3M™ Novec™ 2702 Electronic Grade Coating

Introduction

3M™ Novec™ 2702 Electronic Grade Coating is a clear, low viscosity, low surface tension solution of a fluorochemical polymer coating carried in a hydrofluoroether solvent. Designed for moisture and corrosion protection of printed circuit boards and electronic components, it dries to a thin, transparent, permanent film with excellent hydrophobic and oleophobic properties. Easy to apply, the coating should be post-cured to provide added durability and abrasion resistance. It is non-flammable, low in toxicity, non-ozone depleting and RoHS compliant.

Construction

Solids	Solvent	Color	Container Size
2 wt% fluoropolymer	3M™ Novec™ 7200DL Engineered Fluid	Clear	2.8 gal (33 lb/15 kg), 1 gal (12 lb/5.4 kg)

Typical Physical Properties

Not for specification purposes. All values @ 25°C unless otherwise specified.

Property	Coating Solution
Appearance	Clear, colorless liquid solution
Solids	2 wt% fluoropolymer
Solvent	3M™ Novec™ 7200DL Engineered Fluid
Specific Gravity	1.43
Boiling Point of Solvent	76°C (168.8°F)
Flash Point	None
Environmental	Low in toxicity, non-ozone depleting, non-flammable, VOC exempt (US EPA), RoHS compliant, contains no chlorine or bromine
System	One Part

Property	Fluoropolymer Coating
Appearance	Transparent, colorless
Coating Thickness	100 nm - 1 µm (depending on application method)
Solvent and Chemical Resistance	Yes
T_g (glass transition temperature)	-63°C (-145.4°F)
Thermal Stability of Dry Film	Less than 5% weight loss after 1 hour at 200°C in air
Contact Angles (static, dip coated/dried on glass substrate)	105° (water), 65° (hexadecane)
Refractive Index	1.41
Shelf Life	2 years from date of manufacture in unopened container
Solder-Through Repairability	Yes
Nonflammability	Meets UL 94 V-0
Dielectric Constant @30% RH	3.45 (@ 10 Hz), 3.04 (@ 1 kHz), 2.61 (@ 1 MHz)
Dissipation Factor @30% RH	0.05 (@ 10 Hz), 0.04 (@ 1 kHz), 0.03 (@ 1 MHz)
Dielectric Breakdown Strength @20°C, 30% RH"	1500 V/mil (20°C, 30 %RH)

Features

- Low surface tension of the coating solution provides increased surface wetting, especially under low profile components
- Cross-links with a thermal cure for durable protection
- Contains no volatile organic compounds (VOCs) and has low global warming potential
- Can be applied to metals, glass or epoxy laminates
- Provides excellent repellency, anti-wetting and anti-sticking properties against liquids – water, hydrocarbons, silicones, and photoresists
- Is insoluble in solvents such as heptane, toluene and water
- Is thermally and electrically stable with excellent dielectric properties
- Covalently bonds to glass and metal oxide layers
- The polymer can endure up to 200°C for prolonged periods and maintain good repellency
- Has low surface energy which allows lubricating oils, silicones, etc. to bead and drain freely from coated surfaces

Application Ideas

- Provides excellent moisture, chemical and corrosion protection to printed circuit boards and their components
- Is an easy and cost effective alternative to conformal coatings
- Can be used as a durable hydrophobic or oleophobic surface treatment in many diverse applications
- Can serve as
  - an anti-stiction coating for liquid crystal displays, micromotors or MEMS (Micro Electronic Mechanical Systems) components
  - an anti-migration coating for displays, spindle motors or lubricated electronic parts or
  - an anti-corrosion coating for a variety of materials and components

Application Techniques

Can be dipped, sprayed or selectively deposited. Water should be kept out of coating bath as contact will decrease the pot life. Surfaces to be coated should be clean and dried before application. Masking may not be required for many connector types but testing is suggested. The solvent will evaporate quickly and the fluoropolymer film will dry in minutes. The coating should be thermally cured in an oven for best results.

Application Options	Dipping (preferred), spray, syringe dispense
Dilution	Can be diluted with 3M™ Novec™ 7200DL Engineered Fluid
Drying/Curing	Air dried in 30-90 seconds; Cure at 75-150°C for 30-90 minutes
Removability	Permanent once cured

Safety, Handling, Storage, Shelf Life

To avoid thermal decomposition, the coating solution should not be heated above 150°C (302°F) and the dried fluoropolymer film should not be heated to temperatures above 250°C (482°F). When stored under conditions of 16-27°C (60-80°F) and less than 60% R.H. in the original, unopened container, the shelf life is certified for two years. Before using this product, please read the current product Material Safety Data Sheet (available through your 3M sales or technical service representative or at www.3M.com/Novec) and the precautionary statement on the product package. Follow all applicable precautions and directions.

For Additional Information

To request additional product information or sales assistance, contact 3M Customer Service at one of the numbers below or visit www.3M.com/Novec. For other 3M global offices or information on other 3M products for electronics, visit our web site at 3M.com/electronics.

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 Grade 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 Ltd. 866 2 2704 9011

Product Use: All statements, technical information and recommendations contained in this document are based on tests or experience that 3M believes are reliable. However, many factors beyond 3M's control can affect the use and performance of a 3M product in a particular application, including conditions under which the product is used and the time and environmental conditions in which the product is expected to perform. Since these factors are uniquely within the user's knowledge and control, it is essential that the user evaluate the 3M product to determine whether it is fit for a particular purpose and suitable for the user's method of application.

Warranty and Limited Remedy: Unless stated otherwise in 3M's product literature, packaging inserts or product packaging for individual products, 3M warrants that each 3M product meets the applicable specifications at the time 3M ships the product. Individual products may have additional or different warranties as stated on product literature, package inserts or product packages. 3M MAKES NO OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO, ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR ANY IMPLIED WARRANTY ARISING OUT OF A COURSE OF DEALING, CUSTOM OR USAGE OF TRADE. User is responsible for determining whether the 3M product is fit for a particular purpose and suitable for user's application. If the 3M product is defective within the warranty period, your exclusive remedy and 3M's and seller's sole obligation will be, at 3M's option, to replace the product or refund the purchase price.

Limitation of Liability: Except where prohibited by law, 3M and seller will not be liable for any loss or damage arising from the 3M product, whether direct, indirect, special, incidental, or consequential regardless of the legal theory asserted, including warranty, contract, negligence or strict liability.

Electronics Markets Materials Division
3M Center, Building 224-3N-11
St. Paul, MN 55144-1000
www.3M.com/novec
1-800-810-8513

Please recycle. Printed in USA.
© 3M 2011. All rights reserved.
Issued: 6/11 7981HB
60-5002-0517-8

3M and Novec are trademarks of 3M Company.
Used under license by 3M subsidiaries and affiliates.