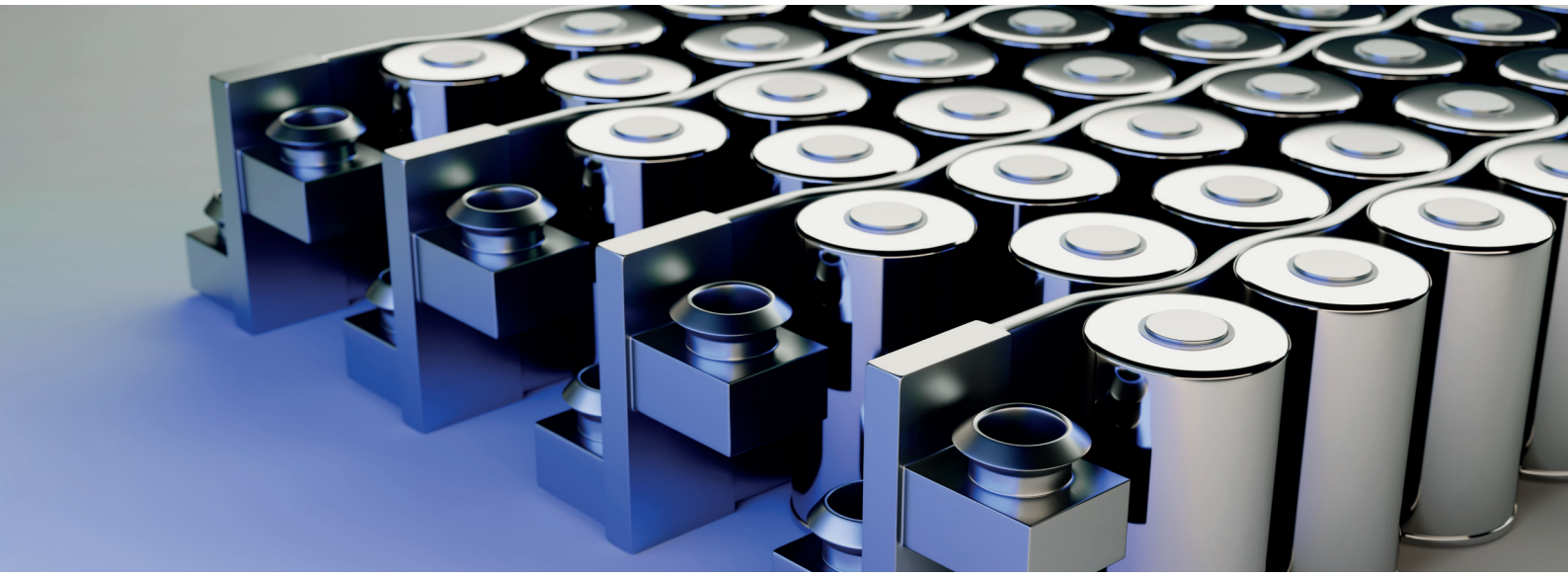
Battery solutions

Thermal management

General Metal Finishing | Product portfolio | atotech.com



Liquid cooling solutions for EV battery packs

Active liquid cooling is becoming the prevailing industry standard for consumer EV batteries. This approach involves utilizing a liquid coolant such as water, organic-based liquid coolant, or refrigerant within flat-plate loop heat pipes to effectively dissipate excess heat away from the battery.

One major challenge in liquid cooling systems is the potential corrosion of metal substrate-based components as they age. To address this concern, we offer specifically tailored solutions for liquid-cooled heat sinks. MKS' Atotech provides medium and high phosphorus electroless nickel processes that ensure exceptionally high corrosion resistance for the intricately shaped components exposed to the chemical environment of a coolant. The effect is that the plates maintain their integrity and functionality over time, safeguarding the overall performance and lifespan of the battery system.

Atotech® electroless nickel plating technologies for liquid-based cooling systems

Nichem® HP 1170: This high phosphorus electroless nickel process (10 – 12% phosphorus content) offers the highest level of corrosion protection in acidic conditions available on the market today. This lead- and cadmium-free process is suitable for multiple substrates and meets the highest standards of environmental compliance (ELV, RoHS, and WEEE regulations).

Nichem® MP NF: This mid-phosphorus electroless nickel process (5 – 8% phosphorus content) provides excellent corrosion protection and uniform thickness distribution over the entire component. The process is very stable and provides a long bath life for all substrates. It complies with ELV, RoHS, and WEEE regulations.

Nichem® HP 1151: This high phosphorus electroless nickel process (10 – 12% phosphorus content) furnishes parts with non-magnetic and highly corrosion-resistant deposits. These pit-free deposits can be plated at high thicknesses and pass the nitric acid test.

EDEN®: The EDEN electroless nickel process is designed to be operated with our EDEN technology to provide a long bath life (>500 MTO). Depending on its operation, it results in deposits that vary in phosphorus content from low to high. The process complies with ELV, RoHS, and WEEE directives. EDEN technology assists in reducing nickel waste by up to 35%.

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Solutions for forced air-cooling systems: Scroll compressors

The scroll compressor is a highly efficient and versatile technology. It is used for various applications, including refrigeration and air conditioning systems. As the orbiting scroll moves inside the stationary scroll, low-pressure and low-temperature gas is compressed and transformed into high-pressure gas.

Protection of rotating scrolls: Custom aluminum treatment for ultimate preservation

One critical aspect of scroll compressors is the protection of the rotating scroll from wear, which is subjected to high friction forces during operation. To ensure long-lasting performance and durability, the rotating scroll must feature a hard surface that exhibits excellent adhesion to the aluminum substrate and provides high wear resistance. Therefore, electroless nickel coating is applied in order to provide protection against excessive wear.Tin-plated fixed scrolls with wear-resistant surfaces must also be provided with good lubricity during operation.

The tailored Atotech aluminum pretreatment, electroless nickel plating, and immersion tin processes help empower manufacturers to optimize scroll compressor performance and durability. By protecting rotating and fixed scrolls and ensuring their smooth operation, we contribute to the seamless functioning of various applications that rely on scroll compressor technologies.

Tailor-made Atotech aluminum pretreatment technologies

Recognizing the specific requirements of different aluminum alloys, we have developed a comprehensive range of aluminum pretreatment solutions:

UniClean® 151: This low-foaming, non-etch mild alkaline hot soak cleaner suits all aluminum alloys and exhibits a high cleaning power by removing all types of grease and soil, machining lubricants, and polishing compounds.

UniClean® 1020: This highly alkaline etchant, suitable for all types of aluminum alloys in all condition types, provides uniform etching to efficiently remove heavy oxides.

Alumetch® LF: This universal process very efficiently removes all types of smut produced by the etching process and assists in removing oxide from aluminum surfaces. It is designed to reduce the amount of hazardous NOx fumes and is ideal for alloys with a high silicon content like A356 and ADC12.

AlumSeal® 611: This cyanide-free immersion zincate process for aluminum is designed to deposit a highly uniform immersion zinc coating onto a wide variety of aluminum alloy surfaces, preventing the formation of an oxide film and promoting excellent adhesion of subsequent metal deposits.

Atotech electroless nickel plating technologies for scroll compressor components

Our electroless nickel plating technologies offer a corrosion- and wear-resistant coating for scroll components. Electroless nickel plating provides excellent adhesion to aluminum substrates, forming a protective barrier that safeguards the scroll against wear, friction, and corrosion. This advanced plating solution extends the service life of the scroll compressor and enhances its reliability and efficiency.

Nichem® 6200 (CH): Nichem® 6200 (CH): This low phosphorus electroless nickel process (3 – 6% phosphorus content) provides the highest “as-plated” hardness (650 – 750 HV 0.025) to the deposit and thereby imparts the best wear-resistance performance. It is ideally suited for applications subjected to the most extreme wear.

Nichem® LP 300: This low phosphorus electroless nickel process (1 – 3% P) exhibits a high “as-plated” hardness, excellent electrical conductivity, and solderability. The process complies with ELV, RoHS, and WEEE directives.

EDEN® 200: For operation with EDEN (Electro Dialysis for Electroless Nickel) technology, we specially developed EDEN 200, the long-life electroless nickel bath. EDEN provides continuous regeneration, preventing the aging of the process bath and extending the bath life indefinitely. Thus, it eliminates the need for frequent bath make-ups and reduces waste treatment.

Immersion tin process

Alstan® 60 NA: This process provides deposits exhibiting a more lustrous and metallic appearance than matte white coatings obtained from conventional sodium or potassium stannate processes.