



# THE PAINTING CYCLE

## CATAPHORESIS AND POWDER

ETA is the first company worldwide to apply cataphoresis painting to electric cabinets

E DUP - Double Layer Protection



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E BOOK  
Document issued in compliance with ISO9001:15

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E BOOK\_paint

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THE PAINTING CYCLE

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DESCRIPTION

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BENEFITS

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ETA S.P.A.  
[www.eta.it](http://www.eta.it)

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## E DUP – Double Layer Protection CYCLE DESCRIPTION

### STEP 1: PREPARATION OF THE METALLIC SUBSTRATE: DEGREASING AND RINSING

1. Loading items onto the conveyor
2. Tank 1: Phosphating-degreasing in acid PH hot water: degreasing and removal of oils and pollutants.
3. Tanks 2 and 3: Item rinsing with mains water: removal of polluting residues and degreasing products.
4. Tank 4: rinsing in demineralized water below 30  $\mu\text{S}$  ; preparation for flash-off treatment.
5. Task 5: nanotechnology passivation
6. Tank 6: rinsing in demineralized water below 10  $\mu\text{S}$ : removal of passivation residues and stabilization of passivation

### STEP 2: FLUID PAINTING WITH CATAPHORESIS PROCESS: FIRST LAYER APPLICATION - PRIMER

1. Dipping in tank with application of the first paint layer by cathodic electrophoresis with grey epoxy resin. Layer thickness from 10 to 15  $\mu\text{m}$  (ensuring excellent coverage, excellent ageing resistance and excellent film adhesion for drilling operations)
2. Elimination and closed-loop recycling of paint in excess
3. Cataphoresis crosslinking in oven

### STEP 3: POWDER PAINTING WITH ELECTROSTATIC DEPOSIT: SECOND LAYER APPLICATION - FINISHING

1. Powder-based electrostatic coating
2. Powder crosslinking in oven

The optimal thickness at the end of the cycle is approx. 70-80micron \*\* on the outer surfaces, but thicker layers can be applied upon request  
Standard powder is RAL7035 epoxy-polyester textured paint \*\*



### BENEFITS

+ Cataphoresis requires accurate cleaning before painting: E DUP is not just a painting process, as it also includes a preliminary treatment of raw material for longer duration \*

+ Cataphoresis is environmental-friendly, as it improves performance and consequently reduces consumption and waste. Paint is dissolved in water instead of chemical solvents: there are no exhausts, as paint in excess is recycled and reused, instead of being sent to a purification plant; this offers clear benefits, avoiding the dispersion of polluting substances. There is no fire hazard either.

+ Using a dipping process, no touching up is required, as the paint layer is consistent both inside and outside, also in recessed areas, while reducing paint and powder consumption.

+ 2 LAYERS are always applied on all products: a fluid primer and a powder topcoat, as two properly calibrated layers combined with preliminary degreasing and rinsing offer at least twice stronger protection against external aggression

+ More durable and lasting painting. Salt spray tests and hygrometers confirm the benefits of the E DUP cycle with tangible results.

+ EPOXY resin is an excellent grip and primer, as it creates a corrosion-resistant basecoat, offering stronger adhesion for finishing powders and film elasticity for drilling operations.

+ CATA-phoresis leverages leading-edge technology

+ Improved corrosion resistance (+ 50% hours compared to a basic powder painting cycle!)

## OVERPAINTING

As verified in tests reported by our suppliers, all powder paints used by E.T.A. can be overpainted with fluid and powder paints, after accurately cleaning the application surface. For overpainting, refer to the technical specifications for application time and temperature parameters recommended by the paint or powder supplier.

## CONDENSATE FORMATION

In conditions of high relative humidity (for instance in non-conditioned environments where relative humidity can reach up to 100% at 25°C), condensate might build up inside the cabinet; to prevent condensate formation, take adequate measures such as ventilating or heating the cabinet. To select the most suitable unit, refer to the E.T.A. catalog.



\* The durability of painting to corrosion is affected by:

- weathering agents (rain, sand, wind, solar radiation, humidity),
- mechanical damage (scratching, friction, impact)
- chemical substances (processes using aggressive, alkaline and acid substances)
- substrate material (raw)

Durability is the expected period of effectiveness of the corrosion protection, until the first major maintenance action. Durability implies no «duration warranty». Duration warranty is a legal concept, normally included in the clauses of an agreement.

Harsh environments are characterized by external factors including air, ice, snow, rain, solar radiation, wind, sand, humidity, salt, condensate, pollution and potential contamination with chemical substances.

It is recommended to select a cabinet with an adequate IP degree of protection (consider mounting a roof for more effective protection against weather and solar radiation) and an adequate protective film.

A surface finished with a topcoat of polyester powder offers resistance to UV radiation, while a good primer creates a barrier against the corrosion of the metal substrate.

E.T.A.'s technical staff is ready to support you to select the most suitable solution.

\*\* upon request, you can select the type and color of finishing pain (orange-peel, smooth, polyester, epoxy-polyester, RAL , ANSI, MUNSELL)

\*\* upon request, special cycles are available using specific powder for outdoor applications and thicker paint layers

Corrosion class	Typical outdoor environments	Typical indoor environments
C1 Very low	-	Heated buildings with clean atmosphere, e.g. offices, schools, stores, hotels.
C2 Low	Environments with low pollution levels, especially rural areas.	Non-heated buildings subject to condensate formation, e.g. deposits, sports facilities.
C3 Medium	Urban and industrial environments, modest pollution with sulfur dioxide. Coastal areas with low salinity.	Production facilities with high humidity levels and moderate pollution level, e.g. food industry, laundries, breweries, dairy companies.
C4 High	Industrial areas and coastal areas with moderate salinity.	Chemical plants, swimming pools, shipyards on coasts.
C5-I Very high (industrial)	Industrial areas with high humidity levels and aggressive atmosphere.	Buildings or areas with almost permanent condensate and high pollution levels.
C5-M Very high (marine)	Coastal and offshore areas with high salinity.	Buildings or areas with almost permanent condensate and high pollution levels.



## QUALITY CONTROL

Two laboratories, one in Canzo and one in Albavilla, perform quality control on painting raw materials, coating film and consistency of process parameters.

The following checks are performed during production:

- Process parameters
- Thickness
- 100% visual inspection

ETA laboratories perform:

- visual inspection of surface texture and color on representative samples
- thickness test
- adhesion test
- drilling test

Humidity resistance test according to ISO 6270 and corrosion resistance test according to ISO 9227, at least with annual frequency

For more information please contact [quality@eta.it](mailto:quality@eta.it)

## Solutions offered:

- standard cycle with cataphoresis and epoxy-polyester powder on alloyed steel: **indoor** applications with neutral atmosphere; climate-conditioned or non-heated buildings with possible condensate formation: C1, C2, C3
- outdoor cycle with cataphoresis and polyester powder on carbon steel: **outdoor** environments with moderate pollution levels, constant humidity, low salinity and solar radiation: C1, C2, C3 outdoor
- various cycles and materials (alloyed zinc, stainless steel) for special **indoor or outdoor** environments: industrial, chemical and oil&gas plants, offshore installations, proximity to sea with high pollution, salinity and humidity levels, for C4, C5m, C5i environments. Refer to ETA staff for technical support.

## Performance summary table

Description	Specifications	Standard	Expected results
Surface inspection	% surface impurity	ETA	0% - 1%
Finished thickness	ETA cycle	ETA	On outer surfaces, application of approx.. 70 -80 micron. At least 5 measurement points on outer surfaces are considered.
Adhesion	Cross-cut test	ISO2409	GT 0
Adhesion	Drilling	ETA	Peeling 0-1mm
Corrosion	Salt spray corrosion test in chamber	ISO9227 / ASTM B117 (ISO12944)	ca480 h. According to the cycle and the substrate material, the test may exceed 720 hours
Humidity	Chamber test	ISO6270 (ISO12944)	ca240 h. According to the cycle and the substrate material, the test may exceed 720 hours
Gloss	Technical datasheet of selected powder / See Technical data sheet	ISO 2808	Depends on the powder. RAL 7035 semi-gloss
UV resistance	Powder supplier	-	Polyester stability to UV