

**APPLICATION**

NYU Langone Health

**PURPOSE**

To minimize or eliminate hazards associated with piped medical gas.

To comply with National Fire Protection Association (NFPA) 99-2012 Edition, and American Society of Sanitary Engineering (ASSE) requirements.

**POLICY AND GENERAL INFORMATION**

**1.0 Application**

NYU Langone Health (NYULH) refers to the NYU Langone Health System, NYU Langone Hospitals, NYU Grossman School of Medicine, NYU Long Island School of Medicine, the Family Health Centers at NYU Langone, and all entities controlled by any of them.

This policy applies to:

- All NYULH owned and leased facilities
- All employees, contractors, and consultants of NYULH

**2.0 Selection**

2.1 Piping for medical air, nitrous oxide, and oxygen shall comply with NFPA 99 (2012). For excerpts, See Appendices A and B.

2.2 Outlets shall comply with the following specifications.

<b>Location</b>	<b>Type</b>	<b>Vendor</b>
Superblock	Diameter-Index Safety System (DISS)	BeaconMedaes (through Hill Rom)
NYULOH	Diameter-Index Safety System (DISS)	Praxair Healthcare Services
NYULH-B	Latchkey-style quick connect	Chemetron
NYULH-LI	Diameter-Index Safety System (DISS)	Chemetron
<b>Offsites:</b>		
Superblock	Diameter-Index Safety System (DISS)	Praxair Healthcare
Family Health Centers at NYU Langone (FHC)	Diameter-Index Safety System (DISS)	Medigas
NYULH-LI	Diameter-Index Safety System (DISS)	Medigas

### 3.0 Authorization to work

- 3.1 Prior to any installation, testing, or maintenance of, or work on, medical gas outlets or piping, personnel shall obtain authorization from Facilities (Facilities Management, Facilities Operations, Engineering) or Real Estate, as applicable.
- 3.2 Facilities or Real Estate shall locate the nearest isolation valve, and determine shutdown requirements.

### 4.0 Installation

Piping for medical air, nitrous oxide, and oxygen shall:

- 4.1 Comply with NFPA 99 (2012).
- 4.2 Be installed only by certified personnel meeting ASSE 6010 requirements.
  - During installation, gas outlets shall be capped with the manufacturer's cap only. Substitute products, such as duct tape or masking tape are prohibited.
- 4.3 Have brazed fittings, installed in accordance with NFPA 99 (2012).
  - During brazing, joints shall be continuously purged with oil-free, dry nitrogen to prevent the formation of copper oxide on the inside surfaces of the joint.

### 5.0 Testing

- 5.1 Personnel (i.e., staff or a vendor) with ASSE 6010 certification shall conduct testing, in accordance with ASSE 6010. When a vendor conducts the testing, the Project Manager (PM) and/or a representative of Respiratory Therapy, Facilities, Real Estate, or an authority having jurisdiction, as applicable shall witness the testing. The PM shall maintain documentation of findings in the project file. At NYU Langone Hospital – Long Island (NYULH-LI), the PM shall provide the Chief Engineer with records of results, and the Chief Engineer shall maintain those records.
  - Certified personnel shall conduct an Initial Pressure Test when all rough assemblies are completed. The test shall be conducted at 1.5 times the working pressure but not less than 150 pounds per square inch (psi). It shall include a check for leaks, with retest if leaks are identified. For vacuum systems, it shall be conducted at 60 psi with soapy water or equivalent.

- Certified personnel shall conduct a Standing Pressure Test for 24 hours at 20% above normal working pressure. The test shall include a check for leaks, with retest if leaks are identified. For vacuum systems, it shall be conducted at no less than 12 inches of mercury (Hg).
- Following pressure testing, certified personnel shall purge lines with oil-free, dry nitrogen in accordance with NFPA 99 (2012) to ensure that no debris remains in the piping.
- A certified vendor shall conduct purity testing (of all lines affected) with oil-free, nitrogen gas, and submit the results to Facilities or Real Estate for review.
- The certified vendor shall conduct a final Tie-In Test at normal system pressure.

**6.0 Labeling**

- 6.1 All piping shall be labeled in accordance with NFPA 99 (2012). See summary information in Appendices A and B.
- 6.2 Adapters (“Christmas trees”) utilized for connection of patient medical supply tubing (e.g. Nasal cannula, non-rebreather, ambu-bag, etc.) to Oxygen and Medical Air flow meters must be clear in color.

**7.0 Preventive maintenance**

Facilities or Real Estate, as applicable, shall coordinate preventive maintenance of medical gas systems.

- 7.1 Maintenance shall include inspection and testing of the entire medical gas distribution systems at least annually.
- 7.2 The testing shall be completed by certified personnel meeting the requirements of ASSE 6030.
- 7.3 Maintenance and repairs shall be conducted by certified personnel meeting the requirements of ASSE 6030 and/or 6040.

<b>Appendix A</b>	Selected Standards from NFPA 99 (2012), Chapter 5: Gas and Vacuum Systems
<b>Appendix B</b>	Standard Designation Colors and Operating Pressures for Gas and Vacuum Systems

<b>Issue date</b>	06/2021
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<b>Replaces</b>	03/2021
<b>Reviewed by</b>	D. Bensimon, Facilities Operations J. Burke, NYULH-LI, Facility & Plant Management M. Ciferri, NYULH-B Facilities Management E. Cintron, Real Estate R. Cohen, Facilities Operations N. Ejaz, NYULH-B Safety Officer M. Figueroa, Environmental Health and Safety D. Rubbo, NYULOH Facilities Engineering NYU Langone Hospital EOC Committee NYU Langone Orthopedic Hospital EOC Committee NYU Langone Hospital – Brooklyn EOC Committee NYU Langone Hospital – Long Island EOC Committee Family Health Centers at NYU Langone EOC Committee

**Summary of Revisions**

<b>Revision date</b>	<b>Section</b>	<b>Changes</b>
June 2021	2.2	Adds Types/Vendors for outlets at NYULOH, NYULH-LI and Offsites
	6.2	Adds requirement for clear adapter connections to patient medical supply tubing
March 2021	Throughout	Changes NYU Winthrop to NYU Langone Hospital–Long Island
December 2019	Policy Name	Shortens name
	Throughout	Reorganizes policy into sections
	1.0	Incorporates Winthrop and NYU Long Island School of Medicine
	5.0	Adds the fact that certified staff do testing
	Reviewed by	Adds review by NYU Winthrop Hospital
February 2018	Throughout	Updates logo and organizational references
	2.0	Adds NYULH-B Facilities Management
	3.0	Adds requirement for capping gas outlet
	Review by	Adds review by NYULH-B Safety Officer, and NYULH-B, LOH and Family Health Centers EOC Committees
	Summary of Revisions	Adds Summary of Revisions

Excerpts from NFPA 99 (2012), Chapter 5: Gas and Vacuum Systems

5.1.10.1	<b>Piping Materials for Field-Installed Positive Pressure Medical Gas Systems.</b>
5.1.10.1.1	Tubes, valves, fittings, station outlets, and other piping components in medical gas systems shall have been cleaned for oxygen service by the manufacturer prior to installation in accordance with CGA G-4.1, <i>Cleaning Equipment for Oxygen Service</i> , except that fittings shall be permitted to be cleaned by a supplier or agency other than the manufacturer.
5.1.10.1.2	Each length of tube shall be delivered plugged or capped by the manufacturer and kept sealed until prepared for installation.
5.1.10.1.3	Fittings, valves, and other components shall be delivered sealed, labeled, and kept sealed until prepared for installation.
5.1.10.1.4	Tubes shall be hard-drawn seamless copper ASTM B 819, <i>Standard Specification for Seamless Copper Tube for Medical Gas Systems</i> , medical gas tube, Type L, except that where operating pressures are above a gauge pressure of 1275 kPa (185 psi) Type K shall be used for sizes larger than DN80 (NPS 3) (3⅞ in. O.D.).
5.1.10.1.5	ASTM B 819, <i>Standard Specification for Seamless Copper Tube for Medical Gas Systems</i> , medical gas tube 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).
5.1.10.1.6	The installer shall furnish documentation certifying that all installed piping materials comply with the requirements of 5.1.10.1.1.
5.1.10.2	<b>Piping Materials for Field-Installed Medical-Surgical Vacuum and WAGD Systems</b>
5.1.10.2.1	Piping for vacuum systems shall be constructed of any of the following: <ul style="list-style-type: none"> <li>(1) Hard-drawn seamless copper tube: <ul style="list-style-type: none"> <li>a) ASTM B 88, <i>Standard Specification for Seamless Copper Water Tube</i>, copper tube (Types K, L, or M)</li> <li>b) ASTM B 280, <i>Standard Specification for Seamless Copper Tubing for Air Conditioning and Refrigeration Field Service</i>, copper ACR tube</li> <li>c) ASTM B 819, <i>Standard Specification for Seamless Copper Tube for Medical Gas Systems</i>, copper medical gas tubing (Type K or Type L)</li> </ul> </li> <li>(2) Stainless steel tube</li> </ul>
5.1.11.1	<b>Pipe Labeling</b>
5.1.11.1.1	Piping shall be labeled by stenciling or adhesive markers that identify the patient medical gas, the support gas, or vacuum system, and include: <ul style="list-style-type: none"> <li>(1) The name of the gas/vacuum system or the chemical symbol per Table 5.1.11</li> <li>(2) The gas or vacuum system color code per Table 5.1.11</li> <li>(3) Where positive pressure gas piping systems operate at pressures other than the standard gauge pressure in Table 5.1.11, the pipe labeling shall include the operating pressure in addition to the name of the gas.</li> </ul>
5.1.11.1.2	Pipe labels shall be located as follows: <ul style="list-style-type: none"> <li>(1) At intervals of not more than 6.1 m (20 ft)</li> <li>(2) At least once in or above every room</li> <li>(3) On both sides of walls or partitions penetrated by the piping</li> <li>(4) At least once in every story height traversed by risers</li> </ul>

**Standard Designation Colors and Operating Pressures for Gas and Vacuum Systems**

<b>Gas Service</b>	<b>Abbreviated Name</b>	<b>Colors (Background/Text)</b>	<b>Standard Gauge Pressure</b>
Medical air	Med Air	Yellow/black	345-380 kPa (50-55 psi)
Carbon dioxide	CO <sub>2</sub>	Gray/black or gray/white	345-380 kPa (50-55 psi)
Helium	He	Brown/white	345-380 kPa (50-55 psi)
Nitrogen	N <sub>2</sub>	Black/white	1,100-1,275 kPa (160-185 psi)
Nitrous oxide	N <sub>2</sub> O	Blue/white	345-380 kPa (50-55 psi)
Oxygen	O <sub>2</sub>	Green/white or white/green	345-380 kPa (50-55 psi)
Oxygen/carbon dioxide mixture	O <sub>2</sub> /CO <sub>2</sub> n% (n is % of CO <sub>2</sub> )	Green/white	345-380 kPa (50-55 psi)
Medical-surgical vacuum	Med Vac	White/black	380mm to 760 mm (15in. to 30 in. HgV)
Waste anesthetic gas disposal	WAGD	Violet/white	Varies with system type
Other mixtures	Gas A%/ Gas B%	Colors as above Major gas for background/ minor gas for text	None
Nonmedical air (Category 3 gas-powered device)		Yellow and white diagonal stripe/black	None
Nonmedical and Category 3 vacuum		White and black diagonal stripe/black boxed	None
Laboratory air		Yellow and white checkerboard/black	None
Laboratory vacuum		White and black checkerboard/black boxed	None
Instrument air		Red/white	1,100-1,275 kPa (160-185 psi)

Source: NFPA 99, 2012 Edition