CHEMETRON™ Fire Systems

CARDOX

CO_2 Application Bulletin

CARBON DIOXIDE FIRE SUPPRESSION —

Paint Mixing & Storage Facilities (Automotive)

The storage, mixing, and pumping of paint from a central paint shop to the various points of its application is common in many metal-working plants, most notably automobile assembly plants. Because of their critical nature, the volumes of paint required, and the sheer size of the rooms, this potential fire problem gets special attention. Of course, these areas are sprinklered; but if a fire should occur, it must be quickly extinguished before there is any chance for prolonged interruption of production. Even a short production delay in a large automobile plant can mean many dollars lost. For that reason, the insurers of these properties and the major automotive firms have used CO_2 systems for many years as the first line of fire defense.

A properly designed CO_2 system should operate quickly enough to suppress a fire before sprinklers have operated. This is important to limit water discharge, which must be treated as a hazardous material. This avoids disposal concerns.

The accompanying drawing illustrates a typical paint shop arrangement. It should be noted that the complex consists of several rooms that are interconnected with one another. Because of the unusually large size of these rooms, together with the need for special concern in protection arrangement, the Low Pressure CO_2 system is ideally suited for same.

The large rooms of a paint shop are to be flooded with a 34% CO_2 concentration within one (1) minute's time. The flooding factor for 34% CO_2 in rooms over 50,000 cubic feet is 22 cubic feet protected by each pound of CO_2. Many of the newest facilities require CO_2 flow rates of well over 20,000 pounds per minute, for which an 8" discharge system is needed.

CHEMETRON™ Fire Systems
A World of Protection

4801 Southwick Drive
Third Floor
Matteson, IL 60443
Telephone: 708/748-1503
Fax: 708/748-2847
email: info@chemetron.com

Branded: 06/2023 20230601SM

If the facility is such that fire could spread through an opening to an adjacent area, if the products of combustion (heat, smoke, flame) can trip the protection system in an adjacent room, or if there is a possibility that personnel, in a fire emergency, could manually trip the protection in the wrong room, then the CO_2 system must be designed so that there is enough CO_2 to flood all interexposing hazards simultaneously. Just as important is the need for independent controls so that, again, simultaneous operation of adjacent hazards will result in each area getting its full measure of CO_2. This is rather easily accomplished with a low pressure CO_2 system.

The need for large doors and other openings in the rooms of the paint complex requires that the CO_2 system designer work with the door design to ensure that they will close on system operation. If a door interconnects two protected areas, it obviously must close with a discharge on either side.

The concern that the CO_2 protection system would always be available for fire extinguishment has, over the years, demonstrated the need for certain features of these systems that are now standard, but were not used in earlier installations. (Any revamping of the protection system should include a full updating of the system controls.) These controls now include full Class B electrical supervision of all key electrical control circuits and devices. Emergency power supplies to ensure full availability of control power are mandatory. The supervision of the all important pilot piping between pilot control cabinets and the pressure operated valves is now a standard.

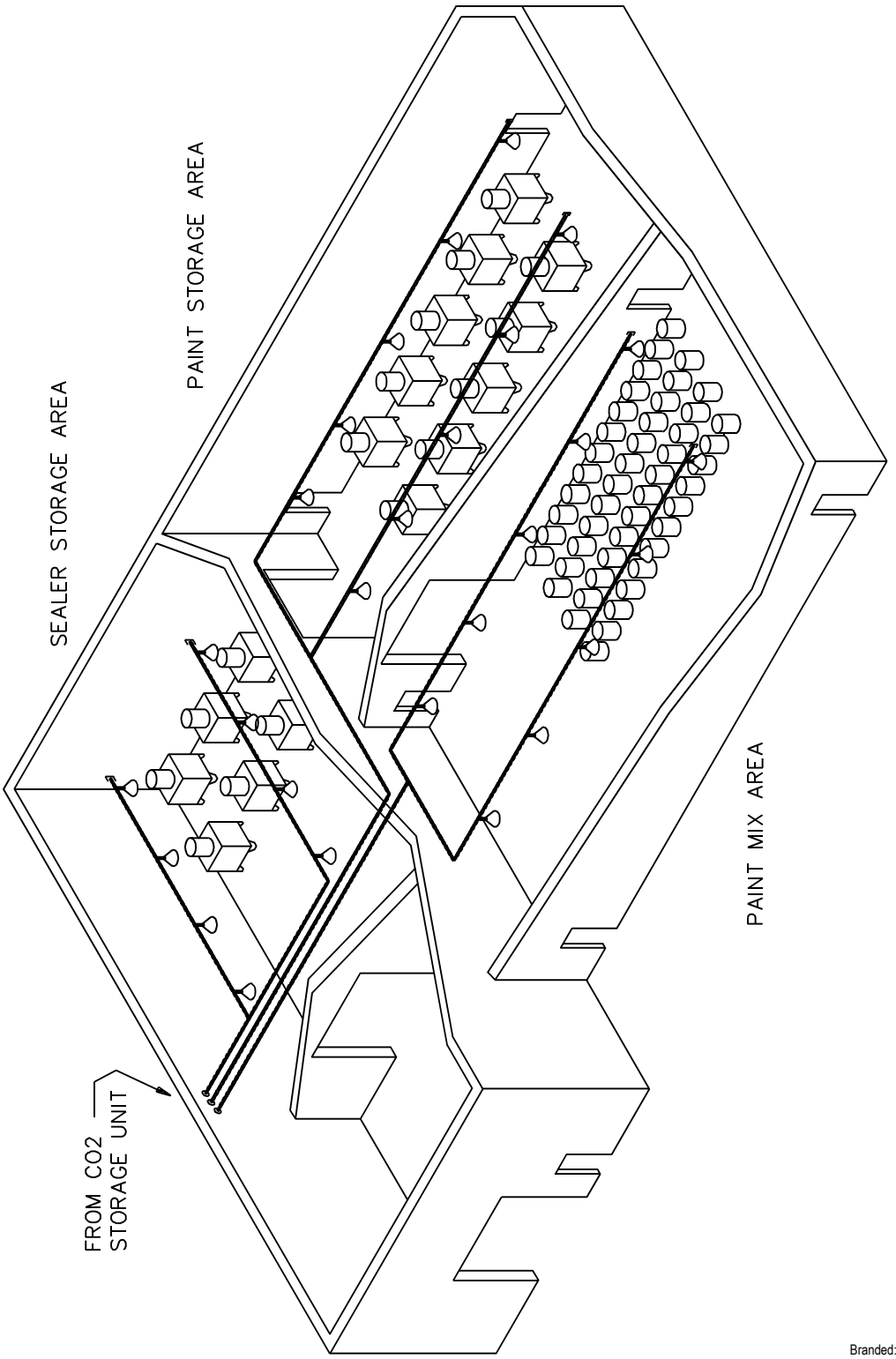
Many times the central paint mix and storage facility is remotely located from the points of paint application, making the extension of this system to protect both impractical. But when this distance is not too great, it is obviously a good idea to consider dual utilization of the CO_2 storage unit.

Safety Concerns: When the carbon dioxide system is designed, the provision for personnel safety must be considered as strongly as the fire protection. A safe system includes provision for:

- Alarms that absolutely, positively indicate that the system is about to discharge. This can include predischarge alarms that function irrespective of the method of system release — electrical or mechanical.
- Analysis of the CO_2 gas flow to identify where the CO_2 will be after a discharge. (Provision for odorizing the CO_2 may be appropriate.)
- Provision for supervised system lock-out for those times when such is appropriate.
- Adequate instructions and training, including warning and instructional signs.

NFPA Standard No. 12 provides good information in this regard.

Carbon Dioxide Fire Protection System for Paint Mixing & Storage Facility



Branded: 06/2023 20230601SM