Why Novec 1230?

Environmental Sustainable

Peace of Mind

Safe for people

Installation flexibility

Speed of Suppression

Peace of Mind

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Installation flexibility

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What is Global Warming and what causes it?

The Greenhouse Effect

Some of the infrared radiation passes through the atmosphere, and some is absorbed and re-emitted in all directions by greenhouse gas molecules. The effect of this is to warm the earth's surface and the lower atmosphere.

- Solar radiation passes through the clear atmosphere
- Most radiation is absorbed by the earth's surface and warms it
- Infrared radiation is emitted from the earth's surface
...and this is the result
SUMMARY
Climate Change Legislative and Regulatory Impacts on Clean Agent Fire Protection

EU

Kyoto Protocol >>> EU-F-gas Regulation (Regulation EC No.842/2006 in force 7/04/07)
- Addresses containment, use, recovery, etc. of industrial fluorinated gases including HFCs, PFCs and SF6.
- Results in higher cost for systems using HFC’s (registration, maintenance & service)
- Applicable for all HFC’s and PFC’s but NOT for Novec 1230 Fluid

<table>
<thead>
<tr>
<th>Compound</th>
<th>Trade Names</th>
<th>Atmospheric Lifetime (yrs)</th>
<th>GWP_{100}</th>
</tr>
</thead>
<tbody>
<tr>
<td>HFC-125 (CF_{3}CF_{2}H)</td>
<td>FE-25, ECARO-25</td>
<td>29</td>
<td>3,500</td>
</tr>
<tr>
<td>HFC-227ea (CF_{3}CFHCF_{3})</td>
<td>FM-200, FE-227</td>
<td>33</td>
<td>3,220</td>
</tr>
<tr>
<td>HFC-236fa (CF_{3}CH_{2}CF_{3})</td>
<td>FE-36</td>
<td>220</td>
<td>9,810</td>
</tr>
<tr>
<td>HFC-23 (CF_{3}H)</td>
<td>FE-13, Trigon 300</td>
<td>260</td>
<td>14,800</td>
</tr>
</tbody>
</table>

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SUMMARY
Climate Change Legislative and Regulatory Impacts on Clean Agent Fire Protection

EU

- Denmark & Switzerland
  - HFCs banned for fire protection.
- Norway
  - Enacted tax on imports of HFCs.

US

- USEPA (U.S. EPA 12/20/02 Federal Register)
  - "(FK-5-1-12/Novec 1230) provides an improvement over use of halon 1301, hydrochlorofluorocarbons (HCFCs) and hydrofluorocarbons (HFCs) in fire protection. We find that C6-perfluoroketone is acceptable because it reduces overall risk to public health and the environment in the end use listed."

- Waxman Bill Would TAX FM-200 $1.46 to $2.193 per Pound
  In order to get an idea of the impact of requiring HFC producers to buy allowances, the cost of allowances to manufacture HFCs used in fire protection would be the following:
  At $1.00 per metric ton, cost of HFC-227ea allowance = $1.46 per pound, HFC-125 = $1.59, and HFC-236fa = $4.46.

- U.S. Supreme Count Decision (4/07)
  - HFCs are a pollutant under the Clean Air Act
Environmental Footprint Comparison

- **HFC 236**
  - Atmospheric Lifetime: 5 days
  - GWP of 1
  - No Ozone Depletion

- **Novec 1230**

Area of the circle is proportional to the atmospheric lifetime of the compound.
Environmental Sustainable

Environment

Legislation

GARANTEED
Greenhouse Gas Emissions from an HFC-227ea discharge

Preventing one discharge from an average size system (approx. 348 kg of agent)

\[ \text{Annual CO}_2 \text{ emissions from 240 U.S. passenger cars} \]
Greenhouse Gas Emissions from an Novec 1230 fluid discharge

Preventing one discharge from an average size system (approx. 401 kg of agent)

Less CO₂ equivalent emissions than the GHG output from one dairy cow for a single month

= Emissions equivalent to 401 kg CO₂
= Emissions equivalent to 0.07 cars/year
Why Novec 1230?

- Safe
- Speed of Suppression
- Environmental sustainable
- Peace of Mind
- Installation flexibility
Human Safety >>> Safest Extinguishing agent available!

Safety Margin

Design Concentration*

NOAEL

* ISO-14520 Class A

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3M™ Novec™ 1230 Fire Protection Fluid

Why

Safe

Speed of Suppression

Installation flexibility

Peace of Mind

Environmental sustainable

Novec 1230

Why

Novec 1230
**Speed of Suppression**

- **6-10 Second Discharge**
- **Damage $**
- **Detectable Smoke**
- **Alarm and activation after preset time**

**Duration of Fire (minutes)**

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Why

Novec 1230

? why

Safe

Installation

flexibility

Speed of

Suppression

Environmental sustainable

Peace of Mind
Space Efficient

200 m³

Inert gas  Carbon Dioxide  Novec1230  HFC-227
Flexibility of fire system using Novec 1230

Compatibility

Flexibility of installation

Local Cylinder Filling
During IMO Testing
Why
Novec 1230
?

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Space Efficient

Speed of Suppression

Peace of Mind
Blue Sky Warranty

3M™ Novec™ 1230 Fire Protection Fluid doesn’t just put out fires. With the new Blue Sky Warranty, it also puts your mind at ease:

If Novec 1230 Fluid is restricted in use or targeted for emission reduction as a fire protection agent due to ozone depletion potential, global warming potential, or atmospheric lifetime, 3M will refund the purchase price of the fluid.
Value Proposition for Novec 1230 Fluid

- **Environmental Profile**
  - No ODP; GWP=1; ALT of 5 days
- **F-gas Regulation**
  - Not a F-greenhouse gas → no foreseen regulations related to environment
  - Capitalize on benefits over HFC’s (no registration, no record keeping, etc.)
- **Safety**
  - Safest halon alternative on the market >>> >60% safety margin
  - PERFECT SOLUTION FOR OCCUPIED SPACES
- **Space & weight**
  - Small, compact systems versus inert gas systems
- **Speed of extinguishing**
- **Local filling & handling**
  - Fluid allows on the spot filling
  - Easy handling and transportation
- **Environmental peace of mind >>> BLUE SKY WARRANTY**
Standards, Approvals and Listings for Novec 1230 fluid

- VdS Approved
- LPCB Approved
- UL Listed
- ISO 14520 Standard on Gaseous Media Fire Extinguishing Systems
- NFPA 2001 Standard on Clean Agent Fire Protection Systems
- FM Approved
Standards, Approvals and Listings for Novec 1230 fluid

- IMO Recognized
- Bureau Veritas Approved
- DNV Approved
- MCA Approved
- GL Approved
- MED Approved
- ABS Approved
- RINA Approved
- Lloyds Approved