3M
Novec™
Brand

# 3M™ Novec™ 2708 Electronic Grade Coating

## Introduction

3M™ Novec™ 2708 Electronic Grade Coating is a single component fluorinated polymer diluted in 3M™ Novec™ 7200 Engineered Fluid, a segregated hydrofluoroether solvent, providing a low viscosity, low surface tension coating solution. Designed for moisture and corrosion protection of printed circuit boards and electronic components, it dries to an ultrathin, transparent coating with excellent hydrophobic and oleophobic properties. It does not need curing and is easy to apply. Novec 2708 coating is non-flammable, non-ozone-depleting, low in toxicity, low in GWP, RoHS compliant and is low VOC.* The coating contains a yellow-orange dye that is built into the polymer and designed to fluoresce under UV light to aid the inspection of the coating and quality control of the coating process.

## Construction

| Solids | Solvent | Color | Container Size |
|---|---|---|---|
| 8.0 wt% fluorinated polymer | 3M™ Novec™ 7200 Engineered Fluid and <5% of PGMEA | Yellow-Orange | 1 gal (11 lbs/5 kg) |

## Table 1: Typical physical properties

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

| Properties | Coating Solution |
|---|---|
| Appearance | Transparent, yellow-orange, liquid solution |
| Solids | 8.0 wt% fluorinated polymer |
| Solvent | 3M™ Novec™ 7200 Engineered Fluid and <5% of PGMEA |
| Density | 1.4 g/ml @ 23°C |
| Viscosity | 4.9 cP |
| Boiling Point per ASTM D1120-94 | 79°C (174°F) |
| Flash Point | None (per closed cup method) |
| Environmental | Low in toxicity, low in GWP, non-ozone depleting, non-flammable, low VOC,* RoHS compliant, contains no chlorine or bromine |
| Shelf Life | Two years from date of manufacture in original unopened package |

*The U.S. EPA defines a VOC as "any compound of carbon, excluding carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates and ammonium carbonate, which participates in atmospheric photochemical reactions, except those designated by EPA as having negligible photochemical reactivity." 3M™ Novec™ 7200 Engineered Fluid is VOC exempt per the U.S. EPA. PGMEA is <5% of the solvent. PGMEA is VOC per the U.S. EPA.

## Table 2: Typical physical properties

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

| Properties | Fluorinated Polymer Coating |
|---|---|
| Appearance | Transparent, light yellow to orange (depending on thickness) |
| Coating Thickness | 0.4 - 5.0 microns (depending on application method) |
| Solvent and Chemical Resistance | Resists a variety of solvents and chemicals. Dissolves in acetone. |
| Tg (Glass Transition Temperature) | 53°C (127°F) |
| Thermal Stability of Dry Film MIL-B-81744A | Repellent to chlorinated silicone oil after 24 hours at 175°C |
| Contact Angles (Static, Dip Coated/Dried on Glass Substrate) | 105° (water), 65° (hexadecane) |
| Refractive Index | 1.38 |
| Solder-Through Repairability | Yes (see SDS for thermal decomposition products) |
| Non-Flammable | Meets UL 94 V-0 |
| Coefficient of Thermal Expansion - TMA | 88 µm/(m-°C) |
| Thermal Conductivity | 0.1 W/m*K |
| Dielectric Constant @30% RH per ASTM D150 | 3.2 (@1kHz) |
| Dissipation Factor @30% RH per ASTM D150 | 0.001 (@1kHz) |
| Dielectric Breakdown Strength @20°C, 30% RH per ASTM D149 | 2500 V/mil |

*Measured contact angles can vary based on the type of surface, surface roughness and the application method.

## Features

- Designed for moisture and corrosion protection of printed circuit boards and electronic components
- Is UV (ultra violet) light detectable for easy identification of coating and quality control
- Low surface energy allows lubricating oils, silicones, photoresist solutions, etc. to bead and drain freely from coated surfaces
- Helps provide repellency and anti-wetting properties against liquids – water, hydrocarbons, silicones and photoresists
- Helps protect against corrosive gases and vapors in addition to liquids
- The polymer can endure up to 175°C for 24 hours and maintain repellency
- Essentially insoluble in solvents such as heptanes, toluene and water
- Adheres to a variety of materials (metals, glass, ceramics, polymers, composites, laminates)
- Thermally and electrically stable with good dielectric properties
- Easy to apply – dries quickly without the need for post-application curing
- Excellent surface wetting, especially under low standoff SMT components
- Allows solder-through repairability
- Non-flammable, non-ozone-depleting, and low in toxicity
- Low in global warming potential (GWP), RoHS compliant and and contains less than 5% volatile organic components (VOCs)*

## Applications

Helps provide:

- Moisture, chemical and corrosion protection for printed circuit boards and their components
- An easy and cost-effective alternative to conformal coatings
- Anti-wetting, anti-stiction, anti-migration and anti-corrosion properties in many diverse applications

Can serve as:

- Anti-migration coating for displays, spindle motors or lubricated electronic parts
- Anti-corrosion coating for a variety of materials and components

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## Application techniques

Coating can be applied by dip, brush or selectively deposited as per the safety and handling requirements stated in the Safety Data Sheet (SDS). Water should be kept out of coating bath as contact will interfere with coating deposition. Surfaces to be coated should be clean and dry before application. Masking may not be required for larger connector types, but testing is always suggested. The solvent will evaporate quickly, and the fluorinated polymer film will dry in minutes.

| | |
|---|---|
| Application Options | Spray, dip, brush and selective dispense |
| Dilution | Can be diluted with 3M™ Novec™ 7200 Engineered Fluid |
| Drying/Curing | Dries at room temperature; can be handled in under two minutes |
| Removability | 3M™ Novec™ 72DA Engineered Fluid (preferred) or removable with Novec 7200 Engineered Fluid |

## Safety, handling, storage and shelf life

To avoid thermal decomposition, the coating solution should not be heated above 150°C (302°F), and the dried fluorinated polymer should not be heated to temperatures above 225°C (437°F), which, in general, is lower than the onset of thermal degradation under TGA test conditions. See SDS for thermal degradation products. 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 from the date of manufacture. Before using this product, please read the current product 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. Always practice smart and safe industrial hygiene practices. Do not spray apply without proper ventilation and/or personal protective equipment (PPE).

## Resources

For more information on 3M Novec products or to contact a 3M representative, visit **3M.com/Novec**.

**Smart. Safe. Sustainable.**

## 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 smart, safe and 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™ Insulating Gases

**Safety Data Sheet:** Consult Safety Data Sheet before use.

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

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