

Ball Milling Solutions

Laboratory & industrial powder processing support

Persis AMS provides technical support for ball milling and powder-processing development across ceramic, metal, composite and advanced-material systems.



PROCESSING SUPPORT

- Powder mixing & homogenisation
- Particle-size reduction
- Mechanical milling
- Mechanochemical processing

DEVELOPMENT FOCUS

- Ceramic & metal powders
- Composite powder development
- Laboratory milling trials
- Process optimisation

Milling Services

Core activities that can be adapted to material, equipment and target powder characteristics.

SERVICE AREA	SCOPE
Powder mixing	Blending and homogenisation of multi-component powder systems.
Particle-size reduction	Milling strategies for refinement and controlled powder processing.
Mechanical milling	High-energy or conventional milling approaches depending on material response.
Mechanical alloying	Processing of metal and alloy powder systems to promote intimate mixing and material modification.
Mechanochemical synthesis	Milling-assisted reactions and phase development where appropriate.
Composite powder development	Processing of ceramic–metal and multi-phase powder systems.
Laboratory trials	Small-scale trials to establish processing windows and reproducibility.
Process optimisation	Evaluation of milling variables and selection of practical processing conditions.

Milling Strategy

Key variables can be considered together rather than as isolated settings.

Milling speed	Influences milling energy, impact conditions and processing behaviour.
Milling time	Controls exposure to milling and the progression of particle refinement or material modification.
Ball-to-powder ratio	Affects milling intensity and powder–media interaction.
Ball size & combination	Can influence impact energy, mixing and particle refinement.
Milling atmosphere	Air, inert or controlled atmospheres may be considered according to material sensitivity.
Powder loading	Batch loading can influence movement, mixing efficiency and energy transfer.
Media / container compatibility	Material selection can help manage wear and potential contamination.
Wet or dry milling	Process route can be selected according to material and target outcome.

Important: Appropriate milling conditions depend on the material, desired powder characteristics, contamination requirements and intended application.

Process Development

A structured route from material assessment to application-oriented powder processing.

01 Material assessment	02 Milling strategy	03 Trial processing	04 Characterisation	05 Optimisation	06 Scale-up
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Characterisation and feedback

Where appropriate, milling trials can be linked with powder characterisation and process feedback to refine the next trial condition.

Potential characterisation inputs

- Particle-size distribution
- Phase / structural analysis
- Morphology and powder appearance
- Composition and contamination assessment
- Application-specific performance testing

Materials & Applications

Potential areas for ball-milled powders and engineered powder formulations.

01	Advanced ceramics Feedstock preparation, powder blending and processing for engineered ceramic systems.
02	Heating-element materials Powder processing for high-temperature electrical and ceramic material development.
03	Refractory materials Preparation and optimisation of powder systems for high-temperature components.
04	Metal & alloy powders Mechanical milling, blending and alloying-related powder development.
05	Composite materials Processing of ceramic–metal and multi-phase powder systems.
06	Research & development Laboratory-scale processing, formulation trials and process-development studies.

Process Support

Discuss your material, target powder characteristics and processing requirements with Persis AMS.

Information useful for an initial discussion

- Material composition and starting powder form
- Target particle size or particle-size distribution
- Required powder quantity / batch scale
- Dry or wet processing preference
- Milling atmosphere requirements
- Contamination or media compatibility constraints
- Intended application and downstream process

TECHNICAL DISCLAIMER

Milling conditions and outcomes depend on material characteristics, equipment configuration, processing parameters and test methods. Final processing conditions should be validated for the intended material and application.

PERSIS AMS

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Engineering the Next Generation of High-Temperature Materials