

**1513.0160 PIPING, TUBING, AND FITTINGS.**

Subpart 1. **Material and design.** Piping, tubing, and fittings must be made of steel or other material suitable for anhydrous ammonia service and must be designed for a pressure not less than the maximum pressure to which they may be subjected in service.

Subp. 2. **Standards.** Piping must be supported in accordance with good piping practices and provisions must be made as necessary for expansion, contraction, impact, vibration, and settling. Piping must conform to ANSI/ASME B31.3, American National Standard for Chemical Plant and Petroleum Refinery Piping, except ANSI/ASME B31.5, American National Standard for Refrigeration Piping, may be used for refrigeration piping systems within its scope.

Subp. 3. **Pipe connections.** Piping used on nonrefrigerated systems must be at least ASTM A-53 Grade B seamless or Electric Resistance Welded Pipe. Pipe joints must be threaded, welded, or flanged. Pipe must be at least Schedule 40 when joints are welded, or welded and flanged. Pipe must be at least schedule 80 when joints are threaded. Brass, copper, or galvanized steel pipe or tubing may not be used. Threaded nipples must be seamless. Welding must be done by a welder certified in accordance with the ASME code, Section IX, "Welding Qualifications." Tubing joints must be flareless or compression type fittings complying with ANSI/SAE J513f, ANSI/ASME B31.3, or ANSI/ASME 31.5.

Subp. 4. **Minimum working pressure.** All metal flexible connections for permanent nonrefrigerated installations shall have a minimum working pressure of 250 psig (safety factor of four).

Subp. 5. **Materials for fittings and valves.** Cast iron fittings may not be used. Those parts of valves which are subjected to gas pressure must be made of steel, ductile (nodular) iron, or malleable iron. Valves in this case include shut-off valves, excess flow valves, back check valves, emergency shut-off valves, and remotely controlled valves. Ductile iron must meet the requirements of ANSI/ASTM A395 and malleable iron the requirements of ANSI/ASTM A47.

Subp. 6. **Protection from damage.** Adequate provisions must be made to protect all exposed piping from physical damage that might result from impact by moving machinery, automobiles, trucks, or any other equipment at the facility.

Subp. 7. **Joint compounds.** Joint compounds must be resistant to ammonia at the maximum pressure and temperature to which they may be subjected in service.

Subp. 8. **Testing.** After assembly, all piping, hose, and tubing must be tested and proved to be free from leaks at a pressure not less than the normal operating pressure of the system.

**Statutory Authority:** *MS s 18C.121*

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