BERKEM®
performance in plating

PROCESS TECHNICAL DATA SHEET

CATAFOR 100 *series*

CATAPHORETIC LACQUERS

Colour : **Various** Use : **Bath** Colour coordinates **: ND**

Product description

CATAFOR 100 is a water-soluble cataphoretic painting process. CATAFOR 100 deposits on any metallic substrate a transparent or coloured acrylic resin with good hardness and adhesion. CATAFOR 100 is characterised by high resistance to corrosion, solvents, water and products for domestic use. The CATAFOR 100 series comprises the products present at page 5

Application Fields for 5 liters

CATAFOR 100 can be applied on any metallic substrate regardless of the sector of use. Due to its particular aesthetic qualities, it is widely used in the creation of objects for costume jewellery, silverware and gold ware.

Operative Conditions

Parameter	UM	Operative range
Solution pH	Un	4,2 – 4.5
Working temperature	°C	24- 30
Cathodic current	Amp/dm2	0,05 – 0,1 max 0,5
Voltage	V	30 – 60* (see rectifier raccomandation)
Deposition time	Sec	10 – 25
Anode-Cathode rate		5:1 max
Deposition speed	Micron/min	5 – 8 µ in 30 sec.
Conducinility at 25°C	Microsiemens	800 – 1000 microsimens
Cooking temperature	°C	120 – 150
Cooking time	Min	45 (a 135 °C)
Dry residue of solution	%	6-10%
Refraction Index	Brix	12 - 15

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Adding informations 1/5

Preparation of the solution

- **With volumes of less than 10 litres, you are advised to use ready-mixed CATAFOR solutions only. In this case no preparation of the solution is required. For volumes of more than 10 litres, use CATAFOR concentrated products, following the directions below:**
- Prime the tank, the filter pump and the pipes with a solution containing 1% of CATAFOR 100C for 18 – 24 hours.
- Discharge the solution.
- Thoroughly wash with deionised water.
- Prime the ultrafiltration equipment by 2 – 3 passes with a 1% solution of CATAFOR 100C solvent.
- Fill the tank to approximately ½ the final volume with deionised water and slowly add 25 – 30% in volume of CATAFOR 100V, stirring continuously.
- Once fully dissolved, bring to the final volume with deionised water.
- Check the pH, bring to working temperature, install the anodes and recirculate the solution for 48 – 72 hours to eliminate the excess solvent. To lower the pH, use CATAFOR 100PH only; avoid all contact with alkaline solutions which can cause precipitation of the lacquer.

Equipment required

Tanks
Pyrex, steel coated in PVC, Moplen or iron coated in PVC with lateral overflow section equal to 1/6 – 1/7 of the total width.

Stirring the solution
Essential for obtaining adequate turnover around the cathode film; the suction must be positioned on the bottom of the overflow section and the delivery on the bottom of the deposition tank, via one or more perforated PVC pipes. The filter pump must have a flow rate of 2 – 4 exchanges per hour and use 5 micron polypropylene cartridges. For small volumes, the solution must be stirred by means of a laboratory magnetic stirrer.

Heaters
Low power quartz, porcelain or Teflon to avoid local overheating which could induce coagulation. Any cooling can be obtained by using AISI 316 stainless steel or titanium pipe coils.

Anodes
316 stainless steel or platinum-plated titanium, the anode surface must be between 1:4 and 1:2 with respect to the cathode surface.

Current rectifier
The use of a rectifier BERKEM cod. POWER 202RP with regulation ramp and voltage control up to 40 V is recommended. Higher voltage is necessary for big tanks up to 300 litres. The amperage must be calculated considering a maximum delivery of 0.2 A/dm^2.

Oven
Forced air circulation with possibility of reaching 160°C, able to provide temperatures of 50 – 60°C for the first few minutes and then 130 – 140 °C for 40 minutes.
(BERKEM code HEATER 201)

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Adding informations 2/5

Instructions for use *(for users with volumes up to 10 litres of paint)*

For best final results, follow the directions below:

- Electrolytically degrease the workpieces.
- Wash under running tap water.
- Wash under demineralised running water..
- Dip the workpieces in the paint for 10-15 seconds before operating the rectifier
- Operate the rectifier.
- Wash under running tap water.
- Wash under demineralised running water.
- Leave the deposit to dry in the air for 5 minutes.
- Bring the temperature to 130-140°C for 45 minutes.
- Remove the workpieces from the oven and leave them to cool in the air.

NOTE

The articles to be treated must be dipped in the solution for approximately 10-15 seconds, before beginning the deposition, to perfectly prime the surface. After this period the voltage must increase to approximately 30 V in 10 – 15 seconds and be maintained at this value for the deposition time necessary; for this purpose, the use of a voltage self-controlled rectifier provided with two timers is recommended. The above procedure serves to avoid current peaks in the case of frames with reduced surface. If the solution is new, the deposition speed will be particularly high and the total deposition time must be maintained between 20 – 40 seconds; in general after a few weeks it can be increased to one minute.

Maintaining the solution *(for industrial plants)*

Frequent additions of small quantities of previously diluted CATAFOR 100V are recommended in order to maintain the concentration around 25-30%. The concentrate must be diluted using the work tank solution in a ratio of 2:1 (2 parts work solution: 1 part CATAFOR 100V). The lacquer consumption will depend on the drag-out; as a guide, it is approximately 1 litre for 20 – 25 m^2 of surface treated. During the work process the solution must be maintained at the operating temperature and under continuous filtering with 5 µ cartridges and 1 turnover per hour; during the pauses the temperature must not drop below 5°C. Losses due to evaporation are compensated for by the addition of deionised water.

Analytical controls on the solution *(for industrial plants)*

To determine the CATAFOR 100V, a refractometer with scale in % Brix degrees (0 - 32) is used. (Berkem code MG011201 FT-01)

- Reset with distilled water
- Perform the reading on a few drops of solution
- VALUE READ X 2.0 = % VOL. CATAFOR 100V

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Adding informations 3/5

Ultrafiltration *(for industrial plants)*
It is advisable to ultra-filter the solution weekly until obtaining a quantity of permeate equal to 10% of the volume of the lacquer and in any case maintaining the conductivity of the solution at 800 – 1000 Microsiemens. The volume of permeate obtained must be replaced with an equal volume of deionised water (5 Microsiemens); CATAFOR 100C must also be added in quantities of 120 ml every 10 litres of permeate removed.

Final washing
It is essential to perform thorough final washing in deionised water (max 5 Microsiemens) in order to avoid spots on the articles treated.

Polymerisation (baking of the paint)
The transparency and hardness of the deposit depend on the baking temperature. In the majority of cases 130-140°C is sufficient for a duration of 30 minutes, bearing in mind that solid articles require longer to reach these temperatures. Temperatures above or equal to 170 – 175°C produce greater hardness (3 – 4 h) and improved resistance to solvents (alcohol). In the case of final silvering or brassing, it is advisable not to exceed 145°C in order to achieve the best compromise between aesthetic requirements and the physical characteristics of the resin.

Storage
CATAFOR 100 must be stored at an ambient temperature of between 25 and 30°C. At 35°C CATAFOR 100 polymerises, making the product unusable, and it is therefore advisable to maintain the temperature around the lowest values of the range indicated. Polymerisation is indicated by a change in colour from pale yellow to pink.

Possible defects and their elimination

Orange peel effect
Excess or lower of solvent (CATAFOR 100C) , the excess can be eliminated by ultrafiltration.

Lumpy patches
Poor wettability, can be eliminated by stirring the articles in the lacquer, before deposition, in a direction opposite to the perpendicular.

Transparent dripping
Can be eliminated by prolonged washing and/or weak insufflation of air into the last two washes.

Iridescence
Can be eliminated by increasing the thickness of the deposit up to the limit of transparency.

Development of hydrogen (surface foam)
Can lead to pitting and is eliminated by increasing the lacquer concentration and/or occasionally interrupting the circulation pump (the hydrogen develops on the surface).

Rules for disposal
The spent solution must be disposed of in compliance with local and national laws.

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Adding informations 4/5

Metal contamination

Metal contamination produces the following effects:

- Increase in viscosity with consequent low flowability of the resin deposited, which produces a typical orange peel effect.
- Reaction with the resin which prevents formation of the cross-links (soft orange-peel deposit).
- Development of gas with pitted deposits (in particular with sodium and magnesium contamination).
- Roughness and irregular appearance.
- The maximum metal contamination value tolerated is 15 to 75 ppm (according to the applications and the quality required).

The most harmful contamination is iron contamination highlighted by persistent pink colouring of the solution. Iron reacts rapidly with the resin, binding with it indissolubly; in this case to restore the electrolyte to normal conditions, it must be partially replaced. It is fundamental to eliminate or at least minimise the causes of the contamination.

Notes

Instructions indicated in Our Process technical data sheets are the result of attentive checks and have been written as a guideline. They represent the best of our knowledge and refer to a normal use of our products. Such products are guaranteed in their quality up to the delivery: we cannot guarantee for the correct use of them, as this action in not under our direct control (addiction or correction to plating baths are made by customer's personnel). As a consequence, process instructions have not to be intended as a guarantee of the final result in the use of our products.

Safety Information

Please refer to the safety data sheets for any information regarding safety and disposal (MSDS).

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Adding informations 4/5

Related articles

ARTICLE	Descritpion	Colour	Packaging
VE010901	CATAFOR 101 cataphoretic lacquer ready to use	Neutral	1 litre
VE011401	CATAFOR 102C cataphoretic lacquer ready to use	Deep red	1 litre
VE011501	CATAFOR 103C cataphoretic lacquer ready to use	Deep blue	1 litre
VE011601	CATAFOR 104C cataphoretic lacquer ready to use	Deep yellow	1 litre
VE011701	CATAFOR 105C cataphoretic lacquer ready to use	Deep green	1 litre
VE011801	CATAFOR 106C cataphoretic lacquer ready to use	Deep black	1 litre
VE011901	CATAFOR 107C cataphoretic lacquer ready to use	Deep violet	1 litre
VE012701	CATAFOR 108C cataphoretic lacquer ready to use	Deep orange	1 litre
VE012801	CATAFOR 109C cataphoretic lacquer ready to use	Deep lillac	1 litre
VE012901	CATAFOR 502XC concentrate pigment	Red	100 ml
VE012601	CATAFOR 503XC concentrate pigment	Blue	100 ml
VE013001	CATAFOR 504XC concentrate pigment	Yellow	100 ml
VE013101	CATAFOR 505XC concentrate pigment	Green	100 ml
VE013201	CATAFOR 506XC concentrate pigment	Black	100 ml
VE013301	CATAFOR 507XC concentrate pigment	Violet	100 ml
VE013501	CATAFOR 508XC concentrate pigment	Orange	100 ml
VE013401	CATAFOR 509XC concentrate pigment	Lillac	100 ml
VE011301	CATAFOR 100V concentrated cataphoretic lacquer	Neutral	5 Kg - 20 Kg
VE010101	CATAFOR 100C disperser for cataphoretic lacquer	—	1 litro
VE011201	CATAFOR 100PH pH corrector for cataphoretic lacquer	—	1 litro

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