



3M Science.
Applied to Life.™

**3M™ Novec™ Engineered Fluids
for Aerosol Formulations in Industrial
and Professional Applications**

**Bringing
more to
the mix.**

More options – more answers.

A wide range of sustainable solutions that set a new standard of performance – for even the most challenging aerosol formulations for industrial and professional use.

In a marketplace overflowing with “me-too” aerosol products, how do you get your product to stand out from the crowd?

You could try updating your packaging. Or cutting your prices. But a better strategy for building long-term loyalty is to provide your customers with unique new solutions to real-world problems. Solutions like providing uniform and stable mixtures of aerosol components. Delivering a safe and sustainable application spray with low global warming potential. Avoiding restricted-use chemicals. Cleaning or coating sensitive materials without damaging them.

That’s where 3M can help. We developed our proprietary family of 3M™ Novec™ Engineered Fluids to address the need for safe, sustainable alternatives to chlorofluorocarbons (CFCs), hydrofluorocarbons (HFCs) and other common industrial solvents, including those used in aerosol formulations. Today, Novec fluids are proving their effectiveness in a wide range of aerosol product applications.

The outstanding combination of performance, safety and environmental properties offered by Novec fluids allows you to provide your customers with unique new solutions that get the job done – without compromising worker safety or your commitment to the environment.

More formulating freedom

Your customers need products that are compatible with substrate materials, safe for workers, compliant with environmental regulations, and effective in applications, such as cleaning a wide range of soils and contaminants.

Designing with Novec fluids gives you more “formulating freedom,” offering a wide range of solvents and solvent blends to achieve the ideal balance of properties for your customers’ applications.

A sustainable, versatile solution

3M™ Novec™ Engineered Fluids provide a balanced, cost-effective solution for your formulation and performance challenges:

- Low global warming potential (GWP)
- Zero ozone depletion potential
- Not scheduled for regulatory restriction or phase-out
- Neat Novec fluids are non-chlorinated and exempt from the U.S. EPA definitions for Volatile Organic Compounds (VOCs)
- Non-flammable
- Low toxicity
- High margin of worker safety and exposure limits
- Excellent materials compatibility: non-corrosive, non-conductive, no residue
- Excellent solubility with a variety of materials

The science behind the solutions

3M™ Novec™ Engineered Fluids are based on a proprietary 3M chemistry known as “segregated hydrofluoroethers” (HFEs). The invention of this unique, low global-warming potential chemistry is part of 3M’s longstanding commitment to continually improve the environmental, health and safety profile of our chemical products. This began over 40 years ago, with the introduction of 3M™ Fluorinert™ Electronic Liquids as alternatives to highly toxic, flammable and ozone-depleting substances. Novec fluids have taken this a step further, by offering safe, high-performance alternatives to materials with high global warming potentials.

Combining safety and sustainability with physical properties that include excellent materials compatibility, low heat of vaporization, wide range of available vapor pressures and stability, Novec fluids are an ideal solution for many of today’s most demanding aerosol formulation applications.

Key performance characteristics of 3M™ Novec™ Engineered Fluids

Engineered for:	To give you:
Solubility	– improved solubility with a wide variety of materials and chemistries, especially hydrocarbons and fluorocarbons, helping to improve the final products’ performance and shelf life.
Stability	– chemical and thermal stability to provide consistent performance, minimizing changes in properties due to storage or transport.
Compatibility	– no damage to a wide variety of components and substrate materials, including metals, plastics and elastomers.
Low surface tension and viscosity	– improved substrate wetting and sprayability for easier and more uniform application, as well as better coverage onto complex geometries or into tight spaces.
Range of available vapor pressures	– the ability to optimize formulations for the best performance balance of evaporation rate and initial viscosity, all of which affect dry times, dripping, film uniformity and coverage.
Inerting	– reduced flammability of your final formulation, helping improve safety for your workers and customers.
Versatility	– an improved balance of performance, substrate compatibility, safety and environmental properties for your required application to help increase product value for your customers.

Engineered for worker safety and long-term regulatory compliance

Novec fluids are non-flammable, low in toxicity and viewed favorably by regulatory agencies around the world. They can help you reduce the overall flammability and toxicity of your formulations – making them a ‘go-to’ solvent in any application where safety regulations are a significant concern. Because there are no use restrictions or reporting requirements for Novec fluids, using them in formulations with regulated materials can help reduce the cost of compliance, while giving you the marketing advantage of providing your customers a safer product.

Novec fluids offer a safe, sustainable alternative to common solvents such as n-propyl bromide (nPB), which has been classified as a Substance of Very High Concern by the European Chemicals agency – meaning that it could be banned or face limitations under the European Union’s REACH legislation. In a National Toxicology Program report, nPB was also associated with “clear evidence of carcinogenic activity.”¹

1. National Toxicology Program report. NTP TR564, August 2011: http://ntp.niehs.nih.gov/ntp/htdocs/LT_rpts/TR564.pdf

Meeting your formulating challenges

With Novec fluids, the possibilities are virtually endless. Here are just a few:

- Neat Novec fluids offer excellent solvency for fluorinated greases. They can be used to make polytetrafluoroethylene (PTFE) solutions when formulating a lubricant aerosol.
- Neat Novec fluids and Novec fluid/t-DCE (trans-dichloroethylene) blends are compatible with plastics such as nylon, high density polyethylene (HDPE) or polypropylene (PP) and a variety of elastomers, including fluorinated elastomers.
- Most hydrocarbon-based solvents and many silicone oils are miscible with neat Novec fluids and Novec fluid/t-DCE blends.
- Blending Novec fluids with a flammable solvent such as t-DCE can result in a non-flammable formulation.
- Novec fluids can be used as an alternative to n-propyl bromide (nPB), hydrochlorofluorocarbons (such as HCFC-225) and trichloroethylene (TCE) in many applications.

3M cares about customer safety

Aerosol formulation is a complex science that involves balancing safety, costs, regulatory issues and compatibility with other components in your aerosol product. With Novec fluids, you have the ability to choose the solvent – and the proportions – to maximize the critical properties for your application and customers.

When formulating with chemicals, proper safe handling and composition is always required. 3M is here to help and should be contacted for information – especially when formulating with polymers, oils or other materials.

3M recommends careful attention to risk management through control over composition, exposure reduction through automated equipment, and use of PPE (Personal Protection Equipment) or control of respiratory exposure through particle size control. 3M does not support the use of our fluids in products that contribute to respiratory irritation or high personal exposures.

3M manages the use of persistent chemicals, including fluorinated fluids, through application review. For assistance with new application reviews, customers should contact 3M Product Stewards, product Responsibility Liaisons, or 3M Technical Services.

Let's get started – together

We are here to help choose the right 3M™ Novec™ Engineered Fluids for your applications and processes. Please use the information below to learn more and get started today!

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

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