

conditions. The joint shall be able to sustain the maximum end force due to the internal pressure and any additional forces due to temperature expansion or contraction, vibration, fatigue, or to the weight of the pipe and its contents. [NFPA 54:5.6.8]

1208.5.8.1 Pipe Joints. Pipe joints shall be threaded, flanged, brazed, or welded. Where nonferrous pipe is brazed, the brazing materials shall have a melting point in excess of 538°C (1,000°F). Brazing alloys shall not contain more than 0.05 percent phosphorus. [NFPA 54:5.6.8.1]

1208.5.8.2 Tubing Joints. Tubing joints shall either be made with approved gas tubing fittings, be brazed with a material having a melting point in excess of 538°C (1,000°F), or made by press-connect fittings complying with CSA LC-4 or equivalent International Standard(s) approved by the Authority Having Jurisdiction. Brazing alloys shall not contain more than 0.05 percent phosphorus. [NFPA 54:5.6.8.2]

1208.5.8.3 Flared Joints. Flared joints shall be used only in systems constructed from nonferrous pipe and tubing where experience or tests have demonstrated that the joint is suitable for the conditions and where provisions are made in the design to prevent separation of the joints. [NFPA 54:5.6.8.3]

1208.5.8.4 Metallic Fittings (Including Valves, Strainers, Filters). [NFPA 54: 5.6.8.4]

- (1) Threaded fittings in sizes exceeding 100mm (4 in.) shall not be used unless acceptable to the Authority Having Jurisdiction.
- (2) Fittings used with steel or wrought-iron pipe shall be steel, brass, bronze, malleable iron, or cast-iron.
- (3) Fittings used with copper or brass pipe shall be copper, brass, or bronze.
- (4) Fittings used with aluminum alloy pipe shall be of aluminum alloy.
- (5) Cast-Iron Fittings.
 - (a) Flanges shall be permitted.
 - (b) Bushings shall not be used.
 - (c) Fittings shall not be used in systems containing flammable gas-air mixtures.
 - (d) Fittings in sizes 100mm (4 in.) and larger shall not be used indoors unless approved by the Authority Having Jurisdiction.

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- (e) Fittings in sizes 150mm (6 in.) and larger shall not be used unless approved by the Authority Having Jurisdiction.
- (6) Aluminum Alloy Fittings. Threads shall not form the joint seal.
- (7) Zinc-Aluminum Alloy Fittings. Fittings shall not be used in systems containing flammable gas-air mixtures.
- (8) Special Fittings. Fittings such as couplings; proprietary-type joints; saddle tees; gland-type compression fittings; and flared, flareless, or compression-type tubing fittings shall be: (1) used within the fitting manufacturer's pressure-temperature recommendations; (2) used within the service conditions anticipated with respect to vibration, fatigue, thermal expansion, or contraction; (3) installed or braced to prevent separation of the joint by gas pressure or external physical damage; and (4) acceptable to the Authority Having Jurisdiction.

1208.5.9 Plastic Piping, Joints, and Fittings. Plastic pipe, tubing, and fittings shall be joined in accordance with the manufacturer's instructions. The following shall be observed when making such joints [NFPA 54:5.6.9]:

- (A) The joint shall be designed and installed so that the longitudinal pullout resistance of the joint shall be equal to the tensile strength of the plastic piping material. [NFPA 54:5.6.9(1)]
- (B) Heat-fusion joints shall be made in accordance with AWS B2.4, *Specification for Welding Procedure and Performance Qualification for Thermoplastics* or equivalent International Standard(s) approved by the Authority Having Jurisdiction. Joints shall be made with the joining method recommended by the pipe manufacturer. Heat-fusion fittings shall be marked "ASTM D2513" or equivalent International Standard(s) approved by the Authority Having Jurisdiction. [NFPA 54:5.6.9(2)]
- (C) Where compression-type mechanical joints are used, the gasket material in the fitting shall be compatible with the plastic piping and with the gas distributed by the system. An internal tubular rigid stiffener shall be used in conjunction with the fitting. The stiffener shall be flush with