

Modify Section 23 05 01, subsection .02 per the following (deletions are shown struck through and additions are double underlined). Remainder of section is unchanged.

23 05 01 Mechanical General Requirements

.02 Valves

A. General

1. Locate valves for easy access and provide separate support where necessary.
2. Install valves in position to allow full handle and/or stem movement.
3. Install valves in horizontal piping with stem at or above center of pipe.
4. Where piping is insulated, provide extended-stem valves, arranged in proper manner to receive specified insulation thickness. Insulation cut away to receive standard stems is not acceptable.

5. Operators:

- a. Provide handwheels, fastened to valve stem, for valves other than quarter-turn.
- b. Provide lever handle for quarter-turn valves, 4" and smaller, other than plug valves.
- c. Provide one wrench for every 10 plug valves.
- d. Provide gear operators for quarter-turn valves 6" and larger (weatherproof on exterior valves).
- e. Provide chainwheel operators for all valves mounted more than 10 feet above floor in equipment rooms (or otherwise beyond convenient and safe reach of person safely using a 6' stepladder). Extend chains to to be reachable and convenient yet avoid being a nuisance, approximately 76-80 inches above finished floor.

1) Exceptions:

- a) If valves are intended for routine, frequent use, provide chainwheel operators if mounted more than 7 feet above floor in equipment rooms, with chains extended to approximately 60-72" above finished floor. Review such applications with OPP.

~~4-6~~ All valves of the same type on any one project shall be the product of one manufacturer.

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~~2-7.~~ Valves shall have right hand threads.

~~3-8.~~ Where possible, valves shall be installed with valve bonnet in an upright position to prevent deterioration or corrosion of bonnet and packing.

9. Valve body materials shall be compatible with piping system materials.

~~4-a.~~ Do not use cast iron body shut-off valves on steam systems.

~~B. Pump Valves~~

~~1. See Section 23-21-23 HVAC Pumps.~~

B. Shutoff Valves

1. General: Install positive shut-off valves throughout the distribution piping system to facilitate shutdown and draining of smallest segment as practical for repairs while keeping the rest of the system operational.

2. Locations: Shutoff valves shall be installed at:

- a. All locations required by the current building Mechanical Code.
- b. Each piece of central or terminal equipment. All valves shall be installed such that valve remains in service without shutting down system when downstream piping or equipment is removed for service, alterations or repairs. Provide arrangement of unions or flanges and removable sections of pipe at final equipment connections to allow easy dismantling and pulling of associated equipment past remaining pipe assemblies without cutting pipe or breaking sweat or press-joint fitting connections.
- c. Secondary / tertiary loops off of primary/secondary piping systems.
- d. Pipe mains at points exiting mechanical rooms, located accessibly within the mechanical room.
- e. Any pipes at points exiting the building or running under slab or underground, located accessibly within the building interior.
- f. Base of each riser
- g. Each horizontal branch takeoff of each riser
- h. Each branch takeoff serving groups of multiple terminals arranged to create hydronic modules to achieve strategically divided sections that can be isolated for service, modifications, and troubleshooting while the rest of system can remain in service.

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- i. Main or branch strainers or filters (on entering and leaving sides to allow for pulling screen).
- j. Any thermal control zone, (i.e. perimeter finned tube zones controlled by exterior orientation0).
- k. Any 3 valve bypass around devices as required maintaining continuous flow for critical applications while servicing device.
- l. Tees for future connections. Review with OPP – in some cases valves might be unnecessary and/or undesirable.
- m. Pipe expansion compensating devices that would otherwise require extraordinary effort for system shutdown and drainage to be able to service or replace. Review with OPP.

3. Types and typical service schedule:

- a. Ball valves (full port): for hydronic and steam systems, up to 2", (or up to 4" as an alternative to high performance butterfly valves for critical shut-off applications).

- b. Butterfly valves: for hydronic systems, greater than 2".

1) General:

- a) Specify only lug or flange style so valves can be a future point of disconnection on one side yet stay in service and not require entire draining of system. Wafer style is prohibited.
- b) Butterfly valves shall be capable of closing tight after long periods of inactivity. Butterfly valves shall be designed with internal, non-wetted connections to eliminate external disc-to-stem connections such as screws or taper pins. OPP often finds butterfly valves that fail to hold or that those connections have corroded and disc rotates on stem internally after years of service, which is unacceptable.

2) Resilient Seat Butterfly Valves: typically use where standard bubble-tight shut-off service is intended but critical, zero leakage isolation is not absolutely essential.

- a) Must be a high quality valve that complies with the general requirements above.

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b) Resilient seats must be properly selected for best longevity for each application. Seats for valves in closed loop hydronic applications shall be rated for a minimum of 250 degrees and completely compatible with service fluid. Seats for valves in open systems shall be selected to resist abrasive wear.

3) High Performance Butterfly valves: use where long term bi-directional zero leakage isolation is absolutely essential (building connections to central utility systems, pipe mains exiting central/primary mechanical rooms, bases of main system risers, main branch takeoffs from risers).

c. Gate: for steam systems, greater than 2"

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C. Balancing Valves

1. See [Section 23 21 13 - Hydronic Specialties](#).

D. Check Valves

1. Where check valves are required, check valves shall be installed on the equipment side of all shutoff valves to facilitate servicing the check valve.

E. Drain Valves

1. General: Hydronic piping systems shall be designed and installed to permit all sections of the system to be properly and fully drained. Provide drain valves at all low points of systems, at bases of riser, and at lowest points at equipment runouts, typically on downstream side of shut-off valves.

1.2. Drain valves shall be a minimum of 3/4" with hose end connection.

F. [Pump Valves](#)

1. [See Section 23 21 23 - HVAC Pumps](#).

END of revision

Update Commentary:

Section was updated primarily for the following reasons:

- 1) *To replace and improve requirements for shut off valves, which were previously deleted by accident.*
- 2) *To add other general valve requirements.*