

Clean Agent Suppression Systems

Architect and Engineer Specification

UL Listed - Ex 4623
FM Approved - 0Y4A8.AF
USCG 162.161/2/0

APPLICATION

FM-200 (HFC-227ea) fire suppression agent is the first environmentally acceptable replacement for Halon 1301. FM-200 has a zero ozone depleting potential, a low global warming potential, and a short atmospheric lifetime. It is particularly useful where an environmentally acceptable agent is essential, 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. FM-200 can be used to protect a wide range of applications from sensitive electrical equipment to industrial applications using flammable liquids. Consult the current NFPA Standard 2001 for specific applications. FM-200 fire suppression agent is used with Fike's total flooding systems.

DESCRIPTION

FM-200 is an odorless, colorless, 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. FM-200 extinguishes a fire by a combination of chemical and physical mechanisms. FM-200 does not displace oxygen and therefore is safe for use in occupied spaces without fear of oxygen deprivation.

PERFORMANCE

FM-200 is an effective fire extinguishing agent that can be used on many types of fires. It is effective for many surface fires, such as flammable liquids, and most solid combustible materials.

On a weight-of-agent basis, FM-200 is a very effective gaseous extinguishing agent. The FM-200 extinguishing concentration for normal Class A combustibles is

approximately 5.8 - 7% by volume. The minimum design concentration for total flood applications should be in accordance with NFPA 2001.

SPECIFICATION

FM-200 is manufactured to these specifications:

Mole%	99.6	Minimum
Acidity, ppm by weight	3.0	Maximum
Water content, % by weight	0.001	Maximum
Soluble residue, % by volume	0.1	Maximum

TOXICITY

The toxicology of FM-200 compares favorably with that of Halon 1301. The LC₅₀ of FM-200 is greater than 800,000 ppm which is equivalent to Halon 1301. FM-200 has been evaluated for cardiac sensitization via test protocols approved by the United States Environmental Protection Agency. Test results show that cardiac tolerance to FM-200 is much higher than that of Halon 1301 and will be acceptable for safe use in occupied space protection. FM-200 will decompose to form halogen acids when exposed to open flames. The formation of these acids is minimized by using Fike early warning detection systems and proper system installation. When properly applied and installed, the generation of these by-products by FM-200 should be minimal.

APPROVALS

FM-200 complies with NFPA Standard 2001 - current edition. Fike FM-200 systems are U.L. listed and FM approved for Clean Agent Fire Suppression Systems.

PHYSICAL PROPERTIES OF FM-200 (HFC-227ea)

Chemical Name	Heptafluoropropane (CF ₃ CHFCF ₃)	
Molecular Weight	170.03	
Boiling Point @ 760 mm Hg	2.55°F	(-16.4°C)
Freezing Point	-204°F	(-131.1°C)
Critical Temperature	215°F	(101.7°C)
Critical Pressure (psia)	422 psia	(2912 kPa)
Critical Volume (ft ³ /lbm) (cc/mole)	0.0258	(274)
Critical Density (lbm/ft ³)	38.8	(621 kg/m ³)
Specific Heat, Liquid (BTU/lb-F°) @ 77°F (25°C)	0.283	(1.184 kJ/kg/°C)
Specific Heat, Vapor (BTU/lb-°F) @ constant pressure of 1 ATM @ 77°F (25°C)	0.1932	(0.808 kJ/kg/°C)
Heat at Vaporization (BTU/lb) at Boiling Point	57.0	(132.6 kJ/kg)
Thermal Conductivity (BTU/h ft°F) of Liquid @ 77°F (25°C)	0.040	(0.069 w/m°C)
Viscosity, Liquid (lb/ft hr) @ 77°F (25°C)	0.443	(0.184 centipoise)
Vapor Pressure (psia) @ 77°F (25°C)	66.4	(457.7 kPa)
Ozone Depletion Potential	0	
Est. Atmospheric Lifetime (years)	31-42	
LC ₅₀ (Rats; 4hrs - ppm)	>800,000	