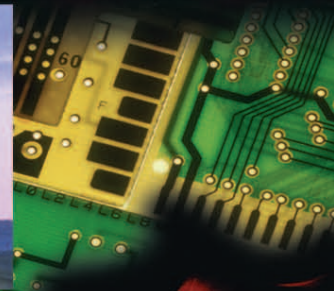


# CHEMETRON

## Fire Systems™

### CO<sub>2</sub> High Pressure



*A World of Protection*

## Would your business survive a fire?

While it seems that everything in our world is changing, Chemetron Fire Systems remains constant in our commitment to provide the highest standard of fire protection safety and value. As the nation's oldest CO<sub>2</sub> systems manufacturer, Chemetron has led the way in establishing industry standards.

Today we understand the challenge you face in this just-in-time business environment. If a fire occurs, a company simply cannot afford a major interruption to its operations and financial future. Your ability to prevent or recover from a business disruption is critical and will depend on selecting the best fire protection system and agent.

With our worldwide reach, Chemetron Fire Systems is your single source solution for standard or custom designed multiple hazard fire protection.

## More Experience. More Applications Worldwide.

### A History of Fire Safety Technology

With over 60 years of commitment to innovative fire protection technology worldwide, Chemetron continues as a leader for integrated special hazard fire protection systems. Since CARDOX® carbon dioxide systems were first installed in 1940, our effective combination of engineering, equipment and system performance continues to make Chemetron the leading choice for high risk applications.

Technology, expertise and customer loyalty have driven Chemetron Fire Systems to the forefront in the global marketplace. Today, our core businesses hold a leading share in their specific markets.

### Advanced Engineering with Custom Solutions

Chemetron leads the industry in innovative product design. As we begin the new millennium, new product development remains a top priority.

You can measure our experience by the diversity of applications, the technical sophistication, and system performance represented by a variety of commercial and industrial special hazard applications. CO<sub>2</sub> is used in the extinguishment and prevention (inerting) of flammable liquid and gas fires. Innovative solutions were developed for dealing with fires involving energized electrical equipment, as well as for a variety of combustibles found in these applications:

- Aerospace
- Data processing centers
- Manufacturing and industrial processes
- Marine
- Power generation
- Telecommunications

### The Benefits of Experience

The challenge of new applications and protection of valuable assets continues to advance our technical development. Chemetron is your single source solution for special hazards fire suppression systems by integrating:

- Fire hazard evaluations
- Hardware
- Advanced engineering, technical and service support
- Innovative computer software
- A worldwide distribution and service network
- A commitment to environmental safety

Our growth has not been a matter of chance. It has been built on a history of ideas, service and quality.

### CO<sub>2</sub> is ...

#### ■ Effective.

■ **Fast.** Carbon dioxide is a three-dimensional clean agent. Within seconds, it penetrates the entire hazard area to smother the combustion.

■ **Efficient.** CO<sub>2</sub> vapor chokes off combustion quickly. The dry ice "snow" in the discharge allows "local application" protection of non-enclosed hazards.

■ **A Low-Cost Clean Agent.** CO<sub>2</sub> is colorless and odorless. It exists as a gas in the earth's atmosphere and is one of the by-products of combustion. Its use has no environmental impact.

■ **Non-damaging.** CO<sub>2</sub> is normally harmless to equipment, materials and property. It does not cause spoilage, requires no

1927

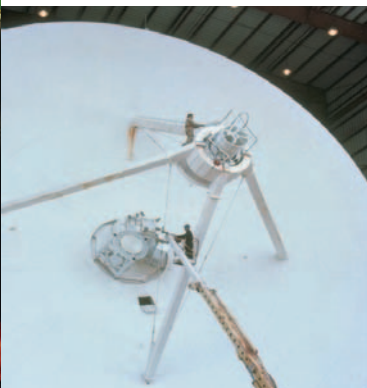
Herbert E. Bell forms Safety Mining Company.

1938

Name changed to Cardox (acronym for carbon dioxide).

1939

Cardox developed and patented bulk low pressure carbon dioxide storage for use in fire extinguishing systems. The first fire protection CO<sub>2</sub> applications were for the power plant industry.





## Chemetron Integrated System Extinguishing Performance

clean up and leaves no residue, thus minimizing downtime after a fire.

■ **Non-conductive.** CO<sub>2</sub> is electrically non-conductive and three-dimensional, allowing use for a wide variety of special applications.

■ **Adaptive.** CO<sub>2</sub> is effective on a wide range of flammable and combustible materials in both surface and deep-seated fires.

A CO<sub>2</sub> High Pressure fire protection system allows for:

- minimal space and weight requirements
- fast installation and service

■ **Recognized** by the top independent listing and approval agencies.

Around the world, Chemetron continues to meet the challenge of special hazards. A Chemetron CO<sub>2</sub> High Pressure system is a versatile, cost-effective suppression system designed with an extra measure of reliability.

### Multiple Hazard Versatility

Chemetron CO<sub>2</sub> High Pressure systems work hand-in-hand with state-of-the-art control and detection components to identify and extinguish fires.

Multiple hazards may be protected from a common supply of CO<sub>2</sub> by using pneumatically operated directional (selector) valves. CO<sub>2</sub> pressure is used to open valves as well as operate switches and accessories. This is essentially an economy measure designed to reduce system size. It is to be used only when there is assurance that only one hazard could require a discharge at any one time.

Similar controls are provided for each hazard area. The directional valves are pilot-controlled and operated by line CO<sub>2</sub> pressure. Pilot controls can be actuated by solenoid valve using pressure from automatic releases or by manually operating the pilot control valve.

A CO<sub>2</sub> High Pressure system is designed to cost effectively combine major components into a reliable system consisting of:

### ■ Storage, valve & discharge components

These components consist of agent containers, valve assemblies, piping, and discharge nozzles.

### ■ Control panels

The control panel is the brain of the system and is used to monitor the detection and accessories, as well as control the alarm and discharge functions.

### ■ Detection, alarm devices, and accessories

These external devices act as the eyes and voice of the system as they detect fire and give audible and visual signals, as well as specialized annunciations.

### ■ CO<sub>2</sub> storage cylinders

A quantity of CO<sub>2</sub> sufficient to extinguish the type of fire anticipated in the protected hazard area is stored in 50 lb (22 kg), 75 lb (34 kg), or 100 lb (45 kg) cylinders, which can be used individually or manifolded together. The gas is released into the piping distribution system upon system actuation.

### ■ Completer Kits

This system component consists of warning signs, hoses, connection fittings, pressure gauge, solenoid valve, and the actuator required to manually operate the cylinder valve.

### Methods of Actuation

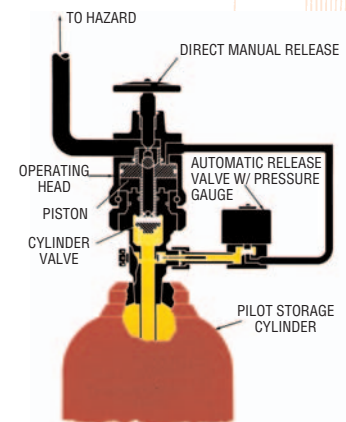
There are three independent types of actuation integrated into each system:

- automatic actuation
- manual electric station
- direct manual release (by handwheel on top of each pilot cylinder)

An optional feature is a pneumatic discharge delay for use in systems with no source of electric power or where an uninterrupted source of electric power is not assured. In the event of the loss of power, which would disable the electrical system controls, the pneumatic discharge delay would prevent an immediate CO<sub>2</sub> discharge into a normally occupied space and allow personnel time to evacuate the area. In order to be effective and as an additional precaution, the pneumatic discharge delay should be connected to a CO<sub>2</sub> siren.

### Continuous Operation

Reserve banks of CO<sub>2</sub> cylinders provide continued operation and protection while the main bank is being serviced after a



### 1940's

World War II accelerated development of CO<sub>2</sub> applications. Massive discharges of carbon dioxide to control large fires was demonstrated with a Cardox crash-fire-rescue truck for the American Armed Forces during World War II.

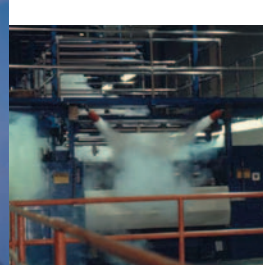
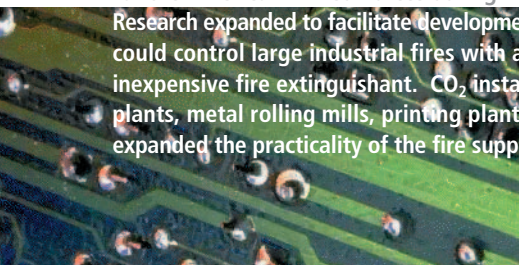
Research expanded to facilitate development of systems that could control large industrial fires with a clean, available, inexpensive fire extinguishant. CO<sub>2</sub> installations in power plants, metal rolling mills, printing plants and industry expanded the practicality of the fire suppression capability.

### 1950's

Gaseous agent systems took a leap forward when, under Cardox, the first proven method of predicting two phase gas flow in piping systems was developed.

### 1952

High pressure CO<sub>2</sub> system design introduced that eliminated weights and levers.





discharge, or during routine inspection. The reserve cylinders can also be used for a second discharge if required.

A reserve cylinder bank can be activated three ways:

- automatic actuation
- manual electric station
- direct manual release (by handwheel on top of each reserve pilot cylinder)

**System Safety**

Carbon dioxide systems are designed in accordance with NFPA (National Fire Protection Association) standards, which require a minimum carbon dioxide concentration of 34%. These design concentrations will not support human life. Visual and audible warnings must be provided to alert occupants to vacate the area prior to discharge. In addition, as CO<sub>2</sub> will tend to migrate to low lying areas near the protected hazard after a discharge, careful consideration of means to prevent accidental exposure of personnel to hazardous atmospheres in adjoining spaces must be designed into every system.

Because of the stated effects of CO<sub>2</sub> on the human body, certain precautions must be taken to prevent personnel exposure. A CO<sub>2</sub> system discharge will also cause turbulence and noise, and the discharge stream may have considerable force. Warning signs must be provided to advise personnel what to do when the fire extinguishing system is actuated, as well as providing instructions on how to activate the system manually.

It has always been recognized that a CO<sub>2</sub> discharge to fire extinguishing levels presents a severe hazard to any personnel who might inadvertently be in the area where the CO<sub>2</sub> is discharged. Precautions to be taken to protect facility personnel are covered in NFPA Standard No. 12, the Chemetron publication "Carbon Dioxide Safety Manual" and OSHA's Lockout & Tag-out Standard, 29CFR Part 1.910,146.

**The Chemetron Difference**

With more experience and more applications, Chemetron provides a full range of hardware, design, specification, installation and support services worldwide.

Thousands of companies have the confidence to protect their businesses with Chemetron CO<sub>2</sub> High Pressure integrated systems. With our single source responsibility for suppression, control and support, Chemetron continues to invest in product improvement to meet changing requirements around the globe with:

- Systems engineering and design capability
- Continuous quality improvement programs
- Proprietary computer program software
- Education and safety training
- Product and technical assistance
- Installation and testing support services
- Worldwide sales and distribution network

Chemetron fire suppression systems have proven their reliability time and time again when performance counts.

**CO<sub>2</sub> Physical and Chemical Properties**

CO<sub>2</sub> is an odorless, colorless, inert gas that extinguishes fire primarily by diluting the oxygen that supports combustion. Some cooling is also accomplished. It is used as an active free extinguishant and applied by either the total flood or local application method. In flooding, the enclosure of the hazard protected is flooded to a proper concentration.

In local applications, CO<sub>2</sub> is directly applied in the proper amount at the needed rate to cover the protected hazard. The small "dry ice" particles, created in the discharge, facilitate its projection into the fire and coverage of the hazard protected.

Because CO<sub>2</sub> is 1.5 times heavier than air, it will tend to settle in low-lying areas in the protected hazard as well as flow into adjacent areas outside of the protected space.

In the design concentrations required to extinguish fire, CO<sub>2</sub> will not support human life.

→ 1970  
High pressure CO<sub>2</sub> system design upgraded.

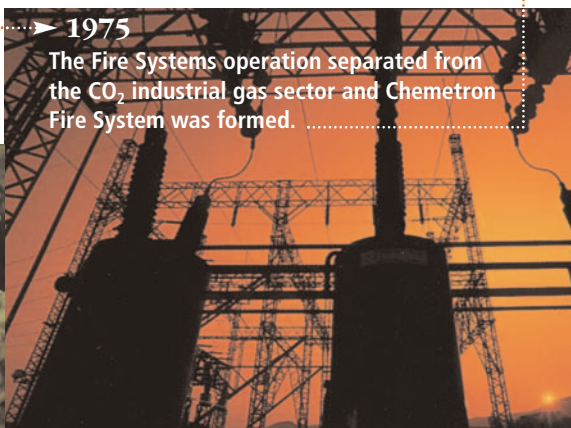
→ 1994  
CO<sub>2</sub> storage tank refrigeration CFC replacement developed.

→ Today  
Since the development of CO<sub>2</sub> as a new concept in fire suppression,

→ 1958  
Cardox merged with Chemetron Corp. Chemetron is an acronym for Chemical-Metals-Electronics).

→ 1975  
The Fire Systems operation separated from the CO<sub>2</sub> industrial gas sector and Chemetron Fire System was formed.

Chemetron Fire Systems has been the leader in CO<sub>2</sub> system technology.



WORLDWIDE PROTECTION



CO<sub>2</sub>

*High Pressure*





# *A World of Protection*

## *Worldwide Applications*

### **CO<sub>2</sub>**

- Power Generation
  - Base Load Plants
  - Co-generation & Combined Cycle Plants
  - Power Peaking Units
  - Upgrading Existing Plants: with
    - Coal Conversions
    - Coal Storage/Handling/Pulverizing
- Cement Plant/Blast Furnace Indirect Coal Firing Systems
- Metals Production and Processing
  - Electric Furnaces
  - Continuous Casters
  - Rolling Mills (Steel & Aluminum)
  - Coating Lines
- Printing
  - Newspaper Production
  - Periodical Printing
  - Packaging

- Automotive
  - Assembly: Paint Application, Mixing & Storage
  - Parts: Machining, Heat Treating
- Electronics Operations
  - Computer Areas
  - Automated Information Storage Systems
- Electronics/Computer Production
  - Wet Benches
  - Wave Soldering Machines
- Food Processing
- Research Facilities
  - Test Facilities
  - Anechoic Chambers
- Shipboard (Marine) Systems
- Automated Storage and Retrieval Facilities

### **FM-200®**

- Telecommunication Facilities
- Computer Operations
- Control Rooms
- Shipboard (Marine) Systems
- Rare Book Libraries
- Universities and Museums
- Art Galleries
- Record & Storage Facilities
- Petrochemical Installations
- Pharmaceutical & Medical Facilities
- Electronics & Data Processing Equipment

**CHEMETRON**

**Fire Systems™**

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*Chemetron. Your Single Source Solution.*