats, and Slide Guides: Scale-resistant polymer polysulfone.

In "Seals" Subparagraph below, peroxide-cured EPDM is resistant to water treated with chlorine or chloramine for longer life expectancy.

Seals: Peroxide-cured EPDM.

Setting Range: 95 to 150 deg F (35 to 65 deg C) and 95 to 120 deg F (35 to 50 deg C) for models with inlet checks certified to ASSE 1070.

ABS Adjustment Knob: Temperature adjustment with graduated scale and tamper-proof locking screw.

Check valve in "Inlet Check Valves" Subparagraph below is optional to prevent undesirable backflow.

Inlet Check Valves: [**Threaded**] [**Solder**] [**Press**].

Retain "Accurate Low-Flow Rate" Subparagraph below for stable control of high-efficiency fixtures.

Accurate Low-Flow Rate: 0.5 gpm (2.3 L/min) minimum flow.

Outlet Temperature Gauge: 30 to 210 deg F (0 to 100 deg C), 2-inch- (50-mm-) diameter dual scale.

Valve in "Valve Body without Union Connections" Subparagraph below is provided separately and field installed with separately purchase union end connections as listed.

Valve Body without Union Connections: [**NPT male** **threaded**] [**Solder**] [**PEX crimp**] [**PEX expansion**] inlets and outlets.

1-inch (25-mm) union body for connections sizes [**NPS 1/2 (DN 15)**] [**NPS 3/4 (DN 20)**] [**NPS 1 (DN 25)**].

1-1/4-inch (32-mm) union body for connections sizes [**NPS 1 (DN 25)**] [**NPS 1-1/4 (DN 32)**].

Ball valve in "Isolation Ball Valves" Subparagraph below is optional and provided separately for field installation.

Isolation Ball Valves: Inlet and outlet low-lead brass.

Maximum Working Static Pressure: 150 psig (1034 kPa).

Maximum Working Dynamic Pressure: 75 psig (517 kPa).

Maximum Hot-Water Inlet Temperature: 195 deg F (90 deg C).

"Flow Capacity" Subparagraph below indicates Cv, which is defined as flowing 1 gpm (0.23 cu. m/h) at 1 psi (0.07 bar) pressure drop for determining flow-resistance pump sizing.

Flow Capacity:

[**NPS 1/2 (DN 15)**] [**NPS 3/4 (DN 20)**] Cv 2.0 (Kv 1.7).

NPS 1 (DN 25**)** CV 3.5 (Kv 3.0).

Copy "Primary, Thermostatic, Water Mixing Valves" Paragraph below and re-edit for each type of vacuum breaker required. If only one type is required, drawing designation may be omitted.

* + - * 1. Primary, Thermostatic, Water Mixing Valves <**Insert drawing designation if any**>:

Retain "Basis-of-Design Product" Subparagraph and list of manufacturers below to require products from manufacturers listed or a comparable product from other manufacturers.

Mixing valve 521 Series "MixCal" is available in sizes NPS 1/2 (DN 15), NPS 3/4 (DN 20), and NPS 1 (DN 25). For more information, see [www.caleffi.com/usa/en-us/products/search?query=521](https://www.caleffi.com/usa/en-us/products/search?query=521).

Basis-of-Design Product: Subject to compliance with requirements, provide product by Caleffi North America; 521 Series MixCal or comparable product by one of the following:

POWERS; A WATTS Brand.

Webstone Company, Inc.; A NIBCO Brand.

<**Insert manufacturer's name**>.

Description: Thermostatically controlled, water mixing valve made for precise, process-water temperature control at point of distribution for domestic water systems. The mixing valve has a large mixing chamber and thermostatic cartridge for precise mixed temperature stability during inlet temperature and pressure variations.

Standards:

ASSE 1017/CSA B125.3, NSF/ANSI/CAN 372 low-lead laws, as certified by ICC ES.

Meets codes IPC, IRC, UPC, and NPC.

ASTM F1807 PEX crimp fittings.

ASTM F1960 PEX expansion fittings.

Body Material: Low-lead brass.

Union End Connections: [**NPT female threaded**] [**Solder**] [**Press**] [**PEX crimp**] [**PEX expansion**] inlets and outlets.

Size: [**NPS 1/2 (DN 15)**] [**NPS 3/4 (DN 20)**] [**NPS 1 (DN 25)**].

Spring: Stainless steel.

In "Shutter, Seats, and Slide Guides" Subparagraph below, polymer polyphenylene oxide reduces seizing or erratic mixed temperatures caused by lime deposits for a long operating life.

Shutter, Seats, and Slide Guides: Scale-resistant polymer polyphenylene oxide.

In "Seals" Subparagraph below, peroxide-cured EPDM is resistant to water treated with chlorine or chloramine for longer life expectancy.

Seals: Peroxide-cured EPDM.

Setting Range: 85 to 150 deg F (30 to 65 deg C).

ABS Adjustment Knob: Temperature adjustment with graduated scale and tamper-proof locking screw.

Check valve in "Inlet Check Valves" Subparagraph below is optional to prevent backflow.

Inlet Check Valves: [**NPT male threaded**] [**Solder**] [**Press**] [**PEX crimp**] [**PEX expansion**].

Outlet Temperature Gauge: 30 to 210 deg F (0 to 100 deg C), 2-inch- (50-mm-) diameter dual scale.

Ball valve in "Isolation Ball Valves" Subparagraph below is optional and provided separately for field installation.

Isolation Ball Valves: Inlet and outlet, low-lead brass.

Maximum Working Pressure: 200 psig (1379 kPa).

Maximum Inlet Temperature: 200 deg F (93 deg C).

Adjustable Temperature Setting: 85 to 150 deg F (30 to 65 deg C).

Maximum Flow Rate: 14 gpm (1.1 L/sec).

"Flow Capacity" Subparagraph below indicates Cv, which is defined as flowing 1 gpm (0.23 cu. m/h) at 1 psi (0.07 bar) pressure drop for determining flow-resistance pump sizing.

Flow Capacity: Cv 3.0 (Kv 2.6).

Copy "Primary, Thermostatic, Water Mixing Valves - High Flow" Paragraph below and re-edit for each type of vacuum breaker required. If only one type is required, drawing designation may be omitted.

* + - * 1. Primary, Thermostatic, Water Mixing Valves - High Flow <**Insert drawing designation if any**>:

Retain "Basis-of-Design Product" Subparagraph and list of manufacturers below to require products from manufacturers listed or a comparable product from other manufacturers.

Mixing valve 5231 Series "MixCal Plus" is available in sizes NPS 1 (DN 25), NPS 1-1/4 (DN 32), NPS 1-1/2 (DN 40), and NPS 2 (DN 50). For more information, refer to [www.caleffi.com/usa/en-us/products/search?query=5231](https://www.caleffi.com/usa/en-us/products/search?query=5231).

Basis-of-Design Product: Subject to compliance with requirements, provide product by Caleffi North America; 5231 Series MixCal Plus or comparable product by one of the following:

POWERS; A WATTS Brand.

Webstone Company, Inc.; A NIBCO Brand.

<**Insert manufacturer's name**>.

Description: High-flow, thermostatically controlled water mixing valve made for precise water temperature control at point of distribution for domestic water systems.

Standards:

ASSE 1017/CSA B125.3, NSF/ANSI/CAN 372 low-lead laws, as certified by ICC ES.

Meets codes IPC, IRC, UPC, and NPC.

Body Material: DZR low-lead brass.

Union Connections: [**NPT male** **threaded**] [**Solder**] [**Press**] inlets and outlet.

Size: [**NPS 1 (DN 25)**] [**NPS 1-1/4 (DN 32)**] [**NPS 1-1/2 (DN 40)**] [**NPS 2 (DN 50)**].

Spring: Stainless steel.

In "Shutter, Seats, and Slide Guides" Subparagraph below, polymer polyphenylene oxide reduces seizing or erratic mixed temperatures caused by lime deposits for a long operating life.

Shutter, Seats, and Slide Guides: Scale resistant polymer polyphenylene oxide.

In "Seals" Subparagraph below, peroxide-cured EPDM is resistant to water treated with chlorine or chloramine for longer life expectancy.

Seals: Peroxide-cured EPDM.

Setting Range: 95 to 150 deg F (35 to 65 deg C).

ABS Adjustment Knob: Temperature adjustment with graduated scale and tamper-proof locking screw.

Gauge in "Outlet Temperature Gauge" Subparagraph below is furnished with an optional adapter that is provided separately and field installed.

Outlet Temperature Gauge: 30 to 210 deg F (0 to 100 deg C), 2-inch- (50-mm-) diameter dual scale.

NPS 1-1/4 (DN 32) soldered connection.

[**NPS 1 (DN 25)**] [**NPS 1-1/4 (DN 32)**], threaded male by female.

[**NPS 1-1/2 (DN 40)**] [**NPS 2 (DN 50)**], threaded male by female.

Retain "Inlet Check Valves" Subparagraph below to prevent backflow. Check valve is provided separately and field installed.

Inlet Check Valves: Stainless steel.

Size: [**NPS 1 (DN 25)**] [**NPS 1-1/4 (DN 32)**] [**NPS 1-1/2 (DN 40)**] [**NPS 2 (DN 50)**].

Minimum Flow for Temperature Stability:

NPS 1 and NPS 1-1/4 (DN 25 and DN 32); 4.4 gpm (0.3 L/sec).

NPS 1-1/2 and NPS 2 (DN 40 and DN 50); 8.8 gpm (0.6 L/sec).

Maximum Flow for Temperature Stability:

NPS 1 and NPS 1-1/4 (DN 25 and DN 32); 40 gpm (2.5 L/sec).

NPS 1-1/2 and NPS 2 (DN 40 and DN 50); 80 gpm (95.0 L/sec).

"Flow Capacity" Subparagraph below indicates Cv, which is defined as flowing 1 gal/min (0.23 cu. m/h) at 1 psi (0.07 bar) pressure drop for determining flow-resistance pump sizing.

Flow Capacity:

NPS 1 (DN 25), Cv 7 (Kv 6.0).

NPS 1-1/4 (DN 32), Cv 7.6 (Kv 6.5).

NPS 1-1/2 (DN 40), Cv 13 (Kv 11.2).

NPS 2 (DN 50), Cv 14.2 (Kv 12.2).

Maximum Working Static Pressure: 200 psig (1379 kPa).

Maximum Operating Differential Pressure: 75 psig (517 kPa).

Hot-Water Inlet Temperature Range: 120 to 195 deg F (49 to 91 deg C).

Cold-Water Inlet Temperature Range: 39 to 80 deg F (3.9 to 26.6 deg C).

Copy "Primary, Electronic, Water Mixing Valves" Paragraph below and re-edit for each type of water mixing valve assembly required. If only one type is required, drawing designation may be omitted.

Primary, electronic, water mixing valve assemblies below are available in NPS 1 to NPS 3 (DN 25 to DN 80).

* + - * 1. Primary, Electronic, Water Mixing Valves <**Insert drawing designation if any**>:

Retain "Basis-of-Design Product" Subparagraph and list of manufacturers below to require a specific product or a comparable product from manufacturers listed.

For more information on 6000A Series LEGIOMIX®, see [www.caleffi.com/usa/en-us/catalogue/legiomixr-electronic-mixing-valve-600064a](https://www.caleffi.com/usa/en-us/catalogue/legiomixr-electronic-mixing-valve-600064a) or [www.caleffi.com/usa/en-us/catalogue/legiomixr-electronic-mixing-valve-flanged-600060a](https://www.caleffi.com/usa/en-us/catalogue/legiomixr-electronic-mixing-valve-flanged-600060a).

Basis-of-Design Product: Subject to compliance with requirements, provide product by Caleffi North America; 6000A Series LEGIOMIX or comparable product by one of the following:

Leonard Valve Company.

POWERS; A WATTS Brand.

<**Insert manufacturer's name**>.

Description: Electronic mixing valve with optional selectable calendar-based scheduling programs for thermal disinfection of hot-water recirculation system to kill Legionella bacteria.

Standards:

ASSE 1017/CSA B15.3, NSF/ANSI/CAN 372 low-lead laws, as certified by ICC-ES.

Meets codes IPC, IRC, UPC, and NPC.

Meets the requirements of CSA Z317.1 Special Requirement for Plumbing Installations in Health Care Facilities, as certified by ICC-ES.

Maximum Body Pressure Rating: Press [**200 psig (1380 kPa)**] [**NPT male threaded**] [**Solder**] [**Flanged**] [**230 psig (1586 kPa)**].

Maximum Working Pressure: 150 psig (1034 kPa).

Maximum Inlet Temperature: 212 deg F (100 deg C).

Adjustable Temperature Range: 70 to 185 deg F (20 to 85 deg C).

Disinfection Temperature Range: 100 to 185 deg F (40 to 85 deg C).

Mixed Outlet Temperature Gauge Scale: 30 to 210 deg F (Minus 1 to plus 99 deg C).

Retain "Tempered-Water Design Flow Rate" Subparagraph below only if flow rate is not indicated on Drawings.

Tempered-Water Design Flow Rate: <**Insert gpm (L/sec)**>.

Temperature Control: Plus, or minus 3 deg F (2 deg C).

Type: Exposed, electronically controlled, water mixing valve.

Valve:

Body Material: DZR low-lead brass with corrosion-resistant interior components.

Size: [**NPS 3/4 (DN 20)**] [**NPS 1 (DN 25)**] [**NPS 1-1/4 (DN 32)**] [**NPS 1-1/2 (DN 40)**] [**NPS 2 (DN 50)**].

Union Connections: [**NPT male threaded**] [**Solder**] [**Press**] inlets and outlets.

Size: [**NPS 2-1/2 (DN 65)**] [**NPS 3 (DN 80)**].

ANSI B16.5/Class 150-RF flanged.

Ball valve in "Isolation Ball Valves" Subparagraph below is optional for NPS 3/4 (DN 20) only and provided separately for field installation.

Isolation Ball Valves: Inlet and outlet, low-lead brass.

Control Ball Valve: Three-way full port.

Sizes: NPS 3/4 to NPS 2 (DN 20 to DN 50); low-lead brass, chrome plated.

Sizes: NPS 2-1/2 or NPS 3 (DN 65 or DN 80); AISI 316 stainless steel.

In "Hydraulic Seals" Subparagraph below, peroxide-cured EPDM is resistant to water treated with chlorine or chloramine for longer life expectancy.

Hydraulic Seals: Peroxide-cured EPDM.

Slip-On Flanges for Sizes: [**NPS 2-1/2 (DN 65)**] [**and**] [**NPS 3 (DN 80)**]; galvanized carbon steel.

Seal Ring: PTFE.

Actuator:

Three-wire floating fail-in-place.

24 V ac - 50/60 Hz supply.

6 VA power consumption.

Self-extinguishing VO protection cover.

IP 65 (NEMA 4/4X) protection class.

31-1/2-inches (800-mm) electric supply cable length.

Controller:

Materials:

Housing: Self-extinguishing ABS.

Color: White RAL 1467.

Cover: Self-extinguishing SAN, smoked transparent.

Electric Supply: 24 V ac (min 21.6, max 26.0 V ac) - 50/60 Hz.

Power Consumption: 6.5 VA.

Protection Class: IP 54 wall mounting, Class II appliance.

Mounting bracket: DIN rail.

Approvals: CE, FCC Part 15.

Temperature Sensors:

Body Material: Stainless steel.

Furnished with two NTC sensitive elements.

Working Temperature Range: 14 to 260 deg F (minus 10 to plus 125 deg C).

10,000 ohms at 77 deg F (25 deg C).

2.5 time constant.

Strap-on style for recirculation piping installation.

Removable Operating Lever: For flanged version only.

Check valve assembly in "Inlet Check Valve Assembly" Subparagraph below is purchased separately and field installed.

Inlet Check Valve Assembly: Stainless steel body, no lead, with acetyl plastic check valve insert and NBR O-ring for union version only.

Size: [**NPS 1 (DN 25)**] [**NPS 1-1/4 (DN 32)**] [**NPS 1-1/2 (DN 40)**] [**NPS 2 (DN 50)**].

Furnished with 115/24 V ac transformer.

Tempered Water Setting: <**Insert value**>.

Valve Flow Rate at 20 psig (138 kPa).

"Flow Capacity" Subparagraph below indicates Cv, which is defined as flowing 1 gal/min (0.23 cu. m/h) at 1 psi (0.07 bar) pressure drop for determining flow-resistance pump sizing. Consult Caleffi's technical literature for sizing based on recommended flow conditions.

Flow Capacity:

NPS 3/4 (DN 20), Cv 9.7 (Kv 8.4).

NPS 1 (DN 25), Cv 21 (Kv 18).

NPS 1-1/4 (DN 32), Cv 24 (Kv 20).

NPS 1-1/2 (DN 40), Cv 34 (Kv 29).

NPS 2 (DN 50), Cv 48 (Kv 41).

NPS 2-1/2 (DN 65), Cv 105 (Kv 90).

NPS 3 (DN 80), Cv 120 (Kv 103).

Digital temperature control and monitoring module.

The valve is programmable in a choice of 11 languages. It has a set of programs for selectable automatic scheduling of circuit thermal disinfection to kill Legionella. It is also configurable via keypad, local controller or remote controller.

User programmable at module or through BAS.

Daily ball rotation cycle to flush debris.

Flush valve relay output.

Data logging (40-day FIFO loop buffer), alarming, and status indication.

Local and remote monitoring.

Furnished with integral ModBus protocol.

Modbus-to-BACnet gateway in subparagraph below is optional and is purchased separately.

Modbus-to-BACnet: Gateway for remote access to building automation integration.

Copy "Primary, Electronic, Water Mixing Valve Station Assemblies" Paragraph below and re-edit for each type of vacuum breaker required. If only one type is required, drawing designation may be omitted.

* + - * 1. Primary, Electronic, Water Mixing Valve Station Assemblies <**Insert drawing designation if any**>:

Retain "Basis-of-Design Product" Subparagraph and list of manufacturers below to require a specific product or a comparable product from manufacturers listed.

For more information on 6000AS Series LEGIOMIX, see [www.caleffi.com/usa/en-us/catalogue/legiomixr-station-600066as](https://urldefense.com/v3/__https:/www.caleffi.com/usa/en-us/catalogue/legiomixr-station-600066as__;!!Ofz1Xjg!sxWjYAW9E69T9lOR1TlOAeU5J6ScobNfyJS21vSf22DPjb7a0o3fOkC9LDJv_D-kFyA$).

6000AS Series LEGIOMIX station assembly includes pre-piped, three-way mixing valve with union connections, serviceable check valves, a recirculation connection, and isolation valves.

Basis-of-Design Product: Subject to compliance with requirements, provide product by Caleffi North America; 6000AS Series LEGIOMIX or comparable product by one of the following:

Leonard Valve Company.

POWERS; A WATTS Brand.

<**Insert manufacturer's name**>.

Description: Electronic mixing station assembly includes pre-piped, three-way mixing valve with union connections, serviceable check valves, a recirculation connection, isolation valves, a return water temperature sensor, and controller/user interface with DIN rail mounting bracket. All mounted on welded- and powder-coat-painted steel strut. Plug-in 120/24 V ac transformer with 20-foot cable included.

Standards:

ASSE 1017/CSA B15.3, NSF/ANSI/CAN 372 low-lead laws, as certified by ICC-ES.

Meets codes IPC, IRC, UPC, and NPC.

Valve body component meets the requirements of CSA Z317.1 Special Requirement for Plumbing Installations in Health Care Facilities, as certified by ICC-ES.

Maximum Valve Body Pressure Rating: 230 psig (1586 kPa).

Maximum Operating Pressure: 150 psig (1034 kPa).

Maximum Inlet Temperature: 212 deg F (100 deg C).

Adjustable Temperature Range: 70 to 185 deg F (20 to 85 deg C).

Disinfection Temperature Range: 100 to 185 deg F (40 to 85 deg C).

Mixed Outlet Temperature Gauge Scale: 30 to 210 deg F (Minus 1 to plus 99 deg C).

Retain "Tempered-Water Design Flow Rate" Subparagraph below only if flow rate is not indicated on Drawings.

Tempered-Water Design Flow Rate: <**Insert gpm (L/sec)**>.

Temperature Control: Plus or minus 3 deg F (2 deg C).

Station Components:

Valve Body Material: DZR low-lead brass with corrosion-resistant interior components.

Frame: Epoxy painted steel uni-strut.

Pipes: Copper, Type L.

Ball Valves: Low-lead brass.

Check Valves: Stainless steel.

Control Ball Valve: Three-way full port.

In "Valve Body Hydraulic Seals" Subparagraph below, peroxide-cured EPDM is resistant to water treated with chlorine or chloramine for longer life expectancy.

Valve Body Hydraulic Seals: Peroxide-cured EPDM.

Valve Body Seal Ring: PTFE.

Actuator:

Three-wire floating fail-in-place.

24 V ac - 50/60 Hz supply.

6 VA power consumption.

Self-extinguishing VO protection cover.

IP 65 (NEMA 4/4X) protection class.

31-1/2-inch (0.8-m) electric supply cable length.

Controller:

Materials:

Housing: Self-extinguishing ABS.

Color: White RAL 1467.

Cover: Self-extinguishing SAN, smoked transparent.

Electric supply: 24 V ac (min 21.6, max 26.0 V ac) - 50/60 Hz.

Power consumption: 6.5 VA.

Protection Class: IP 54 wall mounting, Class II appliance.

Mounting Bracket: DIN rail.

Approvals: CE, FCC Part 15.

Temperature Sensors:

Body Material: Stainless steel.

Furnished with two NTC sensitive elements.

Working Temperature Range: 14 to 260 deg F (Minus 10 to plus 125 deg C).

10,000 ohms at 77 deg F (25 deg C).

2.5 time constant.

Strap-on style for recirculation piping installation.

Furnished with 120/24 V ac transformer.

Tempered Water Setting: <**Insert value**>.

Valve Flow Rate at 20 psig (138 kPa).

"Flow Capacity by Station Size" Subparagraph below indicates Cv, which is defined as flowing 1 gpm (0.23 cu. m/h) at 1 psi (0.07 bar) pressure drop for determining flow-resistance pump sizing.

Flow Capacity by Station Size:

NPS 1 (DN 25) Cv 7.8 (Kv 6.7).

NPS 1-1/4 (DN 32) Cv 9 (Kv 7.8).

NPS 1-1/2 (DN 40) Cv 20 (Kv 17.3).

NPS 2 (DN 50) Cv 38 (Kv 2.6).

NPS 2-1/2 (DN 65) Cv 43 (Kv 37.2).

Maximum flow rate at 5-feet-per-second maximum pipe velocity per UPC and CDA guidelines:

NPS 1 (DN 25), 14 gpm (53 L/min).

NPS 1-1/4 (DN 32), 20 gpm (76 L/min).

NPS 1-1/2 (DN 40), 29 gpm (110 L/min).

NPS 2 (DN 50), 50 gpm (189 L/min).

NPS 2-1/2 (DN 65), 76 gpm (288 L/min).

Digital temperature control and monitoring module.

The valve is programmable in a choice of 11 languages. It has a set of programs for selectable automatic scheduling circuit thermal disinfection to kill Legionella. It is also configurable via keypad or local or remote controller.

User programmable at module or through BAS.

Daily ball rotation cycle to flush debris.

Flush valve relay output.

Data logging (40-day FIFO loop buffer), alarming, and status indication.

Local and remote monitoring.

Furnished with integral ModBus protocol.

Modbus-to-BACnet gateway in subparagraph below is optional and is purchased separately.

Modbus-to-BACnet: Gateway for remote access to building automation integration.

Copy "Thermostatic Mixing Valve Kit for Domestic Water Heaters" Paragraph below and re-edit for each type of water mixing valve assembly required. If only one type is required, drawing designation may be omitted.

Thermostatic mixing valve kit for domestic water heaters is available in NPS 3/4 (DN 20).

* + - * 1. Thermostatic Mixing Valve Kit For Domestic Water Heaters <**Insert drawing designation if any**>:

Retain "Basis-of-Design Product" Subparagraph and list of manufacturers below to require products from manufacturers listed or a comparable product from other manufacturers.

520 Series "TankMixer" mixing valve is furnished with thermal shutoff. The hot-water inlet tightly closes upon cold-water-supply failure, preventing mixed temperature water delivery. Valve is furnished with a tight-closing hot inlet port to prevent temperature creep in the domestic water recirculation system without the need for return balancing valves.

For more information, see [www.caleffi.com/usa/en-us/catalogue/tankmixertm-mixing-valve-low-lead-520500ax](https://www.caleffi.com/usa/en-us/catalogue/tankmixertm-mixing-valve-low-lead-520500ax) and [www.caleffi.com/usa/en-us/catalogue/tankmixertm-mixing-valve-low-lead-temperature-gauge-520510ax](https://www.caleffi.com/usa/en-us/catalogue/tankmixertm-mixing-valve-low-lead-temperature-gauge-520510ax).

Basis-of-Design Product: Subject to compliance with requirements, provide product by Caleffi North America; 520 Series TankMixer or comparable product by one of the following:

Cash Acme; a division of Reliance Worldwide Corporation.

Honeywell.

<**Insert manufacturer's name**>.

Description: Mixing valve solution in a kit to maximize the capacity of modern, high-efficiency water heaters and minimize installation time. Kit includes main thermostatic mixing valve, cold-water cross with check valve, flexible pipe, and connection fittings.

Standards:

ASSE 1017/CSA B125.3, NSF/ANSI/CAN 372 low-lead laws, as certified by ICC-ES.

Meets codes IPC, IRC, UPC, and NPC.

Body Material: DZR low-lead brass.

In "Shutter, Seats, and Slide Guides" Subparagraph below, polymer polysulfone reduces seizing or erratic mixed temperatures caused by lime deposits for a long operating life.

Shutter, Seats, and Slide Guides: Anti-scale polysulfone polymer.

Springs: Stainless steel.

In "Seals" Subparagraph below, peroxide-cured EPDM is resistant to water treated with chlorine or chloramine for longer life expectancy.

Seals: Peroxide-cured EPDM.

ABS Adjustment Knob: Temperature adjustment with graduated scale and tamper-proof locking screw.

"Accurate Low-Flow Rate" Subparagraph below is for stable control of high-efficiency fixtures.

Accurate Low-Flow Rate: 0.5 gpm (2.3 L/min) minimum flow.

Install check valve in cold-water cross outlet to prevent undesirable backflow.

Check valve.

Large ID Flexible Pipe: Stainless steel.

Sizes: NPS 3/4 (DN 20).

Connections:

Tank: NPT female, union.

System: Union press or union solder.

Recirculation Inlet Port: NPS 1/2 (DN 15) NPT female threaded, complete with low-lead brass plug.

Setting Range: 95 to 150 deg F (35 to 65 deg C).

Maximum Working Static Pressure: 150 psig (1034 kPa).

Maximum Working Dynamic Pressure: 75 psig (517 kPa).

Maximum Hot-Water Inlet Temperature: 195 deg F (90 deg C).

Minimum Optimal Performance Flow Rate: 0.5 gpm (0.04 L/sec).

Bubble-tight inlet port close-off to eliminate recirculation temperature creep.

Gauge in "Outlet Temperature Gauge" Subparagraph below is furnished with an optional adapter that is provided separately and field installed.

Outlet Temperature Gauge: 30 to 210 deg F (0 to 100 deg C), 2-inch-diameter, dual-scale temperature gauge.

The tankless water heater service valve kit 290 series can be ordered separately for field installation between the water heater and the TankMixer, or installed in a factory-ordered assembly with the TankMixer.

Basis-of-Design Product: Subject to compliance with requirements, provide product by Caleffi North America; 290 Series Tankless Water Heater Service Valve Kit or comparable product by one of the following:

<**Insert manufacturer's name**>.

Union Connections: NPS 3/4 (DN 20).

Isolation valves.

Garden Hose Connection: NPS 3/4 (DN 20).

Pressure Relief Valve: Set to 150 psi (10.3 bar).

Body Material: DZR low-lead brass.

Maximum Working Pressure: 400 psi (25.6 bar).

Operating Temperature Range: 32 deg F to 210 deg F (0 deg C to 100 deg C).

Provide separate field installation kit.

Provide a 290 series assembly complete with 520 series TankMixer:

Size: [**NPS 3/4 (DN 20)**] [**Press**] [**NPT female**] [**PEX crimp**] [**PEX expansion**].

Copy "Manifold, Thermostatic, Water Mixing Valve Assemblies" Paragraph below and re-edit for each type of water mixing valve assembly required. If only one type is required, drawing designation may be omitted.

Several manufacturers of thermostatic mixing valves promote single "high-low" valves to be used instead of manifold valve assemblies below. If single valves are required for high and low systems, specify them in "Primary, Thermostatic, Water Mixing Valves" Paragraph.

* + - * 1. Manifold, Thermostatic, Water Mixing Valve Assemblies <**Insert drawing designation if any**>:

Retain "Manufacturers" Subparagraph and list of manufacturers below to require products from manufacturers listed or a comparable product from other manufacturers.

Manufacturers: Subject to compliance with requirements, provide products by one of the following:

Acorn Engineering Company; a Division of Morris Group International.

Leonard Valve Company.

POWERS; A WATTS Brand.

Symmons Industries, Inc.

<**Insert manufacturer's name**>.

Description: Factory-fabricated, [**cabinet-type**] [**exposed-mounted**], thermostatically controlled, water mixing valve assembly in [**two**] [**three**]-valve parallel arrangement.

Large-Flow Parallel: Thermostatic, water mixing valve and downstream-pressure regulator with pressure gauges on inlet and outlet.

Retain "Intermediate-Flow Parallel" Subparagraph below for three-valve assemblies.

Intermediate-Flow Parallel: Thermostatic, water mixing valve and downstream-pressure regulator with pressure gauges on inlet and outlet.

Small-Flow Parallel: Thermostatic, water mixing valve.

Thermostatic Mixing Valves: Comply with ASSE 1017. Include check stops on hot- and cold-water inlets and shutoff valve on outlet.

Water Regulator(s): Comply with ASSE 1003. Include pressure gauge on inlet and outlet.

Pressure Rating: 125 psig (860 kPa) minimum unless otherwise indicated.

Retain "Cabinet" Subparagraph below if required.

Cabinet: Factory fabricated, stainless steel, for [**recessed**] [**surface**] mounting and with hinged, stainless steel door.

Selected Large-Flow, Tempered-Water Valve Size: <**Insert size**>.

Tempered-Water Setting: <**Insert deg F (deg C)**>.

Unit Tempered-Water Design Flow Rate: <**Insert gpm (L/sec)**>.

Unit Minimum Tempered-Water Design Flow Rate: <**Insert gpm (L/sec)**>.

Selected Unit Flow Rate at 45-psig (310-kPa) Pressure Drop: <**Insert gpm (L/sec)**>.

Unit Pressure Drop at Design Flow Rate: <**Insert psig (kPa)**>.

Unit Tempered-Water Outlet Size: <**Insert NPS (DN)**> end connection.

Unit Hot- and Cold-Water Inlet Size: <**Insert NPS (DN)**> end connections.

Thermostatic Mixing Valve and Water Regulator Finish: [**Chrome plated**] [**Polished, chrome plated**] [**Rough bronze**].

Piping Finish: [**Chrome plated**] [**Copper**].

Copy "Individual-Fixture, Water Tempering Valves" Paragraph below and re-edit for each type of water tempering valve required. If only one type is required, drawing designation may be omitted.

Individual-fixture, water tempering valves below are unsuitable for service as primary water tempering valves. Valves below are available in NPS 1/2 (DN 15) and larger; however, devices in "Water-Temperature Limiting Devices" Paragraph should be used instead.

* + - * 1. Individual-Fixture, Water Tempering Valves <**Insert drawing designation if any**>:

Retain "Basis-of-Design Product" Subparagraph and list of manufacturers below to require products from manufacturers listed or a comparable product from other manufacturers.

Individual four-port mixing valve 5212 Series SinkMixer is available in sizes NPS 3/8 (DN 12) with compression connections. For more information, see [www.caleffi.com/usa/en-us/products/search?query=5212](https://www.caleffi.com/usa/en-us/products/search?query=5212).

5212 Series "SinkMixer" mixing valve is furnished with thermal shutoff. The hot-water inlet tightly closes upon cold-water-supply failure, preventing mixed temperature water delivery.

ASSE 1070 certification requires inlet port check valves to prevent backflow. The SinkMixer is also furnished with stainless steel mesh filters that provide backflow and debris protection.

Basis-of-Design Product: Subject to compliance with requirements, provide product by Caleffi North America; 5212 Series SinkMixer or comparable product by one of the following:

Cash Acme; a division of Reliance Worldwide Corporation.

WATTS.

<**Insert manufacturer's name**>.

Description: The SinkMixer valve is a four-port body design used for undersink and undercounter applications where the user must be protected from the danger of scalding caused by hot water. The valve is designed to prevent the flow of water discharging from the mixed water outlet in the event of the failure of hot or cold supply. The cold-water outlet to fixture eliminates added piping and tee needed for three-port alternatives. The valve is furnished with a thermal shutoff that closes the hot-water supply in the event of cold-water-failure preventing mixed water temperature.

Standards:

ASSE 1070/CSA B125.3, as certified by ICC-ES.

NSF/ANSI/CAN 372 low-lead laws, as certified by ICC-ES.

NSF/ANSI/CAN 61 certified by ICC-ES.

Meets codes IPC, IRC, UPC, and NPC.

Body Material: Forged low-lead brass.

Regulating Spindle, Spring Holder, and Cold-Inlet Union Nut Material: Forged low-lead brass.

Valve in "Four-Port Body Design" Subparagraph below is to be installed on the cold-water outlet to fixture to eliminate added piping and tee needed for three-port alternatives.

Four-Port Body Design: Undersink installation.

Size and Connections: NPS 3/8 (DN 9) compression, cold inlet NPS 3/8 (DN 9) union-compression.

Retain "Shutter" Subparagraph below to reduce seizing or erratic mixed temperatures caused by lime deposits for a longer life expectancy.

Shutter: Scale-resistant polymer polysulfone.

Spring: AISI 302 stainless steel.

Hot Inlet Strainer: AISI 304 stainless steel.

In "Seals" Subparagraph below, peroxide-cured EPDM is resistant to water treated with chlorine or chloramine for longer life expectancy.

Seals: Peroxide-cured EPDM.

ABS Adjustment Knob: Temperature adjustment with graduated scale and tamper-proof locking screw.

Temperature-adjustment key is furnished with a stand-off wall mounting bracket.

Temperature-Adjustment Key: Polymide nylon, NPS 1/4 (DN 6).

Compression fittings kit in first subparagraph below is optional.

Cold-Water Outlet Port Plug and Copper Compression Fittings Kit: [**Single-pipe fixtures**] [**Hard piping installations**].

Minimum Cold-Water Inlet Temperature: 39 deg F (4 deg C).

Maximum Cold-Water Inlet Temperature: 85 deg F (29 deg C).

Minimum Hot-Water Inlet Temperature: 120 deg F (49 deg C).

Maximum Hot-Water Inlet Temperature: 195 deg F (91 deg C).

Minimum Operating Dynamic Pressure: 1.5 psig (10 kPa).

Maximum Operating Static Pressure: 150 psig (1034 kPa).

Maximum Operating Dynamic Pressure: 70 psig (483 kPa).

Minimum Flow Rate: 0.35 gpm (0.03 L/sec).

Maximum Flow Rate: 2.3 gpm (0.17 L/sec).

Temperature Adjustable Range: 95 to 120 deg F (35 to 49 deg C).

Copy "Point-of-Use Thermostatic Mixing Valves" Paragraph below and re-edit for each type of thermostatic mixing valve required. If only one type is required, drawing designation may be omitted.

* + - * 1. Point-of-Use Thermostatic Mixing Valves <**Insert drawing designation if any**>:

Retain "Basis-of-Design Product" Subparagraph and list of manufacturers below to require a specific product or a comparable product from manufacturers listed.

Individual three-port mixing valve 5213 Series TubMixer is available in size NPS 3/8 (DN 12) with compression connections; and sizes NPS 1/2 to NPS 1 (DN 15 to DN 25) with PEX, threaded, and solder connections.

5213 Series TubMixer mixing valve is furnished with thermal shutoff. In the event of a failure of either the hot or cold supply, the piston will shut off, stopping water discharging from the mixed water outlet. For more information, see [www.caleffi.com/usa/en-us/products/search?query=5213](https://www.caleffi.com/usa/en-us/products/search?query=5213).

ASSE 1070 certification requires inlet port check valves to prevent backflow. The 5213 Series TubMixer is also furnished with stainless steel mesh filters that provide backflow and debris protection.

Basis-of-Design Product: Subject to compliance with requirements, provide product by Caleffi North America; 5213 Series TubMixer or comparable product by one of the following:

POWERS; A WATTS Brand.

Zurn Industries, LLC.

<**Insert manufacturer’s name**>.

Description: The 5213 Series TubMixer provides water at a safe and usable temperature in situations where the control of the temperature of the water discharging from a terminal fitting is of the utmost importance, i.e. within hospitals, schools, and nursing homes. The valve is furnished with a thermal shutoff so in the event of a failure of either the hot- or cold-water supply, the piston will shut off, stopping water discharging from the mixed water outlet.

Standards:

ASSE 1070/CSA B125.3, as certified by ICC-ES.

NSF/ANSI/CAN 372 low-lead laws, as certified by ICC-ES.

Meets codes IPC, IRC, UPC, and NPC.

Body Material: Forged low-lead brass.

Size: [**NPS 3/8 (DN 12)**] [**NPS 1/2 (DN 50)**] [**NPS 3/4 (DN 20)**] [**NPS 1 (DN 25)**].

Union Connections: [**NPT male threaded**] [**Solder**] [**PEX crimp**] [**PEX expansion**] [**NPS 3/8 (DN 9) compression**] inlet and outlet.

Retain "Shutter" Subparagraph below to reduce seizing or erratic mixed temperatures caused by lime deposits for a longer life expectancy.

Shutter: Scale-resistant polymer polyphenylene oxide.

In "Sealing Elements" Subparagraph below, peroxide-cured EPDM is resistant to water treated with chlorine or chloramine for longer life expectancy.

Sealing Elements: Peroxide-cured EPDM.

ABS Adjustment Knob: Temperature adjustment with graduated scale and tamper-proof locking screw.

Replaceable Inlet Check Valves: Low-lead brass.

Maximum Working Pressure: 150 psig (1034 kPa).

Maximum Inlet Temperature: 185 deg F (85 deg C).

Minimum Flow Rate: For optimum performance 0.5 gpm (0.04 L/sec).

Maximum Flow Rate: For optimum performance 9 gpm (0.68 L/sec).

Temperature Adjustment Range: 85 to 120 deg F (30 to 50 deg C).

Tempered-Water Setting: <**Insert deg F (deg C)**>.

Retain "Tempered-Water Design Flow Rate" Subparagraph below only if required.

Tempered-Water Design Flow Rate: <**Insert gpm (L/sec)**>.

Ball valve in "Isolation ball valves" Subparagraph below is optional and provided separately for field installation.

Isolation ball valves.

Copy "Primary Water Tempering Valves" Paragraph below and re-edit for each type of water tempering valve required. If only one type is required, drawing designation may be omitted.

Primary water tempering valves below are available in NPS 1/2 to NPS 4 (DN 15 to DN 100).

* + - * 1. Primary Water Tempering Valves <**Insert drawing designation if any**>:

Retain "Manufacturers" Subparagraph and list of manufacturers below to require products from manufacturers listed or a comparable product from other manufacturers.

Manufacturers: Subject to compliance with requirements, provide products by one of the following:

Heat-Timer Corporation.

Holby Valve Inc.

<**Insert manufacturer's name**>.

Standard: ASSE 1017, thermostatically controlled, water tempering valve, listed as tempering valve.

Pressure Rating: 125 psig (860 kPa) minimum unless otherwise indicated.

Material: Bronze body.

Temperature Control: Manual.

Connections: Threaded inlets and outlet.

Selected Primary Water Tempering Valve Size: <**Insert size**>.

Tempered-Water Setting: <**Insert deg F (deg C)**>.

Tempered-Water Design Flow Rate: <**Insert gpm (L/sec)**>.

Pressure Drop at Design Flow Rate: <**Insert psig (kPa)**>.

Tempered-Water Outlet Size: <**Insert NPS (DN)**> end connection.

Cold-Water Inlet Size: <**Insert NPS (DN)**> end connection.

Hot-Water Inlet Size: <**Insert NPS (DN)**> end connection.

Valve Finish: [**Rough bronze**] <**Insert finish**>.

* + - 1. IN-LINE CHECK VALVES

Copy "Low-Lead Serviceable In-Line Check Valves" Paragraph below and re-edit for each type of in-line check valve required. If only one type is required, drawing designation may be omitted.

* + - * 1. Low-Lead Serviceable In-Line Check Valves <**Insert drawing designation if any**>:

Retain "Basis-of-Design Product" Subparagraph and list of manufacturers below to require a specific product or a comparable product from manufacturers listed.

Valve NA51 Series is a low-lead serviceable spring check valve for plumbing. For more information, see [www.caleffi.com/usa/en-us/catalogue/serviceable-flow-check-valve-low-lead-na51200](https://www.caleffi.com/usa/en-us/catalogue/serviceable-flow-check-valve-low-lead-na51200).

NA51 Series is ideal for residential and commercial applications and features union connections with a variety of end connection options for easy installation and maintenance.

Basis-of-Design Product: Subject to compliance with requirements, provide product by Caleffi North America; NA51 Series or comparable product by one of the following:

Apollo Flow Controls; Conbraco Industries, Inc.

Bonomi North America, Inc.

<**Insert manufacturer's name**>.

Description: Low-lead serviceable in-line spring check valves ensure water only flows in a single direction of a plumbing system.

Standards:

NSF/ANSI/CAN 372 low-lead laws, as certified by ICC-ES.

Complies with codes IPC, IRC, UPC, and NPC.

ASTM F1807 PEX crimp fittings.

ASTM F1960 PEX expansion fittings.

Maximum Working Pressure: 150 psig (1034 kPa).

Operating Temperature Range:

32 to 150 deg F (0 to 65 deg C) for [**NPS 1-1/2 (DN 40)**] [**NPS 2 (DN 50)**].

32 to 250 deg F (0 to 120 deg C) for [**NPS 1/2 (DN 15)**] [**NPS 3/4 (DN 20)**].

Maximum Temperature, for One Hour: 190 deg F (88 deg C).

Opening Pressure Differential:

NPS 1/2 to NPS 1-1/4 (DN 15 to DN 32): 0.25 psig (1.7 kPa).

NPS 1-1/2 to NPS 2 (DN 40 to DN 50): 0.50 psig (3.4 kPa).

"Flow Capacity" Subparagraph below indicates Cv, which is defined as flowing 1 gpm (0.23 cu. m/h) at 1 psi (0.07 bar) pressure drop for determining flow-resistance pump sizing.

Flow Capacity:

NPS 1/2 (DN 15) and NPS 3/4 (DN 20): Cv 17 (Kv 14.7).

NPS 1 (DN 25) and NPS 1-1/4 (DN 32): Cv 30 (Kv 26).

NPS 1-1/2 (DN 40) and NPS 2 (DN 50): Cv 75 (Kv 65).

Size: [**NPS 1/2 (DN 15)**] [**NPS 3/4 (DN 20)**] [**NPS 1 (DN 25)**] [**NPS 1-1/4 (DN 32)**] [**NPS 1-1/2 (DN 40)**] [**NPS 2 (DN 50)**].

In "Seals" Subparagraph below, peroxide-cured EPDM is resistant to water treated with chlorine or chloramine for longer life expectancy.

Seals: Peroxide-cured EPDM.

In "Sizes" Subparagraph below, PEX crimp and PEX expansion connections are not compatible with sizes NPS 1 (DN 25), NPS 1-1/4 (DN 32), NPS 1-1/2 (DN 40), and NPS 2 (DN 50).

Sizes: [**NPT female threaded**] [**NPT male threaded**] [**PEX crimp**] [**PEX expansion**] [**Solder**] [**Press**]; [**NPS 1/2 (DN 15)**] [**NPS 3/4 (DN 20)**] [**NPS 1 (DN 25)**] [**NPS 1-1/4 (DN 32)**] [**NPS 1-1/2 (DN 40)**] [**NPS 2 (DN 50)**].

Body Material: Stainless steel.

Replaceable Check Valve: Nitrile butadiene rubber, polyoxymethylene.

Fitting Tailpieces: Low-lead brass or copper.

Ball valve in "Isolation Ball Valves" Subparagraph below is optional and provided separately for field installation.

Isolation Ball Valves: Inlet and outlet low-lead brass, for check valve size [**NPS 1/2 (DN 15)**] [**NPS 3/4 (DN 20)**].

* + - 1. STRAINERS FOR DOMESTIC WATER PIPING

Copy "Y-Pattern Strainers" Paragraph below and re-edit for each type of Y-pattern strainer required. If only one type is required, drawing designation may be omitted.

Insert drawing designation. Use these designations on Drawings to identify each product.

* + - * 1. Y-Pattern Strainers <**Insert drawing designation if any**>:

Retain "Basis-of-Design Product" Subparagraph and list of manufacturers below to require a specific product or a comparable product from manufacturers listed.

The 128 series low-lead brass union Y-strainer is available with multiple union end connection styles, 20 mesh stainless steel screen, two factory-installed pressure/temperature test ports, and a 1/2-inch purge valve can replace the installed drain plug. For more information, see <http://get.caleffi.info/128>.

Basis-of-Design Product: Subject to compliance with requirements, provide product by Caleffi North America; 128 Series or comparable product by one of the following:

Zurn.

WATTS.

<**Insert manufacturer's name**>.

Description: Y-strainers are designed for residential and commercial plumbing and hydronic applications to protect equipment from premature failure due to damaging debris. The filtering screen is easily removed for cleaning without removing the body from the piping and a drain cap is provided for replacing with a drain valve for blow down.

Retain first 12 subparagraphs below if 128 Series is selected.

Standards:

NSF/ANSI/CAN 372 low-lead laws, as certified by ICC-ES.

ASTM F1807 PEX crimp fittings.

ASTM F1960 PEX expansion fittings.

Maximum Working Pressure: 400 psig (2760 kPa).

Working Temp Range: 32 to 212 deg F (0 to 100 deg C).

Sizes: [**NPS 1/2 (DN 15)**] [**NPS 3/4 (DN 20)**] [**NPS 1 (DN 25)**].

In "Seals" Subparagraph below, peroxide-cured EPDM is resistant to water treated with chlorine or chloramine for longer life expectancy.

Seals: Peroxide-cured EPDM.

Union End Connections, Inlet and Outlet: **[NPT female threaded**] [**Solder**] [**Press**] [**PEX crimp**] [**PEX expansion**].

Body Material: DZR low-lead brass.

Drain Port Plug: Low-lead brass.

Strainer Screen: Stainless steel, 0.87 mm (20 mesh).

Remove cap to pull out strainer for cleaning, inspection or replacement.

"Flow Rating" Subparagraph below indicates Cv, which is defined as flowing 1 gpm (0.23 cu. m/h) at 1 psi (0.07 bar) pressure drop for determining flow-resistance pump sizing.

Flow Rating: 7.7 Cv.

"Dual factory-installed pressure/temperature test ports” Subparagraph below is for verifying and certifying flow rates where required.

Dual factory-installed pressure/temperature test ports.

Ball valve in "Isolation Ball Valves" Subparagraph below is optional and provided separately for field installation.

Isolation Ball Valves: Inlet and outlet low-lead brass.

Drain: [**Pipe plug**] [**Factory-installed, hose-end drain valve**].

Ball valve in "Isolation Ball Valves" Subparagraph below is optional and provided separately for field installation.

Isolation Ball Valves: Inlet and outlet low-lead brass.

* + - 1. OUTLET BOXES

Authorities having jurisdiction may require backflow preventers in water-supply piping or on hose-thread outlets.

Insert drawing designation. Use these designations on Drawings to identify each product.

Copy "Clothes Washer Outlet Boxes" Paragraph below and re-edit for each type of outlet box required. If only one type is required, drawing designation may be omitted.

* + - * 1. Clothes Washer Outlet Boxes <**Insert drawing designation if any**>:

Retain "Manufacturers" Subparagraph and list of manufacturers below to require products from manufacturers listed or a comparable product from other manufacturers.

Manufacturers: Subject to compliance with requirements, provide products by one of the following:

Acorn Engineering Company; a Division of Morris Group International.

Guy Gray, IPS Corporation.

LSP Products Group.

Oatey.

Sioux Chief Manufacturing Company, Inc.

Symmons Industries, Inc.

Water-Tite, IPS Corporation.

<**Insert manufacturer's name**>.

Mounting: Recessed.[**Fire rated.**]

Material and Finish: [**Enameled-steel or epoxy-painted-steel**] [**Enameled-steel, epoxy-painted-steel, or plastic**] [**Plastic**] [**Stainless steel**] box and faceplate.

Faucet: Combination valved fitting or separate hot- and cold-water valved fittings complying with ASME A112.18.1. Include garden-hose thread complying with ASME B1.20.7 on outlets.

Drain Outlet Connection: [**NPS 1-1/2 (DN 40)**] [**NPS 2 (DN 50)**].

Accessory: Water hammer arresters.

Retain "Supply Shutoff Fittings" or "Drain" Subparagraph below, or both, if required. These items are usually not included with box.

Supply Shutoff Fittings: NPS 1/2 (DN 15) gate, globe, or ball valves and NPS 1/2 (DN 15) copper, water tubing.

Drain: [**NPS 1-1/2 (DN 40)**] [**NPS 2 (DN 50)**] standpipe and P-trap for direct waste connection to drainage piping.

Retain "Inlet Hoses" or "Drain Hose" Subparagraph below, or both, if required. Hoses are usually included with clothes washers.

Inlet Hoses: Two 60-inch- (1500-mm-) long, rubber, household clothes washer inlet hoses with female, garden-hose-thread couplings. Include rubber washers.

Drain Hose: One 48-inch- (1200-mm-) long, rubber, household clothes washer drain hose with hooked end.

Copy "Icemaker Outlet Boxes" Paragraph below and re-edit for each type of outlet box required. If only one type is required, drawing designation may be omitted.

* + - * 1. Icemaker Outlet Boxes <**Insert drawing designation if any**>:

Retain "Manufacturers" Subparagraph and list of manufacturers below to require products from manufacturers listed or a comparable product from other manufacturers.

Manufacturers: Subject to compliance with requirements, provide products by one of the following:

Guy Gray, IPS Corporation.

LSP Products Group.

Oatey.

Sioux Chief Manufacturing Company, Inc.

Water-Tite, IPS Corporation.

<**Insert manufacturer's name**>.

Mounting: Recessed.[**Fire rated.**]

Material and Finish: [**Enameled-steel or epoxy-painted-steel**] [**Enameled-steel, epoxy-painted-steel, or plastic**] [**Plastic**] [**Stainless steel**] box and faceplate.

Faucet: Valved fitting complying with ASME A112.18.1. Include NPS 1/2 (DN 15) or smaller copper tube outlet.

Accessory: Water hammer arrestor.

Retain "Supply Shutoff Fitting" Subparagraph below if required. This item is usually not included with box.

Supply Shutoff Fitting: NPS 1/2 (DN 15) gate, globe, or ball valve and NPS 1/2 (DN 15) copper, water tubing.

* + - 1. HOSE STATIONS

Authorities having jurisdiction may require backflow preventers in water-supply piping or on hose-thread outlets. Revise this article to suit Project.

Insert drawing designation. Use these designations on Drawings to identify each product.

Copy "Single-Temperature-Water Hose Stations" Paragraph below and re-edit for each type of hose station required. If only one type is required, drawing designation may be omitted.

* + - * 1. Single-Temperature-Water Hose Stations <**Insert drawing designation if any**>:

Retain "Manufacturers" Subparagraph and list of manufacturers below to require products from manufacturers listed or a comparable product from other manufacturers.

Manufacturers: Subject to compliance with requirements, provide products by one of the following:

ARCHON Industries, Inc.

Armstrong International, Inc.

DynaFluid Ltd.

Leonard Valve Company.

Strahman Valves, Inc.

T&S Brass and Bronze Works, Inc.

<**Insert manufacturer's name**>.

Standard: ASME A112.18.1.

Retain "Cabinet" Subparagraph below if required.

Cabinet: Stainless steel enclosure with exposed valve handle, hose connection, and hose rack. Include thermometer in front.

Hose-Rack Material: Stainless steel.

Body Material: Bronze[**with stainless steel wetted parts**].

Body Finish: Rough bronze[**, chrome plated**].

Mounting: [**Wall, with reinforcement**] [**Floor, with stainless steel pedestal**].

Supply Fittings: [**NPS 1/2 (DN 15)**] [**NPS 3/4 (DN 20)**] gate, globe, or ball valve and check valve and [**NPS 1/2 (DN 15)**] [**NPS 3/4 (DN 20)**] copper, water tubing. Omit check valve if check stop is included with fitting.

Hose: Manufacturer's standard, for service fluid, temperature, and pressure; [**25 ft. (7.6 m)**] [**50 ft. (15 m)**] <**Insert dimension**> long.

Nozzle: With hand-squeeze, on-off control.

Vacuum Breaker:

Integral or factory-installed, non-removable, manual-drain-type, hose-connection vacuum breaker complying with ASSE 1011 or backflow preventer complying with ASSE 1052.

Garden-hose thread complying with ASME B1.20.7 on outlet.

Copy "Hot- and Cold-Water Hose Stations" Paragraph below and re-edit for each type of hose station required. If only one type is required, drawing designation may be omitted.

* + - * 1. Hot- and Cold-Water Hose Stations <**Insert drawing designation if any**>:

Retain "Manufacturers" Subparagraph and list of manufacturers below to require products from manufacturers listed or a comparable product from other manufacturers.

Manufacturers: Subject to compliance with requirements, provide products by one of the following:

ARCHON Industries, Inc.

Armstrong International, Inc.

Cooney Brothers, Inc.

DynaFluid Ltd.

Leonard Valve Company.

Strahman Valves, Inc.

T&S Brass and Bronze Works, Inc.

<Insert manufacturer's name>.

Standard: ASME A112.18.1.

Faucet Type: [**Blending**] [**Thermostatic mixing**] valve.

Retain "Cabinet" Subparagraph below if required.

Cabinet: Stainless steel enclosure with exposed valve handles, hose connection, and hose rack. Include thermometer in front.

Hose-Rack Material: Stainless steel.

Body Material: Bronze[**with stainless steel wetted parts**].

Body Finish: Rough bronze[**or chrome plated**].

Mounting: [**Wall, with reinforcement**] [**Floor, with stainless steel pedestal**].

Supply Fittings: Two [**NPS 1/2 (DN 15)**] [**NPS 3/4 (DN 20)**] gate, globe, or ball valves and check valves and [**NPS 1/2 (DN 15)**] [**NPS 3/4 (DN 20)**] copper, water tubing. Omit check valves if check stops are included with fitting.

Hose: Manufacturer's standard, for service fluid, temperature, and pressure; [**25 ft. (7.6 m)**] [**50 ft. (15 m)**] <**Insert dimension**> long.

Nozzle: With hand-squeeze, on-off control.

Vacuum Breaker: Integral or factory-installed, non-removable, manual-drain-type, hose-connection vacuum breaker complying with ASSE 1011 or backflow preventer complying with ASSE 1052; and garden-hose thread complying with ASME B1.20.7 on outlet.

Copy "Cold-Water and Steam Hose Stations" Paragraph below and re-edit for each type of hose station required. If only one type is required, drawing designation may be omitted.

* + - * 1. Cold-Water and Steam Hose Stations <**Insert drawing designation if any**>:

Retain "Manufacturers" Subparagraph and list of manufacturers below to require products from manufacturers listed or a comparable product from other manufacturers.

Manufacturers: Subject to compliance with requirements, provide products by one of the following:

ARCHON Industries, Inc.

Armstrong International, Inc.

DynaFluid Ltd.

Leonard Valve Company.

Strahman Valves, Inc.

<**Insert manufacturer's name**>.

Standard: ASME A112.18.1.

Faucet Type: [**Blending**] [**Thermostatic mixing**] valve.

Retain "Cabinet" Subparagraph below if required.

Cabinet: Stainless steel enclosure with exposed valve handles, hose connection, and hose rack. Include thermometer in front.

Hose-Rack Material: Stainless steel.

Body Material: Bronze[**with stainless steel wetted parts**].

Body Finish: Rough bronze[**or chrome plated**].

Mounting: [**Wall, with reinforcement**] [**Floor, with stainless steel pedestal**].

Supply Fittings: Two [**NPS 1/2 (DN 15)**] [**NPS 3/4 (DN 20)**] gate, globe, or ball valves and check valves and [**NPS 1/2 (DN 15)**] [**NPS 3/4 (DN 20)**] copper, water tubing. Omit check valves if check stops are included with fitting.

Hose: Manufacturer's standard, for service fluid, temperature, and pressure; [**25 ft. (7.6 m)**] [**50 ft. (15 m)**] <**Insert dimension**> long.

Nozzle: With hand-squeeze, on-off control.

Vacuum Breaker:

Integral or factory-installed, non-removable, manual-drain-type, hose-connection vacuum breaker complying with ASSE 1011 or backflow preventer complying with ASSE 1052.

Garden-hose thread complying with ASME B1.20.7 on outlet.

* + - 1. HOSE BIBBS

Copy "Hose Bibbs" Paragraph below for each type of hose bibb required. If only one type is required, drawing designation may be omitted.

Insert drawing designation. Use these designations on Drawings to identify each product.

* + - * 1. Hose Bibbs <**Insert drawing designation if any**>:

Retain "Manufacturers" Subparagraph and list of manufacturers below to require products from manufacturers listed or a comparable product from other manufacturers.

Manufacturers: Subject to compliance with requirements, provide products by one of the following:

Jay R. Smith Mfg. Co.; a division of Morris Group International.

MIFAB, Inc.

Prier Products, Inc.

Woodford Manufacturing Company.

Zurn Industries, LLC.

<**Insert manufacturer's name**>.

Standard: ASME A112.18.1 for sediment faucets.

Body Material: Bronze.

Seat: Bronze, replaceable.

Supply Connections: NPS 1/2 or NPS 3/4 (DN 15 or DN 20) threaded or solder-joint inlet.

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

Pressure Rating: 125 psig (860 kPa).

Vacuum Breaker: Integral[**or field-installation,**] non-removable, drainable, hose-connection vacuum breaker complying with ASSE 1011.

Finish for Equipment Rooms: Rough bronze, or chrome or nickel plated.

Finish for Service Areas: [**Rough bronze**] [**Chrome or nickel plated**].

Finish for Finished Rooms: Chrome or nickel plated.

Operation for Equipment Rooms: Wheel handle or operating key.

Operation for Service Areas: [**Wheel handle**] [**Operating key**].

Operation for Finished Rooms: [**Wheel handle**] [**Operating key**].

Include operating key with each operating-key hose bibb.

Include[**integral**] wall flange with each chrome- or nickel-plated hose bibb.

* + - 1. WALL HYDRANTS

Wall hydrants without integral vacuum breakers or backflow preventers are available but not recommended. Wall hydrants are not generally considered devices to convey or dispense water for human consumption; therefore, some manufacturers do not comply with lead-free construction/certification. If Project application requires lead-free construction, confirm availability of product with manufacturers.

Insert drawing designation. Use these designations on Drawings to identify each product.

Copy "Non-freeze Wall Hydrants" Paragraph below for each type of wall hydrant required. If only one type is required, drawing designation may be omitted.

* + - * 1. Non-freeze Wall Hydrants <**Insert drawing designation if any**>:

Retain "Manufacturers" Subparagraph and list of manufacturers below to require products from manufacturers listed or a comparable product from other manufacturers.

Manufacturers: Subject to compliance with requirements, provide products by one of the following:

Jay R. Smith Mfg. Co.; a division of Morris Group International.

Josam Company.

MIFAB, Inc.

Prier Products, Inc.

WATTS.

Woodford Manufacturing Company.

Zurn Industries, LLC.

<**Insert manufacturer's name**>.

Standard: ASME A112.21.3M for [**concealed**] [**exposed**]-outlet, self-draining wall hydrants.

Pressure Rating: 125 psig (860 kPa).

Operation: Loose key.

Casing and Operating Rod: Of length required to match wall thickness. Include wall clamp.

Inlet: NPS 3/4 or NPS 1 (DN 20 or DN 25).

Retain "Outlet, Concealed"; "Box"; and "Box and Cover Finish" subparagraphs below for concealed-outlet-type wall hydrants.

Outlet, Concealed: With integral vacuum breaker and garden-hose thread complying with ASME B1.20.7.

Box: Deep, flush mounted with cover.

Box and Cover Finish: [**Polished nickel bronze**] [**Rough bronze**] <**Insert finish**>.

Retain "Outlet, Exposed" and "Nozzle and Wall-Plate Finish" subparagraphs below for exposed-outlet-type wall hydrants.

Outlet, Exposed: With integral vacuum breaker and garden-hose thread complying with ASME B1.20.7.

Nozzle and Wall-Plate Finish: [**Polished nickel bronze**] [**Rough bronze**] [**Chrome plated**] <**Insert finish**>.

Operating Keys(s): [**One**] [**Two**] with each wall hydrant.

Copy "Non-freeze, Hot- and Cold-Water Wall Hydrants" Paragraph below and re-edit for each type of wall hydrant required. If only one type is required, drawing designation may be omitted.

* + - * 1. Non-freeze, Hot- and Cold-Water Wall Hydrants <**Insert drawing designation if any**>:

Retain "Manufacturers" Subparagraph and list of manufacturers below to require products from manufacturers listed or a comparable product from other manufacturers.

Manufacturers: Subject to compliance with requirements, provide products by one of the following:

Jay R. Smith Mfg. Co.; a division of Morris Group International.

Josam Company.

MIFAB, Inc.

Prier Products, Inc.

WATTS.

Woodford Manufacturing Company.

Zurn Industries, LLC.

<**Insert manufacturer's name**>.

Standard: ASME A112.21.3M for [**concealed**] [**exposed**]-outlet, self-draining wall hydrants.

Pressure Rating: 125 psig (860 kPa).

Operation: Loose key.

Casing and Operating Rods: Of length required to match wall thickness. Include wall clamps.

Inlet: NPS 3/4 or NPS 1 (DN 20 or DN 25).

Outlet: Concealed.

Box: Deep, flush mounted with cover.

Box and Cover Finish: [**Polished nickel bronze**] [**Chrome plated**] <**Insert finish**>.

Vacuum Breaker:

Non-removable, manual-drain-type, hose-connection vacuum breaker complying with ASSE 1011 or backflow preventer complying with ASSE 1052.

Garden-hose thread complying with ASME B1.20.7 on outlet.

Operating Key(s): [**One**] [**Two**] with each wall hydrant.

Copy "Moderate-Climate Wall Hydrants" Paragraph below and re-edit for each type of wall hydrant required. If only one type is required, drawing designation may be omitted.

* + - * 1. Moderate-Climate Wall Hydrants <**Insert drawing designation if any**>:

Retain "Manufacturers" Subparagraph and list of manufacturers below to require products from manufacturers listed or a comparable product from other manufacturers.

Manufacturers: Subject to compliance with requirements, provide products by one of the following:

Jay R. Smith Mfg. Co.; a division of Morris Group International.

MIFAB, Inc.

Prier Products, Inc.

WATTS.

Woodford Manufacturing Company.

Zurn Industries, LLC.

<**Insert manufacturer's name**>.

Standard: ASME A112.21.3M for [**concealed**] [**exposed**]-outlet, self-draining wall hydrants.

Pressure Rating: 125 psig (860 kPa).

Operation: Loose key.

Inlet: NPS 3/4 or NPS 1 (DN 20 or DN 25).

Retain "Outlet, Concealed"; "Box"; and "Box and Cover Finish" subparagraphs below for concealed-outlet-type wall hydrants.

Outlet, Concealed:

With integral vacuum breaker or non-removable hose-connection, vacuum breaker complying with ASSE 1011 or backflow preventer complying with ASSE 1052.

Garden-hose thread complying with ASME B1.20.7.

Box: Deep, flush mounted with cover.

Box and Cover Finish: [**Polished nickel bronze**] [**Chrome plated**] <**Insert finish**>.

Retain "Outlet, Exposed" and "Nozzle and Wall-Plate Finish" subparagraphs below for exposed-outlet-type wall hydrants.

Outlet, Exposed:

With integral vacuum breaker or non-removable hose-connection, vacuum breaker complying with ASSE 1011 or backflow preventer complying with ASSE 1052.

Garden-hose thread complying with ASME B1.20.7.

Nozzle and Wall-Plate Finish: [**Polished nickel bronze**] [**Rough bronze**] <**Insert finish**>.

Operating Key(s): [**One**] [**Two**] with each wall hydrant.

Copy "Non-freeze Vacuum Breaker Wall Hydrants" Paragraph below and re-edit for each type of wall hydrant required. If only one type is required, drawing designation may be omitted.

* + - * 1. Non-freeze Vacuum Breaker Wall Hydrants <**Insert drawing designation if any**>:

Retain "Manufacturers" Subparagraph and list of manufacturers below to require products from manufacturers listed or a comparable product from other manufacturers.

Manufacturers: Subject to compliance with requirements, provide products by one of the following:

A.Y. McDonald Mfg. Co.

Champion - Arrowhead.

Jay R. Smith Mfg. Co.; a division of Morris Group International.

Prier Products, Inc.

WATTS.

Woodford Manufacturing Company.

Zurn Industries, LLC.

<**Insert manufacturer's name**>.

Standard: ASSE 1019, Type A or Type B.

Type: Automatic draining with integral air-inlet valve.

Retain only Type B in "Classification" Subparagraph below if hose remains attached.

Classification: [**Type A, for automatic draining with hose removed or**]Type B, for automatic draining with hose removed or with hose attached and nozzle closed.

Pressure Rating: 125 psig (860 kPa).

Operation: [**Loose key**] [**wheel handle**].

Casing and Operating Rod: Of length required to match wall thickness. Include wall clamp.

Inlet: NPS 1/2 or NPS 3/4 (DN 15 or DN 20).

Outlet: Exposed with garden-hose thread complying with ASME B1.20.7.

* + - 1. GROUND HYDRANTS

Retain this article only if ground hydrants are required and are not specified in Section 221113 "Facility Water Distribution Piping." Vacuum breakers are ineffective on this type of hydrant. If using ground hydrants, a backflow preventer in supply piping is recommended.

Ground hydrants are not generally considered devices to convey or dispense water for human consumption; therefore, some manufacturers do not comply with lead-free construction/certification. If Project application requires lead-free construction, confirm availability of product with manufacturers.

Copy "Non-freeze Ground Hydrants" Paragraph below and re-edit for each type of ground hydrant required. If only one type is required, drawing designation may be omitted.

Insert drawing designation. Use these designations on Drawings to identify each product.

* + - * 1. Non-freeze Ground Hydrants <**Insert drawing designation if any**>:

Retain "Manufacturers" Subparagraph and list of manufacturers below to require products from manufacturers listed or a comparable product from other manufacturers.

Manufacturers: Subject to compliance with requirements, provide products by one of the following:

Jay R. Smith Mfg. Co.; a division of Morris Group International.

Josam Company.

MIFAB, Inc.

Murdock Manufacturing; A Division of Morris Group International.

Prier Products, Inc.

WATTS.

Woodford Manufacturing Company.

Zurn Industries, LLC.

<**Insert manufacturer's name**>.

Standard: ASME A112.21.3M.

Type: Non-freeze, concealed-outlet ground hydrant with box.

Operation: Loose key.

Casing and Operating Rod: Of at least length required for burial of valve below frost line.

Inlet sizes in "Inlet" Subparagraph below are available up to and including NPS 2 (DN 50) for some manufacturers.

Inlet: [**NPS 3/4 (DN 20)**] <**Insert pipe size**>.

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

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

Box: [**Standard**] [**Deep**] pattern with cover.

Box and Cover Finish: [**Rough**] [**Polished nickel**] <**Insert finish**> bronze.

Operating Key(s): [**One**] [**Two**] with each ground hydrant.

Vacuum breaker in "Vacuum Breaker" Subparagraph below is ineffectual because of ground-level location. If required, include a deep box. Some manufacturers discourage their use and void product warranty against damage if used.

Vacuum Breaker: ASSE 1011.

* + - 1. POST HYDRANTS

Retain this article only if post hydrants are required and are not specified in Section 221113 "Facility Water Distribution Piping."

Post hydrants are not generally considered devices to convey or dispense water for human consumption; therefore, some manufacturers do not comply with lead-free construction/certification. If Project application requires lead-free construction, confirm availability of product with manufacturers.

Insert drawing designation. Use these designations on Drawings to identify each product.

Copy "Non-freeze, Draining-Type Post Hydrants" Paragraph below and re-edit for each type of post hydrant required. If only one type is required, drawing designation may be omitted.

Hydrants below are not recommended. Non-freeze, sanitary yard hydrants are preferred.

* + - * 1. Non-freeze, Draining-Type Post Hydrants <**Insert drawing designation if any**>:

Retain "Manufacturers" Subparagraph and list of manufacturers below to require products from manufacturers listed or a comparable product from other manufacturers.

Manufacturers: Subject to compliance with requirements, provide products by one of the following:

Jay R. Smith Mfg. Co.; a division of Morris Group International.

MIFAB, Inc.

WATTS.

Woodford Manufacturing Company.

Zurn Industries, LLC.

<**Insert manufacturer's name**>.

Standard: ASME A112.21.3M.

Type: Non-freeze, exposed-outlet post hydrant.

Operation: Loose key.

Casing and Operating Rod: Of at least length required for burial of valve below frost line.

Casing: Bronze with casing guard.

Inlet sizes in "Inlet" Subparagraph below are available up to and including NPS 2 (DN 50) for some manufacturers.

Inlet: [**NPS 3/4 (DN 20)**] <**Insert pipe size**>.

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

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

Vacuum Breaker:

Non-removable, drainable, hose-connection vacuum breaker complying with ASSE 1011 or backflow preventer complying with ASSE 1052.

Garden-hose thread complying with ASME B1.20.7 on outlet.

Operating Key(s): [**One**] [**Two**] with each loose-key-operation wall hydrant.

Copy "Non-freeze Sanitary Yard Hydrants" Paragraph below and re-edit for each type of sanitary yard hydrant required. If only one type is required, drawing designation may be omitted.

* + - * 1. Non-freeze Sanitary Yard Hydrants <**Insert drawing designation if any**>:

Retain "Manufacturers" Subparagraph and list of manufacturers below to require products from manufacturers listed or a comparable product from other manufacturers.

Manufacturers: Subject to compliance with requirements, provide products by one of the following:

Jay R. Smith Mfg. Co.; a division of Morris Group International.

Hoeptner Products.

Murdock Manufacturing; A Division of Morris Group International.

Woodford Manufacturing Company.

<**Insert manufacturer's name**>.

Standard: ASSE 1057.

Operation: Wheel handle or lever.

Head: Cast iron or brass, with pail hook.

Inlet: NPS 3/4 or NPS 1 (DN 20 or DN 25) threaded.

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

Canister: [**Stainless steel**] <**Insert material**>.

Retain "Vacuum Breaker" Subparagraph below if required. Manufacturers caution that leaving the vacuum breaker installed during freezing temperatures can result in possible improper drainage and can damage hydrant.

Vacuum Breaker:

Removable hose-connection backflow preventer complying with ASSE 1052.

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

* + - 1. ROOF HYDRANTS

Retain this article only if roof hydrants are required.

Copy "Non-freeze, Draining-Type Roof Hydrants" Paragraph below and re-edit for each type of roof hydrant required. If only one type is required, drawing designation may be omitted.

Insert drawing designation. Use these designations on Drawings to identify each product.

Roof hydrants are not generally considered devices to convey or dispense water for human consumption; therefore, some manufacturers do not comply with lead-free construction/certification. If Project application requires lead-free construction, confirm availability of product with manufacturers.

* + - * 1. Non-freeze, Draining-Type Roof Hydrants <**Insert drawing designation if any**>:

Retain "Manufacturers" Subparagraph and list of manufacturers below to require products from manufacturers listed or a comparable product from other manufacturers.

Manufacturers: Subject to compliance with requirements, provide products by one of the following:

Jay R. Smith Mfg. Co.; a division of Morris Group International.

MIFAB, Inc.

WATTS.

Woodford Manufacturing Company.

Zurn Industries, LLC.

<**Insert manufacturer's name**>.

Standard: ASME A112.21.3M.

Type: Non-freeze, exposed-outlet roof hydrant with coated cast-iron head and lift handle with lock option. Provide with deck flange and under deck clamp.

Casing and Operating Rod: Bronze interior parts, galvanized-steel casing, and bronze valve housing designed with hole to drain.

Inlet: [**NPS 3/4 (DN 20)**] <**Insert pipe size**>.

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

Vacuum Breaker:

Non-removable, drainable, hose-connection vacuum breaker complying with ASSE 1011 or backflow preventer complying with ASSE 1052.

Garden-hose thread complying with ASME B1.20.7 on outlet.

* + - 1. DRAIN VALVES

Insert drawing designation. Use these designations on Drawings to identify each product.

Copy "Ball-Valve-Type, Hose-End Drain Valves" Paragraph below and re-edit for each type of drain valve required. If only one type is required, drawing designation may be omitted.

* + - * 1. Ball-Valve-Type, Hose-End Drain Valves <**Insert drawing designation if any**>:

Standard: MSS SP-110 for standard-port, two-piece ball valves.

Pressure Rating: 400-psig (2760-kPa) minimum CWP.

Size: NPS 3/4 (DN 20).

Body: Copper alloy.

Ball: Chrome-plated brass.

Seats and Seals: Replaceable.

Handle: Vinyl-covered steel.

Inlet: Threaded or solder joint.

Outlet: Threaded, short nipple with garden-hose thread complying with ASME B1.20.7 and cap with brass chain.

Copy "Gate-Valve-Type, Hose-End Drain Valves" Paragraph below and re-edit for each type of drain valve required. If only one type is required, drawing designation may be omitted.

* + - * 1. Gate-Valve-Type, Hose-End Drain Valves <**Insert drawing designation if any**>:

Standard: MSS SP-80 for gate valves.

Pressure Rating: Class 125.

Size: NPS 3/4 (DN 20).

Body: ASTM B62 bronze.

Inlet: NPS 3/4 (DN 20) threaded or solder joint.

Outlet: Garden-hose thread complying with ASME B1.20.7 and cap with brass chain.

Copy "Stop-and-Waste Drain Valves" Paragraph below and re-edit for each type of drain valve required. If only one type is required, drawing designation may be omitted.

* + - * 1. Stop-and-Waste Drain Valves <**Insert drawing designation if any**>:

Standard: MSS SP-110 for ball valves or MSS SP-80 for gate valves.

Pressure Rating: 200-psig (1380-kPa) minimum CWP or Class 125.

Size: NPS 3/4 (DN 20).

Body: Copper alloy or ASTM B62 bronze.

Drain: NPS 1/8 (DN 6) side outlet with cap.

* + - 1. WATER-HAMMER ARRESTERS

Copy "Water-Hammer Arresters" Paragraph below and re-edit for each type of water-hammer arrester required. If only one type is required, drawing designation may be omitted.

Insert drawing designation. Use these designations on Drawings to identify each product.

* + - * 1. Water-Hammer Arresters <**Insert drawing designation if any**>:

Retain "Manufacturers" Subparagraph and list of manufacturers below to require products from manufacturers listed or a comparable product from other manufacturers.

Manufacturers: Subject to compliance with requirements, provide products by one of the following:

AMTROL, Inc.

Jay R. Smith Mfg. Co.; a division of Morris Group International.

Josam Company.

MIFAB, Inc.

Precision Plumbing Products.

Sioux Chief Manufacturing Company, Inc.

WATTS.

Zurn Industries, LLC.

<**Insert manufacturer's name**>.

Standard: ASSE 1010 or PDI-WH 201.

Type: [**Metal bellows**] [**Piston**] [**Diaphragm**].

Size: ASSE 1010, Sizes AA and A through F, or PDI-WH 201, Sizes A through F.

* + - 1. TRAP-SEAL PRIMER DEVICE

Insert drawing designation. Use these designations on Drawings to identify each product.

Copy "Supply-Type, Trap-Seal Primer Device" Paragraph below and re-edit for each type of primer device required. If only one type is required, drawing designation may be omitted.

* + - * 1. Supply-Type, Trap-Seal Primer Device <**Insert drawing designation if any**>:

Retain "Manufacturers" Subparagraph and list of manufacturers below to require products from manufacturers listed or a comparable product from other manufacturers.

Manufacturers: Subject to compliance with requirements, provide products by one of the following:

Jay R. Smith Mfg. Co.; a division of Morris Group International.

Josam Company.

MIFAB, Inc.

Precision Plumbing Products.

Sioux Chief Manufacturing Company, Inc.

WATTS.

Zurn Industries, LLC.

<**Insert manufacturer's name**>.

Standard: ASSE 1018.

Pressure Rating: 125 psig (860 kPa) minimum.

Body: Bronze.

Inlet and Outlet Connections: NPS 1/2 (DN 15) threaded, union, or solder joint.

Gravity Drain Outlet Connection: NPS 1/2 (DN 15) threaded or solder joint.

Finish: Chrome plated, or rough bronze for units used with pipe or tube that is not chrome finished.

Copy "Drainage-Type, Trap-Seal Primer Device" Paragraph below and re-edit for each type of primer device required. If only one type is required, drawing designation may be omitted.

* + - * 1. Drainage-Type, Trap-Seal Primer Device <**Insert drawing designation if any**>:

Retain "Manufacturers" Subparagraph and list of manufacturers below to require products from manufacturers listed or a comparable product from other manufacturers.

Manufacturers: Subject to compliance with requirements, provide products by one of the following:

Jay R. Smith Mfg. Co.; a division of Morris Group International.

MIFAB, Inc.

Precision Plumbing Products.

Zurn Industries, LLC.

<**Insert manufacturer's name**>.

Standard: ASSE 1044, lavatory P-trap with NPS 3/8 (DN 10) minimum, trap makeup connection.

Size: NPS 1-1/4 (DN 32) minimum.

Material: Chrome-plated, cast brass.

* + - 1. TRAP-SEAL PRIMER SYSTEMS

Copy "Trap-Seal Primer Systems" Paragraph below and re-edit for each type of primer system required. If only one type is required, drawing designation may be omitted.

Insert drawing designation. Use these designations on Drawings to identify each product.

* + - * 1. Trap-Seal Primer Systems <**Insert drawing designation if any**>:

Retain "Manufacturers" Subparagraph and list of manufacturers below to require products from manufacturers listed or a comparable product from other manufacturers.

Manufacturers: Subject to compliance with requirements, provide products by one of the following:

Precision Plumbing Products.

Sioux Chief Manufacturing Company, Inc.

Zurn Industries, LLC.

<**Insert manufacturer's name**>.

Standard: ASSE 1044.

Inlet Size: NPS 3/4, ASTM B88, Type L (DN 20, ASTM B88M, Type B); copper, water tubing.

Cabinet: [**Recessed**] [**Surface**]-mounted steel box with stainless steel cover.

Electric Controls: 24-hour timer, solenoid valve, and manual switch for 120 V ac power.

Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

Vacuum Breaker: ASSE 1001.

Number Outlets: [**Four**] [**Six**] [**Eight**] <**Insert number**>.

Size Outlets: [**NPS 1/2 (DN 15)**] [**NPS 5/8 (DN 18)**].

* + - 1. FLEXIBLE CONNECTORS

Retain "Manufacturers" Paragraph and list of manufacturers below to require products from manufacturers listed or a comparable product from other manufacturers.

* + - * 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

Flex-Hose Co., Inc.

Mason Industries, Inc.

Metraflex Company (The).

<**Insert manufacturer's name**>.

* + - * 1. Bronze-Hose Flexible Connectors: Corrugated-bronze tubing with bronze wire-braid covering and ends brazed to inner tubing.

Working-Pressure Rating: Minimum [**200 psig (1380 kPa)**] [**250 psig (1725 kPa)**].

End Connections NPS 2 (DN 50) and Smaller: Threaded copper pipe or plain-end copper tube.

End Connections NPS 2-1/2 (DN 65) and Larger: Flanged copper alloy.

* + - * 1. Stainless Steel-Hose Flexible Connectors: Corrugated-stainless steel tubing with stainless steel wire-braid covering and ends welded to inner tubing.

Working-Pressure Rating: Minimum [**200 psig (1380 kPa)**] [**250 psig (1725 kPa)**].

End Connections NPS 2 (DN 50) and Smaller: Threaded steel-pipe nipple.

End Connections NPS 2-1/2 (DN 65) and Larger: Flanged steel nipple.

* + - 1. WATER METERS

Retain this article if Contractor is to furnish water meters and water meters are to be installed inside the building. Verify type of water meter required by the utility company and authorities having jurisdiction.

Review ASHRAE 189.1 requirements incorporated into IgCC for "water consumption measurement" requirements, which may require installation of water meters for submetering.

Sustainable design requirements may require provisions for water meters to measure fixture use separate from irrigation.

Retain "Displacement-Type Water Meters" Paragraph below for water meters NPS 2 (DN 50) and smaller. Displacement-type meters with plastic cases that comply with AWWA C710 are also available.

* + - * 1. Displacement-Type Water Meters:

Retain "Manufacturers" Subparagraph and list of manufacturers below to require products from manufacturers listed or a comparable product from other manufacturers.

Manufacturers: Subject to compliance with requirements, provide products by one of the following:

Aaliant; a brand of Niagara Meters.

Badger Meter, Inc.

Carlon Meter.

Master Meter, Inc.

Neptune Technology Group Inc.

<**Insert manufacturer's name**>.

Standard: AWWA C700.

Pressure Rating: 150-psig (1035-kPa) working pressure.

Body Design: Nutating disc; totalization meter.

Registration: In gallons (liters) or cubic feet (cubic meters) as required by utility company.

Retain "Remote Registration System" Subparagraph below if required.

Remote Registration System: Encoder type complying with AWWA C707; modified with signal-transmitting assembly, low-voltage connecting wiring, and remote register assembly as required by utility company.

System to be capable of transmitting data using AMR/AMI technology.

Case: [**Bronze**] [**Stainless steel**].

End Connections: Threaded or flanged.

Retain "Turbine-Type Water Meters" Paragraph below for water meters NPS 1-1/2 to NPS 10 (DN 40 to DN 250).

* + - * 1. Turbine-Type Water Meters:

Retain "Manufacturers" Subparagraph and list of manufacturers below to require products from manufacturers listed or a comparable product from other manufacturers.

Manufacturers: Subject to compliance with requirements, provide products by one of the following:

Aaliant; a brand of Niagara Meters.

Badger Meter, Inc.

Neptune Technology Group Inc.

<**Insert manufacturer's name**>.

Standard: AWWA C701.

Pressure Rating: [**150 psig (1035 kPa)**] <**Insert value**> working pressure.

Body Design: Turbine; totalization meter.

Registration: In gallons (liters) or cubic feet (cubic meters) as required by utility company.

Retain "Remote Registration System" Subparagraph below if required.

Remote Registration System: Encoder type complying with AWWA C707; modified with signal-transmitting assembly, low-voltage connecting wiring, and remote register assembly as required by utility company.

System to be capable of transmitting data using AMR/AMI technology.

Case: [**Bronze**] [**Epoxy-coated cast iron**].

End Connections: Threaded or flanged.

Retain "Compound-Type Water Meters" Paragraph below for water meters NPS 3 (DN 80) and larger. NPS 2 (DN 50) meters are also available.

* + - * 1. Compound-Type Water Meters:

Retain "Manufacturers" Subparagraph and list of manufacturers below to require products from manufacturers listed or a comparable product from other manufacturers.

Manufacturers: Subject to compliance with requirements, provide products by one of the following:

Badger Meter, Inc.

Neptune Technology Group Inc.

Sensus; a Xylem brand.

<**Insert manufacturer's name**>.

Standard: AWWA C702.

Pressure Rating: 150-psig (1035-kPa) working pressure.

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

Registration: In gallons (liters) or cubic feet (cubic meters) as required by utility company.

Retain "Remote Registration System" Subparagraph below if required.

Remote Registration System: Encoder type complying with AWWA C707; modified with signal-transmitting assembly, low-voltage connecting wiring, and remote register assembly as required by utility company.

System to be capable of transmitting data using AMR/AMI technology.

Case: [**Bronze**] [**Coated ductile iron**].

End Connections: Flanged.

Retain "Ultrasonic-Type Water Meters" Paragraph below for water meters NPS 12 (DN 400) and smaller. Currently, no AWWA standard exists that specifically addresses ultrasonic meters.

* + - * 1. Ultrasonic-Type Water Meters:

Retain "Manufacturers" Subparagraph and list of manufacturers below to require products from manufacturers listed or a comparable product from other manufacturers.

Manufacturers: Subject to compliance with requirements, provide products by one of the following:

Badger Meter, Inc.

Master Meter, Inc.

Neptune Technology Group Inc.

<**Insert manufacturer's name**>.

Standard: Applicable portions of AWWA C700.

Pressure Rating: [**150 psig (1035 kPa)**] <**Insert value**> working pressure.

Body Design: Ultrasonic open flow tube; totalization meter.

Registration: In gallons (liters) or cubic feet (cubic meters) as required by utility company.

Retain "Remote Registration System" Subparagraph below if required.

Remote Registration System: Encoder type complying with AWWA C707; modified with signal-transmitting assembly, low-voltage connecting wiring, and remote register assembly as required by utility company.

System to be capable of transmitting data using AMR/AMI technology.

Case: [**Bronze**] [**Stainless steel**] [**Engineered polymer**] [**Epoxy-coated ductile iron**].

End Connections: Threaded or flanged.

* + - 1. AUTOMATIC AIR VENTS
         1. Automatic Air Vents <**Insert drawing designation if any**>:

Retain "Basis-of-Design Product" Subparagraph and list of manufacturers below to require products from manufacturers listed or a comparable product from other manufacturers.

For more information on NA502640A Series PLUMBVENT, see [www.caleffi.com/usa/en-us/catalogue/plumbventtm-automatic-air-vent-low-lead-na502640a](https://www.caleffi.com/usa/en-us/catalogue/plumbventtm-automatic-air-vent-low-lead-na502640a).

Basis-of-Design Product: Subject to compliance with requirements, provide product by Caleffi North America; NA502640A PLUMBVENT or comparable product by one of the following:

Bell & Gossett; a Xylem brand.

TACO Comfort Solutions, Inc.

<**Insert manufacturer's name**>.

Description: Float-type automatic low-lead air vent to vent air from water at high points in plumbing system piping.

Standards:

NSF/ANSI/CAN 372 low-lead laws, as certified by ICC-ES.

Meets codes IPC, IRC, NPC, and UPC.

Retain first subparagraph below for hygroscopic cap that automatically closes the air discharge in case of contact with water.

Hygroscopic cap (anti-drip).

Body: DZR low-lead brass.

In "Seals" Subparagraph below, peroxide-cured EPDM is resistant to water treated with chlorine or chloramine for longer life expectancy.

Seals: Peroxide-cured EPDM.

In "Float" Subparagraph below, the anti-rotation and anti-vibration system assure that in the rest position the air relief valve will not be affected by any movement of the float.

Float:

Material: Moplen EP548S.

Anti-rotation and anti-vibration system.

Connection: NPS 1/2 (DN 15) NPT male threads.

Vertical discharge.

Maximum Working Pressure: 150 psig (1034 kPa).

Maximum Discharge Pressure: 90 psig (621 kPa).

Maximum Discharge Rate: 1.75 gpm (0.13 L/sec).

Maximum Working Temperature: 240 deg F (116 deg C).

Copy "Vacuum Relief Valve" Paragraph below and re-edit for each type of vacuum relief valve required. If only one type is required, drawing designation may be omitted.

* + - 1. Vacuum Relief Valves <Insert drawing designation if any>.

Retain "Basis-of-Design Product" Subparagraph and list of manufacturers below to require a specific product or a comparable product from manufacturers listed.

For more information on 304 Series, see https://www.caleffi.com/usa/en-us/catalogue/vacu-stoptm-vacuum-relief-valve-vrv-304040a.

Basis-of-Design Product: Subject to compliance with requirements, provide product by Caleffi North America; 304 Series VacuStop or comparable product by one of the following:

Zurn Industries, LLC

WATTS.

<Insert manufacturer's name>.

Standards:

ANSI Z21.22/CSA 4.4

NSF/ANSI/CAN 372 low-lead laws, as certified by ICC-ES.

NSF/ANSI/CAN 61 as certified by ICC-ES.

Size: [NPS 1/2 **(DN 15)**] [**NPS 3/4** **(DN 20)**].

Connection: [NPT male threaded].

Body Material: DZR low-lead brass.

Top: Glass fiber reinforced nylon.

Cover Plate: Acrylonitrile butadiene styrene.

Cartridge, check: Polyphenylsulfone.

Spring: Stainless steel.

Washer: Silicone 240/T.

Maximum Working Pressure (water): 200 psig (14 bar).

Maximum Working Pressure (steam): 15 psig (1 bar).

Working Temperature Range: 32 deg F to 250 deg F (0 deg C to 120 deg C).

Vacuum Relief Opening Pressure (opening point): 0.3 inches Hg (1 kPa) vacuum.

Relief Capacity: 4.5 cfm@2 inches Hg 130 L/min.@ (7 kPa) vacuum.

1. EXECUTION
   * + 1. INSTALLATION OF PIPING SPECIALTIES
          1. Backflow Preventers: Install in each water supply to mechanical equipment and systems and to other equipment and water systems that may be sources of contamination. Comply with authorities having jurisdiction.

Locate backflow preventers in same room as connected equipment or system.

Install drain for backflow preventers with atmospheric-vent drain connection with air-gap fitting, fixed air-gap fitting, or equivalent positive pipe separation of at least two pipe diameters in drain piping and pipe-to-floor drain. Locate air-gap device attached to or under backflow preventer. Simple air breaks are unacceptable for this application.

Do not install bypass piping around backflow preventers.

* + - * 1. Water Regulators: Install with inlet and outlet shutoff valves[**and bypass with memory-stop balancing valve**]. Install pressure gauges on inlet and outlet.
        2. Water Control Valves: Install with inlet and outlet shutoff valves[**and bypass with globe valve**]. Install pressure gauges on inlet and outlet.
        3. Automatic Water Shutoff Valves: Test for signal strength before valve installation. Install automatic shutoff valve downstream from main domestic water shutoff valve. Install valve controller in an accessible location with sensors in areas where water is likely to accumulate.
        4. Balancing Valves: Install in locations where they can easily be adjusted. Set at indicated design flow rates.
        5. Temperature-Actuated, Water Mixing Valves: Install with check stops or shutoff valves on inlets and with shutoff valve on outlet.

Install cabinet-type units recessed in or surface mounted on wall as specified.

* + - * 1. Y-Pattern Strainers: For water, install on supply side of each [**control valve**] [**water pressure-reducing valve**] [**solenoid valve**] [**and**] [**pump**].
        2. Outlet Boxes: Install boxes recessed in wall or surface mounted on wall. Install 1-1/2-by-3-1/2-inch (38-by-89-mm) fire-retardant-treated-wood blocking, wall reinforcement between studs. Comply with requirements for fire-retardant-treated-wood blocking in Section 061000 "Rough Carpentry."
        3. Hose Stations: Install with check stops or shutoff valves on inlets and with thermometer on outlet.

Install cabinet-type units recessed in or surface mounted on wall as specified. Install 1-1/2-by-3-1/2-inch (38-by-89-mm) fire-retardant-treated-wood blocking, wall reinforcement between studs. Comply with requirements for fire-retardant-treated-wood blocking in Section 061000 "Rough Carpentry."

* + - * 1. Ground Hydrants: Install with [**1 cu. yd. (0.75 cu. m)**] <**Insert dimension**> of crushed gravel around drain hole. Set ground hydrants with box flush with grade.
        2. Non-freeze, Draining-Type Post Hydrants: Install with [**1 cu. yd. (0.75 cu. m)**] <**Insert dimension**> of crushed gravel around drain hole. Set post hydrants in concrete paving or in [**1 cu. ft. (0.03 cu. m)**] <**Insert dimension**> of concrete block at grade.
        3. Non-freeze, Non-draining-Type Post Hydrants: Set in concrete or pavement.
        4. Non-freeze, Sanitary Yard Hydrants: Set with riser pipe in concrete or pavement. Do not encase canister in concrete.
        5. Non-freeze, Draining-Type Roof Hydrants: Install with drain connection piped to nearest floor drain or to the exterior.

Water-hammer arresters in first paragraph below are best shown on water risers and details. Specifying number, size, and location here is difficult.

* + - * 1. Water-Hammer Arresters: Install in water piping in accordance with PDI-WH 201.
        2. Supply-Type, Trap-Seal Primer Device: Install with outlet piping pitched down toward drain trap a minimum of 1 percent, and connect to floor-drain body, trap, or inlet fitting. Adjust valve for proper flow.
        3. Drainage-Type, Trap-Seal Primer Device: Install as lavatory trap with outlet piping pitched down toward drain trap a minimum of 1 percent, and connect to floor-drain body, trap, or inlet fitting.
        4. Trap-Seal Primer Systems: Install with outlet piping pitched down toward drain trap a minimum of 1 percent, and connect to floor-drain body, trap, or inlet fitting. Adjust system for proper flow.
      1. PIPING CONNECTIONS

Coordinate piping installations and specialty arrangements with Drawings and with requirements specified in piping systems. If Drawings are explicit enough, these requirements may be reduced or omitted.

* + - * 1. Drawings indicate general arrangement of piping, fittings, and specialties.
        2. When installing piping specialties adjacent to equipment and machines, allow space for service and maintenance.
      1. ELECTRICAL CONNECTIONS
         1. Connect wiring in accordance with Section 260519 "Low-Voltage Electrical Power Conductors and Cables."
         2. Ground equipment in accordance with Section 260526 "Grounding and Bonding for Electrical Systems."
         3. Install electrical devices furnished by manufacturer, but not factory mounted, in accordance with NFPA 70 and NECA 1.
      2. CONTROL CONNECTIONS
         1. Connect control wiring in accordance with Section 260523 "Control-Voltage Electrical Power Cables."
      3. IDENTIFICATION
         1. Plastic Labels for Equipment: Install engraved plastic-laminate equipment nameplate or sign on or near each of the following:

Coordinate list below with products retained in Part 2.

Vacuum breakers.

Backflow preventers.

Water pressure-reducing valves.

Automatic water shutoff valve systems.

Balancing valves.

Temperature-actuated, water mixing valves.

In-line check valves.

Strainer for domestic water piping.

Outlet boxes.

Hose stations.

Hose bibbs.

Wall hydrants.

Ground hydrants.

Post hydrants.

Roof hydrants.

Drain valves.

Water-hammer arresters.

Trap-seal primer device.

Trap-seal primer systems.

Flexible connectors.

Water meters.

Automatic air vents.

* + - * 1. 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 220553 "Identification for Plumbing Piping and Equipment."
      1. ADJUSTING
         1. Set field-adjustable pressure set points of water pressure-reducing valves.
         2. Set field-adjustable flow set points of balancing valves.
         3. Set field-adjustable temperature set points of temperature-actuated, water mixing valves.
         4. Adjust each [**pressure vacuum breaker**] [**reduced-pressure-principle backflow preventer**] [**double-check, backflow-prevention assembly**] [**and**] [**double-check, detector-assembly backflow preventer**] <**Insert type**> in accordance with manufacturer's written instructions, authorities having jurisdiction and the device's reference standard.
      2. FIELD QUALITY CONTROL

Retain "Testing Agency," "Manufacturer's Field Service," and "Perform the following tests and inspections" paragraphs below to identify who to perform tests and inspections. If retaining second option in "Testing Agency" Paragraph or if retaining "Manufacturer's Field Service" or "Perform the following tests and inspections" Paragraph, retain "Field quality-control reports" Paragraph in "Informational Submittals" Article.

* + - * 1. Testing Agency: [**Owner will engage**] [**Engage**] a qualified testing agency to perform tests and inspections.

Retain "Manufacturer's Field Service" Paragraph below to require a factory-authorized service representative to perform tests and inspections.

* + - * 1. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect components, assemblies, and equipment installations, including connections.

Retain "Perform the following tests and inspections" Paragraph below to require Contractor to perform tests and inspections.

* + - * 1. Perform the following tests and inspections[**with the assistance of a factory-authorized service representative**].

Test each [**pressure vacuum breaker**] [**reduced-pressure-principle backflow preventer**] [**double-check, backflow-prevention assembly**] [**and**] [**double-check, detector-assembly backflow preventer**] <**Insert type**> in accordance with authorities having jurisdiction and the device's reference standard.

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

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

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

See Section 014000 "Quality Requirements" for retesting and reinspection requirements and Section 017300 "Execution" for requirements for correcting the Work.

* + - * 1. Domestic water piping specialties will be considered defective if they do not pass tests and inspections.
        2. Prepare test and inspection reports.

END OF SECTION 221119