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DOMAIN

① USAGE

For use in dust collectors for filter bag flanged supports to **increase performance** of any jet pulse cleaning operation.



⚙️ FUNCTIONING

In jet pulse cleaning, compressed air is injected into the cages from a pipeline connected to a tank and operated by pulse valves. The scope of the shooting operation is to provoke the periodic fall of the dust cake into the hopper to renew the filter efficiency.

ADVANTAGES

CORROSION PROTECTION

Our in-house electrolytic coating process, EcoHPC+, provides cages with a **reinforced barrier against steel corrosion**. Salt spray tests demonstrate its **superior performance** compared to alternative surface treatments.

CHEMICALS RESISTANCE

The polymer characterization of the EcoHPC+ coating, combined with its nanotechnological application, significantly improves **resistance to various chemical aggressors such as acids and alkalis**.

TEMPERATURE RESISTANCE

The EcoHPC+ coating can withstand temperatures up to 240°C, with peak resistance up to 300°C. This is achieved by fixing an epoxy additive during the manufacturing process at less than 200°C in our drying ovens.

SUSTAINABILITY

CleanAir Europe's cataphoresis treatment manages to achieve a **low-impact manufacturing process with a reduced carbon footprint**, providing long-lasting durability.

SAFETY CONDITIONS

The modulation of the anti-static features in our EcoHPC+ coating achieves **optimal surface resistivity**, significantly **reducing the risk of electrostatic discharges**.

ELECTROPHORESIS AT CLEANAIR

Since **1985**, CleanAir Europe has been investing in enhancing the protection of filter supports. Back then, a fully automatic and robotized plant was developed to ensure superior steel protection for products up to 6 meters in length. Today, we take pride in our cataphoresis process and products.

ELECTROLYTIC TREATMENT



2008

CleanAir's **high-performance coating process** was later branded as EcoHPC. Due to its exceptional results against corrosion, temperature resistance, and chemicals, CleanAir Europe introduced a new logo that highlights the coating process.



2022

Today, **all products that undergo cataphoresis treatment** are labeled as EcoAtex. Under this definition, all cages and accessories come with controlled anti-static features.

PROCESS & TECHNOLOGY

EcoHPC+ is our branded line of products that undergo cataphoresis treatment, also known as cataphoresis or electrophoretic deposition (EPD). This method coats conductive surfaces uniformly with a protective layer through the following steps:

1. **Preparation of Substrate:** The metal cages are thoroughly cleaned to remove contaminants such as dirt, grease, and rust.
2. **Electrophoretic Bath:** The cleaned cages are immersed in an electrophoretic bath, an aqueous solution containing the coating material in the form of charged particles. This solution typically includes polymers, pigments, and additives.
3. **Electrophoresis:** An electric field is applied between the cages and an electrode, causing the charged particles to migrate towards the cages. In cataphoresis, the particles are negatively charged, and the cages act as the anode. The opposite process, anaphoresis, involves positively charged particles and uses the cages as the cathode.
4. **Deposition:** The charged particles reach the substrate, lose their charge, and coagulate to form a uniform coating film. The film thickness is controlled through voltage, process duration, and bath conditions.
5. **Rinsing and Curing:** After deposition, the coated cage is rinsed to remove any loosely adherent particles. It is then cured in an oven to solidify the coating and enhance its mechanical properties.



HIGH UNIFORMITY



COMPLEX SHAPES



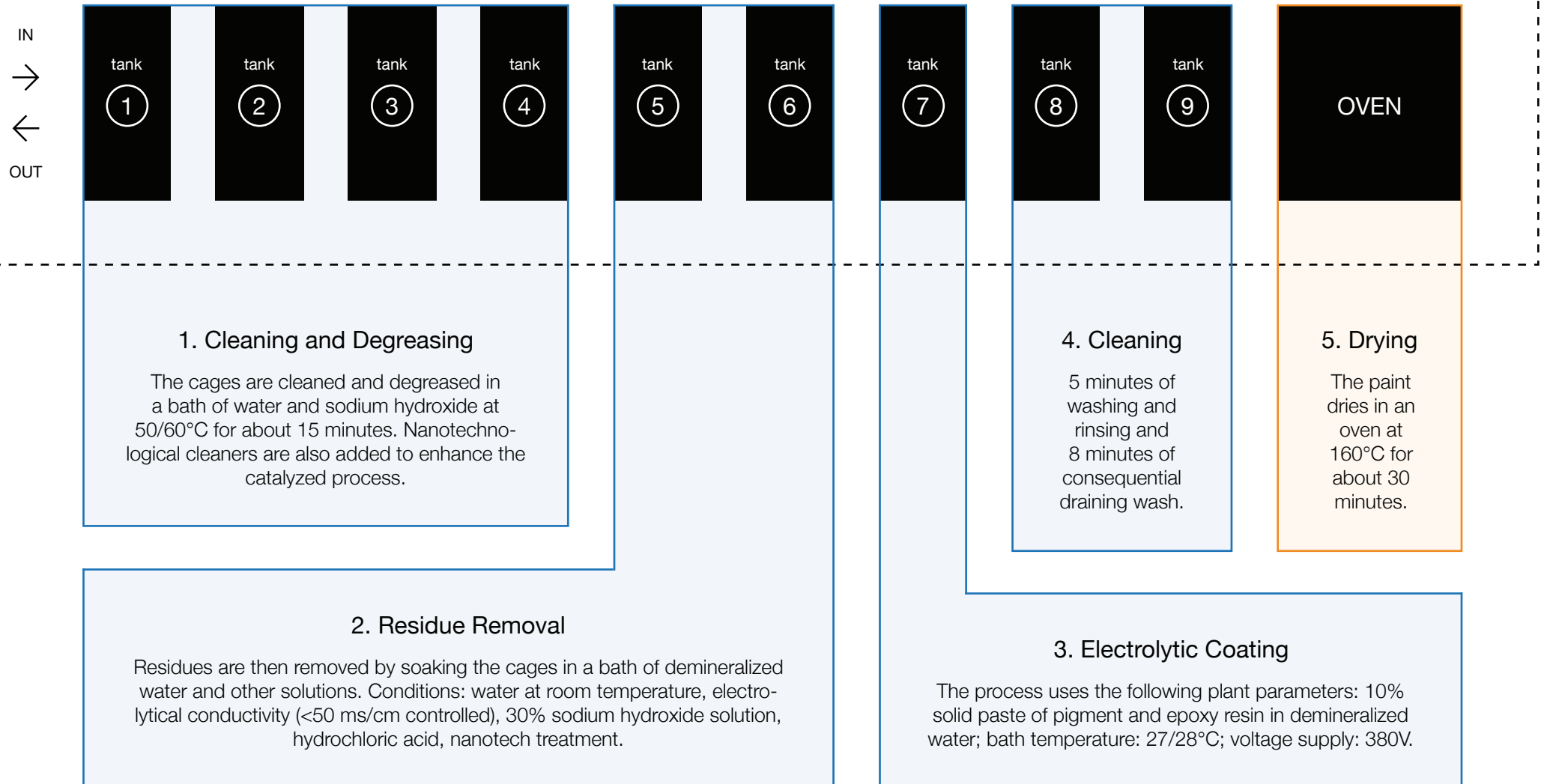
EXCELLENT ADHESION



RESISTANCE TO HUMIDITY

PLANT DESCRIPTION

PLANT LAYOUT ↙



PRODUCT APPLICATION

Cataphoresis is highly valued for its ability to deliver uniform, high-quality, and corrosion-resistant coatings. Following are its main features.



UNIFORM COATING

The electrochemical deposition in the EcoHPC+ process ensures that the material is evenly applied, providing **thorough coverage even on sharp edges and angles**.



FLAME RESISTANCE

EcoHPC+ uses **water-based solutions**, which are less hazardous compared to solvent-based coatings. This not only reduces environmental impact but also lowers the risk of fire during the coating process.



COATING THICKNESS

The average thickness of cataphoresis coatings typically ranges from 15 to 25 nanometers, striking **the perfect balance between durability and flexibility**. This ensures effective corrosion resistance and mechanical protection. The EcoHPC+ process fine-tunes this thickness to achieve the best class of surface resistivity while maintaining long-term durability.



COMPLEX GEOMETRIES

The EcoHPC+ process is especially effective at coating complex geometries, providing **uniform and robust protection** against corrosion, making it **an ideal choice for demanding applications**.



APPLICATION FIELDS

- Automotive industry
- Aerospace industry
- Appliances industry
- General metal application
- Construction equipment

CORROSION PROTECTION

The EcoHPC+ process provides an effective barrier against corrosion in vapor-rich environments due to the following key factors:



UNIFORM COATING

The electrochemical deposition ensures all edges, recesses, and welding spots are uniformly protected, eliminating weak points where corrosion could start.



STRONG ADHESION

The external coating establishes a strong bond with the product, minimizing the risk of delamination or chipping, which can expose the surface to corrosion.



BARRIER PROTECTION

The EcoHPC+ coating acts as a robust barrier, effectively preventing moisture, oxygen, and other corrosive agents from reaching the inner metal surface.



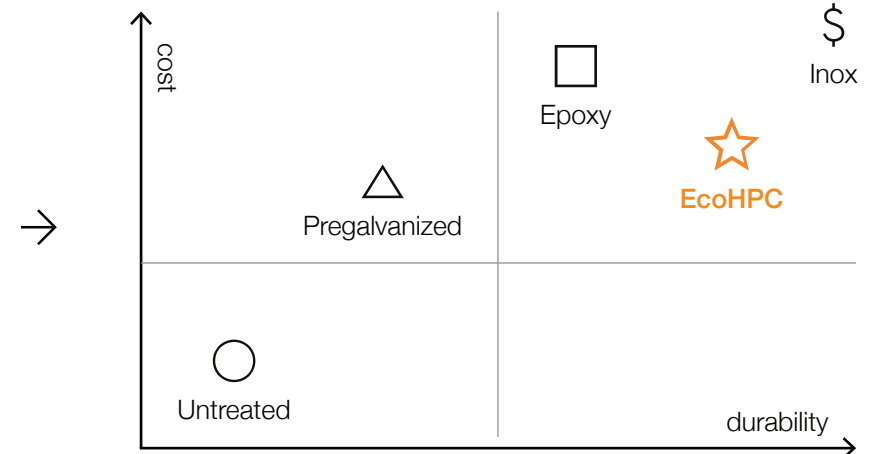
CHEMICAL RESISTANCE

The EcoHPC+ coating is chemically resistant, making it ideal for industrial applications and environments that involve the use or presence of corrosive vapors.

● COST ● DURABILITY



EcoHPC+ has demonstrated **outstanding performance** in laboratory tests (according to ASTM B 117), showing zero signs of rust even after 1800 hours in a saline chamber and **the best balance between cost and durability** among all available finishings.



TEMPERATURE & CHEMICAL PROTECTION

The EcoHPC+ process is renowned for its **exceptional resistance to both acidic and salty environments**, including chloride-induced corrosion typical of coastal areas. It's an ideal solution for applications involving hydrocarbons, oils, and fuels, and also provides excellent resistance to alkalis. Additionally, EcoHPC+ offers moderate resistance to solvents and oxidants, making it a preferred choice for demanding environments.

PARTICULATE MATTER 30	mg/Nm ³	☆☆☆
PARTICULATE MATTER 5	mg/Nm ³	☆☆☆
CADMIUM, THALIUM AND THEIR COMPOUNDS	mg/Nm ³	☆☆☆
ANTIMONY, ARSENIC, LEAD, CHROMIUM, COBALT, COPPER, MANGANESE, NICKEL, VANADIUM AND COMPOUNDS	mg/Nm ³	☆☆☆
HYDROGEN CHLORIDE	mg/Nm ³	☆☆
HYDROGEN FLUORIDE	mg/Nm ³	☆☆
SULFUR DIOXIDE	mg/Nm ³	☆☆
OXIDES OF NITROGEN	mg/Nm ³	☆☆☆
CARBON MONOXIDE	mg/Nm ³	☆☆☆
AMMONIA	mg/Nm ³	☆☆☆
TOTAL ORGANIC CARBON	mg/Nm ³	☆☆☆
PCDD/F1	Ng I-TEQ/Nm ³	☆☆☆
PCDD/F + DIOXINE LIKE PCBS1	Ng Who-TEQ/Nm ³	☆☆☆
MERCURY AND ITS COMPOUNDS	Microg/Nm ³	☆☆☆

☆☆☆ Good ☆☆ Fair ☆ Poor

🔧 THERMAL STABILITY

The polymers used in EcoHPC+ are chosen for their ability to resist thermal degradation, maintaining protective qualities at high temperatures.

💎 CURING PROCESS

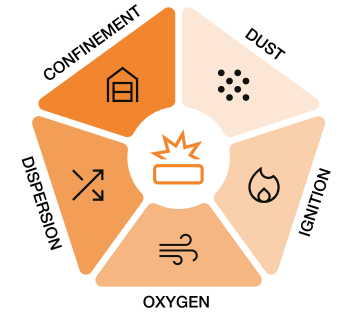
The coatings undergo a rigorous high-temperatures curing process, which enhances thermal resistance and ensures strong adhesion to the metal.

🧪 CHEMICAL RESISTANCE

Engineered to accommodate thermal expansion, EcoHPC+ and EcoAtex processes offer extensive protection against a wide range of chemicals. 9

SAFETY PROTECTION

In combustible dust environments, dust collectors can pose significant risks. One effective way to **prevent potential ignition from electrostatic discharges** is to use EcoAtex filter bag supports, which feature antistatic properties.

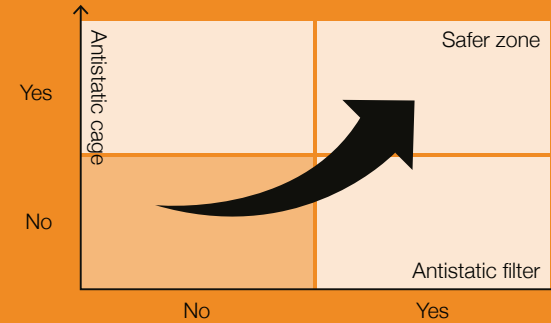


1. REDUCED ELECTROSTATIC RISK

EcoAtex effectively decreases the jump in the triboelectric scale between the earthed cell plate and the insulative filter bags, requiring a **higher energy level to ignite the dust**.



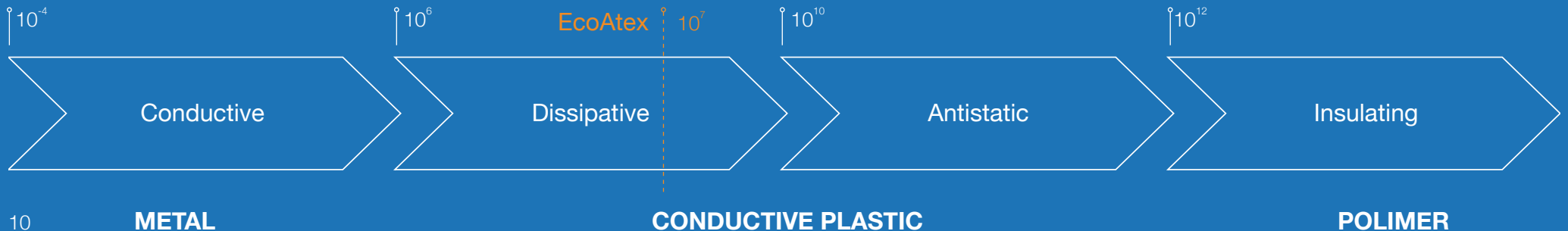
2. ENHANCED SAFETY



When paired with antistatic filter bags, EcoAtex cages contribute to a safer environment by **reducing the risk of fire and explosion**, creating a safer zone within the dust collector.

3. SURFACE RESISTIVITY

EcoAtex cages exhibit a surface resistivity of 10^7 ohms per square, providing **reliable antistatic protection**.

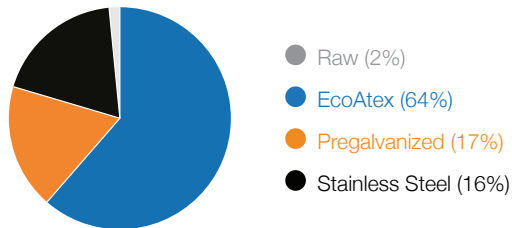


SUSTAINABLE PROTECTION



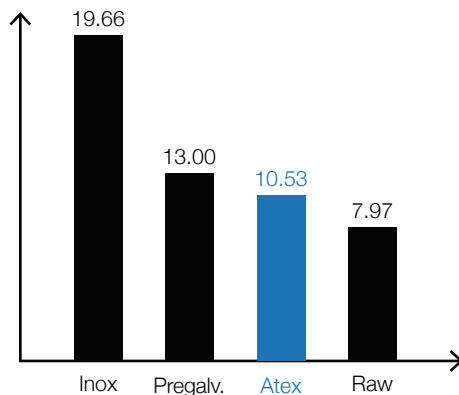
EcoAtex, a product of CleanAir Europe Srl, has been recognized for its outstanding sustainability and low environmental impact. It was honored at the 9th edition of the “Premio Impresa Ambiente” by the Union of the Italian Chamber of Commerce as the most sustainable product. The award citation highlighted:

“CleanAir Europe Srl, a company with decades of experience in filtration enhancement, has introduced a significant innovation in the field of filter bag supports. Through a new design and innovative treatment, these cages offer safer working conditions (with antistatic features), longer durability, and require fewer resources during production by reducing waste.”



CleanAir Europe Srl has heavily invested in the EcoHPC+ process, which represents the company’s most significant production initiative. In 2022, a Life Cycle Assessment (LCA) was conducted to evaluate the carbon footprint of the entire production process using a gate-to-gate approach, focusing on an average cage size of 150mm x 3500mm.

Today, EcoAtex products make up for more than 60% of our facility production, with low environmental impact.



KEY FINDINGS:

- **Impact Category:** The study was based on the Global Warming Potential over 100 years (GWP100) as outlined by IPCC 2021, with results measured in CO2 equivalents.
- **Sustainability Performance:** The EcoAtex product demonstrated superior performance, particularly when considering its long-lasting use and reduced environmental impact across all stages, including Scope 2 and Scope 3 emissions.
- **Best Performer:** After raw material considerations, EcoAtex stood out as the best performer in sustainability, making it an ideal choice for environmentally conscious applications.

NOTES ON ATEX RULES

EcoAtex complies with the ATEX 2014/34/EU directive and adheres to the NFPA guidelines for managing electrostatic hazards in combustible dust environments.

ATEX DIRECTIVE

Filter bags and filter bag cages are crucial for the efficient operation of dust collectors. As specified by the ATEX directive, any critical components that can influence safety in hazardous environments must adhere to ATEX regulations.

LABELING AND TRACEABILITY

The EcoAtex+ label includes a CE mark, along with essential traceability information such as article codes, production lot, temperature class, protection method, and application field. This ensures compliance and safety in environments where explosive atmospheres may be present.

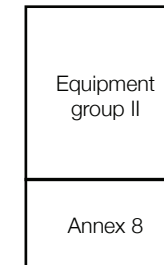
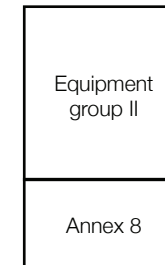


ATEX
directive
2014/34/EU

Third party
certificate

Internal
declaration

Third party
notification



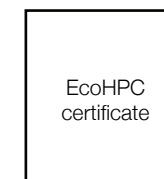
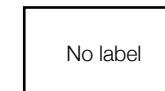
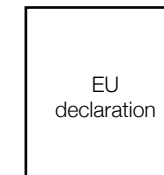
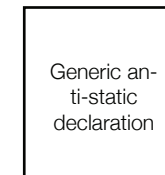
Audit and assessments requirements

ZONE 22

ZONE 21

ZONE 20

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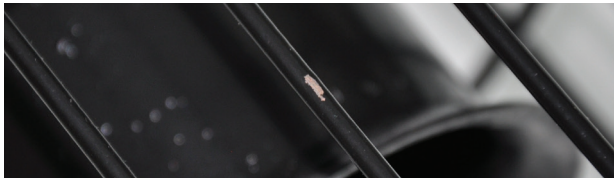


Documentation and labeling

Risk increase for relevance and frequency of explosive environments

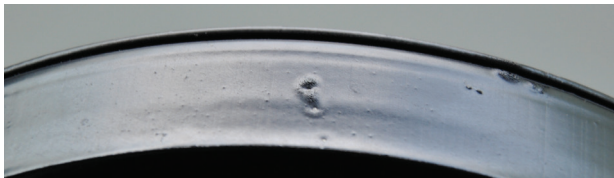
QUALITY INSPECTION CONTROLS

Our EcoHPC+ process features a robust passivation layer that shields the underlying metal from further corrosion, even in the presence of minor surface imperfections. This catalogue section illustrates aesthetic characteristics that might be present although do not represent a manufacturing defect.



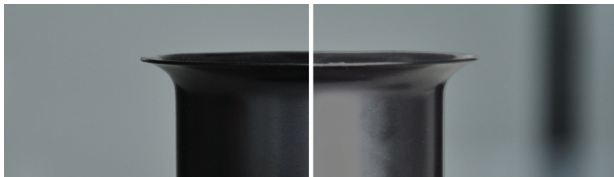
LIFTING POINTS

During product processing, the item must be lifted for dripping in the cathodic electrophoresis bath. As a result, the hooks used may leave small marks that are not indicative of any defect.



POINTS IN EVIDENCE

Occasionally, the surface of the product may not be perfectly smooth. However, we take great care to minimize sharp edges that could come into contact with the filter bags during treatment.



GLOSS REDUCTION

It is natural for the gloss layer to gradually diminish over time with use. Once the gloss has completely faded, it means that it is time to replace the cages to maintain optimal performance.



COLOR ALTERATION

Exposure to sunlight and UV rays can cause black color to lose its brightness and appear faded. To prevent this, a special sleeve crate protects the EcoAtex cages from UV damage.



SCRAPS & RUST

Due to the uniform application of the passivation layer, any individual rusty spot won't be able to initiate corrosion in nearby painted areas, effectively preventing the rust from spreading.

QUALITY LABORATORY TESTS



THICKNESS TEST

A specialized thickness **measurement tool is employed to ensure precise control over the depth of the cathoporesis coating layer.** Based on specific demands and requirements, the coating thickness can range from 12 to 30 microns, providing flexibility to meet various application needs.



CORROSION TEST

A salt spray test evaluates resistance in humid environments by **simulating long-term corrosion** in a shorter cycle. EcoAtex coatings prevent rust formation, even after 1800 hours in saline chambers, demonstrating outstanding durability and corrosion resistance. Tests were performed according to ASTM B117.



MEK TEST

To assess the adhesion of EcoAtex to metal, we conducted the **MEK test.** In this test, **a cotton ball is soaked in a methyl ethyl ketone (MEK) solution and rubbed 40 times over the coated specimen.** The test is considered successful if no paint transfers from the part to the cotton ball.



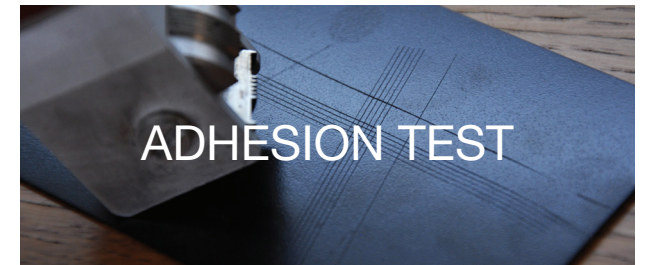
BENDING TEST

To assess the durability of the EcoAtex paint layer, we conduct a test where **the longitudinal wire is bent at a 90° angle.** According to ISO 1519:2011 standards, the bent area should show no signs of detachment or cracking, confirming the coating's ability to withstand mechanical stress and maintain its protective integrity.



HARDNESS TEST

The Willborn Wolff test measures hardness by **applying pencils of varying hardness to the specimen** at a 45° angle with loads of 5, 7.5, and 10 N. Depending on the pencil hardness, the stroke can range from a light mark to a deep scratch. The surface is evaluated according to ISO 15184 and ECCA T4/1 standard.







ADHESION TEST

In the grid test, **a special tool is used to create a grid pattern on the specimen.** After the grid is indented, scotch tape is applied to the area and quickly removed. The specimen is then examined for damage, which is classified into five different categories according to ASTM-5B standards.

ACCESSORIES & APPLICATIONS

SAFETY MESH FOR CAGES PROTECTION

The safety mesh is the perfect solution for transporting EcoAtex cages. Made from 100% polyethylene, this tubular mesh features a rhomboidal structure that easily conforms to the shape and diameter of any cage, providing tailored protection for even the most exposed parts during transit. Following its main features:

-  **CHEMICAL RESISTANCE**
The mesh is highly resistant to a wide range of chemicals, including rust, solvents, acids, alkalis, and bacteria.
-  **VISIBILITY AND SAFETY**
Its bright orange color ensures high visibility, enhancing safety both during transportation and on-site storage.
-  **VERSATILITY**
Available in many diameters and lengths, it can also be customized to fit all shapes and sizes of our filter supports.
-  **SUSTAINABILITY**
The mesh is 100% recyclable and can be disposed of in accordance with local regulations and guidelines.



APPLICATION FIELDS

The EcoAtex cages are advised in any case where there is a need to protect against corrosion. Application is suggested in the following industries:

MINES AND METALS

Steel and rolling mills,
foundries, forgies...

WASTE TREATMENT

Waste recycling,
composting...

CEMENT FACTORIES

Cement, lime,
gypsum, conglomerates...

POWER PLANTS & COALS

Combustion plants for
electricity and production

CHEMISTRY

Fertilizers, salts, sulphates,
phosphates, oxides...



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