



VERDER
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Science for Solids

Solutions for the Steel Industry
and Foundries

Solutions for the Steel Industry and Foundries

Are you looking for innovative, efficient solutions for your steel production or foundry process? Microstructural Analysis, Hardness Testing, Heat Treatment, Elemental Analysis, Size Reduction and Particle Size and Shape Analysis, – the brands of Verder Scientific offer high-quality solutions combined with expert advice and support service worldwide.

Please visit our website «Solutions for the Steel Industry and Foundries» at www.verder-scientific.com/industries/steel-production.



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Materialographic Preparation Process

ATM manufactures machines for materialography (metallography) used in quality control processes.

Steel parts require thorough testing, for instance, after the heat treatment process. ATM's wide range of high-quality machines for cutting, mounting, and grinding/polishing allows for a perfect surface preparation as prerequisite for reliable microstructural analysis.

Thanks to automated solutions, such as the innovative **Cut-off Machine Brilliant 240**, sample preparation is convenient and reproducible. The new, modular **Hot Mounting Press Opal X-Press** is ideally suited to obtain samples with low shrinkage and high edge retention.



Hardness Testing

QNESS specializes in the development and manufacture of innovative hardness testing machines.

Hardness is one of the most important material characteristics for steel producing and heat treatment companies. QNESS instruments combine the two essential requirements for hardness testers integrated in the production process: robust design and simple operation.

For hardness analysis, the **Q150 hardness tester series** is available as compact semi-automatic Rockwell tester or as fully-automatic universal hardness tester.

QNESS is also able to provide customer-specific hardness testing plant solutions, e. g. in-line hardness testing portals or hardness testing machines with integrated milling units for surface preparation called "Qsolution".



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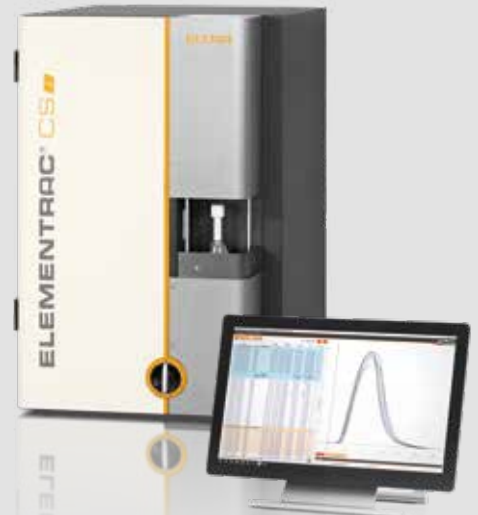
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Elemental Analysis

ELTRA develops combustion analyzers for precise and sensitive CHNOS determination in solids.

Steel plants observe the decreasing carbon content during the whole steel production process from raw iron with up to 4-5% carbon to a few ppm in stainless steel. The carbon content influences not only the texture, but also the material properties of iron; therefore, it is important to determine the content of carbon and sulfur quickly and efficiently during all production stages.

Modern combustion analyzers, like ELTRA's **ELEMENTRAC CS-i**, require a nominal analysis time of 40 seconds to determine both carbon and sulfur content and are easy to operate.



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Heat Treatment

CARBOLITE GERO offers solutions for heat treating (annealing and hardening) special metal alloys and stainless steel.



CARBOLITE GERO has manufactured **continuous furnaces for steel wire** with up to 22 simultaneous lanes and temperatures ranging from 200°C to 1100°C. These custom furnaces can be designed for single/multi-zone operation with inert or reactive atmospheres and optional water quenching and compliance with AMS 2750E.

The **GLO sealed vacuum retort furnace** is available in 4 sizes (40, 75, 120 & 260 liters). With a maximum temperature of 1100°C and fast cooling options, this is a perfect solution for annealing, hardening and tempering. An optional debinding package adds the ability to use this same furnace for debinding or pyrolysis.



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Size Reduction & Particle Size Analysis

RETSCH provides size reduction and sieving equipment designed for sample preparation and characterization of solids.

A variety of raw materials and slags need to be analyzed with regards to their mineralogical and chemical composition to optimize the steel production steps where these materials are involved.

At each stage of the production, samples must be taken, pulverized and analyzed to ensure quality control without gaps. RETSCH offers a range of instruments suitable for the process like **Jaw Crushers**, **Disc Mills**, and **Pellet Presses**.





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Particle Characterization

RETSCH Technology is the leading manufacturer of image analyzers for measuring particle size and particle shape of bulk materials.

Particle analysis is an essential part of the quality control process of different materials that are used in the steel and foundry industry:

- Sand is tested for its suitability to create molds for casting
- Ferro Silicon, which is used as a reducing agent in steel production
- Heat-resistant materials that are used as refractory linings
- Coal and Coke

While sieving is the most common method of analysis, the information gained by it is limited, plus, it is time consuming and error-prone. Therefore, many companies worldwide have switched to **Dynamic Image Analysis systems** like Retsch Technology's **CAMSIZER P4** and **CAMSIZER X2**. Together, these two instruments cover a size range from 0.8 μm to 30 mm, providing detailed particle size and shape information within minutes. The instruments are suited for operation in rough industrial environments as well as in the laboratory.



Science for Solids

As part of the VERDER Group, the business division VERDER SCIENTIFIC sets standards in the development, manufacture and sales of laboratory and analytical equipment. The instruments are used in the areas of quality control, research and development for sample preparation and analysis of solids.

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