

3M™ Electronic Grade Coatings



# Seal & Shield

**3M**

Protect your electronics against moisture, dirt and grime, corrosion or contamination with easy to apply surface modifiers.

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Protective technologies designed to maintain peak performance of electronic devices – even under the most challenging conditions.

Consumer demand for electronic devices that are more compact, portable and loaded with features has made protecting sensitive components against soils, contaminants and moisture more challenging than ever before.

3M offers a family of easy-to-apply protective coatings designed to maintain optimal performance and reliability in a broad range of electronics applications.

An attractive alternative to more traditional coatings, these surface modifiers are clear, low viscosity solutions that dry to thin, protective films over a variety of components and substrates.

They are:

- Low surface energy coatings that repel moisture and many liquids
- Dip, spray, brush or syringe dispensing applicable
- Chemically inert
- Thermally and electrically stable, with excellent dielectric properties

They provide:

- Excellent protection and repellency properties
- Improved manufacturing efficiency

Enhancing performance and reliability

All 3M Electronic Grade Coatings are specially formulated to combine consistent, dependable performance with ease of application. Those products sold under the 3M Novec brand are formulated to provide a sustainable solution based on a superior balance of safety, performance and low environmental impact in their intended applications. All Novec electronic grade coatings are:

- Nonflammable
- Low in toxicity
- Non ozone-depleting
- Low global warming potential
- Formulated with no volatile organic compounds (VOCs)

3M™ Electronic Grade Coatings Selection Guide



	Novec 1700	Novec 1702	Novec 2702	Novec 1720	3M 4880	Novec 2788
Where You Would Use It	Printed circuits boards, surface mount components, solder joints, composites, metals	Printed circuits boards, surface mount components, solder joints, composites, metals	Printed circuits boards, surface mount components, solder joints, composites, metals	Displays, touch screens and other electronic devices plus glass, steel, aluminum, ceramics	Displays, touch screens and other electronic devices plus glass, steel, aluminum, ceramics	Hard disk drive components, aluminum and other metal surfaces that need encapsulation
What It Does	Moisture protection, anti-migration, anti-stiction	Moisture protection, anti-migration, anti-stiction	Moisture protection, anti-migration, anti-stiction	Easy clean and anti-smudge	Easy clean and anti-smudge	Particle suppression for hard disk drives
What It Is	2% fluoroacrylate in 3M Novec 7100DL	0.2% fluoroacrylate in 3M Novec 7100DL	2% fluorinated hybrid in 3M Novec 7200DL	0.1% fluorosilane in 3M Novec 7100DL	10% fluorosilane in alkoxy silane and ethanol (60%/30%)	15% fluorinated hybrid in 3M Novec 7200DL
Coating Thickness (dip coated)	100 nm - 1 µm, (depending upon application)	0.1 micron (approximate)	100 nm - 1 µm, (depending upon application)	5-10 nm	20-100 nm (depending on final dilution)	100 nm - 1 µm, (depending upon application)
Dry Time	5-30 seconds	5-30 seconds	30-90 seconds	5-30 seconds	30-90 seconds	30-90 seconds
Cure Time	No cure required	No cure required	70-150°C 15-60 minutes	70-150°C 15-60 minutes	Room temperature, 24 hours (can be heat cured as well)	150°C 30-60 minutes
Removable	Removable with Novec 7100DL	Removable with Novec 7100DL	Permanent	Permanent	Permanent	Permanent

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For dilution – and for cleaning prior to coating – consider 3M™ Novec™ Engineered Fluids

Novec Engineered Fluids are a family of advanced solvent materials offering a balance of safety, performance and low environmental impact. Various Novec fluids are suitable for use as carrier solvents and as cleaning solvents.

For use as carrier solvents		For use as cleaning solvents	
Product	Boiling Point	Product	Boiling Point
Novec 7100DL	61°C	Novec 7100	61°C
Novec 7200DL	76°C	Novec 7200	76°C
Novec 7300DL	98°C	Novec 71IPA	55°C
Novec 7500	128°C	Novec 72DA	44°C

Assistance from product to process: At 3M, we provide our customers with extensive product and process support, to help you evaluate and use our products. For assistance, please contact 3M customer service at 1-800-810-8513.

## The 3M Electronic Grade Coatings Portfolio

Moisture Chemical and Corrosion Protection	<b>3M™ Novec™ 1700 Electronic Grade Coating</b> A clear, low viscosity solution of a fluorochemical acrylate polymer coating in 3M™ Novec™ 7100DL Engineered Fluid.	<ul style="list-style-type: none"> <li>• Easy application and processing – dries in seconds, without the need for post-curing</li> <li>• Requires little or no masking</li> <li>• Is easily removed for rework and repair</li> <li>• Allows solder-through repairability</li> <li>• Protects steel, aluminum, composites and a variety of other surfaces from corrosion and moisture</li> </ul>
	<b>3M™ Novec™ 1702 Electronic Grade Coating</b> A lower solids content version of Novec 1700 coating.	<ul style="list-style-type: none"> <li>• Dries to an even thinner film and coats under low stand-off components</li> </ul>
	<b>3M™ Novec™ 2702 Electronic Grade Coating</b> A clear solution of a hybrid fluorochemical polymer, carried in 3M™ Novec™ 7200DL Engineered Fluid.	<ul style="list-style-type: none"> <li>• With post-curing, provides durable, permanent protection from moisture and corrosion</li> <li>• Withstands temperatures up to 200°C for prolonged periods without a loss in performance</li> </ul>
Easy Clean/Anti-Smudge	<b>3M™ Novec™ 1720 Electronic Grade Coating</b> A clear solution of a fluorosilane polymer carried in 3M™ Novec™ 7100DL Engineered Fluid.	<ul style="list-style-type: none"> <li>• With post-curing, covalently bonds to glass and metal oxide layers, forming an easy-clean protective layer</li> </ul>
	<b>3M™ Electronic Grade Coating 4880</b> A clear solution of a fluoropolymer carried in an alkoxysilane/ethanol solvent. Needs to be diluted before use with either Novec 7100DL, 7200DL, 7300DL or 7500 Engineered Fluid.	<ul style="list-style-type: none"> <li>• Provides a thicker coating for increased easy clean durability and ruggedness</li> <li>• Has a pleasing tactile feel while also reducing stick-slip friction on glass or metal surfaces</li> </ul>
Particle Suppression	<b>3M™ Novec™ 2788 Electronic Grade Coating</b> A yellow, low surface tension solution of a hybrid fluorochemical polymer carried in 3M™ Novec™ 7200DL Engineered Fluid.	<ul style="list-style-type: none"> <li>• Can significantly reduce the particles shed from substrates, and can be used to replace electroless nickel and e-coat on hard disk drive components</li> <li>• Contains a dye that can be used to inspect the coating under UV light after application</li> <li>• Clean – low outgassing and low extractable ions</li> <li>• Tapes and adhesives can adhere to the coating</li> </ul>

### Features of 3M Electronic Grade Coating

- **Protection**—provides protection by creating a thin layer which dries to a clear, uniform film
- **Excellent repellency**—coats all surfaces of a component, reducing surface energy and enabling exceptional repellency of moisture and particles
- **No masking required**—a thin layer can be applied to all contacts on a PCB without affecting functionality
- **Speed of application and manufacturing efficiencies**—Due to no requirement for masking contacts, and that the thin layer of applied coating dries quickly, processing time and labor costs can be reduced
- **Re-workable**—thin coatings can be reworked for fast and effective repairs
- **Environmental profile**—low environmental impact compared to alternative coating solutions delivered from hydrocarbon solvents
- **Health and safety profile**—3M Novec solutions are non-flammable and low in toxicity

**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, lubricant deposition and several specialty chemical applications.

3M™ Novec™ Engineered Fluids • 3M™ Novec™ Aerosol Cleaners • 3M™ Novec™ 1230 Fire Protection Fluid • 3M™ Novec™ Electronic Coatings • 3M™ Novec™ Electronic Surfactants

United States	China	Europe	Japan	Korea	Singapore	Taiwan
3M Electronics Markets Materials Division 800 810 8513	3M China Ltd. 86 21 6275 3535	3M Belgium N.V. 32 3 250 7521	Sumitomo 3M Limited 813 3709 8250	3M Korea Limited 82 2 3771 4114	3M Singapore Pte. Ltd. 65 64508888	3M Taiwan Limited 886 2 2704 9011

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