# Kidde ECS 500 psi with FK-5-1-12 Fire Protection Fluid

Kidde Fire Systems

**Agent Data Sheet**

Effective: January 2018
**K-45-0500**

## FEATURES

- **People Safe at Concentration Levels Required to Extinguish Fire**
- **Zero Ozone Depletion Potential**
- **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**
- **Space Saving; Quantity of Agent Needed to Extinguish Fires Typically Required Minimal Cylinders, thus Minimal Space Required**
- **UL Listed, ULC Listed, and FM Approved for use with FK-5-1-12 Systems**

## EXTINGUISHING AGENT

FK-5-1-12 is a fluorinated ketone (Dodecafluoro-2-methylpentan-3-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.

FK-5-1-12 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 FK-5-1-12 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 FK-5-1-12 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.

## 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.

FK-5-1-12 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 FK-5-1-12 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. FK-5-1-12 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, FK-5-1-12 fluid designed for use with agent vapor concentrations up to ten volume percent in air are permitted. See NFPA 2001, Sect. 1-6, *Safety.*

Although FK-5-1-12 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, FK-5-1-12 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 FK-5-1-12 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 FK-5-1-12 fluid is discharged in 10 seconds or less, flames will be extinguished rapidly and the amount of by-products produced will be minimal.

## CLEANLINESS

FK-5-1-12 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 FK-5-1-12 fluid.

## APPROVALS

FK-5-1-12 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 ECS 500 psi Fire Suppression Systems designed for use with FK-5-1-12 Fire Protection Fluid 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. FK-5-1-12 fluid is an acceptable alternative to Halon and is approved by the EPA and NFPA for use in fire suppression systems.

**Table 1: FK-5-1-12 Fluid Physical Properties**

| | |
|---|---|
| Chemical Formula | $CF_3CF_2C(O)CF(CF_3)_2$ |
| 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: FK-5-1-12 Fluid Toxicity Properties**

| FK-5-1-12 Fluid Toxicity Properties | |
|---|---|
| NOAEL<br>(No Observable Adverse Effect Level) | 10.0% |
| LOAEL<br>(Lowest Observable Adverse Effect Level) | 10.0% > |

| Fuel | Design Concentration, % 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 | 5.85 |
| Cyclopentanone | 5.98 |
| Denatured Alcohol (92.2% EtOH, 4.6% IPA, and 3.1% MeOH) | 6.89 |
| Diesel Fuel | 5.85 |
| Diethl Ether | 6.37 |
| Ethanol | 7.15 |
| Ethyl Acetate | 6.11 |
| Gasoline-87 oct. unleaded | 5.85 |
| Hexene | 5.98 |
| Isooctane | 6.11 |
| Isopropanol Alcohol | 6.37 |
| Methane | 7.28 |
| Methanol | 8.45 |
| Methyl Ethyl Ketone | 5.85 |
| Methyl Isobutyl Ketone | 5.85 |
| Methyl Tert Butyl Ether | 5.95 |
| 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 |

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Jurisdiction: EAR
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This document contains technical data subject to the EAR.





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