

NETZSCH

Grinding & Dispersing

NETZSCH *SPHERHO*®

The Agitator Bead Mill for finest Dry-Grinding



our technology
YOUR SUCCESS

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The NETZSCH group's Business Unit Grinding & Dispersing is one of the world market leaders in wet- as well as in dry-processing technology. For many years NETZSCH Agitator Bead Mills have been used successfully and reliably for the size-reduction and dispersing of suspended solids in many different industries. Numerous new- and further developments in the areas of wet- and dry-grinding technologies confirm NETZSCH's leading position in these technologies.

Especially in the area of dry-grinding there are many applications which demand extremely fine products and at the same time require high throughput capacities and low energy consumption. Therefore, it only seemed natural to apply NETZSCH's worldwide frequently proven agitator ball mill technology to the dry-grinding area and further enhance the triumphant advance of the IsaMill in the wet-grinding area of the mining industry with a dry agitator bead mill.

NETZSCH has expanded its product range to include an agitator bead mill for the dry-grinding of mineral powders and ceramic raw materials: The *SPHERHO*®.

Compared to conventional ball mills, with the *SPHERHO*® it is possible to obtain extremely fine products combined with very high throughput capacities at low specific energy consumption levels thanks to its operating mode and stress characteristics. Used together with a NETZSCH InlineStar in a grinding-/classifying circuit, mineral fillers with a particle size of less than 2 µm can be produced.





Dry Agitator Bead Mill *SPHERHO*® 30

- 1 Product inlet
- 2 Grinding vessel
- 3 Separation system
- 4 Product outlet
- 5 Operating terminal
- 6 Drive

Design and Functional Principle

Single Passage

The *SPHERHO*® Dry Agitator Bead Mill is continuously fed via a rotary airlock valve. A shaft equipped with exchangeable agitator tools is mounted inside the horizontally installed grinding vessel. The grinding media which are evenly distributed in the grinding vessel are kept in constant motion by the agitator tools and the resulting shearing /pressure- and impact stress ensures a very fine grinding result with a relatively low fines fraction. A potential gradient causes an axial movement of the product through the grinding vessel and its vertical discharge out of the product outlet into a downstream conveying system.

The separation system developed and patented by NETZSCH makes the use of smaller grinding media possible. This means higher stress intensities can be applied resulting in higher finenesses and a higher activation potential of the product being ground.

Grinding-/Classifying Circuit

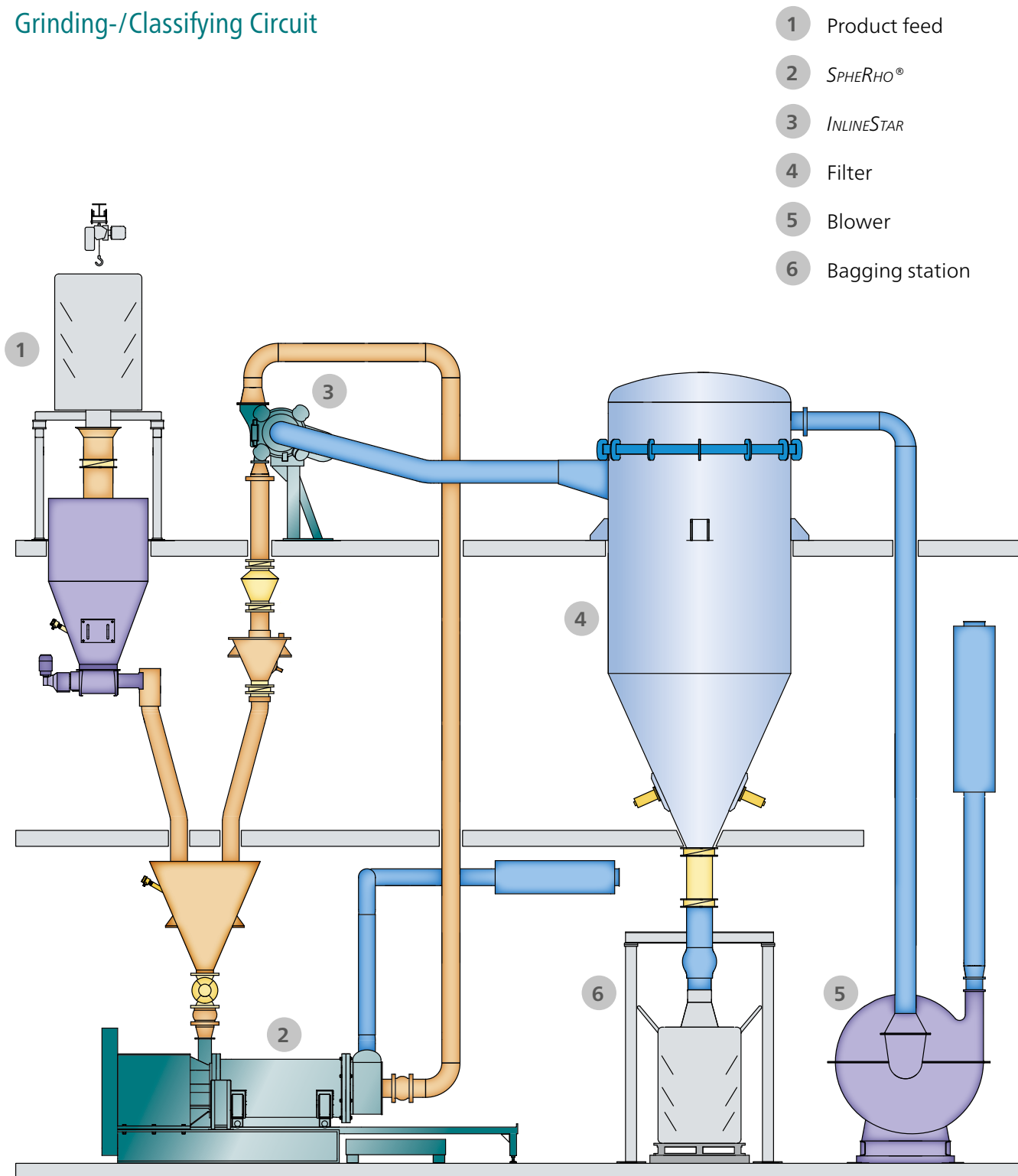
The *SPHERHO*® Dry Agitator Bead Mill can be operated on its own in single passage or alternatively with a NETZSCH High-Performance Fine Classifier of type InlineStar. This combination puts the strengths of the *SPHERHO*® to good use. The material coming from the *SPHERHO*® which is high in fine product and low in coarse product followed by an inline classifier with high cutting precision ensure highest finenesses at low energy consumption levels.

The product is fed into the mill via a feeding station and a gravimetric dosing system. The finely ground product reaches the air classifier via a pneumatic conveying system. The air classifier removes the fine product from the grinding circuit. The finished product is discharged into a downstream handling system installed in a total separator. The coarse product which has not yet been sufficiently ground is transported via a coarse product return chute back to the circuit together with the fresh feed product coming into the mill. Thanks to the optimized operation mode a comparatively low number of circuits are required to obtain the specified and adjustable particle size distribution.

NETZSCH can deliver the *SPHERHO*® Dry Agitator Bead Mill as an individual machine or as a complete turnkey plant



Grinding-/Classifying Circuit



Energy Efficiency

Due to the use of a larger amount of smaller grinding media and the resulting increased surface area, the stress intensity is correspondingly higher. This means that it is also possible to fine grind comparatively coarse feed products at relatively low energy consumption levels.

High Product Yields

The self-adjusting steep particle size distribution has a positive effect on energy consumption and the yield when operating in a grinding-/classifying circuit in combination with a NETZSCH inline-classifier.

Compact Construction

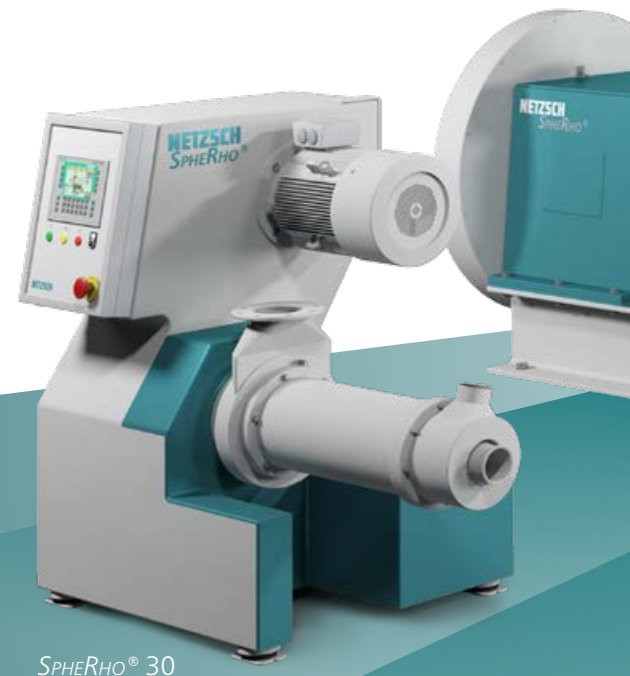
In comparison to conventional ball mills the specific energy in the grinding chamber is substantially higher (approx. 400 kW/m³) and results in smaller footprints and foundations.

Open Mode of Operation

Even if it is used without a downstream classifier, the dry agitator ball mill can obtain attractive finenesses with a respectable particle size limit.

High Finenesses

The patented separation device allows the use of very small grinding media and as a consequence the manufacture of extremely fine products.



SPHERHO® 30

Separation System

A patented separation system allows the use of various grinding media with diameters of up to 2 mm. This separating unit ensures that none of the grinding media can reach the product outlet and means that the installation of a separation screen is not necessary. This prevents crushing of the grinding media and reduces the amount of maintenance work required and stoppages.

Horizontal Design

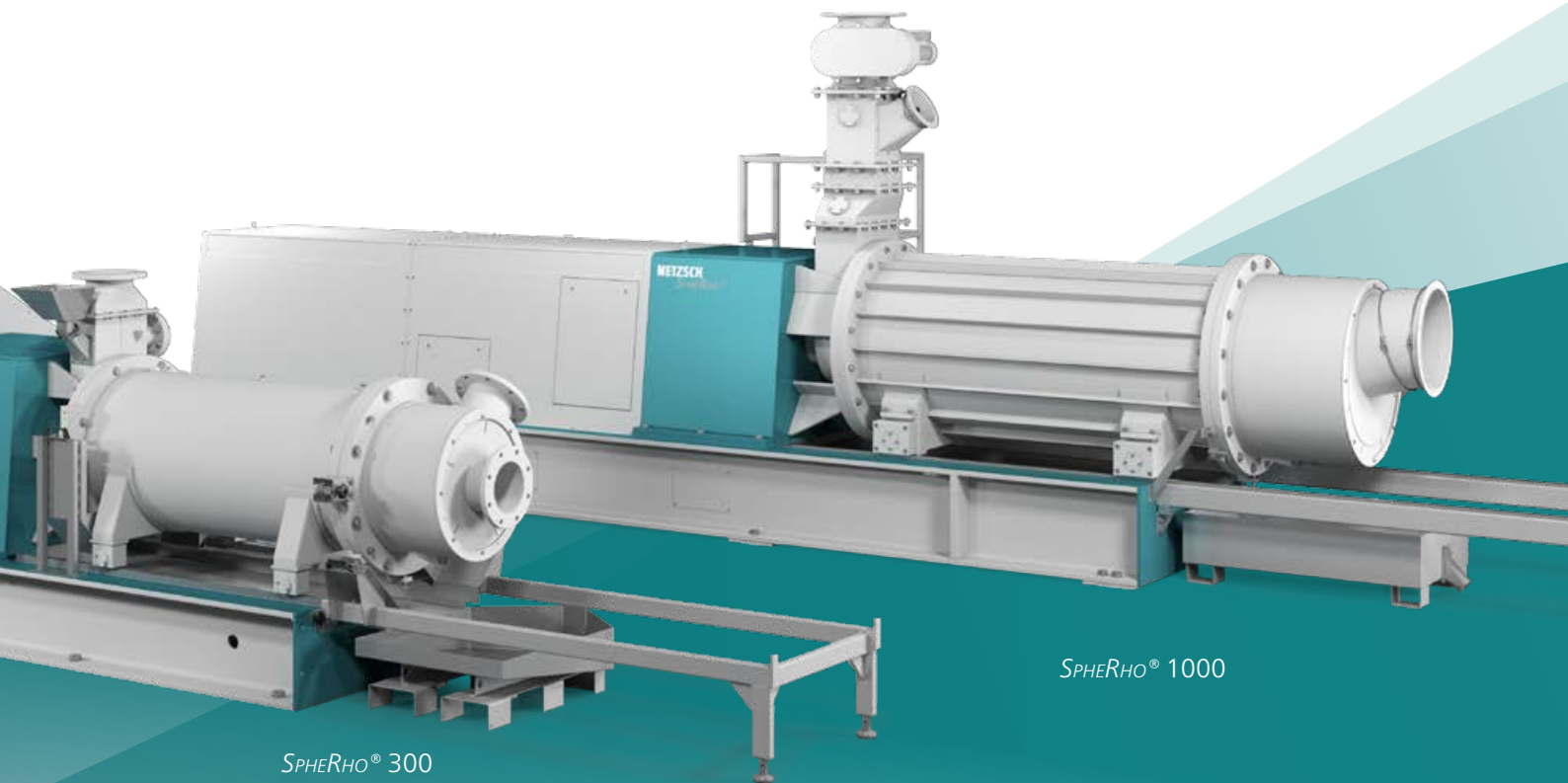
The horizontal execution prevents blockages during operation and makes it possible to restart the mill under load.

Simple Execution

A simple and robust execution enables a rapid change of the grinding media and the agitator elements and makes maintenance and service much easier.

High Throughput Capacities

The availability of a wide range of different machine sizes excludes over- or undersizing and ensures that the appropriate machine is designed to suit the particular application and customer requirements.



FOCUS ON YOUR ADVANTAGES

Technical Data

The *SPHERHO*® is available in a large number of machine sizes and with grinding chamber volumes of 5 l up to 3000 l a wide power range is covered. Larger machines are also readily available upon request.

<i>SPHERHO</i> ®	5	30	80	200	300	500	1000	3000
Power Factor	0.25	1	2	4	6	8	16	48
Max. Motor Power [kW]	5.5	22	45	90	132	200	400	1 500
Air Flow Volume [m³/h]	80	300	600	1 200	1 800	2 400	4 800	14 400
Throughput Capacity* [t/h]	0.1	0.4	0.8	1.6	2.4	3.2	6.4	19.2
Length** [mm]	1 250	2 100	4 700	5 400	5 800	6 600	10 800	17 000
Width [mm]	700	1 500	1 500	2 250	2 450	2 600	1 490	1 800
Height [mm]	1 550	1 550	1 300	1 550	1 685	1 850	2 490	2 900
Weight [kg]	300	1 600	3 000	5 500	6 500	11 000	16 000	41 000

* based on limestone

** max. length (grinding chamber extended)

The available machine sizes of the InlineStar High-Performance Classifier have been adapted and optimized so it can be used with the *SPHERHO*® Agitator Bead Mill. Larger machines are also readily available upon request.

<i>INLINESTAR</i>	30	85	170	340	510	750	1000
Power Factor	0.35	1	2	4	6	9	12
Min. Air Flow Volume [m³/h]	210	600	1 200	2 400	3 600	5 400	7 200
Air Flow Volume [m³/h]	455	1 300	2 600	5 200	7 800	11 700	15 600
Length [mm]	750	1 000	1 300	2 000	2 500	2 800	3 200
Width [mm]	400	600	850	1 200	1 300	1 700	2 200
Height [mm]	350	500	750	1 100	1 500	2 000	2 500
Weight [kg]	250	500	750	1 500	2 500	4 000	6 000

Agitator Tools

Depending on the product to be ground and the application various agitator tool executions are available. The plug-in design of the agitator elements on the shaft allow their easy and rapid exchange.

Wear Protection

Wear-protected execution in hard metal or ceramic for abrasive and highly wearing products means a significantly longer service life of the machine and lower maintenance costs.

NETZSCH-BEADS®

The selection of suitable grinding media is an excellent optimization characteristic for dispersing- and grinding processes. Optimum results can be obtained with NETZSCH-BEADS®.

Additives

To improve the grindability of finest powders, dry or liquid grinding agents can be added via a suitable additive system.

Cooling

Temperature-sensitive products can be processed below the critical temperature limit by using a water-cooled double-walled grinding vessel.

NETZSCH-CONNECT

By linking the *SPHERHO*® to the NETZSCH-CONNECT system, various processing data can be recorded and saved. These are recorded continuously and the decrypted data are then transferred to a central server via a VPN-network. Using a web application the plant status and the operating data can be viewed, analyzed and exported. Access to the control system via remote maintenance is possible for legitimate NETZSCH service employees.

ACCESSORIES AND OPTIONS

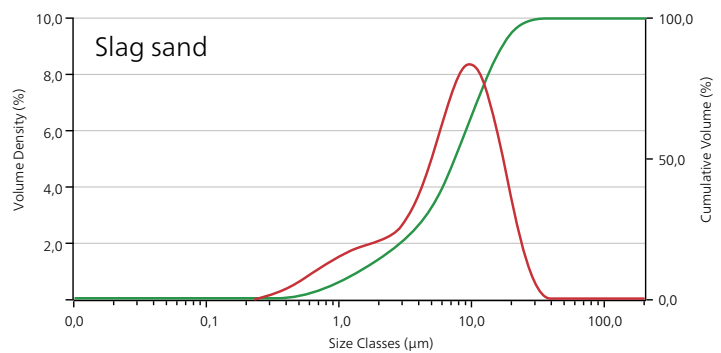
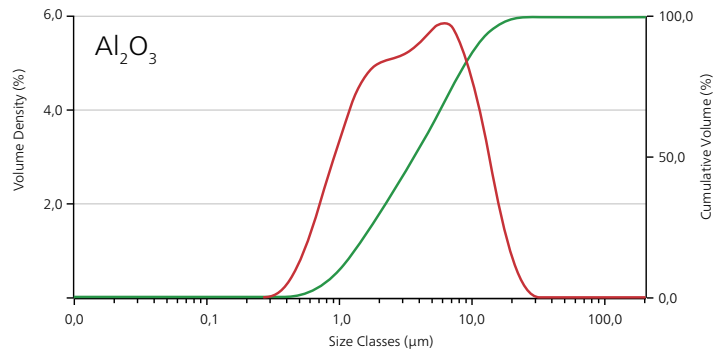
The SPHERHO® opens up

Examples of Applications

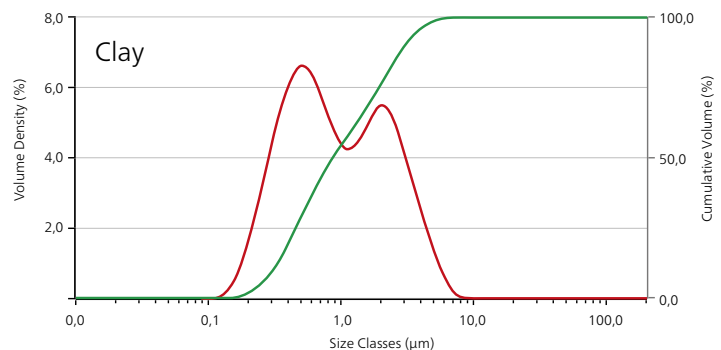
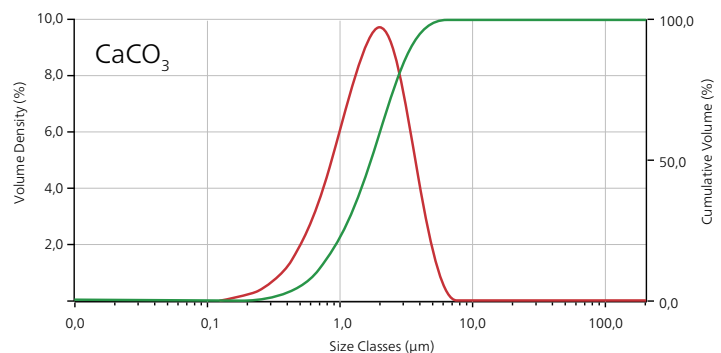
The main application fields of the SPHERHO® dry agitator bead mill are real comminutions in the mineral- and ceramic raw material areas. For these purposes d_{50} product finenesses in a range of 2 μm to 70 μm are possible.

- Activated carbon
- Aluminium oxide
- Baryte
- Bauxite
- Bentonite
- Calcite
- Calcium carbonate
- Calcium hydrate
- Cement
- Ceramic material
- Ceramic pigments
- Clay
- Clinker
- Dolomite
- Feldspar
- Fly ash
- Graphite
- Hydraulic binder
- Mineral fillers
- Perlite
- Petroleum coke
- Pumice powder
- Quartz sand
- Titanium dioxide
- Wollastonite
- Zeolite

Without Classifier



With Classifier



new possibilities for your company

Test Center and Testing

A state-of-the-art test plant in NETZSCH Trockenmahltechnik's test center in Hanau is available for carrying out dimensioning tests. Within this plant the *SPHERHO*® Agitator Bead Mill can either be operated on its own or in combination with the NETZSCH *INLINESTAR*.

A multitude of equipment options with regard to various agitator tools, grinding media and the possibility of using additives enable us to test the grindability of many different products and to determine the optimum operation conditions for a production plant. The machine series based on geometrical similarities guarantees a reliable scale-up to larger production plants.

The plant in our test lab in Hanau is designed for mass flows from approx. 25 kg/h up to 800 kg/h and can also be used for small production amounts to bridge production bottlenecks.



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

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Selb, Germany

NETZSCH Lohnmahltechnik GmbH
Bobingen, Germany

NETZSCH Premier Technologies,
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Equipamentos de Moagem Ltda.
Pomerode, Brazil

NETZSCH Technologies India
Private Ltd.
Chennai, India

NETZSCH Trockenmahltechnik GmbH
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NETZSCH España, S.A.U.
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and Instruments Co., Ltd.
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The NETZSCH Group is a mid-sized, family-owned German company engaging in the manufacture of machinery and instrumentation with worldwide production, sales, and service branches.

The three Business Units – Analyzing & Testing, Grinding & Dispersing and Pumps & Systems – provide tailored solutions for highest-level needs. Over 3 300 employees at 163 sales and production centers in 28 countries across the globe guarantee that expert service is never far from our customers.

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