



Future Coat Technology

ELECROCLAD M180

Introduction

ELECROCLAD M180 is a cathode Electro Deposited (ED) polymer system from the ELECROCLAD Coatings range of ED decorative and functional coating technologies, which are environmentally friendly.

The product utilises proven ELECROCLAD Coatings Polyurethane/Acrylic based chemistry for maximum durability and stability, but offers the user superior resistance to aggressive acidic / perspiration environments through advanced polymer engineering and improved solvent resistance.

When fully cured the product becomes a tough polyurethane system with excellent hardness, Ultra Violet (UV), solvent and wear resistance in addition to chemical resistance to both acid and alkali environments. The product gives a smooth even coating with enhanced gloss.

The product comes as 60% wt/wt solids concentrate which is then “let down” with demineralised water to form a stable emulsion operating at around 10% wt/wt solids. The product offers flexibility in that when combined with ELECROCLAD Coatings dyes attractive transparent metallic finishes in a wide variety of metal substrates are possible.

Features & Benefits

<u>Product Differentiation</u>	<u>Features</u>	<u>Benefits</u>
Superior chemical resistance	Perspiration resistant	Suitable for demanding environments
Excellent UV stability	Fade resistant	Passes current industry demands
Good emulsion stability	Consistency	Reduced maintenance and improved product life
Excellent film clarity	Bright coatings	Improved substrate appearance
Low cream coat results	Improved rinsing	Consistent finishing
Enhanced solvent resistance	Resistant to cleaning preparations, methylated spirits etc Passes over 1000 rubs with acetone	Gives excellent performance in domestic, office and industrial environments
Lower solids content	Low solids operational range	Reduces installation costs & capital tie up by approx. 20%

MAKE UP PROCEDURES

Equipment required : Mechanical mixing is strongly recommended to provide a consistent emulsion.

Emulsification procedure : After weighing out the required amount of concentrate, slowly add (letting down with) de-mineralized water (<10 micro Siemens) with thorough mixing.

Initially the concentrate will become more viscous until the inversion point is reached.

At this point the rate at which water is added can be increased. If the system is to incorporate dyes or pigments these **must** be added to the concentrate system and thoroughly mixed prior to “letting down”.

Make up for 100 litres at 10% wt/wt emulsion solids content is as follows:

Material	Quantity (Kg)
ELECTROCLAD M180	20
Demineralised Water	80

On make up the emulsion should ideally be allowed to reach equilibrium prior to use. This is more important for large volumes and normally equilibrium is reached in 12 to 14 hours. If necessary however the bath can be used within one hour of makeup.

Product Working Bath Specification

Parameter	Typical Working Range
Solids Content wt/wt	10 – 12 %
MEQ @ 10% wt/wt solids	40 – 55
Electroclad Solvent M	2.5 – 5.0 %
Temperature °C	15 – 30 °C
Conductivity - μS	300 – 600μS
Coulombic Efficiency - mg/C	25
Peak Current A/M ²	27
Mean Current A/M ²	6.8

Curing Temperature and Time

Temperature

160C

Time

25 – 30 minutes

Equipment Considerations

Tank Material	Polypropylene
Agitation	Solution movement is important, ensuring good weiring characteristics without excessive solution turbulence.
Tank Design	Solution weiring is recommended with heating & cooling contained within the permeate section or the weir compartment. UF UNIT must be fitted as part of the coating system.
Filtration	In addition to UF UNIT, 1μm absolute particle filtration is recommended except for pigmented processes

Anodes	316 Stainless Steel (Polished)
Anode / Cathode Area	1:1 Nominal (dependent on application)
Anode Cathode Distance	100 mm (Minimum)
Power Unit	Constant volt and / or constant current power are required capable of delivering 30 - 70 volts minimum. The current capacity will depend on the surface area. Under constant current conditions typical current densities of 0.05 – 0.1 A dm ⁻² are required.
Environment Considerations	In the emulsion state the process may be considered non-hazardous. Normal dust free environments are required. Positive pressure rooms are beneficial. Circulating air stoving ovens should be externally vented with the inlet filtered to remove airborne particles and dust.

Typical characteristics at 15 – 25 microns film thickness.

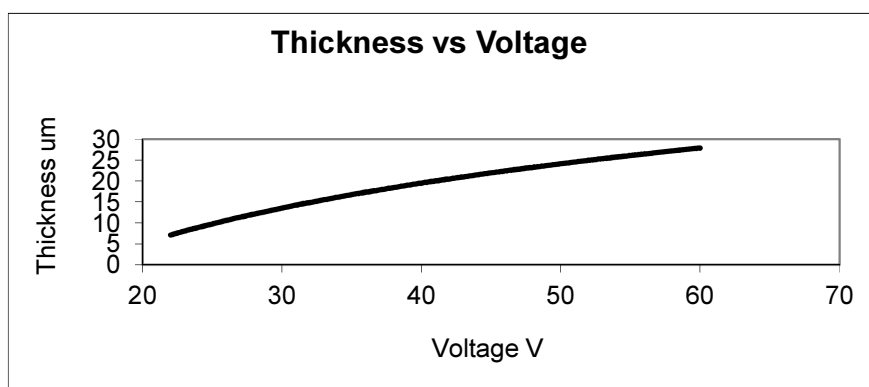
<u>Test</u>	<u>Rating</u>
Pencil Hardness	5H +
Cure	Passes 1000 double rubs acetone when fully cured
Perspiration resistance	4 cycles + (4 cycles is a pass)
Scratch resistance	Passes 2.0 Kgs. (BS3900 relevant part)
Abrasion resistance (ASTM)	30 Litres/mil
Dry adhesion	100%
Corrosion resistance (salt spray)	200 – 2000 hours depending on substrate and pre-treatment.

Coating Performance

<u>Applied Voltage</u>	<u>Time</u>	<u>Thickness</u>
40 Volts	60 Seconds	14 – 18 μm
50 Volts	60 Seconds	20 – 24 μm

The increase in coating thickness with increased voltage is shown below:-

With approximately a thickness of 20 μm , at 40 Volts for 2 minutes.



Thickness variation can be controlled within 20% at 10 μm , to 10% at 20 μm with appropriate control of the system.

Material Consumption at 100% Efficiency

1 Kg of 55% concentrate will cover 55 M^2 at a thickness of 10 μm . Typical efficiencies in larger installations exceed 97% using UF unit.

Health & Safety Precautions in Handling and Use

Before using this product refer to the material safety data sheet for detailed safety, handling, storage and waste disposal information.

Ovens used for stoving should have the appropriate air extraction. This allows for any Volatile Organic Components (VOC'S) released to be removed from operator contact.

Avoid inhalation of vapour, particles and spray mist. Ensure adequate local fume extraction and good general ventilation. Contact with eyes and skin should be strictly avoided. Protective clothing and eye protection should be used.

Please contact your local water authority/company prior to any effluent discharge.

During normal operation of ELECROCLAD Coatings M180 processes very low levels of solvents are discharged via permeate dumping. Since the process can operate at very high material usage efficiencies solids will not normally enter the effluent stream.

ELECROCLAD M180 SOLIDS CONTENT BY WEIGHT %

VS REFRACTOMETER READING (BRIX)

