

NETZSCH



Process Technology for Mineral Processing

Mineral Processing

The requirements on the bulk material market are becoming steadily higher. The specifications for minerals are also changing. Dedusted powders, steeper particle size distributions (PSD) or nano sizes are only some examples of current new requests. Often traditional processes are not able to meet these new challenges. NETZSCH has developed new methods in wet and dry processing which provide mineral processing that match the requirements of current and future markets.



Classifying

Dispersing

Mixing

Wet Grinding

Our Technology - Your Success

- We offer customized solutions for your requirements
- State-of-the-art application laboratories with a separate area for processing your different products for various applications are available in Selb / Bavaria (wet grinding) and Hanau (dry grinding)
- Testing provides:
 - Extensive quality analysis and test recording
 - Intensive discussion on the results
 - Scale-up to your production requirements
- Project planning and management / start up service / after sales support



Dry Grinding

De-Aeration

Plant Processing

Laboratory Use

Dry Processing of Minerals

Fine grinding

Fluidized Bed Jet Mills Type CGS from NETZSCH-Trockenmahltechnik GmbH are able to grind down to the finest particle sizes possible in dry processing. In addition, through particle-to-particle impact, the product literally crushes itself, which means no wear during grinding. The product quality is always on a consistently high level. Low maintenance costs and easy process control are also arguments for this kind of processing. Compared to the classical ball mill the PSD of a jet mill is very steep. The grinding process is the ideal time to coat the fresh surfaces of the particles. This high dispersion enables savings of cost intensive additives, but with the same effect of the coating agent. The CGS mill is offered in various sizes and each size only employs one classifier wheel, utilizing all of the advantages of single classifier equipment.

Energy efficient processing

The cost of energy is becoming an increasingly important factor. Therefore NETZSCH-Trockenmahltechnik GmbH has developed two new processes for jet mills which promote energy savings. In the past jet milling was too expensive even for low cost minerals due to the high energy consumption. But now the *E-JET*[®] system has opened the door to all of the advantages of jet mill processing for this mass product segment. Energy savings of up to 30% compared to conventional jet mill processes can be reached with most minerals.

NETZSCH-Trockenmahltechnik GmbH has also developed the *S-JET*[®] process for dry fine grinding into the submicron range. The S stands for superheated steam and superfine. The superheated steam creates a jet stream that can reach speeds of up to 1 200 m/s and more - as compared to the 570 m/s of conventional jet mills - resulting in the finest particle sizes in dry processing. Sizes below 1 μm are possible with *S-JET*[®] processing mills. Another benefit is a dramatic increase of the capacity compared to standard grinding conditions. With *E-JET*[®] and *S-JET*[®] the CGS mills are prepared for existing and future market requirements when it comes to quality, efficiency and economy. All of our machines are designed for easy cleaning and maintenance. Large doors, simple classifier wheel changes and easy to clean inside surfaces keep the cleaning time as short as possible.



Two CGS 150 for mineral processing (height - 7 m)

Mineral	Feed d_{99} [μm]	Fineness d_{50} [μm]	Production [kg h^{-1}]
Wollastonite	< 200	3.5	750
	< 200	8.5	1 500
Quartz	< 1 000	5	900
	< 200	10	1 400
Graphite natural	< 160	8	660
	<160	20	2 300
Mica	< 800	5	450
	< 800	15	1 200
Talc	<100	4	850
	<100	6	1 350
	<100	7	4 400

Fine classifying

Classification is another important way to modify minerals. For this process we offer two types of classifiers. For normal applications we have the conical shaped CFS and for finer classifications we have developed the CFS HD-S. This effective dispersion is achieved with a specially shaped guide vane basket directly around the classifier wheel.

Especially at finer cut points, this principle performs a sharper cut and produces higher yields compared to classical separation systems.

Low maintenance

Because of autogenous grinding without grinding tools and no wear!



Wet Processing of Minerals

NETZSCH-Feinmahltechnik GmbH supplies agitator bead mills with grinding chambers of working volumes up to 10 000 liters for wet preparation. Pump capacities of $100 \text{ m}^3 \text{ h}^{-1}$ and more are possible at an installed motor power of 3 000 kW.

These mills are used for various kinds of applications and can also be found in the ore and mining industry for the grinding and preparation of precious metal ores.

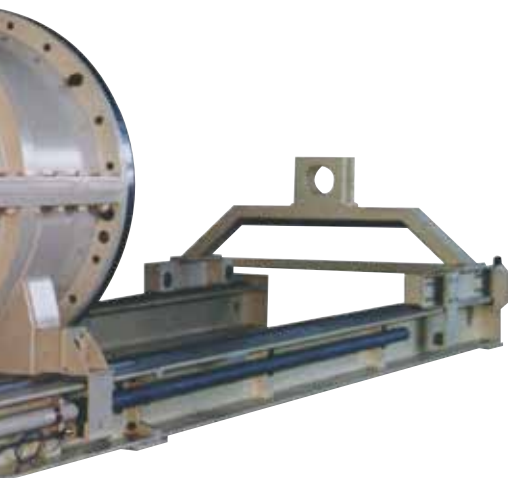
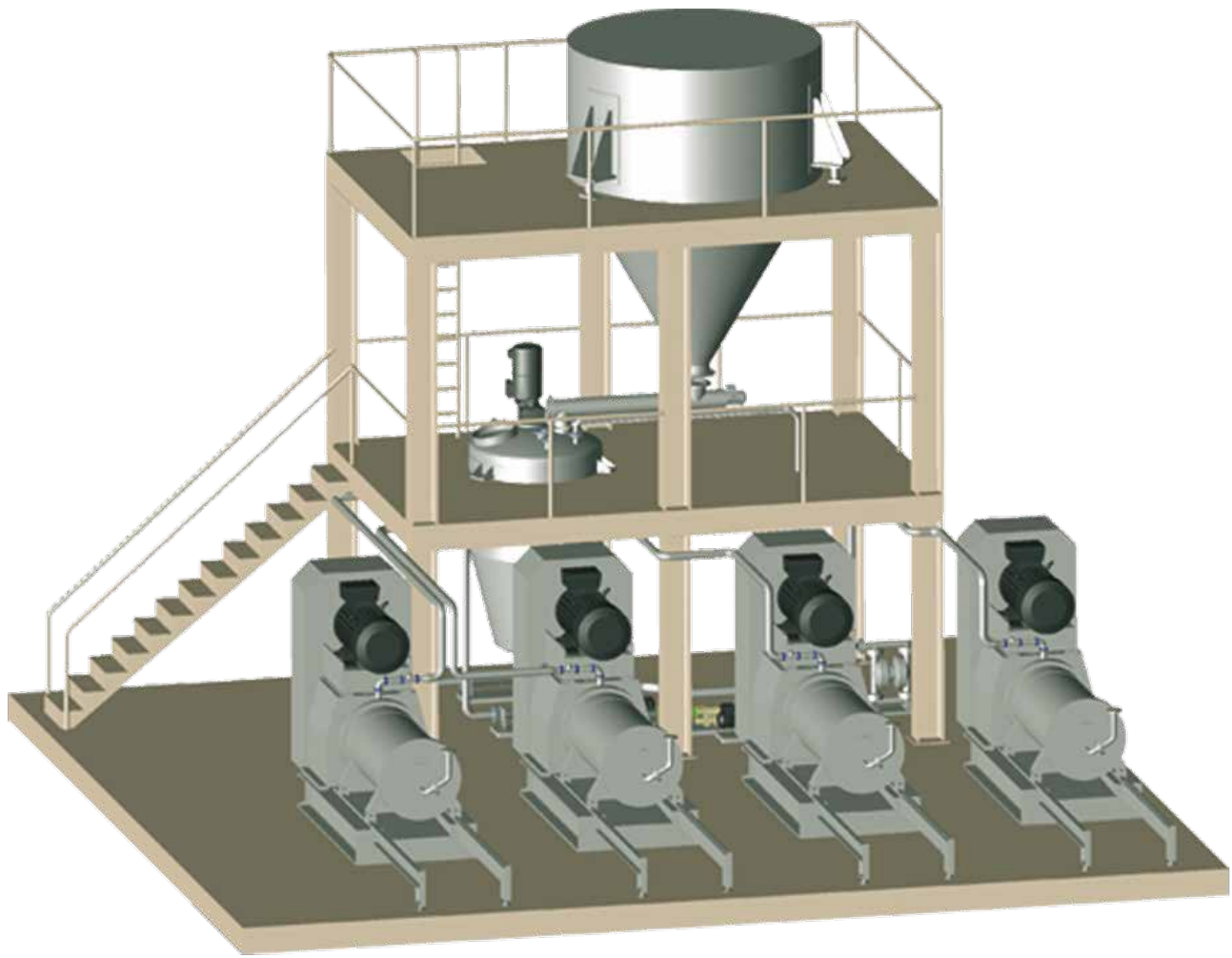
Wet preparation is also applicable for mineral filling and coating materials such as china clay, talc and CaCO_3 . Depending on the requirement, particle finenesses of $95\% < 2 \mu\text{m}$ are possible. Up to 1.2 t of solid material per hour can be achieved on an LME 1000 at an energy requirement of approx. 250 kWh/t solid material.

Flame retardants, such as ATH, are also prepared in a wet process. A 300-liter-mill will achieve the fineness requirement of $d_{50} < 1.8 \mu\text{m}$ at capacities of up to $5 \text{ m}^3 \text{ h}^{-1}$.

Depending on the kind of application and to ensure protection against wear and tear to a large extent, various materials can be chosen. Rubber or NElast coatings are preferred, hardened steels or wear-resistant cast materials are also available.



IsaMill 3000



Mineral	Mill type	Fineness d_{50} [μm]	Production [kg h^{-1}] solid
Talc	LME 1000	< 3* < 2**	900 500
$\text{Al}(\text{OH})_3$	LME 300	< 1.8**	5 000
Clay	LME 500	< 2*	1 500
Zirconium sand	LME 1000	< 1.5** < 1**	600 250 - 300
$\text{Ca}(\text{OH})_2$	LME 1000	< 1**	2 000

* sedigraph
** laser

Business Unit Grinding & Dispersing – The World's Leading Grinding Technology

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The three Business Units – Analyzing & Testing, Grinding & Dispersing and Pumps & Systems – provide tailored solutions for highest-level needs. Over 3400 employees at 210 sales and production centers in 35 countries across the globe guarantee that expert service is never far from our customers.

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