

## Division 40 | Process Interconnections

Section includes various guidelines for valves, instrumentation for process systems, meters, thermometers, and gauges.

This design guideline is written to the designer of record (DOR). This guideline is written to document UA standards of work, assist the designers in ensuring UA standards are incorporated into the contract documents and provide a resource to facilitate the design process. It is the designer of record's responsibility to coordinate the criteria set forth in design guideline and in conjunction with the manufacturer requirements and use the most stringent standard.

### Section 40 05 60 – Valves

#### A. General

1. In general, follow the guidelines below when designing and specifying valves. Unless specifically indicated otherwise, these guidelines are not intended to restrict or replace professional judgment.
2. Sizes 4" and above shall have gear operated chain if located more than 8' above floor. Chain shall reach no lower than 7'-0" of floor or operating platform.
3. Provide isolation Ball valves – 100% full-port, full-line size, bronze-body, threaded connections at all equipment , including all coils, pumps, heat exchangers, steam traps, expansion tanks and on all main branch take-offs.
4. Provide brass valve tags marked for the service. See pertinent service specification for valve type.
5. Butterfly valves shall be 100% bubble-tight shut-off. Lug type only. Iron body with bronze disk.
6. Valves to have two year warranty.
7. Gate valves shall not be used.
8. Strainer blow-down valves shall always be quarter turn types, such as ball valves so that the mesh gets a sudden flow increase instead of a gradual increase.
9. Valves 10" and larger shall be positively proven to be new with dated certificate of manufacture.
10. Grooved (Victaulic) is only approved for fire protection.
11. Below-grade hydronic valves shall be AWWA class equal to M & H valves.

#### B. Design and Application Requirements

##### 1. Fire Protection

Valves for use in Fire Protection Systems shall be U.L./FM approved, NFPA rated.

##### 2. Natural Gas

Natural gas shut-off valves shall be AGA approved ball valves.

### 3. Potable Water Systems

- A. Generally, isolation valves for potable cold and hot water shall be ball or rising stem gate valves with brass or stainless trim.
- B. Valves at city water mains, near water meter, shall comply with City of Tuscaloosa requirements.

### 4. Hydronic Systems

For Chilled Water, Hot Water Heating and Condenser Water Systems, butterfly valves are preferred for isolation for sizes 2-1/2" and larger; ball valves are preferred for sizes 2" and smaller.

### 5. Steam and Condensate Systems

- A. Low Pressure and Medium Pressure Steam valves shall be rated for 150 psig, and 450 °F.
- B. For Low and Medium Pressure Steam and Condensate, all isolation valves shall be rising stem steel bodied gate valves outside yolk and stem.

### 6. Vacuum Systems

Specify valves rated for vacuum service in vacuum systems.

## C. General Valve Material Requirements

### 1. Compatibility with Service

All valves shall have seats, stem seals and disc materials compatible for intended fluid, temperature, pressure and service. Valve pressure ratings shall meet or exceed system pressure ratings in which they are installed. All valves on chilled water systems shall be selected for use with ethylene glycol. Although it is not common to fill chilled water systems with freeze-preventing concentrations of glycol year-round, the University does commonly fill coils with glycol during the winter. In the spring, this glycol is usually not flushed, and becomes part of the chilled water system.

### 2. Pipe Connections

Valves 2" and smaller shall have screwed connections for steel piping and sweated connections for copper piping. Valves 2-1/2" and larger shall have flanged connections

### 3. Bubble-Tight Construction

Butterfly, Ball and Plug Valves shall be of bubble-tight construction.

## D. Valve Material Requirements – By Valve Type

### 1. Ball and Plug Valves

- A. In general, ball valves shall be of two piece design, with stainless steel ball. When used for isolation (not throttling or balancing), valve shall be full port construction.



- B. Plug and ball valves 4" and larger shall have enclosed worm gear operators with position indicators.
- C. Preferred Manufacturers:
  - 1) Valves - Ball with Lever Handle
    - a. Crane
    - b. Grinnell (Anvil)
    - c. Jamesbury
    - d. Watts
    - e. Milwaukee
    - f. American Valve
    - g. Nibco
    - h. Apollo
    - i. Hammond

## 2. Balancing Valves

- A. In general, specify only valves specifically designed to be used for balancing.
- B. Preferred Manufacturers:
  - 1) Flow Measuring & Balancing Equipment - Manual Hydronic
    - a. Accuset
    - b. Anacon, 6 point – turban
    - c. Armstrong
    - d. Aurora
    - e. B & G
    - f. ITT Bell & Gossett Circuit Setter
    - g. Panametric – ultrasonic
    - h. PSE Inc.
    - i. Taco
  - 2) Valves - Automatic Hydronic Regulating/Balancing
    - a. Auto-Flow (press. indep.)



- b. Griswold (press. indep.)
  - c. B & G (press. indep.)
- 3) Valves - Manual Hydronic Regulating
- a. B & G
  - b. Armstrong
  - c. Taco

### 3. Butterfly Valves

- A. Valve body shall be of full lug construction, and allow for disconnecting piping from either direction while maintaining shut-off service.
- B. Butterfly valves shall be high performance type where required as noted above.
- C. Manually operated butterfly valves 4" and larger shall have enclosed worm gear operators with position indicators. Manually operated valves smaller than 4" shall have levers with locking devices.
- D. Preferred Manufacturers:
  - 1) Valves – Butterfly
    - a. Keystone
    - b. Dezurik
    - c. Grinnell (Anvil)
    - d. Stockham
    - e. Fisher
    - f. Watts
    - g. Milwaukee
    - h. Crane
    - i. Nibco
    - j. Victaulic (for fire protection only)
    - k. Hammond



2) Valves - High Performance Butterfly

- a. Jamesbury
- b. Fisher
- c. Dezurik
- d. Grinnell-Winn
- e. Watts
- f. M & H

**4. Check Valves**

A. Check valves 2" and larger in pump discharge, and 3" and larger on water riser, shall be non-slam type.

B. Preferred Manufacturers:

1) Valves - Check

- a. Milwaukee
- b. Grinnell (Anvil)
- c. Crane
- d. Stockham
- e. Nibco
- f. Mueller
- g. Victaulic – fire protection only
- h. Hammond

2) Valves - Gas (AGA Approved)

- a. Pegler
- b. Jomar
- c. Watts
- d. Grinnell (Anvil)
- e. Crane
- f. Milwaukee "Butter Ball"
- g. Nibco



- h. Hammond
- 3) Valves - City Water Main (Tuscaloosa)
  - a. Kennedy 4068
  - b. Mueller A-2380
  - c. East Jordan Series A
  - d. Other valves specifically approved by the City of Tuscaloosa for this application 3 piece full port ball valve: Conbraco.

**Section 40 70 00 – Thermometers and Gauges**

**A. Equipment Requirements**

**1. Thermometers**

- A. Mercury thermometers are not to be used.
- B. Digital thermometer: electronic, with LCD display and solar cell, clear plastic window, adjustable angle, separable socket. Manufacturers: Weiss Model DVBM25 (vari-angle), Tech Controls
- C. Industrial Glass Thermometer: adjustable angle, scale to be 9” long with white aluminum back and black graduation, aluminum or polyester casing, red appearing liquid tube, glass window. Manufacturers: Ashcroft, March, H.O. Terice, Weksler
- D. Thermometer accuracy should be greater than (+/-) 1 deg. F or 1% of reading, whichever is tighter.
- E. Thermometer range guidelines.
 

<u>Service</u>	<u>Range (°F)</u>
Domestic Cold Water	30-130 or 0-120
Domestic Hot Water	30-180
Chilled Water / Condenser Water	30-130 or 0-120
Heating Water	30-240
- F. Outdoor thermometers shall be ultraviolet proof and specifically manufactured for outdoor use.

**2. Pressure Gauges**

- A. Water and Compressed Air Services: 4 ½” diameter face, 6” diameter face for location more than 8 feet above floor, sealed glass window, glycerin filled for connections within 10 feet of pumps.
- B. Steam Service: 4 ½” diameter face, 6” diameter face for location more than 8 feet above floor, sealed glass window, brass coil siphon tube.
- C. Differential Pressure Gauges: 4 ½” diameter face, 6” diameter face for location more than 8 feet above floor, sealed glass window, glycerin filled for connections within 10 feet of pumps. Applicable for the following locations: pumps and fans.

D. Except where noted otherwise, select range for twice normal operating pressure:

<u>Service</u>	<u>Range</u>
Water (CW and HW)	0 - 100 psig
Steam (#15)	30" Hg vac. - 30 psig
Steam (#60)	30" Hg vac. - 100 psig
Comp. Air	0 - 100 psig

E. Manufacturers: Ashcroft, H.O. Trerice, Marsh, Weksler

**3. Pressure/Temperature test plugs**

A. Provide ¼" brass pressure and temperature test plugs where shown on drawings, with two core Nordel rated for 275 degrees and 300 psig.

B. Plug Manufacturers: Petes, Sisco, Schrader

**B. Design Requirements**

1. The A/E shall edit the ranges to project specific applications.
2. All gauges shall be readable from the floor and preferably located at eye level.
3. Single pressure gauges should be used across pumps but the range for the suction and discharge should be reviewed for accuracy.
4. If a single gauge is used for pumps, verify range for suction and discharge.

**C. Installation Requirements**

1. The A/E must show clearly on the drawings or details the locations for all thermometers and gauges.
2. Install thermometers in the following locations and elsewhere as indicated:
  - A. At inlet and outlet of each hydronic zone
  - B. At inlet and outlet of each hydronic boiler and chiller
  - C. At inlet and outlet of each hydronic coil in air-handling units over 5000 cfm
  - D. At inlet and outlet of each hydronic heat exchanger
  - E. At inlet and outlet of each hydronic heat recovery unit
  - F. At inlet and outlet of each thermal storage tank
  - G. At mixed air plenums
  - H. At hot/cold deck plenums
  - I. At each zone supply duct of multi-zone systems
  - J. At supply duct of single zone systems

3. Install pressure gauges in the following locations, and elsewhere as indicated on drawings:
  - A. At suction and discharge of each pump
  - B. At inlet and outlet of each pressure-reducing valve
  - C. At building water service entrance
  - D. At inlet and outlet of hydronic equipment (HW boilers, chillers, heat exchanger, filters)

- End -

