

ENABLING THE FUTURE OF METALLURGY

INNOVATION IN STEEL AND NON-FERROUS METALS INDUSTRY



MATERIALOGRAPHY & HARDNESS TESTING

qatm.com



CUTTING, MOUNTING, GRINDING, POLISHING AND HARDNESS TESTER

QATM is a manufacturer of metallographic and **hardness testing equipment**, which are essential for non-ferrous metals due to their more ductile nature.

Common applications:

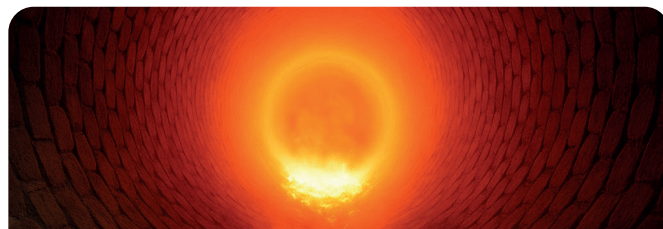
- | **Aluminum and copper alloys** can be prepared with abrasive cut-off machines, mounting systems, and automated grinders/polishers ensure **mirror-finish cross-sections** with **minimal artifacts**, enabling accurate microscopic analysis of grain structures and second-phase particles.
- | Fast controlled material removal to achieve **flatness and prevent scratching**, which is essential for revealing microstructural features like precipitates in age-hardened aluminum or phase distribution in brass.
- | Hardness testers covering microhardness (**Vickers, Knoop for ASTM E384/E92**) and macro hardness (Rockwell, Brinell per ASTM E18, ISO 6508, ISO 6507), supporting traceable, internationally recognized methods.
- | Advanced applications include **hardness mapping of specific components**, such as evaluating the hardness profile of an Aluminum gear **to verify the homogeneity of aging treatment**.

Preparation Methods For Metallographic Analysis



HEAT TREATMENT

carbolite.com



ANNEALING, SINTERING, BRAZING AND CALCINATION FURNACES

CARBOLITE manufactures **heat treatment instruments** widely used in the metallurgical sector across various application areas.

Some examples include:

- | **High-temperature vacuum and inert-gas furnaces** for heat treatment of specialty alloys, including controlled atmosphere **annealing, sintering, and brazing** of titanium and nickel superalloys, with temperature capabilities up to 1150 °C and low oxygen environments.
- | GPCMA series **retort furnaces** designed for powder metallurgy and additive manufacturing, enabling annealing and sintering of **metal powder compacts under Argon or forming gas**; can be certified to **aerospace standards such as AMS 2750 (NADCAP)**.
- | Calcination and drying furnace for minerals (such as bauxite and foundry sand), as well as graphitization and carbonization processes for carbon-based composites.

Carbolite Ovens & Furnaces For Heating Applications



ELEMENTAL ANALYSIS

eltra.com



OXYGEN (O), NITROGEN (N), SULFUR (S), CARBON (C) AND HYDROGEN (H) CONTENT

ELTRA manufactures elemental analyzers for the **determination of O, H, N, C, and S in steels and non-ferrous metals**, enabling the assessment of these materials' properties.

Some of the most common applications include:

- | Oxygen content in copper affects its **electrical conductivity**; our instrument are compliant to **ASTM E2575** for determination of **oxygen levels in copper**.
- | Excess hydrogen—and, in titanium, nitrogen—rather than the analysis itself, **causes embrittlement**. **ASTM E1409** (for oxygen and nitrogen) and **ASTM E1447** (for hydrogen) are used for this measurement.
- | Analysis of **O, N, and H in various metals such as steel, titanium, nickel, and copper** in compliance with many standard norms.

Elemental Analysis Applications

