

FM-200/HFC-227EA CLEAN AGENT

APPROVALS:

- UL Listed
- ULC Listed
- FM Approved

DESCRIPTION

HFC-227ea provides superior fire protection in a wide range of applications from sensitive electrical equipment to industrial applications using flammable liquids. HFC-227ea is ideal for applications where clean-up of other media presents a problem, where weight versus suppression potential is a factor, where an electrically non-conductive medium is needed and where people compatibility is an overriding factor. When environmental impact is a consideration, HFC-227ea is particularly useful. It has zero ozone-depleting potential, low global warming potential and a short atmospheric lifetime. These characteristics make it suitable not only for new installations using total flooding systems, but also for Halon 1301 replacement applications.

HFC-227ea is an odorless, colourless, liquefied compressed gas. (See Physical Properties Table for additional information). It is stored as a liquid and dispensed into the hazard as a colorless, electrically non-conductive vapor that is clear and does not obscure vision. It leaves no residue and has acceptable toxicity for use in occupied spaces at design concentration. HFC-227ea extinguishes a fire by a combination of chemical and physical mechanisms. HFC-227ea does not displace oxygen and therefore is safe for use in occupied spaces without fear of oxygen deprivation.

FEATURES AND BENEFITS

- Colourless, odorless, liquefied compressed gas
- Stored as a liquid
- Electrically non-conductive
- Discharges as a gaseous vapor (due to its relatively low boiling point)
- Zero ozone depleting potential
- Low global warming potential
- Included on the U.S. EPA Significant New Alternative Policy (SNAP) rules

EXTINGUISHING METHOD - HFC-227ea

HFC-227ea extinguishes a fire primarily through Heat Absorption that occurs as the agent changes from a liquid to a vapor during discharge. In addition, HFC-227ea also disrupts the combustion reaction which aids in the extinguishment of a fire. It is important to note, HFC-227ea does not use the depletion of oxygen to extinguish a fire.

USE AND LIMITATIONS - HFC-227ea

HFC-227ea system shall be used on the following Class of Hazards:

Class A & C:	Electrical and Electronic Hazards Telecommunications Facilities High value assets, where the associated down-time would be costly
Class B:	Flammable liquids and gases

HFC-227ea systems shall "NOT" be used on fires involving the following materials:

Chemicals or mixtures of chemicals that are capable of rapid oxidation in the absence of air. (Examples include: Cellulose Nitrate and Gunpowder)
Reactive metals such as Lithium, Sodium, Potassium, Magnesium, Titanium, Zirconium, Uranium, and Plutonium
Metal hydrides such as Sodium Hydride and Lithium Aluminum Hydride
Chemicals capable of undergoing auto-thermal decomposition.
(Examples: Organic Peroxides and Hydrazine)

FM-200/HFC-227EA Clean Agent DATASHEET

EXPOSURE LIMITATIONS

Hazard Type	Design Concentration	Maximum Human Expose Time
Normally Occupied Space	6.25% to 10.5%	5 minutes
Normally Un-Occupied Space	11.0% to 12.0%	30 seconds

Note: We do not recommend HFC-227ea systems to be used in any normally occupied spaces where the design concentration required is above 10.5%

Warning: The discharge of clean agent systems to extinguish a fire can result in potential hazard to personnel from the natural form of the clean agent or from the products of combustion that result from exposure of the agent to the fire or hot surfaces. Unnecessary exposure of personnel either to the natural agent or to the products of decomposition shall be avoided.

PHYSICAL PROPERTIES

Chemical Name/Formula	Heptafluoropropane / $\text{CF}_3\text{CHFCF}_3$
ASHRAE Designation	HFC-227ea
CAS Number	431-89-0
Molecular Weight	170.03
Vapor Density @ 25°C (77°F) and atm, kg/m ³ (lb/ft ³)	7.148 (0.4462)
Boiling Point, 1 atm, °C (°F)	-16.4 (2.5)
Melting Point, °C (°F)	-131 (-204)
Critical Temperature, °C (°F)	101.6 (214.9)
Critical Pressure, kPa (psia)	2930 (424.7)
Critical Density, kg/m ³ (lb/ft ³)	621 (38.77)
Liquid Density @ 25°C (77°F), kg/m ³ (lb/ft ³)	1386 (86.53)
Vapor Density @ 25°C (77°F) and 1 atm, kg/m ³ (lb/ft ³)	7.148 (0.4462)
Specific Heat, Liquid (Cp) @ 25°C (77°F), kJ/Kg- °C (Btu/lb°F)	1.247 (0.2979)
Specific Heat, Vapor (Cp) @ 25°C (77°F) kJ/Kg- °C (Btu/lb°F) and 1 ATM	0.8136 (0.1945)
Vapor Pressure, Saturated @ 25°C (77°F), kPa (psia)	453.3 (65.7)
Heat of Vaporization @ Boiling Point kJ/Kg (Btu/lb)	132.6 (56.7)
Thermal Conductivity, Liquid @ 25°C (77°F), W/m- °C (Btu/hr-ft°F)	0.0533 (0.0308)
Thermal Conductivity, Vapor @ 25°C (77°F), W/m- °C (Btu/hr-ft°F)	0.0127 (0.0073)
Viscosity, Liquid @ 25°C (77°F), cP (lb/ft-hr)	0.2442 (0.5907)
Relative Dielectric Strength @ 1 atm, 25°C (N2=1)	2.00
Solubility of Water in HFC-227ea @ 20°C (68°F), ppm	600
Ozone Depletion Potential	0.0
Global Warming Potential (based on a 100-yr ITH for CO2, GWP =1)	2900