**SECTION 705 JOINTS

705.1 General.**
This section contains provisions applicable to joints specific to sanitary drainage piping.  **705.2 ABS plastic.**
Joints between ABS plastic pipe or fittings shall comply with Sections 705.2.1 through 705.2.3.

**705.2.1 Mechanical joints.**
Mechanical joints on drainage pipes shall be made with an elastomeric seal conforming to ASTM C 1173, ASTM D 3212 or CSA B602. Mechanical joints shall be installed only in underground systems unless otherwise *approved.* Joints shall be installed in accordance with the manufacturer’s instructions.

**705.2.2 Solvent cementing.**
Joint surfaces shall be clean and free from moisture. Solvent cement that conforms to ASTM D 2235 or CSA B181.1 shall be applied to all joint surfaces. The joint shall be made while the cement is wet. Joints shall be made in accordance with ASTM D 2235, ASTM D 2661, ASTM F 628 or CSA B181.1. Solvent-cement joints shall be permitted above or below ground.

**705.2.3 Threaded joints.**
Threads shall conform to ASME B1.20.1. Schedule 80 or heavier pipe shall be permitted to be threaded with dies specifically designed for plastic pipe. *Approved* thread lubricant or tape shall be applied on the male threads only.

**705.3 Asbestos cement.**
Joints between asbestos-cement pipe or fittings shall be made with a sleeve coupling of the same composition as the pipe, sealed with an elastomeric ring conforming to ASTM D 1869.  **705.4 Brass.**
Joints between brass pipe or fittings shall comply with Sections 705.4.1 through 705.4.4.

**705.4.1 Brazed joints.**
All joint surfaces shall be cleaned. An *approved* flux shall be applied where required. The joint shall be brazed with a filler metal conforming to AWS A5.8.

**705.4.2 Mechanical joints.**
Mechanical joints shall be installed in accordance with the manufacturer’s instructions.

**705.4.3 Threaded joints.**
Threads shall conform to ASME B1.20.1. Pipe-joint compound or tape shall be applied on the male threads only.

**705.4.4 Welded joints.**
All joint surfaces shall be cleaned. The joint shall be welded with an *approved* filler metal.

**705.5 Cast iron.**
Joints between cast-iron pipe or fittings shall comply with Sections 705.5.1 through 705.5.3.

**705.5.1 Caulked joints.**
Joints for hub and spigot pipe shall be firmly packed with oakum or hemp. Molten lead shall be poured in one operation to a depth of not less than 1 inch (25 mm). The lead shall not recede more than 1/8 inch (3.2 mm) below the rim of the hub and shall be caulked tight. Paint, varnish or other coatings shall not be permitted on the jointing material until after the joint has been tested and *approved.* Lead shall be run in one pouring and shall be caulked tight. Acid-resistant rope and acid-proof cement shall be permitted.

**705.5.2 Compression gasket joints.**
Compression gaskets for hub and spigot pipe and fittings shall conform to ASTM C 564 and shall be tested to ASTM C 1563. Gaskets shall be compressed when the pipe is fully inserted.

**705.5.3 Mechanical joint coupling.**
Mechanical joint couplings for hubless pipe and fittings shall comply with CISPI 310, ASTM C 1277 or ASTM C 1540. The elastomeric sealing sleeve shall conform to ASTM C 564 or CSA B602 and shall be provided with a center stop. Mechanical joint couplings shall be installed in accordance with the manufacturer’s installation instructions.

**705.6 Concrete joints.**
Joints between concrete pipe and fittings shall be made with an elastomeric seal conforming to ASTM C 443, ASTM C 1173, CSA A257.3M or CSA B602.  **705.7 Coextruded composite ABS pipe, joints.**
Joints between coextruded composite pipe with an ABS outer layer or ABS fittings shall comply with Sections 705.7.1 and 705.7.2.

**705.7.1 Mechanical joints.**
Mechanical joints on drainage pipe shall be made with an elastomeric seal conforming to ASTM C1173, ASTM D 3212 or CSA B602. Mechanical joints shall not be installed in above-ground systems, unless otherwise *approved.* Joints shall be installed in accordance with the manufacturer’s instructions.

**705.7.2 Solvent cementing.**
Joint surfaces shall be clean and free from moisture. Solvent cement that conforms to ASTM D 2235 or CSA B181.1 shall be applied to all joint surfaces. The joint shall be made while the cement is wet. Joints shall be made in accordance with ASTM D 2235, ASTM D 2661, ASTM F 628 or CSA B181.1. Solvent-cement joints shall be permitted above or below ground.

**705.8 Coextruded composite PVC pipe.**
Joints between coextruded composite pipe with a PVC outer layer or PVC fittings shall comply with Sections 705.8.1 and 705.8.2.

**705.8.1 Mechanical joints.**
Mechanical joints on drainage pipe shall be made with an elastomeric seal conforming to ASTM D 3212. Mechanical joints shall not be installed in above-ground systems, unless otherwise *approved.* Joints shall be installed in accordance with the manufacturer’s instructions.

**705.8.2 Solvent cementing.**
Joint surfaces shall be clean and free from moisture. A purple primer that conforms to ASTM F 656 shall be applied. Solvent cement not purple in color and conforming to ASTM D 2564, CSA B137.3, CSA B181.2 or CSA B182.1 shall be applied to all joint surfaces. The joint shall be made while the cement is wet and shall be in accordance with ASTM D 2855. Solvent-cement joints shall be permitted above or below ground.

**705.9 Copper pipe.**
Joints between copper or copper-alloy pipe or fittings shall comply with Sections 705.9.1 through 705.9.5.

**705.9.1 Brazed joints.**
All joint surfaces shall be cleaned. An *approved* flux shall be applied where required. The joint shall be brazed with a filler metal conforming to AWS A5.8.

**705.9.2 Mechanical joints.**
Mechanical joints shall be installed in accordance with the manufacturer’s instructions.

**705.9.3 Soldered joints.**
Solder joints shall be made in accordance with the methods of ASTM B 828. All cut tube ends shall be reamed to the full inside diameter of the tube end. All joint surfaces shall be cleaned. A flux conforming to ASTM B 813 shall be applied. The joint shall be soldered with a solder conforming to ASTM B 32.

**705.9.4 Threaded joints.**
Threads shall conform to ASME B1.20.1. Pipe-joint compound or tape shall be applied on the male threads only.

**705.9.5 Welded joints.**
All joint surfaces shall be cleaned. The joint shall be welded with an *approved* filler metal.

**705.10 Copper tubing.**
Joints between copper or copper-alloy tubing or fittings shall comply with Sections 705.10.1 through 705.10.3.

**705.10.1 Brazed joints.**
All joint surfaces shall be cleaned. An *approved* flux shall be applied where required. The joint shall be brazed with a filler metal conforming to AWS A5.8.

**705.10.2 Mechanical joints.**
Mechanical joints shall be installed in accordance with the manufacturer’s instructions.

**705.10.3 Soldered joints.**
Solder joints shall be made in accordance with the methods of ASTM B 828. All cut tube ends shall be reamed to the full inside diameter of the tube end. All joint surfaces shall be cleaned. A flux conforming to ASTM B 813 shall be applied. The joint shall be soldered with a solder conforming to ASTM B 32.

**705.11 Borosilicate glass joints.**
Glass-to-glass connections shall be made with a bolted compression-type stainless steel (300 series) coupling with contoured acid-resistant elastomeric compression ring and a fluorocarbon polymer inner seal ring; or with caulked joints in accordance with Section 705.11.1.

**705.11.1 Caulked joints.**
Lead-caulked joints for hub and spigot soil pipe shall be firmly packed with oakum or hemp and filled with molten lead not less than 1 inch (25 mm) in depth and not to recede more than 1/8 inch (3.2 mm) below the rim of the hub. Paint, varnish or other coatings shall not be permitted on the jointing material until after the joint has been tested and *approved.* Lead shall be run in one pouring and shall be caulked tight. Acid-resistant rope and acidproof cement shall be permitted.

**705.12 Steel.**
Joints between galvanized steel pipe or fittings shall comply with Sections 705.12.1 and 705.12.2.

**705.12.1 Threaded joints.**
Threads shall conform to ASME B1.20.1. Pipe-joint compound or tape shall be applied on the male threads only.

**705.12.2 Mechanical joints.**
Joints shall be made with an *approved* elastomeric seal. Mechanical joints shall be installed in accordance with the manufacturer’s instructions.

**705.13 Lead.**
Joints between lead pipe or fittings shall comply with Sections 705.13.1 and 705.13.2.

**705.13.1 Burned.**
Burned joints shall be uniformly fused together into one continuous piece. The thickness of the joint shall be at least as thick as the lead being joined. The filler metal shall be of the same material as the pipe.

**705.13.2 Wiped.**
Joints shall be fully wiped, with an exposed surface on each side of the joint not less than 3/4 inch (19.1 mm). The joint shall be not less than 3/8 inch (9.5 mm) thick at the thickest point.

**705.14 PVC plastic.**
Joints between PVC plastic pipe or fittings shall comply with Sections 705.14.1 through 705.14.3.

**705.14.1 Mechanical joints.**
Mechanical joints on drainage pipe shall be made with an elastomeric seal conforming to ASTM C 1173, ASTM D 3212 or CSA B602. Mechanical joints shall not be installed in above-ground systems, unless otherwise *approved.* Joints shall be installed in accordance with the manufacturer’s instructions.

**705.14.2 Solvent cementing.**
Joint surfaces shall be clean and free from moisture. A purple primer that conforms to ASTM F 656 shall be applied. Solvent cement not purple in color and conforming to ASTM D 2564, CSA B137.3, CSA B181.2 or CSA B182.1 shall be applied to all joint surfaces. The joint shall be made while the cement is wet and shall be in accordance with ASTM D 2855. Solvent-cement joints shall be permitted above or below ground.

**705.14.3 Threaded joints.**
Threads shall conform to ASME B1.20.1. Schedule 80 or heavier pipe shall be permitted to be threaded with dies specifically designed for plastic pipe. *Approved* thread lubricant or tape shall be applied on the male threads only.

**705.15 Vitrified clay.**
Joints between vitrified clay pipe or fittings shall be made with an elastomeric seal conforming to ASTM C 425, ASTM C 1173 or CSA B602.  **705.16 Polyethylene plastic pipe.**
Joints between polyethylene plastic pipe and fittings shall be underground and shall comply with Section 705.16.1 or 705.16.2.

**705.16.1 Heat-fusion joints.**
Joint surfaces shall be clean and free from moisture. All joint surfaces shall be cut, heated to melting temperature and joined using tools specifically designed for the operation. Joints shall be undisturbed until cool. Joints shall be made in accordance with ASTM D 2657 and the manufacturer’s instructions.

**705.16.2 Mechanical joints.**
Mechanical joints in drainage piping shall be made with an elastomeric seal conforming to ASTM C 1173, ASTM D 3212 or CSA B602. Mechanical joints shall be installed in accordance with the manufacturer’s instructions.

**705.17 Polyolefin plastic.**
Joints between polyolefin plastic pipe and fittings shall comply with Sections 705.17.1 and 705.17.2.

**705.17.1 Heat-fusion joints.**
Heat-fusion joints for polyolefin pipe and tubing joints shall be installed with socket-type heat-fused polyolefin fittings or electrofusion polyolefin fittings. Joint surfaces shall be clean and free from moisture. The joint shall be undisturbed until cool. Joints shall be made in accordance with ASTM F 1412 or CSA B181.3.

**705.17.2 Mechanical and compression sleeve joints.**
Mechanical and compression sleeve joints shall be installed in accordance with the manufacturer’s instructions.

**705.18 Polyvinylidene fluoride plastic.**
Joints between polyvinylidene plastic pipe and fittings shall comply with Sections 705.18.1 and 705.18.2.

**705.18.1 Heat-fusion joints.**
Heat-fusion joints for polyvinylidene fluoride pipe and tubing joints shall be installed with socket-type heat-fused polyvinylidene fluoride fittings or electrofusion polyvinylidene fittings and couplings. Joint surfaces shall be clean and free from moisture. The joint shall be undisturbed until cool. Joints shall be made in accordance with ASTM F 1673.

**705.18.2 Mechanical and compression sleeve joints.**
Mechanical and compression sleeve joints shall be installed in accordance with the manufacturer’s instructions.

**705.19 Joints between different materials.**
Joints between different piping materials shall be made with a mechanical joint of the compression or mechanical-sealing type conforming to ASTM C 1173, ASTM C 1460 or ASTM C 1461. Connectors and adapters shall be *approved* for the application and such joints shall have an elastomeric seal conforming to ASTM C 425, ASTM C 443, ASTM C 564, ASTM C 1440, ASTM D 1869, ASTM F 477, CSA A257.3M or CSA B602, or as required in Sections 705.19.1 through 705.19.7. Joints between glass pipe and other types of materials shall be made with adapters having a TFE seal. Joints shall be installed in accordance with the manufacturer’s instructions.

**705.19.1 Copper or copper-alloy tubing to cast-iron hub pipe.**
Joints between copper or copper-alloy tubing and cast-iron hub pipe shall be made with a brass ferrule or compression joint. The copper or copper-alloy tubing shall be soldered to the ferrule in an *approved* manner, and the ferrule shall be joined to the cast-iron hub by a caulked joint or a mechanical compression joint.

**705.19.2 Copper or copper-alloy tubing to galvanized steel pipe.**
Joints between copper or copper-alloy tubing and galvanized steel pipe shall be made with a brass converter fitting or dielectric fitting. The copper tubing shall be soldered to the fitting in an *approved* manner, and the fitting shall be screwed to the threaded pipe.

**705.19.3 Cast-iron pipe to galvanized steel or brass pipe.**
Joints between cast-iron and galvanized steel or brass pipe shall be made by either caulked or threaded joints or with an *approved* adapter fitting.

**705.19.4 Plastic pipe or tubing to other piping material.**
Joints between different types of plastic pipe or between plastic pipe and other piping material shall be made with an *approved* adapter fitting. Joints between plastic pipe and cast-iron hub pipe shall be made by a caulked joint or a mechanical compression joint.

**705.19.5 Lead pipe to other piping material.**
Joints between lead pipe and other piping material shall be made by a wiped joint to a caulking ferrule, soldering nipple, or bushing or shall be made with an *approved* adapter fitting.

**705.19.6 Borosilicate glass to other materials.**
Joints between glass pipe and other types of materials shall be made with adapters having a TFE seal and shall be installed in accordance with the manufacturer’s instructions.

**705.19.7 Stainless steel drainage systems to other materials.**
Joints between stainless steel drainage systems and other piping materials shall be made with *approved* mechanical couplings.

**705.20 Drainage slip joints.**
Slip joints shall comply with Section 405.8.  **705.21 Caulking ferrules.**
Ferrules shall be of red brass and shall be in accordance with Table 705.21.  **TABLE 705.21 CAULKING FERRULE SPECIFICATIONS**

|  |  |  |  |
| --- | --- | --- | --- |
| **PIPE SIZES (inches)**  | **INSIDE DIAMETER (inches)**  | **LENGTH (inches)**  | **MINIMUM WEIGHT EACH**  |
| 2 | 21/4  | 41/2  | 1 pound |
| 3 | 31/4  | 41/2  | 1 pound 12 ounces |
| 4 | 41/4  | 41/2  | 2 pounds 8 ounces |

|  |
| --- |
| For SI: 1 inch = 25.4 mm, 1 ounce = 28.35 g, 1 pound = 0.454 kg. |

 **705.22 Soldering bushings.**
Soldering bushings shall be of red brass and shall be in accordance with Table 705.22.  **TABLE 705.22 SOLDERING BUSHING SPECIFICATIONS**

|  |  |
| --- | --- |
| **PIPE SIZES(inches)**  | **MINIMUM WEIGHTEACH**  |
| 11/4  | 6 ounces |
| 11/2  | 8 ounces |
| 2 | 14 ounces |
| 21/2  | 1 pound 6 ounces |
| 3 | 2 pounds |
| 4 | 3 pounds 8 ounces |

|  |
| --- |
| For SI: 1 inch = 25.4 mm, 1 ounce = 28.35 g, 1 pound = 0.454 kg. |

 **705.23 Stainless steel drainage systems.**
O-ring joints for stainless steel drainage systems shall be made with an *approved* elastomeric seal.