3M Novec™ 1230
Fire Protection Fluid
For Marine Applications

Created for life.

When safety matters most

3M™ Novec™ 1230 Fire Protection Fluid is an advanced, “next-generation” halon replacement, offering a number of important advantages over other clean agents and CO_2 in marine applications.

The product is based on a proprietary chemistry from 3M. Its low acute toxicity, combined with high extinguishing efficiency, gives Novec 1230 fluid a significant margin of safety, even at relatively high extinguishing concentrations. This makes Novec 1230 fluid ideal for occupied spaces including engine and pump rooms, paint lockers and communication and control centers.

Novec 1230 fluid vaporizes rapidly during discharge, and it is noncorrosive and non-conductive, so it will not harm delicate electronics, radar, navigation and other equipment. And, unlike foams and powders, it leaves no residue to clean up, which means that operations can continue without interruption.

The bottom line? With Novec 1230 fluid, you get fast, effective fire protection – without compromising ship systems, the safety of passengers and crew, or the environment.

The long-term, sustainable solution

From its initial development, 3M™ Novec™ 1230 Fire Protection Fluid was designed to address the global demand for a halon replacement that is safe, effective and not subject to current or anticipated regulatory restrictions, nor scheduled or targeted for future phaseout. With zero ozone depletion potential, short atmospheric lifetime and a global warming potential of 1, Novec 1230 fluid has proven to be the first halon replacement to offer a viable, long-term, sustainable solution for marine fire protection.

3M™ Novec™ 1230 Fire Protection Fluid Environmental Properties

Properties	Novec 1230	Halon 1211	Halon 1301	HFC-227ea	HFC-125
Ozone Depletion Potential (ODP)[1]	0.0	5.1	12.0	0.0	0.0
Global Warming Potential–IPCC[2]	1	1300	6900	3500	3400
Atmospheric Lifetime (Years)	0.014	11	65	33	29

[1] World Meteorological Organization (WMO) 1998, Model-Derived Method.
[2] Intergovernmental Panel on Climate Change. (IPCC) 2001 Method, 100 Year ITH, CO_2 = 1.

Regulatory Status

Novec 1230 fluid complies with chemical notification requirements in following regions:

- ✔ **United States**
- ✔ **Europe**
- ✔ **Canada**
- ✔ **Korea**
- ✔ **Australia**
- ✔ **Japan**
- ✔ **China**

Why is sustainability important to consider?

In recent years, concerns about environmental issues – especially those relating to climate change – have led to increasing regulatory scrutiny of compounds with high global warming potentials. These so-called "greenhouse gases" include several conventional halon replacements, such as HFCs.

Under the Kyoto Protocol and other international agreements, more and more industrialized nations have committed to reducing the amount of greenhouse gases emitted to the atmosphere. Although the use of HFCs in fire protection is allowed today, there is growing concern about their future viability, as regulators look for industries and applications (such as fire protection) where alternatives exist to reduce greenhouse gas emissions, without harming economic growth.

For example, abatement of HFCs from fire protection applications is one strategy that companies can employ to reduce their overall emissions from the "basket" of six greenhouse gases identified by the Kyoto Protocol. In addition, many forward-thinking companies are beginning to consider the potential costs of monitoring and reporting their use of greenhouse gases; and of the cost and disruption to replace an HFC-based system in the near future, should new restrictions on HFCs, now being debated in the EU and other parts of the world, come into force. Ultimately, a growing number of end-users are concluding that long-term economics – as well as good stewardship – favor the use of sustainable solutions, such as Novec 1230 fluid.

The Widest Margin of Safety

Because 3M™ Novec™ 1230 Fire Protection Fluid offers a much wider margin of safety than other halocarbon agents, its effective use concentration will not exceed safety limits in marine applications.

3M™ Novec™ 1230 Fire Protection Fluid Safety Margin - Class B Hazards

Agent	Novec 1230	Halon 1301	HFC-227ea	HFC-125ea	CO_2
Use Concentration	5.5%	5%	8.7%	11.3%[3]	34%
NOAEL[1]	10%[2]	5%	9%	7.5%	<7%
Safety Margin	82%	None	3%	None	Lethal at design conc.

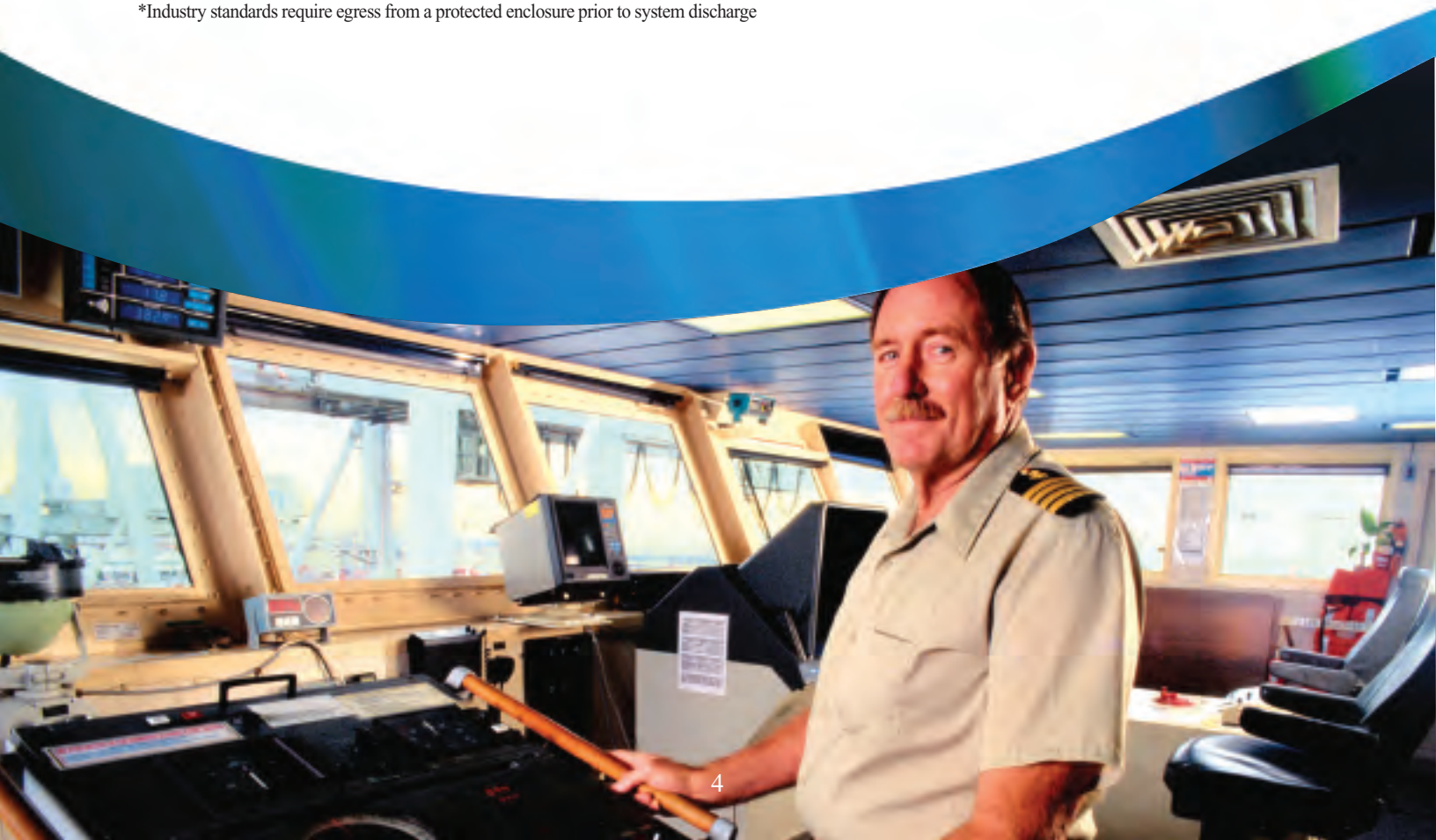
[1] NOAEL for cardiac sensitization (halocarbons) and effects specific to CO_2
[2] NOAEL for acute toxicity, including cardiac sensitization
[3] Based on heptane cup burner

It's important to note that the complex geometry of engine rooms, communications centers and other shipboard locations makes it difficult to calculate their net volume accurately; such calculations are used to determine an effective (but safe) agent design concentration.

If a significant portion of a room is filled with piping, conduits, machinery and other obstructions, agent concentration could quickly exceed its NOAEL (No Observable Adverse Effects Level), if discharged at a rate appropriate for its empty volume.

With Novec 1230 fluid, you get the stopping power you need to extinguish fires in obstructed spaces – without putting people at risk.*

*Industry standards require egress from a protected enclosure prior to system discharge



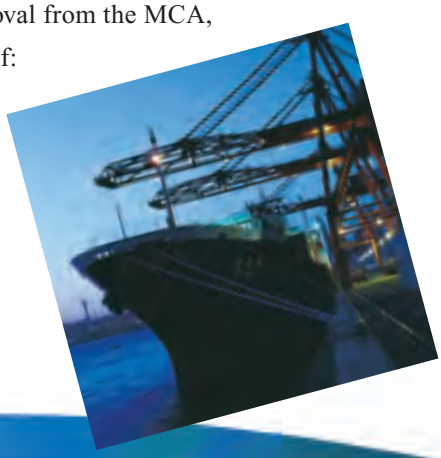
Performance you can depend on

In numerous laboratory and field tests around the world, witnessed by independent agencies, 3M™ Novec™ 1230 Fire Protection Fluid has proven its effectiveness in marine flooding applications. Consequently, fire protection systems incorporating Novec 1230 fluid, developed and sold by the world's leading systems manufacturers, have been registered and certified by a growing number of marine approval authorities (see list below).

For example, fixed fire protection systems using Novec 1230 fluid have successfully completed test protocol IMO MSC Circular #848. This protocol tests the ability of a system to extinguish effectively a variety of fires in total flooding applications. The fires occurred in a 500 m^3 test enclosure, simulating machinery rooms and pump rooms, and were witnessed by agents from Underwriters Laboratories, the U.S. Coast Guard, Lloyd's Register and the United Kingdom's Maritime and Coastguard Agency (MCA).

Subsequently, systems using Novec 1230 fluid received the Certificate of Type Approval from the MCA, indicating that these systems are accepted and in compliance with the requirements of:

- The Merchant Shipping Regulation 1998, S.I. 1012
- The Merchant Shipping Regulation 1998, S.I. 1011
- 1978 SOLAS Protocol as amended by the SOLAS amendments to date
- HSC Code - Resolution MSC.36(63)
- The Code of Practice for Safety of Large Commercial Sailing & Motor Vessels
- The International Maritime Organization MSC/Circ.848



Fire suppression systems using Novec 1230 fluid have been submitted by their manufacturers for certification by marine approval authorities around the world:

- UK MCA
- RINA, Italy
- LRS Type Approval
- DNV Type Approval
- Bureau Veritas Type Approval
- UK Module B
- Polish Registry of Shipping
- Australian Coast Guard
- Marine Marchand Approval
- Dutch Shipping Authority Acceptance, Inland & Sea
- Belgium - Inland and Seagoing Acceptance
- Icelandic Registry of Shipping
- American Bureau of Shipping (International)
- Canadian Coast Guard
- Korean Registry of Shipping
- Germanische Lloyds
- NK (Japan)
- U.S. Coast Guard

Easy handling, easy storage

3M™ Novec™ 1230 Fire Protection Fluid is an excellent choice for engine and equipment rooms, and other normally-occupied areas of pleasure craft and high-speed craft.

Because it is a liquid at room temperature, and stored at low vapor pressure, agent handling and charging of systems using Novec 1230 fluid is greatly simplified, and can be accomplished without removing the cylinders offsite – saving you time, and ensuring uninterrupted protection of your assets. Because the liquid is shipped non-pressurized, refilling after discharge is a straightforward procedure. Note: Before using this product, please read and follow the precautions and directions for use in the Material Safety Data Sheet (MSDS), product label and manufacturer guidelines for refilling systems.

The liquid state of Novec 1230 fluid also allows for efficient use of space, requiring about the same number of cylinders as conventional halocarbon agents. The product can be shipped safely by air in bulk quantities, without any regulations or restrictions.

Upgrading an existing fire protection system can be accomplished by reusing the existing system control equipment with the newly installed system designed for use with Novec 1230 fluid.

Compatible with fire system materials

Novec 1230 fluid has been shown to be compatible with typical materials of construction used in fire suppression systems, including stainless steel, carbon steel, aluminum, brass and copper. The material is stable and noncorrosive in its pure form. Long-term testing has demonstrated excellent compatibility with various elastomers used in o-rings, gaskets and other types of seals. Note: However, we recommend that the product not be used with fluoroelastomers, because they are both fluorine-based with an affinity for each other and, therefore, should not be used together.

3M Resources

3M™ Novec™ 1230 Fire Protection Fluid is supported globally by 3M sales, technical and customer service resources, as well as by authorized fire suppression system manufacturers (OEMs).

For more information, please visit our web site at www.3m.com/novec1230fluid

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