

Because it works with flammable and even explosive materials, the oil and gas industry necessarily makes high demands of its fire protection systems. Many traditional solutions are, however, no longer acceptable because of concerns related to global climate change – a top of mind issue for the oil and gas industry. Joe Ziemba of 3M Company looks at a new alternative that offers many benefits.

## Enhanced Fire Safety for the Oil and Gas Industry

To provide fire protection in the offices, equipment rooms and other confined spaces that form part of onshore and offshore oil and gas installations, halon-based extinguishing systems have, in the past, been a popular choice. As an extinguishing agent, halon is efficient, clean, relatively low in toxicity and, in its heyday at least, it was inexpensive.

It does, however, have two crucial shortcomings – as a brominated fluorocarbon it does significant damage to the Earth's ozone layer. In addition, halon is long lived in the atmosphere and has a high global warming potential. This led to the production of halon being phased out in the early 1990's to comply with the Montreal Protocol, and most manufacturers ceased to make halon-based fire suppression systems around the same time.

Clearly, an alternative was needed, and the most widely adopted class of compounds were hydrofluorocarbons (HFCs). These agents certainly have the required zero ozone depletion potential, but they fall short in another area – their global warming potentials are substantial.

For this reason, the continued use of HFCs is being questioned.

For today's environmentally and cost conscious oil and gas industry, this creates two challenges. The first is to achieve effective fire protection for workers and property without increasing their carbon footprint. The second is to minimize facility lifetime costs by avoiding systems that may need extensive modifications or replacement to meet future regulatory requirements.

Fortunately, there is a solution to both of these problems, and it's one that also brings many other benefits for applications in the oil and gas industries. That solution is 3M™ Novec™ 1230 Fire Protection Fluid.

Let's start by looking at its environmental characteristics. Like HFCs, Novec 1230 fluid has zero ozone depletion potential, but its key differentiating factor is its global warming potential of just one. This is significantly less than the 3,220 (2007 IPCC assessment) for the most common HFCs. In addition, Novec 1230 fluid's atmospheric lifetime is only five days, in contrast to about 30 years for HFCs.

With environmental characteristics as desirable as this, the prospect of Novec 1230 fluid being restricted in use is negligible. Nevertheless, for specifiers who desire reassurance, 3M backs its technology with a unique Blue Sky<sup>SM</sup> warranty. Under the terms of this warranty, if Novec 1230 fluid is banned from or restricted in use as a fire protection agent because of its ozone depletion or global warming potential, 3M will refund the price of the fluid. The warranty is valid for 20 years.

Novec 1230 fluid offers a very wide margin of safety and therefore can be used in staffed areas. For most applications, it is typically used at a concentration of between 4% and 6%, but its no observable adverse effects level (NOAEL) is 10%. Therefore, its safety margin is between 67% and 150% - the widest margin of safety of any viable chemical halon replacement available on the market today. In contrast, halon has no safety margin at all. Further some HFCs have a NOAEL below the design concentration and the safety margin of even the most commonly used HFC is well below that offered by Novec 1230 fluid.

Unlike most other extinguishing agents, Novec 1230 fluid is not stored as a pressurized gas, but as a liquid, which instantly dissipates to form a gas when it is discharged from a properly designed system. Also, storage in liquid form has many benefits; one being Novec 1230 fluid can be easily transported in bulk - even by air. Further, refilling a system after discharge is much safer and simpler than working with bulk pressurized gas supplies and much more convenient than sending the cylinders off site. Finally, cylinders containing Novec 1230 fluid occupy less space than cylinders of CO<sub>2</sub> or inert gas systems. All of these benefits are particularly significant when the product is used in offshore applications.

With less impact on the environment and favorable handling characteristics, Novec 1230 fluid's performance and extinguishing properties remain unmatched. It is formulated to extinguish by cooling, so it knocks down fires quickly, minimizing the risk of spreading. It is suitable for delivery by flooding, and its non-corrosive, non-conductive properties allow it to be used to protect sensitive equipment such as telecommunications and computer installations.

Novec 1230 fluid is a clean extinguishing agent. It evaporates immediately and, unlike foams and powders, it leaves no residues. This means time-consuming clean up operations are eliminated, minimizing the delay before the system can be returned to service – an important advantage in the oil and gas industry where downtime costs can be significant.

Following the withdrawal of halon extinguishing agents from the market, HFCs achieved significant

popularity in oil and gas applications. However, with the increased focus to reduce green house gas emissions, HFCs themselves are now becoming an environmental concern and may soon be subject to restrictions or even bans.

Consequently, specifiers in the oil and gas industries would do well to consider Novec 1230 fluid from 3M – the extinguishing agent that has been specifically developed to combine performance, safety and ease of handling with an excellent environmental profile. ■

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The Novec brand is the hallmark for a variety of patented 3M compounds. 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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**Electronics Markets  
Materials Division**

3M Center, Building 224-3N-11  
St. Paul, MN 55144-1000  
www.3M.com/novec1230fluid  
1-800-251-8634

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