



5.1.14.2 Maintenance of Medical Gas, Vacuum, WAGD, and Medical Support Gas Systems.

5.1.14.2.2 Maintenance Programs.

5.1.14.2.2.1 Inventories. Inventories of medical gas, vacuum, WAGD, and support gas systems shall include at least all source subsystems, control valves, alarms, manufactured assemblies containing patient gases, and outlets.

5.1.14.2.2.2* Inspection Schedules. Scheduled inspections for equipment and procedures shall be established through the risk assessment of the facility and developed with consideration of the original equipment manufacturer recommendations and other recommendations as required by the authority having jurisdiction.

Chapter 3 Definition

3.2.2* Authority Having Jurisdiction (AHJ). An organization, office, or individual responsible for enforcing the requirements of a code or standard, or for approving equipment, materials, and installation, or a procedure

5.1.14.2.2.3 Inspection Procedures. The facility shall be permitted to use any inspection procedure (s) or testing methods established through its own risk assessment.

5.1.14.2.2.4 Maintenance Schedules. Scheduled maintenance for equipment and procedures shall be established through the risk assessment of the facility and developed with consideration of the original equipment manufacturer recommendations and any other recommendations as required by the authority having jurisdiction.

5.1.14.2.2.5 Qualifications. Persons maintaining these systems shall be **qualified** to perform these operations. Appropriate qualification shall be demonstrated by any of the following:

(1) Training and certification through the **healthcare facility** by which such persons are employed to work with specific equipment as installed in that facility

(2) Credentialing to the requirements of **ASSE 6040**, Professional Qualification Standard for Medical Gas Maintenance Personnel

- 1) Candidates must be employed or contracted by a health care facility, or actively engaged in working with medical gas systems.
- 2) Candidate shall have minimum of one (1) year of documented practical experience in the maintenance of medical gas systems.
- 3) Candidate shall have completed a minimum 32-hour training course conducted by a Medical Gas Systems Instructor certified to ASSE Standard 6050

(3) Credentialing to the requirements of ASSE 6030, Professional Qualification Standard for Medical Gas System Verifiers

- 1) Candidates must have a minimum of two (2) years of documented practical experience in the verification of medical gas piping systems. Records substantiating the required experience or testimonial letters on company letterhead from employers are required. Testimonial letters must fully describe duties performed and dates employed, and must be accompanied by W-2 forms.
- 2) Candidates are also required to have a current certificate of insurance, in the name of the individual or employing verification company, for general liability, and professional liability insurance.
- 3) Candidate shall have completed a minimum 32-hour training course conducted by a Medical Gas Systems Instructor certified to ASSE Standard 6050

5.1.14.2.3 Inspection and Testing Operations

5.1.14.2.3.1 General. The elements in 5.1.14.2.2 through 5.1.15 shall be inspected or tested as part of the maintenance program as follows:

- 1) Medical air source, as follows:
 - A. Room temperature
 - B. Shaft seal condition
 - C. Filter condition
 - D. Presence of hydrocarbons
 - E. Room ventilation
 - F. Water quality, if so equipped
 - G. Intake location
 - H. Carbon monoxide monitor calibration
 - I. Air purity
 - J. Dew point
- 2) Medical Vacuum Source-Exhaust Location
- 3) WAGD Source-Exhaust Location
- 4) Instrument Air Source-Filter Condition
- 5) Manifold Sources
 - (a) Ventilation
 - (b) Enclosure Labeling
- 6) Bulk cryogenic liquid source inspected in accordance with NFPA 55, Compressed Gases and Cryogenic Fluids Code

NFPA 55

8.14.1.3 (NFPA 55) Inspection

8.14.1.3.1 (NFPA 55) Cryogenic fluid storage systems shall be inspected annually and maintained by a qualified representative of the equipment owner.

8.14.1.3.2 (NFPA 55) A record of the inspection shall be prepared and provided to the user or the authority having jurisdiction upon request.

- 7) Final line regulation for all positive pressure systems-
Delivery pressure
- 8) Valves-Labeling

9) Alarms and Warning Systems-Lamp and Audio Operation

10) Alarms and Warning Systems, as follows:

- (a) Master alarm signal operation
- (b) Area alarm signal operation
- (c) local alarm signal operation

11) Station outlets/inlets, as follows:

- (a) Flow
- (b) Labeling
- (c) Latching/de-latching
- (d) Leaks

5.1.14.2.3.2 Manufactured Assemblies Employing Flexible Connection (s) Between the User Terminal and the Piping System.

- A. Nonstationary booms and articulating assemblies, other than headwalls utilizing flexible connectors, shall be tested for leaks, per manufacturer's recommendations, every 18 months, or at a duration that is safe for use with oxygen.
- B. The system pressure to nonstationary booms and articulating arms shall be maintained at operating pressure until each joint has been examined for leakage by effective means of leak detection that is safe with oxygen
- C. Safe working condition of the flexible assemblies shall be confirmed.
- D. DISS connectors internal to the boom and assemblies shall be checked for leakage
- E. Leaks, if any, shall be repaired, or the components replaced, and the equipment retested prior to placing the equipment back into service
- F. Additional testing of nonstationary booms or articulating arms shall be performed at intervals defined by documented performance data.

5.1.14.3 Medical Gas and Vacuum Systems Information and Warning Signs.

5.1.14.3.1 The gas content of medical gas and vacuum piping systems shall be labeled in accordance with 5.1.11.1

5.1.14.3.2 Labels for shutoff valves shall be in accordance with 5.1.11.2 and updated when modifications are made changing the areas served.

5.1.14.4 Medical Gas and Vacuum Systems Maintenance and Record Keeping.

5.1.14.4.1 Permanent records of all tests required by 5.1.12.3.1 through 5.1.12.3.14 shall be maintained in the organization's files.

5.1.14.4.2 The supplier of the bulk cryogenic liquid system shall, upon request, provide documentation of vaporizer (2) sizing criteria to the facility.

5.1.14.4.3 An annual review of bulk system capacity shall be conducted to ensure the source system has sufficient capacity.

5.1.14.4.4 Central supply systems for nonflammable medical gases shall conform to the following:

- (1) They shall be inspected annually
- (2) They shall be maintained by a qualified representative of the equipment owner.
- (3) A record of the annual inspection shall be available for review by the authority having jurisdiction

5.1.14.4.5 A periodic testing procedure for nonflammable medical gas and vacuum and related alarm systems shall be implemented.

5.1.14.4.6 Whenever modifications are made that breach the pipeline, any necessary installer and verification test specified in 5.1.12 shall be conducted on the downstream portions of the medical gas piping system.

5.1.14.4.7 Procedures, as specified, shall be established for the following:

- (1) Maintenance program for the medical air compressor supply system in accordance with the manufacturer's recommendations
- (2) Facility testing and calibration procedure that ensures carbon monoxide monitors are calibrated at least annually or more often if recommended by the manufacturer
- (3) Maintenance program for both the medical-surgical vacuum piping system and the secondary equipment attached to the medical-surgical vacuum station inlets to ensure the continued good performance of the entire medical-surgical vacuum system

5.1.14.4.8 Audible and visual alarm indicators shall meet the following requirements:

- (1) They shall be periodically tested to determine that they are functioning properly.
- (2) Records of the test shall be maintained until the next test is performed.

5.1.14.4.9 Medical-surgical vacuum station inlet terminal performance, as required in 5.1.12.3.10.4, shall be tested as follows:

- (1) On a regular preventive maintenance schedule as determined by the facility maintenance staff
- (2) Based on flow of free air into station inlet while simultaneously checking the vacuum level

5.1.15 Category 1 Maintenance. Facilities shall have a routine maintenance program for their piped medical gas and vacuum systems.