Introduction

3M endeavors to develop solutions that optimize the widest margins of safety, for both 3M manufacturing plant workers and our customers, combined with the best performance possible.

Occupational Exposure

To achieve this outcome, 3M toxicologists carefully develop peer-reviewed, health-based occupational exposure limits (OELs) for 3M manufactured chemical products. 3M’s OEL derivation process is conducted using established methodologies consistent with those used by other authoritative, OEL-setting bodies such as the TERA-OARS, WEEL Committee [note: formally under the auspices of the AIHA], ACGIH and the European Union’s (EU) SCOEL Committee. These OELs are designed to “…represent conditions under which it is believed that nearly all workers may be repeatedly exposed … over a working lifetime without adverse health effects.”

The most common OEL is an eight-hour time weighted average (TWA) that is derived to be protective of human health based on airborne occupational exposure for eight hours a day, five days a week, 52 weeks a year for an occupational working lifetime (typically >30 years).

3M conducted a series of single- and repeat-dose inhalation toxicity experiments to determine safe use; the results of these studies indicated low toxicity and were the basis for establishing an OEL eight-hour TWA of 225 ppm for 3M™ Novec™ 5110 Insulating Gas. Intermittent exposures above the TWA are acceptable, provided they fall within the following excursion guidance which has been published by the ACGIH: transient increases in workers’ exposure levels may exceed three times the value (675 ppm) of the TWA level for no more than 15 minutes at a time, on no more than four occasions spaced one hour apart during a workday, and under no circumstances should they exceed five times the value (1125 ppm) of the eight-hour TWA level. Additional detail can be found on www.ACGIH.org.

In the electrical power utility industry, very few if any workers would be exposed to concentrations of Novec 5110 Insulating Gas approaching the eight-hour TWA on
Environmental risk assessment which characterizes the probability of the hazard actually causing harm.

Environmental Hazard Summary
If released to the environment, Novec 5110 gas is expected to partition primarily to the atmospheric compartment where it will undergo direct photolysis with a half-life of 16 days. Novec 5110 Insulating Gas does not contribute to ozone depletion in the stratosphere.

In the unlikely event that it is forced into contact with water, Novec 5110 gas will quickly hydrolyze. The primary hydrolysis product is trifluoroacetic acid (TFA), which is classified as persistent per EU and EPA definitions, in the aquatic and terrestrial compartments but will not bioaccumulate or bioconcentrate. Acute aquatic toxicity studies with daphnia magna show immediate conversion to TFA. Some ecotoxicity was observed, but could not be attributed to parent, reactive intermediate, or the primary degradation products. The substantial vapor pressure of Novec 5110 gas means that it is unlikely to be in the aquatic compartment long enough for ecotoxicity to occur.

Very low concentrations of TFA have been found in the environment for decades and have been reported to be primarily from natural sources. The minor contribution from industrial sources is not believed to present a risk to human health or the environment.6

The global warming potential (100-year integration time horizon) of Novec 5110 gas relative to carbon dioxide (CO2) is <1 (as calculated using the IPCC 5th assessment report method). The ozone depletion potential (ODP) of Novec 5110 Insulating Gas is zero.

Additional Environmental, Health, and Safety information is communicated to our customers in a variety of media that include the Globally Harmonized System (GHS) classification and labels on our products, sections 11 and 12 of the safety data sheets (SDSs), and topic specific product bulletins, MTSSs, publications or public databases such as the European Chemicals Agency (ECHA) database of registered substances.

Life Cycle Considerations
3M engineers products such as Novec 5110 Insulating Gas that provide sustainable solutions for our customers’ needs. We carefully assess the life cycle of our products, including whether they are safe for their intended uses. We evaluate risks to human health and the environment – not only to wildlife, but climate impact and energy consumption as well. As a matter of philosophy, we strive to minimize, and as much as possible eliminate, any footprint from products that are persistent (or products that degrade into persistent materials). While 3M advocates a common sense approach to the management of these products, taking into account such aspects as economic feasibility, technological capability, recyclability and end-of-life considerations, 3M does not support uses of these kinds of products where substantial amounts of the product are intentionally released as a matter of course during the handling, use or disposal of the product.

1 Toxicology Excellence for Risk Assessment–Occupational Assessment for Risk Sciences
2 Workplace Environmental Exposure Level
3 American Industrial Hygiene Association
4 American Conference of Governmental Industrial Hygienists
5 Scientific Committee on Occupational Exposure Levels

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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.

Safety Data Sheet: Consult safety data sheet (SDS) before use.

Regulatory: For regulatory information about this product, contact your 3M representative.

Technical Information: The technical information, recommendations and other statements contained in this document are based upon tests or experience that 3M believes are reliable, but the accuracy or completeness of such information is not guaranteed.

Product Use: Many factors beyond 3M’s control and uniquely within user’s control can affect the use and performance of a 3M product in a particular application. Given the variety of factors that can affect the use and performance of a 3M product, user is solely responsible for evaluating the 3M product and determining whether it is fit for a particular purpose and suitable for user’s method of application.

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