FIRE SHIELD

ALT

global warming

ODP

GWP

Halon

ozone killer

ADVANCING SAFETY WORLDWIDE

Lets join hands for a...

...Greener Earth

CO_2 Flooding System

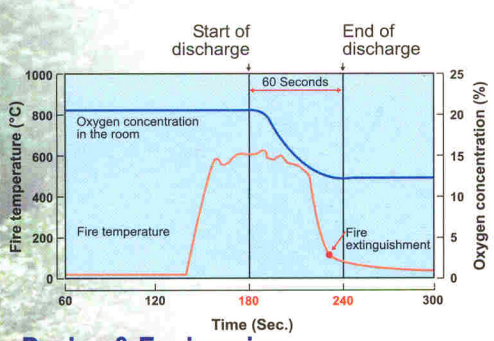
Fast acting with proven effectiveness

Principle

In Fire Shield CO_2 Flooding Systems, Carbon dioxide(CO_2) is stored in liquid form with maximum filling ratio of 0.667 kg/ltr of cylinder volume. 1 kg. of liquid CO_2 vapourizes to occupy approximately 560 ltrs at atmospheric pressure & 21°C temperature. This means that, a large quantity of CO_2 gas is effectively stored in liquid form in relatively smaller cylindrical volume, reducing the hardware requirement to flood/inject it through the pipe network to the extinguishing sector, causing volumetric reduction of oxygen concentration & phisical cooling, thereby extinguishing the fire effectively.

The result of fire tests

Oxygen concentration	Oxygen concentration
21%	11%



Design & Engineering

Proper designing of pipe-network is of prime importance for efficient discharge of CO_2 in the protected area, without forming snow or ice. Our vastly experienced panel of engineers follows NFPA-12 (National Fire Protection Association) Rules &IS:6382 codes for designing & installation of Fire Shield CO_2 Flooding System. It consists of a supply of CO_2 stored in explosive approved, high pressure, seamless steel cylinders, conforming to IS:7285, fitted with solenoid valve. Each cylinder is equipped with an actuation device which may be mechanically, electrically or pneumatically activated to extinguish the fire. Our microprocessor based control panel presents a wide range of options for automatic and manual operation — the latest in programming oppurtunities, system status monitoring, post-discharge feedback etc.

Centralized Installations

In centralized installations, the cylinders, grouped together in a common bank, with a volume of gas sufficient to protect the largest area is optimized to protect multiple hazard zones using directional (selection) valves.

Modular Installations

In modular installations, the cylinders are separately situated in distantly located fire-prone zones to be protected. Ideal for small hazard areas situated at distant locations.

With the ever-expanding needs of fire protection, we offer different types of CO_2 Flooding Systems to meet your peculiar needs:

Total flooding System

A pre-determined amount of CO_2 gas is transported though fixed pipe network to nozzles in the enclosed protected area. It floods the CO_2 gas evenly, throughout the protected area, providing a total fire protection. The CO_2 concentration must be maintained for a sufficient period of time to extinguish the fire completely.

Local Flooding System

Nozzles are so arranged to discharge CO_2 gas directly onto the fire. It is applied to protect particular equipments, isolated from other combustibles, so that fire will not spread beyond the protected area

Hand Hose Line System

Flexible, high-pressure, hand-held hose lines are permanantly connected to a fixed supply of CO_2 gas. It is applicable for manual protection of small, localized equipments.

Advantages

- **Clean agent,** no post-discharge residue to clean up.
- It is a naturally occurring gas, so very **economical** with long-term availability.
- **Low Maintainance** - the weight of CO_2 gas cylinder should be checked at least once in a year along with working of the total system.
- Electrically non-conductive
- Colourless & Odorless.

HFC Fire Shield Clean Agent Fire Extinguishers

Safe, Effective, Environment - friendly

Fire Shield Clean Agent Fire Extinguishers uses, clean agents, viz. HFC 236, HFC 227, FM 200 superpressurized with nitrogen . These are light- weight & easy-to-use fire extinguishers which extinguishes fire within a span of 10 seconds only by a combination of chemical & phisical mechanism without effecting the available oxygen for evacuation.

Manual

Automatic

Specification

Types of Fire Extinguishers	Manual				Automatic		
Capacity	1Kg	2Kg	5Kg	10Kg	5Kg	10Kg	15Kg
I.S. Specification	15683	15683	15683	15683	-	-	-
Test Pressure (Kgf/cm^2)	30	30	30	30	30	30	30
N_2 Gas Pressure(Kgf/cm^2)	15	15	15	15	15	15	15
Discharge Range	2m	2m	4m	5m	$4m^2/8m^3$	$8m^2/15m^3$	$12m^2/20m^3$
Height (mm)	325	380	535	625	270	295	295
Diameter (mm)	87	108	150	175	230	300	400
Gross Weight (Kgs)	2.2	3.7	9	16.3	8	14.6	23

Our Manufacturing & Quality Control

Mig Welding

Hydraulic Testing

Painting Workshop

Fire Test

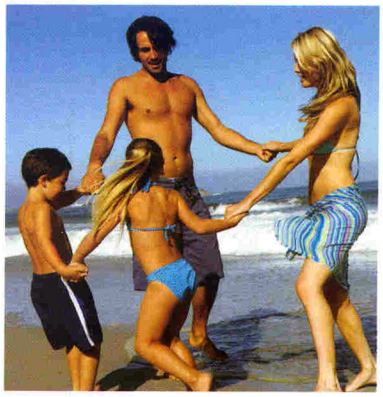
HFC 227ea (FM200)

Clean Agent Fire Suppression System

Quick acting due to High Pressure Technology (HPT)

Protecting...

...Lives

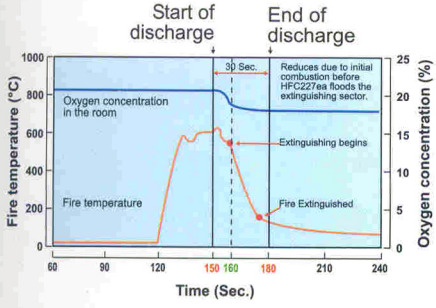


Principle

Oxygen occupies 21% place in the air, by volume. Continuous combustion requires more than 15% of oxygen concentration by volume. When Fire Shield HFC 227ea (FM 200) systems actuates to put out a fire, it suppresses fire by a combination of chemical & phisical mechanisim without effecting the available oxygen for evacuation as the oxygen concentration in the extinguishing sector changes only to about 17% from 21% due to initial combustion before the system actuates.

The result of fire tests

Oxygen concentration **21%** → **Oxygen concentration** **17%**



HPT Concept

The faster extinguishing effect of Fire Shield HFC 227ea as compared with conventional FM200 systems is achieved solely by means of the High Pressure Technology. By HPT, we understand a minimum operating pressure, at the nozzle of 10 bar as well as an HFC 227ea storage pressure of 42 bar together.

Faster Extinguishing

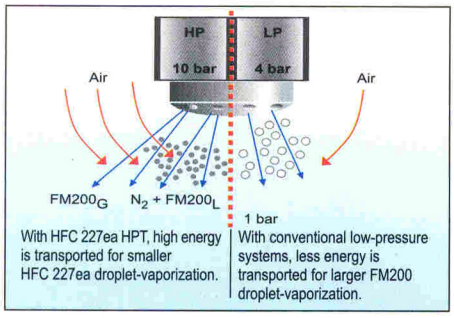
Criteria for extinguishing fire in less than 30 seconds.

- **Rapid release of HFC 227ea in the extinguishing sector.**
- **Total vaporization already during flooding.**
- **Perfect homogenization before flooding is completed.**

The results of numerous extinguishing tests in our laboratories have shown, that as a rule, a fire can be completely extinguished in less than 30 seconds after the system has been actuated, only when all three of these criteria are completely fulfilled.

Rapid Release

HFC 227ea is rapidly released in liquid form to the nozzles in the extinguishing sector, where it is atomized. Required energy must be supplied to the droplets for vaporization. As the graphic shows, the ambient air is drawn into the HFC 227ea droplets/nitrogen jet providing the necessary energy for vaporization.



The droplet size, arising from atomization of HFC 227ea, decreases with the increasing operating pressure at the nozzle

Total Vaporization

The life of an HFC 227ea droplet expressed, as the distance travelled in metres, as a function of the operating pressure at the nozzle, as per thermodynamic calculations.

Operating pressure at the nozzle (bar)	Distance travelled by droplet (m)
10	<1.5
6	>4.5
4	>5.5

Higher the operating pressure, lower is the distance travelled

It clearly shows that only at a minimum operating pressure of 10 bars is an HFC227ea droplet completely vaporized before

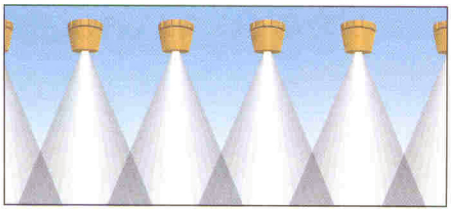
...Properties

& Environment

it can collide with any object in the extinguishing sector. Hence with HFC 227ea, extinguishing begins at the latest, when all the liquid HFC 227ea has entered the extinguishing sector, i.e. before the end of 10 seconds flooding -time.

Perfect Homogenization

The Room nozzles sprays the jet at an optimal angle of 50° to the nozzle axis, whereas for Void nozzles the jet angle is 90°. All the nozzles are so arranged to overlap the jet angles of each other, which increases the homogenization in the extinguishing sector, providing you an added



Nozzle Arrangement

advantage of flooding rooms upto a height of 5 metres over conventional low pressure systems which are usually limited to room heights of less than 4 m.

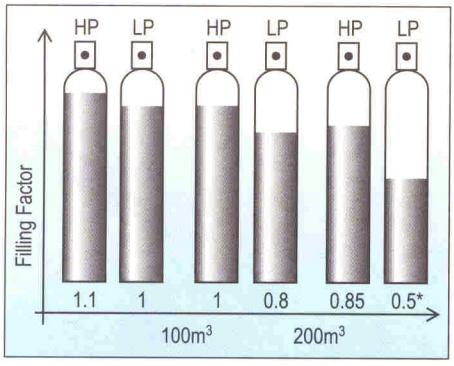
Solubility of Nitrogen

While Nitrogen in the cylinder head, via the HFC 227ea liquid surface, serves to fill the pipe network with liquid HFC 227ea initiating atomization at the nozzle, the dissolved Nitrogen in the HFC 227ea is very crucial, since it sustains the flooding of HFC 227ea in the extinguishing sector

Storage pressure (bar)	Solubility of nitrozen (g/kg HFC 227ea)
25 bar	10
42 bar	17

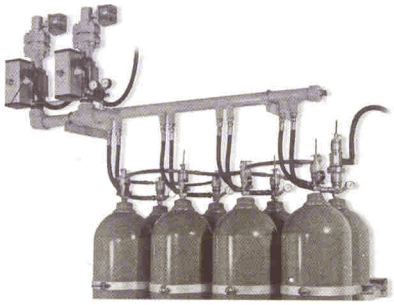
Solubility of Nitrogen

In liquid FM200, Nitrogen is highly soluble. It is comparable with that of N_2 in the blood of a diver which increases with the increasing pressure. As a result Fire Shield HFC 227ea systems, gurantees almost twice as much nitrogen propellet for each stored kilogram of HFC 227ea, if one takes into account the fact that under high pressure, more Nitrogen can be stored in the space available in the cylinder head, with which even with larger and more complex



Filling factor dimension

application, the maximum filling factors can be realized in comparison to conventional systems.



Finally, the increased impetus of the jet and a special nozzle design and arrangement by Fire Shield HFC 227ea systems provides Rapid release, Total vaporization & Perfect homogenization of HFC 227ea upon entering the extinguishing sector, which results in extinguishing the fire within 30 seconds.

Advantages

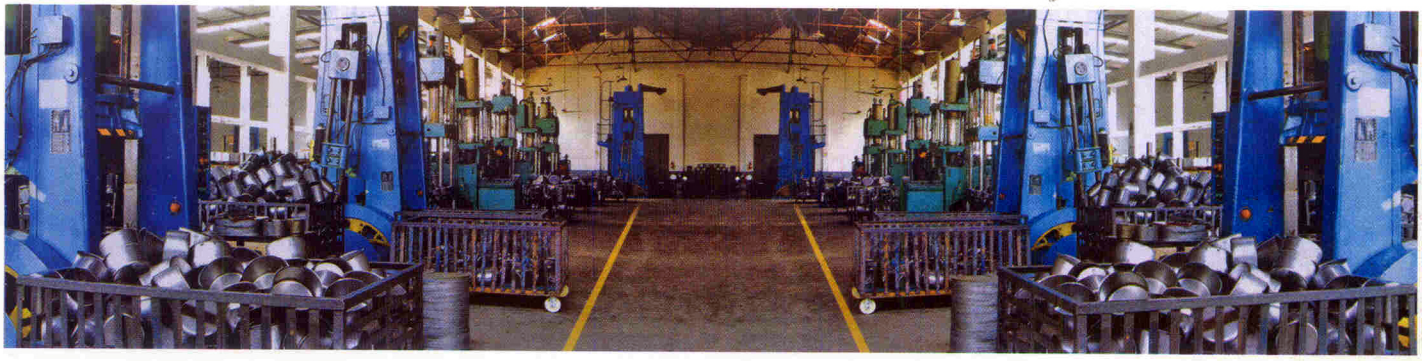
- **No Physiological Effects To Humans-** EPA, USA, proposes that an IG-100 system could be designed to an oxygen level of 10% if occupants can egress the area within one minute, but may be designed only to the 12% level if it takes longer than one minute to egress the area, while the design concentration of oxygen for Fire Shield HFC 227ea systems is 17%
- **Safe For You-** Oxygen concentration remains at safe level for evacuation, even if someone is trapped inside a protected place during discharge. Hence it is suitable for even densely occupied places.
- **Clear view to exits** – As it is colourless, it provides clear visibility necessary for occupants to access exits.
- Electrically non-conductive & odorless.
- No post-discharge residue to clean up.

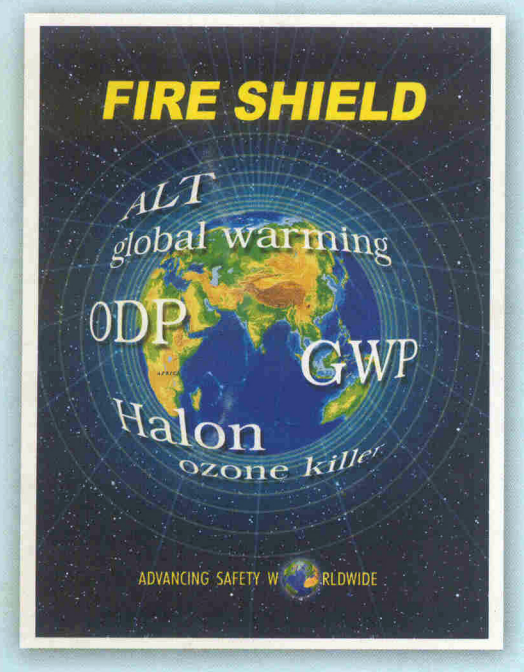
Storage pressure	42 bar (20°C)
Temperature range	-20°C - 50°C
Maximum room height	5m
Filling factor	0.45 - 1.15
Flooding time	≤10 s
Extinguishing time	≤30 s

Key specifications of HFC 227ea

Note : We reserve our right to change the design, specifications and dimensions without prior notice, in lieu of our continuous efforts and research, to provide you with the most advanced and innovative technologies.

Our Works





One of the first rules of fire-fighting is to extinguish the fire in the quickest possible time, since, longer the time is taken, heavier is the damage caused by fire itself.

Perhaps, this is why, Halon 1301 & 1211 was so extraordinarily popular in the past, for its exceptional speed of extinguishment. But, in 1980's, Halon was identified to possess high level of Ozone Depletion Potential. Hence, according to Montreal Protocol, an internationally adopted environmental initiative to phase-out the production & use of ozone depleting chemicals, mandated a ban on Halon production after 1993.

Today, the global environmental protection becomes one of the most serious issues for human beings to survive. With the phase-out of Halon, the quest for a perfect replacement, resulted in the invention of a number of environment - friendly, Fluorocarbons, Hydrofluorocarbons & Heptafluoropropane ($CF_3CHF\ CF_3$) based clean fire extinguishing agents.

Hence, we offer our latest – Clean Agent Fire Extinguishers & Fire Suppression Systems with

- **Zero Ozone Depletion Potential (ODP)**
- **Lowest Global Warming Potential (GWP)**
- **Lowest Atmospheric Life Time (ALT)**

ISO 9001 : 2008

FM 79011

ISO 14001 : 2004

EMS 552640

FIRE SHIELD

ENGINEERING EQUIPMENTS

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