



How 3M™ Novec™ 1230 Fire Protection Fluid is stored as a liquid and discharged as a gas.

3M™ Novec™ 1230 Fire Protection Fluid has been developed for use as a gaseous, total-flooding extinguishing agent. To understand the ability of Novec1230 fluid to transform from a liquid into a gas upon discharge, some important physical properties need to be understood. For illustration, let's compare **Novec 1230 fluid** to the best known liquid: water.

Intermolecular Forces (or Attraction between Molecules)

Water

Each molecule within the liquid water is strongly attracted to its nearest neighboring molecules, forming what's called a hydrogen bond. These strong attractive forces have a profound effect on the physical properties of water.

Novec 1230 Fluid

Novec 1230 fluid does not contain any hydrogen atoms, and therefore has no hydrogen bonds. The bonds between the molecules in Novec 1230 fluid are much weaker than the hydrogen bonds formed between water molecules. This weak attraction between molecules gives Novec 1230 fluid its unique physical properties.

Heat of Vaporization

Water

Because of its strong hydrogen bonds, water has a relatively high heat of vaporization. This means that a significant amount of energy (heat) is required to separate the molecules and convert it from a liquid to a gaseous state (steam or water vapor). When discharged through a nozzle, water tends to stay as liquid droplets since sufficient energy to convert it to vapor cannot be transferred into it in such a short period of time.

Novec 1230 Fluid

Novec 1230 fluid, on the other hand, has a low heat of vaporization. Because of its much weaker attraction between molecules, significantly less energy is needed to evaporate the fluid (25 times less than for water). The energy needed to convert the agent into a gaseous state is readily absorbed from the air when the fluid is discharged from the nozzle. In fact, if you pour Novec 1230 fluid onto a surface, it will evaporate in a matter of seconds.

Vapor Pressure

Water

Vapor pressure is also a measure of ease of evaporation. Water has a low vapor pressure, meaning that the air has a limited capacity to hold water in its vapor form. At 25°C, water vapor will saturate the air at about 3 percent by volume before it begins to recondense into liquid form.

Novec 1230 Fluid

Novec 1230 fluid has a vapor pressure that is about 12 times that of water, indicating the ease with which it can transform from a liquid to a gas. At 25°C, the air can hold 40% by volume of the agent without it recondensing to liquid form.

Liquid to Gas Upon Discharge

These physical properties allow 3M™ Novec™ 1230 Fire Protection Fluid to transition from a liquid to a gaseous state, even at cold discharge. In a properly designed extinguishing system, Novec 1230 fluid will be discharged through a nozzle that evenly distributes the agent throughout the enclosure. The low heat of vaporization and relatively high vapor pressure will allow rapid transformation from a liquid into a gas, extinguishing the fire, protecting valuable equipment, and leaving no residue.

Comparison of Key Physical Properties of Water and 3M™ Novec™ 1230 Fire Protection Fluid

Property	Unit	Water	Novec 1230 fluid
Boiling Point	°C	100	49
Freezing Point	°C	0	-108
Vapor Pressure @ 25°C	kPa	3.2	40.4
Heat of Vaporization @ 25°C	kJ/kg	2442	95

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www.3m.com/novec1230fluid

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Safety Data Sheet

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SECTION 1: Identification

1.1. Product identifier

3M™ Novec™ 1230 Fire Protection Fluid

Product Identification Numbers

98-0212-3203-2, 98-0212-3217-2, 98-0212-3414-5

1.2. Recommended use and restrictions on use

Recommended use

Streaming and Flooding Fire Protection

1.3. Supplier's details

MANUFACTURER:	3M
DIVISION:	Electronics Materials Solutions Division
ADDRESS:	3M Center, St. Paul, MN 55144-1000, USA
Telephone:	1-888-3M HELPS (1-888-364-3577)

1.4. Emergency telephone number

1-800-364-3577 or (651) 737-6501 (24 hours)

SECTION 2: Hazard identification

2.1. Hazard classification

Not classified as hazardous according to OSHA Hazard Communication Standard, 29 CFR 1910.1200.

2.2. Label elements

Signal word

Not applicable.

Symbols

Not applicable.

Pictograms

Not applicable.

SECTION 3: Composition/information on ingredients

Ingredient	C.A.S. No.	% by Wt
1,1,1,2,2,4,5,5,5-Nonafluoro-4-(trifluoromethyl)-3-pentanone	756-13-8	> 99.5

SECTION 4: First aid measures

4.1. Description of first aid measures

Inhalation:

Remove person to fresh air. If you are concerned, get medical advice.

Skin Contact:

Wash with soap and water. If signs/symptoms develop, get medical attention.

Eye Contact:

Flush with large amounts of water. Remove contact lenses if easy to do. Continue rinsing. If signs/symptoms persist, get medical attention.

If Swallowed:

No need for first aid is anticipated.

4.2. Most important symptoms and effects, both acute and delayed

See Section 11.1. Information on toxicological effects.

4.3. Indication of any immediate medical attention and special treatment required

Not applicable

SECTION 5: Fire-fighting measures

5.1. Suitable extinguishing media

Material will not burn. Use a fire fighting agent suitable for the surrounding fire.

5.2. Special hazards arising from the substance or mixture

Exposure to extreme heat can give rise to thermal decomposition.

Hazardous Decomposition or By-Products

Substance

Carbon monoxide

Carbon dioxide

Toxic Vapor/Gas

Condition

During Combustion

During Combustion

During Combustion

5.3. Special protective actions for fire-fighters

When fire fighting conditions are severe and total thermal decomposition of the product is possible, wear full protective clothing, including helmet, self-contained, positive pressure or pressure demand breathing apparatus, bunker coat and pants, bands around arms, waist and legs, face mask, and protective covering for exposed areas of the head.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

Evacuate area. Ventilate the area with fresh air. For large spill, or spills in confined spaces, provide mechanical ventilation to disperse or exhaust vapors, in accordance with good industrial hygiene practice. Refer to other sections of this SDS for information regarding physical and health hazards, respiratory protection, ventilation, and personal protective equipment.

6.2. Environmental precautions

Avoid release to the environment. For larger spills, cover drains and build dikes to prevent entry into sewer systems or bodies of water.

6.3. Methods and material for containment and cleaning up

Contain spill. Working from around the edges of the spill inward, cover with bentonite, vermiculite, or commercially available inorganic absorbent material. Mix in sufficient absorbent until it appears dry. Remember, adding an absorbent material does not remove a physical, health, or environmental hazard. Collect as much of the spilled material as possible. Place in a closed container approved for transportation by appropriate authorities. Seal the container. Dispose of collected material as soon as possible in accordance with applicable local/regional/national/international regulations.

SECTION 7: Handling and storage**7.1. Precautions for safe handling**

Contents may be under pressure, open carefully. Do not breathe thermal decomposition products. For industrial or professional use only. Do not use in a confined area with minimal air exchange. Avoid release to the environment.

7.2. Conditions for safe storage including any incompatibilities

Protect from sunlight. Store in a well-ventilated place. Store at temperatures not exceeding 38C/100F. Store away from strong bases. Store away from other materials. Store away from amines.

SECTION 8: Exposure controls/personal protection**8.1. Control parameters****Occupational exposure limits**

If a component is disclosed in section 3 but does not appear in the table below, an occupational exposure limit is not available for the component.

Ingredient	C.A.S. No.	Agency	Limit type	Additional Comments
1,1,1,2,2,4,5,5,5-Nonafluoro-4-(trifluoromethyl)-3-pentanone	756-13-8	Manufacturer determined	TWA:150 ppm(1940 mg/m3)	

ACGIH : American Conference of Governmental Industrial Hygienists

AIHA : American Industrial Hygiene Association

CMRG : Chemical Manufacturer's Recommended Guidelines

OSHA : United States Department of Labor - Occupational Safety and Health Administration

TWA : Time-Weighted-Average

STEL : Short Term Exposure Limit

CEIL : Ceiling

8.2. Exposure controls**8.2.1. Engineering controls**

Provide appropriate local exhaust when product is heated. For those situations where the material might be exposed to extreme overheating due to misuse or equipment failure, use with appropriate local exhaust ventilation sufficient to maintain levels of thermal decomposition products below their exposure guidelines. Use general dilution ventilation and/or local exhaust ventilation to control airborne exposures to below relevant Exposure Limits and/or control dust/fume/gas/mist/vapors/spray. If ventilation is not adequate, use respiratory protection equipment.

8.2.2. Personal protective equipment (PPE)**Eye/face protection**

Eye protection not required.

Skin/hand protection

No chemical protective gloves are required.

Respiratory protection

If thermal degradation products are expected, use a full facepiece supplied-air respirator.

If thermal decomposition occurs:

Use a positive pressure supplied-air respirator if there is a potential for over exposure from an uncontrolled release, exposure levels are not known, or under any other circumstances where air-purifying respirators may not provide adequate protection.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

General Physical Form:	Liquid
Specific Physical Form:	Liquid
Odor, Color, Grade:	Clear colorless liquid with low odor
Odor threshold	<i>No Data Available</i>
pH	<i>Not Applicable</i>
Melting point	-108 °C
Boiling Point	49 °C [<i>@ 760 mmHg</i>]
Flash Point	No flash point
Evaporation rate	> 1 [<i>Ref Std:BUOAC=1</i>]
Flammability (solid, gas)	Not Applicable
Flammable Limits(LEL)	None detected
Flammable Limits(UEL)	None detected
Vapor Pressure	40.4 kPa [<i>@ 25 °C</i>]
Vapor Density	11.6 [<i>Ref Std:AIR=1</i>]
Density	1.6 g/ml
Specific Gravity	1.6 [<i>@ 68 °F</i>] [<i>Ref Std:WATER=1</i>]
Solubility in Water	Nil
Solubility- non-water	<i>No Data Available</i>
Partition coefficient: n-octanol/ water	<i>No Data Available</i>
Autoignition temperature	<i>Not Applicable</i>
Decomposition temperature	<i>No Data Available</i>
Viscosity	0.6 centipoise [<i>@ 25 °C</i>]
Molecular weight	<i>No Data Available</i>
Volatile Organic Compounds	1600 g/l [<i>Test Method:calculated SCAQMD rule 443.1</i>]
Percent volatile	100 %
VOC Less H2O & Exempt Solvents	1600 g/l [<i>Test Method:calculated SCAQMD rule 443.1</i>]

SECTION 10: Stability and reactivity

10.1. Reactivity

This material may be reactive with certain agents under certain conditions - see the remaining headings in this section.

10.2. Chemical stability

Stable.

10.3. Possibility of hazardous reactions

Hazardous polymerization will not occur.

10.4. Conditions to avoid

Light

10.5. Incompatible materials

Strong bases
Amines
Alcohols

10.6. Hazardous decomposition products**Substance**

Hydrogen Fluoride

Condition

At Elevated Temperatures - extreme conditions of heat

Refer to section 5.2 for hazardous decomposition products during combustion.

If the product is exposed to extreme condition of heat from misuse or equipment failure, toxic decomposition products that include hydrogen fluoride and perfluoroisobutylene can occur. Extreme heat arising from situations such as misuse or equipment failure can generate hydrogen fluoride as a decomposition product.

SECTION 11: Toxicological information

The information below may not be consistent with the material classification in Section 2 if specific ingredient classifications are mandated by a competent authority. In addition, toxicological data on ingredients may not be reflected in the material classification and/or the signs and symptoms of exposure, because an ingredient may be present below the threshold for labeling, an ingredient may not be available for exposure, or the data may not be relevant to the material as a whole.

11.1. Information on Toxicological effects**Signs and Symptoms of Exposure**

Based on test data and/or information on the components, this material may produce the following health effects:

Inhalation:

No known health effects.

Skin Contact:

Contact with the skin during product use is not expected to result in significant irritation.

Eye Contact:

Contact with the eyes during product use is not expected to result in significant irritation.

Ingestion:

No known health effects.

Toxicological Data

If a component is disclosed in section 3 but does not appear in a table below, either no data are available for that endpoint or the data are not sufficient for classification.

Acute Toxicity

Name	Route	Species	Value
1,1,1,2,2,4,5,5,5-Nonafluoro-4-(trifluoromethyl)-3-pentanone	Dermal	Professional judgment	LD50 estimated to be > 5,000 mg/kg
1,1,1,2,2,4,5,5,5-Nonafluoro-4-(trifluoromethyl)-3-pentanone	Ingestion	Professional	LD50 estimated to be > 5,000 mg/kg

		Judgement	
1,1,1,2,2,4,5,5,5-Nonafluoro-4-(trifluoromethyl)-3-pentanone	Inhalation-Vapor (4 hours)	Rat	LC50 > 1,227 mg/l

ATE = acute toxicity estimate

Skin Corrosion/Irritation

Name	Species	Value
1,1,1,2,2,4,5,5,5-Nonafluoro-4-(trifluoromethyl)-3-pentanone	Rabbit	No significant irritation

Serious Eye Damage/Irritation

Name	Species	Value
1,1,1,2,2,4,5,5,5-Nonafluoro-4-(trifluoromethyl)-3-pentanone	Rabbit	No significant irritation

Skin Sensitization

Name	Species	Value
1,1,1,2,2,4,5,5,5-Nonafluoro-4-(trifluoromethyl)-3-pentanone	Guinea pig	Not classified

Respiratory Sensitization

For the component/components, either no data are currently available or the data are not sufficient for classification.

Germ Cell Mutagenicity

Name	Route	Value
1,1,1,2,2,4,5,5,5-Nonafluoro-4-(trifluoromethyl)-3-pentanone	In Vitro	Not mutagenic
1,1,1,2,2,4,5,5,5-Nonafluoro-4-(trifluoromethyl)-3-pentanone	In vivo	Not mutagenic

Carcinogenicity

For the component/components, either no data are currently available or the data are not sufficient for classification.

Reproductive Toxicity

Reproductive and/or Developmental Effects

Name	Route	Value	Species	Test Result	Exposure Duration
1,1,1,2,2,4,5,5,5-Nonafluoro-4-(trifluoromethyl)-3-pentanone	Inhalation	Not classified for female reproduction	Rat	NOAEL 3,000 ppm	prematuring & during gestation
1,1,1,2,2,4,5,5,5-Nonafluoro-4-(trifluoromethyl)-3-pentanone	Inhalation	Not classified for male reproduction	Rat	NOAEL 3,000 ppm	prematuring & during gestation
1,1,1,2,2,4,5,5,5-Nonafluoro-4-(trifluoromethyl)-3-pentanone	Inhalation	Not classified for development	Rat	NOAEL 3,000 ppm	prematuring & during gestation

Target Organ(s)

Specific Target Organ Toxicity - single exposure

Name	Route	Target Organ(s)	Value	Species	Test Result	Exposure Duration
1,1,1,2,2,4,5,5,5-Nonafluoro-4-(trifluoromethyl)-3-pentanone	Inhalation	nervous system	Not classified	Rat	NOAEL 100,000 ppm	2 hours
1,1,1,2,2,4,5,5,5-Nonafluoro-4-(trifluoromethyl)-3-pentanone	Inhalation	cardiac sensitization	Not classified	Dog	Sensitization Negative	17 minutes

pentanone						
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Specific Target Organ Toxicity - repeated exposure

Name	Route	Target Organ(s)	Value	Species	Test Result	Exposure Duration
1,1,1,2,2,4,5,5,5-Nonafluoro-4-(trifluoromethyl)-3-pentanone	Inhalation	liver kidney and/or bladder heart endocrine system hematopoietic system muscles nervous system respiratory system vascular system	Not classified	Rat	NOAEL 3,000 ppm	90 days

Aspiration Hazard

For the component/components, either no data are currently available or the data are not sufficient for classification.

Please contact the address or phone number listed on the first page of the SDS for additional toxicological information on this material and/or its components.

SECTION 12: Ecological information**Ecotoxicological information**

Please contact the address or phone number listed on the first page of the SDS for additional ecotoxicological information on this material and/or its components.

Chemical fate information

Please contact the address or phone number listed on the first page of the SDS for additional chemical fate information on this material and/or its components.

SECTION 13: Disposal considerations**13.1. Disposal methods**

Dispose of contents/ container in accordance with the local/regional/national/international regulations.

Dispose of waste product in a permitted industrial waste facility. As a disposal alternative, incinerate in a permitted waste incineration facility. Combustion products will include HF. Facility must be capable of handling halogenated materials. Empty drums/barrels/containers used for transporting and handling hazardous chemicals (chemical substances/mixtures/preparations classified as Hazardous as per applicable regulations) shall be considered, stored, treated & disposed of as hazardous wastes unless otherwise defined by applicable waste regulations. Consult with the respective regulating authorities to determine the available treatment and disposal facilities.

EPA Hazardous Waste Number (RCRA): Not regulated

SECTION 14: Transport Information

For Transport Information, please visit <http://3M.com/Transportinfo> or call 1-800-364-3577 or 651-737-6501.

SECTION 15: Regulatory information**15.1. US Federal Regulations**

Contact 3M for more information.

EPCRA 311/312 Hazard Classifications:**Physical Hazards**

Not applicable

Health Hazards

Not applicable

15.2. State Regulations

Contact 3M for more information.

15.3. Chemical Inventories

The components of this product are in compliance with the new substance notification requirements of CEPA.

The components of this material are in compliance with the China "Measures on Environmental Management of New Chemical Substance". Certain restrictions may apply. Contact the selling division for additional information.

The components of this material are in compliance with the provisions of the Korean Toxic Chemical Control Law. Certain restrictions may apply. Contact the selling division for additional information.

The components of this material are in compliance with the provisions of Japan Chemical Substance Control Law. Certain restrictions may apply. Contact the selling division for additional information.

The components of this material are in compliance with the provisions of Philippines RA 6969 requirements. Certain restrictions may apply. Contact the selling division for additional information.

The components of this product are in compliance with the chemical notification requirements of TSCA. All required components of this product are listed on the active portion of the TSCA Inventory.

Contact 3M for more information.

15.4. International Regulations

Contact 3M for more information.

This SDS has been prepared to meet the U.S. OSHA Hazard Communication Standard, 29 CFR 1910.1200.

SECTION 16: Other information**NFPA Hazard Classification****Health: 3 Flammability: 0 Instability: 1 Special Hazards: None**

National Fire Protection Association (NFPA) hazard ratings are designed for use by emergency response personnel to address the hazards that are presented by short-term, acute exposure to a material under conditions of fire, spill, or similar emergencies. Hazard ratings are primarily based on the inherent physical and toxic properties of the material but also include the toxic properties of combustion or decomposition products that are known to be generated in significant quantities.

The NFPA Health code of 3 is due to emergency situations where the material may thermally decompose and release Hydrogen Fluoride. During normal use conditions, please reference Section 2 and Section 11 of the SDS for additional health hazard information.

HMIS Hazard Classification**Health: 1 Flammability: 0 Physical Hazard: 1 Personal Protection: X - See PPE section.**

Hazardous Material Identification System (HMIS® IV) hazard ratings are designed to inform employees of chemical hazards in the workplace. These ratings are based on the inherent properties of the material under expected conditions of normal use and are not intended for use in emergency situations. HMIS® IV ratings are to be used with a fully implemented HMIS® IV

program. HMIS® is a registered mark of the American Coatings Association (ACA).

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Reason for Reissue

Conversion to GHS format SDS.

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Protecting assets today with the future in mind.

3M™ Novec™ 1230 Fire Protection Fluid vs. FM-200®

FM-200® following the path of halon.

If you are looking for ways to protect your valuable electronic assets and operations, you have already made the smart decision to avoid relying on water for fire protection. Selecting a clean extinguishing agent offers the best opportunity to minimize risk to a business and its critical assets.

However, all clean agents are not the same. For example, HFC-227ea, sold under the FM-200® brand, is a hydrofluorocarbon (HFC) clean agent – which is a potent greenhouse gas. Due to their high global warming potentials (GWP), time is running out for HFCs, including FM-200.

The regulatory path taken by halon provides insight into the future for HFCs. In the past couple years there have been increasing efforts on a global basis to reduce the use of HFCs, including the European Union's implementation of an HFC phase-down under the F-gas Regulation and the U.S.

EPA's advancement of regulations in an effort to reduce use of HFCs. In fact, in December 2015 a collective group of 197 countries at the 27th Meeting of the Parties to the Montreal Protocol committed to act in 2016 to put HFCs on a global phase-down schedule similar to the path taken by halon.

Unfazed by the HFC phasedown

What do these regulations mean to users of fire suppression systems? For example, in the event of an FM-200 system discharge, facility owners will face the uncertainty and risk of the future supply and costs of FM-200 to continue to protect their valued assets.

Thankfully there are system options that do not use HFCs. With 3M™ Novec™ 1230 Fire Protection Fluid, owners can avoid the uncertainty associated with HFCs like FM-200 and halons. Novec 1230 fluid is NOT an HFC. Novec 1230 fluid is a sustainable clean agent – enabling a transition from HFCs such as FM-200 and halon to a more environmentally sound solution without compromising

performance. In its approval of Novec 1230 fluid, the U.S. EPA noted that Novec 1230 fluid “is *acceptable because it reduces overall risk to public health and the environment in the end use listed.*” In fact, 3M is so confident that Novec 1230 fluid will continue to meet environmental standards far into the future that 3M backs Novec 1230 fluid with 20-year protection: the 3M™ Blue Sky™ Warranty.

Novec 1230 fluid revolutionized the clean agent market in 2001 and now sets a new standard for sustainable clean agent fire suppression. Its unique dielectric properties and low vapor pressure yields design advantages to satisfy your top priority – protecting your assets. These advantages include ease of handling and the flexibility for higher pressure system innovation that is not practical for halons and HFCs. Specifying Novec 1230 fluid leverages these advances in fire suppression to protect your operations while eliminating future risks associated with HFCs such as FM-200.

3M™ Novec™ 1230 Fire Protection Fluid vs. FM-200®

Typical Environmental Properties (Not for specification purposes)

Properties	3M™ Novec™ 1230 Fire Protection Fluid	Chemours FM-200® (HFC-227ea)
Fire Performance vs. Health and Extinguishment Safety (NOAEL)	Class A, B & C¹ Class A: 4.5% - NOAEL 10% Safety Margin 122% Class B: 5.9% - NOAEL 10% Safety Margin 70% Class C: 4.5% - NOAEL 10% Safety Margin 122%	Class A, B & C² Class A: 6.7% - NOAEL 9% Safety Margin 34% Class B: 8.7% - NOAEL 9% Safety Margin 3% Class C: 7.0% - NOAEL 9% Safety Margin 29%
ODP - Ozone Depletion Potential ¹	0	0
GWP - Global Warming Potential ²	<1	3,350
Atmospheric Lifetime – Years	0.019	38.9
Global Environmental Warranty on Agent (Years)	Yes 3M™ Blue Sky™ Warranty (20 Years)	None
Subject to Phase-Down under EU F-Gas Regulation	No	Yes
Subject to U.S. Proposals for Global Phase-Down under Montreal Protocol	No	Yes
Subject to Potential U.S. EPA SNAP Status Change Proposals Directed at HFCs	No	Yes
Manufacturer Advocating for Global HFC Phase-Down	Yes	Yes

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

² Intergovernmental Panel on Climate Change (IPCC) 2013 Method, 100-year 1TH

³ NFPA 2001

The 3M™ Novec™ Brand Family

The Novec brand is the hallmark for a variety of proprietary 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, protective coatings, immersion cooling, advanced insulation media replacement solutions and several specialty chemical applications.

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

Regulatory: For regulatory information about this product, contact your 3M representative.

Technical Information: The technical information, recommendations and other statements contained in this document are based upon tests or experience that 3M believes are reliable, but the accuracy or completeness of such information is not guaranteed.

Product Use: Many factors beyond 3M's control and uniquely within user's knowledge and control can affect the use and performance of a 3M product in a particular application. Given the variety of factors that can affect the use and performance of a 3M product, user is solely responsible for evaluating the 3M product and determining whether it is fit for a particular purpose and suitable for user's method of application.

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Web www.3M.com/novec1230fluid

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3M™ Novec™ 1230 Fire Protection Fluid

Frequently Asked Questions (FAQs)

Smart Performance FAQs

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

A: Novec 1230 fluid is a sustainable fire extinguishing clean agent that helps protect continuity of operations and high value assets. It is a waterless fire suppressant designed to replace high global warming potential (GWP) hydrofluorocarbons (HFCs) like FM-200®.

Novec 1230 fluid is a clean agent included in the NFPA 2001 standard. It is non-conductive and leaves no residue, putting out fires while preserving both assets and operations. Novec 1230 fluid has been sold into clean agent fire suppression for 15 years and into more than a 100 countries. Its proven quality and reliability have provided specifiers and end-users with a smart solution for their clean agent needs.

Download the [3M™ Novec™ 1230 Fire Protection Fluid brochure](#) (PDF, 1.4 mb), [the technical data sheet](#) (PDF, 510 kb), or visit the [Fire Suppression - Novec 1230 webpage](#) to learn more.

Q: What operations and valued assets is 3M™ Novec™ 1230 Fire Protection Fluid used to protect?

A: Novec 1230 fluid is designed to help protect continuity of operations because, unlike water, it does not damage electronic equipment and the critical data stored on it—to keep your business up and running. It also protects valuable assets including everything from paper archives and historical documents to priceless works of art and antiquities. To learn more about specific industry applications, download one of our brochures.

- [3M™ Novec™ 1230 Fire Protection Fluid for Telecomm & Data Centers](#) 1464.0 kB
- [3M™ Novec™ 1230 Fire Protection Fluid Oil & Gas](#) 923.0 kB
- [3M™ Novec™ 1230 Fire Protection Fluid Flightline Applications](#) 699.25 kB
- [3M™ Novec™ 1230 Fire Protection Fluid Marine Application](#) 1086.0 kB
- [3M™ Novec™ 1230 Fire Protection Fluid Museums & Archives](#) 765.0 kB

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Q: Can I purchase a Novec 1230 fluid fire suppression system from 3M?

A: No. 3M manufactures Novec 1230 fluid but the actual sales and installations of the systems are through our OEM partners and their global distribution networks. Novec 1230 fluid is a recognized component of a listed or approved system, e.g. UL and Factory Mutual.

[Click here](#) for our full list of approved system manufacturers.

Q: How do I purchase a fire suppression system using 3M Novec 1230 fluid?

A: 3M produces Novec 1230 fluid and sells it to original equipment manufacturers (OEMs). Our OEM partners have third party approvals (such as UL and/or FM) for the fire suppression system, including both hardware and software. Systems can be customized to match the needs of the area being protected. Contact a system manufacturer.

[Click here](#) for our full list of approved system manufacturers.

Q: How do I specify Novec 1230 fluid for my fire suppression system?

A: When designing a new system, it's important that you specify an agent that's clean, sustainable and reliable. In fire suppression, there are no "equals". To ensure clean, specifications should exclude dry chemicals and water mist. To ensure sustainability, specifications should exclude HFCs, including FM-200® and ECARO-25®. To ensure quality, reliability and safety, specify 3M™ Novec™ 1230 Fire Protection Fluid and not generic descriptions of this agent.

[Download this template](#) (DOC, 85 kb) for help in specifying 3M™ Novec™ 1230 Fire Protection Fluid in a total flooding fire protection system.

Q: Where is 3M Novec 1230 fluid typically installed?

A: Systems are installed to protect critical operations and high value assets such as data centers, computer rooms, control rooms, museums, archives or any other location where the use of water to control a fire would damage the asset being protected and critical operations.

Q: How is 3M Novec 1230 fluid applied to a fire?

A: Upon activation from an automatic detection system, Novec 1230 fluid is released into the room and puts out the fire.

Q: How does 3M Novec 1230 fluid extinguish a fire?

A: Novec 1230 fluid stops the combustion process by absorbing heat. As part of an advanced fire suppression system, it quickly extinguishes the fire. Unlike CO₂ and inert gases, Novec 1230 fluid does not extinguish a fire by displacing the oxygen in an enclosure.

Q: Is there a requirement to have a dedicated ventilation system to remove Novec 1230 fluid after a discharge?

A: An active mechanical process that is designed to remove Novec 1230 fluid/gas from the protected space is not required by the industry standard, NFPA 2001. That said, the designer of a system using Novec 1230 fluid may consider use of such a ventilation system on a case-by-case basis if conditions warrant, similar to what has been done in the past with halon.

Q: Is 3M Novec 1230 fluid a liquid or a gas?

A: Actually, it is both. Novec 1230 fluid is produced and stored as a liquid. However, upon discharge from a properly designed spray nozzle, it floods the protected space as a gas. This fire suppressant evaporates 50 times faster than water, so the energy of the discharge is more than sufficient to convert it to a gas. The gas extinguishes the fire and prevents re-ignition of the potential fire incident. (Note: the term “fluid” can be used to describe either a liquid or a gas.)

Learn more about the science behind [3M Novec 1230 fluid’s transformation from liquid to gas](#) (PDF, 51 kb).

Q: What is the shelf life of 3M Novec 1230 fluid?

A: Novec 1230 fluid has at least a 30 year shelf life in an installed system when purchased from one of our authorized manufacturers. This means the effectiveness of the fluid in a listed and approved system will not diminish during that time span.

Q: Does the noise from a system discharging Novec 1230 fluid cause damage to hard disc drives?

A: Damage to hard disc drives has not been observed as a result of a discharge of a system using Novec 1230 fluid.

For inert gas systems, noise at specific decibel levels and frequencies has been tied to HDD damage. Volume, tone and duration of the noise are all important factors. The duration of discharge for inert gas systems is up to 12 times longer than halocarbon systems, such as those that use Novec 1230 fluid. Efforts are now underway to design inert gas systems to minimize noise at the nozzle.

Learn more in the [Clean Extinguishing Agent System Noise and Hard Disk Drive \(HDD\) Failure FAQs](#) (PDF, 111 kb).

Q: What are the advantages of using 3M Novec 1230 fluid compared to inert gas?

A: Owners of inert gas systems have become keenly aware of the hidden costs of installing, housing, maintaining and recharging inert gas systems.

On a volume basis, inert gas systems must deliver more agent into a room to displace as much as 40% of the air in a protected space—compared to approximately 5% with a system using 3M Novec 1230 fluid. This translates into many more cylinders of inert gas required to protect a given space. In addition, the cylinders store gas at much higher pressures.

Both the greater number of cylinders and the high pressures at which these systems operate represent additional expenses, or “extra” installation costs that may not be readily apparent in the initial bid. For example, the added construction costs associated with over-pressurization may not be included in the cost of system installation, but are necessary expenses associated with installation. In addition, the larger amount of space required for the higher quantity of inert gas cylinders translates to higher real estate or space costs.

The high pressure at which inert gas systems operate also requires more frequent and rigorous maintenance to ensure that it can withstand the high discharge pressures. At regular intervals, maintenance teams validate system pressure and the integrity of the hoses, pressure vents, and cylinders.

Learn more about how [3M Novec 1230 fluid compares to inert gas](#).

Q: Can I air ship Novec 1230 fluid in bulk?

A: Yes. Unlike other clean agents, Novec 1230 fluid is stored as a liquid in unpressurized containers and can be shipped in bulk quantities by air.

Safety FAQs

Q: Is this product safe for human occupancy?

A: Yes. 3M Novec 1230 fluid currently provides the largest margin of safety of any clean agent and is approved for use in occupied spaces by the U.S. Environmental Protection Agency (EPA). In its approval of 3M™ Novec™ 1230 Fire Protection Fluid, the EPA noted that the fluid “provides an improvement over use of halon 1301, hydrochlorofluorocarbons (HCFCs) and hydrofluorocarbons (HFCs) in fire protection. because it reduces overall risk to public health and the environment...”

Learn more about our margin of safety compared to other clean agents in the [Novec 1230 Fluid brochure](#) (PDF, 1.4 mb).

Q: When designing a fire suppression system using 3M Novec 1230 fluid, how are agent concentrations maintained after discharge?

A: Systems using Novec 1230 fluid are designed to flood a space with the gas to a design concentration. This design concentration is maintained by ensuring that the space has integrity (no leaks or minimal leaks) to maintain the required concentration for the required hold time, usually 10 minutes as a minimum. According to the 2015 edition of NFPA 2001, paragraph 5.6, “A minimum concentration of 85 percent of the adjusted minimum design concentration shall be held at the highest height of protected content within the hazard for a period of 10 minutes or for a time period sufficient to allow for response by trained personnel.” This requirement also exists in other, similar standards.

Sustainability FAQs

Q: Why should I choose 3M Novec 1230 fluid rather than an HFC fire suppression systems?

A: As of October 2016, HFCs like Chemours' FM-200® (HFC-227ea) and FE-25™ (HFC-125), as well as Fike's ECARO-25® (HFC-125), are scheduled for global production phasedown under the Montreal Protocol. FM-200® and other hydrofluorocarbons (HFCs) are following the path of halon. Although these HFCs are clean agents that do not deplete the ozone layer, they are potent greenhouse gases—more than 3000 times more potent than CO₂. The European Union's HFC phasedown started in 2015 under the F-Gas regulations and the HFC phasedown in the United States and other developed countries begins in 2019 under the Montreal Protocol.


Because fire suppression systems are often intended to last for 30 years or more, FM-200® and other HFCs have become unsustainable clean agents. Novec 1230 fluid provides the fire protection industry with an agent that will stand the test of time based on its safety, performance and environmental properties. Novec 1230 fluid has no ozone depletion potential and a climate impact less than CO₂ and it's not targeted for phasedown or phase-out.

[Learn more](#) about how 3M™ Novec 1230™ Fire Protection Fluid stacks up against the competition.

Q: How can I stay up to date on environmental regulations impacting the fire suppression industry?

A: Visit 3M.com/NovecHotTopics to access our insights on the latest developments from around the world. Written by the makers of 3M Novec products to enhance the knowledge and insight of experts like you, this is the place to learn about the forces shaping your business and get the help you need to make informed choices about your fire protection, cleaning or other industrial applications.

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Q: Can 3M guarantee that Novec 1230 fluid will not be subject to environmental restrictions in the future?

A: While no one can accurately predict what the future will bring, 3M is so confident that Novec 1230 fluid will not be affected by any environmental mandates that it offers the 3M™ Blue Sky™ Warranty.

Read the [Blue Sky Warranty flyer](#) (PDF, 248 kb) for more information.

Q: What is the 3M™ Blue Sky™ Warranty?

A: The 3M™ Blue Sky™ Warranty states, for a period of 20 years after original installation and subject to noted requirements, that 3M™ Novec™ 1230 Fire Protection Fluid, installed in an approved fire suppression system, will not be restricted for use in fire protection due to its Ozone Depletion Potential (ODP) or Global Warming Potential (GWP) and is not targeted for phasedown by the Montreal Protocol, nor subject to the European F-Gas Regulations targeting the phasedown of production and import of HFCs into Europe; and will not be affected by U.S. EPA SNAP regulations which would render it either unacceptable or acceptable subject to narrow use limits.

Read the [3M Blue Sky Warranty](#) (PDF, 223 kb) complete terms and conditions.

Q: How much will it cost to receive this reassurance?

A: There is no cost for this warranty and it is in effect for 20 years after installation.

To apply, an end user who purchased a newly installed system simply registers it on the [3M Novec website](#) within 30 days of system installation.

Q: Why is 3M Novec 1230 fluid considered a “third” generation fire suppression clean agent?

A: The halon family of fire protection products was widely utilized as the first of the new clean agents. These products were popular because they would extinguish a fire without damaging the contents of the space being protected, such as the early computer server rooms. However, in 1987, halons were regulated by the Montreal Protocol because they contributed to the depletion of the ozone layer. In response to the mandates of the Montreal Protocol, manufacturers developed replacement products for halons known as HFCs including FM-200®, the second generation of clean agents. While none of these products contributed to ozone depletion, they do have other environmental concerns such as high global warming potential (GWP) and the resulting regulatory consequences addressed above.

Novec 1230 fluid is a third generation clean agent because it was developed to provide high performance and a large margin of safety without harming the environment.

Q: Water is sustainable too. Why would Novec 1230 fluid be used rather than water mist?

A: Water mist is still water. It is wet and messy, electrically conductive and can require costly clean-up. It can destroy the critical assets that keep businesses running. Because water mist is not a clean agent, it is not covered by NFPA 2001. Instead, it is covered by another standard: NFPA 750 which notes, “The standard does not provide definitive fire performance criteria, nor does it offer specific guidance on how to design a system to control, suppress, or extinguish a fire.”

FM Global’s Data Sheet 5-32 states: “When it is essential to reduce equipment damage from an incipient fire to minimum possible levels, or to facilitate the return to service, provide an FM Approved clean agent fire extinguishing system with detection to protect the data equipment within the data processing equipment room. This is to supplement the automatic sprinkler or water mist system protecting the facility or raised floor.”

Q: Where can I learn more about Novec 1230 fluid?

A: The quickest way to find accurate and informative material regarding Novec 1230 fluid is on our [Fire Suppression - Novec 1230 Fluid webpage](#).

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The 3M™ Novec™ Brand Family

The Novec brand is the hallmark for a variety of proprietary 3M products. Although each has its own unique formula and performance properties, all Novec products are designed in common to address the need for smart, safe and sustainable solutions in industry-specific applications. These include precision and electronics cleaning, heat transfer, fire protection, protective coatings, immersion cooling, advanced insulation media replacement solutions and several specialty chemical applications.

3M™ Novec™ Engineered Fluids ■ 3M™ Novec™ Aerosol Cleaners ■ 3M™ Novec™ 1230 Fire Protection Fluid ■ 3M™ Novec™ Electronic Grade Coatings ■ 3M™ Novec™ Electronic Surfactants ■ 3M™ Novec™ Dielectric Fluids

Regulatory: For regulatory information about this product, contact your 3M representative.

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Product Use: Many factors beyond 3M's control and uniquely within user's control can affect the use and performance of a 3M product in a particular application. Given the variety of factors that can affect the use and performance of a 3M product, user is solely responsible for evaluating the 3M product and determining whether it is fit for a particular purpose and suitable for user's method of application.

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