

# PLATING PRODUCTS IND PVT LTD

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CIN No.: U24303MH2021PTC371241

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## Technical Data Sheet

Version: 05

### PP 2700

PP 2700 is a cathodically **Electro Deposited (ED)** polymer system from the **Plating Products** range of ED decorative and functional coating technologies, which are environmentally friendly.

The product utilises proven **Plating Products** Polyurethane 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 50% 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 **Plating Products** 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 very 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

<u>Product Differentiation</u>	<u>Features</u>	<u>Benefits</u>
Enhanced solvent resistance	Resistant to cleaning preparations, methylated spirits etc Passes over 2000 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

- :
1. Into a clean, dry container, add 20kg of PP 2700.
  2. Add 80 litres of de-ionised water and begin agitation with a suitable propeller mixer.
  3. Continue mixing for 20 minutes to obtain a completely homogenous mixture.
  4. Transfer to coating bath
  5. Allow the working solution to reach an equilibrium by circulating through a 1 micron filter for 24-48 hours.

**NB. PP 2700 differs from other products in that it should not be diluted slowly with water as is more commonly done. The emulsification process occurs more effectively by following the above procedure.**

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

Material	Quantity (Kg)
<b>PP 2700</b>	20
Demineralised Water	80

### Supply Form Specification

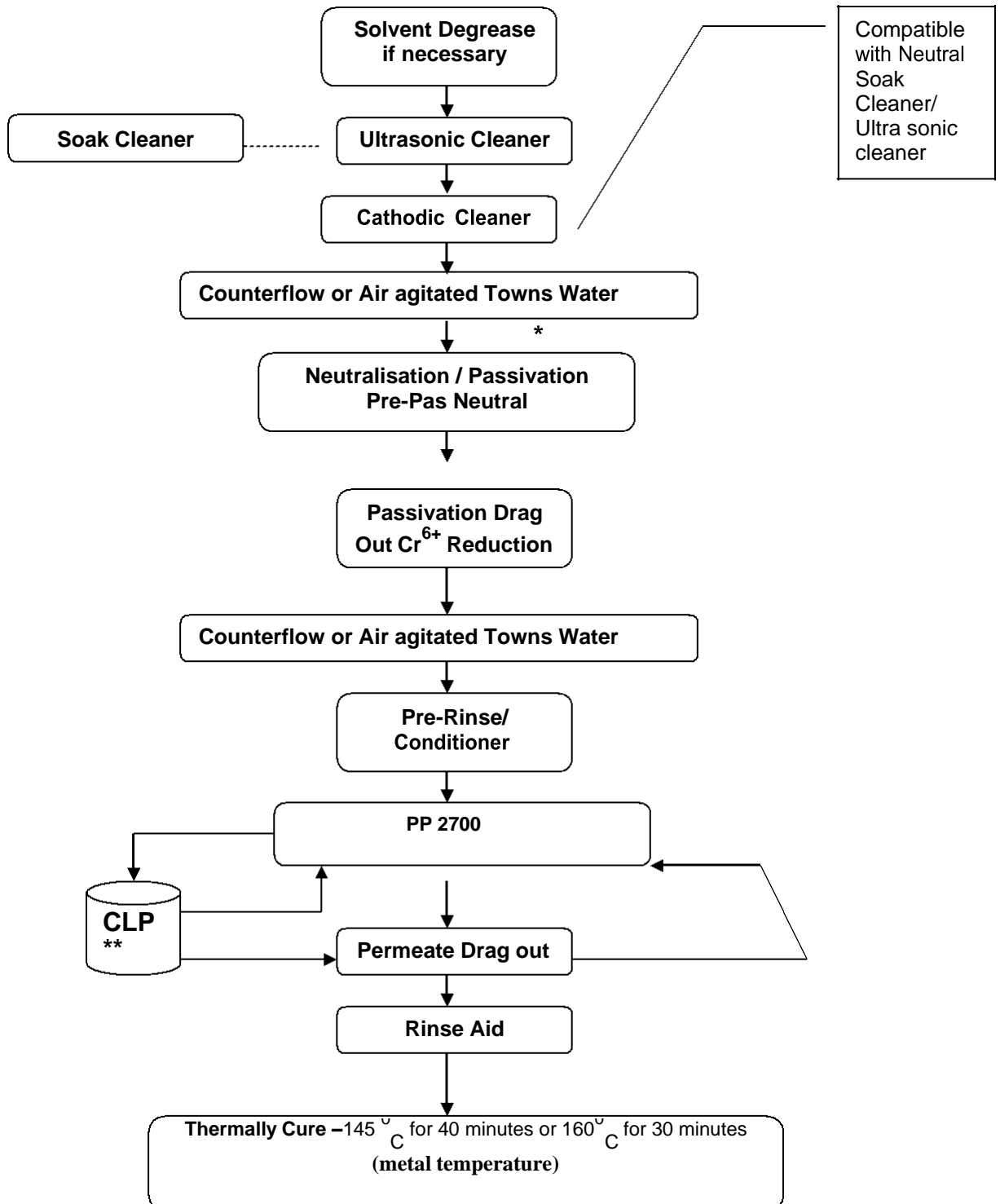
Physical Property	Typical Range
Solids Content (wt/wt)	48-52%
Viscosity	Free Flowing Liquid. Typical Range 20 – 50 poise
Specific Gravity	1.0 – 1.05

### Product Working Bath Specification

Parameter	Typical Working Range
Solids Content wt/wt	8–12%
MEQ @ 10% wt/wt solids	40–55
Solvent Content	
Solvent Replenisher H401	2.0 – 4.0 %
Solvent Replenisher H415	1-2%
Temperature °C	25–30°C
Conductivity - $\mu\text{S}$	500 – 750 $\mu\text{S}$
Coulombic Efficiency - mg/C	25
Peak Current A/M <sup>2</sup>	27
Mean Current A/M <sup>2</sup>	6.8

## The Coating Process

The pretreatment will very much depend on the substrate to be coated. A GENERAL GUIDE for zinc & zinc die cast is as follows;



NOTE : For brass and copper alloys, a dry acid salt dip and rinse should be inserted at \*.

\*\* Closed Loop Purification (CLP) system incorporates both ultrafiltrate and purification cartridge filter

### **Equipment Considerations**

<b>Tank Material</b>	Polypropylene
<b>Agitation</b>	Solution movement is important, ensuring good weiring characteristics without excessive solution turbulence.
<b>Tank Design</b>	Solution weiring is recommended with heating & cooling contained within the permeate section or the weir compartment. CLP must be fitted as part of the coating system.
<b>Filtration</b>	In addition to CLP, 1µm absolute particle filtration is recommended except for pigmented processes
<b>Anodes</b>	316 Stainless Steel (Polished)
<b>Anode / Cathode Area</b>	1:1 Nominal (dependent on application)
<b>Anode Cathode Distance</b>	100 mm (Minimum)
<b>Plating Products ED Power Unit</b>	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 are required.
<b>Environment Considerations</b>	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 10 – 15 microns Film Thickness When Cured at 160 Degrees Celsius for 30 minutes (metal temperature)**

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

**Material Consumption at 100% Efficiency**

1 Kg of 50% concentrate will cover  $50 \text{ M}^2$  at a thickness of  $10 \mu\text{m}$ . Typical efficiencies in larger installations exceed 97% using Closed Loop Purification.

**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.

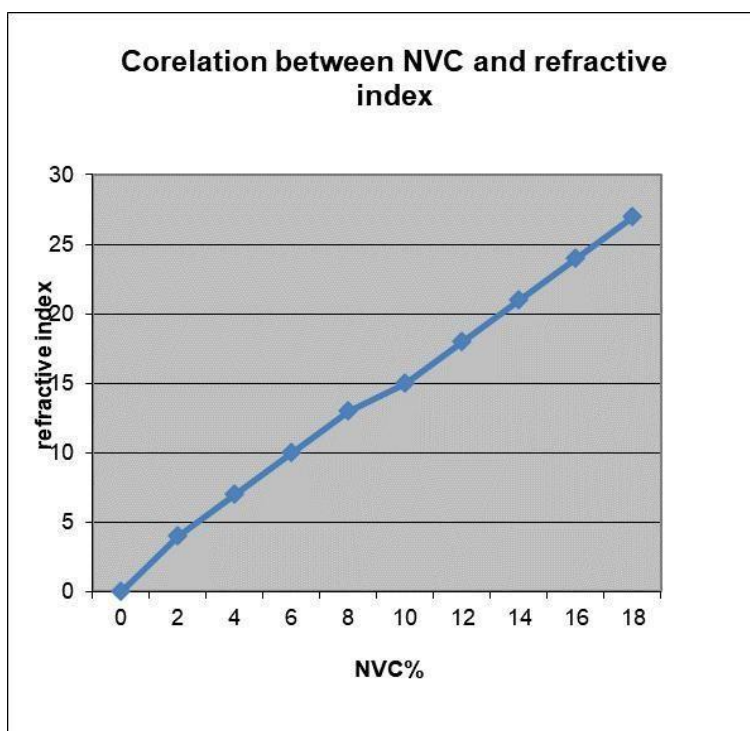
Ovens used for stoving should have the appropriate air extraction. This allows for any Volatile Organic Components (VOC'S) released to be removed from operator contact.

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 **Plating Products** 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.

**Correlation Between Refractive Index and non-volatile content for PP  
2700 after bath is conditioned by discarding 1 tank volume of  
permeate.**



NON VOLATILE CONTENT (%)	REFRACTIVE INDEX
2	4
4	7
6	10
8	13
10	15
12	18
14	21
16	24
18	27

**Chemical Resistance Properties at Different Curing Schedules and Temperatures**

The two tests below which were developed by the **Plating Products** laboratory demonstrate the chemical resistance properties of PP 2700 when cured under the recommended curing conditions. For applications which require a lower curing temperature, it is possible to achieve exceptional performance at 145 degrees Celsius. It is, however, necessary to cure the coating for 10 minutes longer under this condition. If the coating is cured at 160 degrees Celsius then it is possible to reduce the curing time to 30 minutes. The highest hardness and chemical resistance is also achieved at the higher curing temperature but slight thermal yellowing may occur.

**Test A** – Dilute formic acid (98% conc) with de-mineralised water in a ratio of 1 part formic acid to 4 parts de-mineralised water. Mix the solution well. Apply one to two drops of the solution to a cured 10 micron coating which has been applied to suitable test panels and leave for a pre-determined test time. After the given test time, rinse off the formic acid solution using water and wipe dry. If there is no stain then this constitutes a pass. If however, the coating has been stained by the formic acid solution it is necessary to attempt to scratch using a 2b pencil. If a 2b pencil can scratch down to the metal substrate then this demonstrates a failure.

It is of critical importance that the temperature is controlled to ensure result consistency.

**Test B** - Acetone is absorbed by a cotton wool ball and rubbed continuously on the coating until film degradation is observed.

The number of double rubs (forwards and backwards motion) until the coating is removed, is recorded.

**Table to show Formic acid and Acetone Resistance of PP 2700**

**\*Testing was conducted at 23 degrees Celsius**

145°C/40MIN		160°C/30MIN	
A	B	A	B
30 minutes pass	>1000	40 minutes pass	>2000



## **Associated Product Codes**

<b><u>Product</u></b>	<b><u>Product Code</u></b>
PP 2700	
Solvent Replenishers	H401, H415
Emulsion Stabiliser	H403
Rinse Aid	H500