Futuron® ULTRA
New Generation – Direct Metallization
for Plating on Plastics
Futuron® ULTRA –
New Generation Direct Metallization for Plating on Plastics

Futuron® ULTRA is unique and introduces the next generation in fast, economical and environmentally compatible direct plating.

The former Futuron® process is well known to provide key advantages over conventional pretreatment processes for plastic materials. It eliminates the use of any electroless nickel or copper-plating step, thus increases considerably the production reliability and enhances the productivity through its reduced pretreatment time. Futuron® is simple to integrate into any existing electroplating equipment and features important environmental advantages such as an easier wastewater treatment due to lower complexing agents, no heavy metal stabilizers and no nickel ions.

Futuron® ULTRA now provides the applicator with a process featuring a considerable wider working window. With the previous technology ABS/PC blends could only be plated up to a PC-content of 45%.

The optimized interaction between activator and Cu-link allows now for an enhanced Cu adsorption on the activated substrate, which significantly increases the conductivity of the seed layer. This makes it possible to plate even ABS/PC blends with PC-contents up to 65%, material that finds more and more use in many modern applications for automotive, sanitary or fashion.

The better Cu adsorption allows eventually working with a reduced Pd-content in the activator providing additional economical advantages and due to the improved conductivity of the seed layer, the speed of the subsequent electrolytic Cu-deposition is much faster. In total the pretreatment time can be shortened by 30%.

With its additional features, Futuron® ULTRA represents even more than Futuron®, an attractive resource-economizing alternative to conventional process for plating on plastics.
A comparison of technologies makes it clear: the system encompasses just five process steps prior to final electroplating. Up to the point of activation, the process is the same as conventional pre-treatment of plastics.

Step 1: Chrome/sulphuric acid etching
The most important step for achieving adhesive metallization on plastic base materials is the etching. Therefore usually a mixture of chromic and sulfuric acid is used like in the conventional process. The acids dissolve polybutadiene from the ABS respectively ABS/PC blends matrix. The formed caverns promote later the metal adhesion. The parameters of the etch have to be adjusted to the plastic material in order to get a functionalized and conditioned plastic surface prior to activation.

- Futuron® ULTRA Additive CR

Step 2: Chromic acid reduction
This step reduces the Cr(VI) to Cr(III) and thus protects the entire subsequent process. It is crucial to ensure that no Cr(VI) compounds are carried over, as they could negatively influence the activation and subsequent metal plating. In extreme cases they can even prevent metal deposition entirely. The Futuron® ULTRA Reducer CR guarantees a reliable reduction of excess Cr(VI)-ions. The Futuron® ULTRA Conditioner increase the performance of the reducer step and can be used separately or in the reducing step.

- Futuron® ULTRA Conditioner
- Futuron® ULTRA Reducer CR
Step 3: Pre-dip solution
The pre-dip solution consists of hydrochloric acid whose acid concentration is matched to protect the subsequent activator. Therefore no further rinsing between the pre-dip solution and the activator is necessary.

Step 4: Activation
In the activator, palladium and tin are adsorbed on the pretreated surface. The activator solution contains tin/palladium clusters stabilized with tin chloride.

- Futuron® ULTRA Activator
- Futuron® ULTRA Activator Plus

Step 5: Cu-Link
While conventional systems remove the protective tin chloride and tin from the palladium layer at this stage of the process in order to produce a layer of palladium nuclei on the surface, the Futuron® ULTRA process also involves replacing the tin with copper. The solution used for this contains copper ions bound by a biodegradable chelating agent. The link of copper to the palladium nuclei makes the surface electrically conductive. The resulting conductivity is so high and stable that the surface can be directly electroplated in an acid copper bath after rinsing.

A longer process interruption at this point has no influence on the plating quality. However, conditions during the interruption should be controlled: the air must be dry and free from dust. Futuron® ULTRA Cu-Link improves the Cu-Link step to an extend, that it is possible to work with a lower Pd-concentration in the Activator.

- Futuron® ULTRA Cu-Link
Step 6: Electrolytic Cu Plating

To enhance the quality of the finished plastic components, Atotech markets greatly compatible acid copper systems, especially developed for plating on plastics applications. The processes are highly decorative and provide the appropriate ductility to function as an interlayer between the flexible substrate and the subsequent nickel and chrome layers. They prevent over-leveling, the formation of pits and pores on large surfaces and the build up of copper at high current density areas.

- Cupracid® Family (dye-based)
- CuFlex® 330 (dye-free)
Features and Benefits

The advantages of Futuron® ULTRA at a glance

- Reduced number of process steps
  ➞ No electroless nickel or copper
  ➞ No nickel or copper strike
- Easy integration into existing electroplating equipment
- High production reliability
- Reduced plating reject
- Wider working window
  ➞ Can be used for plating on ABS and ABS/PC blend materials with a high PC content up to 65%
- Economical process with less palladium in the Activator working bath
- No rack plating
- Environmentally responsible process – no special wastewater treatment needed
- Shorter process – enhances productivity
  ➞ Futuron® ULTRA allows to reduce the pretreatment process time up to 30%

The Futuron® ULTRA process conforms exactly with what the automotive industry, sanitary and fashion manufacturers in Europe, the Americas and Asia need.

New developments with Futuron® ULTRA

- Futuron® ULTRA Additive CR
- Futuron® ULTRA Reducer CR
- Futuron® ULTRA Conditioner
- Futuron® ULTRA Activator / Activator Plus
- Futuron® ULTRA Cu – Link: Futuron® ULTRA Cu – Link A
  Futuron® ULTRA Cu – Link B

Subsidiary of the Total Group