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STANDARDIZATIONNEWS

The Quest for Net-Zero

Setting New Standards in Fastener Manufacturing

By Sigma Fasteners

With two decades of experience in the industry, Sigma Fasteners has established itself as a leader in the fastener manufacturing sector, taking a proactive approach to standardization, making important contributions to coating technology, and adopting a relentless pursuit of excellence.

Sigma Fasteners is dedicated to maintaining high-quality standards and is committed to adhering unwaveringly to many ASTM International standards. This commitment extends across regions, from Middle Eastern oil fields to South American jungles to frozen tundras in the Arctic. With extensive experience supplying bolts globally, Sigma Fasteners ensures timely delivery to customers. Headquartered in Houston, Texas, we possess the expertise to efficiently manage global logistics, whether shipping directly or through freight-forwarding companies, navigating international regulations governing cargo transportation. This commitment to comprehensive service highlights Sigma Fasteners' reliability and effectiveness in meeting diverse customer needs worldwide.

Throughout operations, from material selection to manufacturing processes and product inspection, Sigma Fasteners seamlessly integrates standards from ASTM's committee on steel, stainless steel and related alloys (A01) such as A193, A194, A320, and A453; and the committee on nonferrous metals and alloys (B02) such as B564, B408, B164, B446, B637, and more. These standards are foundational in ensuring product consistency and reliability. By incorporating ASTM standards, the company not only guarantees the quality, reliability, and performance of its products but also prioritizes safety and compliance with international industry regulations. Each ASTM standard establishes the necessary quality parameters, enabling us to consistently deliver products that meet or exceed customer expectations.

Sigma Fasteners, along with its partners, is at the forefront of utilizing innovative coating technology, particularly in the application of nanostructured zinc-nickel coatings. Nanostructured zinc-nickel (Zn-Ni) refers to a material composed of zinc and nickel alloy in a nanostructured form, manipulated at the nanoscale (typically with dimensions ranging from 1 to 100 nanometers). This level of control over the material's structure and properties can lead to enhanced performance and unique characteristics compared to the material in its conventional state.

The journey to develop nanostructured Zn-Ni coatings began with a comprehensive research and development process. Through collaboration with partners involved in the development of these coatings, Sigma Fasteners has effectively integrated this advanced technology into our operations, further solidifying our position as a forward-thinking leader in the industry. Sigma Fasteners conducted extensive experimentation and testing, drawing on collaborative expertise in materials science, metallurgy, and chemical engineering to explore novel approaches to coating formulation. As the development process progressed, the company remained steadfast in adherence to ASTM standards, using them to guide the rigorous evaluation and testing of nanostructured Zn-Ni coatings, ensuring compliance with the highest quality and performance standards.

These efforts resulted in the creation of a nanostructured zinc-nickel coating that surpassed expectations. The fine-grained structures produced via pulse plating from modified commercial Zn-Ni alloy plating solutions were found to have a number of benefits over conventional direct current (DC) plating, and we believe this coating represents a significant advancement in fastener technology.

Sigma Fasteners' nanostructured Zn-Ni coating results from two interrelated effects: the development of a unique nanostructure and the application of adjusted electrodeposition parameters. These effects, combined with the resulting superior corrosion-resistance performance, establish a distinct category of electrodeposited coatings separate from standard zinc-nickel coatings. This distinction requires a new specification, leading to Sigma Fasteners' current collaboration with the committee on metallic and inorganic coatings (B08) in the development of a new standard for nanostructured Zn-Ni. This standard aims to assist oil companies in formulating generic specifications for use in the energy industry.

From product brochures to website content and marketing campaigns, Sigma Fasteners underscores its commitment to upholding ASTM standards, leveraging their reliability and global recognition to reinforce its position as a trusted provider of high-quality fastening solutions.

Sigma Fasteners' commitment to innovation extends beyond coatings, with continuous investment in advanced technologies and processes to enhance product quality, performance, and dependability. Through collaborative research initiatives and strategic partnerships, our company remains at the forefront of innovation.

Moving forward, Sigma Fasteners remains committed to advancing coating technology, and investing in research and development initiatives to enhance product performance, reliability, and sustainability. By upholding ASTM standards, pioneering coating technologies, and embracing innovation, Sigma Fasteners sets a new standard for quality and reliability in the industry and remains a trusted partner for industries worldwide, delivering solutions to address the most pressing challenges. ■

SIGMA FASTENERS

Headquarters: **Sigma Fasteners, Houston, TX**

Description: **Providing quality bolting and coating for the energy industry since 2004.**

Number of employees: **90**

Yearly revenue: **$20M**

Trading area: **Global**