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PROPERTY INSURANCE COMMITTEE
Prevention Specifications

Monitoring of CO_2 Systems

CEA 4019: May 1998 (en)

(EFSAC endorsed)

Monitoring of CO_2 Systems

1. General

CO_2 systems shall be automatically monitored for their availability in the case of:

- low-pressure systems,
- high-pressure systems with more than 500 kg supply quantity (not including the reserve quantity),
- high-pressure systems with more than 250 kg supply quantity (not including the reserve quantity) where a delay time is required for life safety aspects, [1]

Components shall be monitored continuously for their availability, if their failing or a wrong operating position can prevent the emission of the extinguishing medium or the functioning of the alarm and delay device in case of triggering, or if it can cause an emission into a not-triggered extinguishing zone.

Testing of the monitoring system must always be possible.

The monitoring system shall not affect the correct function of the CO_2 system.

2. Low-pressure systems

2.1 Valves, disable and control devices

The correct operating position of the following components shall be monitored:

- valves installed in the extinguishant flow, such as isolating valves and selector valves,
- manually operated valves which are not located in the extinguishant flow, but which can jeopardise the function of the installation, as valves in pneumatic pilot lines, etc.,
- disable devices,
- non-electrical control devices.

2.2 Quantity of extinguishing medium

The quantity of available extinguishant shall be monitored. Any loss of more than 10 % of the content of any container shall be indicated.

[1] There may be aspects of value of the protected risks like consequential losses which needs to be considered.

2.3 Pressure

Deviations from the regular working pressure of the following components shall be monitored:

- low-pressure CO_2 container (minimum pressure 18 bars, maximum pressure 22 bars),
- pneumatic detection pipework which is constantly under pressure (not necessary if the correct operating position of a valve upstream of the device is monitored).

3. High-pressure systems

3.1 Disable and triggering devices and selector valves

The correct operating position of the following components shall be monitored:

- Non-electrical control devices,
- Disable devices,
- Selector valves,
- Switch devices for main/ reserve supply container,
- In the case of mechanical control using wire cables: the position of the triggering device.

3.2 Quantity of extinguishing medium and pilot gas

The quantity of available extinguishant and pilot gas shall be monitored. Any loss of more than 10 % of the content of any container shall be indicated :

- all containers of the main supply and of the reserve supply permanently connected to the pipe system,
- containers for the supply of the alarm devices and /or pilot containers.

4. Electrical lines

Electrical lines transmitting alarm and fault signals or signals for the monitoring and control of the installation and alarm devices (monitored first alarm with two independent energy supplies) shall be monitored for line break, short circuit and earth fault. The CEA specifications for fire detection installations shall be taken into account.

Necessary additional controlling signals (e.g. shut-off of ventilation systems, closing or opening of the enclosure) may be transmitted by non-monitored lines.

5. Electrically operated components

The power supply of electrically-operated components of CO_2 installation shall be monitored for normal condition and power failure as far as they cannot be monitored by the fire detection installation.

6. Monitoring and control lines

6.1 Monitoring lines

Each monitoring device shall have a separate indicator. A maximum of 60 monitoring devices may be connected to one detection line.

6.2 Monitoring lines for disable devices

The actuation of the disable device shall be transmitted and indicated separately.

A maximum of 20 monitoring devices for disable devices may be connected to one line.

The disabled condition of the system shall not cause a fault indication but the disabled condition of the system shall be indicated separately.

6.3 Control lines

All electrically-controlled components for the release of the installation, operation of selector valves, delay devices and alarm devices shall be connected to lines monitored for line break, short circuit and earth fault.

The devices shall be attached to the control lines so that in the case of a fault indication an unequivocal and quick identification of the components of the installation causing this fault indication is possible.

This is relevant for:

- Triggering devices of pilot containers, container batteries, isolating valves and selector valves,
- electromagnetic locking devices for triggering devices and/or selector valves and
- solenoid valves for controlling the CO_2 stop device and / or secondary flooding function.

7. Storage area

The CO_2 storage area shall be monitored for the allowable maximum and minimum ambient temperature in the case of high-pressure systems and for the allowable maximum temperature in the case of low-pressure systems where a dedicated heating or cooling system is installed.

8. Fault indication

8.1 Indication and transmission

Faults of the CO_2 installation shall be indicated visually and audibly at a location on the premises, which is continuously manned. It must be possible to switch off the audible signal, but the visual signal may only be switched off if the fault is removed. If the plant does not have a continuously manned location, the fault indication shall be transmitted automatically to an employee in the plant (e.g. by the help of a telephone transmitter).

8.2 Further indications

The fault indication of the following shall be indicated separately:

- monitoring system of the CO_2 system
- other monitoring systems
- fire detection system
- control devices.

Faults in CO_2 installation and faults in the monitoring installation shall be indicated separately.

As long as a fire detection signal on the CO_2 installation is present, no fault detection shall be indicated at the monitoring control panel or at the monitoring insertion of the c.i.e. of the fire detection installation.

9. Power supply of the monitoring installation

The power supply of the monitoring installation shall be installed accordingly to the CEA specifications for fire detection installations.

10. Requirements for components of the monitoring installation

10.1 Protection class

The components of the monitoring installation shall at least meet the protection class IP 54 (IEC 529 - Degrees of protection provided by enclosures - IP code).

10.2 Switching way

In case of valves the fault indications shall depend on the moving way of the component under monitoring. The switching way is the way from the just still closed to the totally opened position of the valve.

10.3 Switching way of normally open devices

The fault indication for valves which are situated in the extinguishant flow and in the pneumatic pilot lines, and the fault indication for other blocking devices which are continuously opened when the CO_2 installation is ready for service, shall be activated at the latest when the components are closed 20% of the switching way.

10.4 Switching way of normally closed devices

In case of valves in the extinguishant flow and in case of valves which are not situated directly in the extinguishant flow and which are closed when the CO_2 installation is ready for service, the fault indication shall be activated immediately when the opening procedure starts.

10.5 Blocking devices of alarm devices, pressure or pneumatic switches

In case of blocking devices of alarm devices and pressure or pneumatic switches, the fault indication shall be effective already in intermediate positions.

10.6 Non-electrical control devices

Non-electrical control devices shall be monitored. The requirement is fulfilled if the room with the non-electrical control device is only accessible to authorised persons and if opening the door causes a fault indication.

Components may not be monitored if they are automatically reset into their operating position by the triggering energy of the installation itself.