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. This Section includes the following general-duty valves:

1. Bronze angle valves.
2. Cast-iron angle valves.
3. Copper-alloy ball valves.
4. Ferrous-alloy ball valves.
5. Ferrous-alloy butterfly valves.
6. High-pressure butterfly valves.
7. Bronze check valves.
8. Gray-iron swing check valves.
9. Ferrous-alloy wafer check valves.
10. Spring-loaded, lift-disc check valves.
11. Bronze gate valves.
12. Cast-iron gate valves.
13. Bronze globe valves.
14. Cast-iron globe valves.
15. Cast-iron plug valves.
16. Resilient-seated, cast-iron, eccentric plug valves.
17. Chainwheel actuators.

B. Related Sections include the following:

1. Division 21 fire-suppression piping and fire pump Sections for fire-protection valves.
2. Division 23 piping Sections for specialty valves applicable to those Sections only.
3. Division 23 Section "Identification for HVAC Piping and Equipment" for valve tags and charts.
4. Division 23 Section "Instrumentation and Control for HVAC" for control valves and actuators.

1.3 DEFINITIONS

A. The following are standard abbreviations for valves:

1. CWP: Cold working pressure.
2. EPDM: Ethylene-propylene-diene terpolymer rubber.
3. PTFE: Polytetrafluoroethylene plastic.
4. SWP: Steam working pressure.
5. TFE: Tetrafluoroethylene plastic.

1.4 SUBMITTALS

A. Product Data: 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.

1.5 QUALITY ASSURANCE

A. ASME Compliance: ASME B31.1 for power piping valves and ASME B31.9 for building services piping valves.

B. ASME Compliance for Ferrous Valves: ASME B16.10 and ASME B16.34 for dimension and design criteria.

C. NSF Compliance: NSF 61 for valve materials for potable-water service.

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.
3. Set angle, 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.

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.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where subparagraph titles below introduce lists, the following requirements apply for product selection:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the manufacturers specified.
2. Manufacturers: Subject to compliance with requirements, provide products by the manufacturers specified.

2.2 VALVES, GENERAL

A. Refer to Part 3 "Valve Applications" Article for applications of valves.

B. Bronze Valves: NPS 2 (DN 50) and smaller with threaded ends, unless otherwise indicated.

C. Ferrous Valves: NPS 2-1/2 (DN 65) and larger with flanged ends, unless otherwise indicated.

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

E. Valve Sizes: Same as upstream pipe, unless otherwise indicated.

F. Valve Actuators:

1. Chainwheel: For attachment to valves, of size and mounting height, as indicated in the "Valve Installation" Article in Part 3.
2. Gear Drive: For quarter-turn valves NPS 8 (DN 200) and larger.
3. Handwheel: For valves other than quarter-turn types.
4. Lever Handle: For quarter-turn valves NPS 6 (DN 150) and smaller, except plug valves.
5. Wrench: For plug valves with square heads. Furnish Owner with 1 wrench for every 10 plug valves, for each size square plug head.

G. Extended Valve Stems: On insulated valves.

H. Valve Flanges: ASME B16.1 for cast-iron valves, ASME B16.5 for steel valves, and ASME B16.24 for bronze valves.

I. Valve Grooved Ends: AWWA C606.

1. Solder Joint: With sockets according to ASME B16.18.

a. Caution: Use solder with melting point below 840 deg F (454 deg C) for angle, check, gate, and globe valves; below 421 deg F (216 deg C) for ball valves.

2. Threaded: With threads according to ASME B1.20.1.

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

2.3 BRONZE ANGLE VALVES

A. Available Manufacturers:

B. Manufacturers:

1. Type 2, Bronze Angle Valves with Nonmetallic Disc:

a. American Valve, Inc.
b. Cincinnati Valve Co.
c. Crane Co.; Crane Valve Group; Crane Valves.
d. Crane Co.; Crane Valve Group; Jenkins Valves.
e. Crane Co.; Crane Valve Group; Stockham Div.
f. Grinnell Corporation.
g. Hammond Valve.
h. NIBCO INC.

i. Powell, Wm. Co.

C. Bronze Angle Valves, General: MSS SP-80, with ferrous-alloy handwheel.

D. Type 2, Class 125, Bronze Angle Valves: Bronze body with PTFE or TFE disc [and union-ring bonnet.

E. Type 2, Class 150, Bronze Angle Valves: Bronze body with PTFE or TFE disc and union-ring bonnet.

F. Type 2, Class 200, Bronze Angle Valves: Bronze body with PTFE or TFE and union-ring bonnet.

2.4 CAST-IRON ANGLE VALVES

A. Available Manufacturers:

B. Manufacturers:

1. Type II, Cast-Iron Angle Valves with Metal Seats:

a. Crane Co.; Crane Valve Group; Crane Valves.
b. Crane Co.; Crane Valve Group; Jenkins Valves.
c. Crane Co.; Crane Valve Group; Stockham Div.
d. NIBCO INC.

C. Cast-Iron Angle Valves, General: MSS SP-85, Type II.

D. Class 125, Cast-Iron Angle Valves: Bronze mounted with gray-iron body and bronze seats.

E. Class 250, Cast-Iron Angle Valves: Bronze mounted with gray-iron body and bronze seats.

2.5 COPPER-ALLOY BALL VALVES

A. Available Manufacturers:

B. Manufacturers:

1. One-Piece, Copper-Alloy Ball Valves:

a. American Valve, Inc.
b. Conbraco Industries, Inc.; Apollo Div.
c. Crane Co.; Crane Valve Group; Jenkins Valves.
d. Crane Co.; Crane Valve Group; Stockham Div.
e. DynaQuip Controls.
f. Grinnell Corporation.
g. Jamesbury, Inc.
h. Kitz Corporation of America.
i. Legend Valve & Fitting, Inc.
j. NIBCO INC.
k. Watts Industries, Inc.; Water Products Div.

2. Two-Piece, Copper-Alloy Ball Valves:

a. Conbraco Industries, Inc.; Apollo Div.
b. Crane Co.; Crane Valve Group; Crane Valves.
c. Crane Co.; Crane Valve Group; Jenkins Valves.
d. Crane Co.; Crane Valve Group; Stockham Div.
e. DynaQuip Controls.
f. Flow-Tek, Inc.
g. Grinnell Corporation.
h. Hammond Valve.
i. Honeywell Braukmann.
j. Jamesbury, Inc.
k. Jomar International, LTD.
l. Kitz Corporation of America.
m. Legend Valve & Fitting, Inc.
n. Milwaukee Valve Company.
o. Nexus Valve Specialties.
p. NIBCO INC.
q. R & M Energy Systems (Borger, TX).
r. Red-White Valve Corp.
s. Richards Industries; Marwin Ball Valves.
t. Watts Industries, Inc.; Water Products Div.

3. Three-Piece, Copper-Alloy Ball Valves:

a. Conbraco Industries, Inc.; Apollo Div.
b. DynaQuip Controls.
c. Grinnell Corporation.
d. Hammond Valve.
e. Jamesbury, Inc.
f. Kitz Corporation of America.
g. NIBCO INC.
h. PBM, Inc.
i. Red-White Valve Corp.
j. Worcester Controls.

4. Safety-Exhaust, Copper-Alloy Ball Valves:

a. Conbraco Industries, Inc.; Apollo Div.
b. DynaQuip Controls.
c. Grinnell Corporation.
d. Hammond Valve.
e. Jamesbury, Inc.
f. Milwaukee Valve Company.
g. NIBCO INC.

C. Copper-Alloy Ball Valves, General: MSS SP-110.

D. Two-Piece, Copper-Alloy Ball Valves: Forged-brass body with full-port, chrome-plated bronze ball; PTFE or TFE; and 600-psig (4140-kPa) minimum CWP rating and blowout-proof stem.

E. Three-Piece, Copper-Alloy Ball Valves: Forged-brass body with full-port, chrome-plated bronze ball; PTFE or TFE seats; and 600-psig (4140-kPa) minimum CWP rating and blowout-proof stem.

F. Safety-Exhaust, Copper-Alloy Ball Valves: Two-piece bronze body with exhaust vent opening, chrome-plated ball with vent, blowout-proof stem, locking handle, and working pressure rating of 600-psig (4140-kPa) CWP.

2.6 FERROUS-ALLOY BALL VALVES

A. Available Manufacturers:

1. American Valve, Inc.
2. Conbraco Industries, Inc.; Apollo Div.
3. Cooper Cameron Corp.; Cooper Cameron Valves Div.
4. Crane Co.; Crane Valve Group; Stockham Div.
5. Flow-Tek, Inc.
6. Foster Valve Co.
7. Hammond Valve.
8. Jamesbury, Inc.
9. Jomar International, LTD.
10. Kitz Corporation of America.
11. KTM Products, Inc.
12. McCANNA, Incorporated.
13. Milwaukee Valve Company.
14. NIBCO INC.
15. PBM, Inc.
16. Richards Industries; Marwin Ball Valves.
17. Worcester Controls.

B. Ferrous-Alloy Ball Valves, General: MSS SP-72, with flanged ends.

C. Ferrous-Alloy Ball Valves: Class 150, full [or regular] port.

D. Ferrous-Alloy Ball Valves: Class 300, full [or regular] port.

2.7 FERROUS-ALLOY BUTTERFLY VALVES

A. Available Manufacturers:

1. Flangeless, Ferrous-Alloy Butterfly Valves:

a. American Valve, Inc.
b. Bray International, Inc.
c. Cooper Cameron Corp.; Cooper Cameron Valves Div.
d. Crane Co.; Crane Valve Group; Center Line.
e. Crane Co.; Crane Valve Group; Stockham Div.
f. Dover Corp.; Dover Resources Company; Norriseal Div.
g. General Signal; DeZurik Unit.
h. Grinnell Corporation.
i. Hammond Valve.
j. Kitz Corporation of America.
k. Legend Valve & Fitting, Inc.
l. Metraflex Co.
m. Milwaukee Valve Company.
n. Mueller Steam Specialty.
o. NIBCO INC.
p. Process Development & Control.
q. Red-White Valve Corp.
r. Techno Corp.
s. Tyco International, Ltd.; Tyco Valves & Controls.
t. Watts Industries, Inc.; Water Products Div.

2. Single-Flange, Ferrous-Alloy Butterfly Valves:

    a. American Valve, Inc.
    b. Bray International, Inc.
    c. Cooper Cameron Corp.; Cooper Cameron Valves Div.
    d. Crane Co.; Crane Valve Group; Center Line.
    e. Crane Co.; Crane Valve Group; Jenkins Valves.
    f. Crane Co.; Crane Valve Group; Stockham Div.
    g. Dover Corp.; Dover Resources Company; Norriseal Div.
    h. General Signal; DeZurik Unit.
    i. Grinnell Corporation.
    j. Hammond Valve.
    k. Kitz Corporation of America.
    l. Legend Valve & Fitting, Inc.
    m. Metraflex Co.
    n. Milwaukee Valve Company.
    o. Mueller Steam Specialty.
    p. NIBCO INC.
    q. Process Development & Control.
    r. Red-White Valve Corp.
    s. Techno Corp.
    t. Tyco International, Ltd.; Tyco Valves & Controls.
    u. Watts Industries, Inc.; Water Products Div.

3. Flanged, Ferrous-Alloy Butterfly Valves:

    a. Bray International, Inc.
    b. Cooper Cameron Corp.; Cooper Cameron Valves Div.
    c. Grinnell Corporation.
    d. Mueller Steam Specialty.
    e. Tyco International, Ltd.; Tyco Valves & Controls.

4. Grooved-End, Ductile-Iron Butterfly Valves:

    a. Central Sprinkler Co.; Central Grooved Piping Products.
    b. Grinnell Corporation.
    c. Hammond Valve.
    d. McWane, Inc.; Kennedy Valve Div.
    e. Milwaukee Valve Company.
    f. Mueller Steam Specialty.
    g. NIBCO INC.
    h. Victaulic Co. of America.

B. Ferrous-Alloy Butterfly Valves, General: MSS SP-67, Type I, for tight shutoff, with disc and lining suitable for potable water, unless otherwise indicated.

C. Flangeless, 150-psig (1035-kPa) CWP Rating, Ferrous-Alloy Butterfly Valves: Wafer type with two-piece stem.

D. Flangeless, 175-psig (1207-kPa) CWP Rating, Ferrous-Alloy Butterfly Valves: Wafer type with two-piece stem.

E. Flangeless, 200-psig (1380-kPa) CWP Rating, Ferrous-Alloy Butterfly Valves: Wafer type with two-piece stem.

F. Flangeless, 250-psig (1725-kPa) CWP Rating, Ferrous-Alloy Butterfly Valves: Wafer type with two-piece stem.

G. Flangeless, 300-psig (2070-kPa) CWP Rating, Ferrous-Alloy Butterfly Valves: Wafer type with two-piece stem.

H. Single-Flange, 150-psig (1035-kPa) CWP Rating, Ferrous-Alloy Butterfly Valves: Wafer-lug type with two-piece stem.

I. Single-Flange, 175-psig (1207-kPa) CWP Rating, Ferrous-Alloy Butterfly Valves: Wafer-lug type with two-piece stem.

J. Single-Flange, 200-psig (1380-kPa) CWP Rating, Ferrous-Alloy Butterfly Valves: Wafer-lug type with two-piece stem.

K. Single-Flange, 250-psig (1725-kPa) CWP Rating, Ferrous-Alloy Butterfly Valves: Wafer-lug type with two-piece stem.

L. Single-Flange, 300-psig (2070-kPa) CWP Rating, Ferrous-Alloy Butterfly Valves: Wafer-lug type with two-piece stem.

M. Flanged, 150-psig (1035-kPa) CWP Rating, Ferrous-Alloy Butterfly Valves: Flanged-end type with two-piece stem.

N. Flanged, 175-psig (1207-kPa) CWP Rating, Ferrous-Alloy Butterfly Valves: Flanged-end type with two-piece stem.

O. Flanged, 200-psig (1380-kPa) CWP Rating, Ferrous-Alloy Butterfly Valves: Flanged-end type with two-piece stem.

P. Flanged, 250-psig (1725-kPa) CWP Rating, Ferrous-Alloy Butterfly Valves: Flanged-end type with two-piece stem.

Q. Flanged, 300-psig (2070-kPa) CWP Rating, Ferrous-Alloy Butterfly Valves: Flanged-end type with two-piece stem.

R. Grooved-End, 175-psig (1207-kPa) CWP Rating, Ferrous-Alloy Butterfly Valves: Ductile-iron or steel body with grooved or shouldered ends.

S. Grooved-End, 300-psig (2070-kPa) CWP Rating, Ferrous-Alloy Butterfly Valves: Ductile-iron or steel body with grooved or shouldered ends.

2.8 HIGH-PRESSURE BUTTERFLY VALVES

A. Available Manufacturers:

B. Manufacturers:

1. Bray International, Inc.
2. Cooper Cameron Corp.; Cooper Cameron Valves Div.
3. Crane Co.; Crane Valve Group; Flowseal.
4. General Signal; DeZurik Unit.
5. Grinnell Corporation.
6. Jamesbury, Inc.

7. Pratt, Henry Company.
8. Process Development & Control.
9. Tyco International, Ltd.; Tyco Valves & Controls.
10. Xomox Corporation.

C. High-Pressure Butterfly Valves, General: MSS SP-68.

D. Flangeless, Class 150, High-Pressure Butterfly Valves: Wafer type.

E. Single-Flange, Class 150, High-Pressure Butterfly Valves: Wafer type.

F. Flangeless, Class 300, High-Pressure Butterfly Valves: Wafer-lug type.

G. Single-Flange, Class 300, High-Pressure Butterfly Valves: Wafer-lug type.

2.9 BRONZE CHECK VALVES

A. Available Manufacturers:

B. Manufacturers:

1. Type 2, Bronze, Horizontal Lift Check Valves with Nonmetallic Disc:

    a. Cincinnati Valve Co.
    b. Crane Co.; Crane Valve Group; Crane Valves.
    c. Crane Co.; Crane Valve Group; Jenkins Valves.
    d. Crane Co.; Crane Valve Group; Stockham Div.
    e. Walworth Co.

2. Type 2, Bronze, Vertical Lift Check Valves with Nonmetallic Disc:

    a. Grinnell Corporation.
    b. Kitz Corporation of America.
    c. Milwaukee Valve Company.

3. Type 4, Bronze, Swing Check Valves with Nonmetallic Disc:

    a. Cincinnati Valve Co.
    b. Crane Co.; Crane Valve Group; Crane Valves.
    c. Crane Co.; Crane Valve Group; Jenkins Valves.
    d. Crane Co.; Crane Valve Group; Stockham Div.
    e. Grinnell Corporation.
    f. Hammond Valve.
    g. McWane, Inc.; Kennedy Valve Div.
    h. Milwaukee Valve Company.
    i. NIBCO INC.
    j. Red-White Valve Corp.
    k. Walworth Co.
    l. Watts Industries, Inc.; Water Products Div.

C. Bronze Check Valves, General: MSS SP-80.

D. Type 2, Class 125, Bronze, Horizontal Lift Check Valves: Bronze body with nonmetallic disc and bronze seat.

E. Type 2, Class 125, Bronze, Vertical Lift Check Valves: Bronze body with nonmetallic disc and bronze seat.

F. Type 2, Class 150, Bronze, Horizontal Lift Check Valves: Bronze body with nonmetallic disc and bronze seat.

G. Type 2, Class 150, Bronze, Vertical Lift Check Valves: Bronze body with nonmetallic disc and bronze seat.

H. Type 2, Class 200, Bronze, Horizontal Lift Check Valves: Bronze body with nonmetallic disc and bronze seat.

I. Type 2, Class 200, Bronze, Vertical Lift Check Valves: Bronze body with nonmetallic disc and bronze seat.

J. Type 4, Class 125, Bronze, Swing Check Valves: Bronze body with nonmetallic disc and bronze seat.

K. Type 4, Class 150, Bronze, Swing Check Valves: Bronze body with nonmetallic disc and bronze seat.

L. Type 4, Class 200, Bronze, Swing Check Valves: Bronze body with nonmetallic disc and bronze seat.

2.10 GRAY-IRON SWING CHECK VALVES

A. Available Manufacturers:

B. Manufacturers:

1. Type II, Gray-Iron Swing Check Valves with Composition to Metal Seats:

    a. Crane Co.; Crane Valve Group; Crane Valves.
    b. Crane Co.; Crane Valve Group; Stockham Div.
    c. Mueller Co.
    d. Watts Industries, Inc.; Water Products Div.

2. Grooved-End, Ductile-Iron Swing Check Valves:

    a. Grinnell Corporation.
    b. Mueller Co.
    c. Victaulic Co. of America.

C. Gray-Iron Swing Check Valves, General: MSS SP-71.

D. Type II, Class 125, gray-iron, swing check valves with composition to metal seats.

E. Type II, Class 250, gray-iron, swing check valves with composition to metal seats.

F. 175-psig (1207-kPa) CWP Rating, Grooved-End, Swing Check Valves: Ductile-iron body with grooved or shouldered ends.

G. 300-psig (2070-kPa) CWP Rating, Grooved-End, Swing Check Valves: Ductile-iron body with grooved or shouldered ends.

2.11 FERROUS-ALLOY WAFER CHECK VALVES

A. Available Manufacturers:

1. Single-Plate, Ferrous-Alloy, Wafer Check Valves:

    a. Gestra, Inc.
    b. McWane, Inc.; Kennedy Valve Div.
    c. Mueller Co.
    d. Techno Corp.
    e. Tyco International, Ltd.; Tyco Valves & Controls.
    f. Wheatley Gaso, Inc.

2. Dual-Plate, Ferrous-Alloy, Wafer Check Valves:

    a. Crane Co.; Crane Valve Group; Crane Valves.
    b. Crane Co.; Crane Valve Group; Stockham Div.
    c. Flomatic Valves.
    d. Gestra, Inc.
    e. Grinnell Corporation.
    f. Gulf Valve Co.
    g. Metraflex Co.
    h. Mueller Steam Specialty.
    i. NIBCO INC.
    j. Red-White Valve Corp.
    k. SSI Equipment, Inc.
    l. Techno Corp.
    m. Val-Matic Valve & Mfg. Corp.
    n. Valve and Primer Corp.
    o. Watts Industries, Inc.; Water Products Div.

3. Dual-Plate, Ferrous-Alloy, Wafer-Lug Check Valves:

    a. Crane Co.; Crane Valve Group; Crane Valves.
    b. Gulf Valve Co.
    c. Valve and Primer Corp.

4. Dual-Plate, Ferrous-Alloy, Double-Flanged-Type Check Valves:

    a. Crane Co.; Crane Valve Group; Crane Valves.
    b. Gulf Valve Co.
    c. Techno Corp.

B. Ferrous-Alloy Wafer Check Valves, General: API 594, spring loaded.

C. Single-Plate, Class 125 or 150, Ferrous-Alloy, Wafer Check Valves: Flangeless body.

D. Single-Plate, Class 250 or 300, Ferrous-Alloy, Wafer Check Valves: Flangeless body.

E. Single-Plate, Class 125 or 150, Ferrous-Alloy, Wafer-Lug Check Valves: Single-flange body.

F. Single-Plate, Class 250 or 300, Ferrous-Alloy, Wafer-Lug Check Valves: Single-flange body.

G. Single-Plate, Class 125 or 150, Ferrous-Alloy, Double-Flanged Check Valves: Flanged-end body.

H. Single-Plate, Class 250 or 300, Ferrous-Alloy, Double-Flanged Check Valves: Flanged-end body.

I. Dual-Plate, Class 125 or 150, Ferrous-Alloy, Wafer Check Valves: Flangeless body.

J. Dual-Plate, Class 250 or 300, Ferrous-Alloy, Wafer Check Valves: Flangeless body.

K. Dual-Plate, Class 125 or 150, Ferrous-Alloy, Wafer-Lug Check Valves: Single-flange body.

L. Dual-Plate, Class 250 or 300, Ferrous-Alloy, Wafer-Lug Check Valves: Single-flange body.

M. Dual-Plate, Class 125 or 150, Ferrous-Alloy, Double-Flanged Check Valves: Flanged-end body.

N. Dual-Plate, Class 250 or 300, Ferrous-Alloy, Double-Flanged Check Valves: Flanged-end body.

2.12 SPRING-LOADED, LIFT-DISC CHECK VALVES

A. Available Manufacturers:

1. Type I, Wafer Lift-Disc Check Valves:

    a. Mueller Steam Specialty.

2. Type II, Compact-Wafer, Lift-Disc Check Valves:

    a. Durabla Fluid Technology, Inc.
    b. Flomatic Valves.
    c. GA Industries, Inc.
    d. Grinnell Corporation.
    e. Hammond Valve.
    f. Metraflex Co.
    g. Milwaukee Valve Company.
    h. Mueller Steam Specialty.
    i. Multiplex Manufacturing Co.
    j. NIBCO INC.
    k. SSI Equipment, Inc.
    l. Val-Matic Valve & Mfg. Corp.
    m. Valve and Primer Corp.

3. Type III, Globe Lift-Disc Check Valves:

    a. Durabla Fluid Technology, Inc.
    b. Flomatic Valves.
    c. GA Industries, Inc.
    d. Grinnell Corporation.
    e. Hammond Valve.
    f. Metraflex Co.
    g. Milwaukee Valve Company.
    h. Multiplex Manufacturing Co.
    i. NIBCO INC.
    j. SSI Equipment, Inc.
    k. Val-Matic Valve & Mfg. Corp.
    l. Valve and Primer Corp.

4. Type IV, Threaded Lift-Disc Check Valves:

    a. Check-All Valve Mfg. Co.
    b. Durabla Fluid Technology, Inc.
    c. Grinnell Corporation.
    d. Legend Valve & Fitting, Inc.
    e. Metraflex Co.
    f. Milwaukee Valve Company.
    g. Mueller Steam Specialty.
    h. NIBCO INC.
    i. Watts Industries, Inc.; Water Products Div.

B. Lift-Disc Check Valves, General: FCI 74-1, with spring-loaded bronze or alloy disc and bronze or alloy seat.

C. Type I, Class 125, Wafer Lift-Disc Check Valves: Wafer style with cast-iron shell with diameter matching companion flanges.

D. Type I, Class 250, Wafer Lift-Disc Check Valves: Wafer style with cast-iron shell with diameter matching companion flanges.

E. Type II, Class 125, Compact-Wafer, Lift-Disc Check Valves: Compact-wafer style with cast-iron shell with diameter made to fit within bolt circle.

F. Type II, Class 250, Compact-Wafer, Lift-Disc Check Valves: Compact-wafer style with cast-iron shell with diameter made to fit within bolt circle.

G. Type III, Class 125, Globe Lift-Disc Check Valves: Globe style with cast-iron shell and flanged ends.

H. Type III, Class 250, Globe Lift-Disc Check Valves: Globe style with cast-iron shell and flanged ends.

I. Type IV, Class 125, Threaded Lift-Disc Check Valves: Threaded style with bronze shell and threaded ends.

J. Type IV, Class 150, Threaded Lift-Disc Check Valves: Threaded style with bronze shell and threaded ends.

2.13 CAST-IRON GATE VALVES

A. Available Manufacturers:

1. Type I, Cast-Iron, Nonrising-Stem Gate Valves:

    a. Cincinnati Valve Co.
    b. Crane Co.; Crane Valve Group; Crane Valves.
    c. Crane Co.; Crane Valve Group; Jenkins Valves.
    d. Crane Co.; Crane Valve Group; Stockham Div.
    e. Grinnell Corporation.
    f. Hammond Valve.
    g. Kitz Corporation of America.
    h. Legend Valve & Fitting, Inc.
    i. Milwaukee Valve Company.

j. NIBCO INC.
k. Powell, Wm. Co.
l. Red-White Valve Corp.
m. Walworth Co.
n. Watts Industries, Inc.; Water Products Div.

2. Type I, Cast-Iron, Rising-Stem Gate Valves:

a. Cincinnati Valve Co.
b. Crane Co.; Crane Valve Group; Crane Valves.
c. Crane Co.; Crane Valve Group; Jenkins Valves.
d. Crane Co.; Crane Valve Group; Stockham Div.
e. Grinnell Corporation.
f. Hammond Valve.
g. Kitz Corporation of America.
h. Legend Valve & Fitting, Inc.
i. Milwaukee Valve Company.
j. NIBCO INC.
k. Powell, Wm. Co.
l. Red-White Valve Corp.
m. Walworth Co.
n. Watts Industries, Inc.; Water Products Div.

B. Cast-Iron Gate Valves, General: MSS SP-70, Type I.

C. Class 125, NRS, Bronze-Mounted, Cast-Iron Gate Valves: Cast-iron body with bronze trim, non-rising stem, and solid-wedge disc.

D. Class 125, OS&Y, Bronze-Mounted, Cast-Iron Gate Valves: Cast-iron body with bronze trim, rising stem, and solid-wedge disc.

E. Class 125, NRS, All-Iron, Cast-Iron Gate Valves: Cast-iron body with cast-iron trim, non-rising stem, and solid-wedge disc.

F. Class 125, OS&Y, All-Iron, Cast-Iron Gate Valves: Cast-iron body with cast-iron trim, rising stem, and solid-wedge disc.

G. Class 250, NRS, Bronze-Mounted, Cast-Iron Gate Valves: Cast-iron body with bronze trim, non-rising stem, and solid-wedge disc.

H. Class 250, OS&Y, Bronze-Mounted, Cast-Iron Gate Valves: Cast-iron body with bronze trim, rising stem, and solid-wedge disc.

I. Class 250, NRS, All-Iron, Cast-Iron Gate Valves: Cast-iron body with cast-iron trim, non-rising stem, and solid-wedge disc.

J. Class 250, OS&Y, All-Iron, Cast-Iron Gate Valves: Cast-iron body with cast-iron trim, rising stem, and solid-wedge disc.

2.14 BRONZE GLOBE VALVES

A. Available Manufacturers:

B. Manufacturers:

1. Type 2, Bronze Globe Valves with Nonmetallic Disc:

    a. Cincinnati Valve Co.
    b. Crane Co.; Crane Valve Group; Crane Valves.
    c. Crane Co.; Crane Valve Group; Jenkins Valves.
    d. Crane Co.; Crane Valve Group; Stockham Div.
    e. Grinnell Corporation.
    f. Hammond Valve.
    g. Kitz Corporation of America.
    h. McWane, Inc.; Kennedy Valve Div.
    i. Milwaukee Valve Company.
    j. NIBCO INC.
    k. Powell, Wm. Co.
    l. Red-White Valve Corp.
    m. Walworth Co.

C. Bronze Globe Valves, General: MSS SP-80, with ferrous-alloy handwheel.

D. Type 2, Class 125, Bronze Globe Valves: Bronze body with PTFE or TFE disc and union-ring bonnet.

E. Type 2, Class 150, Bronze Globe Valves: Bronze body with PTFE or TFE disc and union-ring bonnet.

F. Type 2, Class 200, Bronze Globe Valves: Bronze body with PTFE or TFE disc and union-ring bonnet.

2.15 CAST-IRON GLOBE VALVES

A. Available Manufacturers:

B. Manufacturers:

1. Type I, Cast-Iron Globe Valves with Metal Seats:

    a. Cincinnati Valve Co.
    b. Crane Co.; Crane Valve Group; Crane Valves.
    c. Crane Co.; Crane Valve Group; Jenkins Valves.
    d. Crane Co.; Crane Valve Group; Stockham Div.
    e. Grinnell Corporation.
    f. Hammond Valve.
    g. Kitz Corporation of America.
    h. Milwaukee Valve Company.
    i. NIBCO INC.
    j. Powell, Wm. Co.
    k. Red-White Valve Corp.
    l. Walworth Co.

C. Cast-Iron Globe Valves, General: MSS SP-85.

D. Type I, Class 125, Cast-Iron Globe Valves: Gray-iron body with bronze seats.

E. Type I, Class 250, Cast-Iron Globe Valves: Gray-iron body with bronze seats.

2.16 CAST-IRON PLUG VALVES

A. Available Manufacturers:

1. Lubricated-Type, Cast-Iron Plug Valves:

    a. Milliken Valve Co., Inc.
    b. Nordstrom Valves, Inc.
    c. Olson Technologies; Homestead Div.
    d. R & M Energy Systems (Tomball, TX).
    e. Walworth Co.

2. Nonlubricated-Type, Cast-Iron Plug Valves:

    a. General Signal; DeZurik Unit.
    b. Grinnell Corporation.
    c. Mueller Flow Technologies.
    d. Tyco International, Ltd.; Tyco Valves & Controls.
    e. Wheatley Gaso, Inc.
    f. Xomox Corporation.

B. Cast-Iron Plug Valves, General: MSS SP-78.

C. Class 125 or 150, lubricated-type, cast-iron plug valves.

D. Class 250 or 300, lubricated-type, cast-iron plug valves.

E. Class 125 or 150, nonlubricated-type, cast-iron plug valves.

F. Class 250, nonlubricated-type, cast-iron plug valves.

2.17 RESILIENT-SEATED, CAST-IRON, ECCENTRIC PLUG VALVES

A. Available Manufacturers:

1. General Signal; DeZurik Unit.
2. Milliken Valve Company.
3. Olson Technologies; Homestead Div.
4. Pratt, Henry Company.
5. Val-Matic Valve & Mfg. Corp.

B. Resilient-Seated, Cast-Iron, Eccentric Plug Valves, NPS 2-1/2 (DN 65) and Smaller: Design similar to MSS SP-108, and rated for 175-psig (1207-kPa) minimum CWP.

1. Resilient Seating Material: Suitable for potable-water service, unless otherwise indicated.

C. Resilient-Seated, Cast-Iron, Eccentric Plug Valves, NPS 3 (DN 80) and Larger: MSS SP-108, and rated for 175-psig (1207-kPa) minimum CWP.

1. Resilient Seating Material: Suitable for potable-water service, unless otherwise indicated.

2.18 CHAINWHEEL ACTUATORS

A. Available Manufacturers:

1. Babbitt Steam Specialty Co.
2. Roto Hammer Industries, Inc.

B. Description: Valve actuation assembly with sprocket rim, brackets, and chain.

1. Sprocket Rim with Chain Guides: Ductile iron, of type and size required for valve. Include zinc coating.
2. Brackets: Type, number, size, and fasteners required to mount actuator on valve.
3. Chain: Hot-dip, galvanized steel, of size required to fit sprocket rim.

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.

3.2 VALVE APPLICATIONS

A. Refer to piping Sections for specific valve applications. If valve applications are not indicated, use the following:

1. Shutoff Service: Ball, butterfly, or plug valves.
2. Throttling Service: Angle, ball, butterfly, or globe valves.
3. Pump Discharge: Spring-loaded, lift-disc check valves.

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

C. Chilled-Water Piping: Use the following types of valves:

1. Angle Valves, NPS 2 (DN 50) and Smaller: Type 2, Class 200, bronze.
2. Angle Valves, NPS 2-1/2 (DN 65) and Larger: Type II, Class 250, cast iron.

3. Ball Valves, NPS 2 (DN 50) and Smaller: **Three**-piece, **600-psig (4140-kPa)** CWP rating, copper alloy.
4. Ball Valves, NPS 2-1/2 (DN 65) and Larger: Class **300**, ferrous alloy.
5. Butterfly Valves, NPS 2-1/2 (DN 65) and Larger: **Flanged**, **300-psig (2070-kPa)** CWP rating, ferrous alloy, with **EPDM** liner.
6. High-Pressure Butterfly Valves, NPS 3 (DN 80) and Larger: **Single-flange**, Class **300**.
7. Grooved-End, Ductile-Iron Butterfly Valves, NPS 2-1/2 (DN 65) and Larger: **300-psig (2070-kPa)** CWP rating.
8. Swing Check Valves, NPS 2-1/2 (DN 65) and Larger: Type II, Class **250**, gray iron.
9. Grooved-End, Ductile-Iron, Swing Check Valves, NPS 2-1/2 (DN 65) and Larger: **300-psig (2070-kPa)** CWP rating.
10. Wafer Check Valves, NPS 2-1/2 (DN 65) and Larger: **Dual**-plate, **double-flanged**, Class **250 or 300** ferrous alloy.
11. Spring-Loaded, Lift-Disc Check Valves, NPS 2 (DN 50) and Smaller: Type IV, Class **200**.
12. Spring-Loaded, Lift-Disc Check Valves, NPS 2-1/2 (DN 65) and Larger: Type **III** Class **250**, cast iron.
13. Gate Valves, NPS 2-1/2 (DN 65) and Larger: Type I, Class [**125**] [**250**], [**NRS**] [**OS&Y**], bronze-mounted cast iron.
14. Plug Valves, NPS 2 (DN 50) and Larger: Class **250 or 300**, **nonlubricated**-type, cast iron.
15. Resilient-Seated, Eccentric Plug Valves, NPS 3 (DN 80) and Larger: 175-psig (1207-kPa) CWP rating, cast iron.

D. Heating Water Piping: Use the following types of valves:

1. Angle Valves, NPS 2 (DN 50) and Smaller: Type 2, Class 200, bronze.
2. Angle Valves, NPS 2-1/2 (DN 65) and Larger: Type II, Class 250, cast iron.
3. Ball Valves, NPS 2 (DN 50) and Smaller: Three-piece, 600-psig (4140-kPa) CWP rating, copper alloy.
4. Ball Valves, NPS 2-1/2 (DN 65) and Larger: Class 300, ferrous alloy.
5. Butterfly Valves, NPS 2-1/2 (DN 65) and Larger: Flanged, 300-psig (2070-kPa) CWP rating, ferrous alloy, with EPDM liner.
6. High-Pressure Butterfly Valves, NPS 3 (DN 80) and Larger: Single-flange, Class 300.
7. Grooved-End, Ductile-Iron Butterfly Valves, NPS 2-1/2 (DN 65) and Larger: 300-psig (2070-kPa) CWP rating.
8. Lift Check Valves, NPS 2 (DN 50) and Smaller: Type 2, Class 200, vertical, bronze.
9. Swing Check Valves, NPS 2 (DN 50) and Smaller: Type 4, Class 200, bronze.
10. Swing Check Valves, NPS 2-1/2 (DN 65) and Larger: Type II, Class 250, gray iron.
11. Grooved-End, Ductile-Iron, Swing Check Valves, NPS 2-1/2 (DN 65) and Larger: 300-psig (2070-kPa) CWP rating.
12. Spring-Loaded, Lift-Disc Check Valves, NPS 2 (DN 50) and Smaller: Type IV, Class 200.
13. Spring-Loaded, Lift-Disc Check Valves, NPS 2-1/2 (DN 65) and Larger: Type III, Class 250, cast iron.
14. Gate Valves, NPS 2 (DN 50) and Smaller: Type [2] [3], Class 200, bronze.
15. Gate Valves, NPS 2-1/2 (DN 65) and Larger: Type I, Class 250, OS&Y, bronze-mounted cast iron.
16. Globe Valves, NPS 2 (DN 50) and Smaller: Type 2, Class 200, bronze.
17. Globe Valves, NPS 2-1/2 (DN 65) and Larger: Type I, Class 250, bronze-mounted cast iron.
18. Plug Valves, NPS 2 (DN 50) and Larger: Class 250 or 300, nonlubricated-type, cast iron.

E. Select valves, except wafer and flangeless types, with the following end connections:

1. For Copper Tubing, NPS 2 (DN 50) and Smaller: Solder-joint or threaded ends, except provide valves with threaded ends for condenser water, heating hot water, steam, and steam condensate services.
2. For Copper Tubing, NPS 2-1/2 to NPS 4 (DN 65 to DN 100): Flanged ends.
3. For Copper Tubing, NPS 5 (DN 125) and Larger: Flanged ends.
4. For Steel Piping, NPS 2 (DN 50) and Smaller: Threaded ends.
5. For Steel Piping, NPS 2-1/2 to NPS 4 (DN 65 to DN 100): Flanged ends.
6. For Steel Piping, NPS 5 (DN 125) and Larger: Flanged ends.
7. For Grooved-End, Copper Tubing and Steel Piping: Valve ends may be grooved. Do not use for steam or steam condensate piping.

3.3 VALVE INSTALLATION

A. Piping installation requirements are specified in other Division 23 Sections. Drawings indicate general arrangement of piping, fittings, and specialties.

B. Install valves with unions or flanges at each piece of equipment arranged to allow service, maintenance, and equipment removal without system shutdown.

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

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

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

F. Install chainwheel operators on valves NPS 4 (DN 100) and larger and more than 96 inches (2400 mm) above floor. Extend chains to 60 inches (1520 mm) above finished floor elevation.

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

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

3.4 JOINT CONSTRUCTION

A. Refer to Division 23 Section "Common Work Results for HVAC" for basic piping joint construction.

B. Grooved Joints: Assemble joints with keyed coupling housing, gasket, lubricant, and bolts according to coupling and fitting manufacturer's written instructions.

C. Soldered Joints: Use ASTM B 813, water-flushable, lead-free flux; ASTM B 32, lead-free-alloy solder; and ASTM B 828 procedure, unless otherwise indicated.

3.5 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.

END OF SECTION

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