

New TUFFTRIDE® system at the Donau-Härterei in Neu-Ulm goes into operation



„The process reliability and flexibility are convincing“

Stefan Schiele, CEO of the Donau-Härterei, is currently expanding his hardening shop's capacities with a new TUFFTRIDE® system. He has been using the TUFFTRIDE® system for several years and appreciates the advantages of salt bath nitrocarburizing when treating parts of steel, cast iron and sintered iron materials. The company regards its new investment in the ultramodern salt bath system from Durferrit GmbH, Mannheim, as an important step in securing its future.

High flexibility and process reliability are decisive advantages

"We have clear competitive advantages through the use of salt bath technology", is the positive summary of the managing partner Stefan Schiele, and the strongest argument for his commitment to the salt bath technology and associated expansion of capacities. Even if hardening in salt baths is not the focus of today's work in many general and contract hardening shops, he has deliberately opted for this process. And for a good reason: "This process offers not only a high process reliability but also enormous flexibility. We can compile our batches at random and even process individual parts in the salt bath when working to a tight schedule since the furnace is accessible at all times. What's more, components can be simultaneously nitrocarburized with different treatment parameters".

The TUFFTRIDE® systems demonstrate their superiority with their great flexibility in the current tense economic situation and the drop in overall volumes.

Components treated by the TUFFTRIDE® process in combination with an oxidizing after treatment display excellent results in terms of wear resistance, corrosion resistance, fatigue strength and the sliding properties. In many cases the TUFFTRIDE® process is an ideal alternative to other surface layer processes

such as case hardening, plasma and gas nitrocarburizing or coating methods such as hard chrome plating, nickel plating or plastic coating.

"Our customers are well aware of the advantages of the process. Reproducibility is a key argument, particularly for critical components, since the temperature constancy is one of the most important parameters for the result during heat treatment. And this is easily at its best in molten salt. Since the microstructure of the base material does not change during the TUFFTRIDE®-treatment and the thermal stresses are very low thanks to a very smooth heating and cooling, there are no significant changes in dimensions. A very important argument for our customers."



The high flexibility and great process reliability are the decisive advantages of the new TUFFTRIDE® system for Stefan Schiele, CEO of the Donau-Härterei (right) and Dr. Joachim Boßlet.

Constant quality control

With a comprehensive quality assurance system, the team at the Donau-Härtereie also ensures that the focus is on quality, starting with the incoming goods to be treated, and this remains a key role throughout the entire process chain. "All common hardness testing methods are used in our modern workshop laboratory, for example. We have a modern image process system for microstructure tests. Digital image technology means that we can send our customers the results of our tests quickly by email. This saves time and costs. This is very important, especially for our customers in small and medium-sized enterprises", is how Stefan Schiele explains the high standing of quality in his company. The great know-how and experience of the employees also plays a key role in this context.

New system technology saves energy and improves quality

Despite the high reproducibility of the processes, process control is very simple and needs no complicated system technology. As Dr. Joachim Boßlet, head of technical sales at Durferri GmbH, emphasises, "the treatment of components can be carried out not only in computer-controlled automatic machines but also on manually operated plants. The system itself is operated with no waste water. A newly developed, pneumatically closable and insulated cover minimises heat losses from the surface of the bath. With the help of the new TENOCLEAN® filter technology, the molten salt is permanently cleaned with a high level of efficiency. A special dosing device for the regenerator REG1 permits the exact adjustment of the activity in the melt. This means that we can further improve the good layer qualities. The process is on the whole very ecological."

Since the bath is regenerated with no change in the volume of the molten salt, no waste salt is produced. The drag-out losses that occur when the treatment batch is removed are compensated with the TF1 refill salt. Unlike gas nitriding/gas nitrocarburizing, those charge materials needed in the TUFFTRIDE® process (TF1 und REG1) are classified as neither toxic nor harmful for the environment.



About TUFFTRIDE®

TUFFTRIDE® is a process to nitrocarburize components of steel, cast iron and sintered materials in a salt bath. The parts to be treated are normally immersed in a molten bath with a controlled cyanate content at temperatures just below 600 °C for between a half and two hours depending on the steel composition. The oxidation treatment after the salt bath nitrocarburizing is carried out in a specially developed quenching bath. A black iron oxide layer (magnetite) is hereby produced on the surface of the treated parts which greatly increases the corrosion resistance. The quenching bath has a temperature of 370-420 °C. The components are then cooled further to room temperature and cleaned.

During TUFFTRIDE® treatment a nitrocarburizing layer is formed consisting of the external compound layer (- iron nitride) and the subsequent diffusion layer.

The development, structure and properties of the compound layer depend on the base material that is used. The compound layer consists of composition of iron, nitrogen, carbon and oxygen. Their structure means that it no longer has any metallic properties. It is characterised by a very good resistance to wear, scuffing and corrosion and is stable almost up to its formation temperature. Compared to plasma or gas nitrocarburizing, compound layers with the highest oxygen contents can be produced with the TUFFTRIDE®

process. Layers with a high oxygen content provide better wear and in particular corrosion resistance than those with a lower content. Vickers hardnesses of around 800 to 1500HV have been measured in the compound layer depending on the material used. Apart from the treatment conditions (temperature, time, bath composition) the carbon and alloying elements contents of the materials being treated affect the layer thickness that can be achieved. Although the layer growth drops with an increasing alloy share, the hardness increases to the same degree.

TENIFER® is a registered trademark of Durferri GmbH. The process is also known under the trademark TUFFTRIDE® or MELONITE® outside Germany.

"The high environmental compatibility and energy-saving new plant technology were additional important aspects to trust in the proven TUFFTRIDE®-technology in future. The long-standing and good cooperation with the specialists at Durferri GmbH has certainly paid off."

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