



Technical Data Sheet

NVOC Non-VOC Conformal Coating - Aerosol

Product Description

NVOC has been specifically designed to eliminate the use of volatile organic solvents in the conformal coating process. It has been tested to many important standards recognised in the electronics industry, proving that NVOC is a viable and unique alternative to many standard solvent based conformal coatings. NVOC is a flexible, moisture cure, conformal coating based on polyurethane technology for the protection of electronic circuitry. It has been designed for a wide range of application requirements, including aerosol, manual and selective spray as well as brush and dip applications.

NVOC offers many environmental and user benefits, such as greater coverage, less waste, no solvent emissions upon cure and no expensive curing equipment is required. The aerosol version utilises a propellant which also offers many environmental benefits over alternative technologies. The propellant is 100% ozone friendly, with an Ozone Depleting Potential (ODP) of zero. It also has a negligible Global Warming Potential (GWP) of <5, which is extremely low in comparison with alternative propellants with GWP >1000.

Features

- Very low vapour pressure
- Negligible global warming potential (GWP <5)
- Excellent adhesion to a wide variety of substrates
- Wide operating temperature range
- Resistant to mould growth
- Excellent solvent resistance
- Cured coating can be removed with Electrolube Remover Gel (DRG)
- Contains a UV trace for ease of inspection

Approvals

RoHS Compliant (2002/95/EC):

IPC-CC-830B:

IEC 61086:

UL94 Vertical Burning Tests:

Yes

Meets Approval

Meets Approval

Meets V-0

Liquid Properties

Appearance:

Specific Gravity (Density) @ 20°C:

Vapour Pressure (Calculated):

Solids content:

Flash Point (Closed Cup):

Coverage per 200ml Aerosol @ 25µm:

Shelf Life @ 20-25°C:

Amber Liquid

1.12 g/ml

< 0.01 kPa (Concentrate)

100%

>200°C (Concentrate)

Approx. 2.2m²

12 months

Curing	Touch Dry: (Humidity Dependent)	80-90 minutes @ 20°C 30 minutes @ 60°C 20 minutes @ 80°C
	Full Cure:	36 hours @ 20°C
	Recommended Touch Dry Time:	10 minutes @ 30°C, ~70% RH Followed by 10-15 minutes @ 80°C
	Recommended Full Cure Time:	10 minutes @ 30°C, ~70% RH Followed by 2 hours @ 80°C

Dry Film Coating	Colour:	Light Amber
	Operating Temperature Range:	-60°C to +125°C
	Extended (Short Term) Temperature Range:	-70°C to +150°C
	Pencil Hardness:	7H
	Flammability:	Meets UL94 V-0
	Adhesion (BS EN ISO 2409):	
	➤ FR4	Class 0
	➤ Copper	Class 0
	➤ Solder Resist (Probimer 65)	Class 0
	Thermal Cycling (IEC-61086):	Meets Approval
Surface Insulation Resistance:	>1 x 10 ¹³	
Moisture Resistance (IEC 61086):	>10 ¹² (Meets Approval)	
Salt Mist Testing (IEC 61086) :	>10 ¹² (Meets Approval)	
Dielectric Strength (ASTM D149):	60kV/mm	
Dielectric Constant @ 100 Hz (ASTM D150):	2.98	
Dissipation Factor @ 100 Hz (ASTM D150):	0.026	
Surface Resistivity (ASTM D257):	1 x 10 ¹⁶ Ω @ 70µm thickness	
CTI (BS EN 60112:2003) :	>400V, PLC Grade 1	

<u>Packing</u>	<u>Description</u>	<u>Order Code</u>	<u>Shelf Life</u>
NVOC Conformal Coating	200ml Aerosol	ENVOC200H	12 Months
	5 Litre Bulk	ENVOC05L	12 Months
NVOC High Viscosity Coating	5 Litre Bulk	ENVOC-HV05L	12 Months
NVOC Thixotropic Gel	1 Litre Bulk	ENVOC-G01L	12 Months
NVMC Machine Cleaner	5 Litre Bulk	ENVMC05L	48 Months
Coating Remover	1 Litre Bulk	DRG01L	36 Months

Directions for Use

NVOC aerosol is supplied in a ready to use 200ml aerosol can for manual application. Thickness will be operator dependant and an approximate 20% reduction should be assumed upon cure. This is due to the release of carbon dioxide as part of the reaction process. Therefore, if a 25µm dry thickness is required, approximately 30µm wet thickness of coating should be applied.

NVOC is a moisture cure coating. Therefore low humidity levels will result in delayed touch dry and full cure times. Relative humidity above 60% is advised and for optimum properties to be achieved the recommended cure schedule, as detailed above, should be followed. This is particularly true for solvent resistance and electrical properties as superior performance will be noted if a heat cure process is utilised.

Substrates should be thoroughly cleaned before coating. This is required to ensure that satisfactory adhesion to the substrate is achieved. Also, all flux residues must be removed as they may become corrosive if left on the PCB. Electrolube manufacture a range of cleaning products using both hydrocarbon solvent and aqueous technology. Electrolube cleaning products produce results within Military specification.

Please refer to the material safety data sheet for health and safety information.

Spraying - Aerosol

When applying NVOC in aerosol form care must be taken to ensure the can is not shaken before use. Shaking the can will introduce excessive air bubbles and will give a poor coating finish.

The can should be held at 45°, and 200mm from the substrate to be coated. The valve should then be depressed when the can is pointing slightly off target and moved at about 100mm / second across the target. To ensure the best coating results are achieved try to use a smooth sweeping motion with small overlap for successive rows. To ensure penetration of the coating beneath the components and in confined spaces, spray the assembly from all directions to give an even coating.

Immediately after use, the can should be inverted and sprayed until only propellant is dispensed. This is to clear the valve and actuator after use and prevent blocking. Additional actuators are supplied with each aerosol should the original need replacing during the life of the product.

Drying

NVOC can be dried at room temperature or accelerated via drying in either a convection or IR oven. A typical IR profile with the PCB set to a constant temperature of 80°C will achieve an initial cure time of approximately 30 minutes. Increasing the humidity of the surrounding area will also reduce the cure time of the coating however wetting humidity (>95%RH) is not advised.

Atmospheric humidity is generally acceptable for the curing of NVOC however in the case of very dry conditions a humidity generator should be used. This can be an enclosed container with adjustable %RH or alternatively, placing a beaker of hot deionised water in the bottom of a drying cabinet or oven should be sufficient. For more information or help with the application of any of the materials in the NVOC range, please contact Electrolube.

Cleaning

Electrolube's NVMC has been designed as a suitable cleaner for use with NVOC. Equipment and surfaces can be cleaned with NVMC where applicable. Water-based cleaners should not be used in conjunction with the coating however PCB cleaning using water-based products is acceptable providing that surfaces are clean and dry before application of the coating.

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Electrolube cannot be held responsible for the performance of its products within any application determined by the customer, who must satisfy themselves as to the suitability of the product.