

SECTION 15100
VALVES

A. VALVE FEATURES---GENERAL

1. Valve Design: Rising stem or rising outside screw and yoke stems.
2. Pressure and Temperature Ratings: As scheduled and required to suit system pressures and temperatures.
3. Sizes: Same size as upstream pipe, unless otherwise indicated.
4. Operators: Provide the following special operator features:
 - a. Hand wheels, fastened to valve stem, for valves other than quarter turn.
 - b. Lever handles, on quarter-turn valves 6-inch and smaller, except for plug valves.
 - c. Chain-wheel operators, for valves 2-1/2 inch and larger, installed 96 inches or higher above finished floor elevation. Extend chains to an elevation of 6'-0" above finished floor elevation.
 - d. Gear drive operators, on quarter-turn valves 8" and larger.
5. Extended Stems: Where insulation is indicated or specified, provide extended stems arranged to receive insulation.
6. Bypass and Drain Connections: Comply with MSS SP-45 bypass and drain connections.
7. End Connections: As indicated in valve specifications.
 - a. Threads: Comply with ANSI B1.20.1
 - b. Flanges: Comply with ANSI B16.1 for cast iron, ANSI B16.5 for steel, and ANSI B 16.24 for Bronze valves.
 - c. Solder-Joint: Comply with ANSI B16.18.

Caution: Where soldered end connections are used, use solder having a melting point below 421 Deg. F for ball valves. Use lead-free solder on valves serving domestic water piping.

8. The consultant shall verify current model numbers with equipment suppliers prior to writing specifications. Contact I.U. Engineering Services for prior approval of other manufacturers.

9. For steam and chilled water service entrances at IUPUI, all equipment including valves shall comply with the requirements of Citizens Thermal Energy. Contact Campus Facility Services for assistance.

B. BALL VALVES

1. Ball Valves, 1- Inch and Smaller

Rated for 150 psi saturated steam pressure, 400 psi WOG pressure; two-piece construction; with bronze body conforming to ASTM B 62, standard (or regular) port, chrome-plated brass ball, replaceable "Teflon" or "TFE" seats and seals, blowout-proof stem, and vinyl-covered steel handle. Provide solder ends for chilled water, and domestic hot and cold water service; threaded ends for heating hot water and low-pressure steam.

2. Ball Valves, 1-1/4 Inch to 2-Inch

Rated for 150 psi saturated steam pressure, 400 psi WOG pressure; 3-piece construction; with bronze body conforming to ASTM B 62, conventional port, chrome-plated brass ball, replaceable "Teflon" or "TFE" seats and seals, blowout proof stem, and vinyl-covered steel handle. Provide solder ends for chilled water, and domestic hot and cold water service; threaded ends for heating hot water and low-pressure steam.

C. GLOBE VALVES

1. Globe Valves, 2-inch and Smaller

MSS SP-80; Class 125; body and screwed bonnet of ASTM B62 cast bronze; with threaded or solder ends, brass of replaceable composition disc, copper-silicon alloy stem, brass packing gland, "Teflon" impregnated packing, and malleable iron hand wheel.

IUPUI: Provide Class 300 or Class 150 valves meeting the above-stated conditions according to system pressures.

2. Globe Valves, 2-1/2 inch and Larger

MSS SP-85; Class 125 iron body and bolted bonnet conforming to ASTM A126, Class B; with outside screw and yoke, bronze mounted, flanged ends, and "Teflon" impregnated packing, and two-piece packing gland assembly.

IUPUI: Provide Class 300 or Class 150 valves meeting the above-stated conditions according to system pressures.

3. Globe Valves, 2-inch and Smaller

Shall be forged steel, outside screw and yoke Class 150; bolted bonnet, loose disk, renewable seat, steel hand wheel, and with socket weld ends. Provide Class 300 valves meeting the above where system pressure requires. MP and HP steam valves

to be weld-in type up to and including the first valve for condensate.

4. Globe Valves, 2-1/2 inch and Larger

Shall be forged steel, outside screw and yoke Class 150; bolted bonnet, loose disk, renewable seat, steel hand wheel, and with butt weld ends. Provide Class 300 valves meeting the above where system pressure requires. MP and HP steam valves to be weld-in type up to and including the first valve for condensate.

D. BUTTERFLY VALVES

1. Butterfly Valves, 2-1/2 Inch and Larger

MSS SP-67; rated at 200 psi; cast-iron body conforming to ASTM A 126, Class B. Provide valves with field replaceable EPDM sleeve, nickel-plated ductile iron disc stainless steel stem, and EPDM O-ring stem seals. Provide lever operators with locks for sizes 2-1/2 through 6 inches and gear operators with position indicator for sizes 8 through 24 inches. Provide lug type as indicated. Specify chain wheel operators for valves installed at or above 8 feet from finished floor.

2. Butterfly Valves, 14 Inch and Larger (applicable to IUPUI Only)

MSS SP-67; rated for 250 psig; Valve to meet requirements of AWWA C504, body to be epoxy coated, interior coating to meet AWWA C550. Operator shall be buried service actuator with 2" square nut.

3. Butterfly Valves, High Performance / Triple Offset, 3-inch and Larger (applicable to IUPUI Only)

Forged steel, ANSI Class 300; adjustable packing gland; butt weld ends meeting the requirements of ANSI B16.34. Provide valve with a 90-degree clockwise-to-close, non-rubbing, metal-to-metal seated, zero leakage bidirectional design.

E. CHECK VALVES

1. Swing Check Valves, 2-Inch and Smaller

MSS SP-80; Class 125, cast-bronze body and cap conforming to ASTM B 62; with horizontal swing, Y-pattern, and bronze disc; and having threaded or solder ends. Provide valves capable of being reground while the valve remains in the line. Provide Class 150 or Class 300 valves meeting the above specifications, with threaded end connections, where system pressure requires or where Class 125 valves are not available.

2. Swing Check Valves, 2-1/2 Inch and Larger

MSS SP-71; Class 125 (Class 175 FM approved for fire protection piping systems), cast iron body and bolted cap conforming to ASTM A 126, Class B; horizontal swing, and bronze disc or cast-iron disc with bronze disc ring; and flanged ends. Valves shall be capable of being refitted while remaining in the line. Provide Class 150 or Class 300 valves meeting the above specifications, with threaded end connections, where system pressure requires or where Class 125 valves are not available.

3. Wafer Check Valves

Class 250, cast-iron body with replaceable bronze seat, and non-slam design lapped and balanced twin bronze flappers and stainless steel trim and torsion spring. Provide valves designed to open and close at approximately one foot differential pressure.

On Medium Pressure and High Pressure steam service at IUPUI only:

4. Horizontal Piston Check Valves, 2-Inch and Smaller

Union bonnet; renewable chrome hardened carbon steel disc and seat; Class 800; with socket weld ends meeting the requirements of ANSI B16.34.

5. Swing Check Valves, 2-1/2 Inch and Larger

Horizontal swing checks type; bolted bonnet, renewable chrome hardened carbon steel disc and seat; Class 300; with flanged ends meeting the requirements of ANSI B16.34.

F. CONTROL VALVES

1. Steam and heating system control valves shall fail to the closed position.

G. GATE VALVES (applicable to Indianapolis Only)

1. Gate Valves, 2-Inch and Smaller

MSS SP-80; Class 125, body and bonnet of ASTM B 62 cast bronze; with threaded or solder ends, solid disc, copper-silicon alloy stem, brass packing gland, "Teflon" impregnated packing and malleable iron hand wheel For LP steam only.

2. Gate Valves, 2-Inch and Smaller

MSS SP-80; Class 150, body and union bonnet of ASTM B 62 cast bronze; with threaded or solder ends, solid disc, copper-silicon alloy stem, brass packing gland, "Teflon" impregnated packing, and malleable iron hand wheel. Do not use solder end valves for hot water heating or steam piping applications. MP and HP steam valves to be weld-in type up to and including the first valve for condensate.

3. Gate Valves, 2-Inch and Smaller

Forged steel, outside screw yoke, Class 150; bolted bonnet, chrome hardened carbon steel solid wedge, renewable seat, steel hand wheel; butt weld or threaded ends meeting the requirements of ANSI B16.34. Provide Class 300 valves meeting the above where system pressure requires. MP and HP steam valves to be weld-in type up to and including the first valve for condensate.

4. Gate Valves, 2-1/2 Inch and Larger

MSS SP-70; Class 125 iron body, bronze mounted, with body and bonnet conforming to ASTM A 126 Class B; with flanged ends, "Teflon" impregnated packing, and two-piece backing gland assembly. For LP steam only.

5. Gate Valves, 2-1/2 Inch and Larger

Cast steel, outside screw and yoke Class 150; bolted bonnet, chrome hardened carbon steel solid wedge, renewable seat, steel hand wheel; butt weld ends meeting the requirements of ANSI B16.34. Provide Class 300 valves meeting the above where system pressure requires. MP and HP steam valves to be weld-in type up to and including the first valve for condensate.

6. Gate Valves, 4 Inch and Larger

Iron Body, 250# working pressure, non-rising stem; resilient wedge; bolted bonnet, meeting requirements of AWWA C509, UL 262 and FM 1120/1130. Wedge shall be encapsulated with resilient material, meeting ASTM D429. The body and bonnet shall be epoxy coated interior and exterior. Operator shall be buried service actuator with 2" square nut.

H. PLUG VALVES (applicable to Indianapolis Only)

1. Plug Valves, 2-Inch and Smaller

Rated at 150 psi WOG; bronze body, with straight-away pattern, square head, and threaded ends.

2. Plug Valves, 2-1/2 Inch and Larger

MSS SP-78; rated at 175 psi WOG; lubricated plug type, with semi-steel body, single gland, wrench operated, and flanged ends.

I. PRESSURE REDUCING/REGULATING VALVES (applicable to Indianapolis Only)

1. Pressure Reducing/Regulating Valves, 2-Inch and Smaller

Cast steel body; adjustable range diaphragm having positive shutoff; internal relief valve with vent; sized in accordance with manufacturer's recommendations for full capacities of equipment served; threaded connections; pilot operated; Class 150 meeting the requirements of ANSI B16.34. Provide Class 300 valves meeting the above where system pressure requires.

2. Pressure Reducing/Regulating Valves, 2-1/4 Inch and Larger

Cast steel body; adjustable range diaphragm having positive shutoff; internal relief valve with vent; sized in accordance with manufacturer's recommendations for full capacities of equipment served; spiral wound gaskets, flanged connections; pilot operated; Class 150 meeting the requirements of ANSI B16.34. Provide Class 300 valves meeting the above where system pressure requires.

J. SAFETY RELIEF VALVES (applicable to Indianapolis Only)

1. Safety Relief Valves, 2-Inch and Smaller

Cast iron body, Class 250, designed for full relief of capacity of equipment served, in accordance with ASME Boiler and Pressure Vessel Code. Furnish complete with cast iron drip-pan elbow having threaded inlet and outlet with threads (FPT) conforming to ANSI B1.30.1; sized for full size of safety valve outlet connection.

2. Safety Relief Valves, 2-Inch and Smaller

Cast bronze body, Class 250, with threaded (MPT) inlet and threaded (FPT) outlet, forged copper alloy disc, fully enclosed cadmium plated steel spring having an adjustable pressure range and positive shut-off. Factory-set valves to relieve at 10 psi above operating pressure.

3. Safety Relief Valves, 2-1/2 Inch and Larger

Cast iron body; Class 250, designed for full relief of capacity of equipment served, in accordance with ASME Boiler and Pressure Vessel Code. Furnish complete with cast iron drip-pan elbow having flanged inlet conforming to ANSI B1.30.1; sized for full size of safety valve outlet connection.

K. PISTON VALVES (applicable to Indianapolis only)

On Medium Pressure and High Pressure steam service:

1. Piston Valves, 2-inch and smaller

Cast steel body, Class 300 or greater, bolted bonnet, steel hand wheel, socket weld ends, meeting the requirements of ANSI B16.11

2. Piston Valves, 2-1/2 inch and larger

Cast steel body, Class 300 or greater, bolted bonnet, steel hand wheel, socket weld ends, meeting the requirements of ANSI B16.10

L. VALVE PRESSURE CLASSIFICATION SCHEDULES

1. Valves, 2-Inch and Smaller

<u>SERVICE</u>	<u>GATE</u>	<u>GLOBE</u>	<u>BALL</u>	<u>CHECK</u>
Chilled Water	125	125	150	125
Domestic Hot Cold Water	125	125	150	125
Heating Hot Water	150	150	150	150
Steam Condensate Return	150	150	150	150

Indianapolis Campus Only:

Chilled Water	150	150	150	150
Domestic Hot Cold Water	125	125	150	125
Heating Hot Water	150	150	150	150
Steam Supply (<15 psig)	125	125	125	125
Steam Supply (15--75 psig)	150	150	150	150
Steam Supply (75--250 psig)	300	300	300	300
Condensate Return (<15 psig)	125	125	125	125
Condensate Return (15-75 psig)	150	150	150	150
Condensate Return (75-250 psig)	300	300	300	300

2. Valves, 2-1/2 Inch and Larger

<u>SERVICE</u>	<u>GATE</u>	<u>GLOBE</u>	<u>BUTTERFLY</u>	<u>CHECK</u>
Chilled Water	125	125	200	125
Domestic Hot and Cold Water	125	125	200	125
Heating Hot Water	125	125	200	125
Steam Condensate Return	125	125	200	125
<u>Indianapolis Campus Only:</u>				
Chilled Water (above grade)	150	150	200	150
Chilled Water (below grade)	250	250	250	250
Domestic Hot Cold Water	125	125	200	125
Heating Hot Water	125	125	200	125
Steam Supply (<15 psig)	150	150	-----	150
Steam Supply (15--75 psig)	150	150	-----	150
Steam Supply (75--250 psig)	300	300	-----	300
Condensate Return (<15 psig)	150	150	-----	150
Condensate Return(15-75 psig)	150	150	-----	150
Condensate Return(75-250 psig)	300	300	-----	300

3. Valves, all sizes

SERVICE

Specify appropriate valves having required design pressure ratings.

Valves on 150 psig steam distribution systems shall be Class 300 steel, weld-in type. Valves on the medium and low pressure steam distribution systems shall be rated Class150.

Control valves shall fail closed on the steam supply system.

M. APPROVED MANUFACTURERS –INDIANAPOLIS ONLY

1. Gate Valves: Crane, Walworth, Nibco, Vogt, Grinnell, Hammond
2. Globe Valves: Crane, Walworth, Nibco, Vogt, Grinnell, Hammond
3. Check Valves: Crane, Walworth, Keystone, Centerline, Nibco, OSAF, Milwaukee, Victaulic, Hammond
4. Ball Valves: Conbraco (Apollo), Crane, Walworth, Nibco, Vogt, Grinnell, Hammond

5. Butterfly Valves: Crane, Conbraco (Apollo), Keystone, Centerline, Nibco, OSAF, Zwick, Hammond
6. Pressure Reducing/Regulating Valves: Spence, Spirax/Sarco, Leslie
7. Safety Relief Valves: Kunkle, Spirax/Sarco
8. Piston Valves: Klinger, Bonetti*
 - * Bonetti currently does not manufacture a Class 300 butt weld valve.

N. VALVE SCHEDULE (Applicable to all campuses except IUPUI).

1. Gate Valves (125#) - 2 Inch and Smaller

<u>MANUFACTURER</u>	<u>THREADED</u> <u>NRS</u>	<u>THREADED</u> <u>RS</u>	<u>SOLDER</u> <u>NRS</u>	<u>SOLDER</u> <u>RS</u>
Crane	438	428	1701S	1700S
Walworth	7	55	4SJ	55SJ

2. Gate Valves (125#) - 2-1/2 Inch and Larger

<u>MANUFACTURER</u>	<u>OS&Y</u> <u>RS</u>	<u>NRS</u>
Crane	465-1/2	461
Hammond	IR1140	IR1138
Milwaukee	F-2885	F-2882

3. Gate Valves (150#) - 2 Inch and Smaller

<u>MANUFACTURER</u>	<u>THREADED</u> <u>NRS</u> *	<u>THREADED</u> <u>RS</u> *	<u>SOLDER</u> <u>NRS</u> *	<u>SOLDER</u> <u>RS</u> *
Crane	X	431ub	X	X
Walworth	14	56	X	X

* X means not available

4. Ball Valves - 1 Inch and Smaller

<u>MANUFACTURER</u>	<u>THREADED ENDS</u>	<u>SOLDER ENDS</u> *
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Conbraco (Apollo)	77C-100	77C-200
Crane	9302	9322
Walworth	575	X

* X means not available

5. Ball Valves - 1-1/4 Inch to 2 Inch

<u>MANUFACTURER</u>	<u>THREADED ENDS</u>	<u>SOLDER ENDS</u>
Conbraco (Apollo)	77C-100	77C-200
Crane	9302	9322
Walworth	575	575SJ

Note: For grooved end connections, use Victaulic Style 721.

6. Globe Valves - 2 Inch and Smaller

<u>MANUFACTURER</u>	<u>CLASS 125 THREADED</u>	<u>CLASS 125 SOLDER</u>	<u>CLASS 150 THREADED</u>
Crane	1	1310	17TF
Walworth	3057	3058SJ	3096

7. Globe Valves - 2-1/2 Inch and Larger

<u>MANUFACTURER</u>	<u>STRAIGHT BODY</u>	<u>ANGLE BODY</u>
Hammond	IR116	IR118
Crane	351	353
Milwaukee	F2981	F2986

8. Butterfly Valves - 2-1/2 Inch and Larger

a. The following are model numbers for wafer-type, with nickel-plated ductile-iron disc:

<u>MANUFACTURER</u>	<u>LEVER</u>	<u>GEAR</u>
Crane	12	12
Conbraco (Appolo)	6XZ13X-01	6W13X-0

Note: For grooved end connection, use Victaulic Series 300 & 704.

9. Swing Check Valves - 2 Inch and Smaller

<u>MANUFACTURER</u>	<u>CLASS 125 THREADED ENDS</u>	<u>CLASS 125 SOLDER ENDS</u>	<u>CLASS 150 THREADED ENDS</u>
Crane	37	1342	137
Walworth	3046	3046SJ	3412

Note: For grooved end connections, use Victaulic Series 712

10. Swing Check Valves - 2-1/2 Inch and Larger

<u>MANUFACTURER</u>	<u>CLASS 125</u>	<u>CLASS 175 *</u>
Crane	373	X
Milwaukee	F2973	X

Note: For grooved end connections, use Victaulic Series 712

* X means not available

11. Wafer Check Valves

<u>MANUFACTURER</u>	<u>CLASS 125</u>
Metraflex:	Chexx
Mission :	12 HMP
Stockham :	WG970
Victaulic:	Series 710-711