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BOC FS125

FACTS THAT WILL HELP YOU TO TAKE A TIMELY DECISION…

- Fire spreads rapidly from ignition stage to an uncontrollable blaze in a geometrically increasing magnitude.

- Increasing quantities of extinguishing agents are required as fire transits from one stage to other.

- In the first stage, uncontrolled fire can reach a blaze, within 1-10 minutes depending on the type of fire. This is the only stage where fire extinguisher is helpful.

- In the second stage, fire spreads rapidly over large areas and requires sophisticated systems to be extinguished.

- In the third stage fire moves beyond control and only experts like fire brigade can prevent it from spreading to the neighbourhood.

Early detection and suppression of fire are the key to fire protection.

The need for effective fire protection is critical, if your complex houses the following facilities like :

- Computer Rooms
- Control Rooms
- Data Storage Centers
- Transportation and Infrastructure
- Museums
- Laboratories
- Data Storage Archives
- Marine / Shipping
- Petrochemical
- High Value Industrial Equipment Areas.

The extinguishing system for the above purpose has to be

- Quick Acting.
- Reliable.
- High Shelf Life.
- Time Tested And Approved By Authority.
- Clean And Safe For Equipment.
- People Safe.
- Environment (Ozone) Friendly
- Versatile Enough To Take Care Of All Classes Of Fire.
- Long Term Availability.
- Space Efficient.
- Economy, Best Cost / Benefit Ratio
- Minimum Maintenance Cost.

HOW FIRE DETECTION AND GAS RELEASE PANEL WORKS ?

Fire detection shall be achieved using smoke detectors. Each protected area shall have an independent **micro processor based fire control/gas discharge panel** and one set of detectors. Each zone shall have one set of ionization and one set of optical smoke detectors. While ionization detectors are more sensitive to fast flaming fire, optical smoke detectors are more sensitive to slow smoldering fires. In case of either type of fire, smoke detectors shall detect the condition at an early stage (the moment products of combustion enter the detector) and shall cause the alarm panel to activate.

The moment the first zone gets activated the specific zone number shall be displayed and the panel buzzer shall start operating. At the end of time one, stage 1 bells and relays shall be switched on. There shall be two sounders, both of which get switched on simultaneously to ensure that at least one shall work even if the other fails. The stage 1 bells shall be identified by the fact that they pulsate at the rate defined by timer 1.

When the second zone also activates, the second zone number shall also be displayed on the panel and stage 2 bells shall be activated which is identified by a continuous tone. The stage 2 bells indicate that area is to be evacuated. The output from the panel (actuator output) shall activate at the end of timer two, which is initiated from the moment the panel enters stage 2. it is important to note that the actuator output on the panel shall be enabled only if the automatic gas release of the gas by pressing the hold off switch on the panel, which shall reset the time to zero. The moment the switch is release the time shall start afresh.

In the manual mode, even if the panel enters the stage 2, the actuator output shall not be enabled. In this case, actuator output shall be enabled if and only if the manual release switch is pressed, which shall cause the panel to enter stage 2 directly and at the end time 2 enables the actuator output.

In case of alarm during presence of staff, the mute key shall be pressed to silence the alarm. Reset switch shall be pressed. The shall cause the zone isolation lamp to light on the panel.

In case of any fault condition (open circuit or short circuit on zone loop or power fault or bell fault or actuator fault) the indicator and the buzzer shall come on. The faults relay shall also be activated and provide a change over contact. Pressing the mute key shall cause the buzzer to shift to intermittent state and the LED'S shall also alight steadily, instead of flashing.

BOC FS125 IS SAFE FOR THE PLANET :

Unlike Halon 1301, BOC FS125 does not deplete the ozone layer. Its Atmospheric Lifetime and Global Warming Potential are low, making BOC FS125 an overall environmentally acceptable alternative to Halon 1301.

WHY BOC FS125 IS BEST FOR SENSITIVE EQUIPMENT ?

a) BOC FS125's relatively high boiling point, combined with proper system design, guards against the thermal shock to electronics that could occur from the direct discharge of other agents.

b) BOC FS125 is also electrically non conductive and non corrosive.

c) It leaves no particulars or oily reside to damage instruments, computers, sophisticated medical devices etc.

d) BOC FS125 systems typically displace about 8 percent of the air in the room, (some other extinguishers can force).

e) BOC FS125 lower requirements reduce the potential for room and equipment damage due to over pressurization.

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MODULAR INSTALLATIONS

In modular installations, the cylinders are not grouped together but are separately situated in the area to be protected so that, when actuated, the BOC FS125 gas is released as evenly as possible only in the area where fire is sensed. Ideal for small hazard area situated at distant locations.

SPACE SAVER

Where space is at a premium. BOC FS125 is the right choice. The extinguishing performance of BOC FS125 required only a modest increase in agent storage cylinders compared to Halon 1301. BOC FS125 saves yours expensive floor space for productive use.

DON'T HOLD YOUR BREATH - Test prove that BOC FS125 exposure is safer than exposure to Halon 1301/NAFSIII. Additionally, BOC FS125 is effective at low concentrations, well below the EPA's maximum exposure levels.

BOC FS125 (pentafluroethane + Delumine) : The Best Fire Protection For High-Value Assets.

With phasing out of Halon 1301, BOC FS125 stands alone as the leading choice & Compatable with Halon 1301 for high value asset fire protection with many successful installations world-wide.

For the protection of people, sensitive and valuable facilities, high value assets, fire protection is not a relative thing. It's an absolute. BOC FS125 is the solution to all your worries in following way :

BOC FS125 provide you with a significant margin of safety.

a) **U.L. (Underwriters Laboratories) listed and IMO (International Maritime Organization) approved.** BOC FS125 systems are engineered to achieve minimum design concentrations in 10 seconds or less, quickly extinguishing fires. Delays in extinguishment can add significantly to damage, repair cost and down time.

b) BOC FS125 another advantage is its proven explosion inserting capabilities can prevent catastrophic consequences.

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WHY BOC FS125 WORKS SO WELL ?

BOC FS125 mechanism of extinguishing fires is active.

a) Its primary action is through physically cooling the fire at the molecular level.
b) BOC FS125 belong to the same class of compounds used in refrigeration, and as such, is an efficient heat transfer agent.
c) BOC FS125 literally removes heat energy from the fire to the extent that the combustion reaction cannot sustain itself.
d) Additionally, there is a chemical extinguishing of free action contributed by BOC FS125 Trace amounts of free radicals are released in a fire, ultimately inhibiting the chain reaction of combusting.

BOC FS125 IS CLEAN TOO !!!

BOC FS125 Not only prevent extensive fire damage. It virtually eliminates collateral damage to delicate equipment and instruments from the extinguish ant itself.

a) BOC FS125 is a clean gaseous agent containing no particulars or oily residues.
b) BOC FS125 does not dignificantly reduce oxygen levels and is safe for occupied spaces where your most important assets reside.
c) After BOC FS125 is discharged it can be removed from the protected space by simple ventilation allowing you to resume normal operations quickly.

Use and Limitations

BOC FS125 systems are designed for total flooding applications to extinguish Class A, B and C type of fires. BOC FS125 systems are super-pressurized with Nitrogen and stored at 42 bar (609 psi).

BOC FS125 is suitable for use in rooms, vaults, enclosed machines, containers, storage areas, and bins or wherever fixed enclosures are used. The use of BOC FS125 in total flooding systems requires the protected areas to be sealed at the time of discharge.

- **Class A Fires,** Surface fires involving ordinary combustible materials, such as wood, cloth, paper, rubber, and many plastics.
- **Class B Fires,** fires involving flammable liquids, gases oils, greases, tars, oil-base paints, and lacquers.
- **Class C Fires,** electrical fires.

The 42 bar BOC FS 125 engineered system is available with the UL listing.

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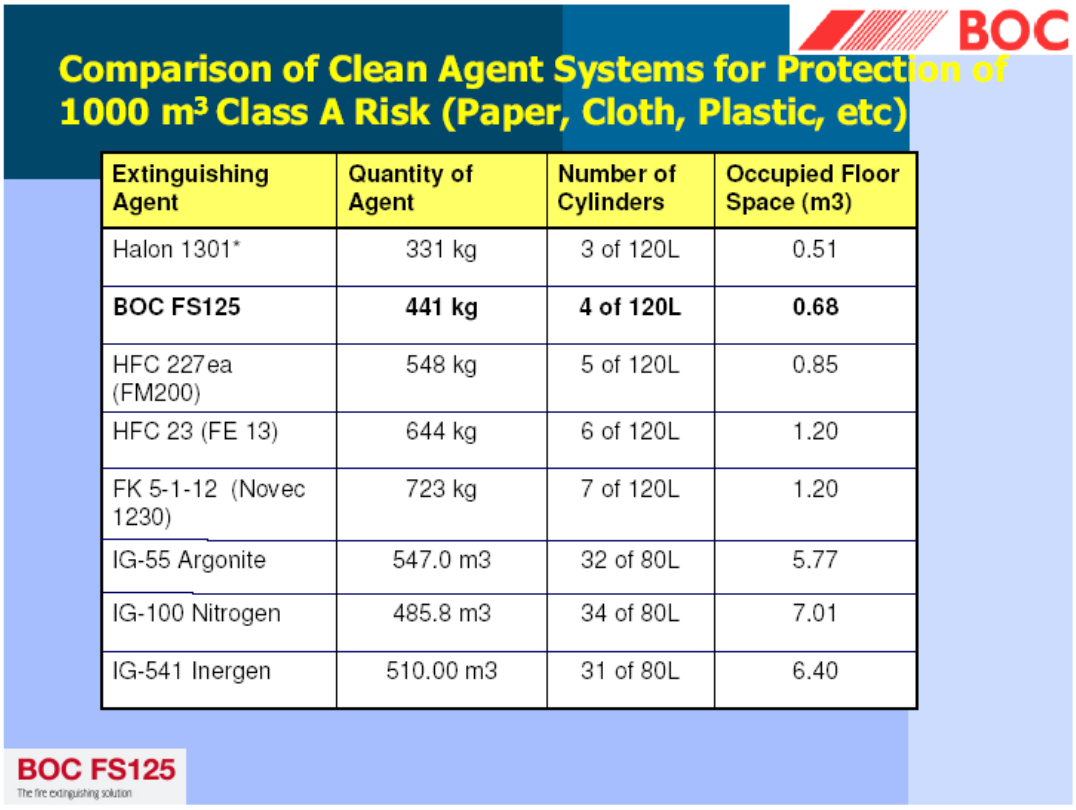
RETROFIT WITH EXISTING HALON 1301 SYSTEM

Only BOC FS125 has similar and nearest physical properties to Halon 1301 which makes it an ideal environmentally friendly replacement. With similar gas quantity requirements, there is a better chance that a drop-in solution can be found maximizing the use of the existing system and pipe network causing the least amount of disruption to your business.



Extinguishing Agent	Quantity of Agent	Number of Cylinders	Occupied Floor Space (m3)
Halon 1301*	331 kg	3 of 120L	0.51
BOC FS125	**441 kg**	**4 of 120L**	**0.68**
HFC 227ea (FM200)	548 kg	5 of 120L	0.85
HFC 23 (FE 13)	644 kg	6 of 120L	1.20
FK 5-1-12 (Novec 1230)	723 kg	7 of 120L	1.20
IG-55 Argonite	547.0 m3	32 of 80L	5.77
IG-100 Nitrogen	485.8 m3	34 of 80L	7.01
IG-541 Inergen	510.00 m3	31 of 80L	6.40

SERVING YOU LOCALLY

BOC is renowned for guaranteed quality and safety. With local UL Listed filling facility plant in navi Mumbai and stock in country, we serve our customers better by providing shorter delivery times and better service. Our excellent distribution network also means we provide efficient delivery for emergencies even in remote locations.

RELIANCE FIRE PROTECTION SYSTEMS
2nd Ground Floor,
Albian Place, Heritage Compound,
Sant Savta Marg, Byculla (E),

BOC

Comparison Between FM200®, CO_2, INERGEN, BOC FS- 125 (Gaseous Fire Suppressants)

Sr No	*Parameter for Comparison*	*FM-200®*	*INERGEN*	*BOC FS125*	*Carbon Di- Oxide*
1	**Manufacturer**	Great Lakes Chemical Corporation, USA	Ansul Incorporated, USA	Manufactured by Safety Hi – tech, Italy.	--
2	**Product Data**	FM-200 is the commercial name for HeptaFluoropropane. Empirical formula: CF_3-CHF-CF_3 ASHRAE Designation: HFC 227ea	Also Known as IG- 541. It is blend of Naturally available gases: N_2 - 52 % Argon - 40 % Co_2 - 8 %	BOC FS125 is commercial name for Penta Fluro ethane Chemical Formula: CF3CHF2 +additive HFC 125 = 99.85% d-Lemonene = 0.15%	Naturally available Gas
3	**Product Properties**	Boiling Point: -16.36 ºC Freezing Point: -131 ºC Molecular Wt.: 170.04	Boiling Point: - 78.5 ºC Freezing Point: - 196 ºC	Boiling Point: - 48.5 ºC. Freezing Point: - 102.8º C Note: Higher Boiling Point, thus no thermal shock. Molecular Wt.: 120.4	Boiling Point: - 77 ºC
4	**Approvals from Major global Certifiers.**	U.L.., USA U.L., Canada FMRC, USA Listed as a Clean agent in NFPA 2001. Listed as approved Clean agent in US EPA's Final Rule. Only 25-bar system is UL approved. 42 bar system is VDS approved.	U.L.., USA U.L., Canada FMRC, USA Listed as a Clean agent in NFPA 2001. Listed as approved Clean agent in US EPA's Final Rule.	Has been Approved and listed by U.L., Canada. U.L., USA. Listed as a Clean agent in NFPA 2001. Listed as approved Clean agent in US EPA's Final Rule. SNAP List Tested and Listed as a clean agent according to ISO 14520 Part 1 Annex. C. Tested and Listed as a clean agent according to International Maritime Organization (IMO) MSC/Circ 848	N/A – Not a replacement for Halon 1301 as documented in NFPA 2001.
5	**Standard for Design.**	NFPA 2001.	NFPA 2001.	NFPA 2001.	NFPA 12
6	**Principle of Fire Suppression**	FM200® is a good heat transfer agent – it is from the same family of refrigerants as Freon. FM-200® primarily works on the principle of cooling of the fire at a molecular level – to the extent that the fire temp. is bought below 1300 ºF, and flame is extinguished. Additionally, there is a chemical action, wherein Hydroxyl radicals at the flame surface are engaged in reaction with hydrogenated CF_3 radicals, thereby inhibiting the combustion reaction.	Oxygen Starvation – Oxygen levels in the hazard area are bought below 14 % by creation of a inerting atmosphere, so that the fire does not get sufficient O_2 for combustion.	BOC FS125® is an excellent heat transfer agent. It primarily works on the principle of cooling of the fire at a molecular level – to the extent that the fire temp. is bought below 1300 ºF, and flame is extinguished.	Oxygen Starvation – Oxygen levels in the hazard area are bought below 14 % by creation of a inerting atmosphere, so that the fire does not get sufficient O_2 for combustion. **Note: Low O_2, High CO_2 atmospheres are dangerous for Humans.**
7	**Inerting Concentration as Defined by NFPA 2001 and US EPA's SNAP**	Cup burner n-heptane extinguishing concentration of 5.8 %, hence a minimum design concentration of 7.0% v/v for FM-200® Confirmed through testing by NRL, Canada; NMERI, Mexico; Fenwal, USA; GLCC, USA.	Cup burner n-heptane extinguishing concentration of 29.1%, hence a minimum design concentration of 35% v/v for Inergen. Confirmed through testing by Ansul, USA and various testing agencies.		NFPA 12 gives Minimum design concentrations ranging from 66% for Acetylene to a minimum of 34 % for Methane etc. The standard also recommends Flooding factors and Material conversion factors for arriving at effective concentrations.

					NFPA 12 also provides concentrations required for electrical hazards and for surface / deep seated fires.
8	**Toxicity Levels:** **N O A E L -** **L O A E L –** **(As Accepted By The E P A)**	9.0 % 10.5 %	43 % 52 % Note: These values are based on the Physiological Effects in hypoxic atmospheres. These values are functional equivalents of NOAEL and LOAEL Values, and correspond to 12 % minimum oxygen at the NOAEL and 10 % minimum oxygen at the LOAEL.		Not Applicable- Not for use in Manned Areas.
9	**Discharge Time**	Less than 10 seconds	One minute or longer	Less than 10 seconds – No chances of producing any decomposition by products due to addition of additives e.g. d-Lemonene.	One minute or longer
10	➢ **Minimum Container design level Working pressure –** ➢ **Total Pressure level at 21.1ºC -**	35 bar 25 bar	153 bar	42 bar	60 bar
11	**Safety to People – Applicability in manned areas.**	Recommended for use in manned areas – Note that the Design concentrations are below the NOAEL and LOAEL. The discharge time is necessarily limited to less than 10 secs, thereby greatly reducing the ill–effects of decomposition products. The acute toxicity is equal to that of Halon 1301, and US EPA's SNAP and NFPA 2001 has evaluated it for cardiac sensitisation through test protocols approved by the EPA – and has approved it for use in normally occupied areas as a Clean total flooding agent, after several toxicity tests. That it has been proposed as an alternative to CFC propellant in pharmaceutical inhalers, suggests that level of safety of FM-200 for humans.	Recommended for use in normally occupied areas as per the final Rule of the EPA, ***provided*** the Oxygen levels are not under any circumstances, below 10 %, and there is no more thane 5 % Co_2 in the agent discharged area. It has to be kept in mind that Inergen works on the principle of Oxygen starvation, and that the life safety of the personnel is of prime importance. Though the agent has been tested for exposure to humans in labs, the following points are to be noted : a) During a actual fire condition, the Carbon di-oxide levels in the area shall be much higher than the ones designed, due to the fuels burning emitting CO_2. b) During a actual fire condition, Carbon monoxide shall be released, and the effects of which are potentially more dangerous than those of CO_2.		To be used only for Normally unoccupied areas – physiological effects of CO_2 should be considered. 10 % CO_2 is the lowest recorded concentration causing fatality in man – (After 1 minute exposure) It is mandatory that all personnel be evicted out of the hazard area before the discharge of CO_2 gas.

			Further, due to a higher respiration rate of humans in Inergen atmospheres, more Carbon Monoxide shall be inhaled by the human, causing severe problems. c) The system is designed considering a empty room void dimensions – in reality, the room void shall not be empty, but shall have various equipments placed in it. Thus, the actual concentration of the agent in the area in the case of a discharge shall be much higher than the designed levels.		
12	**Safety To Environment**	➢ ODP = Zero ➢ Atmospheric lifetime=31-42 yrs. ➢ GWP = 2900.	➢ ODP = Zero ➢ Atmospheric lifetime =Zero ➢ GWP =Zero Inergen is a mixture of natural gases – there is no threat to environment by it's discharge.	➢ ODP=Zero There is no Chlorine or bromine in the FM 200 Compound – Hence there is no chance of Ozone depletion. ➢ Atmospheric lifetime=32.6 yrs. The atmospheric lifetime is lowest amongst all the HFCs proposed for use as Fire suppressants. ➢ GWP = 2800. The Global warming potential too is very low- equivalent to driving a car for 1500 miles	➢ ODP = Zero ➢ Atmospheric lifetime = Zero ➢ GWP = ONE (GWPs of all the other gases are compared against that of CO_2) Carbon Di-oxide is a natural gas – there is no threat to environment by its discharge.

Note: ODP = Ozone Depletion Potential ; GWP = Global Warming potential.
With respect to GWP, it has to be understood that Fire Protection is intrinsically a environmentally friendly activity which prevents damaging emissions caused directly by fires. Furthermore, averting the need for the goods and the materials to replace those lost through fire saves natural resources, the manufacture of which would have a global warming impact. Also, an enlightened user has to understand that in many cases, the Indirect GWP of the gases could be more than the Direct GWP.