

## Key Features

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Zero ozone depleting potential

Negligible global warming potential

Atmospheric lifetime of less than 5 days

Safe for use in occupied areas

Existing halon control system can be adapted for use with Novec 1230 fluid

Requires minimal storage space

Provisional S.N.A.P. listing by US E.P.A.

UL/FM testing underway

Submitted for inclusion in ISO and CEN design standards

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# 3M™ NOVEC™ 1230 Fire Protection Fluid



The search for halon 1301 replacements has been on-going for over 10 years and each alternative brings with it a unique set of properties. We have brought to the market products that match the requirements of industry and our latest research allows us to introduce fire protection systems using Novec 1230 fluid, a new development with some advantages over current technologies. Novec 1230 fluid allows us to complement our existing range of agents as the phase out of halons accelerates in many countries around the world.

Novec 1230 fluid is known as a fluorinated ketone and is manufactured by 3M.



Novec1230 fluid has low toxicity and has a boiling point of 49 degrees C and therefore exists as a liquid at room temperature. Like halon 1301 it is super-pressurised with nitrogen to 25 bar. Like most other chemical agents, it rapidly extinguishes through a combination of heat absorption (its main action) and some chemical interference with the flame.

### Environmental Features

Novec 1230 fluid contains neither bromine nor chlorine and has zero Ozone depleting potential.

The atmospheric lifetime of Novec 1230 fluid is estimated to be in the range of 3-5 days and with a global warming potential of 1, it is considered that the Novec 1230 fluid has no measurable impact on climate change. These attributes ensure that Novec 1230 fluid represents a truly sustainable technology.

### Safety

Acute toxicity testing has shown that Novec 1230 fluid is safe at end use concentrations. The effective toxicity exposure limit is greater than 10% for both the acute inhalation exposure and cardiac sensitisation No Observed Adverse Effect Level (NOAEL) and set against low design concentrations, it offers margins of safety (up to 100%).

### Applications

Despite having a low boiling point, Novec 1230 fluid is able to be effectively vapourised over a wide range of hazard temperatures. It is therefore available to protect most hazards traditionally protected with halon 1301 and will be particularly important in Marine applications and others where high margins of safety and long term sustainability are considered to be important features.

### Handling

One of the advantages offered by Novec 1230 fluid's high boiling point is that it presents very low vapour pressures, enabling it to be transported in lightweight totes or drums as opposed to steel pressurised containers. This allows Novec 1230 fluid to be readily air freighted and as both initial filling and recharging operations are possible by simply pouring the fluid into containers, prior to super-pressurising, the filling operation is far simpler than with traditional high pressure gases.



## ENVIRONMENTAL DATA AND PHYSICAL PROPERTIES

## Novec 1230 fluid versus HALON 1301

	Novec 1230	HALON 1301
Ozone Depleting Potential	0	16
Atmospheric Lifetime	3-5 days	87-110 years
Class A Hazards Extinguishing Concentration	<4%*	<4.1%
Class B Hazards Extinguishing Concentration	<5%**	4.1%***
Class A Hazards Minimum Design Concentration	<5%	5%
Class B Hazards Minimum Design Concentration	<7%	5%
CARDIAC SENSITISATION		
No Observed Adverse Effect Level (NOAEL)	10%	5%
Lowest Observed Adverse Effect Level (LOAEL)	>10%	7.5%
Acute Toxicity (4-hour-rat) LC50 - ppm	> 100,000****	800,000****
Chemical Structure	$\text{CF}_3\text{CF}_3\text{C}(\text{O})\text{CF}(\text{CF}_3)_2$	$\text{CF}_3\text{Br}$
Molecular Weight	316.04	148.93
Boiling Point	48°C	-57.8°C
Freezing Point	-108°C	-168°C
Vapour Pressure @ 20°C	0.32bar	14.63 bar
Vapour Density @ 20°C	to be advised	115.6kg/m <sup>3</sup>
Liquid Density @ 20°C	1610 kg/m <sup>3</sup>	1575kg/m <sup>3</sup>
Maximum Recommended Filling Density	1200 kg/m <sup>3</sup>	1121kg/m <sup>3</sup>

Note - Minimum Design Concentrations are anticipated values based on extinguishing value +30% safety factor

\* Exact values to be confirmed during UL/FM testing

\*\* Based on heptane: other class B materials will produce different values - exact heptane value to be confirmed during UL/FM testing

\*\*\* Ref. BS5306 Section 5.1: 1982 (Value for heptane: other class B materials produce different results)

\*\*\*\* With added oxygen



#### Replacing Halon with Novec 1230 fluid

Novec 1230 fluid is available to protect most hazards traditionally protected with halon 1301. The physical properties of each halon alternative determine how much agent is required to provide an equivalent level of protection. Novec 1230 fluid will require approximately twice as much agent by weight as the equivalent halon system, although end use design concentrations will be similar, resulting in minimal increases in storage space for the containers.

It is likely that any existing pipework would need to be replaced or at least supplemented, although the exact requirement for any particular system can only be determined after a detailed review of the existing installation.

#### Room Integrity Testing

Room Integrity Testing has become an important feature of the commissioning of gaseous fire fighting systems. The integrity test is performed to check that enclosures can maintain a sufficient extinguishing agent concentration for the required time following discharge.

This time may vary according to the hazard and the available response time for the emergency services although 10 minutes is often considered to be an acceptable period.

Room integrity testing is now a requirement of ISO 14520 and NFPA 2001 at the commissioning stage and may form part of an on-going maintenance schedules.