

**3M** Science.  
Applied to Life.™

**Cool solutions  
for today's  
hottest  
challenges.**

**3M™ Heat Transfer Fluids**

# Turn down the heat — and turn up performance.

## When temperatures rise, choose time-tested 3M™ Heat Transfer Fluids

For over 60 years, 3M has studied the science of heat transfer to develop a portfolio of solutions made for the challenges you face when it comes to keeping your equipment and processes cool when the heat is on. Our two families of heat transfer fluids – 3M™ Novec™ Engineered Fluids and 3M™ Fluorinert™ Electronic Liquids have unique properties including non-flammability, high dielectric strength, inertness, non-corrosiveness and low viscosity. These give them the performance, safety and versatility for a wide range of applications and industries.



### Semiconductor manufacturing

Semiconductor manufacturing requires precision. The smallest variation in temperature during manufacturing can have big impacts on yield. 3M Novec and Fluorinert fluids are engineered to remain stable over time, offering consistent performance and uniform temperatures across all steps of production. What's more, unlike aqueous coolants such as deionized (DI) water, 3M fluids offer wider operating temperature ranges, require less maintenance and will not damage electronic equipment or wafers in the event of leaks or other failures.



### Data centers and high-performance computing

Data centers form the backbone of today's wired world, and high-performance supercomputers enable the research that drives tomorrow's advances. Air cooling these powerful servers comes at a high cost — fans and chillers consume enormous amounts of electricity, which negatively impacts our environment and your bottom line. By switching to immersion cooling with 3M heat transfer fluids, you can cut costs and shrink your data center size and energy footprint.



### Military and aerospace

Mission-critical electronics for military and aviation applications are highly sensitive, requiring efficient and reliable cooling to perform at their best. 3M Novec and Fluorinert fluids are tough enough to stand up to demanding applications and environments while being easier to handle thanks to being non-flammable and less messy than oil-type coolants. They have excellent materials compatibility and can be used in high-end avionic spray cooling systems.



### Power electronics

Voltage-changing power electronics — power inverters, thyristors and variable-speed drives — provide the precise control needed for high-performance equipment. Safe for contact with electronics, heat transfer fluids from 3M give you the ability to uniformly and efficiently cool these devices through single-phase and two-phase immersion cooling.



### Pharmaceutical and chemical processing

Secondary loop and freeze drying processes used in the pharmaceutical and chemical industries can also benefit from the unique properties of 3M heat transfer fluids. Unlike the solvents and oils typically used in these applications, Novec and Fluorinert fluids are non-flammable and have high margins of safety for workers.



## Electronics reliability testing

With properties including high thermal stability and dielectric strength, inertness and non-corrosiveness, Fluorinert liquids are ideal for electronics reliability testing. Components can be tested both physically (leak testing) and electrically while immersed in the liquid. Tested devices will dry quickly with no residue or post-test cleaning required.

# Selecting the right fluid for your unique cooling needs

Both 3M™ Novec™ Engineered Fluids and 3M™ Fluorinert™ Electronic Liquids offer top-tier thermal management performance backed by 3M’s research and expert guidance. While physical properties differ between the two families of heat transfer fluids, both offer unique advantages.



Engineered for:	To give you:
 <p><b>Dielectric Performance</b></p>	Suitability for direct contact with live electronics*
 <p><b>Versatility</b></p>	A wide range of operating temperatures and stable performance
 <p><b>Health and Safety</b></p>	Non-flammability and a wide margin of worker safety especially compared to trichloroethylene (TCE) and methylene chloride (MeCl)
 <p><b>Compatibility</b></p>	The ability to use the fluids in systems made from a wide range of materials*
 <p><b>Clean Evaporation</b></p>	Quick drying with no mess or residue

\* Check with your 3M representative for full details.

## 3M™ Fluorinert™ Electronic Liquids

Fluorinert liquids have set the industry standard for direct contact electronics cooling for over 60 years. These fully-fluorinated liquids have exceptionally high dielectric strength, making them ideal for sensitive applications.

While they are non-ozone depleting, Fluorinert liquids have high global warming potentials (GWP) and users should take care to manage and minimize emissions of these materials.

## 3M™ Novec™ Engineered Fluids

Building on 3M’s extensive heat transfer expertise, Novec fluids offer outstanding performance and safety properties plus enhanced environmental sustainability thanks to their low-GWP and non-ozone depleting chemistries.

Novec fluids have slightly higher solvency compared to Fluorinert liquids, so materials that come into direct contact with the fluids should be checked for compatibility before use. Novec fluids also have lower dielectric strengths than Fluorinert liquids, so be sure to evaluate your application and select the right 3M heat transfer fluid for your needs.

# Let's get started — together.

3M is more than a brand — we're people who share your passion for solving problems and improving lives. We know the science of heat transfer, understand the regulatory landscape and have a global supply and support network eager to help you find solutions to your most critical challenges.



## Not sure which solution is right for your application? We're here to help!

Contact us for answers to any questions you may have, including guidance on choosing between 3M™ Novec Engineered Fluids and 3M™ Fluorinert™ Electronic Liquids. We also offer general application advice, product data, information on purchasing test samples and more.

**Visit [3M.com/HeatTransfer](http://3M.com/HeatTransfer) or contact your local 3M representative to get started today.**

**Safety Data Sheet:** Consult Safety Data Sheet prior to use.

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

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