# Technical Data Sheet

# TFA
# Toluene Free Acrylic Coating

## Product Description

TFA is a flexible and transparent acrylic conformal coating for the protection of electronic circuitry. It has been formulated to meet many of today's commercial applications, meeting both Military and IPC standards. TFA is available as bulk product for application by dipping, brushing or spraying and also in an aerosol.

## Features

- UL approved, toluene free product.
- Fluoresces under UV light for ease of inspection.
- Wide operating temperature range.
- Excellent Dielectric properties
- Can be soldered through without fear of highly toxic gases being produced (contains no isocyanates).
- Non-corrosive to Cadmium and Zinc plate (contains no phenols).
- Resistant to mould growth.
- Cured coating can be removed with Electrolube Ultrasolve (ULS).

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| **Approvals:** | **IPC-CC-830** | **Approved** |
| | **MIL Approval (MIL-1-46058C):** | **Meets approval** |
| | **UL746** | **Approved File Number E138403** |
| | **RoHS Compliant (2002/95/EC):** | **Yes** |
| **Liquid Properties:** | Appearance: | Pale Coloured Liquid |
| | Specific Gravity (Density) @ 20°C: | 0.92 (Bulk), 0.78 (Aerosol) g/ml |
| | VOC Content: | 64% (Bulk), 85% (Aerosol) |
| | Flash Point: | -7°C (Bulk), -4°C (Aerosol) |
| | Solids content: | 36% (Bulk), 15% (Aerosol) |
| | Viscosity @ 20°C: | 260 Centipoise (bulk) |
| | Touch Dry: | 15-20 minutes. |
| | Recommended Drying Time: | 24 Hours @ 20°C<br>4 Hours @ 60°C<br>2 Hours @ 90°C |
| | Coverage @ 25µm: | 14 $m^2$ per litre, 2.4 $m^2$ (200ml Aerosol) |
| **Dry Film Coating:** | Colour: | Colourless |
| | Operating Temperature Range: | -65°C to +125°C |
| | Flammability: | UL94 V-1 |
| | Thermal Cycling (MIL-1-46058C): | Meets approval |
| | Coefficient of Expansion: | 130ppm |
| | Dielectric Strength: | 45 kV/mm |
| | Dielectric Constant: | 2.5 |

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| Insulation Resistance: | 1 x $10^{15}$ Ohms/cm (DEF-STAN 59/47) |
| Comparative Tracking Index | >300 Volts |
| Dissipation Factor @ 1MHz @ 25°C | 0.01 |
| Moisture Resistance (MIL-1-46058C): | Meets approval |

| Description | **Packaging** | **Order Code** | **Shelf Life** |
|---|---|---|---|
| TFA Conformal Coating | 5 Litre | ETFA05L | 48 Months |
| | 200ml Aerosol | ETFA200H | 36 Months |
| Conformal Coating Thinners | 5 Litre | DCT05L | 72 Months |
| Removal Solvent | 200ml Aerosol | ULS200D | 36 Months |
| | 400ml Aerosol | ULS400D | 36 Months |
| | 1 Litre Bulk | ULS01L | 72 Months |
| | 5 Litre Bulk | ULS05L | 72 Months |
| | 25 Litre Bulk | ULS25L | 72 Months |

## Directions For Use

TFA can be sprayed, dipped or brushed. The thickness of the coating depends on the method of application (typically 25 microns). Temperatures of less than 16°C or relative humidity in excess of 75% are unsuitable for its application. As is the case for all solvent based conformal coatings, adequate extraction should be used (refer to MSDS for further information).

Substrates should be thoroughly cleaned before coating. This is required to ensure that satisfactory adhesion to the substrate is achieved and to prevent flux residues causing corrosion on the PCB. Electrolube manufacture a range of cleaning products using both hydrocarbon solvent and aqueous technology, which all produce results within Military specification.

## Spraying – Bulk

TFA needs to be diluted with the appropriate thinners (DCT) before spraying. The optimum viscosity to give coating quality and thickness depends on the spray equipment and conditions, but normally a dilution ratio of 1:1 to 2:1 (Coating to DCT) is required. Suitable spray viscosity is typically 50-80 centipoise. If bulk coating material has been agitated, allow to stand until air bubbles have dispersed before use.

TFA is suitable both for use in manual spray guns and selective coating equipment. The selected nozzle should enable a suitable even spray to be applied in addition to suiting the prevailing viscosity. The normal spray gun pressure required is 275 to 413kPa (40 – 60 lbs/sq.inch). After spraying, the boards should be placed in an air-circulating drying cabinet and left to dry.

## Spraying - Aerosol

When applying TFA 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. After spraying, the boards should be placed in an air-circulating drying cabinet and left to dry.

## Dip Coating

TFA has been formulated to a suitable viscosity for dip coating (200 – 300cps @ 20°C). Ensure that the coating material in the container has been agitated thoroughly and has been allowed to stand for at least 2 hours for all the air bubbles to disperse before use. The coating material should be checked periodically using a viscosity meter or "flow cup" and DCT added as required, to replace the solvent lost by evaporation and maintain the viscosity.

The board assemblies should be immersed in the dipping tank in the vertical position, or at an angle as close to the vertical as possible. Connectors should not be immersed in the liquid unless they are very carefully masked. Electrolube Peelable Coating Mask (PCS) is ideal for this application. Leave submerged for approximately 10 seconds until the air bubbles have dispersed. The board or boards should then be withdrawn slowly (1 to 2 Seconds / mm) so that an even film covers the surface. After withdrawing, the boards should be left to drain over the tank or drip tray 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.

## Brushing

Ensure that the coating material has been agitated thoroughly and has been allowed to settle for at least 2 hours at ambient temperature. When the brushing operation is complete the boards should be placed in an air-circulating drying cabinet and left to dry.

## Inspection

**TFA** contains a UV trace, which allows inspection of the PCB after coating to ensure complete and even coverage. The stronger the reflected UV light, the thicker the coating layer is.