

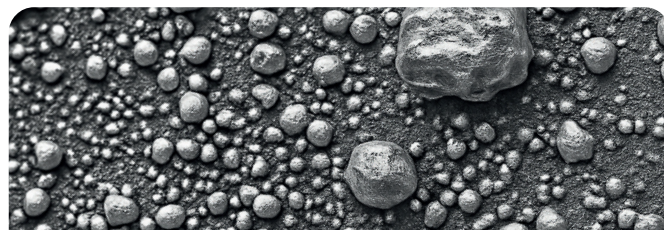
ENABLING THE FUTURE OF METALLURGY

INNOVATION IN METAL POWDER



PARTICLE CHARACTERIZATION

microtrac.com



PARTICLE SIZE AND SHAPE, BET SURFACE AREA, DENSITY, AND METAL COLLOIDS CHARACTERIZATION

MICROTRAC is a manufacturer of particle characterization instruments. The product range is divided into three main areas: **particle size and shape analysis**, **surface area and density measurement**, and **zeta potential and colloid analysis**.

Some examples of common applications:

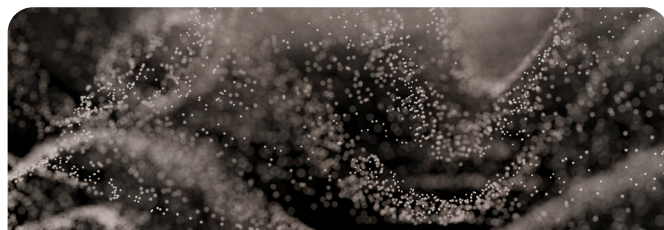
- | **Particle Size and Shape Analysis (ASTM B822, ISO 13320, ASTM F3571-22)** to ensure proper flow, packing, and sintering of metal powders (Al, Ti, Ni, Cu) in additive manufacturing and powder metallurgy.
- | **BET Surface Area and Pore Size Distribution (ASTM D3663, ISO 9277)** to evaluate powder reactivity and porosity, supporting quality control in sintering, catalyst development, and alloy R&D.
- | **True density measurement (ASTM B923, ISO 12154)** assessing powder flow, compaction, porosity, and monitoring alloy phase composition.

MICROTRAC - Leader in Particle Characterization



POWDER TESTING

erweka.com



TAPPED DENSITY AND FLOW GRANULATE TESTER

ERWEKA is a manufacturer of high-quality testing equipment for industry.

Tapped density tester accurately measures the tapped density of metal powders, ensuring consistent packing and quality. Flow granule tester evaluates the flowability of metal powders, essential for efficient processing and optimal product performance in industrial applications.

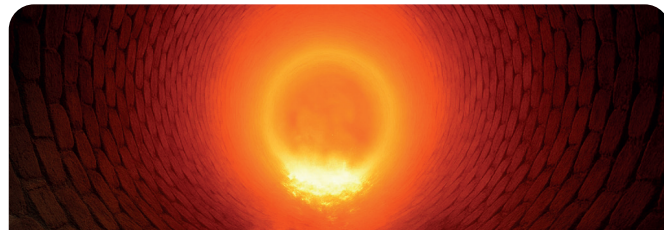
- | Determines the tapped density of **metal powders according to official methods**, providing critical data for powder compaction and quality control.
- | Measures the flowability of metal powders, essential for assessing powder behavior during handling and processing in metallurgical applications.

SVM II Tapped Density Tester Physical Tester



HEAT TREATMENT

carbolite.com



ANNEALING, SINTERING, BRAZING AND CALCINATION FURNACES

CARBOLITE manufactures heat treatment systems 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; to determine oxygen levels in copper, **ASTM E2575 is used**.
- | Determination of **C and S in stainless steel powder** using the **induction method** which ensures high temperature and fast combustion.
- | **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 for all industries & markets



MATERIALOGRAPHY & HARDNESS TESTING

qatm.com



CUTTING, MOUNTING, GRINDING, POLISHING AND HARDNESS TESTER

QATM manufactures precision instruments essential for the preparation and analysis of powdered metal components, including:

- | **Sectioning & Mounting**: Fast, precise cut-off and mounting products for fragile and porous samples. With two-step hot mounting process make the hot mounting of fragile and porous samples possible.
- | **Grinding & Polishing**: Automated solutions achieve flat, scratch- and deformation free surfaces, crucial for accurate porosity and microstructure analysis in sintered metals.
- | **Hardness Testing**: Full range from micro- to macro-hardness (Vickers, Knoop, Rockwell, Brinell, ASTM/ISO compliant) for evaluating surface and core properties of powder metal parts.
- | **Advanced Analysis**: Supports microstructure evaluation, density measurement, and hardness mapping—ideal for quality control and process optimization in powder metallurgy.

QATM solutions ensure reliable, repeatable results for aluminum, copper, steel, and all other powder metallurgy components.

Preparation Methods for Metallographic Analysis



MILLING & SIEVING

retsch.com



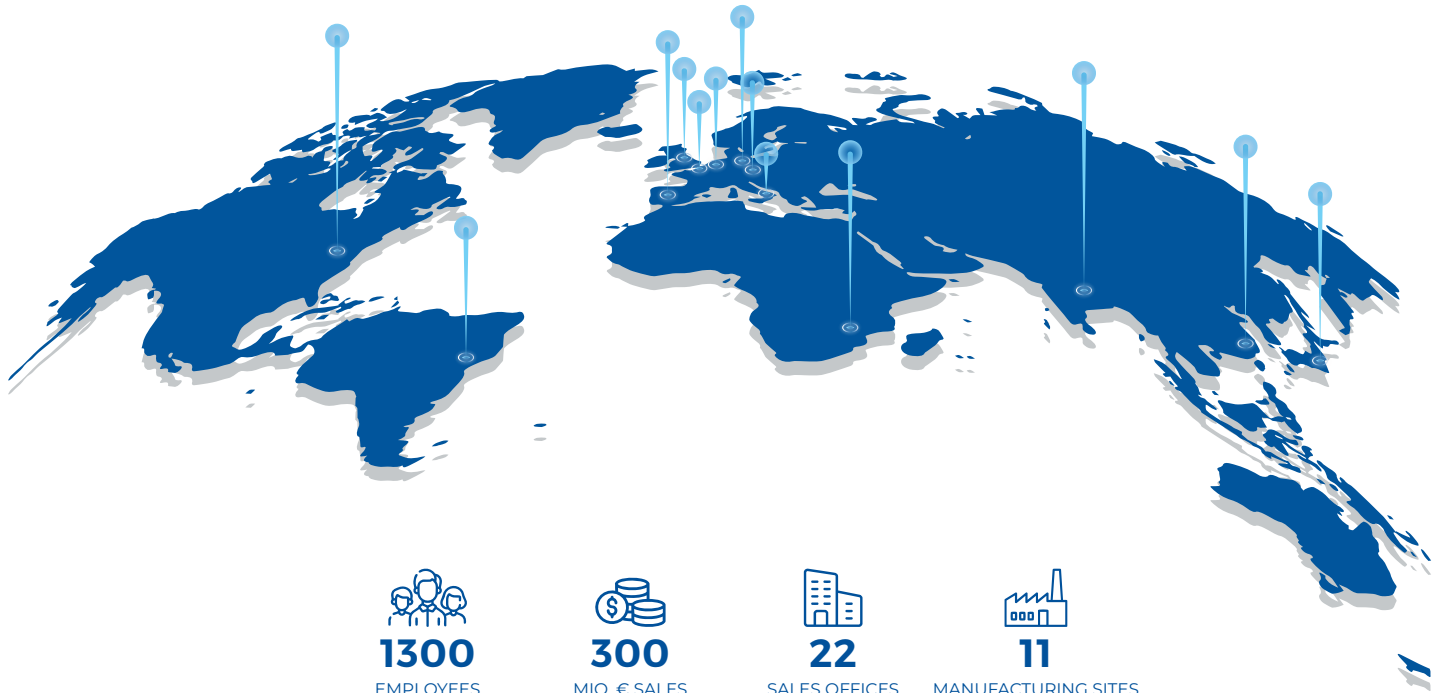
MILLING AND SIEVING PRODUCTS

RETSCH is a manufacturer of sample preparation systems, offering a wide range of mills and sieving equipment for different powder alloys.

- | Accurate analysis of **ores and metals** requires representative, homogeneous samples. Retsch jaw crushers and mills prepare **fine powders for precise chemical analysis**, such as Al₂O₃ content in bauxite.
- | Retsch sieve shakers and sample dividers enable reliable **particle size classification** and unbiased sample splitting, ensuring lab sub-samples truly represent the bulk material.

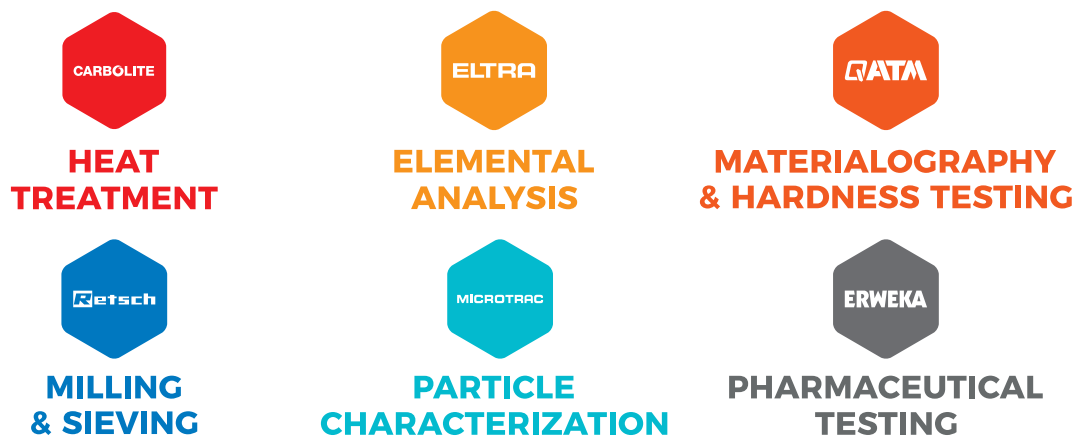
Mechanical Alloying with Ball Mills

ENABLING PROGRESS



VERDER

GLOBAL REACH, LOCAL EXPERTISE



CONTACT US



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