



## **CLEARCLAD HD**

**Product code: 252A331**

### **1. PRODUCT DESCRIPTION**

CLEARCLAD HD is a general purpose cathodic electropaint which offers an attractive combination of properties including high clarity, excellent resistance to chemicals and UV light, good corrosion protection over a wide variety of metals, and versatility in its ability to be "tinted" or pigmented in order to achieve an extensive range of decorative finishes. Base resin variants exist as follows:

CLEARCLAD HD CF	- highly enhanced UV resistance. see section 9.
CLEARCLAD HD Interpas	- improved corrosion protection for brass and zinc. see section 10.

### **2. SUPPLY FORM**

The base resin concentrates of CLEARCLAD HD and its variants are tan colored, free flowing liquids of moderate viscosity. Pigmented and matte variants will vary in appearance and viscosity accordingly. Packaging is 20 liter American pails. Other packaging types and sizes may be available on request.

### **3. SUPPLY SPECIFICATION**

This will vary according to product type. The base resin concentrates are supplied in ready-to-dilute form; solids content 45 - 50% by weight (determined gravimetrically at 120C for 1 hour).

### **4. METHOD OF DILUTION**

All CLEARCLAD HD concentrates should always be pre-mixed with either high purity de-ionized water, or bath material at coating solids, when making a new bath or replenishing an existing bath respectively.

Pre-mixing must take place in a suitable clean vessel equipped with a motorized stirrer. Diluting material is added gradually to the concentrate, under stir, until a solids content of less than 18% is achieved. At this stage, at least 10 minutes stirring is applied to achieve complete emulsification. Subsequently, this pre-mix may then be further diluted to the required solids or added to the bath as appropriate.

***CLEARCLAD HD concentrates must never be added directly into de-ionized water or into the bath without this pre-mixing procedure.***



**5. CONDITIONING OF NEW BATHS**

A period of at least 24 hours, and preferably 48 hours, should elapse between initial bath make up and commencement of production. During this time, the bath should be kept circulating through adequate particle filtration at its normal operating temperature, and at least one bath volume of ultrafiltrate permeate should be eliminated. Solvent loss due to permeate elimination is not significant, but the MEQ (corrected) should be maintained at a minimum value of 30 by appropriate additions of CLEARCLAD Emulsion Stabilizer.

**6. BATH OPERATING PARAMETERS - HD, HD Interpas, HD CF & "Tinted" systems.**

<i>Parameter</i>	<i>Range</i>
Solids %w/w	8.0 - 10.0
pH	3.7 - 4.3
Conductivity microsiemens/cm	400 - 700
MEQ @ 10% solids	30 - 45
Solvent PM A264 %w/w	3.0 - 6.0
Solvent HC A250 %w/w	2.5 - 3.5
Operating temperature	23 – 29°C (73 – 84°F)
Coating voltage	30 - 120 dependent upon load type and required Thickness
Coating time (seconds)	60 - 120 as above
Curing schedule	150 to 180°C (302 – 356°F) metal temperature: 30 minutes @ 150°C to 15 minutes @ 180°C
Particle filtration	1 micron cartridge type for clear or tinted products. Higher micron ratings required for matted and pigmented systems.
Ultrafiltration	Preferably used in conjunction with TRAP UF/ion exchange system. Approximately 10% permeate production should be routinely eliminated on a continuous basis.
Bath heating/cooling	Where applicable, this should be indirect through a heat exchanger.



Circulation	Continuous pumped circulation from a skim weir and return via submerged sparge pipe. Turnover rate for clear and tinted systems is 3 - 5 bath volumes per hour. Matte and pigmented systems require 8 - 10 bath volumes per hour.
Anodes	316 grade stainless steel. Anode: cathode ratio 1:1
Bath turnover rate	In order to maintain the optimum properties, the feed replenishment rate should be consistent with one bath turnover within three months.

## **7. ASSESSMENT OF CURE**

This appropriate degree of cure (polymerization) should be established for the particular application and this should be related to the resistance to a solvent rub test. In this way, a quick end-of-line test for correct degree of cure can be established. Obviously, this is a destructive test even in the case of a pass, and so when it is applied to selected production pieces as part of a quality control procedure, the pieces should be discarded or re-worked as appropriate.

## **8. COVERING POWER**

One kilo of the base resin concentrate of CLEARCLAD HD will apply a coating of 1 micron over approximately 4800 square feet assuming 100% efficiency.

Near to 100% efficiency can be achieved using closed-loop ultrafiltration reclaim. Without a reclaim system, efficiency and consequently covering power will reduce.

"Tinted" systems, using relatively low concentrations of colorants, will have covering power very similar to the base resin concentrate. Other types of pigmented systems, incorporating significant concentrations of dense colorants or matting agents will have lower covering power. This will depend entirely on the particular product and such information will form part of the appropriate data sheet.

## **9. RESISTANCE OF CLEARCLAD HD COATINGS TO ULTRAVIOLET LIGHT**

HD in its base form has good resistance to UV light. However, with "tinted" or pigmented systems which are targeted at exterior applications, it is recommended that HD CF is used due to its superior resistance to UV.

As a transparent coating, its UV resistance is comparable to the best available exterior-quality acrylics or polyesters. However, its principal advantage is in being able to provide the well established "tinted" simulation of colored metals onto reflective "white" metal substrates, but with at least ten times the color change/fade resistance achieved with previous similar systems. (Assessment using delta E measurements according to the CIELAB system after exposure to minimum 500 hours QUV UVB).



## Product Data Sheet

---

CCI have developed a colorant system which will achieve yellow metal effects from "brass" through "gold" to "bronze", the actual color being determined by a combination of the mixed colorants and the color of the base metal.

Other colored "tints" in addition to hard colors including white and black in a range of gloss values may be formulated on request.

### 10. CORROSION PROTECTION AFFORDED BY CLEARCLAD HD COATINGS

The resistance to corrosion of any coated metal is always determined by the particular "system" - which means a combination of the base metal, its pretreatment, the type of coating applied, and the thickness and type of pigmentation of the coating.

CLEARCLAD HD is effectively a one-coat paint system. Accordingly, its corrosion-protective properties will be principally influenced by its thickness and quality of adhesion to the base metal. In this way, HD will provide a barrier (optimized by its thickness) to corrosive agents, and a resistance against spread of corrosion (optimized by its adhesive strength). Further than this, the intrinsic corrosion resistance of the base metal should be optimized, for example by the chromating of brass and zinc. Proper preparation of the base metal will both increase the intrinsic corrosion resistance and enhance the adhesion of HD, both factors combining to optimize the corrosion resistance of the whole system. Specifically for zinc and brass, HD Interpas has been designed to give enhanced corrosion protection. The improved performance may be achieved without chromate passivation if environmental or effluent considerations are paramount. HD Interpas will enable about 80% of the performance achieved by chromate passivation. If HD Interpas is used in conjunction with chromate passivation - a so-called "embedded" system - then outstanding corrosion resistance is achieved.

Note that for significant corrosion protection without change in decorative properties, electro-passivation using weak dichromate-based processes is preferred over simple immersion passivation using chromic acid based processes.

### 11. WEAR AND ABRASION RESISTANCE

CLEARCLAD HD has good intrinsic abrasion resistance (as determined by ASTM D968 Falling Sand test - 25 liters/25 micron thickness). This in combination with it being a high-build product (20 micron thickness readily available) affords a high degree of wear and abrasion protection. As the absolute wear property of organic coatings is principally a function of thickness, applications demanding wear resistance should utilize the higher thicknesses available with HD.

For Health and Safety data see separate MSDS

252A331rva.doc