

## Clean Extinguishing Agents

The extinguishing agents listed in this section are electrically nonconductive agents that extinguish fires as noted and leave no residue upon evaporation. These agents are listed in National Fire Protection Association: NFPA 2001, Standard on Clean Agent Fire Extinguishing Systems and are accepted by the United States Environmental Protection Agency (EPA) Significant New Alternatives Policy (SNAP) Program, subject to any SNAP "Narrowed Use Limits" and other restrictions.

Jurisdictions **outside** the United States may **not** recognize NFPA and EPA sanction of certain clean agents. Local and national governmental regulations should be consulted **prior** to agent selection.

### Chemori™ 227

Trade Name:	Chemori™ 227
Chemical Identification:	1,1,1,2,3,3,3-heptafluoropropane
Designation:	HFC-227ea
Minimum Extinguishing Concentrations:	Class A – 5.8%
	Class B – 6.7%
ALC:	>80%
NOAEL:	9.00%
LOAEL:	10.50%
Uses:	For use in FM Approved fire extinguishing systems that have been tested expressly for use with HFC-227ea agent. Class A (surface burning only), Class B, and Class C extinguishing capabilities.

<b>Company Name:</b>	Chemori LLC
<b>Company Address:</b>	108 West 13th St, Wilmington, Delaware 19801, USA
<b>Company Website:</b>	Not Available
<b>New/Updated Product Listing:</b>	No
<b>Listing Country:</b>	United States of America
<b>Agent Type:</b>	HFC-227
<b>Certification Type:</b>	FM Approved

## Clean Agent Fire Extinguishing Systems

These systems contain electrically nonconducting, volatile, or gaseous fire extinguishing agents that don't leave a residue upon evaporation (per NFPA 2001 paragraph 1-3.1). They are effective for total flooding protection against hazards involving liquid flammable materials, electrical equipment, and ordinary solid combustibles in occupancy arrangements which produce only surface burning. In general, these agents are not effective or appropriate for hazards which produce deep-seated burning or for those which involve chemicals containing their own oxygen (such as cellulose nitrate), metal hydrides, or reactive metals (such as sodium, magnesium or uranium).

Clean Agent systems are similar in many respects to Halon 1301 and carbon dioxide systems. Discharge of the agent by total flooding or local application may create atmospheric hazards to personnel. Toxic thermal decomposition products can be minimized by fast fire detection coupled with rapid agent discharge. Personnel should not remain in the area following system discharge. Table A-1-5.1.1 of NFPA 2001 provides information on toxicological and physiological effects covered in this equipment classification. The No Observed Adverse Effect Level (NOAEL) is the highest concentration at which no adverse physiological or toxicological effect has been observed. The Lowest Observed Adverse Effect Level (LOAEL) is the lowest concentration at which an adverse physiological or toxicological effect has been observed.

Systems can only be FM Approved under this classification if they use agents having a component Approval. The system Approvals specifically reference the relevant agent Approval. Individual agent listings appear under the category Clean Extinguishing Agents.

Compatible FM Approvals controls must be used. (See AUTOMATIC RELEASES FOR EXTINGUISHING SYSTEMS AND OTHER FIRE PROTECTION EQUIPMENT under ELECTRICAL SIGNALING.)

Application of this equipment should be subject to the limitations specified and subject to FM Global's acceptance of plans prior to installation. Required design concentrations vary from agent to agent and depending upon maximum design parameters, the concentration may vary among system manufacturers. The design concentrations listed by the system manufacturers are generally accepted in electrical/electronic hazards, i.e. computer, telecommunication areas, provided that Class A ordinary combustibles are kept to a minimum, thereby minimizing the potential for a deep seated Class A fire.

System charging and recharging shall be done only by the manufacturer or a FM Approved representative.

The Clean Agent systems FM Approved under this classification have been addressed by NFPA 2001, Standard on Clean Agent Extinguishing Systems, 1994 Edition and must be listed in the United States Environmental Protection Agency (EPA) Significant New Alternatives Policy (SNAP) as an acceptable substitute to Halon 1301.

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\*Alternative to Halon 1211 and Halon 1301.

## SFFECO 500 PSI Engineered HFC-227ea Fire Extinguishing System

System Designation:	500 PSI HFC-227ea
System Type:	Engineered Clean Agent Fire Extinguishing System
Agent Identification:	HFC-227ea
Minimum and Maximum Agent Storage Temperatures:	Balanced Systems: 32 to 122°F (0 to 50°C) Unbalanced Systems: 60 to 80°F (16 to 27°C)
Types of Nozzles Available:	180°, 360°
Minimum and Maximum Nozzle Heights:	1.0 to 16.0 ft (0.33 to 4.87 m)
Maximum Area of Coverage for Nozzle Type:	360°: 1600 ft² (148.65 m²); Maximum Radial Coverage (Distance to Farthest Corner): 28.28 ft (8.62 m) 180°: 1600 ft² (148.65 m²); Maximum Radial Coverage (Distance to Farthest Corner): 44.72 ft (13.63 m)
Minimum Design Concentrations for Hazard Class:	Class A: 6.96% Class B: 8.71% (for liquids other than heptane, see system manual)
Flow Calculation Software:	Sffeco Flow Calculation Software SFF_v4.00.857.467
Design, Installation, Operation, and Maintenance Manual(s):	Sffeco Engineered HFC-227ea (500 PSI) Clean Agent Fire Suppression System Design, Installation, Operation, and Maintenance Manual, SF-90225-E, Rev 0.0, April 1st, 2021  Sffeco Clean Agent HFC-227ea Fill Manual, SF-92221-FM Rev 0.0, April 1st 2021
Limitations or Exceptions to Approval:	Limitations as defined in the software and manuals listed above

Approved Filling Stations:

Saudi Factory for Fire Equipment Co  
2nd Industrial Area Al-Kharj Rd  
Po Box 58469  
Riyadh, 11515  
Saudi Arabia

<b>Company Name:</b>	Saudi Factory for Fire Equipment Co
<b>Company Address:</b>	2nd Industrial Area Al-Kharj Rd, PO Box 58469, Riyadh 11515, Saudi Arabia
<b>Company Website:</b>	<a href="http://sffeco.com">http://sffeco.com</a>
<b>New/Updated Product Listing:</b>	Yes
<b>Listing Country:</b>	Saudi Arabia
<b>Agent Type:</b>	HFC-227ea
<b>Certification Type:</b>	FM Approved

## Clean Agent Fire Extinguishing Systems

These systems contain electrically nonconducting, volatile, or gaseous fire extinguishing agents that don't leave a residue upon evaporation (per NFPA 2001 paragraph 1-3.1). They are effective for total flooding protection against hazards involving liquid flammable materials, electrical equipment, and ordinary solid combustibles in occupancy arrangements which produce only surface burning. In general, these agents are not effective or appropriate for hazards which produce deep-seated burning or for those which involve chemicals containing their own oxygen (such as cellulose nitrate), metal hydrides, or reactive metals (such as sodium, magnesium or uranium).

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Application of this equipment should be subject to the limitations specified and subject to FM Global's acceptance of plans prior to installation. Required design concentrations vary from agent to agent and depending upon maximum design parameters, the concentration may vary among system manufacturers. The design concentrations listed by the system manufacturers are generally accepted in electrical/electronic hazards, i.e. computer, telecommunication areas, provided that Class A ordinary combustibles are kept to a minimum, thereby minimizing the potential for a deep seated Class A fire.

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\*Alternative to Halon 1211 and Halon 1301.

## SFFECO 360 PSI Engineered HFC-227ea Fire Extinguishing System

System Designation:	360 PSI HFC-227ea
System Type:	Engineered Clean Agent Fire Extinguishing System
Agent Identification:	HFC-227ea
Minimum and Maximum Agent Storage Temperatures:	Balanced Systems: 32 to 122°F (0 to 50°C) Unbalanced Systems: 60 to 80°F (16 to 27°C)
Types of Nozzles Available:	180°, 360°
Minimum and Maximum Nozzle Heights:	1.0 to 16.0 ft (0.33 to 4.87 m)
Maximum Area of Coverage for Nozzle Type:	360°: 1600 ft² (148.65 m²); Maximum Radial Coverage (Distance to Farthest Corner): 28.28 ft (8.62 m) 180°: 1600 ft² (148.65 m²); Maximum Radial Coverage (Distance to Farthest Corner): 44.72 ft (13.63 m)
Minimum Design Concentrations for Hazard Class:	Class A: 6.96% Class B: 8.71% (for liquids other than heptane, see system manual)
Flow Calculation Software:	Sffeco Flow Calculation Software SFF_v4.00.857.467
Design, Installation, Operation, and Maintenance Manual(s):	Sffeco Engineered HFC-227ea (360 PSI) Clean Agent Fire Suppression System Design, Installation, Operation, and Maintenance Manual, SF-90225-D, Rev 0.0, April 1st, 2021  Sffeco Clean Agent HFC-227ea Fill Manual, SF-92221-FM Rev 0.0, April 1st 2021
Limitations or Exceptions to Approval:	Limitations as defined in the software and manuals listed above

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Po Box 58469  
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<b>Company Name:</b>	Saudi Factory for Fire Equipment Co
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<b>Company Website:</b>	<a href="http://sffeco.com">http://sffeco.com</a>
<b>New/Updated Product Listing:</b>	Yes
<b>Listing Country:</b>	Saudi Arabia
<b>Agent Type:</b>	HFC-227ea
<b>Certification Type:</b>	FM Approved