



Novec[™]

Brand

GWP and 3M[™] Novec[™] 4710 Insulating Gas

Let's explore how the global warming potential (GWP) of 3M[™] Novec[™] 4710 Insulating Gas is helping enable significant environmental gains in the electric power equipment industry.

3M[™] Novec[™] 4710 Insulating Gas:

A breakthrough innovation in sustainable research and development

For almost 20 years, the 3M[™] Novec[™] Brand has been the hallmark of 3M chemistries designed to provide safe, sustainable solutions for a wide variety of industry applications. Novec products have been developed in response to the global transition away from legacy chemistries that have high global warming potentials such as hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulfur hexafluoride (SF₆). On this basis, Novec products need to strike a balance of properties that provide the same or similar performance as legacy chemistries while, at the same time, substantially reducing the environmental footprint.

Global warming potential (GWP) impact requires a comparative assessment

The various industry applications for which we develop Novec solutions have dramatically different performance requirements and currently use chemistries with different environmental impacts. Therefore, we are careful not to establish thresholds in the environmental, health and safety (EHS) properties of a Novec solution. This approach is consistent with regulatory approaches in these same applications. For instance, neither the EU nor the U.S. EPA have established a maximum or acceptable GWP threshold across all industry sectors or applications. Rather, the general regulatory approach is a comparative assessment of human health and environmental risks within each end use – what may be considered a high GWP in one sector may enable substantial reductions in greenhouse gas emissions in another sector.

Novec 4710 Insulating Gas vs. SF₆

SF₆ has been used as an insulating gas in electrical equipment for decades, because of its unique set of physical and chemical properties. Unfortunately, SF₆ also has an extremely high global warming potential at 23,500 times CO₂. 3M researchers filtered through hundreds of candidates before finding the balance of properties necessary to substitute for SF₆. In fact, Novec 4710 insulating gas provides electrical properties superior to SF₆. With a global warming potential of 2100, 3M would undoubtedly not commercialize Novec 4710 insulating gas for most other traditional F-gas applications but, compared to SF₆, Novec 4710 insulating gas has a GWP that is 10 times less.

Reduced use concentrations, reduced environmental impact

The excellent electrical properties of Novec 4710 insulating gas also enable substantially reduced use concentrations for any given piece of electrical equipment. Typical use concentrations for Novec 4710 insulating gas will be less than 10 volume % of SF₆ concentrations, increasing the improved environmental performance compared to SF₆ by as much as 99%. The two-fold improvement in climate impact of Novec 4710 insulating gas represents a significant advantage in a regulatory environment based on comparative risk.

Relative global warming potential impact

	GWP (100 yr. ITH)	Dielectric breakdown strength relative to SF ₆	Volume % formulation example	GWP of gas mixture	% GHG reduction* vs. SF ₆
Sulfur hexafluoride (SF ₆)	23,500	1	100	23,500	–
3M™ Novec™ 4710 Insulating Gas	2,100	2	4	328	99.3

*Greenhouse gas emission reduction taking into account the GWP and reduced density of the gas mixture.

For additional information

For information on additional 3M™ Novec™ Insulating Gases visit our web site at: 3M.com/novec

Smart. Safe. Sustainable.

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 smart, safe and 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™ Insulating Gases

Safety Data Sheet: Consult Safety Data Sheet before use.

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