

The pressure's on

The hidden maintenance costs of inert gas fire suppression systems

Inert gas systems are designed to operate at high pressures – resulting in higher upfront costs for equipment and infrastructure, and higher maintenance costs for testing and replacing components over the life of the system.

Fire suppression systems are engineered to perform under pressure – both literally and figuratively. The higher the pressure, the more stress is placed on system components. Inert gas fire suppression systems operate at pressures at least three times higher than systems utilizing 3M™ Novec™ 1230 Fire Protection Fluid, and are therefore subjected to higher stresses. To ensure that inert gas systems perform as intended, they must undergo significant maintenance over the life of the system – and the costs associated with this maintenance may not be readily apparent. System owners need to consider these lifetime maintenance costs as part of the total cost of ownership of an inert gas system.

Required testing

Inert gas-based systems do not utilize low-pressure switches to monitor the cylinders, a feature which is normally available for systems using Novec 1230 fluid. Therefore, with inert gas systems, a calibrated gauge must be installed during inspection intervals to validate the actual pressure of the inert gas system cylinders. This inspection process is a substantial cost to the system owner. Inert gas systems that experience a loss of cylinder pressure that goes undetected between inspection intervals could result in a system malfunction. If a leak is detected during an annual inspection, there

are several process steps that are required to repair the system and bring it back to operational standards. The process steps include the disassembly of the framing and discharge hoses associated with the affected cylinders and transport for offsite cylinder refilling. Finally, the cylinders would be transported back to the site for re-installation and system re-commissioning. During this entire process the site may be without a fully functioning fire suppression system.

Another “hidden” cost is a five-year hydrostatic test on all system hoses. This requires disassembly of the inert gas system, which renders it inoperable during this test period. Generally, the presence of security personnel will be required to monitor the area while the system is out of order.

Another option is to replace each high-pressure hose at five-year intervals. In either case, this expense includes not only the cost of a new hose but also the cost of the labor to remove old hoses and install new hoses. This can easily cost \$100–\$200 per cylinder depending on local labor costs.

In addition to the pressure checks on system cylinders and hose testing, there is also a requirement to conduct hydrostatic testing on the cylinders of inert gas systems. The frequency of this testing varies in different regions of the world but may

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Inert gas systems require periodic inspection and testing of pressure relief devices – a cost typically not associated with systems using 3M™ Novec™ 1230 Fire Protection Fluid.

be as frequent as every five to ten years. Like the other testing required to maintain inert gas systems, there are substantial costs associated with disassembly and reassembly of the system.

Inert gas systems can add gases equivalent to 40% of the volume of air in the room, requiring pressure venting. Pressure venting is an integral part of the system: upon system discharge, it must operate to prevent room over-pressurization. Maintenance costs include inspection and testing of these devices to ensure they are unobstructed and operate freely. This inspection is conducted at regular intervals for high-pressure inert gas systems, but is not typically associated with systems using Novec 1230 fluid.

Summary

The high pressure at which inert gas systems are designed to operate 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.

The maintenance needed to ensure that an inert gas suppression system remains operational is a significant cost in terms of both time and money. Many – if not all – of the maintenance costs associated with a high-pressure inert system can be eliminated by choosing a sustainable system containing Novec 1230 fluid.

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3M™ Novec™ 1230 Fire Protection Fluid is an advanced clean agent fire suppression material, based on a proprietary chemistry from 3M. It was designed to address industry needs for clean agent fire protection that is safe and effective, while offering a sustainable environmental profile that no other halocarbon agent can match. This includes: Zero ozone depletion potential; a 5-day atmospheric lifetime, and; a Global Warming Potential of 1. Because of these properties, Novec 1230 fluid is not targeted for phase-down or regulatory restrictions anywhere in the world. It is approved for use in total flooding fire suppression systems by the U.S. EPA and most major regulatory bodies. All of this makes Novec 1230 fluid today's sustainable choice for clean agent fire protection.

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

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