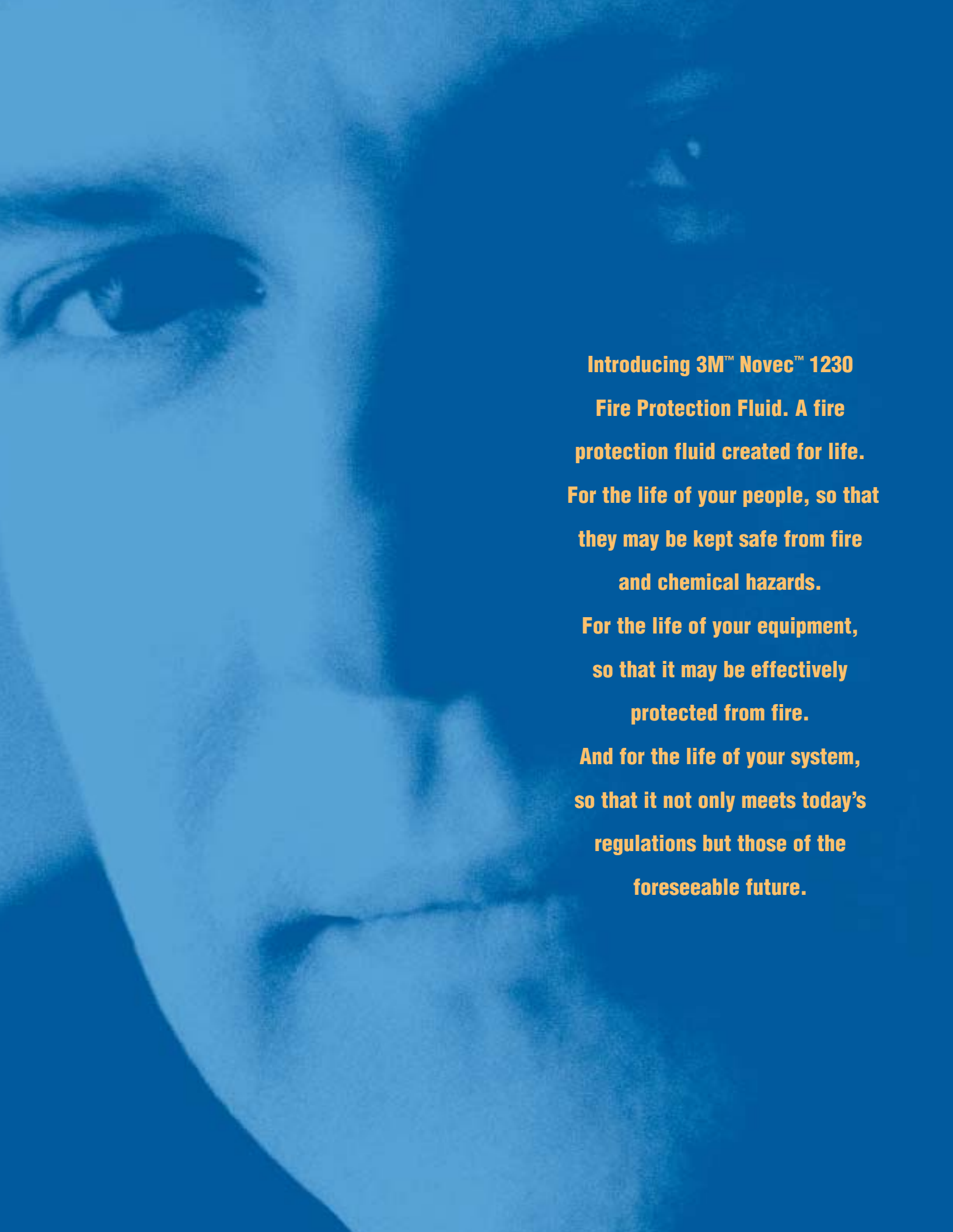
Novec™ 1230 Fire Protection Fluid.

Created for life.

3M Novec™ 1230
Fire Protection Fluid



Introducing 3M™ Novec™ 1230 Fire Protection Fluid. A fire protection fluid created for life.

For the life of your people, so that they may be kept safe from fire and chemical hazards.

For the life of your equipment, so that it may be effectively protected from fire.

And for the life of your system, so that it not only meets today's regulations but those of the foreseeable future.

A long-term, sustainable technology.

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

3M™ Novec™ 1230 Fire Protection Fluid Environmental Properties

Properties	Novec 1230	Halon 1211	Halon 1301	HFC-125	HFC-227ea
Ozone Depletion Potential (ODP)[1]	0.0	5.1	12.0	0.0	0.0
Global Warming Potential[2]	1	1300	6900	3400	3500
Atmospheric Lifetime (Years)	0.014	11	65	29	33
SNAP (Yes/No)	Yes	N/A	N/A	Yes	Yes

[1] World Meteorological Organization (WMO) 1998, Model-Derived Method.
[2] Intergovernmental Panel on Climate Change (IPCC) 2001 Method, 100 Year ITH.

The widest margin of safety.

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

Note: Industry standards require egress from a protected enclosure prior to system discharge.

3M™ Novec™ 1230 Fire Protection Fluid Safety Margin

Agent	Novec 1230	Halon 1301	HFC-125	HFC-227ea
Use Concentration	4-6%	5%	8.7-12.1%	7.5-8.7%
NOAEL[3]	10%[4]	5%	7.5%	9%
Safety Margin	67-150%	Nil	Nil	3-20%

[3] NOAEL for cardiac sensitization.
[4] NOAEL for acute toxicity, including cardiac sensitization.

3M™ Novec™ 1230 Fire Protection Fluid Typical Physical Properties (Not for specification purposes)

Chemical formula	$CF_3CF_2C(O)CF(CF_3)_2$
Molecular weight	316.04
Boiling point @ 1 atm	49.2°C (120.6°F)
Freezing point	-108°C (-162.4°F)
Density, sat. liquid, 25°C	1.60 g/ml (99.9 lbm/ft^3)
Density, gas @ 1 atm, 25°C	0.0136 g/ml (0.851 lbm/ft^3)
Specific volume @ 1 atm, 25°C	0.0733 m^3/kg (1.175 ft^3/lb)
Liquid viscosity @ 0°C/25°C	0.56/0.39 centistokes
Heat of vaporization @ BP	88.0 kJ/kg (37.9 BTU/lb)
Solubility of H_2O in Novec 1230 fluid	<0.001% by wt.
Vapor pressure @ 25°C	0.404 bar (5.87 psig)
Relative dielectric strength @ 1 atm (N_2=1.0)	2.3

3M™ Novec™ 1230 Fire Protection Fluid Regulatory Status

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

All major global regulatory requirements have been addressed. Novec 1230 fluid can be supplied to meet global demand.

One fire protection fluid. So many reasons to use it.

Here is the new standard for halon replacement. Novec 1230 fluid offers a long-term, sustainable technology that has the greatest margin of safety, the lowest GWP for halocarbon alternatives, and zero ozone depletion potential.

What is Novec 1230 fluid?

Novec 1230 fluid is a fluoroketone — a proprietary 3M technology that offers a number of important advantages over conventional halon replacements.

How does it work?

Extinguishing via its cooling effect, Novec 1230 fluid works as a gas, yet it is a liquid at room temperature. Because it is not stored or shipped from the factory in pressurized cylinders, Novec 1230 fluid is **easy to handle and charge**. Novec 1230 fluid systems allow for more efficient use of space, requiring about the same number of cylinders as conventional halocarbon agents.

Where is Novec 1230 fluid used?

Novec 1230 fluid is a highly efficient fire extinguishant that **can be used for both streaming and flooding applications**. It is **ideal for special hazards:** spaces where the criticality of maintaining operation of high-value equipment is paramount. Examples include: telecommunication switch rooms, computer and electronic control rooms, hazards aboard ships, critical military applications such as engine and crew bay, and flightline protection.

What sets it apart?

Novec 1230 fluid has **zero ozone depletion potential** and the **lowest atmospheric lifetime for halocarbon alternatives: 5 days**. The closest alternative is 33 years.

It has a **Global Warming Potential of 1,** 99.9% lower than any halocarbon agent acceptable for use in occupied spaces.

Novec 1230 fluid has the **greatest margin of safety** for use in occupied spaces.

It makes **good business sense** to use Novec 1230 fluid because it is a **sustainable, long-term technology**. Not only does Novec 1230 fluid meet today's regulations but it meets those of the foreseeable future.

Novec 1230 fluid is supported by global sales, technical and customer service resources, with fully-staffed technical service laboratories in the U.S., Europe, Japan and Southeast Asia.

Important notice to purchaser:

The information in this publication is intended for persons with knowledge and technical skills sufficient to assess and apply their own informed judgment to the information. The Material Safety Data Sheet (MSDS), Material Toxicity Summary Sheet (MTSS) and other product literature should be read and understood before using the 3M product. The information in this publication is based on tests that we believe are reliable. Your results may vary due to differences in test types and conditions. You must evaluate and determine whether the 3M product is suitable for your intended application. Since conditions of product use are outside of our control and vary widely, the following is made in lieu of all expressed and implied warranties (including the implied warranties of merchantability and fitness for a particular purpose): Except where prohibited by law, 3M's only obligation, and your only remedy, is replacement or, at 3M's option, refund of the original purchase price of product that is shown to have been defective when you received it. In no case will 3M be liable for any direct, indirect, special, incidental, or consequential damages (including, without limitation, lost profits, goodwill, and business opportunity) based on breach of warranty, condition or contract, negligence, strict liability, or any other legal or equitable theory.

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