

Fluoro-K™ Fire Suppression Clean Agent

Effective: April 2023
K-45-0900 Rev AA

FEATURES

- **Fluoro-K™ Fire Suppression Clean Agent is UL Listed and FM Approved**
- **Colorless, with Low Odor and No Particulate or Oily Residue Allowing for Minimal Business Disruption After a Discharge**
- **Zero Ozone Depletion Potential**
- **Atmospheric Lifetime of Five Days**
- **Electrically Non-Conductive**
- **Space Saving; Quantity of Agent Needed to Extinguish Fires Typically Required Minimal Cylinders, thus Minimal Space Required**
- **People Safe at Concentration Levels Required to Extinguish Fire**

EXTINGUISHING AGENT

Fluoro-K™ Fire Suppression Clean Agent (herein referred to as “agent”) is a fluorinated ketone (Dodecafluoro-2-methylpentan-3-one) compound of carbon, fluorine and oxygen ($\text{CF}_3\text{CF}_2\text{C}(\text{O})\text{CF}(\text{CF}_3)_2$). It is colorless, electrically non-conductive and has a low odor. It suppresses fire primarily by physical mechanisms due to its relatively high heat capacity with minimal effect on the available oxygen. This allows people to see and breathe, permitting them to leave the fire area safely. The agent fluid is acceptable for use in occupied spaces when used in accordance with the United States Environmental Protection Agency (EPA) Significant New Alternatives Policy (SNAP) program rules.

Although the agent is considered non-toxic to humans in concentrations necessary to extinguish most fires, certain safety considerations should be observed when applying and handling the agent. The discharge of the agent may create a hazard to people from the decomposition products which result when the agent is exposed to fire or other hot surfaces. Exposure to the agent is generally of less concern than is exposure to the decomposition products. Unnecessary exposure to the agent or the decomposition products should be avoided.

TOXICITY

Unnecessary exposure to clean agents is to be avoided in accordance with the requirements of NFPA-2001. As such, upon operation of a system pre-discharge alarm, all personnel should immediately exit the protected space. In no case shall personnel remain in a room in which there is a fire. In the very unlikely instance where a clean agent system should discharge unexpectedly into an occupied room, all personnel should proceed in a calm and orderly manner to an exit and leave the room.

The agent fluid has been evaluated for cardiac sensitization in accordance with test protocols approved by the United States Environmental Protection Agency (U.S. EPA). The EPA’s SNAP Program classifies the agent fluid as acceptable for use as a total flooding agent in occupied spaces with specific limitations. Refer to the SNAP program rules or NFPA 2001 for more information. The agent fluid has been judged acceptable by the U.S. EPA for use in occupied spaces when used in accordance with the guidance of NFPA 2001. In accordance with NFPA 2001, the agent fluid designed for use with agent vapor concentrations up to ten volume percent in air are permitted. See NFPA 2001, Sect. 1-5, *Safety*.

Although the agent fluid has negligible toxicity in concentrations needed to suppress most fires, certain safety considerations must be observed when applying and handling the agent. For example, the agent fluid is a liquid at room temperature and has been superpressurized with dry nitrogen. Upon release to atmospheric pressure (e.g., from nozzles) the liquid flash evaporates at a low temperature. Thus, nozzles must be located to avoid direct impingement on personnel.

DECOMPOSITION

When the agent fluid is exposed to high temperatures, such as what may be expected in a flame front, hazardous products of thermal decomposition (halogen acids) are produced. If the agent fluid is discharged in 10 seconds or less, flames will be extinguished rapidly and the amount of by-products produced will be minimal.

CLEANLINESS

The agent fluid is clean and leaves no residue, thereby eliminating costly after-fire clean-up and keeping expensive downtime to a minimum. Most materials such as steel, stainless steel, aluminum, brass and other metals as well as plastics, rubber and electronic components are unaffected by exposure to the agent fluid.

APPROVALS

The agent fluid complies with the NFPA Standard 2001, Standard for Clean Agent Fire Extinguishing Systems, EPA SNAP Program, (Significant New Alternate Policy), Underwriters Laboratories, Inc. (UL) FM Approvals (FM).

USE

Kidde Fire Systems Fire Suppression Systems designed for use with the agent are designed to extinguish fires in specific hazards or equipment located where an electrically non-conductive agent is required, where agent cleanup creates a problem, where extinguishing capability with low weight is a factor and where the hazard is normally occupied by personnel. The agent fluid is an acceptable alternative to Halon and is approved by the EPA and NFPA for use in fire suppression systems.

Table 1: Agent Fluid Physical Properties

Chemical Formula	CF ₃ CF ₂ C(O)CF(CF ₃) ₂
NFPA Reference	Dodecafluoro-2-methylpentan-3-one
Molecular Weight	316.04
Freezing Point	-162.4°F (-108°C)
Boiling Point at 1 Atm.	120.6°F (49.2°C)
Critical Temperature	335.6°F (168.7°C)
Critical Density	39.91 lb./ft. ³ (639.1 kg/m ³)
Critical Pressure	270.44 PSIA (1865 kPa)
Critical Volume	0.0251 ft. ³ /lbm (494.5 cc/mole)
Ozone Depletion Potential	0
Global Warming Potential	1

Table 2: Agent Fluid Toxicity Properties

NOAEL (No Observable Adverse Effect Level)	10.0%
LOAEL (Lowest Observable Adverse Effect Level)	>10.0%

COMPATIBILITY

System	Industrial Approval	Marine Approval
ECS-500™ System	UL, ULC, FM	UL
ADS™ with Fluoro-K™ Fire Suppression Clean Agent	UL, ULC, FM	UL
ECS™ 360 with Fluoro-K™ Fire Suppression Clean Agent*	UL, ULC, FM	UL

*This system is no longer offered for sale. Agent is for refill purposes only.

AGENT APPROVALS

Agent	Industrial Approval	Marine Approval
Kidde Fire Systems Fluoro-K™ Fire Suppression Clean Agent	UL, ULC, FM	UL

DESIGN CONCENTRATION NOTES

Table 3: NFPA Minimum Design Concentrations for Fluoro-K™ Fire Suppression Clean Agent

Class of Fire	Minimum Design Concentration
Class A	4.50
Class B (n-Heptane)	5.85*
Class B (Ethyl alcohol)	7.02*
Class C with Voltage < 480 V	4.52
Class C with Voltage ≥ 480 V	For voltages ≥480 volts that remain powered during and after discharge, the MDC shall be determined by testing, as necessary, and a hazard analysis.

*For additional Class B values, contact Kidde Fire Systems Technical Support.

FM GLOBAL CLASS C CONCENTRATION VALUES

Per the FM Global Property Loss Prevention Data Sheet 4-9, Interim Revision July 2021, the Class C Fires Minimum Design Concentrations for Fluoro-K Fire Suppression Clean Agent are as follows:

Table 4: FM Global Class C Fires Minimum Design Concentrations for Fluoro-K Fire Suppression Clean Agent

Class of Fire	Minimum Design Concentration
Class C with Voltage ≤ 480 V	4.52
Class C with Voltage > 480 V	10

Note: The Minimum Design Concentration for Class C fires with voltages greater than 480 volts meets or exceeds the EPA Accepted LOAEL and NOAEL for the agent. Using this high of an MDC requires use of the following:

- Pneumatic Time Delays
- Pneumatic Sirens
- Signs
- Lockout Valves

EXPORT INFORMATION (USA)

Jurisdiction: EAR
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