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USACE / NAVFAC / AFCEC / NASA UFGS-23 22 25.00 40 (February 2011)  
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Preparing Activity: NASA Superseding  
UFGS-23 22 25 (November 2010)

UNIFIED FACILITIES GUIDE SPECIFICATIONS

References are in agreement with UMRL dated July 2014

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02/11

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### SECTION 23 22 25.00 40

#### STEAM VALVES 02/11

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NOTE: This guide specification covers the requirements for valves for steam and condensate systems.

Standard valves for steam, water, etc., operating at 178 degrees C and 900 kilopascal 353 degrees F and 125-pounds per square inch gage working steam pressure are covered in Section 23 05 15 COMMON PIPING FOR HVAC.

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

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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 first paragraph deleted. If Section 40 17 30.00 40 WELDING GENERAL PIPING is not included in the project specification, applicable requirements therefrom should be inserted and the second paragraph deleted.

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

] [Section 40 17 30.00 40 WELDING GENERAL PIPING applies to work specified in this section.

] 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 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 WELDING SOCIETY (AWS)

AWS A5.13 (2010) Specification for Surfacing Electrodes for Shielded Metal Arc Welding

ASME INTERNATIONAL (ASME)

ASME B1.20.1 (2013) Pipe Threads, General Purpose (Inch)

ASME B1.20.2M (2006; R 2011) Pipe Threads, 60 Deg. General Purpose (Metric)

ASME B16.1 (2010) Gray Iron Pipe Flanges and Flanged Fittings Classes 25, 125, and 250

ASME B16.34 (2013) Valves - Flanged, Threaded and Welding End

ASTM INTERNATIONAL (ASTM)

ASTM A105/A105M (2013) Standard Specification for Carbon Steel Forgings for Piping Applications

ASTM A106/A106M (2013) Standard Specification for Seamless Carbon Steel Pipe for High-Temperature Service

ASTM A126	(2004; R 2014) Standard Specification for Gray Iron Castings for Valves, Flanges, and Pipe Fittings
ASTM A182/A182M	(2014) Standard Specification for Forged or Rolled Alloy-Steel Pipe Flanges, Forged Fittings, and Valves and Parts for High-Temperature Service
ASTM A216/A216M	(2014) Standard Specification for Steel Castings, Carbon, Suitable for Fusion Welding, for High-Temperature Service
ASTM A436	(1984; R 2011) Standard Specification for Austenitic Gray Iron Castings
ASTM B61	(2008; R 2013) Standard Specification for Steam or Valve Bronze Castings
ASTM B62	(2009) Standard Specification for Composition Bronze or Ounce Metal Castings

ISA - INTERNATIONAL SOCIETY OF AUTOMATION (ISA)

ISA RP60.9	(1981) Piping Guide for Control Centers
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MANUFACTURERS STANDARDIZATION SOCIETY OF THE VALVE AND FITTINGS INDUSTRY (MSS)

MSS SP-70	(2011) Gray Iron Gate Valves, Flanged and Threaded Ends
MSS SP-80	(2013) Bronze Gate, Globe, Angle and Check Valves
MSS SP-86	(2009; Errata 2011) Guidelines for Metric Data in Standards for Valves, Flanges, Fittings and Actuators

U.S. GENERAL SERVICES ADMINISTRATION (GSA)

CID A-A-50457	(Rev A; Notice 2) Valves Radiator, Heating Packless Bonnett, Class 125 PSIG
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## 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.

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[; G][; G, [\_\_\_\_\_]]

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

#### SD-03 Product Data

Dial Cocks[; G][; G, [\_\_\_\_\_]]

Diaphragm Control And Instrument Valves[; G][; G, [\_\_\_\_\_]]

Gate Valves[; G][; G, [\_\_\_\_\_]]

Globe And Angle Valves[; G][; G, [\_\_\_\_\_]]

Check Valves[; G][; G, [\_\_\_\_\_]]

Cone-Plug Balancing Valve[; G][; G, [\_\_\_\_\_]]

Eccentric Plug Valves[; G][; G, [\_\_\_\_\_]]

#### SD-07 Certificates

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

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

### 1.3 ADMINISTRATIVE REQUIREMENTS

#### 1.3.1 Pre-Installation Meetings

Prior to commencement of work, submit the following to the Contracting Officer for review and approval:

- a. [Listing of product installations](#) for valve assemblies indicating at least [five] [\_\_\_\_\_] installed units, similar to those proposed for use, that have been in successful service for a minimum of [five] [\_\_\_\_\_] years, with contact information for verification.
- b. Submit [certificates of conformance](#) for the following items showing conformance to the referenced standards contained in this section:
  - (1) Gate Valves
  - (2) Globe and Angle Valves
  - (3) Check Valves
  - (4) Cone-Plug Balancing Valve
  - (5) Eccentric Plug Valves
  - (6) Dial Cocks
  - (7) Diaphragm Control and Instrument Valves
- c. [Fabrication drawings](#) and [installation drawings](#) for each type of the following used in the work:
  - (1) Valves
  - (2) Accessories

## PART 2 PRODUCTS

### 2.1 COMPONENTS

#### 2.1.1 [Dial Cocks](#)

Provide dial cocks in sizes [DN65 2-1/2-inch ips](#) and smaller with pointer and etched position dial rated [1100 kilopascal 150-psi](#) working steam pressure (wsp) and made of manufacturer's standard all-brass construction.

#### 2.1.2 [Diaphragm Control And Instrument Valves](#) (DCIV)

Provide diaphragm control and instrument valves in sizes [DN8 and DN10 1/4 and 3/8 inch](#) with a forged-brass body with reinforced tetrafluoroethylene diaphragm, and an AISI 300 series corrosion-resistant steel spring with round phenolic handle. Fit handle with disks color-coded in accordance with [ISA RP60.9](#).

### 2.2 FABRICATION

#### 2.2.1 [Gate Valves](#)

\*\*\*\*\*

**NOTE: These valves are recommended for steam and condensate service.**

\*\*\*\*\*

#### 2.2.1.1 Gate Valves 2500 kPa 350 psi

Rate gate valves 2100 kilopascal 300 pounds per square inch (psi) working steam pressure (wsp) and ensure conformance to ASME B16.34.

Ensure body end connections are flanged for all valves larger than DN50 2 inches, unless butt weld ends are specified. Use [Screwed] [Socket] weld for sizes DN50 2 inches and under to suit specified piping system end connection and maintenance requirements, or be welded. Provide flange faces with concentric serrated finish.

Provide [union] [gasketed-bolted] type body to bonnet connection for valves DN50 2 inches and under and gasketed-bolted type for valves larger than DN50 2 inches. Ensure bonnet is outside screw and yoke (OS&Y) type, with rising stem.

Provide [cast steel] [forged carbon steel] body and bonnet assembly. Provide certification that [cast steel conforms to ASTM A216/A216M, Grade WCB] [forged carbon steel conforms to ASTM A105/A105M].

\*\*\*\*\*

**NOTE: Select the following paragraph only after checking flow coefficients.**

\*\*\*\*\*

[ Provide full port valves.

] Ensure trim includes [hard-surfaced solid] [one-piece flexible] wedge disc and hard-surfaced seats, with rising and backseating type stem.

Provide trim materials and hard-surfaced substrates [conforming to ASTM A182/A182M, Grade F6] [of manufacturer's standard metallurgical equivalents for the specified service].

Provide certification that hard surfacing alloy conforms to AWS A5.13, [Class RNiCr-B] [Class RCoCr-B].

Provide wire-reinforced packing, fiber braid impregnated with [30 percent tetrafluoroethylene] [a corrosion-inhibiting lubricant specifically suitable for service with stem material provided].

Provide [cast iron] [malleable iron] [wrought steel] valve wheels.

\*\*\*\*\*

**NOTE: Note on drawings all locations where an integral bypass valve is required. Integral bypass valves are used for valves larger than DN150 6 inches and for smaller sizes where unusual warm up operations will occur.**

\*\*\*\*\*

Provide integral bypass globe valves around valves larger than DN150 6 inches. Ensure bypass valves are factory installed and have [butt] [socket] welded end, conforming to the same requirements as the main valve, except that in all cases valve seat and plug disk must be hard surfaced and

seat must be removable, replaceable type. Provide pressure tubing piping connections conforming to Schedule 80 **ASTM A106/A106M**, Grade [ B ] [ C ], and without change of direction fittings, i.e., bent. Ensure connection is to valve bosses located to perform specified function. Ship valves with integral bypass bolted to crates in a manner that will preclude damage to bypass assembly.

\*\*\*\*\*  
NOTE: Note on drawings all locations where integral drain valve is required. Integral drain valves are particularly useful in tall risers and shall be noted in all cases where required except where valve size is less than **DN50 2 inches**, in which case, provide an independent drain immediately above the valve. Note pitch of horizontal lines.  
\*\*\*\*\*

Provide [ factory ] [ field ] installed integral drain valve. Weld connection to main valve body. Ensure drain valve is trimmed with manufacturer's standard hardened corrosion-resistant steel. Provide pressure tubing piping conforming to **ASTM A106/A106M**, Grade [ B ] [ C ]. Provide [ capped ] [ plugged ] drain discharge with threaded closure assembly made with tetrafluoroethylene tape.

#### 2.2.1.2 Gate Valves **1100 kPa 150 psi**

Provide valves rated at **1100 kilopascal 150-psi** (wsp) and ensure conformance to **ASME B16.34**.

Provide flanged body end connections for all valves larger than **DN50 2 inches** unless butt weld ends are specified. Use [ Screwed ] [ Socket ] weld for sizes **DN50 2 inches** and under to suit specified piping system end connection and maintenance requirements. Ensure flange faces have concentric serrated finish.

Provide [ union ] [ gasketed-bolted ] type body to bonnet connection for valves **DN50 2 inches** and under and gasketed-bolted type for valves larger than **DN50 2 inches**. Ensure bonnet is OS&Y type, with rising stem.

Provide [ cast steel ] [ forged carbon steel ] body and bonnet assembly. Ensure [ cast steel conforms to **ASTM A216/A216M**, Grade WCB ] [ forged carbon steel conforms to **ASTM A105/A105M** ].

\*\*\*\*\*  
NOTE: Select the following paragraph only after checking flow coefficients.  
\*\*\*\*\*

[ Provide valves with a full port.

] Include [ hard surfaced solid ] [ one-piece flexible-wedge ] disk and hard-surfaced seats with trim for valves larger than **DN50 2 inches** Provide trim for valves **DN50 2 inches** and under with [ hard-surfaced ] [ hardened-solid ] [ one-piece flexible wedge disk ] and [ hard-surfaced ] [ hardened seats ]. Ensure hardened components have Brinell hardness of not less than 500, with rising and backseating type stem.

Provide trim materials and hard-surfaced substrates [ conforming to **ASTM A182/A182M**, Grade F6 ] [ selected from manufacturer's standard

metallurgical equivalents for the specified service].

Provide hard-surfacing alloy conforming to AWS A5.13, [ Class RNiCr-B] [ Class RCoCr-B].

Provide wire reinforce packing, fiber braid impregnated with [ 30 percent tetrafluoroethylene] [ a corrosion-inhibiting lubricant specifically suitable for service with stem material provided].

Provide valve wheels of [ cast iron] [ malleable iron] [ wrought steel].

\*\*\*\*\*  
NOTE: Note on drawings all locations where an integral bypass valve is required. Integral bypass valves are used for valves larger than DN150 6 inches and for smaller valves where unusual warm up operations will occur.  
\*\*\*\*\*

Provide integral bypass globe valves around valves larger than DN150 6 inches. Factory install bypass valves and [ butt] [ socket] weld end, conforming to the same requirements as the main valve except that in all cases, ensure valve seat and disk are hard-surfaced and seat is removable, replaceable type. Provide pressure tubing type piping connections, conforming to Schedule 80 ASTM A106/A106M, Grade [ B] [ C], and without change of direction fittings; i.e., bent. Ensure connection is to valve bosses located to perform specified function. Ship valves with integral bypass bolted to crates in a manner that will preclude damage to bypass assembly.

\*\*\*\*\*  
NOTE: Note on drawings all locations where integral drain valve is required. Integral drain valves are particularly useful in tall risers. Note in all cases where required except where valve size is less than DN50 2 inches, in which case provide an independent drain immediately above the valve. Note pitch of horizontal lines.  
\*\*\*\*\*

[Factory ] [Field install ] integral drain valve assembly. Factory drill main valve boss. Weld connection to main valve body. Trim drain valve with manufacturer's standard hardened corrosion-resistant steel. Provide pressure tubing type piping conforming to ASTM A106/A106M, Grade [B] [C]. [Cap ] [Plug ] drain discharge, and make threaded closure assembly with tetrafluoroethylene tape. Provide all necessary handling and shipping care.

#### 2.2.1.3 Gate Valves 900 kPa 125 psi

Provide valves rated 900 kilopascal 125-psi (wsp) and ensure conformance to MSS SP-80 and MSS SP-86, with wedge disc, rising stem, inside screw, 900 kilopascal 125-pound for sizes DN50 2 inches and under and to MSS SP-70 for sizes over DN50 2 inches.

Ensure body end connections are flanged for all valves larger than DN50 2 inches and screwed in sizes DN50 2 inches and under to suit specified piping system end connection and maintenance requirements.

For valves in sizes DN50 2 inches and under, provide union-bonnet type,

made of cast iron conforming to ASTM A126, Class B.

Ensure stem is rising and backseating type.

Ensure packing is fiber braid impregnated with 30 percent tetrafluoroethylene.

Provide[ cast iron][ malleable iron][ wrought steel] valve wheels.

\*\*\*\*\*

NOTE: The following materials selection may be desirable as a means of eliminating dissimilar metal couples in a corrosive condensate. Forged steel valve cost premium on per-unit basis is approximately 100 percent.

Coordinate the following selection with appropriate selections for 1100 150 service valves.

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For condensate service, provide screwed-end gate valves, 1100 kilopascal 150-psi, wsp-rated, forged steel, conforming to ASME B16.34, with manufacturer's standard corrosion-resistant steel trim.

\*\*\*\*\*

NOTE: Note on drawings all locations where an integral bypass valve is required. Integral bypass valves are used for valves larger than DN150 6 inches and where warm up operations will occur.

\*\*\*\*\*

Provide integral bypass globe valves around valves larger than DN150 6 inches. Factory install main valve body taps. Provide globe type, [ factory][ field] installed bypass valves, with a socket welded end conforming to ASME B16.34. Ensure valve seat and plug disk are hard-surfaced and seats are be removable replaceable type. Provide pressure tubing piping connections conforming to Schedule 80 ASTM A106/A106M, Grade[ B][ C], without change of direction fittings; i.e., bent, and include a socket welded end 20700 kilopascal 3,000-psi-rated, forged steel union with corrosion-resistant steel insert. Ensure connection is to valve bosses located to perform specified function. Ship valves with integral bypass bolted to crates in a manner that will preclude damage to bypass assembly.

\*\*\*\*\*

NOTE: Note on drawings all locations where integral drain valve is required. Integral drain valves are particularly useful in tall risers. In all cases note where required, except where valve size is less than DN50 2 inches, in which case, provide an independent drain immediately above the valve. Note pitch of horizontal lines.

\*\*\*\*\*

Provide integral drain valves. Factory finish main valve boss penetration, and field install. Provide gate type drain valve. Provide pressure tubing type piping conforming to ASTM A106/A106M, Grade[ B][ C]. [Cap] [Plug] drain discharge, and thread closure assembly with tetrafluoroethylene tape.

## 2.2.2 Globe And Angle Valves

\*\*\*\*\*  
NOTE: These valves are recommended for steam and condensate service.  
\*\*\*\*\*

### 2.2.2.1 Globe And Angle Valves 2500 kPa 350 psi

Rate valves 2100 kilopascal 300-psi (wsp) and ensure conformance to ASME B16.34.

Provide flanged body end connections for all valves larger than DN50 2 inches, unless butt weld ends are specified. Use[ screwed][ socket] weld for sizes DN50 2 inches and under to suit specified piping system end connection and maintenance requirements. Provide flange faces with concentric serrated finish.

Provide[ union][ gasketed-bolted] type body to bonnet connection for valves DN50 2 inches and under; gasketed-bolted type for valves larger than DN50 2 inches and for valves DN10 3/8 inch and under, use screwed type assembly. Ensure bonnet is OS&Y type, except for valves DN10 3/8 inch and under use inside screw type.

Provide[ cast steel][ forged carbon steel] body and bonnet assembly, with cast steel conforming to ASTM A216/A216M, Grade WCB, or forged carbon steel conforming to ASTM A105/A105M.

Include in trim hard-surfaced plug disk and hard-surfaced seats, with rising and backseating type stem.

Provide trim materials and hard surface substrates[ conforming to ASTM A182/A182M, Grade F6][ of manufacturer's standard metallurgical equivalents for the specified service].

Ensure hard-surfacing alloy conforms to AWS A5.13, [ Class RNiCr-B][ Class RCoCr-B].

Provide wire reinforced packing, fiber braid impregnated with[ 30 percent tetrafluoroethylene][ a corrosion-inhibiting lubricant specifically suitable for service with stem material provided].

Provide[ cast iron][ malleable iron][ wrought steel] valve wheels.

\*\*\*\*\*  
NOTE: Note on drawings all locations where integral drain valve is required. Integral drain valves are particularly useful in risers. Note in all cases where required, except where valve size is less than DN50 2 inches, in which case provide an independent drain immediately above the valve. Note pitch of horizontal lines.  
\*\*\*\*\*

Provide integral drain valves, with main valve boss penetration factory finished and drain assembly[ factory][ field] installed. Weld connection to main valve body. Trim drain valve with manufacturer's standard hardened corrosion-resistant steel. Provide pressure tubing type piping conforming to ASTM A106/A106M, Grade[ B][ C]. Ensure drain discharge is[ capped][

plugged], and threaded closure assembly is made with tetrafluoroethylene tape.

#### 2.2.2.2 Globe And Angle Valves 1100 kPa 150 psi

Provide valves rated 1100 kilopascal 150-psi working steam pressure (wsp) and ensure conformance to ASME B16.34.

Provide flanged body end connections for all valves larger than DN50 2 inches, unless butt weld ends are indicated. Use [Screwed] [Socket] weld for sizes DN50 2 inches and under to suit specified piping system end connection and maintenance requirements. Ensure flange faces have concentric serrated finish.

Provide [union] [gasketed-bolted] type body to bonnet connections for valves DN50 2 inches and under; gasketed-bolted type for valves larger than DN50 2 inches; and for valves DN10 3/8 inch and under, screwed type assembly. Ensure bonnet is OS&Y type, except that valves DN10 3/8 inch and under are inside screw type.

Provide [cast steel] [forged carbon steel] body and bonnet assembly, with cast steel conforming to ASTM A216/A216M, Grade WCB, or forged carbon steel conforming to ASTM A105/A105M.

Ensure trim for valves larger than DN50 2 inches and for all sizes of valves in bypass service includes hard-surfaced, solid plug disk and hard-surfaced seats. For plug material in valves DN50 2 inches and under provide [as specified for valves larger than DN50 2 inches] [in accordance with AISI 400 series corrosion-resistant steel hardened to not less than 500 Brinell]. Ensure stem is rising and backseating type.

Provide trim materials and hard surface substrates [conforming to ASTM A182/A182M, Grade F6] [of manufacturer's standard metallurgical equivalents for the specified service].

Ensure hard-surfacing alloy conforms to AWS A5.13, [Class RNiCr-B] [Class RCoCr-B].

Provide wire reinforced packing, fiber braid impregnated with [30 percent tetrafluoroethylene] [a corrosion-inhibiting lubricant specifically suitable for service with stem material provided].

Provide [cast iron] [malleable iron] [wrought steel] valve wheels.

\*\*\*\*\*  
NOTE: Note on drawings all locations where integral drain valve is required. Integral drain valves are particularly useful in risers. Note in all cases where required, except where valve size is less than DN50 2 inches, in which case provide an independent drain immediately above the valve. Note pitch of horizontal lines.  
\*\*\*\*\*

Provide [factory] [field] installed integral, drain-valves assembly. Factory drill main valve boss. Weld connection to main valve body. Trim drain valve with manufacturer's standard hardened corrosion-resistant steel. Provide pressure tubing type piping conforming to ASTM A106/A106M, Grade [B] [C]. [Cap] [Plug] drain discharge. Ensure threaded closure

assembly is made with tetrafluoroethylene tape.

#### 2.2.2.3 Globe And Angle Valves 900 kPa 125 psi

Provide valves rated 900 kilopascal 125-psi (wsp) conforming to MSS SP-80, MSS SP-86, [ globe] [ angle], [900] [1100] kilopascal [125] [150]-pound.

Provide flanged body end connections for all valves larger than DN50 2 inches and screwed for sizes DN50 2 inches and under.

For valves DN50 2 inches and under in size, provide union bonnet type.

Ensure cast iron conforms to ASTM A126, Class B.

Provide rising and backseating type stem.

Composition seating surface disc construction may be substituted for metal plug disc connection.

\*\*\*\*\*  
NOTE: Select the following paragraph for large  
pressure regulating stations.  
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[ Provide 1100 kilopascal 150 psi pressure regulating station bypass valves.

\*\*\*\*\*  
NOTE: Select the following paragraph for  
miscellaneous high-pressure drop throttling.  
\*\*\*\*\*

] [For plug material for throttling valves DN50 2 inches and under, provide AISI 400 series corrosion-resistant steel hardened to not less than 500 Brinell.

] Provide braid packing impregnated with 30 percent tetrafluoroethylene.

Provide [ cast iron] [ malleable iron] [ wrought steel] valve wheels.

\*\*\*\*\*  
NOTE: Note on drawings all locations where integral  
drain valve is required. Integral drain valves are  
particularly useful in risers. Note in all cases  
where required, except where valve size is less than  
DN50 2 inches, in which case provide an independent  
drain immediately above the valve. Note pitch of  
horizontal lines.  
\*\*\*\*\*

Provide integral drain valves. Ensure main valve boss penetration is factory finished and drain assembly is [ factory] [ field] installed. Ensure drain valve is gate type. Provide pressure tubing type piping conforming to ASTM A106/A106M, Grade [ B] [ C]. Ensure drain discharge is [ capped] [ plugged], and threaded closure assembly is made with tetrafluoroethylene tape. Provide all necessary handling and shipping care.

#### 2.2.3 Check Valves

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**NOTE: These valves are recommended for steam and condensate service.**

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#### 2.2.3.1 Check Valves 2500 kPa 350 psi

Provide valves rated 2100 kilopascal 300-psi wsp and ensure conformance to applicable portions of ASME B16.34.

Provide horizontal swing-check type valves.

Provide flanged body end connections for all valves larger than DN50 2 inches unless butt weld ends are specified. [Screwed] [Socket] weld connections for sizes DN50 2 inches and under to suit specified piping system end connection and maintenance requirements. Ensure flange faces have concentric serrated finish.

Provide[ union][ gasketed-bolted] type body to cover connection.

Provide[ cast steel][ forged carbon steel] body and bonnet assembly, with[ cast steel conforming to ASTM A216/A216M, Grade WCB][ forged carbon steel conforming to ASTM A105/A105M].

Ensure trim materials, including hinge pin, are manufacturer's standard corrosion-resistant alloys for the specified service.

#### 2.2.3.2 Check Valves 900 kPa 125 psi

Provide valves rated 900 kilopascal 125-psi wsp, standard horizontal swing type, conforming to MSS SP-80, MSS SP-86, swing check, 900 kilopascal 125-pound.

Provide flanged body end connections for all valves larger than DN50 2 inches; screwed in sizes DN50 2 inches and under.

Provide gasketed-bolted type body to cover connection;[ cast iron, conforming to ASTM A126, Class B][ Class 1[ Class 1, at 178 degrees C; 1379 kilopascal 125-psig, wsp at 353 degrees F; 200-psig water, oil and gas (wog), nonshock] valves conforming to MSS SP-70] in sizes larger than DN50 2 inches. Ensure flanges to ASME B16.1.

Provide corrosion-resistant[ steel][ bronze][ brass] swing check pin. Ensure swing check angle of closure is manufacturer's standard, unless a specific angle is indicated.

Provide[ re-grindable metal][ renewable composition] type valve disk.

#### 2.2.3.3 Manual Radiator Valves

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**NOTE: The following paragraph applies to steam and hot water systems.**

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Ensure valves to control heating using medium heating element are packless type, metallic diaphragm seal, using MSS SP-86 conforming to CID A-A-50457, Type II, Style D metallic diaphragm seal.

#### 2.2.4 Cone-Plug Balancing Valve (CPBV)

Provide cone-plug balancing valves in sizes through DN32 1-1/4 inches with thread end, conforming to ASME B1.20.1 and ASME B1.20.2M; rated for service at not less than 1207 kilopascal at 121 degrees C 175 psi at 250 degrees F. Ensure that valve body and components are[ ASTM B61 bronze][ manufacturer's equal-strength brass materials]. Provide swivel-type contoured cone valve plug, which will not rattle or make noise in service at any balancing position. Ensure valve has high temperature, service-rated packing, with bushing in bottom of gland and gland adjustment. Fit valves with a memory device which permits a valve set at a balance point to be opened or closed but not opened beyond the balance point. Provide with nonrising stem type valve. Where used for combination shutoff and balancing service, furnish valve with insulating composition handle.

#### 2.2.5 Eccentric Plug Valves (EPV)

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NOTE: Review service temperature range of dual  
temperature systems prior to making selection and  
restrict to temperatures and materials to ensure  
long elastomer life.  
\*\*\*\*\*

[ Ensure eccentric plug valves in sizes DN50 2 inches and smaller are constructed of manufacturer's standard [brass] [bronze] materials conforming to[ ASTM B61][ ASTM B62]. Rate valves for service at 1207 kilopascal 175-psi maximum nonshock pressure at 121 degrees C 250 degrees F. Provide valve body with screwed ends. Coat eccentric plug surfaces in contact with flow with a 60 to 70 Shore A durometer hardness elastomer, resistant to treated water. Fit valves used for combination shutoff and balancing service with a memory device or mechanism which permits a valve set at a balance point to be operated to the closed position.

] [Provide reopening, limited to eccentric plug valves in sizes DN65 2-1/2 inches and larger, constructed of Type 2 nickel-alloy iron conforming to ASTM A436. Rate valves for service at 1207 kilopascal 175-psi maximum nonshock pressure at 121 degrees C 250 degrees F. Provide valve body with screwed ends. Coat eccentric plug surfaces with a 60 to 70 Shore A durometer hardness elastomer, resistant to treated water. Fit valves used for combination shutoff and balancing service with a memory device. Ensure memory device or mechanism permits a valve set at a balance point to be operated to the closed position, but with reopening limited to the balance point. Fit valves up to DN150 6-inch ips with removable lever operator.  
]

\*\*\*\*\*  
NOTE: Normally delete the following paragraphs.  
Limit to DN125 5-inch valves. Cross sectional area  
of valve bore, when open, shall equal pipe inlet  
area.  
\*\*\*\*\*

[ Fit valves DN150 6-inch nps and larger, with totally enclosed, flood-lubricated, worm-gear drive; with operating torque not exceeding 68 newton meter 50 foot-pounds.

]PART 3 EXECUTION

3.1 INSTALLATION

Install valves in accordance with the manufacturer's recommendations, approved [installation drawings](#), and in accordance with the applicable requirements of Section 23 05 15 COMMON PIPING FOR HVAC.

-- End of Section --