

FIRE SUPPRESSION SYSTEM- SE-200 HFC-227ea

Every second counts in Fire... The once hard-built kingdom has vanished in split seconds. Flames of fire have destroyed all your belongings, leaving your company succumbing to critical losses of treasures that are left perished in fire. The destruction is even more heart-shattering in extreme fire cases as precious lives are swept away before any attempts to save them. It is going to take a long time to rebuild everything back from scratch.

Devastating as it is, your company's most valuable human resources, data, equipment and systems are all lost to fire. Unbearable truth of the aftermath is to face inoperable equipment, service interruptions and failure to produce necessary information for your customers' needs.

Ultimate protection against catastrophe... The best protection for high-value assets requires a product that could meet all the criteria necessary to minimize the risk of fire damages. Halon 1301 has been widely used as it proves to be an effective fire suppression agent, but Halon 1301 has significant environmental consequences due to its potential contribution to depleting the ozone layer.

The quest for a replacement resulted in the introduction of HFC-227ea to the market place. It has been designated as a replacement for CFC propellants in pharmaceutical metered dose inhalers in asthma medications. Known as the world most widely accepted replacement for Halon 1301, HFC-227ea is considered as people-friendly and takes up less floor space than other systems. The U.S. Environmental protection Agency named it a non-ozone depleting agent for fire extinguishing systems installed in occupied places.

Exceptionally Fast and protective... Once a developing fire in its initial stage is detected, HFC-227ea extinguishes it quickly by discharging in just 10±1 second or lesser. SE-200 fire suppression system effectively removes heat and breaks up the fire at molecular level. With fast and protective extinguishing action, sensitive components are not damaged. Toxicologically harmless, HFC-227ea discharges as gas and leaves no residue, thus there is no hassle for any clean-up cost, unlike sprinklers. Indeed, SE-200 can provide greater coverage in the shortest time span than any other options. This is significant to minimize damages and interruptions for your business especially when your company relies heavily on the high availability of critical operating procedures.

Space Efficiency... SE-200 can be individually adapted to suit every area and desired corner in your company. Nozzle holes and container fill volumes are the results of object specific calculations and characterize a system optimized down to the smallest detail. The charging pressures of up to 25 BAR depicts that multizone.



systems and longer pipe works can be designed. No separate space is needed for the supply of extinguishing agent; it can be located in the protected area itself. Equipped with environmental properties and good performance ratio, you will definitely get greater protection while utilizing less floor space.

Clean & safer choice Colorless, odorless, and in gaseous form, SE-200 extinguishes without leaving any residue. With speedy distribution throughout the room, SE-200 is not erosive and electrically conductive thus causes no damage through short circuits. The function of SE-200 is to deprive the heat and interrupt the combustion reaction.

SE-200 SYSTEM APPLICATION

Clean Agent Decision Criteria

- Excellent price / performance ratio
- Robust design, so low maintenance costs
- Compact and space saving
- VDS approved
- Worldwide recognized and approved extinguishing agent
- Rapid extinguishing effect
- Safe for use in occupied areas
- No extinguishing agent residues
- Simple design and hydraulic calculation
- Higher operating pressure possible

Extra Guaranteed service

- Professional advice
- Technical and maintenance support

Use for:

- Power generation, transmission & distribution facilities
- Telecommunications facilities
- Commercial & institutional facilities
- Data centres & industrial applications.

Safety & Preclusions

Exposure to SE-200 at the design concentration of 7% to 9% is not hazardous to health within a permissible period of time. According to Non-Observed Adverse Effect Level (NOAEL), the maximum human exposure time shall not exceed 5 minutes with 9% Concentration level.

It is recommended that unnecessary exposure to any agent be avoided and that personnel evacuate protected areas as quickly as possible to avoid the decomposition products of the clean agent.

SE-200 can decompose at high temperature or under fire to a form of halogen acids which is readily detected as a sharp, pungent odour even after fire extinguished or long before hazardous maximum exposure levels are reached. Ventilation and openings are required to clear the protected areas after SR-200 discharged, no one is allowed to enter the areas during system discharge or before the area is totally ventilated and safe for occupancy again.

Direct contact with the vaporizing liquid discharge from a SR-200 nozzle has a cool chilling effect on objects and in extreme case can cause frostbite to the skin. one should avoid direct contact with the agent.

SE-200 should not be used on fires involving the following materials:

- Certain chemicals or mixtures of chemicals, such as cellulose nitrate and gunpowder, those are capable of rapid oxidation in the absence of air.
- Reactive metals such as lithium, sodium, potassium, magnesium, titanium, Zirconium, uranium and plutonium.
- Metal hydrides.
- Chemicals capable of undergoing auto thermal decomposition, such as certain organic peroxides and hydrazine.

Agent Characteristics

HFC-227ea is a gaseous halocarbon agent containing no particles; it leaves no oily residues on electronic equipment and can be removed and can be removed from the protected space by ventilation. It is the first environmentally acceptable replacement for Halon 1301.

The present understanding of the functioning of HFC-227ea is that 80% of its firefighting effectiveness is achieved through heat absorption and 20% through direct chemical means. HFC-227ea is stored as a liquefied compressed gas super pressurized with dry nitrogen to 25BAR and is discharged into the protected area as a vapor.

Agent Physical Properties

Chemical Structure	CF ₃ CHFCF ₃
Chemical Name	1,1,1,2,3,3,3-Heptafluoropropane
Molecular Weight	170 g/mol
Boiling point at 1.013 Bar (abs)	-16.4°C (1.9°F)
Freezing point	-131°C (-204°F)
Critical Temperature	101.7°C (214°F)
Critical Pressure	29.1 Bar (422 psi)
Critical Volume	274 cc/mole (0.0258 cu.ft/lb)
Critical Density	621 kg/m ³ (38.76 lb/ft ³)
Specific Heat, Liquid at 25C	1.184 kJ/kg°C
Specific Heat, 25°C	0.808 kJ/kg°C
pressure 1atm and 25C	0.808 kJ/kg°C
Heat of Vaporization at Boiling point	132.6 kJ/kg
Thermal Conductivity of liquid @ 25C	0.069 W/m°C
Viscosity, Liquid at centipoise 25C	0.184
Relative Dielectric Strength @ 1atm	2
Saturated vapor Density @ 21C	0.06 % by weight
Saturated Vapor Density @ 20C (68F)	31.18kg/m ³ (1.95 lb/ft ³)
Ozone depletion (ODP)	0
Atmospheric Lifetime	36.5 yrs
No Observed Adverse Effect Level (NOAEL)	9%
Lowest Observed Adverse Effect Level (LOAEL)	>10.5%

Approval

The SE-200 fire suppression system is approved by Vds Schadenverhütung (Loss Prevention) Germany to Vds 2452 gas extinguishing system requirement and methods. Key components of SR-200 fire suppression system such as container valve, actuator, nozzle, discharge hose, connecting hose, check valves and etc are certified by Vds.

Vds (Vertrauen durch Sicherheit) is fully owned subsidiary of the German insurance Association (GDV) and through its owner, has more than 100 years of experience in its core area of business, namely fire protection.

For further details visit www.vds.de



System Design & Operation



The SE-200 fire suppression systems are designed, installed and maintained according to NFPA 2001 (Clean Agent Fire Extinguishing Systems). SE-200 utilizes the halocarbon gas Heptafluoropropane (HFC-227ea) in NFPA 2001 and ISO:14520-1. The general requirements and design criteria are based on both NFPA 2001 and ISO 14520-1.

SR-200 is employed as a total flooding system and should not be used for local application system. SR-200 suppresses fire by absorbing heat energy at its molecular level faster than they can be generated, so they cannot sustain itself.

It also forms free radicals to chemically interfere with the chain reaction of the combustion process. This makes it a highly effective firefighting agent that is safe for people and causes no damage to equipment.

- Smoke / Heat Detector
- Nozzle
- Slave Cylinders
- Master Cylinder
- Manifold
- Control Panel
- Alarm Bell
- Manual Call Point (break glass)
- Discharge Flashing Light

Design Calculations

The required agent quantity is based on the volume of protected area at the lowest expected ambient temperature and concentration required. To obtain the minimum agent quantity required, use the following equation: $W = (V/S) \times (C/100-C)$

W= Weight of agent required

V= Volume of protected area

S= Specific vapour volume (0.1263 + 0.000513 T)

C= Required HFC-227ea design concentration (%by volume) at design temperature (t)

T= Design temperature in protected area (°C)

Material MOC

Description	Material (MOC)
1. Valve Assembly	Brass
2. Electromagnetic release device	Brass & Stainless steel
3. Manual/Pneumatic release device	Brass & Stainless steel
4. Pressure gauge	Plastic
5. Discharge Hose	Wire braided rubber hose with 2 high tensile steel wire braids reinforcement
6. Check valve	Gun metal & Stainless steel
7. Pilot line Hose	Wire braided rubber hose with 2 high tensile steel wire braids reinforcement
8. Pneumatic release device	Brass
9. TPED or DOT cylinder	Chromium molybdenum steel

Cylinder Specification

Description	Material (MOC)
Material	Chromium molybdenum steel
Filling Pressure	25 / 42 Bar @ 21 °C
Test Pressure	50 Bar
Standard of Compliance	TPED 1999/36/Ce or acc. To international standard
Colour	Red

PESO approved cylinder gas filled in PESO facility

Warning: The valve outlet cap must always be fitted onto the cylinder, irrespective of whether the cylinder full or empty, when it is not connected to the pipe network or manifold.



SUPREMEX EQUIPMENTS

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Sr.no	Part no.	Capacity (l)	Valve Outlet Size	Cylinder Height A (mm)	Cylinder Diameter (O/D) B(mm)
1	32L SPS 227-CS-032-33	32	DN33	522.4	324
2	52L SPS 227-CS-032-33	52	DN33	782.4	324
3	100L SPS 227-CS-032-33	100	DN33	963	406
4	120L SPS 227-CS-032-49	120	DN49	1126	406
5	150L SPS 227-CS-032-49	150	DN49	1372	406
6	180L SPS 227-CS-032-49	180	DN49	1268	462
7	200L SPS 227-CS-032-49	200	DN49	1398	462

Components

Valve Assembly	B0482 Type DN33	B0481 Type DN49
Material	Brass	Brass
Temperature Range	-10°C to +50°C	-10°C to +50°C
Release Device Connection	M 42 X 1.5	M 42 X 1.5
Pressure gauge connection	M 10 x 1	M 10 x 1
Valve outlet connection	1 7/8" – 12 UNJ	2 1/2" – 12 UNJ
Valve seat diameter	33 mm	49 mm
Approval	Vds	Vds
Approval No.	G312003	G312003



B0482 Type DN33



B0481 Type DN49



Valve DN 50



Valve DN 65

Check Valve	DN50	DN65
Body (MOC)	Gun Metal	Gun Metal
Seat (MOC)	Nylon	Nylon
Washer (MOC)	Stainless steel	Stainless steel
Nut (MOC)	Stainless steel	Stainless steel
Max. Working Pressure	34 Bar	34 Bar
Temperature Range	-10°C to +50°C	-10°C to +50°C
Approval	vds	vds
Approval No.	G311029	G311029
Inlet & Outlet connection	2"BSP	2 1/2"BSP

Pressure Gauge	Only Pressure Gauge	Pressure Gauge with internal Pressure Switch
Type	Spring tube Manometer	Limit signal switch
Temperature Range	-15°C to +50°C	-10°C to +50°C
Connection to valve	M10 x 1	M10 x 1
Approval	Vds	Vds
Approval No.	G308005	G309005



Pressure Gauge



Pressure Gauge with integrated Pressure Switch



Pneumatic Release Device	
Material	Brass
Min. Actuating Pressure	15 Bar
Max. Working Pressure	250 Bar
Valve connection	M 42 X 1.5
Pneumatic connection	1/8" BSP
Approval	Vds
Approval No.	G302023 Type B04420066

Manual /Pneumatic Release Device	
Body (MOC)	Brass
Lever (MOC)	Stainless steel
Safety pin (MOC)	Stainless steel
Min. Actuating pressure	15 Bar
Max. Working Pressure	250 Bar
Valve connection	M 42 X 1.5
Pneumatic connection	1/8" BSP
Approval	Vds
Approval No.	G302023 Type B04420065



Electromagnetic Release Device	
Body	Brass & Stainless steel
Actuating pin	Stainless Steel
Nominal Voltage	24V DC
Nominal Current	1.2 A
Valve connection	M 42 X 1.5
Approval	Vds
Approval No.	G302023 Type B04420103

Pilot Line Hose	
Material	Synthetic rubber hose with 2 high tensile steel wire braids reinforcement
Max. Working Pressure	350 Bar
Temperature Range	-15°C to +50°C
Fitting & Hose Connection	1/8" BSP
Approval	Vsd
Approval No.	G304027



Discharge Nozzle			
Approval	Vds		
Approval No.	G311027		
Available Nozzle Sizes	1/2"	49	31.75
	3/4"	54	38.10
	1"	60	44.45
	1 1/4"	70	57.15
	1 1/2"	74	63.50
	2"	79	76.20

Discharge Hose	DN38	DN50
Material	Synthetic rubber hose with 2 high tensile steel wire braids reinforcement	Synthetic rubber hose with 2 high tensile steel wire braids reinforcement
Max. Working Pressure	40 Bar	40 Bar
Temperature Range	-10°C to +50°C	-10°C to +50°C
Hose Connection	2" BSP	2 1/2" BSP
Approval	Vds	Vds
Approval No.	G311015	G311019



Gas Extinguishing Panel	TYPE 1
Primary Power	120-220 VAC \pm 10%, 50Hz, 2.5 Amps
Standby power	24v D.C (2 Nos. of 12v, 12Ah Sealed Lead acid battery)
Quiescent current	12 mA
Operating Temperature	0 – 49° C / 32-120° F
Relative Humidity	93 \pm 2% RH (non- condensing) at 32 2° C / 90 \pm 3° F
DC Output Power	Supervised 24VDC regulated, 300mA
No. of circuits/ No. of Inputs	2 / 4
Operating voltage	24 VDC
Releasing	8 – 12 VDC
Programmable	
Nominal Current	0.6A per circuit
Line Drop	1.8 V
End-Of-Line Resistor	3K9, 1/2 Watt
Releasing	3K9, 1/2 Watt
Programmable	
Dimensions	440W X 350H X 120D
Color	Red / White
IP Rating	IP50
Cable Entry	11x \varnothing 19mm Knockout in top of the cabinet 10 x \varnothing 22.25mm Knockout in top of the cabinet



Rate of rise heat detector (EN-54)	
Heat sensor setting	135°F(57°C)/>20°F(6.7°C)min
Voltage DC	10-35V
Standby current (Max) UA	42μA
Alarm current (Max)	60mA@24V
Start-up current (μA)	170μA
Max Rms ripple	25% of DC Input
Rate of rise	>20°F (6.7°C)/Min
Temperature range	-32°C to -100°C (0°C to -38°C)
Material of body	ABS
Colour of Body	White
Approval	LPCB & Bomba
Approval No.	512d

Optical smoke detector (EN-54)	
Voltage DC	12-35V
Standby current (Max) UA	35μA
Alarm current (Max)	70mA
Surge Current	40μA
Start-up time(Max)	60sec
Permissible current (Max)	80mA
Emitting duty	3-5sec
Temperature range	-10°C to +50°C
Humidity	0 to 95% RH, Non condensing
Material of body	ABS
Colour of Body	White
Approval	LPCB & Bomba
Approval No.	512a





Evacuate Sign	
Current Rating	220mA
Dimension (mm)	260(W) X 105(H) X 60(D)
Indication	Red
Enclosure	Mild steel with wrinkle black

Sounder	
Operating voltage	24V DC
Sounder output	106db (A)at 1Mtr
Min current consumption	20mS



Battery -Sealed Lead Acid	
Normal Voltage	12V
Capacity	7AH min 20 hrs
Dimension (mm)	15(L) x 60(W) X 90(H)
Weight	Max. 2.4Kg
Approval	UL approved FAS-198

Abort Switch	
Operating Voltage	2Amps @ 28V DC



Gas Release Key-Switch	
Dimension (mm)	100(W) X 100(H) X 90(D)

Website Link : <https://www.supremexfire.com/fm200-fire-system>