
USACE / NAVFAC / AFCEA / NASA UFGS-23 09 13.34 40 (February 2011)

Preparing Activity: NASA Superseding
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UNIFIED FACILITIES GUIDE SPECIFICATIONS

References are in agreement with UMRL dated January 2011

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02/11

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CONTROL VALVES, SELF-CONTAINED 02/11

NOTE: This specification covers the requirements
for self-contained control and relief valves.

Edit this guide specification for project specific
requirements by adding, deleting, or revising text.
For bracketed items, choose applicable items(s) or
insert appropriate information.

Remove information and requirements not required in
respective project, whether or not brackets are
present.

Comments, suggestions and recommended changes for
this guide specification are welcome and should be
submitted as a Criteria Change Request (CCR).

PART 1 GENERAL

1.1 REFERENCES

NOTE: This paragraph is used to list the
publications cited in the text of the guide
specification. The publications are referred to in
the text by basic designation only and listed in
this paragraph by organization, designation, date,
and title.

Use the Reference Wizard's Check Reference feature
when you add a RID outside of the Section's
Reference Article to automatically place the
reference in the Reference Article. Also use the
Reference Wizard's Check Reference feature to update
the issue dates.

References not used in the text will automatically
be deleted from this section of the project
specification when you choose to reconcile
references in the publish print process.

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN SOCIETY OF SANITARY ENGINEERING (ASSE)

ASSE 1003 (2009) Performance Requirements for Water Pressure Reducing Valves for Domestic Water Distribution Systems - (ANSI approved 2010)

ASME INTERNATIONAL (ASME)

ASME B16.1 (2005) Gray Iron Threaded Fittings; Classes 25, 125 and 250

ASME BPVC SEC VI (2010) BPVC Section VI-Recommended Rules for the Care and Operation of Heating Boilers

ASTM INTERNATIONAL (ASTM)

ASTM A 126 (2004; R 2009) Standard Specification for Gray Iron Castings for Valves, Flanges, and Pipe Fittings

ASTM A 463/A 463M (2009a) Standard Specification for Steel Sheet, Aluminum-Coated, by the Hot-Dip Process

ASTM A 48/A 48M (2003; R 2008) Standard Specification for Gray Iron Castings

ASTM B 61 (2008) Standard Specification for Steam or Valve Bronze Castings

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION (ISO)

ISO 4126-1 (2004; Cor 1-2007) Safety Devices for Protection Against Excessive Pressure - Part 1: Safety Valves

ISO 5209 (1977) General Purpose Industrial Valves - Marking

ISO 5752 (1982) Metal Valves for Use in Flanged Pipe Systems - Face to Face and Center to Face Dimensions

ISO 7005-2 (1988) Metallic Flanges Part 2: Cast Iron Flanges

MANUFACTURERS STANDARDIZATION SOCIETY OF THE VALVE AND FITTINGS INDUSTRY (MSS)

MSS SP-86 (2009) Guidelines for Metric Data in Standards for Valves, Flanges, Fittings and Actuators

1.2 SUBMITTALS

NOTE: Review Submittal Description (SD) definitions in Section 01 33 00 SUBMITTAL PROCEDURES and edit the following list to reflect only the submittals required for the project. Submittals should be kept to the minimum required for adequate quality control.

A "G" following a submittal item indicates that the submittal requires Government approval. Some submittals are already marked with a "G". Only delete an existing "G" if the submittal item is not complex and can be reviewed through the Contractor's Quality Control system. Only add a "G" if the submittal is sufficiently important or complex in context of the project.

For submittals requiring Government approval on Army projects, a code of up to three characters within the submittal tags may be used following the "G" designation to indicate the approving authority. Codes for Army projects using the Resident Management System (RMS) are: "AE" for Architect-Engineer; "DO" for District Office (Engineering Division or other organization in the District Office); "AO" for Area Office; "RO" for Resident Office; and "PO" for Project Office. Codes following the "G" typically are not used for Navy, Air Force, and NASA projects.

Choose the first bracketed item for Navy, Air Force and NASA projects, or choose the second bracketed item for Army projects.

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are [for Contractor Quality Control approval.] [for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government.] Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Fabrication Drawings

Installation Drawings

SD-03 Product Data

Self-Contained Temperature Control Valves

Self-Contained Temperature-Regulator Valves

Rate-of-Flow Controller

Nonmodulating Float Valve

Water Pressure Regulating Valvee
Water Pressure Relief Valve
Pilot-Operated Pressure-Relief Valve
Relief Valves for Electric Water Heaters
Sample Warranty

SD-07 Certificates

Listing of Product Installation
Certificates of Conformance
Manufacturer's Warranty

SD-06 Test Reports

Test Reports

1.3 GENERAL REQUIREMENTS

NOTE: If Section 23 00 00 AIR SUPPLY, DISTRIBUTION,
VENTILATION, AND EXHAUST SYSTEMS is not included in
the project specification, applicable requirements
therefrom should be inserted and the following
paragraph deleted.

Section 23 00 00 AIR SUPPLY, DISTRIBUTION, VENTILATION, AND EXHAUST SYSTEMS
applies to work specified in this section.

Submit [fabrication drawings](#) for self-contained control and relief valves,
including part numbers and exploded views.

Submit [listing of product installation](#) for self-contained control and
relief valves, identifying a minimum of five installed units, similar to
those proposed for use, that have been in successful service for a minimum
period of five years.

1.4 QUALITY ASSURANCE

Submit [certificates of conformance](#) for the following items showing
conformance with the referenced standards contained in this section:

- a. Self-Contained Temperature Control Valves
- b. Self-Contained Temperature-Regulator Valves
- c. Rate-of-Flow Controller
- d. Nonmodulating Float Valve
- e. Water Pressure Regulating Valve

- f. Water Pressure Relief Valve
- g. Pilot-Operated Pressure-Relief Valve
- h. Relief Valves for Electric Water Heaters

Submit copy of manufacturer's [sample warranty](#), to the Contracting Officer for review.

PART 2 PRODUCTS

2.1 [SELF-CONTAINED TEMPERATURE CONTROL VALVES](#)

NOTE: Select or delete the heading and the following paragraphs as applicable to the project.

Type I pressure limits: [175 kilopascal](#) [25 pounds per square inch \(psi\)](#), gage, [99 degrees C](#) [210 degrees F](#) water.

Type II pressure limits: [550 kilopascal](#), [99 degrees C](#) [80 psig](#), [210 degrees F](#) water.

Select, revise, delete or supplement the following to suit project conditions.

Provide self-contained temperature-control valves conforming to [MSS SP-86](#) and the following requirements:.

NOTE: Select one or both of next two paragraphs, subject to the project scope.

- [a. Type I, Class II (integral temperature-sensing units for very hot water).
 -] [b. Type II, Class 2, Style A (remote temperature-sensing units for very hot water with a single temperature-sensing control element).
 -] Mount set-point adjustment on the cabinet of the convector; ensure the control knob is accessible on the cabinet surface.
- Wall-mount set-point adjustment and thermostat for finned-tube radiation. Provide nickel-plated brass thermostat surfaces.
- Provide with armored capillary tubing, with remote element not be less than [450 millimeter](#) [18 inches](#) long and contained within a guard.
- Provide with renewable valve disks.

[2.2 [SELF-CONTAINED TEMPERATURE-REGULATOR VALVES](#)

Provide direct-operated, self-contained type valve, with[[ASTM B 61](#), (bronze)][[ASTM A 126](#) (cast iron)] body rated not less than [862 kilopascal](#) [125-pounds per square inch \(psi\)](#) saturated working steam-pressure. Provide with screwed type body end connections. Ensure trim is corrosion-resistant

AISI Type 300 Series steel. Provide with hardened replaceable seat and plug, or faced with a cobalt-chromium-tungsten alloy to produce a surface with resistance to impact, wire-drawing, and with a Brinell hardness of not less than 450. Fit packed steam valves with tetrafluoroethylene packing, spring-load, and self-adjust. Ensure valve is single-seated, suitable for dead-end service, and fail-safe. Mount remote Class I or Class III filled-bulb element in a nonferrous separable socket. Ensure valve maintains set-point temperature, plus or minus 15 degrees C 5 degrees F, with the set point at or near midpoint of the adjustable element range.

] [2.3 RATE-OF-FLOW CONTROLLER

NOTE: Select for service to maintain constant
flow-rate, regardless of changing line pressure.
Provide flow and size data.

Provide a hydraulically operated, pilot-controlled diaphragm-type globe valve for a rate of flow controller, with pilot control configured to actuate by differential pressure produced across an orifice installed at the inlet. Adjust rate of flow by varying spring loading on the pilot. Provide with cast iron valve body conforming to ASTM A 48/A 48M, with 862 kilopascal 125-pound ASME B16.1, MSS SP-86 and ISO 7005-2 flanges. Ensure valve trim is manufacturer's standard bronze or AISI 18-8 corrosion-resistant steel, orifice plate of AISI Type 303 corrosion-resistant steel, and diaphragm and seal are Buna-N. Ensure maximum-service-pressure rating is not less than 1207 kilopascal at 82 degrees C 175 psi at 180 degrees F.

] [2.4 NONMODULATING FLOAT VALVE

NOTE: Use with cooling towers.

Provide nonmodulating float valve, pilot-controlled, diaphragm-actuated, spring-loaded, single-seated, hydraulically operated type. Mount pilot valve on the main valve or remotely mount within the cooling tower basin. Ensure main valve body is cast iron conforming to ASTM A 48/A 48M with screwed ends for sizes smaller than DN50 2-inch iron pipe size (ips) and flanges conforming to ASME B16.1, MSS SP-86 and ISO 7005-2, for sizes DN50 2-inch ips and larger, with brass or bronze pilot valve body, with main and pilot valve trim, including linkage and float, made of the manufacturer's standard bronze-copper or AISI Type 300 series corrosion-resistant steel. Ensure diaphragm materials and seals are Buna-N, and maximum-service-pressure rating is not less than 1207 kilopascal at 82 degrees C 175 psi at 180 degrees F. Ensure valve operation is nonslam.

] [2.5 WATER PRESSURE-REGULATING VALVE

Provide direct acting pressure-regulating valve conforming to MSS SP-86 and ISO 5752 (ASSE 1003) ASSE 1003.

Ensure pressure-regulating valve does not stick or allow pressure to build up on the low side. Set valve to maintain a terminal pressure of approximately 35 kilopascal 5 psi in excess of the static pressure on the system and operate within a 9 Newtons 2-pound maximum variation regardless of initial pressure fluctuation, and without objectionable noise under any

condition of operation.

] [2.6 WATER PRESSURE-RELIEF VALVE

Construct, label, and install pressure-relief valve in accordance with ASME BPVC SEC VI ISO 5209 and ISO 4126-1. Ensure relieving capacity is as specified by the referenced publication, with valves of nonferrous construction, complete with test lever.

] [2.7 PILOT-OPERATED PRESSURE-RELIEF VALVE

NOTE: Select for pump-discharge pressure control or
for surge protection downstream of check.

Provide pilot-operated pressure-relief valve, hydraulically operated, pilot-controlled modulating, with adjustable set point over the indicated range. Provide with cast iron valve body conforming to ASTM A 48/A 48M, with 862 kilopascal 125-psi ASME B16.1, MSS SP-86 and ISO 7005-2 flanges. Include with manufacturer's standard brass, bronze, or corrosion-resistant steel valve trim. Provide pilot control with AISI Type 303 or 304 corrosion-resistant steel trim with Buna-N diaphragm and seal material. Ensure maximum service-pressure rating is not less than 1207 kilopascal at 82 degrees C 175 psi at 180 degrees F.

] [2.8 RELIEF VALVES FOR ELECTRIC WATER HEATERS

Provide temperature- and pressure-relief valves conforming to ASTM A 463/A 463M. Install Type I (combination pressure- and temperature-relief) valves when the heat input is less than 30 kilowatts 100,000 Btu per hour and when the storage is less than 450 liter 120 gallons. If either or both of the specified conditions will be reached or exceeded, install Type II (temperature relief, water rated) or Type III (temperature relief, steam rated) valves. Install vacuum-relief valves on each cold-water branch connection to electric water heaters at an elevation above the top of the heater. Design vacuum relief to prevent water heater damage from a reverse flow vacuum.

] PART 3 EXECUTION

3.1 INSTALLATION

Submit installation drawings for self-contained control and relief valves, and install valves and specify in accordance with the manufacturer's recommendations, and Section 23 05 15 COMMON PIPING FOR HVAC.

[3.2 TEST REPORTS

Upon completion of the installation, test the system components and submit [_____] copies of the test reports to the Contracting Officer. Remove and replace any defective components at no cost to the Government. Retest and submit reports to the Contracting Officer.

] 3.3 WARRANTY

Submit [[_____] copies] of the manufacturer's warranty, signed by the

Authority Having Jurisdiction (AHJ), assigned to the Government, to the Contracting Officer prior to project closeout.

-- End of Section --