

MP313C

MP313C is a one component, air-drying solvent-based varnish. MP313C has been designed for application by dipping. Best results will be obtained by use of PCB dipping machine. Coating of suitable, even thickness requires a slow steady withdrawal from the dipping bath - thus difficult to achieve by hand dipping. If the PCB has a number of large standoff units this may necessitate a draining step in the dipping cycle. The thickness of varnish applied may be varied with the limits by altering the speed of withdrawal from the bath - the slower the withdrawal, the thinner the coat. Attempting to apply too thick a coat in one stage may result in sagging or wrinkling. If a thick coat is required, this is best achieved via two thin coats - the first coat must be thoroughly cured before the second is applied. In all cases before the application of the coating thorough cleaning and drying is essential. Immediately before PCB assemblies are conformally coated all flux residues and other surface contaminants should be removed. If practicable, a cleanliness level better than $1.5\mu\text{gNaCl}/\text{cm}^2$ salt weight equivalents should be achieved. The material will dry to give a tough hard-working insulating varnish when cured at room temperature; however, superior properties will be obtained if cured at elevated temperatures. A suggested cure schedule is 8 hours @ 80°C. This material is normally supplied at a dilution that should give a coating thickness in the region of $35\mu\text{m}$, however this can be altered by changes to application procedures. In some applications thinning of the material may be required e.g. spraying. In such instances TS109 Thinners should be used.

NOTE: To avoid dispersion of MP313C as an aerosol (i.e. fine spraying or mist) in the workroom atmosphere, spraying application should not be carried out except in a properly equipped spraying booth.

Key Properties

- Operating temperature range -50 to $+130^\circ\text{C}$
- Fast room temperature drying
- Contains UV trace and antifungal agents
- Excellent adhesion to a wide variety of substrates
- Excellent resistance to mould growth, ultra violet light, prolonged exposure to tropical life and salt spray.
- Excellent dielectric properties at all frequencies
- Can be soldered through without fear of toxic gases being produced, e.g. isocyanate
- Non-corrosive to Cadmium and Zinc plate (contains no Phenol)

Typical Properties

| Test | Result | Unit |
|----------------------------------|---------------------------------------|------------------|
| Colour | Amber | |
| Non-volatile Content | 40 | % |
| Viscosity (@ 20°C) | 150-250 | MPa.s |
| Specific gravity (@ 20°C) | 0.91 | |
| Flash point (closed cup) | 4.5 | °C |
| Dielectric Strength | 90 | kV/mm |
| Dielectric Constant (@ 20°C) | 2.5 | 100Hz |
| Dissipation factor (@ 20°C) | 0.028 | 100Hz |
| Volume Resistivity | 1×10^{15} | ohm.cm |
| Insulation resistance | 1×10^{12} | ohms |
| Temperature range | -60 to $+160$ | °C |
| Drying time (@ 25°C) | 20-30 | Minutes |
| Coating Thickness | 1 coat = 25 – 45 2 coats = 50 – 90 | micron micron |
| Flow cup viscosity (No 4 @ 20°C) | 55 ± 10 | Seconds |

Contact: Technical Support on 01793 823741 or support@robnor.co.uk for details.

Drying times and curing conditions

| Temperature | Touch dry time (minutes) | Initial cure time (minutes) | Full Cure time (hours) | Post cure* (hours) |
|-------------|--------------------------|-----------------------------|------------------------|--------------------|
| 20°C | <20 minutes | 60 minutes | 24 hours | - |
| 60°C | 5 minutes | 20 minutes | 12 hours | - |
| 80°C | 3 minutes | 5 minutes | 4 hours | 12 hours |
| 100°C | - | - | 2 hours | 6 hours |
| 120°C | - | - | 1 hour | 3 hours |

For maximum performance and chemical resistance a post cure is recommended. In general the higher the post cure temperature the greater the chemical resistance. The above times will vary dependant on coating thickness, humidity and component density and are given as a guide only.

Processing

MP313C can be dipped, sprayed or brushed. The thickness of the coating depends on the method of application, but a dip coater normally deposits a film thickness of about 25 microns (single coat). Workshop temperatures of less than 16°C or relative humidity in excess of 75% are unsuitable for the coating. MP313C contains a UV trace that allows inspection of the PCB after coating to ensure complete and even coverage. The stronger the reflected light, the thicker the coating layer.

PCB Cleanliness

It is essential that the PCB is thoroughly cleaned and dry before coating to ensure maximum adhesion and coating performance. No clean flux residues must also be removed as they inhibit adhesion of the coating.

Dilution

MP313C is supplied ready use for dipping or brushing. During extended open times some solvent loss will be experienced and this will increase the viscosity and coating thickness. The solvent loss can be recovered by adding TS109 thinners. The TS109 thinners is normally added at increments of approximately 10% by volume until the desired viscosity is achieved. After blending with TS109 thinners the product should be allowed to stand for approximately 10 minutes or until all bubbles have been dispersed.

Viscosity Control

The viscosity should be checked using a viscosity meter or "flow cup". Another method of controlling the viscosity is by measuring the cured coating thickness on a glass slide.

Dip Coating

The board assemblies should be immersed in the dipping tank in the vertical position, or at an angle as close to vertical as possible. Connectors should not be immersed in the liquid unless they are very carefully masked. Leave the PCB submerged until the air bubbles have dispersed. The board or boards should then be withdrawn **VERY SLOWLY** so that an even film covers the surface. After withdrawing, the boards should be left to drain over the tank until the majority of residual coating has left the surface. After the draining operation is complete, the boards should be placed in an air-circulating drying cabinet and left to dry for 2 hours at room temperature prior to any heat curing.

Brushing

Gently apply the coating with a good quality brush so as not to leave brush marks and so that the components and wiring are not disturbed. When the brushing operation is complete the boards should be placed in an air-circulating drying cabinet and left to dry for 30 minutes at room temperature prior to heat curing.

Spraying

To spray MP313C the material must be diluted with 2-parts TS109. Once modified with solvent the material will be suitable for use in manual spray guns and computer controlled airless spray equipment that only coats the required areas of the PCB, eliminating the need for masking. The nozzle of the spray gun requires to be selected to give an even spray to suit the prevailing viscosity of the coating material.

The normal spray gun pressure required is $27.6 \times 10^6 \text{ kN/m}^2$ to $34.5 \times 10^6 \text{ kN/m}^2$ (40 –50lbs/sq. inch).

To ensure penetration of the coating beneath the components and in confined spaces, spray the assembly from all directions to give an even coating.

Double Coating

Coatings by their nature do not give 100% protection and contamination, poor coating and surface tension on components may lead to microscopic 'pin holes' in the coating. In most cases two coats are not usually required if the board is clean and the coating operation is controlled adequately. Two coats will generally give a greater degree of protection as the second layer can mask 'pin holes' created in the first coating layer and thus give greater protection. However, if two coats are required, the second coating should be applied within 30 minutes of the first to ensure that the two coats will bond satisfactorily.

Plastic Compatibility

Please note the solvent system in MP313C may affect components containing polystyrene and polycarbonate.

Approvals

| | |
|----------------------------|-----|
| RoHS compliant | Yes |
| DEF STAN 59/47 | Yes |
| UL94-V0 | No |
| REACH (SVHC concentration) | 0% |

Availability

Available through distribution www.resins-online.com and sales@robnor.co.uk

Part Numbers

MP313C/NC/1LT
MP313C/NC/5LT

Storage and Shelf Life

Material stored in the original unopened containers under cool dry condition between 10 and 25°C will have a shelf life of 18 months.

Once used the containers must be kept sealed to prevent effects from water, air or contaminants.

Health and Safety

May cause sensitisation by skin contact or inhalation. It is therefore strongly recommended that skin and eye contact is avoided by the using of appropriate personal protective equipment such as gloves, safety glasses or goggles and overalls. Wash any contamination from the skin immediately and thoroughly and do not eat, smoke or drink in the working vicinity. Under normal working conditions a good source of ventilation is adequate, however if the material is heated, or where vapour levels are likely to exceed the occupational exposure limits appropriate respiratory protection must be worn. Local exhaust ventilation (LEV) may be required where large volumes of material are curing. The above is given as a guide only; Please refer to MP313C Health and Safety data or our Technical Service Department for individual/specific advice.

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