

**WAC 296-307-41021 Piping, tubing, and fittings.** (1) Pipe must be wrought iron or steel (black or galvanized), brass, copper, or aluminum alloy. Aluminum alloy pipe must be at least Schedule 40 according to the specifications for Aluminum Alloy Pipe, ANSI H38.7-1969 (ASTM, B241-1969), and must be suitably marked at each end of each length indicating compliance with ANSI specifications. Alloy 5456 is prohibited.

**Exception:** This does not apply to piping for LP-gas used as a motor fuel or to piping on commercial vehicles.

(2) Aluminum alloy pipe must be protected against external corrosion whenever:

(a) It is in contact with dissimilar metals other than galvanized steel; or

(b) Its location is subject to repeated wetting by such liquids as water (except rain water), detergents, sewage, or leaking from other piping; or

(c) It passes through flooring, plaster, masonry, or insulation.

Galvanized sheet steel or pipe, galvanized inside and out, are considered suitable protection.

(3) Aluminum pipe must be three-fourths inch nominal and shall not be used for pressures exceeding 20 psig. Aluminum alloy pipe must not be installed within six inches of the ground.

(a) Vapor piping with operating pressures not exceeding 125 psig must be suitable for a working pressure of at least 125 psig. Pipe must be at least Schedule 40 ASTM A-53-69, Grade B Electric Resistance Welded and Electric Flash Welded Pipe or equal.

(b) Vapor piping with operating pressures over 125 psig and all liquid piping must be suitable for a working pressure of at least 250 psig. Pipe must be at least Schedule 80 if joints are threaded or threaded and back welded. At least Schedule 40 (ASTM A-53-1969 Grade B Electric Resistance Welded and Electric Flash Welded Pipe or equal) must be used if joints are welded, or welded and flanged.

(4) Tubing must be seamless copper, brass, steel, or aluminum alloy. Copper tubing must be of Type K or L or equivalent as covered in the Specification for Seamless Copper Water Tube, ANSI H23.1-1970 (ASTM B88-1969). Aluminum alloy tubing must be of Type A or B or equivalent as covered in Specification ASTM B210-1968 and must be suitably marked every 18 inches indicating compliance with ASTM specifications. The minimum nominal wall thickness of copper tubing and aluminum alloy tubing must be as specified in Table U-2 and Table U-3.

**TABLE U-2  
WALL THICKNESS OF COPPER TUBING<sup>1</sup>**

Note: The standard tube size is one-eighth-inch smaller than its nominal outside diameter.

Standard size (inches)	Nominal O.D. (inches)	Nominal wall thickness (inches)	
		Type K	Type L
1/4	0.375	0.035	0.030
3/8	0.500	0.049	0.035
1/2	0.625	0.049	0.040
5/8	0.750	0.049	0.042
3/4	0.875	0.065	0.045
1	1.125	0.065	0.050
1 1/4	1.375	0.065	0.055

Standard size (inches)	Nominal O.D. (inches)	Nominal wall thickness (inches)	
		Type K	Type L
1 1/2	1.625	0.072	0.060
2	2.125	0.083	0.070

<sup>1</sup>Based on data in Specification for Seamless Copper Water Tubing, ANSI H23.1-1970 (ASTM B-88-69).

**TABLE U-3**  
**WALL THICKNESS OF ALUMINUM ALLOY TUBING<sup>1</sup>**

Outside diameter (inches)	Nominal wall thickness (inches)	
	Type A	Type B
3/8	0.035	0.049
1/2	0.035	0.049
5/8	0.042	0.049
3/4	0.049	0.058

<sup>1</sup>Based on data in Standard Specification for Aluminum-Alloy Drawn Seamless Coiled Tubes for Special Purpose Applications, ASTM B210-68.

(5) Aluminum alloy tubing must be protected against external corrosion whenever:

(a) It is in contact with dissimilar metals other than galvanized steel; or

(b) Its location is subject to repeated wetting by liquids such as water (except rainwater), detergents, sewage, or leakage from other piping; or

(c) It passes through flooring, plaster, masonry, or insulation.

Galvanized sheet steel or pipe, galvanized inside and out, are considered suitable protection.

(6) The maximum outside diameter for aluminum alloy tubing must be three-fourths inch and must not be used for pressures exceeding 20 psig. Aluminum alloy tubing installed within six inches of the ground is prohibited.

(7) In systems where the gas in liquid form enters the building without pressure reduction, only heavy walled seamless brass or copper tubing with an internal diameter a maximum of 3/32 inch, and a wall thickness of at least 3/64 inch must be used.

**Exception:** This requirement does not apply to research and experimental laboratories, buildings or separate fire divisions of buildings used exclusively for housing internal combustion engines, and to commercial gas plants or bulk stations where containers are charged, nor to industrial vaporizer buildings, nor to buildings, structures, or equipment under construction or undergoing major renovation.

(8) Pipe joints must be screwed, flanged, welded, soldered, or brazed with a material having a melting point over 1,000°F. Joints on seamless copper, brass, steel, or aluminum alloy gas tubing must be made by approved gas tubing fittings, or soldered or brazed with a material having a melting point over 1,000°F.

(9) For operating pressures of 125 psig or less, fittings must be designed for a pressure of at least 125 psig. For operating pressures above 125 psig, fittings must be designed for a minimum of 250 psig.

(10) Threaded cast iron pipe fittings are prohibited. Aluminum alloy fittings must be used with aluminum alloy pipe and tubing. Insulated fittings must be used where aluminum alloy pipe or tubing connects with a dissimilar metal. The employer may use malleable, nodular, or higher strength gray iron for fittings.

**Note:** Strainers, regulators, meters, compressors, pumps, etc., are not to be considered as pipe fittings.

(11) All materials such as valve seats, packing, gaskets, diaphragms, etc., must be resistant to the action of LP-gas under the service conditions to which they are subjected.

(12) All piping, tubing, or hose must be tested after assembly and proved free from leaks at least normal operating pressures. After installation, piping and tubing of all domestic and commercial systems must be tested and proved free of leaks using a manometer or equivalent device that will indicate a drop in pressure. Test made by flame is prohibited.

(13) The employer must ensure that piping allows for expansion, contraction, jarring, and vibration, and settling. The employer may use flexible connections.

(14) Piping outside buildings may be buried, aboveground, or both, but must be well supported and protected against physical damage. Where soil conditions warrant, all piping must be protected against corrosion. Where condensation may occur, the piping must be pitched back to the container, or the employer must provide a means for revaporization of the condensate.

[Statutory Authority: RCW 49.17.010, 49.17.040, 49.17.050, and 49.17.060. WSR 20-21-091, § 296-307-41021, filed 10/20/20, effective 11/20/20. WSR 97-09-013, recodified as § 296-307-41021, filed 4/7/97, effective 4/7/97. Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. WSR 96-22-048, § 296-306A-41021, filed 10/31/96, effective 12/1/96.]