

3M™ Novec™ EGC-2702 Electronic Coating

Introduction

3M™ Novec™ EGC-2702 Electronic Coating is a clear, low viscosity, low surface tension solution of a fluorochemical polymer coating carried in a hydrofluoroether solvent. When applied to clean, moisture-free surfaces such as copper, epoxy laminates, aluminum, ceramic, steel, tin or glass, Novec EGC-2702 coating dries to a thin transparent film with excellent anti-wetting, anti-stiction, anti-migration, and anti-corrosion properties required in many diverse applications.

Novec EGC-2702 coating will form a clear, nearly invisible, uniform film that is insoluble in solvents such as heptane, toluene and water. The polymer covalently bonds to glass and metal oxide layers. These films can endure up to 200°C for prolonged periods and maintain good repellency. The solvent is non-flammable, low in toxicity and provides acceptable environmental properties for today's demanding electronics applications.

Typical Properties

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

Coating Solution	
Appearance	Clear, colorless to light-colored liquid solution
Solvent	3M™ Novec™ 7200 Engineered Fluid
Specific Gravity	1.43
Boiling Point of Solvent	76°C
Flash Point	None
Solids	2 wt% fluoropolymer
Environmental	Low in toxicity, non-ozone depleting, non-flammable, VOC exempt (US EPA)
One Part System	Yes
Fluoropolymer Coating	
Thermal Stability of Dry Film	Less than 5% wt. loss after 1 hr at 200°C in air
T _g (glass transition temperature)	-63°C
Contact Angles (static, dip coated/cured on glass)	105° (water), 65° (hexadecane)
Surface Energy	14-15 dynes/cm
Coating Thickness	100 nm - 1 µm depending on application
Refractive Index	1.41
Solvent and Chemical Resistant	Yes
Solder-Through Repairability	Yes
Transparent	Yes
Dielectric Constant	3.45 (at 10 Hz), 3.04 (at 1 kHz), 2.61 (at 1 MHz)
Dissipation Factor	0.05 (at 10 Hz), 0.04 (at 1 kHz), 0.03 (at 1 MHz)
Dielectric Breakdown Strength	1500 V/mil (20°C, 30% RH)

Advantages

The low surface energy films cast from Novec EGC-2702 coating have excellent repellency to hydrocarbon oils, silicone oils, synthetic fluids and aqueous solutions. With a surface energy of 14-15 dynes/cm, Novec EGC-2702 films compare favorably to coatings of polyethylene and polytetrafluoroethylene, which have surface energy values of approximately 31 and 18 dynes/cm respectively. This property enables non-solubilizing solvents such as heptane, toluene, and water as well as liquids having low surface tension values such as lubricating oils, silicones, etc. to bead and drain freely from surfaces coated with Novec EGC-2702 coating, while leaving the film intact. Novec EGC-2702 coatings exhibit many of the practical characteristics desired in a coating system, making them especially well-suited for many applications.

Application Recommendations

The low surface tension of the solvent in 3M™ Novec™ EGC-2702 Electronic Coating makes it well suited to application by dip coating equipment. The coating solution will wet out on virtually any surface, leaving the fluoropolymer film behind. Care should be taken to keep water out of the coating bath, as contact with water will decrease the pot life of the product. Assemblies dipped into a bath of Novec EGC-2702 coating, as with most coating solutions, should be clean and dry. Masking may not be required for many connector types, but testing is suggested. The coating may also be applied by precision spray equipment or precision syringe/pump equipment that is commonly used in the electronics manufacturing industry. The key is the ability to control the low viscosity of the solution. The solvent will evaporate quickly and the fluoropolymer film will dry in a matter of minutes, at which time it may be handled for further processing. Novec EGC-2702 coating should be thermally cured in an oven to get the best performance out of the product. Depending on the assembly, temperatures of 75-100 °C for durations of 30-90 minutes are generally sufficient to cure the product.

Application Options	Dipping is preferred but spraying, brushing and syringe dispense also work well
Dilution	EGC-2702 can be diluted to lower concentrations with 3M™ Novec™ 7200 Engineered Fluid
Drying/Curing	Dries in minutes. For best results the coating should be thermally cured following application

Product Safety & Handling

To avoid thermal decomposition, neither the coating solution nor the cured fluoropolymer should be subjected to temperatures above 250 °C.

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.

Resources

For additional technical information on Novec EGC-2702 coating, contact 3M Customer Service at one of the numbers below or visit www.3M.com/novec. For other 3M global offices, and information on additional 3M products for electronics industries, visit our web site at 3M.com/electronics.

The 3M™ Novec™ Brand Family

The Novec brand is the hallmark for a variety of patented 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

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