

# THERMO-TECH

THERMONITE<sup>SM</sup> - Quality Heat  
Treatment of Tool Steels





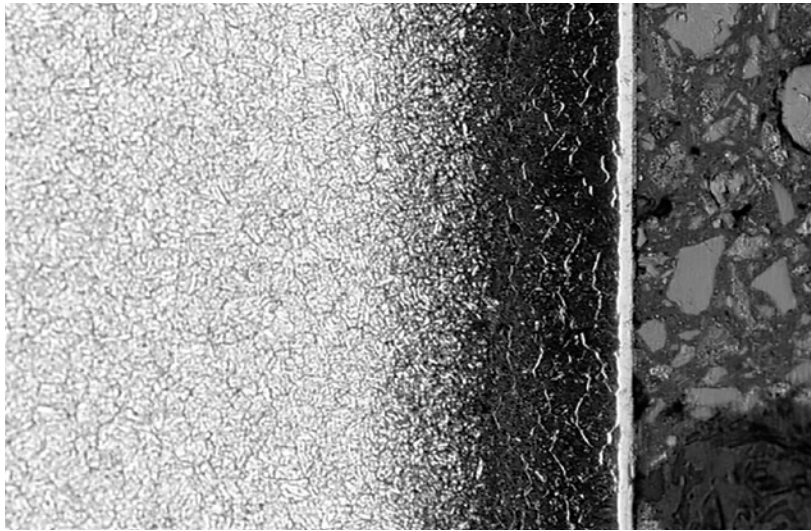
# THE THERMONITE<sup>SM</sup> PROCESS

voestalpine Thermo-Tech is equipped with a unique Nitro-carburizing surface treatment to answer the needs of hot work and cold work tool manufacturers. THERMONITE<sup>SM</sup> is a perfect complement to the Vacuum Heat Treatment services available from the World's Leading Tool Steel company.

- » THERMONITE<sup>SM</sup> (Gas Nitriding, Nitrocarburizing)
- » THERMONITE<sup>SM</sup> II (Gas Nitriding + Oxidation)
- » THERMOX<sup>SM</sup> (Oxidation)

## Exceptional Properties:

- » Abrasive and erosive wear solutions
- » High surface hardness
- » Increased resistance to thermal fatigue
- » Surface lubricity
- » Higher contact fatigue strength in machine parts applications
- » Increased resistance to atmospheric corrosion



## SURFACE HARDNESS OF THERMONITE<sup>SM</sup> TREATED MATERIALS

Material	Hardness before FNC, HRC	Surface hardness after FNC, HRC	White layer Hardness, HRC
H13	~45	60-64	>68
P20	~29	55-60	-
4140	~28	55-60	-
Mild Steel	<20	41-43	-

## THERMONITE<sup>SM</sup>

THERMONITE<sup>SM</sup> imparts high wear resistance to ferrous alloys (iron and steels), and is suitable for parts requiring high surface hardness, wear/erosion resistance and resistance to atmospheric corrosion. The parts are heated to a suitable temperature between 900°F - 1050°F in a vacuum chamber. Upon reaching the specified temperature a balanced mixture of nitriding and carburizing gases, are injected into the chamber for a specified period under a completely automatic computerized control system. Since, the parts never come into contact with air at high temperatures, no oxidation or scaling takes place during this process.

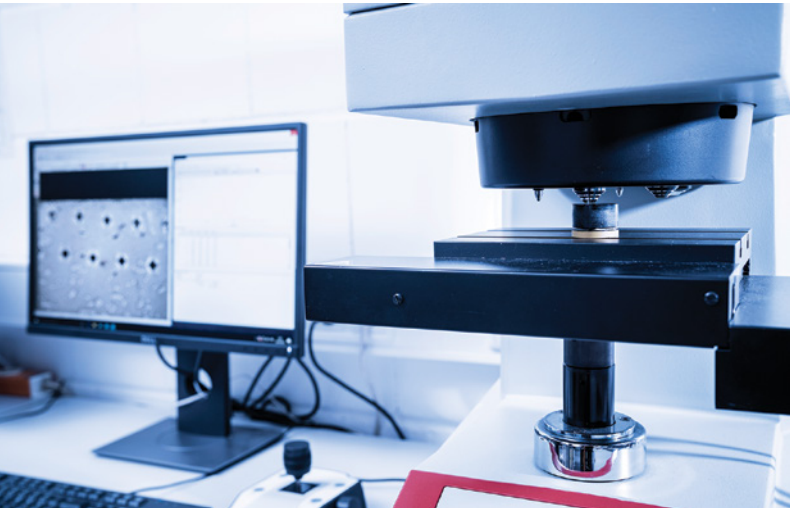
The process duration and the temperature have a direct influence on the result. With the targeted process control, the hardness, the nitriding hardness or hardening depth and the layer thicknesses can be influenced.

## THERMONITE<sup>SM</sup> II

THERMONITE<sup>SM</sup> II is an innovative process combining THERMONITE<sup>SM</sup> with a precisely controlled oxidation phase used when resistance to atmospheric corrosion and an attractive black finish are the main requirements. With the targeted post-oxidation, the iron nitride layer at the surface of the workpiece is transformed into an iron oxide layer due to an oxidizing atmosphere. Through careful formation of the oxide layer on the surface, our THERMONITE<sup>SM</sup> II treatment not only enhances corrosion resistance but also contributes to superior die lubricant retention and increased wear resistance. Elevate your materials with the cutting-edge technology of THERMONITE<sup>SM</sup> II for unparalleled performance and longevity.

## THERMOX<sup>SM</sup>

THERMOX<sup>SM</sup> Oxidation increases the corrosion resistance of the material. The treatment creates a 1-2  $\mu\text{m}$  thin oxide layer of  $\text{Fe}_3\text{O}_4$  (magnetite), which gives the surface an anthracite to black appearance and makes it significantly less susceptible to corrosion.



## CAPABILITIES

- » Microprocessor controls for precise nitriding potential and repeatable results.
- » On-site Metallurgical Test Lab, NADCAP accredited.
- » Metallurgical R&D Team for cycle development.
- » Conformance to SAE specifications AMS-2759/6 for gas nitriding.
- » Ability to mask parts.
- » Standard processes offered by voestalpine Thermo-Tech are short-term nitriding, normal nitriding, and long-term nitriding. We, of course, also perform customer-specific nitriding treatments.
- » At Thermo-Tech we adopt a problem-solving approach rather than fact finding alone. When you trust us with your inquiry, we seek to understand your problem and work hard to find optimum tailored solutions.
- » Experience counts and Thermo-Tech has that experience working with tool steels all over the world.

**Put our experience to work for you!**

## QUALITY ASSURANCE & PROCESS CONTROL

THERMONITE<sup>SM</sup> processing is carried out in state of the art, fully automated vacuum sealed electric furnaces with minimum operator intervention which provides excellent repeatability.

We are certified to ISO9001:2015 and AS9100D standards and received NADCAP Accreditation in 2022.

## APPLICATIONS

- » Hot forging dies, Extrusion tooling.
- » Plastic molds made from P20 and high strength structural steels (Cr, Ni, Mo alloyed steels).
- » Machine parts such as Hydraulic Cylinders, Gears, Shafts, Bushings, Pinions, and Rack assemblies.
- » Thin gauge stampings which are made from low strength steels because of ease of forming, attain higher strength to mass ratio and gain very high over all strength and structural rigidity.
- » Parts made from low carbon/alloy steel requiring better sliding wear resistance and resistance to ordinary atmospheric corrosion with aesthetically enhanced surface appearance.
- » Can be used as a high hardness substrate in multi-layer coatings.

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**voestalpine**  
ONE STEP AHEAD.