SHLOK SUNDARESH /// ENGINEERING MANAGER /// TS USA (HEF GROUP)

"Our liquid nitriding and PVD equipment are manufactured to very exacting standards to meet repeatability and process control demands"

What is your role at TS USA?

I joined TS USA, HEF Group, in 2014 as a process engineer for its Springfield, Ohio, facility. As our footprint in the U.S. grew, my responsibilities included other nitriding facilities as well across diverse applications. In 2018, I was promoted to the role of Senior Process Engineer, leading process development activities for the U.S. organization. In 2019, I was promoted to the engineering manager position responsible for all process engineering activities of the company in the U.S. along with supporting the North American side of the business. Part of my responsibility includes providing technical support, not just to our customers in terms of developing applications and the use of surface treatments, but also on the licensing side of the business where we provide some technical assistance to nitriders who purchase chemicals from us.

What is your organization's background?

HEF Group, which stands for Hydromécanique et Frottements (Hydromechanics and Friction)— is a French-based company. HEF Group's global HQ is located south of Lyon, France, and it primarily started as a tribology company working on wear, friction, and corrosion reduction applications. We've been in business for more than 60 years, and we are the leading global provider of surface treatments and coatings primarily. Our two primary surface technology options are liquid nitriding and physical vapor deposition or PVD, specifically diamond-like carbon coatings (DLC). We are the only supplier that offers both technology options worldwide. We also offer a range of other surface treatments to meet customer-specific needs. All of our facilities provide surface treatments and coating jobbing services to local customers. It can be applications ranging from automotive to oil and gas to aerospace, as well as hydraulic and pneumatic equipment, construction and mining equipment, material handling equipment, or even power generation. TS USA — Techniques Surfaces USA — is a subsidiary of HEF Group. HEF does the manufacturing, and TS offers the processing for our customers.

Does HEF design and manufacturer its own equipment?

HEF manufactures its own chemicals and equipment for liquid nitriding side of the business. We also manufacture our own equipment for PVD vacuum coatings as well. In short, we are a vertically integrated organization offering value-added surface engineering solutions. Our liquid nitriding and PVD equipment are manufactured to very exacting standards to meet repeatability and process control demands for a diverse range of industrial segments. Our nitriding chemicals are the new generation technology that is environmentally friendly and can yield metallurgical properties superior to the other nitriding processes and platings.

Your website www.hefusa.net mentions processes that are not common in traditional heat treatment. Can you elaborate?

Liquid nitriding and salt bath nitriding are used interchangeably in the industry. We offer different variants within the same technology, and MELONITE®, TUFFTRIDE®, and ARCOR® are all trademarked processes of HEF Group called as CLIN — controlled liquid ionic nitriding. These trade names are used primarily for differences in the nitriding chemistry and the secondary processing steps (if any). ARCOR® (V, N, C, DT, etc.) represents a family of liquid nitriding processes based on customer-specific applications and our chemicals. They provide a more robust compound layer, which are operationally easier to control and environmentally friendlier than other liquid-nitriding treatments.

Could you explain some of the advantages of your processes over conventional gas nitriding and chrome platings?

Nitrocarburizing uses different media such as liquid, gas, or plasma and, in some cases, fluidized bed, which is not as popular. However, all methods are intended to accomplish similar, but not identical results. Liquid or salt bath technologies are typically considered the benchmark for uniformity with more flexibility in terms of tailor-made innovative solutions. ARCOR® and MELONITE® liquid nitriding provides the best combination of both wear and corrosion protection. But the key advantage here is its much shorter processing times (few hours) as compared to the very long 12 to 24 hours for gas nitriding. The benefit with HEF's liquid nitriding services is it provides that added option of impregnation with proprietary oils that can enhance the corrosion resistance of the nitrided part. The customizable surface porosity that's generated with this process is very effective in retaining the impregnated fluid and increasing the lubricity and also beneficial for breaking applications. In the past few years, gas and plasma nitriding were default processes because parts with large dimensions of more than 60 inches long couldn't be done in those furnaces. However, at our TS USA Chattanooga, Tennessee, facility, we're able to offer our treatments for applications such as oil and gas, large and heavy, hydraulic or pneumatic applications, and high-volume automotive components. HEF's environmentally friendly liquid-nitriding technology, along with its enhanced performance, has been the go-to process, replacing a lot of hard chrome plating, which has environmental challenges with hexavalent chrome.

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