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USACE / NAVFAC / AFCEC / NASA UFGS-23 09 13.34 40 (February 2011)  
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Preparing Activity: NASA Superseding  
UFGS-23 09 13.34 (November 2010)

UNIFIED FACILITIES GUIDE SPECIFICATIONS

References are in agreement with UMRL dated July 2016

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02/11

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SECTION 23 09 13.34 40

CONTROL VALVES, SELF-CONTAINED  
02/11

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

Adhere to UFC 1-300-02 Unified Facilities Guide Specifications (UFGS) Format Standard when editing this guide specification or preparing new project specification sections. 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).

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### PART 1 GENERAL

#### 1.1 REFERENCES

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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 Reference Identifier (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.

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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 (2015) Gray Iron Pipe Flanges and Flanged  
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 A126 (2004; R 2014) Standard Specification for  
Gray Iron Castings for Valves, Flanges,  
and Pipe Fittings

ASTM A463/A463M (2010; R 2015) Standard Specification for  
Steel Sheet, Aluminum-Coated, by the  
Hot-Dip Process

ASTM A48/A48M (2003; R 2012) Standard Specification for  
Gray Iron Castings

ASTM B61 (2015) Standard Specification for Steam or  
Valve Bronze Castings

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION (ISO)

ISO 4126-1 (2013) 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

(2014) Guidelines for Metric Data in  
Standards for Valves, Flanges, Fittings  
and Actuators

1.2 SUBMITTALS

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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.

The Guide Specification technical editors have  
designated those items that require Government  
approval, due to their complexity or criticality,  
with a "G." Generally, other submittal items can be  
reviewed by the Contractor's Quality Control  
System. Only add a "G" to an item, 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.

Use the "S" Classification only in SD-11 Closeout  
Submittals. An "S" following a submittal item  
indicates that the submittal is required for the  
Sustainability Notebook to fulfill federally  
mandated sustainable requirements in accordance with  
Section 01 33 29 SUSTAINABILITY REPORTING.

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

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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.] Submittals with an "S" are for inclusion in the  
Sustainability Notebook, in conformance to Section 01 33 29 SUSTAINABILITY  
REPORTING. Submit the following in accordance with Section 01 33 00  
SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Fabrication Drawings[; G[, [\_\_\_\_]]]

Installation Drawings[; G[, [\_\_\_\_]]]

#### SD-03 Product Data

Self-Contained Temperature Control Valves[; G[, [\_\_\_\_]]]

Self-Contained Temperature-Regulator Valves[; G[, [\_\_\_\_]]]

Rate-of-Flow Controller[; G[, [\_\_\_\_]]]

Nonmodulating Float Valve[; G[, [\_\_\_\_]]]

Water Pressure Regulating Valve[; G[, [\_\_\_\_]]]e

Water Pressure Relief Valve[; G[, [\_\_\_\_]]]

Pilot-Operated Pressure-Relief Valve[; G[, [\_\_\_\_]]]

Relief Valves for Electric Water Heaters[; G[, [\_\_\_\_]]]

Sample Warranty[; G[, [\_\_\_\_]]]

#### SD-07 Certificates

Listing of Product Installation[; G[, [\_\_\_\_]]]

Certificates of Conformance[; G[, [\_\_\_\_]]]

Manufacturer's Warranty[; G[, [\_\_\_\_]]]

#### SD-06 Test Reports

Test Reports[; G[, [\_\_\_\_]]]

### 1.3 GENERAL REQUIREMENTS

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**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.**  
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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

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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.

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Provide self-contained temperature-control valves conforming to MSS SP-86 and the following requirements:.

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

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- [ 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 B61, (bronze)][ ASTM A126 (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

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**NOTE: Select for service to maintain constant  
flow-rate, regardless of changing line pressure.  
Provide flow and size data.**  
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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 A48/A48M, 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

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**NOTE: Use with cooling towers.**  
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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 A48/A48M 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 head 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

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**NOTE: Select for pump-discharge pressure control or  
for surge protection downstream of check.**  
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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 A48/A48M, 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 A463/A463M. 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 --