

High Pressure Carbon Dioxide Fire Suppression System

Features

- Non-corrosive, non-conductive, clean extinguishing agent that leaves no residue
- Suitable for Class A, B, and C hazards
- Fixed nozzle and/or hose reel agent distribution
- UL, ULC, and FM approved
- In accordance with NFPA-12 – Carbon Dioxide Extinguishing Systems

Application

The ANSUL® Carbon Dioxide (CO₂) Fire Suppression System is an engineered system utilizing either a fixed nozzle agent distribution network, hose reel(s), or a combination of both. The system is listed by Underwriters Laboratories, Inc. (UL) and Underwriters Laboratories of Canada (ULC), and is approved by Factory Mutual (FM). The system is designed in accordance with the latest revision of the National Fire Protection Association (NFPA) Standard 12, "Carbon Dioxide Extinguishing Systems." When properly designed, the carbon dioxide system will suppress fire in Class A, B, and C hazards by displacing the air containing oxygen which supports combustion.

Typical Applications

The following are typical hazards protected by carbon dioxide systems:

- Printing presses
- Vaults
- Open pits
- Dip tanks
- Spray booths
- Ovens
- Engine rooms
- Coating machines
- Process equipment
- Hoods and ducts
- Flammable gas or liquid storage areas
- Generators

Description

The ANSUL CO₂ Fire Suppression System can be actuated by detection and control equipment for automatic system operation along with providing local and remote manual operation as needed. Accessories are used to provide alarms, delay discharge, ventilation control, door closures, or other auxiliary shutdown or functions.

Due to the method of extinguishment, personnel occupying areas protected by carbon dioxide systems must be evacuated prior to system discharge. For this reason, discharge time delays and alarms are mandatory for occupied hazards. Two or more hazard areas can be protected with a single group of agent storage containers (cylinders) by means of directional or selector valves.

The ANSUL CO₂ Fire Suppression System is particularly useful for suppressing fires in hazards where an electrically non-conductive medium is essential or desirable; where clean-up of other agents presents a problem; or where the hazard obstructions require the use of a gaseous agent.

Additional equipment includes: remote manual pull stations, corner pulleys, door closures, pressure trips, bells and sirens, transfer switches, time delays, pneumatic switches, and weighing devices. All or some are required when designing a total system.

Ordering Information

Order all system components through your local authorized ANSUL distributor.

Specifications

PART 1 – GENERAL

1.01 DESCRIPTION OF WORK:

- A. Design and installation shall be an engineered fire detection and carbon dioxide total flooding, gaseous agent, fire suppression system as manufactured by Johnson Controls, Marinette, Wisconsin.
- B. Drawings: The contract drawings shall indicate the general arrangements of the areas to receive detection and carbon dioxide protection. Contractor is to review all drawings so that all items affecting the operation of the fire detection/carbon dioxide suppression system (such as equipment location, air diffusers, damper closures, and door openings) are considered in the design of the engineered system.

Specifications (Continued)

1.02 REFERENCES:

- A. National Fire Protection Association (NFPA):
 - 1. NFPA 12 – Standard on Carbon Dioxide Extinguishing Systems
 - 2. NFPA 70 – National Electrical Code
 - 3. NFPA 72 – Standard For Protective Signaling Systems
- B. Underwriters Laboratories, Inc. (UL) and Underwriters Laboratories of Canada (ULC) – Fire Protection Equipment Directory
- C. Factory Mutual (FM) Approval Guide
- D. Requirements of the Authority Having Jurisdiction (AHJ)

1.03 REQUIREMENTS:

- A. This installation shall be made in strict accordance with the drawings, specifications and applicable National Fire Protection Association Standards. All equipment and devices used shall be listed in both the UL/ULC Fire Equipment Directory and the Factory Mutual Approval Guide.
- B. Design and installation of the fire detection/carbon dioxide suppression system shall be in strict accordance with the following guidelines and regulatory agencies:
 - 1. NFPA 12 – Carbon Dioxide Extinguishing Systems
 - 2. NFPA 70 – National Electric Codes
 - 3. NFPA 72 – National Fire Alarm Code

1.04 GENERAL:

- A. Furnish all engineering designs and materials for a complete fire detection/carbon dioxide suppression system, including: charged carbon dioxide storage cylinders, nozzles, control panel, detectors, wiring, annunciators, alarms, and all other equipment necessary for a complete operational system.
- B. Major system components shall be produced by Johnson Controls (no alternatives) and shall be installed by an authorized ANSUL distributor certified for the design, installation, and service of carbon dioxide suppression systems.

PART 2 – PRODUCTS

2.01 SYSTEM DESCRIPTION AND OPERATION:

- A. Design Requirements:
 - 1. System design shall be total flood providing a minimum of 34% design concentration throughout the entire protected area.
- OR
- Specify the design concentration or the area of coverage if used as a local application.

2.02 SEQUENCE OF OPERATION:

- A. Activation of any single detector in any detection zone shall:
 - 1. Cause audio and visual pre-discharge alarms to operate.
 - 2. Transmit an alarm signal to remote monitoring or building alarm panel.
 - 3. Operate auxiliary contacts for HVAC shutdowns and automatic dampers
 - 4. Initiate a mechanical/pneumatic time delay to sound prior to CO₂ release.
- B. Upon completion of the time delay the carbon dioxide system shall:
 - 1. Cause a discharge alarm to be activated.
 - 2. Energize control actuator for carbon dioxide cylinders releasing CO₂.

2.04 CONTROL PANEL – AUTOPULSE CONTROL SYSTEM:

- A. The control panel shall be an AUTOPULSE system and shall communicate with and control the following types of equipment used to make up the system: heat detectors, manual release, alarm notification appliances, releasing components and other system controlled devices.

2.05 HEAT DETECTORS:

- A. Rate compensated heat detectors shall be supplied. Maximum spacing shall be 250 ft² (23.3 m²) per detector.

2.06 INDICATING APPLIANCES:

- A. Explosion-proof horn shall be provided in protected area.
- OR
- Alarm horn strobe shall be provided in protected area.

2.07 MANUAL PULL STATION:

- A. Explosion-proof manual pull station shall be provided at each exit.
- OR
- Manual pull station shall be provided at each exit.

2.08 CARBON DIOXIDE STORAGE CYLINDERS:

- A. Cylinder Assembly:
 - 1. Steel construction with red epoxy finish and equipped with a pressure seat-type CV-98 valve.
 - 2. Cylinder sizes shall be 35 lb (15.9 kg), 50 lb (22.7 kg), 75 lb (34.0 kg), 100 lb (45.4 kg), or 120 lb (54.4 kg) capacity.

2.09 PNEUMATIC TIME DELAY:

- A. Pneumatic time delay shall be provided to delay discharge of carbon dioxide.
- B. Pneumatic pressure operated siren shall be located in protected space to sound for 30 seconds prior to discharge.

2.10 SUPERVISED MECHANICAL LOCKOUT:

- A. Installer shall provide a supervised mechanical lockout valve installed in the discharge line to prevent discharge of CO₂ into the protected space. Control panel must display a supervisory signal when valve is closed.

Specifications (Continued)

2.11 CYLINDER BRACKET:

- A. Each cylinder assembly shall be furnished with a bracket made from welded steel. The bracket shall hold the cylinders in a saddle with a front bracket piece that secures the cylinders. The brackets shall be modular in design to allow added bracketing or stacking of cylinders depending on installation requirements.
- B. Cylinder brackets shall be UL/ULC listed and/or FM approved for use with the carbon dioxide system as manufactured by Johnson Controls.

2.12 VALVE ACTUATORS:

- A. Electric valve actuators shall be of brass construction and stackable design with swivel connections to allow removal of actuators for maintenance or testing.

2.13 DISCHARGE HOSE/CHECK VALVE:

- A. When manifolding, all cylinder assemblies shall include a flexible discharge hose and check valve for connection to the manifold inlet.
- B. All hose/check valves shall be UL/ULC listed and/or FM approved for use with the CV-98 carbon dioxide valves as manufactured by Johnson Controls.

2.14 DISCHARGE NOZZLES:

- A. Designed to direct discharge of carbon dioxide in a liquid or gaseous state.
- B. Orifice size determined by flow rate and system design required.
- C. Standard nozzles to be natural brass or painted red.
- D. Nozzle quantity and placement shall be in compliance with the ANSUL Design, Installation, Recharge and Maintenance Manual (Part No. 427604).

PART 3 – SYSTEM TESTING

3.01 SYSTEM CHECKOUT:

- A. The completed installation shall be inspected by factory authorized and trained personnel. The inspection shall include a full operational test of all components per the equipment manufacturer's recommendations.
- B. Inspection shall be performed in the presence of the owner's representative, architect or engineer's representative, insuring authority and/or the local authority having jurisdiction.
- C. All mechanical and electrical components shall be tested according to the manufacturers recommended procedure to verify system integrity.
- D. Inspection shall include a complete checkout of the detection/control system and certification of cylinder contents. A written report shall be filed with the owner.
- E. As-built drawings shall be provided by the contractor (two copies) indicating the installation details. All routing of piping, electrical conduit, and accessories shall be noted.
- F. Equipment installation and maintenance manuals shall be provided in addition to the as-built drawings.

- G. Prior to final acceptance, the contractor shall provide operational training in all concepts of the system to the owner's key personnel. Training shall consist of:
 - 1. Control system operation
 - 2. Trouble procedures
 - 3. Abort procedures
 - 4. Emergency procedures
 - 5. Safety requirements
 - 6. Demonstration of the system (excluding carbon dioxide release)
- H. The quantity of agent shall reflect the actual design quantity of carbon dioxide agent.
- I. A functional test shall be completed consisting of detection, release, alarm, accessories related to the system, control unit and a review of the cylinders, piping, fittings, hangers and cylinder pressure.

Safety Data Sheets (SDS) are available at www.ansul.com

Note: The converted values in this document are provided for dimensional reference only and do not reflect an actual measurement.

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