



LAS VEGAS FIRE & RESCUE

Fire Prevention Division

Information Sheet



The items listed are basic information only. Please refer to adopted codes for specific details. Codes are subject to change. Additional requirements may apply.

Effective Date: January 5, 2026

Ordinance # 6918

Medical Gas Systems Plan Review / Inspection Checklist

This informational checklist has been created to assist with the general requirements for the plan review and inspections of medical gas system within the City of Las Vegas. The checklist is not intended to cover all aspects of the systems. Refer to the International Fire Code (IFC) and the appropriate Standard (NFPA 99) related to Medical Gas systems.

Medical Gas System: System(s) consisting of equipment and piping for the distribution of nonflammable medical gases such as but not limited to: Oxygen, Nitrous oxide, Compressed air, Carbon dioxide, and Helium and medical vacuum system. Commercial Co2 systems for beverage dispensing are not covered under this information sheet.

Risk Categories (Formally levels):

Category I	Activities, systems or equipment whose failure is likely to cause major injury or death of patients, staff, or visitors. (NFPA 99 4.1.1)
Category II	Activities, systems or equipment whose failure is likely to cause minor injury of patients, staff, or visitors. (NFPA 99 4.1.2)
Category III	Activities, systems or equipment whose failure is not likely to cause injury to patients, staff, or visitors but can cause discomfort. (NFPA 99 4.1.3)
Category IV	Activities, systems or equipment whose failure would have no impact on patient care. (NFPA 99 4.1.4)

Plan Review:

- Completed Fire Permit application
- Medical Gas system plan submittal shall include items as indicated in SNFC § 5306.6.
- Certificate and or qualifications of individual or organization performing brazing shall be provided at time of permit application submittal

Construction of Medical Gas Rooms:

- Rooms shall be separated from the rest of the building by not less than one-hour (1) fire resistive construction (IFC § 5306.2.1)
- Openings between the gas room and exterior spaces shall be self-closing smoke and or draft control assemblies having a fire protection rating of not less than one hour. (IFC § 5306.2.1)
- Rooms shall have at least one exterior wall that is provided with at least two vents. Each vent shall not be less than 36 sq. inches in area. One vent shall be within 6 inches of the floor and one shall be within 6 inches of the ceiling. (IFC § 5306.2.1)
- Rooms shall be equipped with at least one automatic sprinkler in case of fire to provide container cooling. *In the case the facility does not have an approved automatic fire sprinkler installed; a single sprinkler head connected to the domestic water supply can be installed within the medical gas room.

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- Interior rooms or areas where medical gases are stored or used in quantities exceeding the MAQ shall be in accordance with the International Building Code for High Hazard Group (IFC § 5306.2)
- Room Signage shall be in accordance with NFPA 99 § 5.1.3.1.9

Medical Gases
No Smoking or Open Flame

Components/Piping:

- Air compressors utilized for dental air shall be located separately from other medical gas systems or storage enclosures (NFPA 99 § 15.3.3.2.1)
- Air sources for compressors utilized for dental air shall be drawn from locations where no contamination from vacuum systems discharges or particulate matter is anticipated. NFPA 99 § 15.3.3.4.2.3
- Cylinders shall be protected from damage by means of the following specific procedures:
 - Oxygen cylinders shall be protected from abnormal mechanical shock, which is liable to damage the cylinder, valve, or safety device.
 - Oxygen cylinders shall not be stored near elevators or gangways or in locations where heavy moving objects will strike them or fall on them.
 - Cylinders shall be protected from tampering by unauthorized individuals.
 - Cylinders or cylinder valves shall not be repaired, painted, or altered.
 - Safety relief devices in valves or cylinders shall not be tampered with.
 - Valve outlets clogged with ice shall be thawed with warm — not boiling — water.
 - A torch flame shall not be permitted, under any circumstances, to come in contact with a cylinder, cylinder valve, or safety device.
 - Sparks and flame shall be kept away from cylinders.
 - Even if they are considered to be empty, cylinders shall not be used as rollers, supports, or for any purpose other than that for which the supplier intended them.
 - Large cylinders (exceeding size E) and containers larger than 45 kg (100 lb) weight shall be transported on a proper hand truck or cart complying with 11.4.3.1.
 - Freestanding cylinders shall be properly chained or supported in a proper cylinder stand or cart.
 - Cylinders shall not be supported by radiators, steam pipes, or heat ducts. NFPA 99 § 11.6.2.3
- Liquids from a Category 3 Vacuum are routed directly to a sanitary drainage system through compliant means in accordance with NFPA 99 § 5.1.3.7 and Plumbing code as adopted by the City of Las Vegas. Piping for medical gas system vacuums shall be either copper type L or K or M or stainless steel tube in accordance with NFPA 99 § 5.1.10.2.
- Piping for medical gas systems shall be hard-drawn seamless copper ASTM B 819 medical gas tube, Type L or K. NFPA 99 5.1.10.1.4
- Medical gas systems piping for mains and branches and individual stations shall be designed and sized to deliver the required flow rates at the utilization pressures but shall be not less than ½ in, NFPA 99 5.1.10.11.1.3
- Vacuum piping shall be designed and sized to draw the required flow rates at the utilization vacuums but shall be no less than ¾ in, with individual drops of ½ in permitted. NFPA 99 5.3.10.1.1
- Piping for medical gas and vacuum systems shall be supported in accordance with NFPA 99 § 5.1.10.11.4.6. Underground piping for medical gas and vacuum systems shall be protected and installed in accordance with NFPA 99 § 5.1.10.11.5.

Pipe and Valve labeling: NFPA 99 § 5.1.11.1- 5.1.11.3.2

- At intervals of not more than 20 ft.

- At least once in or above every room
- On both sides of walls or partitions penetrated by the piping
- At least once in every story height traversed by risers
- Piping for medical gas shall not be painted.

Inspections:

General:

- Tubes, piping, valves, fittings, station outlets, and other piping components in medical gas and vacuum systems shall be tested by a person other than the installing contractor certified by an independent medical gas testing agency prior to the use of the system. (SNFC § 5306.7, NFPA 99 5.1.12.3.1.4)
- Tests gas shall be oil free, dry nitrogen NF.

Initial Pressure Test: NFPA 99 5.1.12.2.3

- Gases and Vacuum systems tested at 1.5 times system operating pressure. (But not less than 150 psig)
- System was under pressure until each joint was examined for leakage using means that is safe to use with oxygen and do not contain ammonia.
- Completed prior to any devices such as pressure/vacuum alarm devices, indicators and similar.
- Testing is being performed after initial blowdown of the distribution piping and valves.
- Testing is being performed after installation of station outlet/inlet rough-in (Test caps shall be permitted to be used)

Initial Cross Connection Test: NFPA 99 5.1.12.2.4.2

- It shall be determined that no cross-connections exist between the various medical gas and vacuum piping systems.
- All piping systems shall be reduced to atmospheric pressure.
- Sources of test gas shall be disconnected from all piping systems, except for the one system being tested.
- Individual system been charged with oil-free nitrogen NF to a gauge pressure of 345 Kpa (50psi)
- Verification of test gas per outlet has been confirmed
- After the installation of the individual faceplates with appropriate adapters matching outlet/inlet labels, each individual outlet/inlet in each installed medical gas and vacuum piping system shall be checked to determine that the test gas is being dispensed only from the piping system being tested.
- The cross-connection test referenced in 5.1.12.2.4 shall be repeated for each installed medical gas and vacuum piping system

Initial Piping Purge Test: NFPA 99 5.1.12.2.5

- Each outlet has been purged starting at the closest outlet/inlet to the zone valve and was continued to the furthest outlet/inlet.
- Each outlet was purged and documented as such to remove any particulate matter from the piping system. (*Intermittent high-volume flow until purge produces no discoloration in a clean white cloth*)

Standing Pressure Test: NFPA 99 5.1.12.2.6

- Standing pressure test conducted after initial pressure test.
- All valve bodies face plates and similar are in place.
- All source valves were closed at start of 24 hr. test.
- Test pressure locked in at 20 percent above normal operating pressure.
Start Time: _____ Start pressure _____ Stop Pressure _____

- The leakage over the 24-hour test shall not exceed 0.5 percent of the starting pressure [e.g., 2 kPa (0.3 psi) starting at 415 kPa (60 psig)], except that attributed to specific changes in ambient temperature.

Standing Vacuum Test: NFPA 99 5.1.12.2.7

- Standing pressure test conducted after initial pressure test.
- Sources of test vacuum were disconnected at start of 24 hr. test.
- Test vacuum locked in at 20 HgV.
- Start Time: _____ Start Vacuum: _____ HgV Stop Vacuum: _____ HgV.
- The leakage over the 24-hour test shall not exceed 0.5 percent of the starting pressure [e.g., 0.3 mm (0.125 in.) HgV starting at 635 mm (25 in.) HgV] except that attributed to specific changes in ambient temperature.
- **Medical gas and /or Vacuum Alarm installed in accordance with NFPA 99 § 5.1.9 through 5.1.9.5.3.**

Alarm System Tests:

- All warning systems shall be installed in accordance with NFPA 99 Chapter 5 and verified to alarm at systems increases or decreases of 20 % of the normal operating pressures.

Third Party Final Testing Report:

- Third party test results and system certification provided.

Table 1 NFPA 99 Table 5.1.11 Standard designation Colors and operating Pressures for Gas and Vacuum Systems

Gas Service	Abbreviated Name	Colors (Background/Text)
Medical Air	Med Air	Yellow/Black
Carbon Dioxide	Co2	Gray/Black or Gray/White
Helium	He	Brown/White
Nitrogen	N2	Black/White
Nitrous Oxide	N2O	Blue/White
Oxygen	O2	Green/white or White/Green
Oxygen/Co2 mixtures	O2/co2 n%(n is 5 of co2)	Green/White
Medical-surgical vacuum	Med Vac	White/Black
Waste anesthetic gas disposal	WAGD	Violet/White
Other mixtures	Gas A %/ Gas B %	Colors as above. Major gas for background and minor gas for text
Non-Medical air. (Level 3 gas –powered device)		Yellow and white diagonal stripe/black
Non-Medical and level 3 Vacuum		White and Black diagonal stripe/Black boxed
Laboratory air		Yellow and White checkerboard/Black
Laboratory vacuum		White and Black checkerboard/Black boxed
Instrument Air		Red/White

Table 2 NFPA 99 Maximum Pipe Support spacing

Pipe Size	Hanger spacing
¼ in.	5 ft.
3/8 & ½ in.	6 ft.
¾ in.	7 ft.
1 in.	8 ft.
1 ¼ in.	9 ft.
1 ½ in.	10ft.