1315.0 Materials.

The provisions of this section apply to the field-installed piping for the distribution of medical piped gases.

1315.1 Tubes shall be hard-drawn seamless copper ASTM B 819, Type L, medical gas tubing or equivalent International Standard(s) approved by the Authority Having Jurisdiction except that where operating pressures are exceeding a gauge pressure of 13bar (185 psi), Type K shall be used for sizes exceeding DN80, 80mm O.D. (3-1/8 in. O.D.).

ASTM B 819 medical gas tubing or equivalent International Standard(s) approved by the Authority Having Jurisdiction shall be identified by the manufacturer's markings "OXY," "MED," "OXY/MED," "OXY/ACR," or "ACR/MED" in blue (Type L) or green (Type K). [NFPA 99:5.1.10.1.4, 5.1.10.1.5]

Piping for vacuum systems shall be constructed of any of the following:

(1) Hard-drawn seamless copper tube:
   (a) ASTM B 88, *Standard Specification for Seamless Copper Water Tube*, copper tube (Types K, L, M) or equivalent International Standard(s) approved by the Authority Having Jurisdiction.
   (b) ASTM B 280, *Standard Specification for Seamless Copper Tubing for Air Conditioning and Refrigeration Field Service*, copper ACR tube or equivalent International Standard(s) approved by the Authority Having Jurisdiction.
   (c) ASTM B 819, *Standard Specification for Seamless Copper Tube for Medical Gas Systems*, copper medical gas tubing (Type K or L) or equivalent International Standard(s) approved by the Authority Having Jurisdiction.

(2) Stainless steel tube [NFPA 99:5.1.10.2.1]:

Piping systems shall be designed and sized to deliver the required flow rates at the utilization pressures.

Mains and branches in medical gas-piping systems shall be not less than DN15, 16mm O.D. (5/8 in. O.D.) size.

Mains and branches in medical-surgical vacuum systems shall be not less than DN20, 22mm O.D. (7/8 in. O.D.) size.

Drops to individual station outlets and inlets shall be not less than DN15, 16mm O.D. (5/8 in. O.D.) size.

Runouts to alarm panels and connecting tubing for gauges and alarm devices shall be permitted to be DN8, 10mm O.D. (3/8 in. O.D.) size. [NFPA 99:5.1.10.10.1.1 - 5.1.10.10.1.5]

1315.2 Turns, offsets, and other changes in direction in welded or brazed medical gas and vacuum piping shall be made with wrought-copper capillary fittings complying with ASME B16.22, *Wrought Copper and Copper Alloy Solder-Joint Pressure Fittings*, brazed fittings complying with ASME B16.50, *Wrought Copper and Copper Alloy Braze-Joint Pressure Fittings* or equivalent International Standard(s) approved by the Authority Having Jurisdiction. [NFPA 99:5.1.10.3.1]

1315.2.1 Cast-copper alloy fittings shall not be permitted. [NFPA 99:5.1.10.3.2]

1315.2.2 Branch connections in vacuum piping systems shall be permitted to be made using mechanically formed, drilled, and extruded tee-branch connections that are formed in accordance with the tool manufacturer's instructions and brazed. [NFPA 99:5.1.10.3.3]

1315.3 The following special fittings shall be permitted to be used in lieu of brazed joints:

(1) Memory-metal couplings having temperature and pressure ratings joints not less than that of a brazed joint.
(2) Listed or approved metallic gas tube fittings that, when made up, provide a permanent joint having the mechanical, thermal, and sealing integrity of a brazed joint.
(3) Dielectric fittings, where required by the manufacturer of special medical equipment to electrically isolate the equipment from the piping distribution system.
(4) Axially swaged, elastic strain preload fittings providing metal to metal seal having pressure and temperature ratings not less than that of a brazed joint and, when complete, are permanent and nonseparable. [NFPA 99:5.1.10.7]

1315.4 The following joints shall be prohibited throughout medical gas and vacuum distribution pipeline systems:

(1) Flared and compression-type connections, including connections to station outlets and inlets, alarm devices, and other components.
(2) Other straight-threaded connections, including unions.
(3) The use of pipe-crimping tools to permanently stop the flow. [NFPA 99:5.1.10.8]

1315.4.1 Threaded joints in medical gas and vacuum distribution piping shall meet the following requirements:

(1) Be limited to connections to pressure/vacuum indicators, alarm devices, and source equipment.