**Section 890.320 Types of Joints**

a) Caulked joints. Caulked joints for (drain, waste and vent systems only) cast iron hub-and-spigot pipe shall be firmly packed with oakum or hemp and filled with molten lead at least 1 inch deep and be firmly caulked not to extend more than ⅛ inch below the rim of the hub. Paint, varnish, or other coatings shall not be permitted on the jointing material until after a plumbing inspector has been given the opportunity to test and approve or disapprove the joint. (See Appendix C.Illustration A.)

b) Threaded/Screwed Joints. Threaded joints shall conform to American National Taper Pipe Thread, ASME B.1.20.1 (General Purpose). All burrs shall be removed; pipe ends shall be reamed or filed to size of the bore, and all chips shall be removed. Pipe joints compound shall be insoluble in water and non-toxic.

c) Wiped Joints. Joints in lead pipe or fittings, or between lead pipe fittings and brass or copper pipe ferrules, solder nipples, or traps shall be full-wiped joints. Wiped joints shall have exposed surface on each side of the joint at least ¾ inch and at least as thick as the material being joined. Wall or floor flange lead-wiped joints shall be made by using a lead ring or flange placed behind the joints at the wall or floor. Joints between lead pipe and cast iron, steel or wrought iron shall be made by means of a caulking ferrule, soldering nipple or bushing.

d) Soldered Joints. The surface to be soldered shall be cleaned bright. The joints shall be properly fluxed (lead free) and made with approved lead free solder conforming to ASTM Standard B32. Joints in copper water tubing shall be made with approved cast bronze or wrought copper pressure fittings, properly soldered together. All solders or flux containing more than 0.2 percent lead shall bear a warning label that states that the solder or flux is not approved for private or potable water use as required by Section 4 of the federal Hazardous Substances Act (15 USC 1263). Use of this product in making joints or fittings in any private or public potable water system is prohibited. No part of a drain, waste and vent (DWV) system shall be joined or fitted with a solder or flux containing more than 0.2 percent lead.

e) Flared Joints. Flared joints for plastic pipe and tubing and soft copper water tubing shall be made with approved fittings. The tubing shall be expanded with a proper flaring tool. (See Appendix C.Illustration B.)

f) Hot-Poured Joints. Hot-poured compound for clay or concrete sewer pipe shall not be water absorbent and when poured against a dry surface shall have a bond of at least 100 pounds per square inch (psi). All surfaces of the joint shall be cleaned and dried before pouring. If wet surfaces are unavoidable, a primer such as oil or tar shall be applied. The compound shall not soften sufficiently to destroy effectiveness of the joint when subjected to a temperature of 160 degrees Fahrenheit, and not be soluble in any of the waste carried by the drainage system. Approximately 25 percent of the joint space at the base of the socket shall be filled with jute or hemp. A pouring collar rope or other device shall be used to hold the hot compound during pouring. Each joint shall be poured in one operation until the joint is filled. Joints shall not be tested until one hour after pouring.

g) Precast Joints. Precast collars shall be formed in both the spigot and bell of the pipe in advance of use. Prior to making joint contact, surfaces shall be cleaned. When the spigot end is inserted in the collar, it shall bind before contacting the base of the socket.

h) Brazed Joints. Brazed joints shall be made by first cleaning the surface to be joined down to the base metal, applying flux approved for brazed joints and for the filler metal to be used, and making the joints by heating to a temperature sufficient to melt the approved brazing filler metal on contact. (See Section 890.330(b).) An extracted mechanical joint may be made in copper tube types K or L only for water distribution. The joint shall be made with a mechanical extraction tool and joined by brazing. To prevent the branch tube from being inserted beyond the depth of the extracted joint, depth stops shall be provided. This joint shall be for above-ground use only.

i) Cement Mortar Joints. Except for repairs, cement mortar joints are prohibited.

j) Burned Lead (Welded). (For DWV system only) Every burned (welded) joint shall be made so that the two or more sections to be joined shall be uniformly fused together into one continuous piece. The weld shall be at least as thick as the lead being joined.

k) Bituminized Fiber Pipe Joints. Joints in bituminized fiber pipe shall be made with tapered type couplings of the same composition as the pipe. Joints between bituminized fiber pipe and metal pipe shall be made by means of an adaptor coupling caulked as required in subsection (a).

l) Plastic Pipe Joints

1) Every joint in plastic piping shall be made with approved fittings by either solvent-welded or fusion-welded connections, compression fittings, approved insert fittings, metal clamps and screws of corrosion-resistant material, or threaded joints. (See Appendix A.Table A for approved pipe, fittings and solvent.)

2) Joints and Fittings in Plastic Pipe. Potable water piping fittings and joints shall be in accordance with the manufacturer's recommendations subject to the following: (See Appendix A.Table A, "Approved Standards for Fittings".)

A) Polyethylene (PE) pipe shall be installed only with compression fittings, insert and clamp type fittings or thermal-welded joints and fittings. All clamps shall be of corrosion-resistant material. The inside diameter (ID) of any insert fitting shall not be less than the minimum allowable size for water service/distribution piping. (See Appendix A.Tables D, N and O, for minimum allowable sizes for water service/distribution piping.)

B) Polyvinyl chloride (PVC) pipe shall be installed with solvent-welded or flanged joints only. The pipe shall not be threaded. Transition to metallic or other piping shall be made with the use of adaptor fittings. The fittings shall be molded from PVC. The primer and solvent cement used shall be in accordance with the manufacturer's recommendation for PVC piping.

C) Polybutylene (PB) pipe shall be installed only with insert and clamp type fittings, compression type, flanged type, or thermal-welded joints and fittings. All clamps shall be of corrosion-resistant material. The ID of any insert fitting shall not be less than the minimum allowable size for water service/distribution piping. (See Appendix A.Tables D, N and O, for minimum allowable sizes for water service/distribution piping.)

3) Joints in Plastic Drainage. Joints in plastic drainage piping or vent piping within a building shall be solvent welded. Threaded or flanged joints may be used with adaptor fittings. The solvent cement shall be specific for the type of piping material listed in Appendix A.Table A. O-ring expansion joints are acceptable if accessible.

m) Ground Joint Connections. Ground joint connections (when accessible) may be used on the inlet or outlet side of a fixture trap or within the trap seal. Ground joint connections shall not be used in any inaccessible drainage piping.

n) No-Hub Soil Pipe Joints. Shielded joints for no-hub cast iron soil pipe shall be made with an elastomeric gasket covered by either a stainless steel shield secured by two or more stainless steel bands or clamps, or covered by cast iron couplings secured with stainless steel nuts and bolts. When a stainless steel shield is used, the shield and clamps shall be corrosion resistant and homogeneous throughout. The joint materials shall comply with ASTM C564 and CISPI 310 or FM 1680.

o) Compression Type Joints

1) Compression type joints for hub and spigot cast iron soil pipe shall be made with neoprene insert gaskets in accordance with ASTM C564. The pipe shall comply with the specifications contained in ASTM A-74 with regard to hub and spigot dimensions and tolerances. (See Appendix C.Illustration C.)

2) Compression type joints for copper water tube or brass tube shall be made with brass ferrules and ground joint connections.

p) Grooved Type Mechanical Couplings

1) Cut grooved type mechanical couplings, fittings and valves used on standard weight galvanized steel pipe, cast iron pipe or ductile iron pipe shall comply with the grooving dimensions of the AWWA specifications C606, limited to water distribution piping and downspout pipe above ground.

2) Rolled grooved type mechanical couplings, fittings and valves used on standard weight galvanized steel pipe or type K or L copper tubing shall comply with the manufacturer's standard, limited to water distribution piping above ground. Fittings, couplings, and valves shall be compatible with the pipe material. Transition adapters shall be dielectric type.

3) Gaskets for use with potable water piping shall be fabricated from material that is non-toxic, durable and impervious.

q) Copper Press Fittings. Copper press fittings for joining copper water tubing shall have an elastomeric o-ring that forms the joint. The fitting shall be made by pressing the socket joint under pressure in accordance with the manufacturer's installation requirements and NSF/ANSI Standard 61.

(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)