SECTION 23 05 23 - GENERAL-DUTY VALVES FOR HVAC PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

a. Bronze gate valves.

b. Bronze globe valves.

c. Bronze swing check valves.

d. Bronze needle valves.

e. Iron gate valves.

f. Iron globe valves.

g. Iron swing check valves.

h. Iron grooved-end check valves.

i. Bronze ball valves.

j. Steel ball valves.

k. Cast iron plug valves.

l. Iron butterfly valves.

m. Iron grooved-end butterfly valves.

n. Calibrated balancing valves.

o. Electric valve actuators.

B. Related Sections:

1. Division 23 HVAC piping Sections for specialty valves applicable to those Sections only.
2. Division 23 Section "Identification for HVAC Piping and Equipment" for valve tags and schedules.

1.3 DEFINITIONS

A. CWP: Cold working pressure.

B. EPDM: Ethylene propylene copolymer rubber.

C. NBR: Acrylonitrile-butadiene, Buna-N, or nitrile rubber.

D. NRS: Nonrising stem.

E. OS&Y: Outside screw and yoke.

F. RS: Rising stem.

G. SWP: Steam working pressure.

H. PTFE: Polytetrafluoroethylene plastic.

I. WOG: Water, oil, or gas.

J. TFE: Tetrafluoroethylene plastic

1.4 SUBMITTALS

A. Product Data:

1. For each type of valve indicated. Include body, seating, and trim materials; valve design; pressure and temperature classifications; end connections; arrangement; dimensions; and required clearances. Include list indicating valve and its application. Include rated capacities; shipping, installed, and operating weights; furnished specialties; and accessories.

2. For each type of special duty valve indicated include flow and pressure drop curves based on manufacturer's testing for diverting fittings, calibrated balancing valves and automatic flow control valves.

B. Maintenance Data.

1. Furnish maintenance manuals as specified in Division 1.

1.5 QUALITY ASSURANCE

A. Source Limitations for Valves: Obtain each type of valve from single source from single manufacturer.

B. ASME Compliance:

1. ASME B16.10 and ASME B16.34 for ferrous valve dimensions and design criteria.
2. ASME B31.1 for power piping valves.
3. ASME B31.9 for building services piping valves.

C. Standards: If any item in this specification, as furnished by the contractor is manufactured in a location which does not certify ASME / ANSI standards, the contractor is to pay the owner for all expenses incurred by the owner for an outside testing company to confirm such compliances.

D. To assure uniformity and compatibility, all grooved end valves and adjoining couplings and fittings shall be supplied by Victaulic.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Prepare valves for shipping as follows:

1. Protect internal parts against rust and corrosion.
2. Protect threads, flange faces, grooves, and weld ends. with wooden flange covers or with screwed plugs / caps as required.
3. Set gate, and globe valves closed to prevent rattling.
4. Set ball and plug valves open to minimize exposure of functional surfaces.
5. Set butterfly valves closed or slightly open.
6. Block check valves in either closed or open position.
7. Protect instrumentation from damage.

8. Clean flanges and exposed metal surfaces and treat with anti-corrosive compound before assembly and testing.

B. Use the following precautions during storage:

1. Maintain valve end protection.
2. Store valves indoors and maintain at higher than ambient dew point temperature. If outdoor storage is necessary, store valves off the ground in watertight enclosures.

C. Use sling to handle large valves; rig sling to avoid damage to exposed parts. Do not use handwheels or stems as lifting or rigging points

1.7 WARRANTY

A. General warranty: Special warranty specified in this article shall not deprive the owner of the other rights Owner may have under other provisions of the Contract

Documents and shall be in addition to and run concurrent with other warranties made by Contractor under requirements of the Contract Documents.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS FOR VALVES

A. Refer to HVAC valve schedule articles for applications of valves (Part 3 “Valve Applications Schedule”.

B. Valve Pressure and Temperature Ratings: Not less than indicated and as required for system pressures and temperatures.

C. Valve Sizes: Same as upstream piping unless otherwise indicated.

D. Valve Actuator Types:

1. Gear Actuator: For quarter-turn valves NPS 8 (DN 200) and larger.
2. Handwheel: For valves other than quarter-turn types.
3. Handlever: For quarter-turn valves NPS 6 (DN 150) and smaller except plug valves.
4. Wrench: For plug valves with square heads. Furnish Owner with 1 wrench for every 10 plug valves, for each size square plug-valve head.
5. Chainwheel: Device for attachment to valve handwheel, stem, or other actuator; of size and with chain for mounting height, as indicated in the "Valve Installation" Article.
6. Electric motor: As indicated on the drawings.

E. Valves in Insulated Piping: With 2-inch (50-mm) stem extensions and the following features:

1. Gate Valves: With rising stem.
2. Ball Valves: With extended operating handle of non-thermal-conductive material, and protective sleeve that allows operation of valve without breaking the vapor seal or disturbing insulation.
3. Butterfly Valves: With extended neck.

F. Valve-End Connections:

1. Flanged: With flanges according to ASME B16.1 for iron valves
2. Flanged: With flanges according to ASME B16.24 for bronze valves.
3. Grooved: With grooves according to AWWA C606.
4. Solder Joint: With sockets according to ASME B16.18.
5. Threaded: With threads according to ASME B1.20.1.

G. Valve Bypass and Drain Connections: MSS SP-45.

2.2 VALVE DESCRIPTIONS

A. BRONZE GATE VALVES, 2 INCHES AND SMALLER, MSS SP-80 TYPE 1

1. Manufacturers -Bronze gate valves

a. Crane Co.; Crane Valve Group; Jenkins Valves

b. Crane Co; Crane Valve Group; Crane Valves

c. Crane Co; Crane Valve Group; Stockham Division.

d. Grinnell Corporation

e. Walworth Company

f. NIBCO Inc.

2. Class 150 psi steam, 300 psi cold working pressure (CWP)

a. ASTM B 62 cast-bronze body and bonnet

b. Union bonnet

c. Solid-bronze wedge

d. Copper-silicon alloy rising stem

e. Teflon-impregnated packing with bronze packing nut

f. Threaded (steel piping) end connection –SCHEDULE VALVE NO. 0101

g. Soldered (copper piping) end connection – SCHEDULE VALVE NO. 0102

h. Aluminum or malleable-iron handwheel

B. BRONZE GLOBE VALVES, 2 INCHES AND SMALLER, MSS SP-80 TYPE 3

1. Manufactures-Bronze globe valves

a. Crane Co; Crane Valve Group; Jenkins Valves

b. Crane Co; Crane Valve Group; Crane Valves

c. Crane Co; Crane Valve Group; Stockham Division.

d. Grinnell Corporation

e. Walworth Company

f. NIBCO Inc.

2. Class 150 psi steam, 300 psi cold working pressure (CWP)

a. ASTM B 62 cast-bronze body and bonnet

b. Union bonnet

c. Stainless steel disc

d. Stainless steel seat

e. Copper-silicon alloy rising stem

f. Teflon-impregnated packing with bronze packing nut

g. Threaded end connection

h. Aluminum or malleable-iron handwheel

i. SCHEDULE VALVE NO. 0201

C. BRONZE SWING CHECK VALVES, 2 INCHES AND SMALLER, MSS SP-80

1. Manufacturers - Bronze check valves, Horizontal and Vertical

a. Horizontal

1) Crane Co.; Crane Valve Group; Jenkins Valves

2) Crane Co.; Crane Valve Group; Crane Valves

3) Crane Co.; Crane Valve Group; Stockham Division

4) Grinnell Corporation

5) Walworth Company

6) NIBCO Inc.

b. Vertical

1) Crane Co.; Crane Valve Group; Jenkins Valves

2) Crane Co.; Crane Valve Group; Crane Valves

3) Cincinnati Valve Co

2. Class 150 psi steam, 300 psi cold working pressure (CWP)

a. ASTM B 62 cast-bronze body and cap

b. "Y" pattern

c. Stainless steel free floating hinge pin

d. Threaded cap

e. Regrinding seat

f. Bronze disc

g. Threaded (steel piping) end connection – SCHEDULE VALVE NO. 0301

h. Soldered (copper piping) end connection – SCHEDULE VALVE NO. 0302

D. Bronze needle valves, 1/8 inch to 3/4 inch, MSS SP-80

1. Manufacturers - Bronze Needle Valves

a. Crane Co.; Crane Valve Group; Jenkins Valves

b. Crane Co.; Crane Valve Group; Stockham Division.

2. Class 200 psi steam, 400 psi cold working pressure (CWP)

a. ASTM B 62 cast-bronze body and bonnet

b. Screwed bonnet

c. Bronze ASTM B 150 rising stem & needle

d. Integral bronze seat

e. Graphite packing with bronze packing nut

f. Threaded end connection

g. Globe or angle pattern

h. Aluminum or malleable-iron handwheel

i. SCHEDULE VALVE NO. 0501

E. IRON GATE VALVES

1. Manufacturers - Iron gate valves

a. Crane Co.; Crane Valve Group; Jenkins Valves

b. Crane Co.; Crane Valve Group; Crane Valves

c. Crane Co.; Crane Valve Group; Stockham Division

d. Grinnell Corporation

e. Cincinnati Valve Co.

f. NIBCO Inc.

2. 2 inch and smaller, MSS SP 25, MSS SP-70 type 1

a. Class 125 psi steam, 200 psi cold working pressure (CWP)

1) ASTM A 126 class B cast-iron body and bonnet

2) Bolted bonnet

3) Outside screw & yoke

4) Rising stem

5) Solid bronze disc

6) Bronze stem

7) Renewable bronze seat rings

8) Threaded end connection

9) Non-asbestos packing and gaskets

10) Aluminum or malleable-iron handwheel

11) SCHEDULE VALVE NO. 0601

b. Class 250 psi steam, 500 psi cold working pressure (CWP)

1) ASTM A 126 class B cast-iron body and bonnet

2) Bolted bonnet

3) Outside screw & yoke

4) Rising stem

5) Solid bronze disc

6) Steel stem

7) Renewable bronze seat rings

8) ANSI 250 flat face flanged ends

9) Non-asbestos packing and gaskets

10) Aluminum or malleable-iron handwheel

11) SCHEDULE VALVE NO. 0602

3. 2 1/2 inch to 12 inch, MSS SP 25, MSS SP-70 type 1

a. Class 125 psi steam, 200 psi cold working pressure (CWP)

1) ASTM A 126 class B cast-iron body and bonnet

2) Bolted bonnet

3) Outside screw & yoke

4) Rising stem

5) Solid bronze disc

6) Steel stem

7) Renewable bronze seat rings

8) ANSI 125 flat face flanged ends

9) Non-asbestos packing and gaskets

10) Aluminum or malleable-iron handwheel

11) SCHEDULE VALVE NO. 0611

b. Class 250 psi steam, 500 psi cold working pressure (CWP)

1) ASTM A 126 class B cast-iron body and bonnet

2) Bolted bonnet

3) Outside screw & yoke

4) Rising stem

5) Solid bronze disc

6) Steel stem

7) Renewable bronze seat rings

8) ANSI 250 flat face flanged ends

9) Non-asbestos packing and gaskets

10) Aluminum or malleable-iron handwheel

11) SCHEDULE VALVE NO. 0612

F. IRON GLOBE VALVES

1. Manufacturers - Iron globe valves

a. Crane Co.; Crane Valve Group; Jenkins Valves

b. Crane Co.; Crane Valve Group; Crane Valves

c. Crane Co.; Crane Valve Group; Stockham Division

d. Grinnell Corporation

e. Cincinnati Valve Co.

f. NIBCO Inc.

2. 3 inches to 10 inches, MSS SP-85

a. Class 125 psi steam, 200 psi cold working pressure (CWP)

1) ASTM A 126 class B cast-iron body and bonnet

2) Bolted bonnet

3) Outside screw & yoke

4) Rising stem

5) 6 inch and smaller: solid bronze disc

6) 8 inch and larger: cast iron disc with bronze facing

7) Bottom guided disc

8) Brass alloy stem

9) Renewable bronze seat

10) ANSI 125 flat face flanged ends

11) Non-asbestos packing and gaskets

12) Aluminum, steel, or cast iron handwheel

13) SCHEDULE VALVE NO. 0701

b. Class 250 psi steam, 500 psi cold working pressure (CWP)

1) ASTM A 126 class B cast-iron body and bonnet

2) Bolted bonnet

3) Outside screw & yoke

4) Rising stem

5) 3 inch and smaller: solid bronze disc

6) 6 inch and larger: cast iron disc with bronze facing

7) Bottom guided disc

8) Brass alloy stem

9) Renewable bronze seat

10) ANSI 250 flat face flanged ends

11) Non-asbestos packing and gaskets

12) Aluminum, steel, or cast iron handwheel

13) SCHEDULE VALVE NO. 0702

G. IRON SWING CHECK VALVES

a. Crane Co.; Crane Valve Group; Jenkins Valves

b. Crane Co.; Crane Valve Group; Crane Valves

c. Crane Co.; Crane Valve Group; Stockham Division

d. Grinnell Corporation

e. Cincinnati Valve Co.

f. NIBCO Inc.

2. 2½ inch to 12 inch, ASME B16.10

a. Class 125 psi steam, 200 psi cold working pressure (CWP)

1) Cast iron body and cap

2) Replaceable bronze seat ring

3) 6 inch and smaller: solid bronze disc

4) 8 inch and larger: cast iron disc with bronze facing

5) Replaceable brass hinge pin

6) Flanged ends

7) SCHEDULE VALVE NO. 0811

b. Class 250 psi steam, 500 psi cold working pressure (CWP)

1) Cast iron body and cap, ASTM A126 class B

2) Screwed in bronze body seat ring

3) 3 inch and smaller: solid bronze disc

4) 4 inch and larger: cast iron disc with bronze facing

5) Stainless steel hinge pin

6) Flanged ends

7) SCHEDULE VALVE NO. 0812

H. IRON, GROOVED-END SWING CHECK VALVES

1. Manufacturers: Subject to compliance with requirements, [provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:

a. Victaulic Company.

2. Description:

1) CWP Rating: NPS 2 through NPS 12: 300 psig (2070 kPa).

2) Body Material: ASTM A 536, ductile iron.

3) Seal: EPDM.

4) Disc: Spring operated, ductile iron or stainless steel.

5) Victaulic Styles 716H, 716, 779

I. BRONZE BALL VALVES, 3 INCHES AND SMALLER

1. Manufacturers - Bronze ball valves

a. Conbraco Industries Inc.; Apollo Division

b. Crane Co.; Crane Valve Group; Jenkins Valves

c. Crane Co.; Crane Valve Group; Stockham Division

d. Jamesbury Inc.

e. Milwaukee Valve Company

2. 2 piece, class 150 psi steam, 600 psi cold working pressure (CWP), standard port

a. ASTM B584 cast bronze body

b. Stainless steel ball and stem

c. Chrome plated brass ball with brass stem

d. Blow out proof stem design

e. PTFE seats

f. PTFE stem packing

g. Zinc plated steel lever with vinyl covered grip

h. Threaded ends – SCHEDULE VALVE NO. 1811

i. Solder ends – SCHEDULE VALVE NO. 1812

3. 3 piece, class 150 psi steam, 600 psi cold working pressure (CWP), full port

a. ASTM B584 cast bronze body

b. Stainless steel ball and stem

c. Chrome plated brass ball with brass stem

d. Blow out proof stem design

e. PTFE seats

f. PTFE stem packing

g. Zinc plated steel lever with vinyl covered grip

h. Threaded ends

i. SCHEDULE VALVE NO. 1821

J. CARBON STEEL BALL VALVES

1. Manufacturers - Steel ball valves

    a. Conbraco Industries Inc.; Apollo Division

    b. Crane Co.; Crane Valve Group; Stockham Division

    c. Jamesbury Inc.

    d. Cooper Cameron Corp.; Cooper Cameron Valves Div.

    e. Milwaukee Valve Company

2. 2 piece, class 150 psi steam, 3000 psi cold working pressure (CWP), full port, 2_inches and smaller

    a. ASTM A108 carbon steel body

    b. Stainless steel ball and stem

    c. ASTM A108 chrome plated ball and stem

    d. Blow out proof stem design

    e. PTFE seats

    f. PTFE stem packing

    g. Zinc plated steel lever with vinyl covered grip

    h. Threaded ends

    i. SCHEDULE VALVE NO. 1901

3. 3 piece, class 150 psi steam, 1000 psi cold working pressure (CWP), full port, 2_inches and smaller

    a. ASTM A108 carbon steel body

    b. Stainless steel ball and stem

    c. ASTM A108 chrome plated ball and stem

    d. Blow out proof stem design

    e. PTFE seats

    f. PTFE stem packing

    g. Zinc plated steel lever with vinyl covered grip

    h. Threaded ends – SCHEDULE VALVE NO. 1911

i. Socket weld ends – SCHEDULE VALVE NO. 1912

4. ANSI flanged, class 150 psi steam, 285 psi cold working pressure (CWP), reduced port, 2½ inches to 10 inches

a. ASTM A216 WCB cast carbon steel body

b. ASTM A216 WCB chrome plated ball

c. ASTM A108 carbon steel stem

d. Blow out proof stem design

e. PTFE seats

f. Graphite stem packing

g. Galvanized pipe lever

h. Raised face flange ends

i. SCHEDULE VALVE NO. 1921

5. ANSI flanged, class 300 psi steam, 740 psi cold working pressure (CWP), reduced port, 3 inches to 10 inches

a. ASTM A216 WCB cast carbon steel body

b. ASTM A216 WCB chrome plated ball

c. ASTM A108 carbon steel stem

d. Blow out proof stem design

e. PTFE seats

f. Graphite stem packing

g. Galvanized pipe lever

h. Raised face flange ends

i. SCHEDULE VALVE NO. 1941

K. CAST IRON PLUG VALVES

1. Manufacturers - Cast iron plug valves

a. Nordstrom Valve Inc.

b. Walworth Company

c. R&M Energy systems (Tomball Tx)

d. Olson Technologies; Homestead Div.

2. 2 inch and smaller, MSS SP 25, MSS SP-78

a. 200 psi cold working pressure (CWP)

1) ASTM A 126 gray iron body

2) Regular pattern

3) Screwed gland

4) Buna-N gland and stem seals

5) Gray iron lubricated tapered plug

6) Carbon steel sealant fitting

7) 1 year supply lubricant per valve

8) 1 lubricating gun with 15,000 psi gauge and 12 inch connection hose per 10 valves

9) 1 wrench operator per 10 valves

10) Threaded end connection

11) SCHEDULE VALVE NO. 2001

b. 400 psi cold working pressure (CWP)

1) ASTM A 126 gray iron body

2) Short pattern

3) Screwed gland

4) Buna-N gland and stem seals

5) Gray iron lubricated tapered plug

6) Carbon steel sealant fitting

7) 1 year supply lubricant per valve

8) 1 lubricating gun with 15,000 psi gauge and 12 inch connection hose per 10 valves

9) 1 wrench operator per 10 valves

10) Threaded end connection

11) SCHEDULE VALVE NO. 2002

3. 2 1/2 inch to 4 inch, MSS SP 25, MSS SP-78

a. 200 psi cold working pressure (CWP)

1) ASTM A 126 gray iron body

2) Regular pattern

3) Screwed gland

4) Buna-N gland and stem seals

5) Gray iron lubricated tapered plug

6) Carbon steel sealant fitting

7) 1 year supply lubricant per valve

8) 1 lubricating gun with 15,000 psi gauge and 12 inch connection hose per 10 valves

9) 1 wrench operator per 10 valves

10) ANSI 125 flanged ends

11) SCHEDULE VALVE NO. 2011

b. 400 psi cold working pressure (CWP)

1) ASTM A 126 gray iron body

2) Short pattern

3) Screwed gland

4) Buna-N gland and stem seals

5) Gray iron lubricated tapered plug

6) Carbon steel sealant fitting

7) 1 year supply lubricant per valve

8) 1 lubricating gun with 15,000 psi gauge and 12 inch connection hose per 10 valves

9) 1 wrench operator per 10 valves

10) ANSI 250 flanged ends

11) SCHEDULE VALVE NO. 2012

4. 5 and 6 inch, MSS SP 25, MSS SP-78

a. 200 psi cold working pressure (CWP)

1) ASTM A 126 gray iron body

2) Short pattern

3) Bolted gland

4) Buna-N gland and stem seals

5) Gray iron lubricated tapered plug

6) Carbon steel sealant fitting

7) 1 year supply lubricant per valve

8) 1 lubricating gun with 15,000 psi gauge and 12 inch connection hose per 10 valves

9) 1 wrench operator per 10 valves

10) ANSI 125 flanged ends

11) SCHEDULE VALVE NO. 2021

b. 400 psi cold working pressure (CWP)

1) ASTM A 126 gray iron body

2) Regular pattern

3) Bolted gland

4) Buna-N gland and stem seals

5) Gray iron lubricated tapered plug

6) Carbon steel sealant fitting

7) 1 year supply lubricant per valve

8) 1 lubricating gun with 15,000 psi gauge and 12 inch connection hose per 10 valves

9) 1 wrench operator per 10 valves

10) ANSI 250 flanged end

11) SCHEDULE VALVE NO. 2022

L. IRON BUTTERFLY VALVES

1. Manufacturers - Iron butterfly valves

a. Keystone division of Tyco Flow Control

b. Bray Valve & Controls

c. ABZ Valves & Controls

2. 200 psi cold working pressure (CWP), 2 inch to 24 inch

a. ASTM A126 cast iron body

b. ANSI 125/150 pattern, fully lugged, and tapped body style

c. Aluminum bronze disc – schedule valve no. 2201

d. Stainless steel stem

e. Resilient EPDM seat

f. Bronze stem bushing

g. Stainless steel disc screws or taper pins

M. 300 CWP, Iron, Grooved-End Butterfly Valves:

1. Manufacturers: Subject to compliance with requirements, [provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:

a. Victaulic Company.

2. Description:

a. Standard: MSS SP-67, Type I.

b. NPS 8 (DN 50) and Smaller CWP Rating: 300 psig (2070 kPa).

c. NPS 10 (DN 250) and Larger CWP Rating: 300 psig (2070 kPa).

d. Body Material: Coated, ductile iron.

e. Stem: Two-piece stainless steel.

f. Disc: Coated, ductile iron. Offset

g. Seal: EPDM Grade EHP or E.

h. Victaulic Series 761 Masterseal or Series W761 AGS Vic-300

N. SPRING LOADED LIFT DISC CHECK VALVES

1. Manufacturers - Spring loaded lift disc check valves.

a. Mueller Steam Specialty Co.

b. Milwaukee Valve Co.

c. Titan Flow Control, Inc.

2. 2 inch and smaller

a. 200 psi cold working pressure (CWP) up to 150ºF

1) Cast iron body and cap

2) Screwed cap

3) EPDM seal

4) Stainless steel stem

5) Stainless steel spring

6) Brass disc

7) Threaded ends

8) SCHEDULE VALVE NO. 2401

b. 400 psi cold working pressure (CWP) up to 150ºF

1) Bronze body and cap

2) Screwed cap

3) EPDM seal

4) Stainless steel stem

5) Stainless steel spring

6) Brass disc

7) Threaded ends

8) SCHEDULE VALVE NO. 2402

3. 2½ inch to 12 inch

a. 200 psi cold working pressure (CWP) up to 150ºF

1) ASTM A126 grade B cast iron, globe style, body

2) ASTM B62 bronze disc and seat

3) Stainless steel spring

4) Silicon bronze guide pins and bushings

5) ANSI class 125 flanged end connections

6) SCHEDULE VALVE NO. 2411

b. 500 psi cold working pressure (CWP) up to 150ºF

1) ASTM A126 grade B cast iron, globe style, body

2) ASTM B62 bronze disc and seat

3) Stainless steel spring

4) Silicon bronze guide pins and bushings

5) ANSI class 250 flanged end connections

6) SCHEDULE VALVE NO. 2413

O. CIRCUIT BALANCING VALVES

1. Manufacturers: Tour and Andersson, Armstrong, or Nibco (½" - 12") “Y”-pattern globe style balancing valves:

a. 2” and Smaller Sizes: 300 psi (2065 kPa), threaded, soldered or Permalynx push-to-connect ends, non-ferrous Ametal® brass copper alloy body, EPDM o-ring seals. 4 turn digital readout handwheel for balancing, hidden memory feature with locking tamper-proof setting. Victaulic / TA Hydronics Series 787 STAD or 786 STAS or equal.

b. 2-1/2" and Larger Sizes: 300 psi (2065 kPa), grooved or flanged ends, ASTM A536 ductile iron body, all other metal parts of Ametal® brass copper alloy, EPDM O-ring seals. 8, 12 or 16 turn digital readout handwheel for balancing, hidden memory feature with locking tamper-proof setting. Victaulic / TA Hydronics Series 789 STAG or 788 STAF or equal.

c. The use of coil hook up assemblies 78U & 78Y is acceptable to minimize the number of joints and space requirements.

d. No balancing valves using a ¼ turn device for setting will permitted.

2.3 Electric MOTOR ACTUATORS

1. Manufacturers - Electric valve actuators

a. Limitorque Corporation

b. Rotork Controls, Inc.

c. Belimo Air Controls, Inc.

d. EIM Company, Inc.

B. Motor valve operators.

C. Provide as follows:

1. Mount operators on side or top of valve at factory or at site under manufacturer's supervision. Provide gear operated single or double reduction. For 90 deg (1/4 turn) application, adjustable mechanical stops shall prevent travel of more than 90 deg

2. Grease or oil lubricated.

3. 120 Volt, 1 phase, 60 hertz

4. Control circuit: 24 volt, transformer as required.

5. Assembly:

a. Motor shall be high speed, high torque, totally enclosed non-ventilated, Class B or F insulation and operational at up to 10 percent above or below nominal voltage. Motor shall be prelubricated, anti-friction bearing type with thermal overload protection.

b. Limit switches shall be integral to the unit. Gearing shall be bronze or stainless steel. Steel switches shall be fully adjustable and shall trip anywhere between full open and full close, as required. Switches shall

be heavy duty, open contact type with rotary wiping action. Provide minimum spare contacts 2 normally open, 2 normally closed.

c. Torque switch shall have torque protection either direction, fully adjustable and shall shut off actuator motor when a predetermined amount of torque is reached.

d. Stem nut shall be high tensile bronze or material compatible to the valve stem and shall be constructed for easy removal without disassembling gear case.

e. Handwheel for manual operation: Handwheel shall declutch automatically when motor is energized. Rimpull shall not exceed a maximum of 80 lb. Handwheel shall be similar to Limitorque SMB and SMC.

6. For open/closed operation: All valves shall have integral control package including control transformer with fused secondary, motor reversing contactor (mechanically interlocked), limit switch compartment heater and terminal strip.

a. Indicating lights shall be:

1) Red light glows when valve closed.

2) Green light glows when valve open.

3) Intermediate position indication.

b. Pushbutton station: Provide selector switch if required and momentary or maintained contacts as required.

7. For modulating service shall be controlled by analog signal 4-20 ma DC with momentary pushbuttons.

a. Controls shall be mounted inside the actuator.

b. Provide single phase power supply:

1) Comparator circuit module.

2) Mechanical dial position indicator with 1,000 ohm potentiometer feedback.

3) 2 position (auto/manual) selector switch.

4) Limit switch compartment heater.

5) Motor: 2100 rpm D.C. in lieu of A.C.; class F insulation; 20 percent run valve duty.

6) Mounted and wired, similar to Limitorque Modutronic 10A and 10B.

8. Closing time:

a. Gate shall be 12 inches per minute, minimum 1 minute.

b. Globe shall be 4 inches per minute, minimum 1 minute.

c. Butterfly shall be 1/4 turn per minute.

9. Provide remote open-close buttons and open-close indicating lights for installation on control board in Division 15 Section “Automatic Controls System”.

10. Final field adjustment of valve operation shall be made by manufacturer's representative.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine piping system for compliance with requirements for installation tolerances and other conditions affecting performance.

1. Proceed with installation only after unsatisfactory conditions have been corrected.

B. Examine valve interior for cleanliness, freedom from foreign matter, and corrosion. Remove special packing materials, such as blocks, used to prevent disc movement during shipping and handling.

C. Operate valves in positions from fully open to fully closed. Examine guides and seats made accessible by such operations.

D. Examine threads on valve and mating pipe for form and cleanliness.

E. Examine mating flange faces for conditions that might cause leakage. Check bolting for proper size, length, and material. Verify that gasket is of proper size, that its material composition is suitable for service, and that it is free from defects and damage.

F. Do not attempt to repair defective valves; replace with new valves.

G. Examine grooved ends for conditions that might cause leakage. Ends should be free from indentations or projections in the area from valve end to groove

3.2 VALVE INSTALLATION

A. Install valves with unions flanges, or Victaulic couplings (on authorized systems) at each piece of equipment arranged to allow service, maintenance, and equipment removal without system shutdown.

B. Locate valves for easy access and provide separate support where necessary.

C. Install valves in horizontal piping with stem at or above center of pipe.

D. Install valves in position to allow full stem movement.

E. Install check valves for proper direction of flow and as follows:

1. Swing Check Valves: In horizontal position with hinge pin level.
2. Center-Guided and Plate-Type Check Valves: In horizontal or vertical position, between flanges.
3. Lift Check Valves: With stem upright and plumb.

3.3 ADJUSTING

A. Adjust or replace valve packing after piping systems have been tested and put into service but before final adjusting and balancing. Replace valves if persistent leaking occurs.

3.4 GENERAL REQUIREMENTS FOR VALVE APPLICATIONS

A. General-Duty Valve Applications: Unless otherwise indicated, use the following valve types:

1. Shutoff Service except Steam: Ball, butterfly or gate valves.
2. Shutoff service, Steam: gate valves.
3. Throttling Service except Steam: Ball, butterfly, plug valves.
4. Throttling Service, Steam: Globe valves.

B. If valves with specified SWP classes or CWP ratings are not available, the same types of valves with higher SWP classes or CWP ratings may be substituted.

C. Install shutoff duty valves at each branch connection to supply mains, at supply connection to each piece of equipment, unless only one piece of equipment is connected in the branch line. Install throttling duty valves at each branch connection to return mains, at return connections to each piece of equipment, and elsewhere as indicated.

D. Install Y-pattern multi-turn globe style balancing valves in the return water line of each heating or cooling element and elsewhere as required to facilitate system balancing.

E. Install spring loaded check valves at each pump discharge and elsewhere as required to control flow direction.

3.5 VALVE SCHEDULE

A. The valve numbers listed in the tables below correspond to the valve numbers listed in the products section for each valve type.

B. Table abbreviations

1. CHW – Chilled water
2. HW – hot water
3. LPS – low pressure steam
4. MPS – medium pressure steam, classified as high pressure steam, however the requirements may vary
5. HPS – high pressure steam
6. The pressures are listed next to the service (i.e. <125 psig is less than 125 psig:, 126-250 is between 126 and 250 psig, >251 is greater than 251 psig).

C. Gate valves

Service pressure	< 2”thread	< 2”solder	< 2”flange	> 2”flange	< 2”weld	> 2”weld
CHW< 125	0101 0601	0102	na	0611	na	na
HW < 125	0101 0601	0102	na	0611	na	na
LPS < 15	0101 0601	na	na	0611	na	na
MPS 16-125	0101 0601	na	na	0611	na	na
HPS 126-250	0111	na	na	1411	1102	1412
LPR	0101 0601	na	na	0611	na	na
HPR	0111	na	na	1411	1102	1412
MU	0101 0601	0102	na	0611	na	na

D. Globe valves

Service pressure	< 2”thread	< 2”solder	< 2”flange	> 2”flange	< 2”weld	> 2”weld
CHW< 125	0201	na	na	0701	na	na
HW < 125	0201	na	na	0701	na	na
LPS < 15	0201	na	na	0701	na	na
MPS 16-125	0201	na	na	1501	na	na
HPS 126-250	0211 1201	na	na	1511	1202	1512
LPR	0201	na	na	0701	na	na
HPR	0211	na	na	1511	1202	1512
MU	0201	na	na	0701	na	na

E. Check valves

Service pressure	< 2"thread	< 2"solder	< 2"flange	> 2"flange	< 2"weld	> 2"weld	>2" grooved
CHW< 125	0301	0302	na	0811	na	na	716/779/W715
HW < 125	0301	0302	na	0811	na	na	
LPS < 15	0301	na	na	0811	na	na	
MPS 16-125	0301	na	na	1601	na	na	
HPS 126-250	0311 0801	na	na	1611	1302	1612	
LPR	0301	na	na	0811	na	na	
HPR	0311	na	na	1611	1302	1612	
MU	0301	0302	na	0811	na	na	

F. Angle valves

Service pressure	< 2"thread	< 2"solder	< 2"flange	> 2"flange		
CHW< 125	0401	na	na	0901		
HW < 125	0401	na	na	0901		
LPS < 15	0401	na	na	0901		
MPS 16-125	na	na	na	0901		
HPS 126-300	na	na	na	na		
LPR	0401	na	na	0901		
HPR	na	na	na	na		
MU	0401	na	na	0901		

G. Needle valves

Service pressure	< ¾ "thread					
CHW	0501					
HW	0501					
MU	0501					

H. Stop check valves

Service pressure				> 2"flange		> 2"weld
LPS < 15				1001		1702
MPS 16-125				1701		1702
HPS 126-300				1701		1702

I. Ball valves

Service pressure	< 3"thread	< 3"solder		> 2"flange	< 2" weld	
CHW< 125	1811 1821 1901	1812		1921	1912	
HW < 125	1811 1821 1901	1812		1921	1912	
LPS < 15	1811 1821 1901	na		1921	1912	
LPR	1811 1821 1901	1812		1921	1912	
MU	1811 1821 1901	1812		1921	na	

J. Plug valves

Service pressure	< 2"thread	2½" – 4"	5" – 6"	8" – 12"	8" – 24"	
CHW < 200	2001	2011	2021	2031	na	
HW < 125	2001	2011	2021	2031	na	

K. Butterfly valves

Service pressure	2" – 24"	24" – 48"	>2" grooved			
CHW < 200	2201	na	761/W761			
HW < 200	2201	na				

L. High performance butterfly valves

Service pressure	3" – 24"					
CHW < 285	2301					
HW < 150	2301					

M. Spring loaded lift disc check valves

Service pressure	< 2"	2 ½ " – 12"	12" – 24"			
CHW < 200	2401	2411	2422			
HW < 125	2401	2411	2422			

N. Safety valves

Service pressure	Shut Off	Relief				
LPS < 15	2701	2711				
MPS 16-125	2701	2711				
HPS 126-300	2701	2711				

O. Automatic flow control valves

Service pressure	< 2" thread	2 ½" – 3"	3" – 14"	16" – 24"		
CHW < 200	na	na	2821	2831		
HW < 200	na	na	2821	2831		

P. Solenoid valves

Service pressure	< 2" thread					
CHW < 125	2901 2902					
HW < 125	2901 2902					
MU	2901 2902					

END OF SECTION