

## HFC-227ea CLEAN AGENT

### Description

HFC-227ea 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 gaseous 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.

### Extinguishing Method

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, therefore it is safe for use in occupied spaces.

### Approvals

- Underwriters Laboratories (UL)
- Underwriters Laboratories of Canada (ULC)
- Factory Mutual (FM)
- United States EPA Significant New Alternative Policy (SNAP) report

*For exact certification listings, please reference the respective agency web site.*

### Use and Limitations

HFC-227ea system can 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 such as 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 such as Organic Peroxides and Hydrazine

### Exposure Limitations

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.

| Hazard Type                | Design Concentration | Maximum Human Exposure Time |
|----------------------------|----------------------|-----------------------------|
| Normally Occupied Space    | 6.25%<br>to<br>10.5% | 5 minutes                   |
| Normally Un-Occupied Space | 11.0%<br>to<br>12.0% | 30 seconds                  |

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

This document is only intended to be a guideline and is not applicable to all situations. Information is subject to Fike’s full disclaimer at <http://www.fike.com/disclaimer>.

## Physical Properties

|  |   |
|--|---|
| Chemical Name/Formula  | Heptafluoropropane / CF <sub>3</sub> CHFCF <sub>3</sub> |
| ASHRAE Designation   | HFC-227ea   |
| CAS Number   | 431-89-0  |
| Molecular Weight   | 170.03  |
| Vapor Density @ 25°C (77°F) and atm, kg/m <sup>3</sup> (lb/ft <sup>3</sup> )   | 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 <sup>3</sup> (lb/ft <sup>3</sup> )                      | 621 (38.77)   |
| Liquid Density @ 25°C (77°F), kg/m <sup>3</sup> (lb/ft <sup>3</sup> )          | 1386 (86.53)  |
| Vapor Density @ 25°C (77°F) and 1 atm, kg/m <sup>3</sup> (lb/ft <sup>3</sup> ) | 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 CO <sub>2</sub> , GWP = 1) | 2900  |

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