Code Required Retroactive Retrofit Requirements for HP and LP CO2 Systems

NFPA® 12 Standard on Carbon Dioxide Extinguishing Systems 2015 Edition

This edition of NFPA 12, *Standard on Carbon Dioxide Extinguishing Systems*, was prepared by the Technical Committee on Gaseous Fire Extinguishing Systems. It was issued by the Standards Council on November 11, 2014, with an effective date of December 1, 2014, and supersedes all previous editions.

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Retroactive Provision of NFPA 12 effecting existing system installations:

1.3.4 Existing systems shall be upgraded to meet the requirements for safety signs in 4.3.2, lockout valves in 4.3.3.4 and 4.3.3.4.1, and pneumatic time delays and pneumatic pre-discharge alarms in 4.5.6.2.

1.3.5* The upgrades shall be completed by December 31, 2008.

A.1.3.5 Exposure to carbon dioxide discharge poses a hazard to personnel; therefore, additional safety features for all new installations and for retrofitting of existing systems are provided in Section 4.3. Safety to personnel is of paramount importance; therefore, these additional safety features should be installed as soon as possible but no later than December 31, 2008. The installation of the safety signs per 4.3.2 does not require any modifications to the installation and should be accomplished immediately. The addition of supervised lockout valves, per 4.3.3.4 and 4.3.3.4.1, and pneumatic pre- discharge alarms and pneumatic time delays, per

4.5.5.7, require that the system flow calculations be verified and be in accordance with this standard. That is, the addition of piping equipment (valve and time delay) adds equivalent pipe length to the system. The pneumatic pre-discharge alarm requires carbon dioxide flow to sound. The revised design should be in accordance with the agent quantity requirements of this standard. These modifications could necessitate revisions to, upgrading of, or replacement of system components, including control units. As part of the process of implementing these modifications, the authority having jurisdiction should be consulted for additional recommendations or requirements.

4.3.2 Signs.

4.3.2.1 Warning signs shall be affixed in a conspicuous location in every protected space; at every entrance to protected spaces; in spaces near the protected spaces where it is determined that carbon dioxide could migrate, creating a hazard to personnel; and at each entrance to carbon dioxide storage rooms and where carbon dioxide can migrate or collect in the event of a discharge from a safety device of a storage container.

4.3.2.2 The safety sign format, color, letter style of signal words, message panel lettering, lettering size, and the safety provisions of symbols shall be in accordance with ANSI Z535.

4.3.2.3 Safety signs and message wording shall be provided using a three-panel format as required by 4.3.2.3.1 through 4.3.2.3.6.2.

4.3.2.3.1 The sign in Figure 4.3.2.3.1 shall be used in every protected space.

4.3.3 Evacuation Procedures.

Lockout Valves

4.3.3.4 A lockout shall be provided on all systems except where dimensional constraints prevent personnel from entering the protected space.

4.3.3.4.1 Lockout valves shall be installed on all systems where carbon dioxide could migrate, creating a hazard to personnel.

4.5.5 Supervision and Lockout Valves.

4.5.5.1 Supervision of automatic systems and manual lockout valves shall be provided unless specifically waived by the authority having jurisdiction.

4.5.5.2 Supervision of automatic systems shall be provided, and the lockout required by 4.3.3.4 shall be supervised for both automatic and manual systems unless specifically waived by the authority having jurisdiction.

4.5.5.3* Interconnections between the components that are necessary for the control of the system and life safety shall be supervised. *Exception: Normally unpressurized interconnections of pipe and tube shall not be required to be supervised.*

4.5.5.4 An open circuit, ground-fault condition, or loss of integrity in the pneumatic control lines that would impair full system operation shall result in a trouble signal.

4.5.5.5 The alarm and trouble signals shall be transmitted by one of the methods described in *NFPA 72*.

4.5.5.6 High-pressure pneumatic-operated slave cylinder connections immediately adjacent to pilot cylinders shall not be required to be supervised.

4.5.5.7 Where manual bypasses are provided and such bypasses are capable of being left in an open position, these bypasses shall be supervised.

4.5.6* Alarms. Audible and visible warning alarms shall be provided for the following purposes:
(1) To alert personnel not to enter a space, because the atmospherein the space could be hazardous due to the presence of a high concentration of carbon dioxide (2) To provide personnel the opportunity to evacuate spaces that could be made unsafe by the discharge of a carbon dioxide system

4.5.6.1 Audible and visual carbon dioxide system alarms shall be distinct from all other alarms, including the building fire alarm system.

4.5.6.2 Pre-discharge Alarm and Time Delay. A pneumatic pre-discharge alarm and pneumatic time delay and visible pre-discharge alarm shall be provided for the following enclosures: (1) Normally occupied and occupiable enclosures protected by total flooding systems except as outlined in 4.5.6.2.3 (2) Local application systems protecting hazards where the discharge exposes personnel to concentrations of carbon dioxide in excess of 7.5 percent by volume of agent in air for longer than 5 minutes

4.5.6.2.1 The pre-discharge alarms, where required, shall be located within the enclosure.

4.5.6.2.2 The pre-discharge time delay shall provide a time delay for purpose of pre-discharge alarm of sufficient duration to allow evacuation of personnel from areas within the spaces most remote from the exits.

4.5.6.2.3* Time delays shall be permitted to be eliminated for occupiable hazard areas where the provision of a time delay would result in unacceptable risk to personnel or unacceptable damage to critical pieces of equipment.

4.5.6.2.4 Where time delays are omitted, provision shall be made to ensure that the carbon dioxide system is locked out any time personnel are present in the protected area or space.

4.5.6.2.5 Dry runs shall be made to determine the minimum time needed for persons to evacuate the hazard area, allowing time to identify the warning signal **4.5.6.2.6** Audible signal appliances shall have either sound levels in accordance with 4.5.6.2.6.1 and 4.5.6.2.6.2 or acoustic characteristics in accordance with 18.4.6 of *NFPA 72*.

4.5.6.2.6.1 Audible pre-discharge alarms shall be at least 15 dB above ambient noise level or 5 dB above maximum sound level, whichever is greater, measured 5 ft (1.5 m) above the floor of the occupiable area.

4.5.6.2.6.2 Audible signal appliances shall have a sound level not more than 120 dB at the minimum hearing distance from the audible appliance.

4.5.6.2.6.3 The pre-discharge alarm shall have a minimum decibel rating of 90 dBA at 10 ft (3 m).

4.5.6.3 Visible and audible alarms shall be located outside each entrance to the following:
(1) Normally occupied and occupiable space protected by a total flooding carbon dioxide system (2) Normally occupied and occupiable enclosures where the discharge from a local application system will expose personnel to hazardous concentrations of carbon dioxide (3) Normally occupied and occupiable spaces where carbon dioxide could migrate, creating a hazard to personnel

4.5.6.3.1 These alarms shall begin operation prior to or at the start of the discharge.
4.5.6.3.2* These alarms shall continue to operate after agent discharge until one of the following occurs: (1) Other positive action has been taken to prevent entry of personnel to the space containing an atmosphere made unsafe by the carbon dioxide discharge. (2) The space is ventilated and the safety of the atmosphere for entry by unprotected persons has been verified.

4.5.6.3.3 Silencing of audible alarms while keeping visual notification appliances activated shall be permitted after the action described in 4.5.6.3.2(1) is accomplished.

4.5.6.3.4 Visual alarms shall remain activated until the space is ventilated as required in 4.5.6.3.2(2).

4.5.6.4 An alarm or indicator shall be provided to show that the system has operated and needs recharging.

4.5.6.5* An alarm shall be provided to indicate the operation of automatic systems and that immediate personnel response is desired.

4.5.6.6 Alarms indicating failure of supervised devices or equipment shall give prompt and positive indication of any failure and shall be distinctive from alarms indicating operation or hazardous condition.