PART 1 - GENERAL

This Section includes the design and selection requirements of general duty valves common to piping systems.

1.01 DESIGN

A. Drawings and Specifications:

1. Use gate, ball, or butterfly valves for shutoff duty. Use of valves incorporating more than one function in a common body is prohibited (e.g. common ball/butterfly, triple-duty valve, etc.).
2. Use globe valves for throttling duty of clean water. Use plug or Vee Port for other services.
3. Provide valves with unions or flanges at each piece of equipment arranged to allow servicing, maintenance, and equipment removal without system shutdown.
4. Locate isolation valves at each branch take off, at each floor and when pipe runs exceed two changes in direction.
5. The following valves are not allowed:
    a. Wafer Style Butterfly Valves or combination valves (strainer/ball or ball/butterfly as examples).
6. Provide independent supports as required at concentrated loads from valves and flanges. Valves shall not be supported by adjacent piping.
7. All valves shall be located at accessible locations. For valves located 6' above access level provide chain wheel operator.
8. Strainers shall be provided with a capped ball blow-off valve.

B. Valve Design Selection Guide:

DOMESTIC WATER SYSTEM – OPERATING PRESSURE LESS THAN 150 PSIG

Type	Size	Class	CWP	ASTM - Material
Gate	2 inch and smaller	125	200	B62 Bronze
	2-1/2 inch and larger	125	200	A126 Cl. B Cast Iron

Type	Size	Class	CWP	ASTM - Material
Ball	3 inch and smaller	----	600	B584 Bronze, 316 SS Ball, SS stem, full port, two piece, RTFE or PTFE seats
Globe or Angle	2 inch and smaller	125	200	B62 Bronze
	2-1/2 inch and larger	125	200	A126 Cl. B Cast Iron
Butterfly	2 inch and smaller	----	200	A126 Cl. B Cast Iron
Check Lift	2 inch and smaller	125	200	B62 Bronze
Check Wafer	2-1/2 inch and larger	125	200	A126 Cl B Cast Iron
Check, swing	2 inch and smaller	125	200	B62 Bronze
Silent Check	2-1/2 inch and larger	125	200	A126 Cl. B Cast Iron

SITE SERVICE WATER SYSTEM – OPERATING PRESSURE 150 PSIG THRU 200 PSIG

Type	Size	Class	CWP	ASTM - Material
Gate	2 inch and smaller	150	300	B62 Bronze
	2-1/2 inch and larger	250	500	A126 Cl. B Cast Iron
Ball	3 inch and smaller	----	600	B584 Bronze, A276 316 SS Ball, A276 SS stem, full port, two piece, RTFE or PTFE seats, thrust washer and packing
Globe or Angle	2 inch and smaller	150	300	B62 Bronze
	2-1/2 inch and larger	250	500	A126 Cl. B Cast Iron
Check Lift	2 inch and smaller	125	200	B62 Bronze
Check Wafer	2-1/2 inch and larger	125	200	A126 Cl B Cast Iron
Check, swing	2 inch and smaller	150	300	B62 Bronze

Silent Check	2-1/2 inch and larger	250	500	A126 Cl. B Cast Iron

HEATING WATER SYSTEM – OPERATING PRESSURE 125 PSIG OR LESS

Type	Size	Class	CWP	ASTM - Material
Gate	2 inch and smaller	150	300	B62 Bronze
	2-1/2 inch and larger	125	200	A126 Cl. B Cast Iron
Ball	3 inch and smaller	----	600	B584 Bronze, 316 SS Ball, SS stem, full port, two piece, RTFE or PTFE seats
Globe or Angle	2 inch and smaller	150	300	B62 Bronze
	2-1/2 inch and larger	125	200	A126 Cl. B Cast Iron
Butterfly	2 inch and larger	----	200	A126 Cl. B Cast Iron
Check, swing	2 inch and smaller	150	300	B62 Bronze
	2-1/2 inch and larger	125	200	A126 Cl. B Cast Iron
Check Lift	2 inch and smaller	125	200	B62 Bronze
Check, Wafer	2-1/2 inch and larger	125	200	A126 Cl. B Cast Iron

CHILLED WATER SYSTEM – OPERATING PRESSURE 150 PSIG OR LESS

Type	Size	Class	CWP	ASTM - Material
Gate	2 inch and smaller	150	300	B62 Bronze
	2-1/2 inch and larger	125	200	A126 Cl. B Cast Iron
Ball	3 inch and smaller	----	600	B584 Bronze, 316 SS Ball, SS stem, full port, two piece, RTFE or PTFE seats
Globe or Angle	2 inch and smaller	150	300	B62 Bronze

Type	Size	Class	CWP	ASTM - Material
	2-1/2 inch and larger	125	200	A126 Cl. B Cast Iron
Butterfly	2 inch and larger	----	200	A126 Cl. B Cast Iron
Check, swing	2 inch and smaller	150	300	B62 Bronze
	2-1/2 inch and larger	125	200	A126 Cl. B Cast Iron
Check Lift	2 inch and smaller	125	200	B62 Bronze
Check, non-slam	2-1/2 inch and larger	125	200	A126 Cl. B Cast Iron

CONDENSER WATER SYSTEM – OPERATING PRESSURE 150 PSIG OR LESS

Type	Size	Class	CWP	ASTM - Material
Gate	2 inch and smaller	150	300	B62 Bronze
	2-1/2 inch and larger	125	200	A126 Cl. B Cast Iron
Ball	3 inch and smaller	----	600	B584 Bronze, 316 SS Ball, SS stem, full port, two piece, RTFE or PTFE seats
Globe or Angle	2 inch and smaller	150	300	B62 Bronze
	2-1/2 inch and larger	125	200	A126 Cl. B Cast Iron
Butterfly	2 inch and larger	----	200	A126 Cl. B Cast Iron
Check, swing	2 inch and smaller	150	300	B62 Bronze
	2-1/2 inch and larger	125	200	A126 Cl. B Cast Iron
Check, non-slam	All	125	200	A126 Cl. B Cast Iron

LOW PRESSURE STEAM AND CONDENSATE SYSTEM – OPERATING PRESSURE 15 PSIG OR LESS

Type	Size	Class	CWP	ASTM - Material
Gate	2 inch and smaller	150	300	B62 Bronze
	2-1/2 inch and larger	150	200	A216 Carbon Steel
Globe	2 inch and smaller	150	300	B62 Bronze
	2-1/2 inch and larger	150	200	A216 Carbon Steel
Check, swing	2 inch and smaller	150	300	B62 Bronze
	2-1/2 inch and larger	150	200	A216 Carbon Steel

HIGH PRESSURE STEAM AND CONDENSATE SYSTEM – OPERATING PRESSURE 16 PSIG TO 150 PSIG

Type	Size	Class	CWP	ASTM - Material
Gate	All	300	600	A216 Carbon Steel
Globe	All	300	600	A216 Carbon Steel
Check, swing	All	300	600	A216 Carbon Steel

ITEM	MATERIAL	DESIGN	ASTM SPEC.
Handwheel	Malleable Iron	Accurate fit to stem	A-197
Stem	Copper-Silicon Bronze	Corrosion resistant/strong	B-371 C69400
Disc	Tapered solid wedge	Completely out of flow	PTFE
Body	Bronze	Guides for disc alignment	B-62 C83600
200 PSIG WP at -20 to 500 degrees F.			

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Gate Valves: Crane, Tyco, Kennedy (water), Bonney Forge (steam/condensate).
B. Ball Valves: Crane, Tyco, Milwaukee, Apollo, or approved equal.
C. Globe or Angle Valves**:** Crane, Kennedy, Milwaukee, or approved equal.
D. Butterfly Valves: Crane, Tyco, Kennedy, or approved equal.
E. Triple-Offset Butterfly Valves: Tyco, Vanessa, Quadax, or approved equal.
F. Swing Check Valves: Tyco, Crane, Kennedy, or approved equal.
G. Non-Slam Check Valves: Tyco, Keystone, Mueller, Kennedy, or approved equal.
H. Steam and Condensate Service Valves: Vogt, Keystone, Fisher, Bonney Forge, or approved equal.
I. Plug Valves (lubricated): Nordstrom, Pratt

2.02 BASIC, COMMON FEATURES

A. Design:
   1. Use triple-offset butterfly valves on main building utility isolation valves.
   2. Use rising stem or rising outside screw and yoke stems. Non-rising stem valves may be used only where headroom prevents full extension of rising stems or buried applications.
   3. Pressure and Temperature Ratings: Valves shall be selected to suit system operating pressures and temperatures.
   4. Ball valves shall utilize 316 stainless steel ball, be of 2 piece full port design, use stainless steel stems, PTFE or RTFE seats. Other valves to utilize EPDM or Bronze seats.
   5. Operators: Use specified operators and handwheels, except provide the following special operator features:
      a. Handwheels: For valves other than quarter turn.
      b. Lever Handles: For quarter-turn valves 6-inches and smaller.
      c. Chain-Wheel Operators: For valves 4-inches and larger, installed 96-inches or higher above finished floor elevation. Extend chain 60-inches above finished floor.
      d. Worm Gear-Drive Operator with handwheel: For quarter-turn valves 8-inches and larger.

e. Bronze Gate, Globe and Angle Valve Stem: Copper-zinc-silicon bronze, 80-83% copper, 3-1/2-4-1/2% silicon, ASTM B371, 80,000 psi tensile strength, 40,000 psi yield point.

f. Extended Stems: Where insulation is indicated or specified, provide extended stems arranged to receive insulation.

g. Threads: ASME B1.20.1.

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

i. Seats: Cast copper-nickel discs and seat rings for AAR bronze globe and angle valves, 175 Brinnel.

2.03 VALVE SELECTION

A. Valve Connection Type

1. Copper Tube Size, 2-1/2-Inches and Smaller: Threaded ends, except provide solder ends for domestic water system applications
2. Steel Pipe Sizes, 2-1/2-Inches and Smaller: Threaded.
3. Steel Pipe Sizes, 3-Inches and Larger: Flanged.
4. Refer to 231123 for Natural Gas Valves.
5. Refer to 226100 for Compressed Air Valves.
6. Grooved Piping: Compatible valves, couplings and flange adapters (Refer to 211000 Fire Sprinkler Systems).

PART 3 - EXECUTION

3.01 REQUIREMENTS

A. Provide access where valves and fittings are concealed. Access door shall be 14”X14” minimum.

B. Install valves with stems upright or horizontal, not inverted. Provide stem extensions as required for insulation thickness.

C. Use valve handle extensions to provide clearances on insulated piping.

END OF SECTION