

III FORO

RETOS Y TENDENCIAS EN TRATAMIENTOS SUPERFICIALES

28 de mayo de 2026
Hotel Arima · San Sebastián

Organizado por:



SESIÓN PLENARIA

Ponencia

Innovación y Sostenibilidad en la
Industria de Ingeniería de Superficies



Dr. Ernesto Salazar
Business Manager en MKS-ATOTECH



Co-financiado por:



Co-funded by
the European Union

Innovación y Sostenibilidad en la Industria de Ingeniería de Superficies

Dr. Ernesto Salazar | Director Product Marketing



2026 III Foros de Superficies

Retos y Tendencias en Tratamientos Superficiales

May 28, 2026 | Hotel Arima Donostia



Regulatory Update



Chromium trioxide – REACh restriction proposal



Restriction proposal key content

ECHA received a mandate from European Commission to prepare a restriction proposal for Chromium(VI) substances

Chromium (VI) compounds are to be banned in principle, except in six clearly defined categories of use, provided that strict workplace and emission limit values are complied with

- Formulation of mixtures
- **Electroplating (plastic substrates)**
- **Electroplating (metal substrates)**
- Use in primers/slurries
- Other surface treatments
- Functional additives/process aids

Use of Chromium(VI) compounds as intermediates is to be exempted from the restriction

Chromium trioxide – REACh restriction proposal and timeline

Option	Occupational exposure limits	Emission limits	Industrial impact
RO1	ex. 5 µg/m ³	2.5 kg air/15 kg water	>90% compliant
RO2	ex. 1 µg/m ³	0.25 kg/1.5 kg	~60% compliant
RO3	ex. 0.1–0.5 µg/m ³	0.025 kg/0.15 kg	~30% compliant



June 18, 2025

6 months consultation period
to be started



Beginning 2027

Decision of final option
expected



2028

Restriction expected to enter
into force

Per- and polyfluoroalkyl sulfonates – REACh restriction

Feb 7,
2023

Restriction proposal on PFAS published by ECHA

1. Shall not be manufactured, used or placed on the market as substance on their own,
2. Shall not be placed on the market in
 - a. Another substance, as a constituent,
 - b. A mixture
 - c. An article

In a concentration of or above:

- I. 25 ppb for any PFAS (polymeric PFAS excluded)
 - II. 250 ppb for the sum PFAS
 - III. 50 ppm for PFAS (including polymeric PFAS)
3. Paragraphs 1 and 2 shall apply 18 months after entry into force of the restriction.

Mar
2024

1. Consumer mixtures
2. Cosmetics
3. Ski waxes
4. Hazard evaluation (by RAC)

June
2024

1. Metal plating and manufacturing of metal products
2. Additional discussions on hazards (by RAC)

Sep
2024

1. Textiles, upholstery, leather, apparel, carpets
2. Food contact materials and packaging
3. Petroleum and Mining



Mar 2023

RAC and SEAC started the evaluation of the proposal



Mar 22, 2023

6 months public consultation,
**completed with
>5600 comments**



Q2/2025

ECHAs committees' evaluation completion



2026

Discussion and decision of the European commission



2026

Restriction is expected to enter into force



Mid 2028

18-months transition period ends



Countries like France and Denmark are starting separate PFAS restrictions/ prohibitions!

Covertron®600

Sustainable Decorative
Plating on Plastics
without Cr(VI) or PFAS
Technology Update

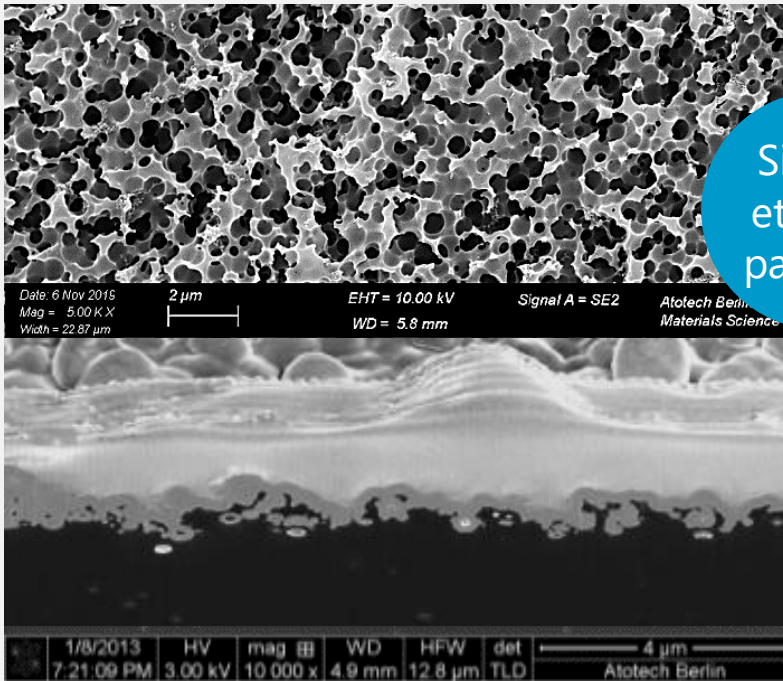


Covertron 600: Cr-free etch for ABS, ABS/PC, others

At a glance

- Cr-free process
- Key feature: Similar etching pattern compared to benchmark

Cr(VI) etch

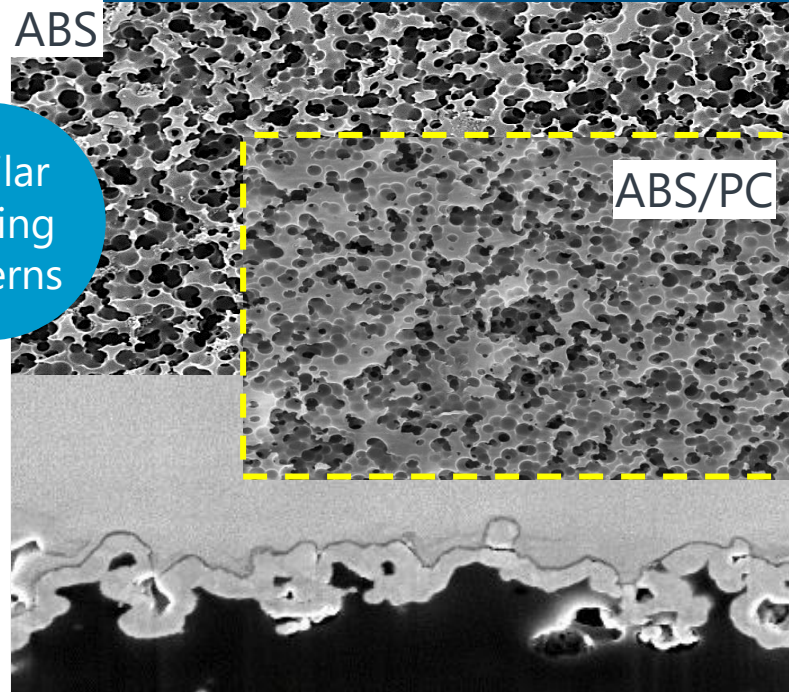


Similar etching patterns

- Chemical, oxidant pretreatment

Non-PFAS

Covertron 600 – Cr free



Fulfills the standard industry requirements:

- Appearance/cosmetic
- Adhesion
- Thermocycle tests from multiple OEMs
- Compatibility with existing plastics, including ABS, ABS/PC and PP
- Selectivity 2K/3K

ASTM B533 standard industry requirements for peel strength testing:

Covertron® 600 – Cr free etching:

ABS	15 – 20 N/cm
ABS/PC	7 – 10 N/cm

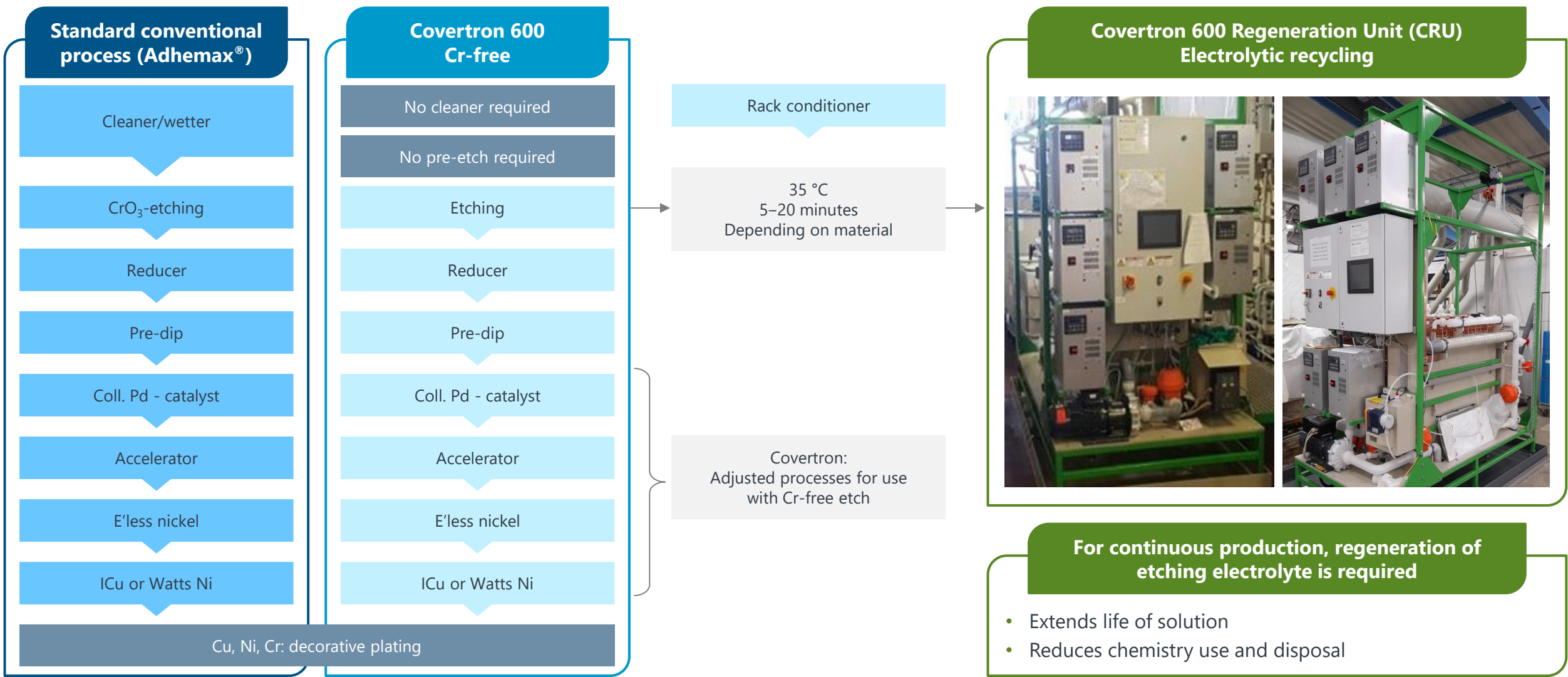
Typical specification:

ABS	> 9.0 N/cm
ABS/PC	> 4.5 N/cm

SEM = Scanning Electron Microscope

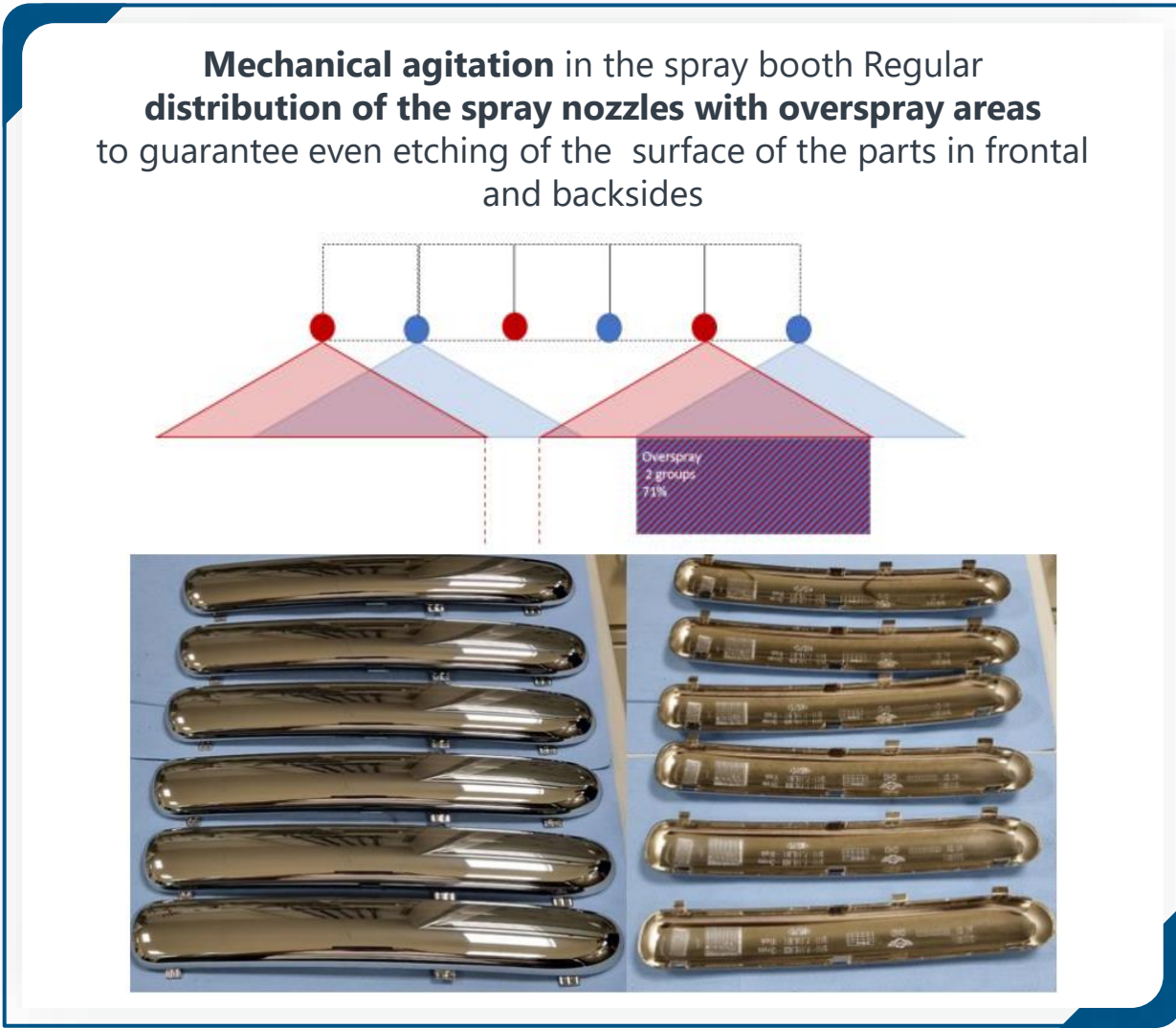
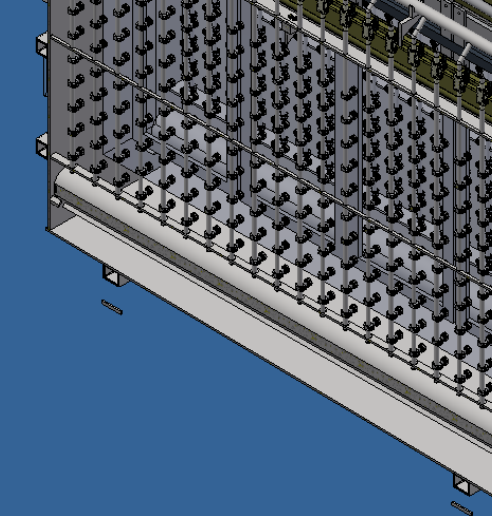
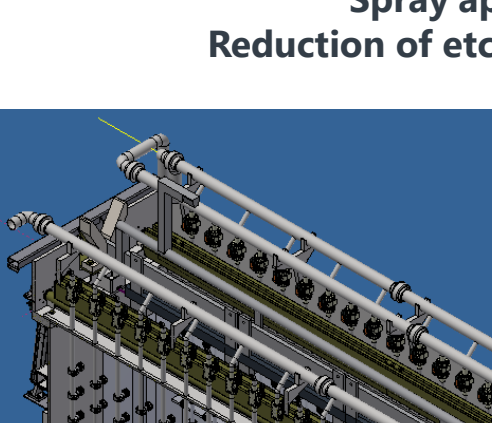
FIB = Focused Ion Beam

Covertron 600: Process sequence (excluding rinses)



Spray application

Reduction of etch volume by 70%



TriChrome®

Sustainable Decorative
Plating without Cr(VI)
or PFAS



TriChrome processes | Cr(VI)-free and non-PFAS solutions

Well proven alternative to hexavalent chrome plating



Alternatives to bright Cr(VI)

TriChrome Plus

- High plating speed
- Passes CaCl_2 /Russian Mud test
- Good corrosion resistance
- Use of graphite anodes

TriChrome ICE (XP)

- Bright color, color match to Cr(VI)
- Excellent deposition rate
- Excellent coverage with reduced treatment time
- Good corrosion resistance
- Use of IMO anodes



Dark fashion finishes*

TriChrome Smoke 2

Warm light grey color

TriChrome Shadow

Light grey color

TriChrome Titan

Deep neutral grey color

TriChrome Graphite

Dark warm grey color

TriChrome Phantom

Darker warm grey color

*based on TriChrome Plus, similar features



Our processes fulfill the requirements of the automotive and decorative industry and are approved by many OEMs.

Learn more online: [Automotive approvals](#)

BluCr[®]

Trivalent Hard Chrome

Sustainable Functional
Plating without Cr(VI)
or PFAS



BluCr® - Trivalent Hard Chrome

Process benefits

- **Advantages of BluCr versus Cr(VI):**

- BluCr is an environmentally friendly Cr(III) based process which offers comparable deposit properties to Cr(VI)
- BluCr does not contain any CRM or PFAS chemistry
- Plated range 1 – 300 µm
- The deposit can be polished
- Similar appearance to Cr(VI) deposit
- High corrosion resistance to chloride environments
- Hardness with heat treatment can exceed Cr(VI)

- **Disadvantages of BluCr versus Cr(Vi):**

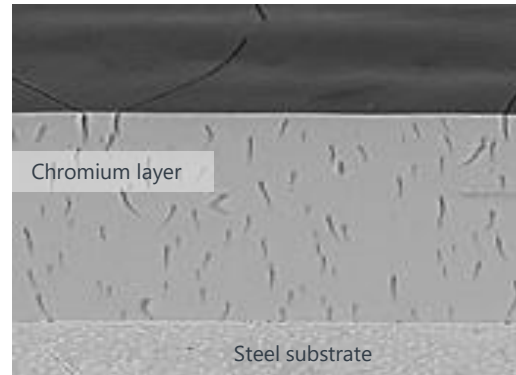
- More macro cracks
- Requires a nickel under layer
- Slightly less as plated hardness



BluCr process has the same plating speed as a leading Cr(VI) process

Excellent abrasion resistance

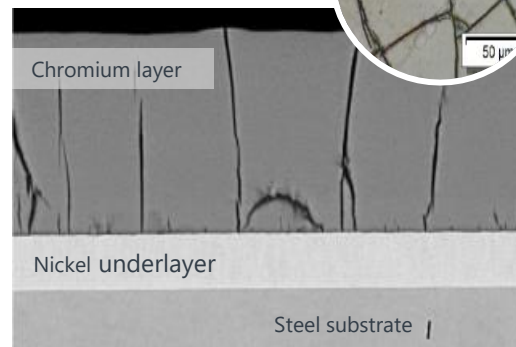
HEEF 25



Macro cracks prevent corrosion protection

- Therefore, a dense intermediate layer is currently applied

BluCr



Underlayer of choice: Nickel

- With a Nickel underlayer, several hundred hours without base material corrosion can be achieved in NSST

Fumalock[®] Wetting Agent 100

Cr(VI) Plating without
PFAS



Fumalock® Wetting Agent 100

A **non-PFAS based surfactant** formulated for use in hexavalent chrome plating solutions

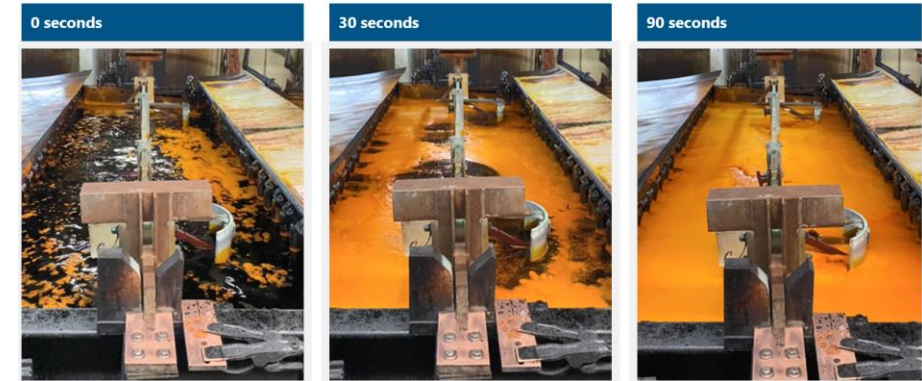
- **2 component system** which is added directly to the chrome bath
- Both additives reduce surface tension
 - One **forms foam blanket**
 - Second **controls foam blanket** characteristics
 - **Ratio of 2 components can be tailored** for each application

Bath controlled by surface tension and/or foam height

Material breaks down with time and causes no negative impact to bath performance

- **Dosed by time**, not amp*hour

PFAS:



Non-PFAS:



Electrical Vehicles

New Challenges and Opportunities



Lightweighting EVs >>> *More range, less mass*

**Rule of thumb (current technology benchmark):
A -10% vehicle weight reduction yields up to +13%
range improvement**

But it is a complex task:

- Need to re-design EV architectures;
 - Less redundancy = fewer components covering more than one function (cell-to-chassis integration, Battery tray = structural underbody, ...)
 - Thus, they are exposed to different mechanical, thermal and environmental stresses at the same time
- Need for "smarter" material choices to keep weight *and* cost in balance:
 - Combining high-strength steels with aluminium, magnesium, composite materials, adhesives
 - Resulting in challenges to structural integrity, materials compatibility and interactions, as well as conductivity/insulation properties

China to enforce world's first mandatory EV energy standard in 2026, capping two-tonne models at 15.1 kWh per 100 km

3 min to read • Dec 26, 2025 4:08 AM CET • Adrian Leung • 17



Regulators announce nationwide enforcement date for electric vehicle efficiency limits. Credit: Douyin

China will implement a new mandatory national standard governing energy consumption for pure-electric passenger vehicles, effective January 1, 2026, according to China Central Television, as cited by [IT Home](#). The regulation is the world's first mandatory standard for electric-vehicle energy consumption and replaces China's previous recommended framework, giving it direct legal force over newly produced models.

China EV DataTracker
Understand China
EV's Market

- Real-time notifications when critical EV data is released
- All important data in one place
- 2,000,000+ data points

Become a member

eQasy Credit

Jetzt Sofortkredit mit finanziellem Spielraum sichern

Jetzt berechnen

By tackling these and other challenges, Surface Finishing is enabling lightweighting of EVs

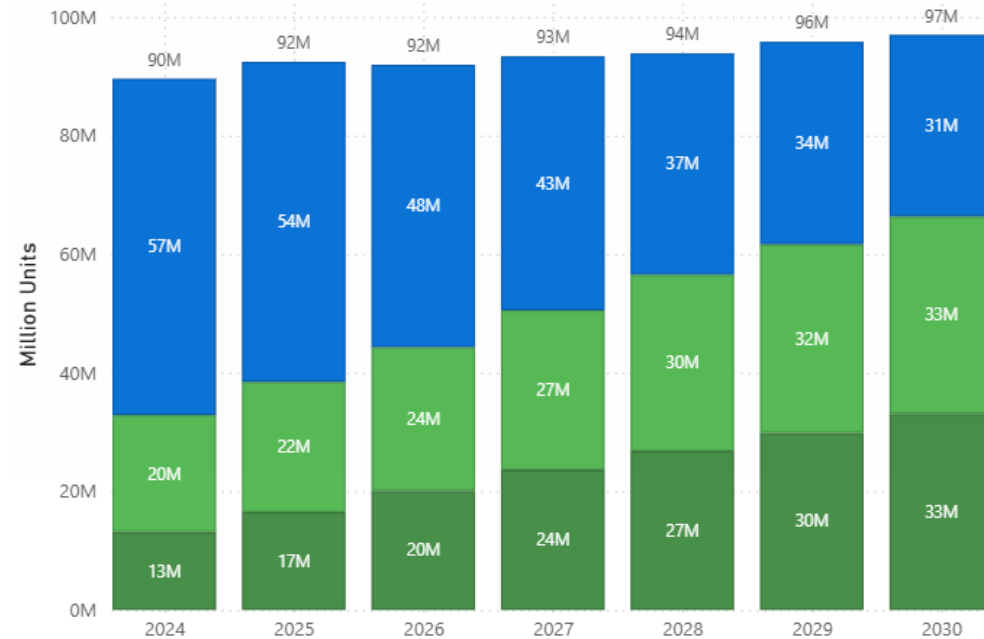
EV Battery is the new Automotive Business

EV
CAGR
+59%

TWh
CAGR
+21%

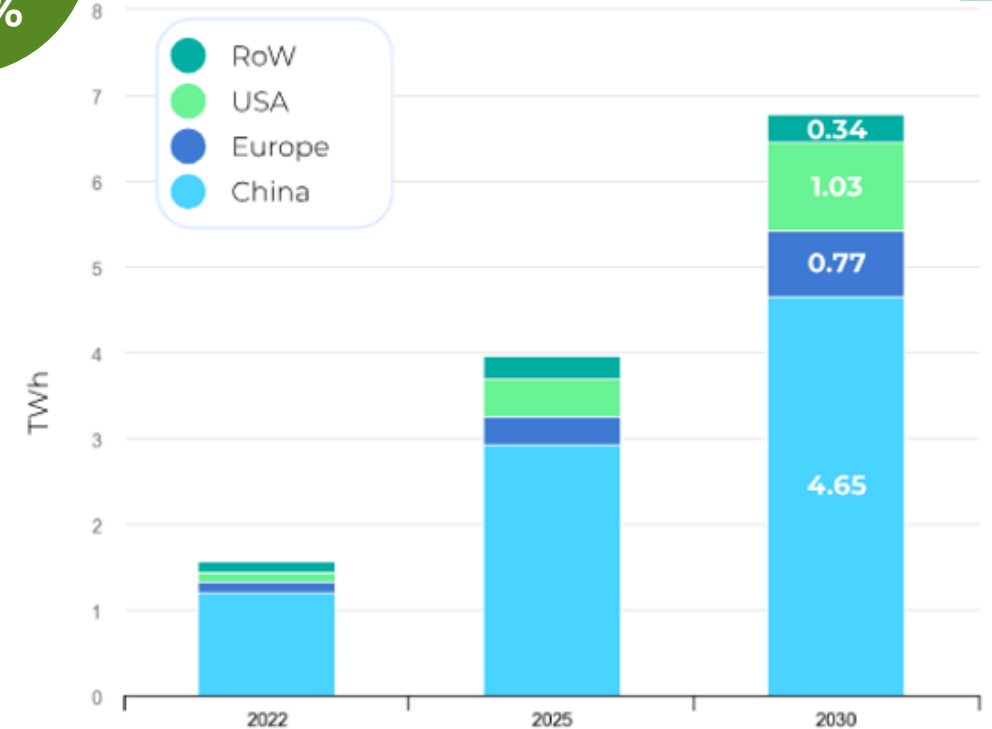


Propulsion System ● (X)EV ● Hybrid ● ICE



For reference >>> EV % penetration in 2025

- 35% in China (57% in 2030)
- 13% in Europe (35% in 2030)
- 6% in the Americas (14% in 2030)

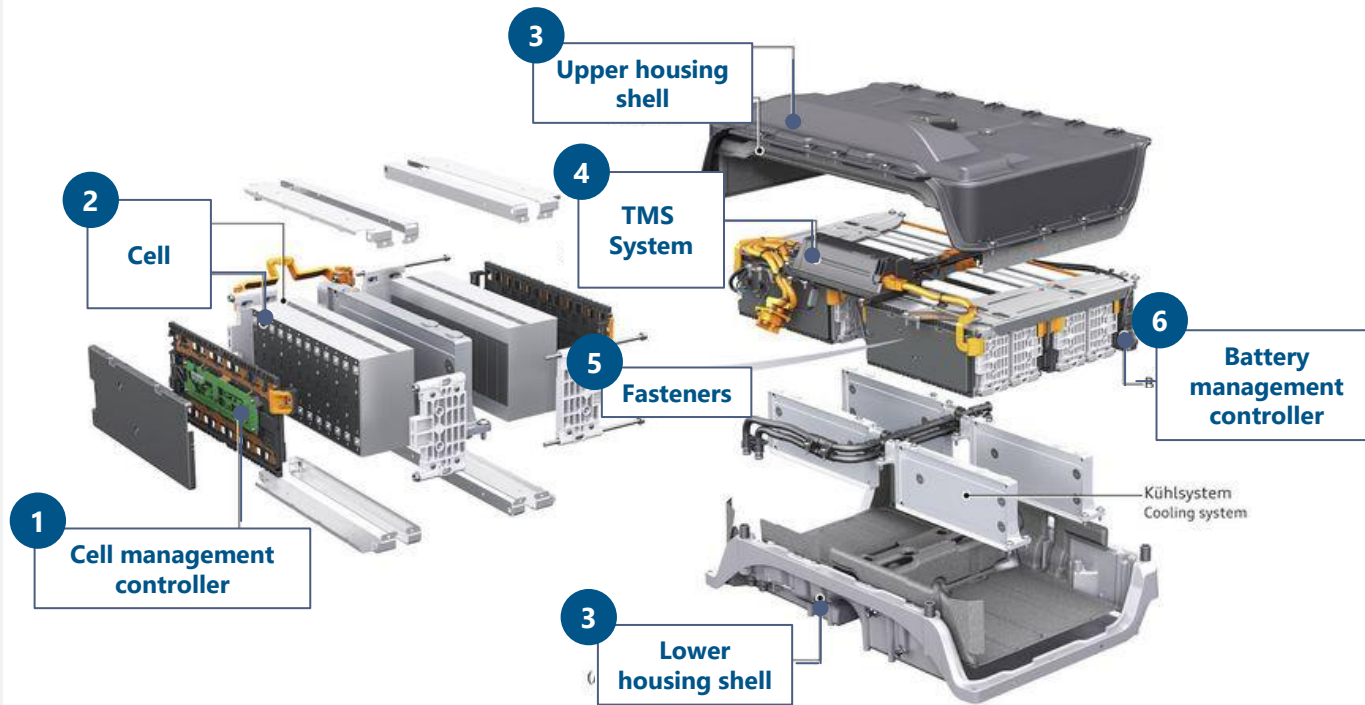


For reference, for 1 GWh capacity

- 60 to 100 MUSD CAPEX
- 50 to 100 jobs
- 10 to 20 k light vehicles

OVERVIEW: Plating applications in the EV Battery

**Rule of thumb: EV Batteries account for 1/3 *and more* of total EV weight
But they are (still) 30-40% of their cost**



Source: <https://www.greencarcongress.com/2015/11/20151103-a3.html>

1 Cell management

Housing, heat sinks, connectors, busbars

- Plating on plastics, pretreatment
- Low contact resistant silver layers
- Copper protection

2 Battery cell

Current collectors, lead tabs, connectors

- Cu and Ni plating, corrosion protection
- Adhesion promoter

3 Housing

Pretreatment, corrosion protection, paint support

- Al pretreatment, conversion coating
- ZnNi plating for steel, paint support
- Paint stripping

4 TMS (Thermal Management System) components

Cooling trays, cooling ribbons / blades

- Al pretreatment, conversion coating
- Electroless nickel

5 Fasteners

Corrosion protection

- Zn and ZnX plating, zinc flakes
- Electroless nickel

6 Battery management

Heat sinks, connectors, BMS (master ECU, battery junction box, cell module unit, current sensor), busbars (copper and aluminum), lead frames, QFNs

- PCB processes*
- Plating on plastics, pretreatment

Qualified processes to fulfill requirements of the EV supply industry

*Desmear and metallization, Cu plating, adhesion promoter, ENIG, I-Sn, Systems

Nichem LP 1124 ELV Compliant



Setting new standard of ELV compliance

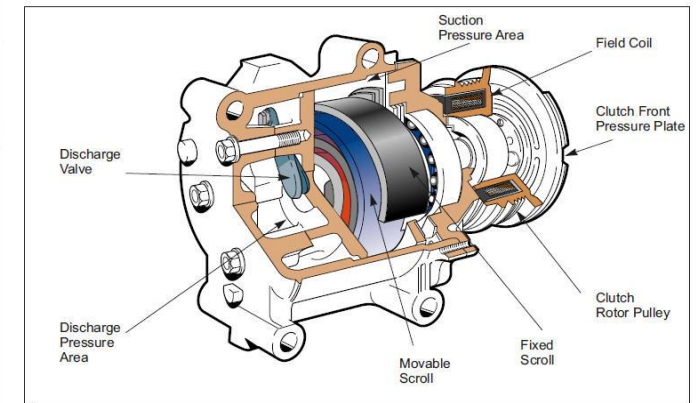
Nichem LP 1124 – new low P process

- Nichem LP 1124 produces low %P content NiP deposits (2–4% P)
- **Pb and Cd-free** (ELV and RoHS/WEEE compliant)
- **Boric acid free**
- **EDTA free**
- High as plated hardness
- Excellent wear resistance
- Excellent bath stability
- Good weldability and solderability

—
LEAD-
FREE
—

—
CADMIUM-
FREE
—

Toxic
metal
stabiliser
free



Source: <https://www.smpengineeredolutions.com>

Green Hydrogen Production



Green Hydrogen Market

Focus for Surface Engineering

Generation



- Alkaline Electrolysis (AEL)
- Polymer Electrolyte Membrane (PEM)
- Solid Oxide Electrolyser Cell (SOEC)

- **Electrolysers Coatings for:**
- BPP (AEL & PEM)
- Separator tanks (H₂ and O₂)
- Fasteners
- End plates and current collectors
- Filter assemblies and pipework



Storage and



- Tanks and pipes
- Compressed H₂
- Cryo-compressed H₂

- Valves
- Seals
- Storage vessels



Use

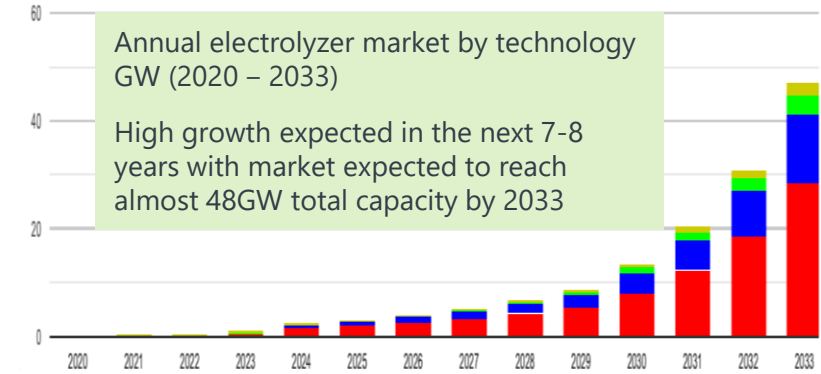


- Polymer Electrolyte Fuel Cell (PEFC)
- Solid Oxide Fuel Cell (SOFC)

- **Fuel Cell coatings for:**
- BPP (PEM)
- End plates
- Current collector plates
- Storage tanks



■ AEL ■ PEM ■ AEM ■ SOEC



MKS is contributing to reduce CO₂ emissions and supporting the H₂-industry in technical challenges

MSD Green Hydrogen Market

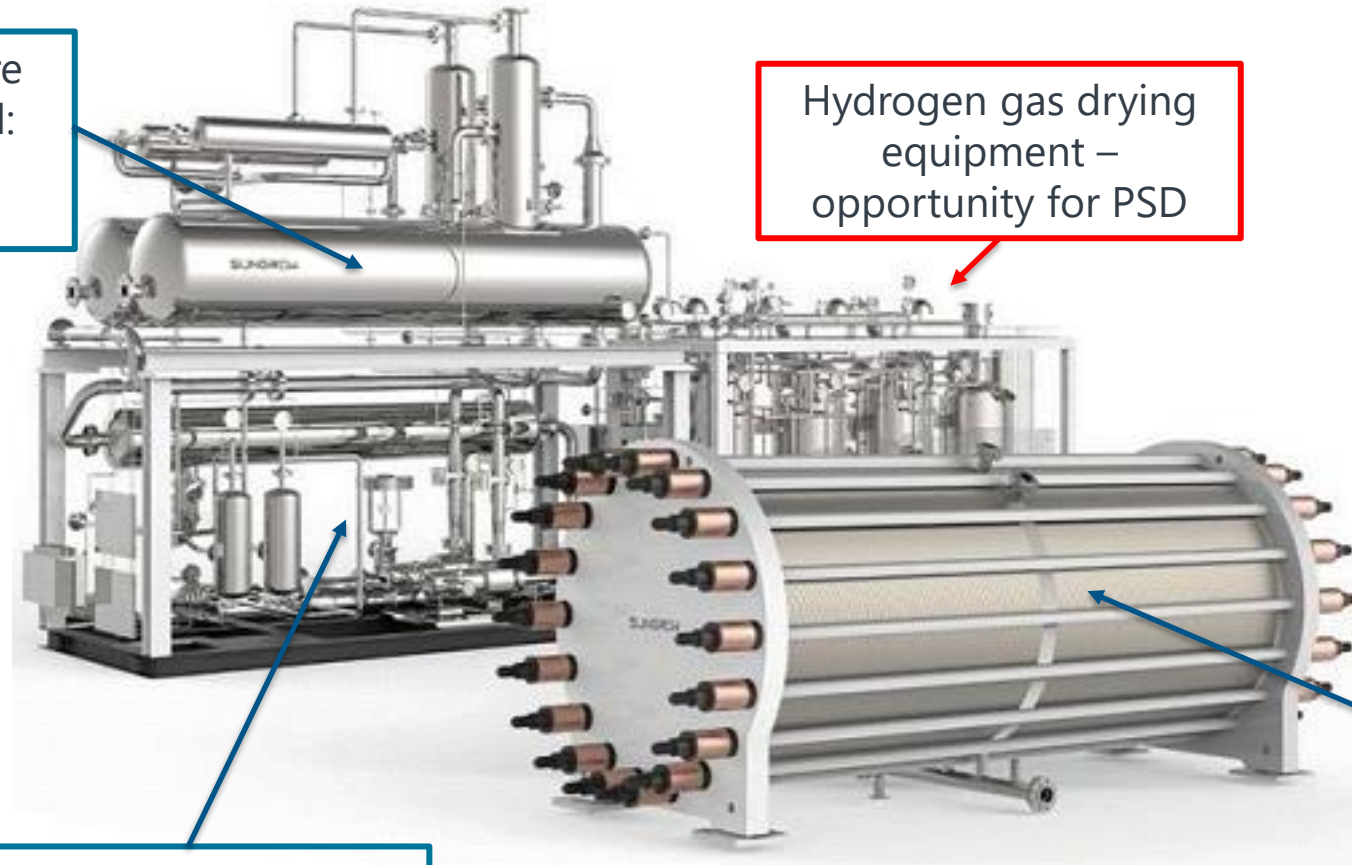
AEL Electrolyzer Unit - Typical Design

Hydrolysis of water – Alkaline water electrolyzer systems

Gas Separation tanks are electroless nickel plated:

- 1 x Oxygen
- 1 x Hydrogen

Hydrogen gas drying equipment – opportunity for PSD



Pumps & filtration equipment



The Stack 5MW:

- **Bipolar Plates** are nickel plated (x330-350)
- **Cathodes** are nickel plated + Catalyst coating (x330-350)
- **Anodes** are Nickel plated + catalyst coating (x330-350)
- **End plates** are Nickel plated (x2)
- **Fasteners** (numerous)

Beyond the REACH for many. Not for us.

Cr(VI)-free and non-PFAS decorative and functional chrome plating
Innovation and sustainability for new electrical vehicles (EV)



Covertron for
Chrome-free
etching of plastics



Extensive experience with
TriChrome, BluCr,
Fumalock for chrome
plating



Nichem and CuFoil to
enabling lightweighting in
EV

Thank you



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Retos y Tendencias en Tratamientos Superficiales

May 28, 2026 | Hotel Arima Donostia



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28 de mayo de 2026
Hotel Arima · San Sebastián

PROGRAMA

8:30-9:00	Registro
9:00-9:30	Inauguración de la Jornada. Sala Secuoya
9:30-10:15	BLOQUE Interreg SUDOE. Sala Secuoya
10:15-11:45	SESIÓN PLENARIA. Sala Secuoya
11:45 -12:15	Coffee break. Sala Mimosa
12:15-14:30	BLOQUE MONITORIZACIÓN. Sala Tamarindo BLOQUE SOSTENIBILIDAD. Sala Magnolia
11:45 -12:15	Cierre y Cocktail. Sala Mimosa
15:30-17:00	Visita a las instalaciones de CIDETEC Surface Engineering.

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