

3M™ Novec™ 1230 Fire Protection Fluid
For Museums and Archives



Protecting the Irreplaceable

3M

Safeguarding high-value assets

Today's sustainable clean agent solution

3M™ Novec™ 1230 Fire Protection Fluid is an advanced “clean agent” fire suppression material, used to protect high-value assets such as rare books, documents, artwork, museum artifacts, display cases, records, computers and other delicate electronics. Novec 1230 fluid is designed to alleviate concerns for human safety, asset preservation, extinguishing performance and the environment – with key properties that have re-defined “sustainability” in clean agent fire protection:

- Zero ozone depletion potential
- A global warming potential of one
- Five-day atmospheric lifetime
- Safe for human occupancy

As a clean agent, Novec 1230 fluid offers a number of important advantages for protecting high value assets. By definition, clean agents do not leave a residue behind when they discharge, and typically are electrically non-conductive, so they won't damage delicate objects or affect the operation of sensitive electronics.

Water sprinklers and water mist systems are effective for extinguishing structural fires, but water can be as destructive to fragile, irreplaceable artifacts as fire itself. Dry chemical extinguishing systems avoid these problems, but leave powdery residues that are difficult to clean up, and can damage or destroy delicate equipment, hard drives and electronic media.



Halons, a class of chemical clean agents introduced in the 1960s, were found to be effective fire extinguishants, but were ultimately banned because of their high ozone depletion potential. First-generation halon replacements, such as HFCs, are non ozone depleting; however, there is growing concern about the long-term sustainability of HFCs because of their high global warming potential and long atmospheric lifetime. CO₂ mitigates these environmental concerns, but can be lethal to humans at extinguishing concentrations. And inert gases, while offering an acceptable margin of safety, can consume valuable floor space – requiring 6 to 7 times as many cylinders for agent storage than a system with similar capacity utilizing Novec 1230 fluid.

Environmental properties

With zero ozone depletion potential, extremely low global warming potential and short atmospheric lifetime, 3M™ Novec™ 1230 Fire Protection Fluid is the first chemical halon replacement to offer a viable, long-term, sustainable technology for special hazards fire protection.

Environmental Properties

	Novec 1230	Halon 1211	Halon 1301	HFC-125	HFC-227ea
Ozone Depletion Potential ¹	0.0	4.0	12.0	0.0	0.0
Global Warming Potential ²	1	1890	7140	3500	3220
Atmospheric Lifetime (Years)	0.014	16	65	34.2	29
SNAP (Yes/No)	Yes	N/A	N/A	Yes	Yes

¹World Meteorological Organization (WMO) 1998, Model-Derived Method

²Intergovernmental Panel on Climate Change (IPCC) 2007 Method, 100-year 1TH

Regulatory Status

3M™ Novec™ 1230 Fire Protection Fluid

USA	TSCA: product complies with chemical notification requirements SNAP: approved for flooding (12/20/02) and streaming (1/23/03)
Europe	ELINCS: product complies with chemical notification requirements
Canada	CDSL: product complies with chemical notification requirements
Korea	KECI: product complies with chemical notification requirements
Australia	AICS: product complies with chemical notification requirements
Japan	METI: product complies with chemical notification requirements
China	CICS: product complies with the chemical notification requirements

The widest margin of safety of any chemical clean agent

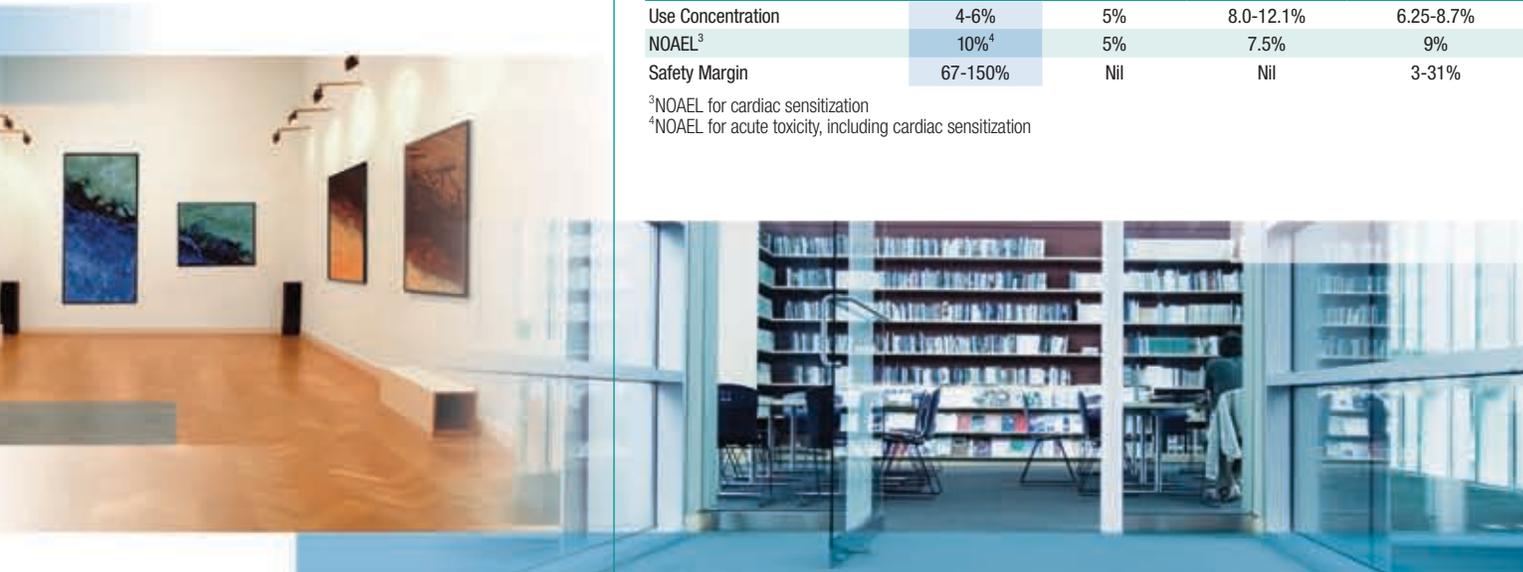
Because its use concentration is much lower than its No Observable Adverse Effects Level (NOAEL), Novec 1230 fluid offers the largest margin of safety of any chemical halon replacement available on the market today.

Safety Margin

Agent	Novec 1230	Halon 1301	HFC-125	HFC-227ea
Use Concentration	4-6%	5%	8.0-12.1%	6.25-8.7%
NOAEL ³	10% ⁴	5%	7.5%	9%
Safety Margin	67-150%	Nil	Nil	3-31%

³NOAEL for cardiac sensitization

⁴NOAEL for acute toxicity, including cardiac sensitization

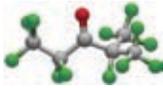


Fire protection for green buildings

The LEED® Green Building Rating System™, founded and administered by the United States Green Building Council, is a third-party certification system designed to encourage sustainable building and development practices. Because 3M™ Novec™ 1230 Fire Protection Fluid enables facilities managers to effect a 99% reduction in greenhouse gases in critical function fire suppression, its use may make it possible to claim LEED Innovation Credits.

Additional information about 3M Novec 1230 Fire Protection Fluid, including how it can help earn credits toward LEED certification, is available at www.3M.com/novec1230fluid.

What is 3M™ Novec™ 1230 Fire Protection Fluid?



3M™ Novec™ 1230 Fire Protection Fluid is a fluoroketone – a proprietary 3M technology that offers a number of important advantages over conventional halon replacements.

Extinguishing via its cooling effect, Novec 1230 fluid works as a gas, yet it is a liquid at room temperature. It is a highly efficient fire extinguishant that can be used for flooding applications in engineered and pre-engineered systems. It is ideal for environments such as libraries, cultural facilities, art galleries, storage rooms, archives and museums, where valuable items must not be damaged by a fire extinguishing agent.

Because it is not packaged under pressure, Novec 1230 fluid has unique shipping and handling advantages over high pressure alternatives. Systems using Novec 1230 fluid allow for more efficient use of space compared to inert gas systems.

An ideal solution for vault storage fire protection



FIRELOCK Media Vault Chamber.

Secure vaults, constructed from concrete and other non-combustible materials, are often used for long-term storage of documents, artifacts and electronic data. These structures pose several unique challenges to the fire protection engineer.

Prior to 2000, the only kind of fire suppression allowed by NFPA standard 232 for vault interiors was either water sprinklers or water mist, which can seriously damage or destroy irreplaceable artifacts, documents and digital media.

Clean agents, which are electrically non-conductive and discharge cleanly without leaving a residue, are now allowable under the standard. However, certain clean

agents – such as inert gases – are impractical in this application, because of concerns about overpressurization of the tightly-sealed vaults. And, because many of these vaults are normally occupied, agent toxicity is another concern. For example, CO₂ is toxic at extinguishing concentrations. Should a staff member or visitor become disoriented or trapped in the close confines of a vault during an agent discharge, the result could be lethal.

Novec 1230 fluid, on the other hand, poses none of these drawbacks. It provides fast, efficient extinguishment with no risk of overpressurizing the room. And because it is effective at concentrations far lower than its “No Observed Adverse Effect Level,” it offers a wide margin of safety for personnel inside the vault.

Created for Life

3M™ Blue SkySM Warranty

20-year protection
against regulatory bans
or restrictions on the use
of 3M™ Novec™ 1230
Fire Protection Fluid

**When it comes
to environmental
regulations,
3M gives you a
clear advantage**

Today's world is full of changes designed to help ensure a better tomorrow. But managing the risks created by these changes is challenging. Fortunately 3M understands your challenges and has the answer you're looking for with the 3M™ Blue SkySM Warranty.

Here's how it works: if Novec 1230 fluid is banned from or restricted in use as a fire protection agent due to ozone depletion potential or global warming potential, 3M will refund the purchase price of the fluid. That's a promise and performance you can take to the bank.

For complete details on this program, please contact your 3M representative, or visit www.3M.com/novec1230fluid

The high global warming potential and atmospheric persistence of halon replacements such as HFCs are leading to concerns about whether their use will continue to be permitted. For example, F-Gas Regulations that have recently been introduced in Europe impose requirements specific to HFCs for technician training, inspections, testing, and reporting. It is entirely possible that HFCs may follow the halon extinguishing agents that were so popular until the 1990s, when they became restricted, and are now banned from being manufactured and are being phased out in end use.

Measures addressing the use of HFCs are also being drafted in the USA. A proposed early action item identified under the California Global Warming Solutions Act of 2006 includes a consideration that, from 2012, all new fire protection systems in California must use an agent with a global warming potential below a minimum threshold level.

The California Air Resources Board (CARB) proposal reflects the regulators' concern that, while emissions from this sector are currently low, the installation base is growing quickly and the emission potential of this ever growing installed base represents a significant future liability. Thus, the only meaningful way to limit this future liability is to reduce the use of HFCs.

These issues are particularly important to the museum and archive industry. If restrictions were introduced in the future, an HFC-based fire suppression system would either have to be replaced in its entirety, or substantially modified resulting in a considerable expense.

That's why 3M offers you the peace-of-mind made possible by our exclusive 3M™ Blue SkySM Warranty.



Our name
means more
than fire
protection

Resources

In addition to 3M™ Novec™ 1230 Fire Protection Fluid, the 3M Novec Brand Family of products can provide you with safe, effective, sustainable solutions in a wide variety of specialized applications. For example, 3M™ Novec™ Engineered Fluids are being used as a non-flammable, non-toxic alternative to alcohol for storing and preserving fragile museum wet specimens. For more information on other Novec brand products visit www.3M.com/Novec

3M™ Novec™ 1230 Fire Protection Fluid is supported by global sales, technical and customer service resources, with fully-staffed technical service laboratories in the U.S., South America, Europe, Middle East, Japan and Southeast Asia.



The 3M™ Novec™ Brand Family

The Novec brand is the hallmark for a variety of patented 3M products. Although each has its own unique formula and performance properties, all Novec products are designed in common to address the need for safe, effective, sustainable solutions in industry-specific applications. These include precision and electronics cleaning, heat transfer, fire protection, lubricant deposition and several specialty chemical applications.

3M™ Novec™ Engineered Fluids • 3M™ Novec™ Aerosol Cleaners • 3M™ Novec™ 1230 Fire Protection Fluid • 3M™ Novec™ Electronic Coatings • 3M™ Novec™ Electronic Surfactants

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