

SCOPE

- I 1.1 This practice covers the design of steam, industrial water, air, or inert gas connections to piping and equipment.
- I 1.2 **Cooling water connections to process coolers and condensers, instrument air connections and all connections** for chemicals, hydrogen, natural gas and potable water are not within the scope of this International Practice.
- I 1.3 **An asterisk (*)** indicates that additional information is required. If a job is contracted, this additional information is furnished in the Job Specification.

DEFINITIONS

- I 2.1 Service categories for utility connections are:
 - a. **Continuous Service:** Used all the time during normal process operations
 - b. **Frequent Service:** Used more than twice a month but not continuously
 - c. **Infrequent Service:** Used less than twice a month
 - d. **Emergency Service:** Used only as required for emergencies

MATERIALS

- S 3.1 **Materials between the utilities specification break** and the process line or equipment shall be suitable for the more corrosive condition of the process or utility service for the maximum metal temperature of the connective piping.

DESIGN

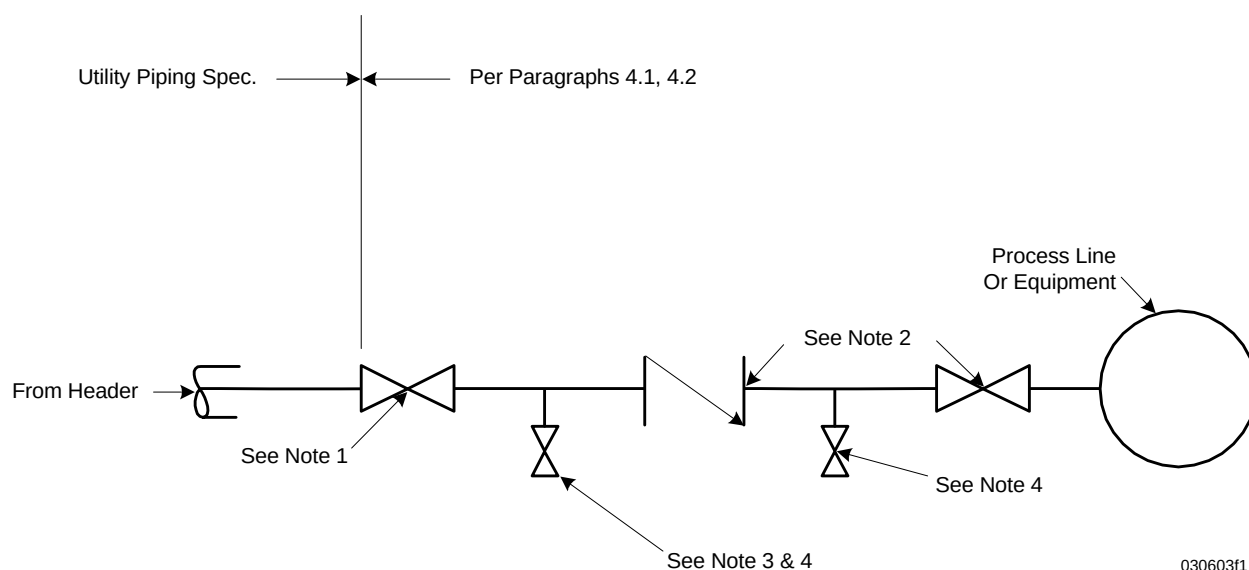
- S 4.1 **For unlined piping or equipment, the rating of the block valves, check valve and the connective piping** from the process line or equipment through the utilities specification break shall be suitable for the more severe line classification of either service.
- S 4.2 **For internal thermally lined piping or equipment, the rating of the block valves, check valve, and connective piping** shall be suitable for the maximum calculated or demonstrated metal temperature of the connective piping, and the more severe design pressure of either service. The maximum metal temperature shall be determined taking into account both the case of maximum utility flow and no utility flow.
- O,R 4.3 For **continuous, frequent or emergency service**, utility connections shall be permanently piped per [Figure 1](#), except for those services listed in **Par. 4.4**.
- O,R 4.4 For **infrequent service, and for the following utility connections, breakaway-type connections per Figure 2** shall be used:
 - a. Utility (industrial) water connected to lines or equipment operating above 212°F (100°C).
 - b. Utility (industrial) water or steam connected to lines or equipment operating below 32°F (0°C).
 - c. Connections to lines or equipment containing toxic materials.
 - d. Connections to lines or equipment in which the process pressure may exceed the utility pressure.
- O,M * 4.5 **Connections used only when equipment is not operating** such as connections for steaming, flushing, or purging shall be breakaway type per [Figure 2](#). The check valve and block valves shall be omitted and nozzle blanked for connections NPS 2 (50 mm) and larger when approved by the Owner's Engineer. Connections smaller than NPS 2 (50 mm) may be valved and plugged.
- S 4.6 **Utility inlet connections to internal equipment** (for example, coils or tube bundles) inside piping or equipment shall be permanently piped as illustrated in [Figure 1](#). The utility system upstream from the process line or equipment through the first block valve and check valve shall be suitable for a minimum design pressure equal to not less than 3/4 of the process line or equipment design pressure.
- S 4.7 **Utility systems, including auxiliaries such as steam traps, connected to the outlet from internal equipment inside piping or equipment**, shall be suitable for a minimum design pressure equal to not less than 3/4 of the piping or equipment design pressure through the first downstream block valve. **Where the block valve is installed upstream of the steam trap, or where the utility system extends to other users**, the remainder of the utility system shall be protected with a pressure relief device.

- R,S 4.8 Air lines connected to asphalt or hot oil piping operating over 200°F (93°C), through which air is supplied to blow the product to tankage, shall be provided with a water knockout drum with drainage facilities. The section of air piping downstream of the knockout drum shall not contain low points. A valved drain shall be provided in the air line immediately upstream of the block valve at the connection to the piping.
- S 4.9 **No connection** shall be made between a **potable water** system and any other piping system or process equipment.

ADDITIONAL REQUIREMENTS FOR UTILITY STATIONS

- S 5.1 **Utility (industrial) water** shall be used for hot and cold water at **utility service stations**. Fire water, cooling tower water, or steam condensate shall **not** be used.
- S 5.2 **Steam** at pressures **above 150 psig (1030 kPa)** nominal pressure shall **not** be used.
- S 5.3 **Industrial air** shall be used when air service is specified. The use of **instrument air** is **prohibited**.
- S 5.4 A **unique coupling** and **color code** shall be used for **each** of the four main utilities: air, steam, utility (industrial) water, and nitrogen.
- O,R 5.5 **Piping to utility service stations** from supply headers shall be 3/4 in. (19 mm) minimum.

FIGURE 1
PERMANENTLY PIPED UTILITY CONNECTIONS



Notes:

- (1) This valve must be readily accessible and shall not be more than 50 ft (15 m) from the connection to the process line or equipment.
- (2) **Block and check valve shall be located adjacent to the process line or equipment.** If operator access to the connective point is not provided, the block and check valve shall be located at the closest position where access exists. This alternative location shall be approved by the Owner's Engineer. Unions, couplings, or other fittings which are potential leak sources are not permitted between this block valve and the process line or equipment nozzle.
- (3) This valve used to test for back-flow through the check valve.
- (4) Bleeder valves shall remain closed and plugged, capped, or blinded except when checking for leaking check or block valve.