

## **815 KAR 20:060. Quality, weight, installation, and storage of materials.**

RELATES TO: KRS 318.130, 318.150, 42 U.S.C. 300g-6

STATUTORY AUTHORITY: KRS 198B.040(10), 318.130

NECESSITY, FUNCTION, AND CONFORMITY: KRS 318.130 requires the department to promulgate administrative regulations establishing the Kentucky State Plumbing Code to regulate plumbing, including the quality, weight, installation, and storage of material. This administrative regulation establishes the manufacturer's specification number for the quality and weight of material that shall be used in the installation of plumbing systems and establishes minimum specifications for the intended use. This administrative regulation also establishes the minimum requirements for the storage and installation material used in the installation of plumbing systems.

Section 1. Quality and Handling of Materials. (1) The material used in a drainage or plumbing system or part of a system shall be free of defects and shall be handled as to not cause damage to the material.

(2) All pipes and fittings shall be:

(a) Inspected for cracks or other damage prior to installation; and

(b) Installed in compliance with the manufacturer's recommendations unless otherwise stated in 815 KAR Chapter 20.

Section 2. Storage. (1) Schedule 40 or 80 PVC and ABS.

(a) Pipe shall remain in lifts until ready for use. Lifts shall not be stacked more than three (3) high and shall always be stacked wood-on-wood. Loose pipe shall be stored in racks with a minimum support space of three (3) feet. Pipe shall be shaded but not directly covered if stored outside in high ambient temperatures to provide for free circulation of air and reduce the heat buildup due to direct sunlight exposure.

(b) Fittings shall be stored in their original cartons to remain free of dirt and to reduce the possibility of damage. As a best practice, fittings shall be stored indoors.

(2) CPVC, SDR 11.

(a) CPVC pipe, tubing, and fittings shall be stored under cover to avoid unnecessary dirt accumulation and long-term exposure to sunlight.

(b) Pipe and tubing shall be stored with continuous support in straight, uncrossed bundles.

(3) PEX. PEX shall not be stored where it will be:

(a) Exposed to direct or indirect ultraviolet light (sunlight);

(b) Exposed to materials that affect the basic properties of PEX, brass, or copper; or

(c) Come into contact with chemicals, pipe thread compounds, putty, and mineral or linseed oil compounds.

(4) Solvent cement and primers. Solvent cement and primers shall not be exposed to ignition, sparks, open flames, or heat during storage and shall not be used beyond their marked shelf life.

Section 3. Marking. Each length of pipe, fitting, trap, fixture, or device used in a plumbing or drainage system shall be indelibly marked with the:

(1) Weight or quality; and

(2) Maker's mark or name (manufacturer's specification number).

Section 4. Vitrified clay pipe, concrete pipe, truss pipe, and SDR 35 pipe shall be produced, labeled, and used only as established in subsections (1) through (4) of this section.

- (1) Vitrified clay pipe shall be as established in ASTM C700, and fittings ASTM C425.
- (2) Concrete pipe shall be as established in ASTM C14, and fittings ASTM C443.
- (3) Truss pipe shall be as established in ASTM D2680, unless it is solid wall truss pipe, which shall be as established in ASTM D2751.
- (4) Extra heavy SDR 35 sewer piping shall be as established in ASTM D3034.
- (5) Joints. Joints in pipe and fittings with no more than two (2) pipe sizes between vitrified clay, ABS, or PVC to cast iron pipe and fittings or the joining of either material may be made with the proper fittings by using a dispersion grade PVC ring produced and labeled as ASTM C443, C425, or C564, or an elastomeric PVC coupling.

Section 5. Cast iron Pipe. (Hub and Spigot and No-hub). (1) Extra heavy. Extra heavy cast-iron pipe and fittings shall be produced and labeled as ASTM A74.

(2) Service-weight. Service-weight cast iron pipe and fittings shall be produced and labeled as ASTM A74 and C1540.

(3) No-hub cast-iron and fittings shall be produced and labeled ASTM 888 or CISPI 301.

(4) No-hub couplings shall be produced and labeled as ASTM C1277, C564, C1563, or CISPI 310.

(5) Coating. Cast-iron pipe and fittings for underground use shall be coated with:

- (a) Asphaltum;
- (b) Coal tar pitch; or
- (c) A coating produced and labeled as ASTM A743.

(6) Instructions for Cutting Cast Iron Soil Pipe. During installation assembly, pipe and fittings shall be inserted into the hub or into the gasket firmly and seated against the bottom of the hub or against the center rib or shoulder of the gasket. To provide a sound joint with field cut lengths of pipe, ends shall be cut square and as smooth as possible with a metal cutting saw or snap type cutters.

(7) General Installation Instructions for Cast Iron Pipe.

(a) Vertical piping.

1. Vertical piping shall be secured at sufficiently close intervals to maintain alignment and to support the weight of the pipe and its contents. Approved metal clamps or hangers shall be used to support stacks at their bases and at sufficient floor intervals to meet the requirements of local codes.

2. If vertical piping is to stand free of any support or if no structural element is available for support and stability during construction, the piping shall be secured in its proper position by means of adequate stakes or braces fastened to the pipe.

(b) Horizontal piping, suspended.

1. Ordinary horizontal piping and fittings shall be secured at sufficiently close intervals to maintain alignment and prevent sagging or grade reversal. Each length of pipe shall be supported by a hanger located not more than eighteen (18) inches from the joint.

2. Terminal ends of all horizontal runs or branches and each change of direction or alignment shall be supported by a hanger.

3. Closet bends installed above ground shall be firmly secured.

(c) Horizontal piping, underground.

1. If trenches are dug too deep, the piping shall be supported with approved grillage laid on firm ground as established in 815 KAR 20:130. To maintain proper alignment during backfilling, the pipe shall be stabilized in proper position by partial backfilling and cradling.

2. Piping laid on grade shall be adequately secured to prevent misalignment when the slab is poured.

3. Closet bends installed under slabs shall be adequately secured.

(d) Joints.

1. Joints in cast iron shall either be caulked, screwed, or made with the use of neoprene gaskets. Neoprene gaskets shall be produced and labeled as ASTM C564.

2. Steel, brass, and copper joints connected to cast iron pipe shall be either screwed or caulked joints. Caulked joints shall be made by the use of a caulking spigot.

3. Cast iron coupling for joining hubless cast iron pipe shall consist of a neoprene gasket, cast iron clamps produced and labeled as ASTM A48, and stainless steel bolts and nuts produced and labeled as ANSI B 18.2.1 and ANSI B 18.2.2.

4. Lead and Oakum Joint Installation.

a. Insert the spigot into the properly cleaned hub.

b. An oakum strand shall be inserted into the joint which is of a diameter that can be pressed into the joint by hand and sufficiently long to make three (3) turns around the pipe. Drive the strand of oakum to the bottom of the joint using a yarning iron. Pack the oakum solidly and evenly using a packing iron and hammer.

c. Place additional strands of oakum into the joint until it fills the hub to within one-half (1/2) inch of the top, and using a packing iron and hammer, pack this oakum until it forms a uniform surface one (1) inch from the top of the hub.

d. Pour molten lead into the joint at one (1) spot between the hub and spigot until it arches up slightly above the top of the hub.

e. When the lead has cooled, drive it down at four (4) points around the hub using a caulking iron to insure uniform caulking.

f. Caulk the joint on the inside and outside edges using a sixteen (16) ounce ball peen hammer and appropriate caulking irons.

5. Compression Joint Installation. a. Fold and insert the one (1) piece rubber gasket into the hub which has been properly cleaned.

b. Apply special gasket lubricant to the spigot and inside of the neoprene gasket.

c. Push, draw or drive the spigot into the gasketed hub with a pulling tool or suitable device.

6. No-hub Joint Installation.

a. Clamp and gasket installation. The following procedures shall be taken to insure a proper joint:

(i) Place the gasket on the end of one (1) pipe and the stainless steel or cast iron clamp assembly on the end of the other pipe.

(ii) Firmly seat the pipe ends against the integrally molded shoulder inside the neoprene gasket.

(iii) Slide the clamp assembly into position over the gasket and tighten the bands or clamps as described below.

b. Torqueing bands. A properly calibrated torque wrench, set at sixty (60) inch pounds shall be used. The following procedure for applying torque to the band assembly shall be used: The stainless steel bands shall be tightened alternately and firmly to sixty (60) inch pounds of torque.

(i) Step 1. The inner bands shall be tightened alternately and firmly to sixty (60) inch pounds of torque.

(ii) Step 2. The outer bands shall be tightened alternately and firmly to sixty (60) inch pounds of torque.

(iii) Torqueing clamps. A properly calibrated torque wrench, set at 175 inch pounds, shall be used. The following procedure for applying torque to the clamp assembly shall be used: The stainless steel bolts shall be tightened alternately, gradually, and firmly to 175 inch pounds torque.

Section 6. Steel and Wrought iron Pipe. (1) All wrought iron pipe shall be produced and labeled with the latest ASTM "specifications for welded wrought iron pipe".

(2) Steel pipe shall be produced and labeled with the current ASTM specification number for welded wrought iron pipe or welded and seamless pipe.

(3) Schedule 40 shall be the minimum weight.

(4) For water distribution or soil, waste and vent, galvanized pipe shall be used.

(5) Cutting and Reaming.

(a) Pipe shall be cut to length with a square cut using the appropriate tool.

(b) If the cut-to-length pipe is to be threaded or prepared for a mechanical connection, it shall be reamed to the full inner diameter of the pipe.

(6) Hangers and Supports.

(a) Hangers, anchors and supports shall be:

1. Of sufficient strength to support the piping and its contents; and

2. Securely attached to the building construction at intervals to support the piping and its contents and made to allow for expansion, contraction, structural settlement and vibration.

(b) Vertical piping.

1. Screwed piping shall be supported at every other story height and supports shall be of ferrous metal.

2. Mechanical joint piping shall be supported at every story height and supports shall be of ferrous metal.

(c) Horizontal piping.

1. Horizontal piping shall be supported at intervals which keep the piping in alignment and prevent sagging.

2. Screwed and mechanical joint pipe one and one-half (1 1/2) inches and over shall be supported at twelve (12) foot intervals. One and one-quarter (1 1/4) inch and smaller shall be supported at eight (8) foot intervals.

3. Supports shall be of ferrous metal.

(7) Joints.

(a) Screw Joints.

1. Screw joints shall be made by the use of a properly cut thread inserted into the female part of the fitting after applying the recommended pipe joint compound sparingly to the male threads.

2. The screw joints shall be tightened hand-tight to check for alignment and then tightened enough to insure a tight leak-proof joint but shall not be over-tightened.

(b) Mechanical joints.

1. Mechanical joints for hot and cold water shall not be used above ground unless the couplings are galvanized and the gaskets are ASTM D2000, Grade N-R-615 BZ.

2. The pipe ends shall be lubricated with a lubricant in compliance with the manufacturer's instructions and the gasket shall be slipped over one (1) pipe end.

3. The pipe ends shall be connected and the gasket shall be inserted into central spanning position.

4. The housing clamps shall be placed over the gasket and the bolts and nuts tightened with a socket wrench.

(c) Steel connections to cast iron pipe. Steel joints connected to cast iron pipe shall be either screwed or caulked joints.

(d) PVC and ABS pipe and fitting connections to steel. 1. PVC and ABS pipe and fitting connections to steel shall be either a screwed or caulked joint.

(e) Stainless steel tubing to cast iron pipe shall be made by caulking spigot.

(f) Stainless steel tubing to galvanized steel pipe or copper pipe shall be made by the use of

an adaptor.

(g) The joints between lead pipe and steel or wrought iron shall be made by means of a caulking ferrule or a soldering nipple.

#### Section 7. Brass Pipe, Copper Pipe, Seamless Stainless Steel Tubing, and Brass Tubing.

(1) Brass pipe, copper pipe, and brass tubing shall be produced and labeled with the latest specifications of ASTM for "brass pipe, copper pipe, and brass tubing, standard sizes".

(2) Cutting, reaming, and sizing. The tube shall be cut to exact length with a square cut using the appropriate tool.

(a) The tube shall have burrs and slivers removed by using a reamer or other appropriate tool.

(b) The tube shall be brought to true dimensions and roundness by using a sizing tool consisting of a plug and ring.

(3) Cleaning. The surface to be joined shall be clean and free from oil, grease and heavy oxides. The end of the tube shall be cleaned with a fine sand cloth or a special wire brush a distance slightly more than is required to enter the socket of the fitting.

(4) Hangers and Supports. Hangers, anchors and supports shall be:

(a) Of material of sufficient strength to support the piping and its contents; and

(b) Securely attached to the building construction at sufficiently close intervals to support the piping and its contents and made to allow for expansion, contraction, structural settlement, and vibrations.

(c) Vertical piping.

1. Copper tubing shall be supported:

a. At each story for piping one and one-half (1 1/2) inches and larger in diameter; and

b. At each story and not more than ten (10) foot intervals for piping one and one-quarter (1 1/4) inches and smaller in diameter.

2. Supports shall be of copper material of sufficient strength which will not adversely react with the piping material.

(d) Horizontal piping.

1. Copper tubing shall be supported at:

a. Six (6) foot intervals for one (1) inch and smaller in diameter; and

b. Ten (10) foot intervals for one and one-quarter (1 1/4) inch and larger.

2. Supports shall be of copper material of sufficient strength which will not adversely react with the piping material.

(5) Joints.

(a) Soldered joints. Joints of copper pipe, brass, and seamless stainless steel tubing shall be soldered. The following procedures shall be used to solder a joint:

1. After cleaning, the surfaces shall be covered with a thin film of mildly corrosive liquid or petroleum based pastes that contain chlorides of zinc and ammonium. Self-cleaning flux shall not be used in place of the cleaning pipe.

2. Excess flux shall be wiped off within the fitting socket.

3. The tube end shall be inserted into the socket, with the tube firmly seated against the end of the socket.

4. Excess flux shall be removed with a rag.

5. Heat shall be applied to the fitting and then moved in order to heat as large an area as possible. The fitting and joint shall:

a. Not be overheated; and

b. Be heated until the solder melts on contact with the pipe and flows by capillary attraction into the joint.

6. The heat shall be removed.
7. The fitting and joint shall be cooled before moving.

(b) Brazed joints. The following procedures shall be used for a brazed joint:

1. Except as provided in subparagraph 2 of this paragraph, after cleaning, the surface of the tube end and the fitting socket shall be covered with a thin film of flux in accordance with the recommendations of the manufacturer of the brazing filler metal being used. Effort shall be made to avoid getting flux inside the tube.
2. Flux may be omitted if joining copper tube to wrought copper fittings with copper-phosphorus alloys (B-cup Series) which are self-fluxing on copper.
3. The tube end shall be inserted into the socket hard against the stop and turn if possible.
4. Heat shall be applied to the parts to be joined, with:
  - a. The tube heated first; and
  - b. The fitting at the base of the cup heated next.
5. Brazing wire, rod or strip shall be applied at the point where the tube enters the socket of the fitting.

6. The heat shall be removed.
7. The fitting and joint shall be cooled.

(c) Flared joints; impact tools. The following procedures shall be used for a flared joint.

1. The joints shall be cut, reamed, sized, and cleaned.
2. The coupling nut shall be slipped over the end of the tube.
3. The flaring tool shall:
  - a. Be inserted into the tube end; and
  - b. Be driven by hammer strokes to expand the end of the tube to the desired flare.
4. The fitting shall be placed squarely against the flare.
5. The coupling nut shall be engaged with the fitting threads.
6. The joint shall be tightened with two (2) wrenches, one (1) on the nut and one (1) on the fitting.

(d) Screw type flaring block.

1. The procedures established in subparagraphs 1. and 2. of paragraph (c), subsection (6) of this section shall be followed for impact flaring.
2. The tube shall be clamped in the flaring block so that the tube is slightly above the block.
3. The yoke of the flaring tool shall be placed on the block so that the beveled end of the compression cone is over the tube end.
4. The compressor screw shall be turned down firmly, forming the flare between the chamber in the flaring block and the beveled compressor cone.
5. The flaring tool shall be removed and assembled pursuant to subparagraphs 4., 5., and 6. of paragraph (c) of this section.

(e) Mechanically formed tee connection.

1. A mechanically formed tee connection shall be approved for use in a domestic hot and cold water distribution system above ground only.
2. A mechanically extracted collar shall be formed in a continuous operation consisting of drilling a pilot hole and drawing out the tube surface to form a collar having a height of not less than three (3) times the thickness of the tube wall. The collaring device shall be fully adjustable so to insure proper tolerance and complete uniformity of the joint.
3. All joints shall be brazed in accordance with subsection (2) of this section and the manufacturer's instructions. A soldered joint shall not be permitted.

(f) Mechanical couplings. Types K and L copper tubing systems from two (2) inch through six (6) inch and used for water distribution may be installed using mechanical pipe couplings of a bolted type with a flush seal gasket along with grooved end copper fittings. Couplings shall

be of the angle pad design to obtain rigidity.

Section 8. Borosilicate Pipe, Stainless Steel Tubing, Silicon Iron Pipe, Polyethylene Pipe, and Polypropylene Pipe. (1) Borosilicate pipe. Borosilicate pipe shall be produced and labeled ASTM C1053 for drain, waste, and vent applications.

(2) Stainless steel tubing.

(a) Stainless steel tubing for hot and cold water piping shall be produced and labeled either as ASTM A269 or ASTM A312.

(b) Stainless steel tubing for the soil, waste, and vent system shall be 304 or 316L produced and labeled as ASME A112.3.1.

(3) PE pipe used in acid waste systems shall be produced and labeled as ASTM 1204.

(4) PP pipe used in acid waste systems shall be produced and labeled as ASTM D4101 or ASTM F1412.

(5) Joints.

(a) Stainless steel tubing to cast iron pipe shall be made by caulking spigot.

(b) Stainless steel tubing to galvanized steel pipe or copper pipe shall be made by the use of an adaptor.

(c) Joints in PE and PP piping shall be made by the heat fusion process.

(d) Joints in PP shall be made with a union joint.

(e) Joints in borosilicate pipe shall be a stainless steel mechanical joint.

(f) Joints between silicon iron pipe shall be either caulk joint or stainless steel mechanical joint.

Section 9. Schedule 40, ABS and PVC plastic pipe and fittings. (1) All plastic piping used in a drainage, waste, and vent system shall be:

(a) Schedule 40 or 80, Type 1, Grade 1, PVC produced and labeled as ASTM D1785;

(b) Cellular core PVC produced and labeled ASTM F891;

(c) Schedule 40 or 80 ABS produced and labeled as ASTM D2661; or

(d) Cellular core ABS produced and labeled as ASTM F628.

(2) Pipe and fittings shall be produced and labeled in accordance with the provisions of ASTM D2665, as amended, for PVC and ASTM D2661 for ABS, and both shall bear the National Sanitation Foundation seal of approval.

(3) All pipe and fittings shall bear the ASTM designation together with the NSF seal, the manufacturer's identification, and the size.

(4)(a) The use of plastic pipe and fittings (PVC or ABS) shall be limited to buildings in which the plumbing system does not exceed forty-five (45) feet in height, measured from the grade plane, and continuing through the vertical distance of the building to a maximum height of forty-five (45) feet, unless:

(b) The use of PVC and ABS piping is limited to schedule 40 or 80 produced and labeled as ASTM D2665 and ASTM D1785 for PVC piping and ASTM D2661 for ABS piping;

(c) The installation of the plastic pipe and fittings (PVC or ABS) is made in compliance with the manufacturer's recommendations, which shall be made available to the inspector; and

(d) Firestop systems are inspected in accordance with ASTM E2174 by an approved inspection agency.

(5) Installation.

(a) Underneath concrete floors. Pipe and fittings shall be laid on stable earth conditions and have four (4) inches of grillage on its bottom, top and sides. If ground is unstable, it shall be removed and the excavation filled with grillage to the underneath side of the piping. Soil or waste pipe shall not be placed in a concrete slab except those pipes that pass vertically

through it.

(b) Above concrete floors. Horizontal piping shall be properly aligned and installed without strain. Piping shall not be bent or pulled in position either before or after solvent welds have been made. It shall be supported at intervals not to exceed four (4) feet and at the end of the branches and at the change of direction and shall be so installed as to permit freedom of movement. Vertical piping shall be supported at their bases and all upward movement shall not be restricted. Closet flanges shall be securely fastened to the floor through which it passes.

(6) Hangers. Hangers and straps shall be at least one (1) inch wide and shall not compress, distort, cut, or abrade the piping to allow free movement at all times.

(7) Joints.

(a) Joints in PVC Schedule 40 or 80 pipe and fittings shall be solvent welded joints and shall be in compliance with ASTM D2665.

(b) Joints in ABS pipe and fittings shall be solvent welded joints and shall be in compliance with ASTM D2661.

(c) ABS and PVC sewer piping produced and labeled as ASTM 3034 shall be joined by solvent cement in compliance with the applicable standard or with an elastomeric joint in compliance with ASTM D3212.

(d) Piping shall be cut square with a saw or pipe cutter designed especially for plastic pipe. Pipe and fittings shall be protected from serrated holding devices or abrasions.

(e) Burrs shall be removed from both inside and outside of the pipe. Dust, dirt and moisture shall be removed from the surfaces that shall be cemented.

(f) Solvent chemical cleaner recommended by the company whose product is being installed shall be applied inside the fitting and on the outside of the piping shall be joined.

(g) A paint brush shall be used to apply the solvent cement in a moderate, even coating in the fitting socket as well as covering the pipe on the joining surfaces.

(h) Joints shall be assembled as quickly as possible before the cement dries. Insert the piping into the fitting socket turning the pipe slightly to ensure even distribution to the cement. Hold the piping in a firm position so it does not "back out" of the joint.

(i) Remove excess solvent cement from the exterior of the joint with a clean dry cloth. The joint shall not be handled for a two (2) minute period. A fifteen (15) minute period shall be allowed for the joint to develop hanging strength.

(j) A Cemented pipe joint shall not be made in conditions of excessive moisture (ninety (90) percent humidity level) or if the temperature is below forty (40) degrees or above ninety (90) degrees Fahrenheit.

(k) ABS and PVC pipe and fitting connections to steel, brass, copper, or cast iron pipe shall be either a screwed or caulked joint.

(l) Joints between Schedule 40 PVC or ABS pipe and cast iron pipe may be made by the use of a neoprene gasket produced and labeled as ASTM C564.

(m) Caulk joints shall be made with the use of either a PVC or ABS or cast iron caulking spigot.

(8) Commingling of Plastic Pipe. Plastic pipe shall not be commingled except through the use of male and female adapters or other transition fittings approved in accordance with 815 KAR 20:020, Section 4.

(9) Mixing of plastic and Metal Piping. Plastic and metal piping shall discharge into one another by the use of proper fittings and adapters.

(10) Thermal Expansion. Each plumbing installation shall be engineered and designed giving due consideration to the expansion characteristics of the material. Expansion tables for both PVC and ABS schedule 40 plastic piping are as follows:

PVC-DWV TYPE 1 THERMAL EXPANSION TABLE							
Chart shows length change in inches vs. degrees temperature change							
Lg. Ft	40° F	50° F	60° F	70° F	80° F	90° F	100° F
20	.278	.348	.418	.487	.557	.626	.696
40	.557	.669	.835	.974	1.114	1.235	1.395
60	.835	1.044	1.253	1.462	1.670	1.879	2.088
80	1.134	1.392	1.672	1.949	2.227	2.506	2.784
100	1.392	1.740	2.088	2.436	2.784	3.132	3.480

ABS-DWV TYPE 1 THERMAL EXPANSION TABLE							
Chart shows length change in inches vs. degrees temperature change							
Lg. Ft	40° F	50° F	60° F	70° F	80° F	90° F	100° F
20	.536	.670	.80	.938	1.072	1.206	1.340
40	1.070	1.340	1.610	1.880	2.050	2.420	2.690
60	1.609	2.010	2.410	2.820	3.220	3.620	4.020
80	2.143	2.680	3.220	3.760	4.290	4.830	5.360
100	2.680	3.350	4.020	4.700	5.360	6.030	6.700

Section 10. SDR 11, CPVC plastic pipe and fittings. (1) Installation. Correct assembly shall consist of the following steps:

- (a) Cutting the pipe square;
- (b) Removing burrs;
- (c) Cleaning both pipe end and fitting socket with a CPVC cleaner in compliance with manufacturer's recommendations, unless using an approved one (1) step cement.
- (d) Applying a liberal coat of CPVC solvent cement to the pipe and applying a light coat of cement to the fitting socket, removing all excess cement from the interior which may clog the waterway;
- (e) Assembling immediately by bottoming the pipe in the socket and rotating one-quarter (1/4) turn as the joint is assembled.
- (f) Removing excess cement from the joint; and
- (g) Determining if the joint has been properly assembled by looking for a small bead of cement to appear at the junction between the pipe or tubing and the fitting.

(2) Installation Temperature. Extra care shall be taken if installing in temperatures below forty (40) degrees Fahrenheit or above 110 degrees Fahrenheit. The manufacturer's installation instructions shall be followed carefully.

(3) Hangers and Supports. Support shall be provided at each floor level for piping installed in vertical runs. For horizontal runs, support shall be provided at three (3) foot intervals for pipe one (1) inch or less in diameter and at four (4) foot intervals for larger pipe sizes. Piping shall not be anchored tightly to a support but secured with smooth straps or hangers allowing for movement caused by expansion and contraction. Hangers shall not have rough or sharp edges that come in contact with the piping.

(4) CPVC-to-metal Transitions. CPVC threaded adapters shall not be used to transition from CPVC to metal. Union type fittings that use gaskets or o-rings to seal dissimilar connections shall not be used. Compression type transition fittings, over-molded transition fittings and

push-type fittings that meet the ASSE 1061 standard may be used.

(5) Thermal Expansion. The linear thermal expansion rate for CPVC is approximately one-half (1/2) inch for each ten (10) degrees Fahrenheit temperature change for each 100 feet of pipe or tubing. If installing long runs of pipe, one-sixteenth (1/16) to three thirty-seconds (3/32) inch longitudinal clearance shall be allowed per foot of run to accommodate thermal expansion. Offsets of twelve (12) inches or more every ten (10) feet shall be included on vertical risers if they are restrained by horizontal branches at each floor.

#### Section 11. PEX.

(1) PEX that is to be used for cold water only shall be produced and labeled as established by ASTM F876.

(2) PEX that is to be used for either cold water or hot water shall be produced and labeled as established by ASTM F877.

(3) PEX-Al-PEX shall be produced and labeled as established by ASTM F1281.

(4) Cold expansion fittings with PEX reinforcing rings for use with PEX tubing shall be produced and labeled as established by ASTM F1960.

(5) Metal insert fittings utilizing a copper crimp ring shall be produced and labeled as established by ASTM F1807.

(6) Stainless steel clamps substituted for the copper crimp ring shall be produced as established by ASTM F2098.

(7) Plastic insert fittings for PEX shall be produced as established by ASTM F2159.

(8) Push fit fittings for PEX shall be produced as established by ASSE 1061.

(9) Metal insert fittings for PEX/aluminum/PEX composite pressure pipe shall be produced as established by ASTM F1974.

(10) Metal insert fittings utilizing a copper crimp ring for PEX-AL-PEX shall be produced as established by ASTM F2434.

(11) Installation.

(a) Water service installation.

1. Tubing shall be snaked in the ditch to allow for linear expansion and contraction.

2. Tubing shall not be installed in contaminated soils.

3. PEX shall not be installed in areas of known soil contamination or where there is a high risk of chemical spills such as organic solvents or petroleum distillates.

4. Metallic fittings other than those consisting of red brass shall be protected from the soil to prevent corrosion.

5. The number of fittings shall be kept to a minimum.

6. The bottom of the trench shall be flat and free of rocks, hollows, or other sharp objects.

7. If placed in soil consisting of rock, piping shall be covered with six (6) inches of coarse sand or pea gravel

8. If passing through a foundation wall, a rigid sleeve that spans the distance from within the wall out to the undisturbed soil shall be used to prevent shearing of the tubing.

(b) Distribution system.

1. If PEX is to be buried under a building, fittings shall not be used.

2. PEX passing through a concrete slab or wall shall be protected by use of sleeves.

3. PEX passing through metal studs or plates shall be protected by plastic grommets designed for this purpose.

4. PEX shall not be used in operating conditions inconsistent with pressure ratings that appear on the tubing and the applicable ASTM standard.

5. PEX shall not be installed:

a. Where it may be exposed to direct or indirect ultraviolet light (sunlight);

- b. Where it may be exposed to open flame;
  - c. With or exposed to petroleum based caulking or sealants;
  - d. Where it may be subjected to prolonged exposure to free chlorine concentrations greater than four (4) ppm;
  - e. Within twelve (12) inches of any recessed light fixture; or
  - f. Within six (6) inches of any gas appliance metallic vent.
6. PEX shall be tested under a pressure not to exceed 100 pounds per square inch nor less than forty (40) pounds per square inch.
- (12) Hangers and supports.
- (a) PEX sizes one (1) inch and smaller installed horizontally shall be supported at intervals not to exceed thirty-two (32) inches.
  - (b) PEX sizes 1-1/4" and larger installed horizontally shall be supported at intervals not to exceed forty-eight (48) inches.
  - (c) PEX installed vertically shall be supported at the base of each story with a mid-story guide.
  - (d) PEX shall not be rigidly anchored but shall be installed to allow room for proper expansion and contraction of the tubing.
  - (e) Hangers or strapping shall be constructed of plastic material or be coated to prevent damage to the tubing.
  - (f) PEX-AI-PEX installed horizontally shall be supported at intervals not to exceed ninety-eight (98) inches.
  - (g) PEX-AI-PEX installed vertically shall be supported at the base of each story with a mid-story guide.

Section 11. Lead Pipe. (1) Lead soil, waste, and vent pipe shall be produced and labeled as Federal Specifications WW-P-325 and shall not be lighter than the weights established in the following table:

Size Inside Diameter Inches	Commercial Designation "D" or "XL"	Wall Thickness Inches	Weight Pounds	Per Foot Ounces
1 1/2	D XL	0.138	3	8
2	D XL	0.142	4	12
3	D XL	0.125	6	0
4	D XL	0.125	8	0

- (2) Lead bends and lead traps. All lead bends and lead traps shall be of the weight known as extra heavy (XH) and shall have at least one-eighth (1/8) inch wall thickness.
- (3) Joints.
  - (a) Joints in lead pipe or between lead pipe and brass or copper pipes, ferrules, soldering nipples, or trap, shall be full-wiped joints with an exposed surface of the solder at each side of the joint of not less than three-quarters (3/4) of an inch.
  - (b) The minimum thickness of the thickest part of the joint shall be at least as thick as the material being used.
  - (c) If lead pipe is used for acid waste lines, the pipe may be joined by burning.
  - (d) The joints between lead to cast iron, steel, or wrought iron shall be made by means of a caulking ferrule or a soldering nipple.

Section 12. Unions. Unions shall be ground faced and shall not be concealed or enclosed.

Section 13. Integral Flashing and Roof Joints. (1) If a roofing system requires integral flashing, a flashing material, which is part of the manufactured roofing system and required by the roofing manufacturer to guarantee or warranty the roofing system, shall be used.

(2) The joint at the roof shall be made watertight by the use of copper, lead, or other approved flashing or flashing material.

(3)(a) Except as established in paragraph (b) of this subsection, the approved flashing shall:

1. Not extend less than six (6) inches from the pipe in all directions; and
2. Extend upward twelve (12) or more inches and turn down into the pipe.

(b) Lead flashings for three (3) inch and four (4) inch vent stacks shall have a minimum twelve (12) inch base.

(4) A hub flashing may be used if it is constructed in a manner allowing the flashing to be caulked into a hub above the roof.

Section 14. Wall or Floor Flange Joints. Wall or floor flange joints shall be made by using a lead ring or brass flange and shall be properly soldered.

Section 15. Sheet Lead. Sheet lead for a shower pan shall not weigh less than four (4) pounds per square foot and shall not weigh less than two and one-half (2 1/2) pounds per square foot for vent pipe flashings.

Section 16. Sheet Copper or Brass. Sheet copper or brass shall not be lighter than No. 18 B. & S. gauge, except local and interior ventilating pipe shall not be lighter than No. 26 B. & S. gauge.

Section 17. Threaded Fittings. (1) A plain screw fitting shall be either castiron, malleable iron, or brass of standard weight and dimension.

(2) A drainage fitting shall be either castiron, malleable iron, or brass, with smooth interior waterway, with threads tapped out of solid metal.

(3) A castiron fitting used in a water supply distribution shall be galvanized.

(4) A malleable iron fitting shall be galvanized.

Section 18. Caulking Ferrules. A caulking ferrule shall be of red brass and shall be in accordance with the following table:

Pipe Sizes Inches	Inside Diameter Inches	Length Inches	Minimum Weight Each
2	2 1/4	2 1/2	1 lb. 0 oz.
3	3 1/4	4 1/2	1 lb. 12 oz.
4	4 1/4	4 1/2	2 lb. 8 oz.

Section 19. Soldering Nipples. A soldering nipple shall be recessed red cast brass, iron pipe size. If cast, they shall be full bore and of minimum weight.

Section 20. Increasesers and reducers. If different size pipes or fittings are to be concealed, the proper size increaser or reducer pitched at an angle of forty-five (45) degrees between the two (2) sizes shall be used. This section shall not apply to nonmetallic installations.

Section 21. Floor Flanges for Water Closets and Service Sinks or Similar Fixtures. (1) A floor flange shall either be:

- (a) Hard lead;
- (b) Brass;
- (c) Cast iron;
- (d) Galvanized malleable iron;
- (e) ABS; or
- (f) PVC.

(2) A hard lead or brass flange shall not be less than one-eighth (1/8) inch thick.

(3) Cast iron or galvanized malleable iron shall:

- (a) Not be less than one-fourth (1/4) inch thick; and
- (b) Have a two (2) inch caulking depth.

Section 22. Use of Lead. (1) Lead shall not be used in the installation or repair of a public or private water system providing potable water for human consumption.

(2) This section shall not apply to:

(a) Pipes, pipe fittings, plumbing fittings, or fixtures, including backflow preventers, that are used exclusively for nonpotable services such as manufacturing, industrial processing, irrigation, outdoor watering, or any other uses in which the water is not anticipated to be used for human consumption; or

(b) Toilets, bidets, urinals, fill valves, flushometer valves, tub fillers, shower valves, service saddles, or water distribution main gate valves that are two (2) inches in diameter or larger.

Section 23. Prohibited Joints and Connections. A fitting or connection that has an enlargement chamber, or recess with a ledge shoulder, or reduction of the pipe area in the direction of the flow shall be prohibited.

Section 24. New Materials. (1) Materials other than those established in this administrative regulation shall be prohibited unless the material is specifically approved by the division and the department as being equal to or better than the material specified in this code.

(2) It shall be the responsibility of any person or company seeking the approval of a material not included in this code to prove that the material is equal to or better than the material that it is intended to replace.

(3) Procedural requirements for approval of new parts and materials are established in 815 KAR 20:020. (1 Ky.R. 479; eff. 3-12-1975; 2 Ky.R. 495; 3 Ky.R. 313; eff. 9-1-1976; 445; eff. 1-5-1977; 4 Ky.R. 184; 538; eff. 6-7-1978; Recodified from 401 KAR 1:030, 7-5-1978; Am. 5 Ky.R. 160; eff. 10-4-1978; 6 Ky.R. 133; 384; eff. 1-2-1980; 8 Ky.R. 359; eff. 1-6-1982; 14 Ky.R. 1123; eff. 1-4-1988; 15 Ky.R. 601; 970; eff. 9-28-1988; 17 Ky.R. 2882; eff. 5-3-1991; 18 Ky.R. 2720; eff. 4-3-1992; 19 Ky.R. 999; 1385; eff. 12-8-1992; 27 Ky.R. 1902; 2794; eff. 3-22-2001; TAm eff. 8-9-2007; 35 Ky.R. 2586; 36 Ky.R. 83; eff. 7-29-2009; 41 Ky.R. 169; eff. 9-24-2014; 42 Ky.R. 127; 1193; eff. 11-6-2015; 43 Ky.R. 621; eff. 1-6-2017; 46 Ky.R. 1657, 2424; eff. 6-2-2020.)