Kidde
Fire Systems

# *Carbon Dioxide Suppression Systems Safety Upgrade*


CARDOX®

## ARE YOU COMPLIANT?

The purpose of this brochure is to provide you the mechanical requirements needed for upgrading existing $CO_2$ systems to meet the revised NFPA Standard 12, 2011 Edition, which addresses personnel safety and reliability. These are mandatory upgrades for new and all existing systems that were required to be in compliance by December 31, 2008.

These changes implemented by the NFPA Standard 12, reflect a continuing effort to improve "life safety" features of both new and existing $CO_2$ fire extinguishing systems.

Kidde offers an array of Clean Agent and $CO_2$ product lines to provide a wide selection of gaseous agent fire protection options. When $CO_2$ is selected as the suitable agent, these safety devices need to be considered.

This information is not intended to take the place of a complete review of the NFPA Standard 12, 2011 Edition. The current edition should be consulted for all noted changes, exceptions and clarifications included in the standard, but not presented herein.

All existing $CO_2$ systems should be upgraded by adding new signage and hazard lockout valves as a minimum. Further, for total flooding applications, pneumatic pre-discharge delays and sirens are required if hazard occupation is possible. Pneumatic pre-discharge sirens may be a good choice for local application systems where $CO_2$ concentrations exceed 7.5% or where personnel are exposed to unsafe $CO_2$ levels. If hazards are normally occupied rooms, a clean agent system may be a suitable alternative.

However, for high value areas that are not normally occupied, a $CO_2$ fire system may be a good choice.

### Examples covered in the NFPA Standard 12 where $CO_2$ is suitable include:

- Where clean agent concentrations are above LOAEL or result in oxygen levels less than 8%
- Where energized electrical equipment is >400 volts and have grouped cables
- Where uncloseable openings limit the ability to build concentrations or require extended discharge not offered by other agents
- Marine cargo holds and some engine rooms

## EXISTING INSTALLATIONS

Existing systems should be upgraded to meet the requirements for graphic safety signs, lockout valves, pneumatic time delays and pneumatic pre-discharge alarms where suitable. The installation of graphic safety signs does not require any modifications to the system and should be completed immediately.

The addition of supervised lockout valves, pneumatic pre-discharge alarms and pneumatic time delays may require that the system flow calculations be verified for proper system performance:

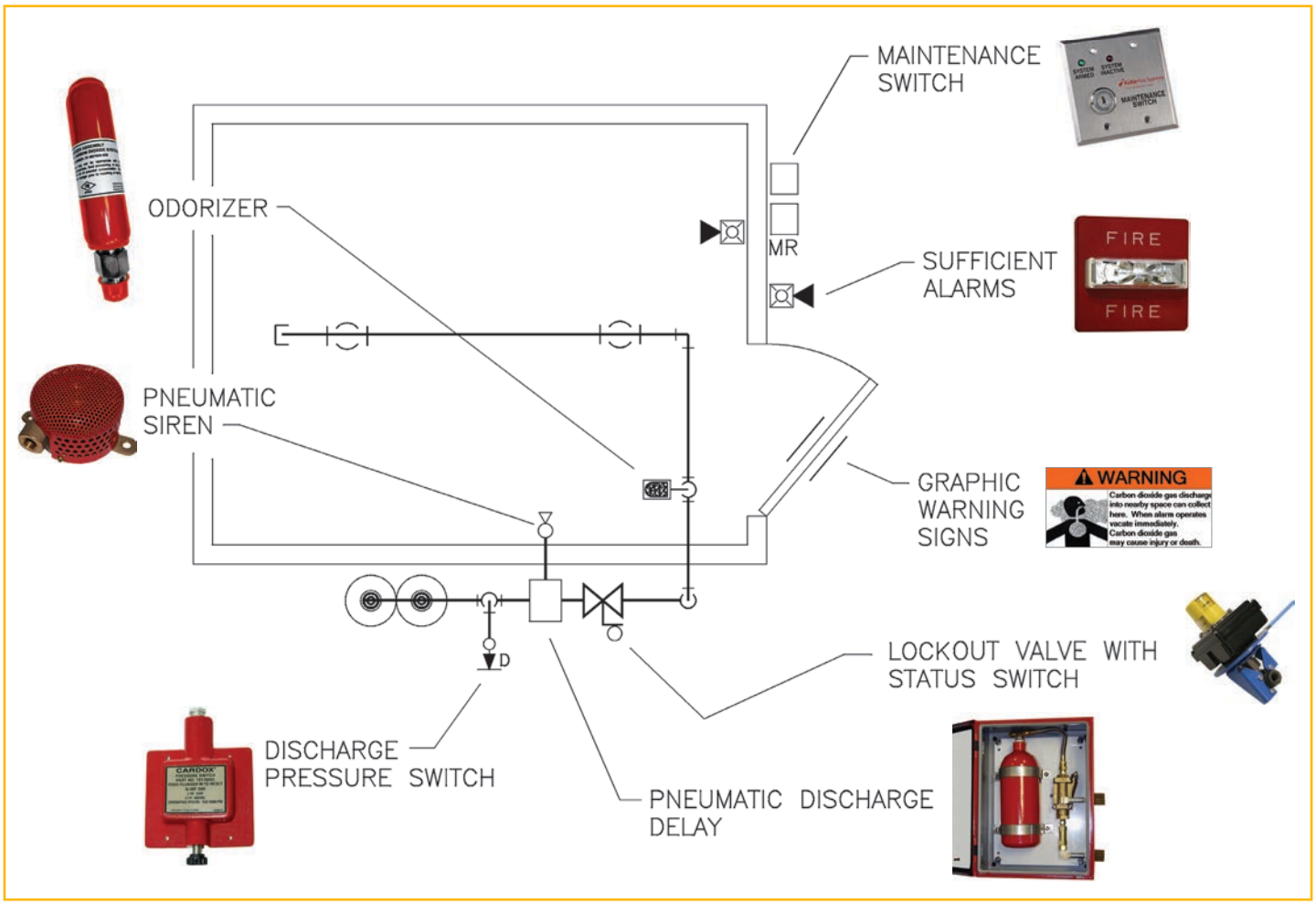
- Confirm proper nozzle pressures and flow rates after adding lockout valves and pneumatic time delays
- Confirm current supplied $CO_2$ is sufficient for hazard and siren requirements

These modifications could necessitate revisions to the pipe, the valves and/or the discharge nozzles.



# NFPA STANDARD #12: CARBON DIOXIDE

# UPGRADE ILLUSTRATION FOR LOW-PRESSURE $CO_2$






**Safety considerations required for new and existing systems:**

## LOCKOUT VALVES

For all new and existing $CO_2$ systems, manual lockout valves should be provided (rare exceptions apply). Status switches for lockout valves should report to the system control unit or building fire alarm panel. In a low-pressure system, the tank shutoff valve should not be considered a lockout valve, except where the tank supplies a single hazard or is protecting multiple interrelated hazards.

## PRE-DISCHARGE ALARM AND TIME DELAY

A pneumatic pre-discharge time delay and pneumatic alarm should be provided for the following enclosures:

- Most total flooding system hazard spaces
- Local application systems that expose personnel to $CO_2$ concentrations in excess of 7.5% for longer than 5 minutes

## OLFACTORY INDICATION

The addition of a distinctive odor to the discharging carbon dioxide serves as an indication that carbon dioxide gases are present. Personnel should be trained to recognize the odor and evacuate spaces where the odor is detected. Check for suitability of olfactory indication.

## ALARMS

Provide automatic alarms at the entry to and within spaces that are protected by carbon dioxide fire systems. Establish confined space entry procedures for $CO_2$ system lockout and enforce limited area access.

## DISCHARGE PRESSURE SWITCH

A discharge pressure switch should be installed between the carbon dioxide supply and the lockout valve. Activation of a pressure switch should operate warning alarms.

## MAINTENANCE SWITCH

A maintenance switch should be wired into the solenoid release circuit to permit a means of electrically disabling the system. This meets the code requirement of a disconnect switch.

The current NFPA Standard 12 does not allow the use of Class 150 malleable iron fittings. All system upgrades should include the use of Class 300 or Class 600 fittings for the modified portion of the system. Refer to the NFPA 12 standard for specific requirements pertaining to low-pressure and high-pressure applications.

## OTHER CONSIDERATIONS FOR UPGRADES TO EXISTING $CO_2$ SYSTEMS

**System Release Control Panels – Kidde offers conventional, addressable and multiple hazard control panels, all in conformance with UL 864 listings.**

**Enclosure Options – NEMA 1, as well as industry exclusive NEMA 4, and 12 are available.**

## ALTERNATE SUPPRESSION OPTIONS

**If safety concerns drive the decision for an alternate method of fire protection, Kidde offers four gaseous agent systems. These options provide proven fire suppression, are environmentally-conscientious and eliminate the expense of damage to high-value assets and equipment.**

**CLEAN AGENTS: FM-200™ & Novec™ 1230** **INERT GASES: Nitrogen & ARGONITE®**

# *WE CAN HELP!*

We understand that staying on top of codes and being current with all of the regulatory requirements can be difficult and daunting. We are able and willing to leverage our knowledge and experience to help you navigate the compliance process.

### Here are two ways that we can help you:

- You can call us for a packet of information about the current requirements so that you can assess your own needs on your own schedule.
- We can arrange to meet with you at the site facility to discuss current system status and provide a path to full compliance.

To arrange a visit, obtain additional information, participate in a webinar or speak with a knowledgeable and experienced professional, please contact one of our Regional Sales Managers listed at ***www.kiddefiresystems.com***.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**Kidde Fire Systems**
**400 Main Street, Ashland, MA 01721 USA**



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