ReedFOX®

Certified & Members of: NFPA SFPE FSSA

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REEDFOX EFKA-5112™ FIRE PROTECTION FLUID

FEATURES

- People safe at concentration levels required to extinguish fire
- Atmospheric lifetime of five days
- Colorless with low odor and no particulate or oily residue allowing for minimal business disruption after a discharge.
- Electrically non-conductive
- Low global warming potential
- UL component recognized
- FM approved
- Space saving; quantity of agent needed to extinguish fires typically required minimal cylinders, thus minimal space required
- Discharges as a gaseous vapor (due to its relatively low boiling point)
- Zero ozone depletion potential

EXTINGUISHING AGENT

ReedFOX™ EFKA-5112™ Fire Protection Fluid (herein referred to as "agent") is a fluorinated ketone (Dodecafluoro-2-methylpentan3-one) compound of carbon, fluorine and oxygen ($CF_3CF_2C(O)CF(CF_3)_2$). 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 fluid 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 fluid 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.

EXTINGUISHING METHOD

EFKA-5112™ extinguishes a fire primarily through heat absorption. The gaseous mixture created when EFKA-5112™ discharges into air has a much higher heat capacity than air alone. The gaseous mixture absorbs large amounts of heat due to the high heat capacity and extinguishes fires by sufficiently cooling the combustion zone. It is important to note, EFKA-5112™ does not use the depletion of oxygen to extinguish a fire.

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).

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.

USE

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: Use and Limitations.

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
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.)

TOXICITY AND EXPOSURE LIMITATIONS

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. 1-6, *Safety*.

Table 2: Agent Fluid Toxicity Properties.

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

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PT. REEDFOX ULTIMATE INDONESIA

Fire Suppression Systems Specialist, Maintenance, Services, Authorized Distributor, Fire & Life Safety Equipment Importer, Refilling APAR; FM-200; EFKA™5112; RF-36; Inert Gas; CO2.

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https://reedfox.id
0813-1111-0220

Table 3: Exposure Limitations.

Hazard Type	Design Concentration	Maximum Human Exposure Time
Normally Occupied Space	4.5% to 10.0%	5 minutes

Note: ReedFOX does not recommend EFKA-5112™ to be used in any normally occupied spaces where the design concentration required is above 10%.

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 fire or hot surfaces. Unnecessary exposure of personnel either to the natural agent or to the products of decomposition shall be avoided.

Table 4: Agent Fluid Physical Properties.

Chemical name	Dodecafluoro-2-methylpentan-3-one
ASHRAE Designation	FK-5-1-12
Chemical formula	$CF_3CF_2C(O)CF(CF_3)_2$
CAS number	756-13-8
Molecular weight	316.04
Boiling point, @ 1 atm (760 mmHg)	49 °C
Melting point	−108 °C
Critical temperature	168.66 °C
Critical pressure	1865 kPa
Critical density	639.1 kg/m³
Density, Sat. Liquid	1.60 g/ml
Density, Gas @ 1 atm	0.0136 g/ml
Specific heat, liquid (Cp) @ 25 °C	1.103 kJ/kg−°C
Specific heat, vapor (Cp) @ 25 °C	0.891 kJ/kg−°C
Vapor Pressure @ 25 °C	40.4 kPa
Heat of vaporization @ boiling point	88 kJ/kg
Thermal conductivity, liquid @ 25 °C	0.059 W/m−°C
Viscosity, liquid (lb/ft-hr) @ 25° C	0.524 cP
Relative dielectric strength @ 1 atm, 25 °C (N_2=1)	2.3
Solubility of water in FK-5-1-12 @ 21 °C	< 0.001 ppm
Ozone depletion potential	0.0
GWP (100yr. ITH for CO2, GWP=1)	<1

DESIGN CONCENTRATION NOTES

- NFPA Listed Minimum Design Concentration MDC) for Class A and Class C Fires (less than 480 volts) = 4.5%
- Design concentrations for Class B Fire are shown in the right column table. The MDC is equal to the Cup Burner (vol %) x 1.3 but not less than 5.85% in accordance with the UL-2166 and FM 5600 requirements that the Class B design concentration cannot be less than that based on heptane.

Table 5: Minimum Design Concentration.

Fuel	MDC, % v/v
1-Butane	6.37
1-Propanol	7.02
2,2,4-trimethylpentane	6.11
2-butoxyethanol	6.76
Acetone	5.85
Acetonitrile	5.85
Commercial Heptane	5.85
Commercial Hexanes	5.85
Cyclohexane	5.95
Cyclopentanone	6.89
Denatured Alcohol (92.2% EtOH, 4.6% IPA, and 3.1% MeOH)	5.85
Diesel Fuel	6.37
Diethl Ether	7.15
Ethanol	6.11
Ethyl Acetate	5.85
Gasoline-87 oct. unleaded	5.98
Hexene	6.11
Isooctane	6.37
Isopropanol Alcohol	7.28
Methane	8.45
Methanol	5.85
Methyl Ethyl Ketone	5.85
Methyl Isobutyl Ketone	5.95
Methyl Tert Butyl Ether n-Heptane	5.85
n-Pentane	6.11
Octane	5.85
Propane	7.54
Pyrrolidine	6.11
Technical Heptane	5.85
Tetrahydrofuran	6.50
Toluene	5.85
Transformer Oil	5.85

FM APPROVED

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