

N 7.4.6 Safety devices that can be configured or programmed shall comply with both of the following:

- (1) Have documented configurations
- (2) Be verified at least annually

7.4.7 Safety device testing shall be documented at least annually.

7.4.8 Calibration of continuous vapor concentration high limit controllers shall be performed in accordance with the manufacturer's instructions and shall be performed at least once per month.

7.4.9 Pressure and explosion relief devices shall be visually inspected at least annually to ensure that they are unobstructed and properly labeled.

7.4.10* Valve seat leakage testing of safety shutoff valves and valve proving systems shall be performed in accordance with the manufacturer's instructions.

7.4.10.1 Testing frequency shall be at least annually.

7.4.10.2 The installation of a valve proving system or a valve with proof of closure shall not replace the requirement for seat leakage testing in 7.4.10.1.

7.4.11* The set point of the pressure relief valve, where installed, shall be verified at least annually.

7.4.12 Replacement of Safety Shutoff Valves for Open-Close Cycling Applications.

7.4.12.1* Safety shutoff valves that are used to comply with 8.7.1.5 and are not proved closed shall be replaced before they exceed their maximum allowable number of lifetime open-close cycles.

7.4.12.2* The number of safety shutoff valve cycles shall be determined by one of the following ways:

- (1) Counting of actual safety shutoff valve open-close cycles
- (2) Estimated time to reach 90 percent of lifetime total cycles based on normal cycling rates

7.4.13 Manual shutoff valves shall be maintained in accordance with the manufacturer's instructions.

7.4.14* Lubricated manual shutoff valves shall be lubricated and subsequently leak tested for valve closure at least annually.

7.4.15* Equipment isolation valves and emergency shutoff valves shall be exercised at least annually.

7.4.16* Oxygen piping and components shall be inspected and maintained in accordance with CGA G-4.1, *Cleaning Equipment for Oxygen Service*.

7.4.17* The temperature indication of the excess temperature limit interlock shall be verified to be accurate.

7.4.18 Whenever any safety interlock is replaced, it shall be tested for function.

7.4.19 Whenever any temperature, pressure, or flow device used as a safety interlock is replaced, the set point setting shall be verified.

7.4.20 An inspection shall be completed at least annually to verify that all designed safety interlocks are present and have not been bypassed or rendered ineffective.

7.4.21 When a quantity of flammable gas that can result in a hazardous condition is released as part of installation, commissioning, testing, maintenance, or decommissioning, the gas shall be vented to an approved location. (See A.6.2.7.)

N 7.4.22* Where a radiant tube has no pre-ignition purge or no flame supervision, an annual inspection or test of the radiant tube, including any associated heat recovery system, shall be done to verify its integrity is such that unburnt fuel gases and products of combustion do not enter the working chamber.

7.5 Record Retention. Records of inspection, testing, and maintenance activities shall be retained for a period of 1 year or until the next inspection, testing, or maintenance activity, whichever is longer.

7.6* Procedures. The user's operational and maintenance program shall include procedures that apply to entry into equipment in accordance with all applicable regulations.

Chapter 8 Safety Equipment and Application

8.1* General. For the purpose of this chapter, the term *furnace heating system* shall include the heating source, associated piping and wiring used to heat the furnace, auxiliary quenches, and the work therein.

8.2* Safety Device Requirements and Burner Management Systems.

8.2.1* Except as permitted by Section 8.3, combustion safeguards, flame detectors, excess temperature limit interlocks, and safety shutoff valves shall be listed for combustion safety service or approved if a listed device is not commercially available.

8.2.2* Safety devices not identified in 8.2.1 shall be listed for the service intended or approved if a listed device is not commercially available.

8.2.3* Safety devices shall be applied and installed in accordance with this standard and the manufacturer's instructions.

8.2.4 Electric relays and safety shutoff valves shall not be used as substitutes for electrical disconnects and manual shutoff valves.

8.2.5 Regularly scheduled inspection, testing, and maintenance of all safety devices shall be performed. (See Section 7.4.)

8.2.6 Safety devices shall be located or guarded to protect them from physical and environmental damage.

8.2.7 Safety devices shall not be bypassed electrically or mechanically.

8.2.7.1 The requirement in 8.2.7 shall not prohibit safety device testing and maintenance in accordance with 8.2.5. Where a system includes a "built-in" test mechanism that bypasses any safety device, it shall be interlocked to prevent operation of the system while the device is in the test mode, unless listed for that purpose.

8.2.7.2 The requirement in 8.2.7 shall not prohibit a time delay applied to the action of pressure-proving, flow-proving, or proof-of-closure safety switch as used in accordance with 8.7.1.12.3(3), where the following conditions exist:

- (1) There is an operational need demonstrated for the time delay.