

NFPA-99 2002 to 2005 changes

<p>Central Supply System (bulk gases and high pressure manifold gases)</p>	<p>5.1.3.1.3 (liquid container labeling) "Liquid containers shall have additional product identification visible from all directions with a minimum of 51 mm (2 in.) high letters such as a 360 degree wraparound tape for medical liquid containers"</p> <p>5.1.3.1.4 (non-interchangeable connections) "Cryogenic liquid containers shall be provided with gas-specific outlet connections in accordance with CGA V-5, <i>Diameter-Index Safety System (Non-interchangeable Low Pressure Connections for Medical Gas Applications)</i>, or CGA V-1, <i>Compressed Gas Association Standard for Compressed Gas Cylinder Valve Inlet and Outlet Connections.</i>"</p> <p>5.1.3.1.5 (un-removable connectors to containers) "Cylinder and cryogenic liquid container outlet connections shall be affixed in such a manner as to be integral to the valve(s), un-removable with ordinary tools or so designed as to render the attachment point unusable when removed."</p> <p>5.1.3.1.6 (contents shall be checked) "Contents of cylinder and cryogenic liquid containers shall be verified prior to use."</p> <p>5.1.3.3.2(7) (cylinders no longer need to be individually chained) "Be provided with racks, chains, or other fastenings to secure all cylinders, whether connected, unconnected, full, or empty, from falling."</p> <p>5.1.3.4.12.4(1) (equal headers - not just 2) "Two equal headers, per 5.1.3.4.9, each having sufficient number of liquid container connections for an average day's supply, and with the headers connected to the final line pressure regulator assembly in such a manner that either header may supply the system"</p> <p>5.1.3.4.12.9(2) (new alarm point for hybrid manifolds) "Where a hybrid arrangement is employed, when or at a predetermined set point before the secondary (cylinder) header contents fall to one day's average supply, indicating secondary low"</p> <p>5.1.3.4.13 (The entire bulk cryogenic liquid system section has been re-written. Refer to the NFPA-99 2005 catalog for changes)</p>
<p>Medical Air Compressor Systems</p>	<p>5.1.3.5.4.1(3) (Rotating element compressors are now allowed) "Rotating element compressors provided with a compression chamber free of oil that provides the following: (a) Separation of each oil-containing section from the compression chamber by at least one seal having atmospheric vents on each side with the vent closest to the oil-containing section supplied with a gravity drain to atmosphere (b) Unobstructed visualization of the atmospheric vent(s), closest to each oil-containing section, that is accessible for inspection without disassembling the compressor (c) Entry of the rotating shaft into each compressor chamber at a point that is above atmospheric pressure (d) The facility operators to confirm proper seal operation by direct visual inspection of the atmospheric vents</p> <p>5.1.3.5.12.3(6) (after power loss, compressors must automatically restart) "Automatic restart function such that compressor(s) will restart after power interruption without manual intervention"</p> <p>5.1.3.5.15 (Dew point / CO monitor activation)</p>

	<p>"Dew point and carbon monoxide monitors shall activate the individual monitor's signal at all master alarm panels if the monitor loses power."</p> <p>5.1.9.2.4(10) (medical air dew point level change) "A medical air dew point high alarm from each compressor site to indicate when the line pressure dew point is greater than +2°C (+35°F)</p> <p>Note: The above paragraph contradicts others within the standard: 5.1.3.5.15(1) "...+4°C (+39°F)" table 5.1.12.3.12.3 ..."4°C (39°F)"</p>
<p>Instrument Air Systems</p>	<p>5.1.3.8.11 (Electrical power and controls are required to be similar to the medical air compressor controls. The points of this section are too numerous to note here. Please see this particular section in NFPA-99 2005 edition)</p>
<p>Medical-Surgical Vacuum Systems</p>	<p>5.1.3.6.6.3(6) (after power loss, pumps must automatically restart) "Automatic restart function such that pump(s) will restart after power interruption without manual intervention"</p>
<p>Waste Anesthetic Disposal Systems (WAGD)</p>	<p>5.1.3.7.2.2 (low vacuum level WAGD systems) "Vacuum producers (e.g., fans or blowers) designed for operation at vacuum levels below 130 mm (5 in.) HgV shall be as follows: (1) Permitted to be made of any materials determined by the manufacturer as suitable for the service (2) Provided with anti-vibration mountings as required by equipment dynamics or location in accordance with the manufacturer's recommendation (3) Connected with their intake and outlet piping through flexible connections (4) Used only for WAGD service and not employed for other services (5) Interconnected via piping, ductwork, and so on made of materials determined by the manufacturer as suitable to the service"</p> <p>5.1.3.7.3 (distance of WAGD piping to medical vacuum piping) "If WAGD is joined to vacuum piping, it shall be connected a minimum distance of 1.5 m (5 ft) from any vacuum inlet"</p> <p>5.1.3.7.5.3(6) (after power loss, pumps must automatically restart) "Automatic restart function such that pump(s) will restart after power interruption without manual intervention"</p>
<p>Piping Infrastructure</p>	<p>5.1.4.5 (mainline supply valve not required if...) "A shut off valve shall be provided in the main supply line inside of the building, except where one or more of the following conditions exist: (1) The source and the source valve are located inside the building served. (2) The source system is physically mounted to the wall of the building served and the pipeline enters the building in the immediate vicinity of the source valve."</p> <p>5.1.10.2.2.1 (vacuum pipe must be marked) "If copper vacuum tubing is installed along with any medical gas tubing, the vacuum tubing shall, prior to installation, be prominently labeled or otherwise identified to preclude using materials or installation procedures in the medical gas system that are not suitable for oxygen service."</p> <p>5.1.10.2.2.2 (marking pipe is not required if its meets this standard) "If medical gas tube (<i>ASTM B 819, Standard Specification for Seamless Copper Tube for Medical Gas Systems</i>) is used for vacuum piping, such special marking shall not be required, provided the vacuum piping installation meets all other requirements for medical gas piping, including the prohibition of flux on copper to copper joints and the use of nitrogen purge while</p>

	<p>brazing."</p> <p>5.1.10.2.3(2) (low vacuum WAGD pipe may be any suitable material) "In systems operated under 130 mm (5 in.) HgV maximum vacuum only, using any non-corroding tube or ductwork"</p>
<p>Alarms - see specific pieces of source equipment (i.e. medical compressors, etc) for alarm changes pertinent to those items</p>	<p>5.1.9.2.2 (computers may be used as a master alarm) "A centralized computer system shall be permitted to be substituted for one of the master alarms required in 5.1.9.2.1, if the computer system complies with 5.1.9.4." <p>Note: the computer system must meet the requirements of the master alarms.</p> <p>5.1.9.3.4(2) (alarm sensors for anesthetizing locations can be on either side of the zone valve box) "Area for anesthetizing gas delivery shall have the sensors installed either on the source side of any of the individual room zone valve box assemblies or on the patient or use side of each of the individual zone valve assemblies"</p> </p>
<p>Installation</p>	<p>5.1.10.6 (gas tungsten arc welding allowed. The points of this section are too numerous to note here. Please see this particular section in NFPA-99 2005 edition)</p> <p>5.1.10.7(4) (new fitting allowed) "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"</p> <p>5.1.10.10.5.3 (access and drainage are required of split joints) "If underground piping is protected by a conduit, cover, or other enclosure, the following requirements shall be met: <ul style="list-style-type: none"> (1) Access shall be provided at the joints for visual inspection and leak testing. (2) The conduit, cover, or enclosure shall be self-draining and not retain groundwater in prolonged contact with the pipe."</p>
<p>Testing</p>	<p>5.1.12.3.8.4 (limit change of hydrocarbons) "The difference between two tests shall in no case exceed the following: <ul style="list-style-type: none"> (1) Total hydrocarbons (excluding methane), 5 ppm (2) Halogenated hydrocarbons, 5 ppm"</p> <p>5.1.12.3.9.2 (ultrasonic leak detectors for vacuum pipe) "Each joint in the final connection between the new work and the existing system shall be leak-tested with the gas of the system designation at the normal operating pressure by means of soapy water or other means safe for use with oxygen. Vacuum joints shall be tested using an ultrasonic leak detector or other means that will permit detection of leaks in an active vacuum system"</p>