PART I - GENERAL

PART 2 - PRODUCTS

2.1 VALVES FOR TUNNEL STEAM AND CONDENSATE DISTRIBUTION SYSTEMS

   - Including blow-down/drain valves, valves ahead of traps and first valve inside building.

Normal Operation: ≤165 PSIG, ≤400F.
Worst Case Excursion: 175 PSIG, 450F.

1. Size 2” and Smaller, Socket-Weld Forged Steel Wedge Gate Valve.
   a. ANSI class 800.
   b. Shut-off class IV, bi-directional.
   c. Forged carbon steel body.
   d. Socket-welding connections.
   e. Bolted bonnet.
   f. Outside screw and yoke, rising stem design.
   g. 13% chrome steel wedge.
   h. Alloy 6 (Stellite) hard-faced seats.
   i. Renewable seat rings.
   j. Integral back seat for positive packing chamber isolation.
   k. Stainless steel gasket with graphite filler.
   l. Graphite stem packing.
   m. Spoked hand wheel.
   n. Approved manufacturers: Bonney Forge, Hancock, Smith.

2. Size 2 ½ and 3”, Butt-Weld Cast Steel Wedge Gate Valve.
   a. ANSI class 300.
   b. Shut-off class IV, bi-directional.
   c. Cast carbon steel body.
   d. Butt-welding connections.
   e. Outside screw and yoke, rising stem design.
   f. 13% chrome steel flexible wedge.
   g. Alloy 6 (Stellite) hard-faced seats.
   h. Seal-welded seat rings.
   i. Integral back seat for positive packing chamber isolation.
   j. Stainless steel gasket with graphite filler.
   k. Graphite stem packing.
i. Spoked hand wheel.

m. Approved manufacturers: Kitz, Velan.

   a. ANSI class 300.
   b. API 598 zero leakage shutoff rating, bi-directional.
   c. Carbon steel body.
   d. Butt-welding connections to match pipe schedule.
   e. 316 stainless steel disc and seat.
   f. Non-rigid valve-to-shaft connection to accommodate differential thermal expansion of components.
   g. Adjustable graphite shaft packing.
   h. Geared rotary hand-wheel operator sized for maximum rim pull of 100 lb.
   i. Approved Manufacturers: Zwick Series Tri-Con, Xomox Series 9000, FlowSeal MS.

   - Including blow-down/drain valves, valves ahead of traps and first valve inside building.

Normal Operation: ≤60 PSIG, ≤350F.
Worst Case Excursion: 125 PSIG, 400F.

1. Size 2” and Smaller, Socket-Weld Forged Steel Wedge Gate Valve.
   a. ANSI class 800.
   b. Shut-off class IV, bi-directional.
   c. Forged carbon steel body.
   d. Socket-welding connections.
   e. Bolted bonnet.
   f. Outside screw and yoke, rising stem design.
   g. 13% chrome steel wedge.
   h. Alloy 6 (Stellite) hard-faced seats.
   i. Renewable seat rings.
   j. Integral back seat for positive packing chamber isolation.
   k. Stainless steel gasket with graphite filler.
   l. Graphite stem packing.
   m. Spoked hand wheel.
   n. Approved manufacturers: Bonney Forge, Hancock, Smith.

2. Size 2 ½ and 3”, Butt-Weld Cast Steel Wedge Gate Valve.
   a. ANSI class 150.
   b. Shut-off class IV, bi-directional.
   c. Cast carbon steel body.
   d. Butt-welding connections.
e. Outside screw and yoke, rising stem design.
f. 13% chrome steel flexible wedge.
g. Alloy 6 (Stellite) hard-faced seats.
h. Seal welded seat rings.
i. Integral back seat for positive packing chamber isolation.
j. Stainless steel gasket with graphite filler.
k. Graphite stem packing.
l. Spoked hand wheel.
m. Approved manufacturers: Kitz, Velan.

   a. ANSI class 150.
b. API 598 zero leakage shutoff rating, bi-directional.
c. Carbon steel body.
d. Butt-welding connections to match pipe schedule.
e. 316 stainless steel disc and seat.
f. Non-rigid valve-to-shaft connection to accommodate differential thermal expansion of components.
g. Adjustable graphite shaft packing.
h. Geared rotary hand-wheel operator sized for maximum rim pull of 100 lb.
i. Approved Manufacturers: Zwick Series Tri-Con, Xomox Series 9000, FlowSeal MS.

   - Including drain valves and first valve inside building.

Normal Operation of Associated Steam Systems: ≤60 PSIG, ≤350F (MP) or ≤165 PSIG, ≤400F (HP).

Worst Case Excursion of Associated Steam Systems: 125 PSIG, 400F (MP) or 175 PSIG, 450F (HP).

1. Size 2” and Smaller, Socket-Weld Forged Steel Wedge Gate Valve.
   a. ANSI class 800.
b. Shut-off class IV, bi-directional.
c. Forged carbon steel body.
d. Socket-welding connections.
e. Bolted bonnet.
f. Outside screw and yoke, rising stem design.
g. 13% chrome steel wedge.
h. Alloy 6 (Stellite) hard-faced seats.
i. Renewable seat rings.
j. Integral back seat for positive packing chamber isolation.
k. Stainless steel gasket with graphite filler.
l. Graphite stem packing.
2. **Size 2 ½ and 3”, Flanged or Butt-Weld Cast Steel Wedge Gate Valve.**
   a. ANSI class 150.
   b. Shut-off class IV, bi-directional.
   c. Cast carbon steel body.
   d. Flanged or butt-welding connections.
   e. Outside screw and yoke, rising stem design.
   f. 13% chrome steel flexible wedge.
   g. Alloy 6 (Stellite) hard-faced seats.
   h. Seal-welded seat rings.
   i. Integral back seat for positive packing chamber isolation.
   j. Stainless steel gasket with graphite filler.
   k. Graphite stem packing.
   l. Spoked hand wheel.
   m. Approved manufacturers: Bonney Forge, Hancock, Smith.

3. **Size 2 ½” and Larger, Lug-Style High Performance Butterfly Valve.**
   a. ANSI class 150.
   b. Shut-off class VI, bi-directional.
   c. Stainless steel or carbon steel lug-style body.
   d. 316 stainless steel double-offset disc.
   e. Reinforced TFM seats.
   f. Disc spacers to center disc in seat.
   g. PH-4 stainless steel shaft.
   h. Stainless steel backed polymer shaft bearings.
   i. Adjustable graphite shaft packing.
   j. Geared rotary hand-wheel operator.
   k. Approved manufacturers: Jamesbury, Xomox. Cameron W-K-M.

**D. Shut-Off Valves for Condensate Piping for Steam Distribution (Tunnel) Systems.**

- **Ball valves as ALTERNATE to gate valves.**

1. **Size 2” and Smaller, Socket-Weld Three-Piece Full-Port Ball Valve.**
   a. ANSI class 600.
   b. Shut-off class VI, bi-directional.
   c. Carbon steel three-piece body.
   d. Socket-welding connections.
   e. 316 stainless steel full-port ball and stem.
   f. Vented ball.
   g. Reinforced TFM seats.
h. Live-loaded graphite stem packing.
i. Extended stem to clear insulation.
j. Latch-lock handle.

2. Size 2 ½" and Larger, Butt-Weld Three-Piece Ball Valve.
   a. ANSI class 600.
   b. Shut-off class VI, bi-directional.
   c. Carbon steel three-piece body.
   d. Extended butt-welding connections to match pipe schedule.
   e. 316 stainless steel ball and stem.
   f. Vented ball.
   g. Reinforced TFM seats.
   h. Live-loaded graphite stem packing.
   i. Extended stem to clear insulation.
   j. Geared rotary hand-wheel operator or latch-lock handle.

E. Shut-Off Valves for Pumped Condensate in Steam Distribution (Tunnel) Systems.
   - Including first valve inside building.

Normal Operation: ≤60 PSIG, ≤ 212F.
Minimum Design Conditions: 125 PSIG, 250F.

1. Size 2" and Smaller, Socket-Weld Forged Steel Wedge Gate Valve.
   a. ANSI class 800.
   b. Shut-off class IV, bi-directional.
   c. Forged carbon steel body.
   d. Socket-welding connections.
   e. Bolted bonnet.
   f. Outside screw and yoke, rising stem design.
   g. 13% chrome steel wedge.
   h. Alloy 6 (Stellite) hard-faced seats.
   i. Renewable seat rings.
   j. Integral back seat for positive packing chamber isolation.
   k. Stainless steel gasket with graphite filler.
   l. Graphite stem packing.
   m. Spoked hand wheel.
   n. Approved manufacturers: Bonnie Forge, Hancock, Smith.

2. Size 2 ¼ and 3", Flanged or Butt-Weld Cast Steel Wedge Gate Valve.
   a. ANSI class 150.
b. Shut-off class IV, bi-directional.
c. Cast carbon steel body.
d. Butt-welding connections.
e. Outside screw and yoke, rising stem design.
f. 13% chrome steel flexible wedge.
g. Alloy 6 (Stellite) hard-faced seats.
h. Seal-welded seat rings.
i. Integral back seat for positive packing chamber isolation.
j. Stainless steel gasket with graphite filler.
k. Graphite stem packing.
l. Spoked hand wheel.
m. Approved manufacturers: Kitz, Velan.

   a. ANSI class 150.
b. Shut-off class VI, bi-directional.
c. Stainless steel or carbon steel lug-style body.
d. 316 stainless steel double-offset disc.
e. Reinforced TFM seats.
f. Disc spacers to center disc in seat.
g. PH-4 stainless steel shaft.
h. Stainless steel backed polymer shaft bearings.
i. Adjustable graphite shaft packing.
j. Geared rotary hand-wheel operator.
k. Approved manufacturers: Jamesbury, Xomox. Cameron W-K-M.

   Ball valves as ALTERNATE to gate valves.

1. Size 2" and Smaller, Socket-Weld Three-Piece Full-Port Ball Valve.
   a. ANSI class 600.
b. Shut-off class VI, bi-directional.
c. Carbon steel three-piece body.
d. Socket-welding connections.
e. 316 stainless steel full-port ball and stem.
f. Vented ball.
g. Reinforced TFM seats.
h. Live-loaded graphite stem packing.
i. Extended stem to clear insulation.
j. Latch-lock handle.
2. Size 2 1/2” and Larger, Flanged Ball Valve.
   a. ANSI class 300.
   b. Shut-off class VI, bi-directional.
   c. Carbon steel body.
   d. Flanged connections.
   e. 316 stainless steel ball and stem.
   f. Vented ball.
   g. Reinforced TFM seats.
   h. Adjustable graphite stem packing.
   i. Extended stem to clear insulation.
   j. Geared rotary hand-wheel operator or latch-lock handle.

PART 3 - EXECUTION

3.1 VALVES FOR TUNNEL STEAM AND CONDENSATE DISTRIBUTION SYSTEMS

A. Valve Orientation.
   1. Gate Valve
      a. Valve shall be installed such that stem is oriented within 45 degrees of vertical position if possible. Valve may be installed with stem oriented horizontally if no other option. In no case shall valve be installed such that stem is oriented vertically downward (i.e. with hand wheel at bottom).
   2. Ball Valve.
      a. Valve may be installed in any position except with stem oriented vertically downward (i.e. with handle at bottom).
      b. Valve shall be installed such that direction of flow indication on valve body and/or product literature, if any, matches actual direction of fluid flow through valve.
      a. Valve shall be installed such that shaft is oriented horizontally. In no case shall valve be installed such that shaft is oriented vertically downward (i.e. with actuator at bottom).
      b. Valve shall be installed such that direction of flow indication on valve body and/or product literature, if any, matches actual direction of fluid flow through valve.
      c. High performance butterfly valves shall be pre-assembled to ensure proper disc/seat alignment. This is essential to achieve tight shut-off.

B. Valve Insulation.
   1. Insulated piping applications.
      a. Valves in insulated piping systems shall have body, flanges, etc. completely insulated. The practice of leaving heating valves and associated unions/flanges un-insulated is not acceptable.
      b. Insulated valves shall be equipped with extended stems and protective shields as required to allow operation without disturbing insulation.

END OF SECTION 33 63 23
This section of the *U of I Facilities Standards* establishes minimum requirements only. It should not be used as a complete specification.