



PHARMACEUTICAL

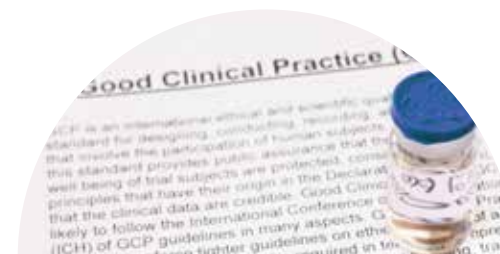
APPLICATION SOLUTIONS FOR RESEARCH AND MANUFACTURING



R&D SUPPORTING DRUG DEVELOPMENT



RAW MATERIALS ENSURING CONSISTENCY FROM THE START



QUALITY CONTROL (QC) SAFEGUARDING PRODUCT INTEGRITY



DISCOVER MORE

FROM R&D TO QUALITY CONTROL IN PHARMACEUTICAL INDUSTRY



RESEARCH AND DEVELOPMENT

DISSOLUTION TEST
DISINTEGRATION
AND FRIABILITY TEST

PARTICLE SIZE AND SHAPE
ZETA POTENTIAL
COLLOIDAL STABILITY ANALYZER
BET & POROSIMETRY

MIXER MILLS AND BALL MILLS
CO-CRYSTAL SCREENING
MECHANOCHEMISTRY

SAMPLE DRYING
& STERILIZATION



RAW MATERIALS

POWDER TESTER

PARTICLE SIZE AND SHAPE

SIEVING SYSTEMS
SAMPLE DIVIDERS

LOSS ON DRYING
& SULPHATED ASH



QUALITY CONTROL

DISSOLUTION TEST
TABLET HARDNESS / FRIABILITY /
DISINTEGRATION TESTER

IN-PROCESS MONITORING

CRYOGENIC MILLING SYSTEMS
GMP COMPATIBLE SIEVERS

IGNITION RESIDUE
& ASH DETERMINATION



PHARMACEUTICAL TESTING

| Dissolution testing: Dissolution testers (manual & automated). Define dissolution profiles according to pharmacopeia methods (USP/EP/JP).

| Tablet disintegration: Disintegration. Automated testing simulates physiological conditions, ensuring reproducibility.

| Powder flowability & friability: Powder flow. Measures flow function, cohesion, compressibility, ensuring robust formulation.



PARTICLE CHARACTERIZATION

| Particle size distribution (PSD): Laser diffraction analyzers. Provides rapid, reproducible PSD across micro- to millimeter range on wet and dry sample.

| Nanoparticle characterization: Dynamic Light Scattering analyzers. Measures particle distribution in the nano scale with precision down to sub-1 nm.

| Particle shape analysis: Image analyzers. High-resolution imaging quantifies shape distributions in real time.

| Bulk powder characterization: BET surface area analyzer & porosimetry. Measures Brunauer-Emmett-Teller (BET) surface area and pore volume precisely.

| PSD of excipients: Laser diffraction, dynamic light scattering and image analyzers. Provides reliable QC of incoming raw materials.

| QC PSD & shape verification: Laser diffraction & image analysis. Provides fast, complies with CFR 21 part 11 and robust QC methods

| QC - stability control of each batch: Static Multiple Light Scattering. Fast, Objective and traceable measurement of shelf life.



MILLING & SIEVING

| Sample preparation (milling & grinding): Laboratory mills. Wide range of mills provide reproducible sample prep for APIs and excipients.

| Homogenization & mixing: Mixer Mills. High-energy mixing ensures consistent dispersions of powders and semi-solids.

| Co-crystal synthesis: Drum Mills TM 300/ TM 500 316L.

| Sample drying Fluid Bed Dryer TG 200: Gentle, rapid drying (~5-20 min) without localized overheating, for reproducible moisture conditioning.

| Particle size separation: Sieving machines. Provides standardized sieving with automated evaluation per ISO/USP.

| Representative sampling: Sample dividers. Sample dividers ensure statistical representative sub-samples.

| Standardized sample prep for QC: Rotor mills, cryo mills. Mills designed for pharmaceutical standards ensure sample integrity.

| Sieving compliance tests: New GMP compatible air jet sieving machine NEW AS 200 Jet Pharma. Software validated according to ISPE GAMP 5, FDA 21 CFR Part 11, and EC GMP Annex 11 with hierarchical user rights, e-signatures, and secure audit trail.



HEAT TREATMENT

| Sample drying & sterilization: Laboratory drying ovens (CR, HPCR series). Provide precise temperature control for drying powders, glassware, and heat-resistant instruments in cleanroom environments.

| Loss on Drying (LOD) tests on raw materials: Laboratory drying ovens (TSO, TSR series). Remove residual moisture from APIs and excipients.

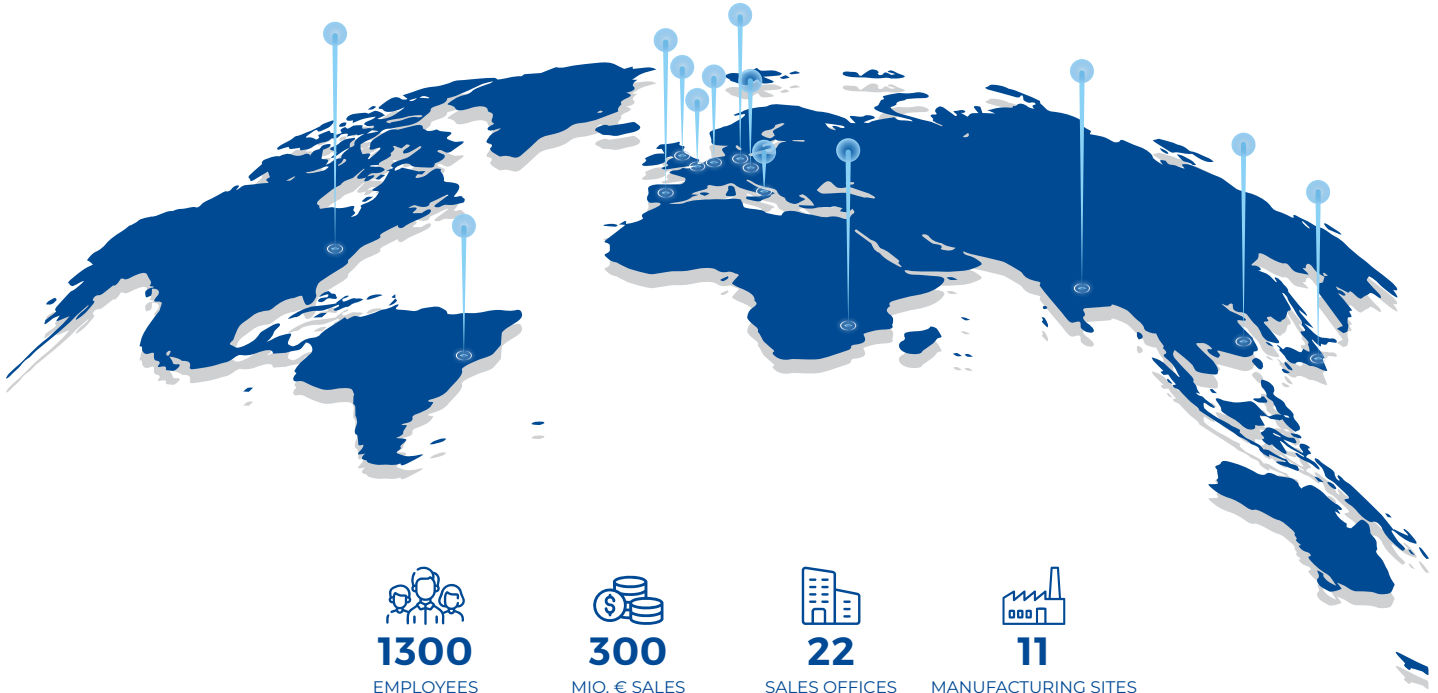
| Sulphated ash & residue-on-ignition analysis: Muffle furnaces (AAF series). Sulphated ash/residue-on-ignition testing and calcination of inorganic ingredients, supporting raw material purity and composition.

| Ignition residue & ash determination: Muffle furnaces (AAF series). Ensure accurate determination of ignition residue and loss on ignition in quality control of active ingredients and excipients.

| Drying & sterilization: Cleanroom ovens (PF, CR, HPCR series). Support contamination-free drying and sterilization of pharmaceutical tools and samples under GMP-compliant conditions.



ENABLING PROGRESS



VERDER

GLOBAL REACH, LOCAL EXPERTISE

 HEAT TREATMENT	 ELEMENTAL ANALYSIS	 MATERIALOGRAPHY & HARDNESS TESTING
 MILLING & SIEVING	 PARTICLE CHARACTERIZATION	 PHARMACEUTICAL TESTING



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