

DOUBLE LAYER PROTECTION
EDUP



innovative
enclosure solutions
for industrial & electronic
applications

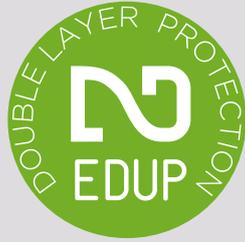
DOUBLE PROTECTION FOR UNIQUE PRODUCTS

ETA painted products are featured by a double treatment. E DUP Painting cycle includes a first coat of Cathodic Electrocoat Epoxy Resin and a topcoat with ETA standard powder coating. Only ETA provides this to offer “unique products”.

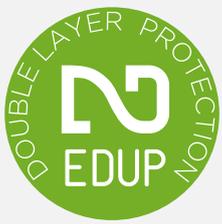


DOUBLE LAYER PROTECTION
E
EDUP





**ETA, the first world-wide producer
to use the cataphoresis process
in electrical panel painting**



MORE ABOUT IN WHY WE USE CATAPHORESIS

Cabinets, boxes and enclosures in general are often used with complex plant or machinery.

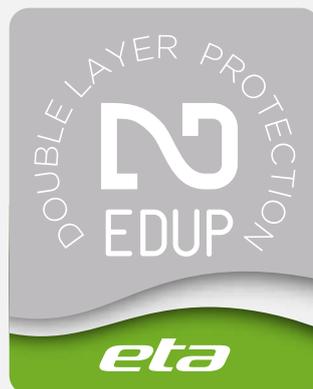
Ensuring these products maintain their aesthetic appearance and functionality over time is fundamental in sustaining the quality and value of the whole plant.

In its continuous quest to improve its products, ETA wanted to perfect sheet metal protection with a double layer treatment, a process called E DUP.

The first layer is cataphoresis, a process borrowed from the automotive industry, which for the first time world-wide is being used on electrical enclosures. The second layer is the finish.

The project for the system was developed in line with ETA's independently defined environmental guidelines for its designers: the lowest possible energy consumption, all construction materials must be recyclable, very low water consumption and limited environmental impact.

Ensuring it was possible to apply the treatment to **all ETA's painted steel sheet products**, in a continuous cycle and with extremely high levels of quality assurance, was a challenging project.



The mark indicating
ETA products which
have undergone the
E DUP surface treatment



SURFACE TREATMENTS

This has been a real team effort involving the companies producing the system and its components, the liquid suppliers' laboratories, ETA painting department managers and specialised ETA Next technicians.

ETA Next is ETA's research centre which, thanks to its specialised equipment and highly qualified personnel, was able to assist in the start-up phase of the system and guarantee its efficiency in continuous production with periodic testing.

After the first layer of cataphoresis primer, the second finishing layer is applied, this is the thermosetting powder coating cycle, which all ETA customers will already be familiar with.



Barbara Tessari
QHSE Manager

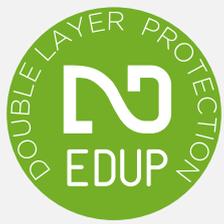


Antonio Turati
*Production & Logistics
Executive director*



Andrea Costamagna
R&D Technical Manager





THE PAINTING CYCLE

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 μS ; preparation for flash-off treatment.
- 5 **Task 5:** nanotechnology passivation.
- 6 **Tank 6:** rinsing in demineralized water below 10 μS : removal of passivation residues and stabilization of passivation.



* upon request, you can select the type and colour of finishing painting (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.

CATAPHORESIS AND POWDER

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

- ❶ Dipping in tank with application of the first paint layer by cathodic electrophoresis with grey epoxy resin. Layer thickness from 10 to 15 μm (ensuring excellent coverage, excellent ageing resistance and excellent film adhesion for drilling operations).
- ❷ Elimination and closed-loop recycling of paint in excess.
- ❸ Cataphoresis crosslinking in oven.

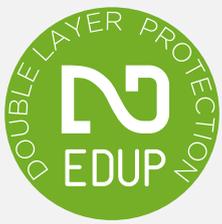
STEP 3 - POWDER PAINTING WITH ELECTROSTATIC DEPOSIT: SECOND LAYER APPLICATION - FINISHING

- ❶ Powder-based electrostatic coating.
- ❷ Powder crosslinking in oven.

The optimal thickness at the end of the cycle is approx. 70-80 micron on the outer surfaces, but thicker layers can be applied upon request.*

Standard powder is RAL7035 epoxy-polyester textured paint.*

The logo for eta, consisting of the lowercase letters 'eta' in a bold, italicized, sans-serif font, positioned within a white rounded square.



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 ETA 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 nonconditioned 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 ETA 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);

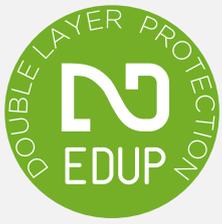
Durability is the expected period of effectiveness of the corrosion protection, until the first major maintenance action. Durability implies no “duration warranty”. Duration warranty is a legal concept, normally included in the clauses of an agreement.

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.

ETA's technical staff is ready to support you to select the most suitable solution.



QUALITY CONTROL

Two laboratories, one in Canzo and one in Albavilla (CO), 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



SOLUTIONS OFFERED

- A** 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.
- B** 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.
- C** 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, C5-I, C5-M 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 0-1 mm
Corrosion	Salt spray corrosion test in chamber	ISO9227 / ASTM B117 (ISO12944)	ca 480 h. According to the cycle and the substrate material, the test may exceed 720 hours.
Humidity	Chamber test	ISO6270 (ISO12944)	ca 240 h. According to the cycle and the substrate material, the test may exceed 720 hours.
Gloss	Technical datasheet of selected powder	ISO 2808	Depends on the powder. RAL 7035 semi-gloss.
UV resistance	Powder supplier	–	Polyester stability to UV.



CLASSES OF CORROSIVITY TABLE

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.



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