Medical Gas

City of Henderson
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Fire Safety Engineering
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This checklist is provided for the convenience of our customers. Complete and accurate plan submittals help speed the plan review process. Attention to the completeness and accuracy of information at the beginning of the process generally leads to fewer delays and requests for revisions by City staff. Please use the following information to assure that your application includes all of the information that is necessary for a complete review of your plans.

Part. 1 Applicant's Responsibility

Applicants are responsible for ensuring applications submitted are complete. Incomplete applications will result in plans being rejected for acceptance or returned to the applicant during the review process. City service commitments will not apply to incomplete submissions.

Part. 2 Prerequisites

Plan Readability. Easily Read; legible; a readable typeface. Vivid contrast or difference in brightness between the light and dark areas of the drawing.

Part. 3 Applicable Codes

Plans shall meet the requirements of the adopted codes, ordinances and regulations.

Part. 4 Submittal Package

Provide the following information at the time you submit your application for a Medical Gas permit.

- ☐ 1. Plans (1 digital set).
- ☐ 2. Material Submittals, also called "Product Data Submittal" (minimum 1 set).

Part. 5 Plan Contents

Plans must contain the following minimum content requirements. This list is not intended to be all inclusive of every detail required on a set of fire sprinkler plans. Rather, it is provided to give an overview of the basic plan contents needed for the review of plans.

- ☐ 1. Project Name, Project Street Address and Owner's Name.
- ☐ 2. Contractor's Name, Address, License Numbers, Phone #, and Fax #.
- ☐ 3. Applicable codes, height and number of stories.
- ☐ 4. Occupancy classification. For all occupancies, state the occupant load and if building is sprinklered.
- ☐ 5. Aggregate quantities of gases (1,500 cu ft max / 3,000 cu ft if sprinklered) **UFC 8001.15.2.3.5**
- ☐ 6. Scale of All Drawings Graphically Indicated.

Part. 6 Checklist

- ☐ 1. Air compressors and vacuum pumps shall be located separately from other medical systems or cylinder storage enclosures **NFPA 99 5.3.6.20.5**
- ☐ 2. Indoor locations shall be constructed of an assembly of building materials with a fire resistance rating of at least 1 hour. **NFPA 99 5.3.3.3.3.2**

☐ 3. Compressed gas containers, cylinders, tanks and systems shall be secured against accidental dislodgment and against access by unauthorized personnel in accordance with Section 7401.6. **UFC § 7401.6.1 & § 7401.6.4 General, Security.**

☐ 4. A one-hour exterior room shall be a room or enclosure separated from the rest of the building by not less than one-hour-rated fire-resistance construction.

- ☐ Openings between the room or enclosure and interior spaces shall be self-closing smoke- and draft-control assemblies having a fire-protection rating of not less than one hour.
- ☐ Rooms shall have at least one exterior wall with at least two vents.
  - ☐ Each vent shall not be less than 36 square inches in area. One vent shall be within 6 inches of the floor and one shall be within 6 inches of the ceiling.
- ☐ **Containers of medical gases shall be provided with a least one fire sprinkler to provide container cooling in case of fire. UFC § 7404.2.1.2 Medical Gas Systems, Interior Supply Location**

☐ 5. Air sources for a compressor(s) located outside the building shall be drawn from locations where no contamination from vacuum or scavenging system discharges or particulate matter is anticipated. **NFPA 99 § 5.3.3.5.7 Source of Intake Air** (For exterior intake and exhaust piping, the recommended separation distance is 10 ft.)

☐ 6. Liquids from a Level 3 vacuum system shall be **directly connected to the sanitary drainage** system through a trapped and vented drain. **NFPA 99 § 5.3.3.6.3.1**

☐ 7. Piping for positive-pressure nonflammable medical gases (e.g., oxygen and nitrous oxide) shall have:

- ☐ a. 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 CGA4.1
- ☐ b. Each length of tube shall be delivered plugged or capped by the manufacturer and kept sealed until prepared for installation.
- ☐ c. Fittings, valves, and other components shall be delivered sealed and labeled by the manufacturer and kept sealed until prepared for installation.
- ☐ d. Tubes shall be hard-drawn seamless copper ASTM B 819 medical gas tube, Type L or K.
- ☐ e. ASTM B 819 medical gas tube shall ve 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 § 5.3.10.1.1 Piping Material for Medical Gases**

☐ 8. Piping materials for field-installed level 3 vacuum systems shall be either copper type L or K or PVC plastic, Schedule 40 minimum. **NFPA 99 § 5.3.10.2 Piping Material for vacuum systems**

☐ 9. Piping materials for field-installed level 1 vacuum systems shall be hard-drawn seamless copper, either **NFPA 99 § 5.3.10.2 Piping Material for vacuum systems**

☐ 10. Joints shall be brazed within one hour after the surfaces are cleaned for brazing. **NFPA § 99-5.3.10.7.3.12**

The brazing of joints shall be completed at the end of the day in which they are fitted and installed. Caps are to be placed at open ends to prevent contamination.

☐ 11. While being brazed (Nitrous Oxide & Oxygen piping), joint shall be continuously purged with oil-free, dry Nitrogen NF to prevent the formation of copper oxide on the inside surfaces being joined. **NFPA § 99-5.3.10.7.5.1**

☐ 12. The source of the purge gas shall be monitored and the installer shall be audibly alerted when the source content is low. **NFPA § 99-5.3.10.7.5.2**

☐ 13. During and after installation, openings in the piping shall be kept sealed to maintain a nitrogen atmosphere within the piping to prevent debris or other contaminants from entering the system**. NFPA § 99-5.3.10.7.5.6**

☐ 14. The final connection of new piping to an existing, in-use pipeline shall be permitted to be made without the use of a nitrogen purge. **NFPA § 99-5.3.10.7.5.10**

☐ 15. After a final connection in a positive pressure medical gas pipeline is made without a nitrogen purge, an outlet in the immediate downstream zone of the affected portion(s) of both the new and existing in-use piping shall be tested in accordance with 5.1.12.3.9 Final Tie-In test (see below). **NFPA § 99-5.3.10.7.5.11**

☐ 16. Brazing shall be performed by individuals who are qualified under provisions of 5.3.10.10.15 **NFPA 99- 5.3.10.10.1.3**

☐ 17. Piping shall be supported from the building structure in accordance with MSS Standard Practice SP-69, *Piping Hangers and supports – Selection and Application*. Hangers and supports shall comply with Mss Standard Practice SP-58, *Pipe Hangers and Supports – Materials, Design and Manufacture.* Hangers for copper tube shall have a copper finish. In potentially damp locations, copper tube hangers or supports shall be plastic-coated or otherwise insulated from the tube. Maximum support spacing shall be as follows:

¼ - 5 ft. ⅜ & ½ in. – 6 ft., ¾ in. – 7 ft., 1 in. – 8 ft. 1¼ in. – 9 ft. 1½in. – 10ft. **NFPA 99 § 5.3.10.10.6 Pipe Support**

☐ 18. Underground piping shall be installed in a continuous enclosure to protect the pipe from damage while backfilling. The continuos enclosure shall be split or otherwise provide access at the joints during visual inspection and leak testing. Buried piping that will be subject to surface loads shall be buried at a sufficient depth to protect the piping from excessive stresses. (the recommended depth is 18") Trenches shall be excavated so that the pipe has a firm, substantially continuous bearing on the bottom of the trench. Backfill shall be clean and compacted so as to protect and uniformly support the pipe enclosure. **NFPA 99 § 5.3.10.10.8 Underground Piping Outside of Buildings**

☐ 19. Piping shall be labeled by stenciling or adhesive markers that identify the system. **NFPA 99 § 5.3.11.1.1 Pipe Labeling**

☐ 20. Pipe labels shall show the name of the gas / vacuum system or the chemical symbol. **NFPA 99 § 5.3.11.1.2 Pipe Labeling**

☐ 21. Pipe Labels shall be located as follows:

NFPA 99 § 5.3.11.1.4 Pipe Labeling

- ☐ a. At intervals of not more than 20ft.
- ☐ b. At least once in or above every room
- ☐ c. On both sides of walls or partitions penetrated by the piping
- ☐ d. At least once in every story height traversed by risers

☐ 22. The inspection and testing reports shall be submitted directly to the party that contracted for the testing, who shall submit the report through channels to the responsible facility authority and any others that are required. **NFPA 99- 5.3.12.1.6**

☐ 23. The responsible facility authority shall review these inspection and testing records prior to the use of all systems to assure that all findings and results of the inspection and testing have been successfully completed. **NFPA 99- 5.3.12.1.8**

☐ 24. **5.3.12.2.3 Initial Pressure Test:**

- ☐ a. Each section of the piping in medical gas and vacuum systems shall be pressure tested. (note: per 5.1.12.2.1.2 The test gas shall be oil free, dry Nitrogen NF.)
- ☐ b. Initial pressure tests shall be conducted as follows:
  - (1) After installation of station outlets/ inlets rough-in assemblies. Test caps shall be permitted to be used.
  - (2) Prior to the installation of components of the distribution piping system that would be damaged by the test pressure (e.g., pressure/ vacuum alarm devices, pressure/ vacuum indicators, etc.)
- ☐ c. N/A
- ☐ d. The source shutoff valves for all piping systems shall remain closed during these tests.
- ☐ e. The test pressure for pressure gases shall be **1.5 times** the system working pressure but not less than a gage pressure of **150 psi**.
- ☐ f. The test pressure for copper Level 3 vacuum piping shall be a gage pressure of **15 psi.**
- ☐ g. The test pressure shall be maintained until each joint has been examined for leakage by means of soapy water or other equally effective means of leak detection that is safe for use with oxygen.
- ☐ h. Leaks, if any, shall be located, repaired (if permitted), replaced (if required), and retested

☐ 25. **5.3.12.2.7 Standing Pressure Test for Medical Gas Piping**

- ☐ a. Test shall be conducted after the final installation of station outlet valve bodies, face plates, and other distribution system components (e.g., pressure alarm devices, pressure indicators, line pressure relief valves, etc.)
- ☐ b. The source valve shall be closed during this test.
- ☐ c. The piping system shall be subjected to a 24-hour standing pressure test using oil-fr dry Nitrogen NF.
- ☐ d. Test pressures shall be 20 percent above the normal system operating pressure. (6 psi)
- ☐ e. At the conclusion of the tests, there shall be no change in the test pressure greater than a gage pressure of 5 psi.
- ☐ f. Leaks, if any, shall be located, repaired (if permitted), replaced (if required), and retested

☐ 26. **5.3.12.2.8 Standing Pressure Test for Vacuum Systems**

- ☐ a. The piping systems shall be subjected to a vacuum of not less than 19 in. gage HgV for 24-hours, using either the vacuum source equipment or a test source.
- ☐ b. During the test, the vacuum source shall be disconnected from the piping system.
- ☐ c. At the conclusion of the test, the vacuum shall not have reduced to less than 12 in HgV

☐ 27. Verification tests shall be performed only after all tests required in 5.3.12.2 (see above) have been completed. **NFPA 99- 5.3.12.3.1.1**

☐ 28. Testing shall be performed by a party other than the installing contractor **NFPA 99- 5.3.12.3.1.4**