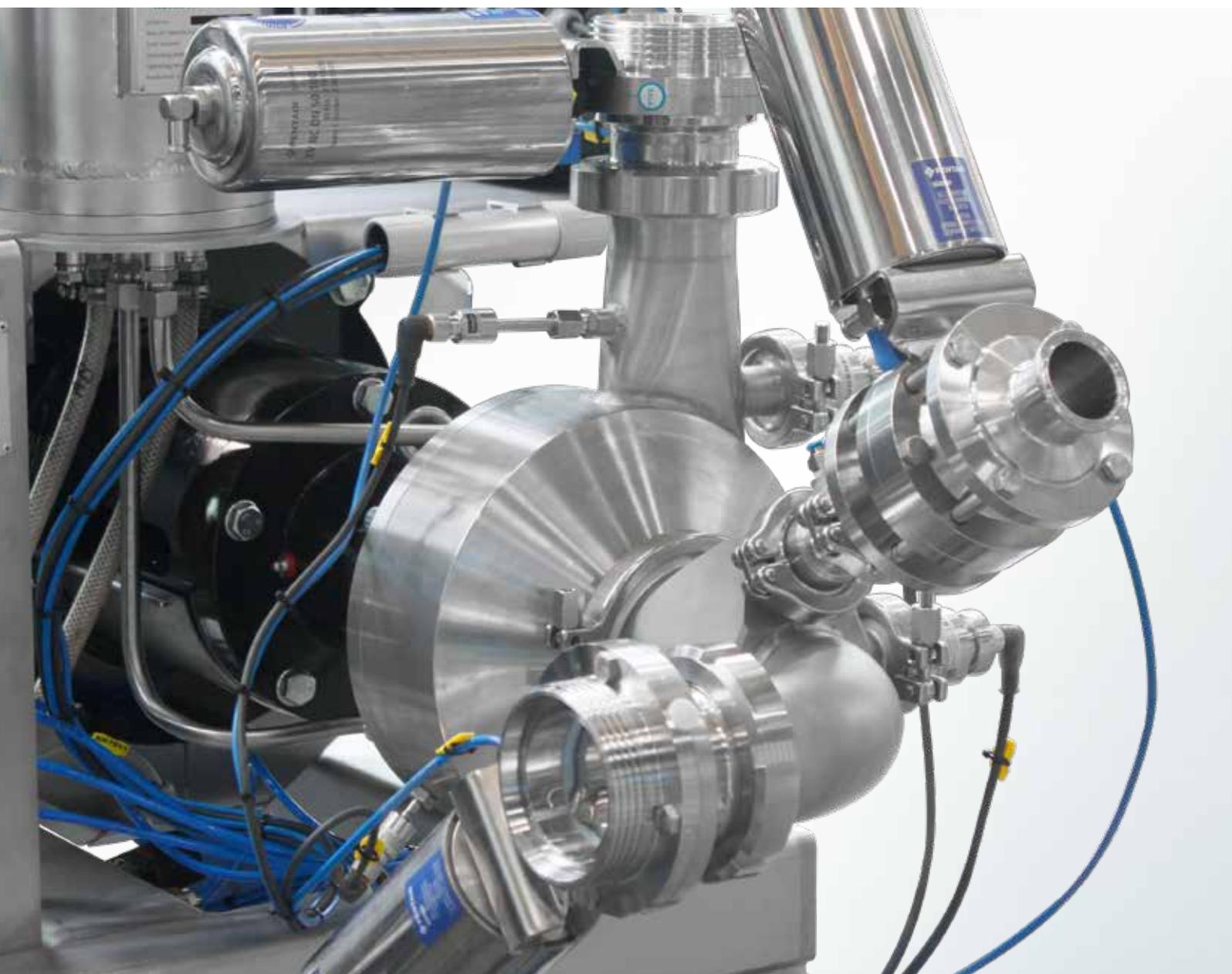


NETZSCH



EPSILON Inline Disperser

The unique Dispersing System

The unique System

FOR DISPERSING SOLIDS IN LIQUIDS

The NETZSCH *EPSILON* inline disperser is unique on the market. Dispersion does not occur according to the conventional rotor-stator principle, in which high shear forces and a high energy input are used to disperse powder in liquid. The dispersion principle of the NETZSCH *EPSILON* has no stator through which the product flows, and no narrow shear gaps between the rotating and stationary parts.

The resulting benefits are also unique:

- **Minimal warming of the product**
- **Minimal input of shear forces**
- **Deaeration of the product following powder intake**
- **Insensitive to smaller foreign objects**
- **High availability**

For the best possible wetting and dispersion of the powdered solids in liquid, the pressure differences that result from the pumping / centrifugal effect of the rotor are used. The air contained in the powder expands in the negative pressure of the suction area and the powder enters the liquid, which is then pressed into the core of the powder structure in the overpressure area of the rotor.

Powders that have been wetted in this way can be finely dispersed with considerably less energy. Products that do not require further grinding can therefore be produced with permanently reproducible quality. Products that require further grinding in an agitator bead mill can be processed with optimized parameters such as higher throughput or smaller grinding media. The consistent quality of the predispersion has a positive effect on the reproducibility of the grinding result.

YOUR BENEFIT

Dispersion Quality

- Consistently reproducible product quality
- Best wetting of the solid surface
- Gentle processing of sensitive formulation components

Handling & Cleaning

- Process free of manual influences
- Quick and easy to clean, good accessibility
- No adhesion of powder dust in the process tank

Dust & Emission Free

- Closed process housing
- Separate feeding of solid and liquid
- Loss-free incorporation of solids

Process Reliability

- Automatic mode eliminates operator error
- Tolerant to smaller foreign objects, generally, no machine downtime
- Explosion-proof version

| Technical Data | <i>EPSILON 30</i> | <i>EPSILON 90</i> |
|---|-------------------|-------------------|
| Solids intake [kg/h] | 50 - 5 000 | 150 - 12 000 |
| Suspension flow during solids intake [m ³ /h] | 15 - 30 | 40 - 80 |
| Max. suspension flow during circulation [m ³ /h] | 67 (water) | 130 (water) |
| Drive power [kW] | 30 / 37 | 75 / 90 / 110 |
| Max. speed [1/min] | 3 600 | 3 600 |
| Max. discharge pressure [bar] | 5 | 5 |
| Min. feed pressure [bar] | 0.1 - 0.5 | 0.1-0.5 |



- 1 Barrier fluid system
- 2 Product outlet
- 3 Processing chamber
- 4 Powder inlet
- 5 Liquid inlet
- 6 Residual discharge
- 7 Mechanical seal
- 8 Frame
- 9 Motor
- 10 Control panel

Operating Principle

The *EPSILON* works together with a product tank in circulation. After the machine is started, the liquid flows to the *EPSILON* and is pumped back into the tank. Due to the strong pumping action of the rotor, a strong negative pressure is created in the process chamber of the *EPSILON*. This vacuum is used to draw in the powdered solids. No external vacuum generation or addition of external air is necessary. Powder that has been prepared in a hopper, silo, bag loading station or BigBag station is automatically drawn in by the machine when the powder feed is opened.

After the powder delivery, the powder feed is closed and, if necessary, circulation of the product continues. In this step, the enormous advantages of the dispersing system become clear: the subsequent dispersion improves the quality and simultaneously deaerates the product. Due to the low energy input, warming of the product is significantly reduced compared to conventional rotor-stator systems.



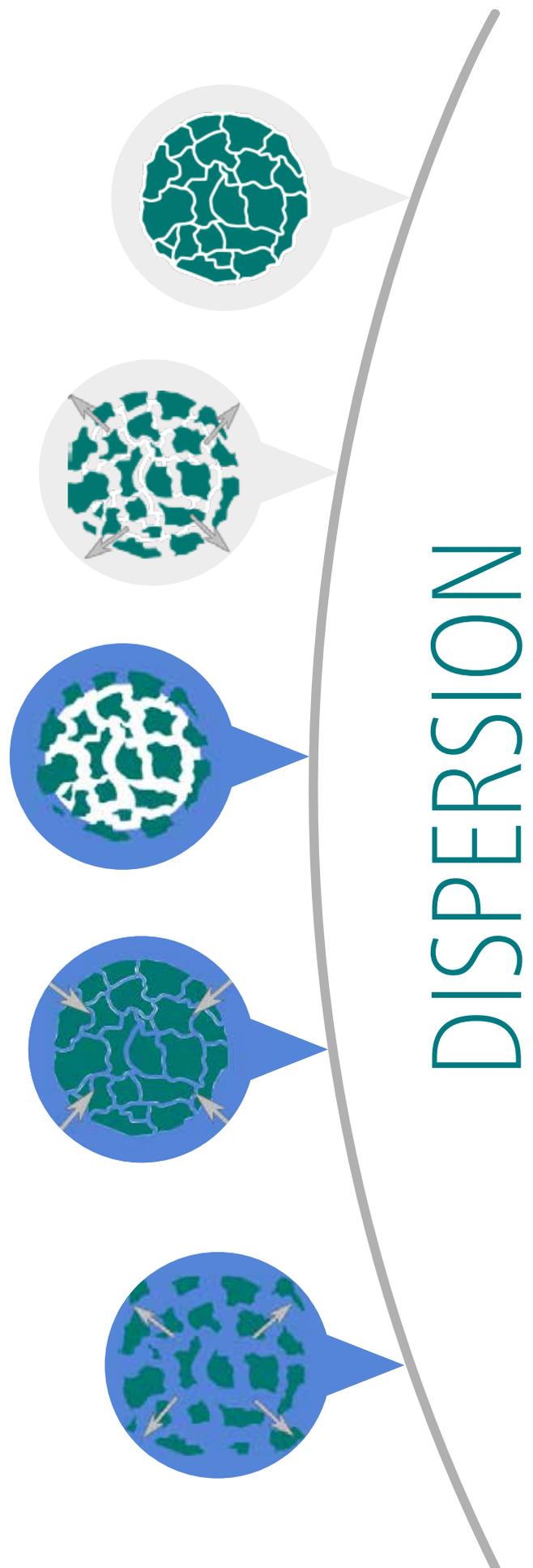
01 All powders contain air. The amount of air contained in the powder is the ratio of the bulk density to solid density and can be from 75 to more than 90 percent by volume. For a good dispersion result, this air must be completely replaced by liquid and the particles separated.

02 During the intake of the powder, the air contained in the powder expands in the negative pressure of the suction area. Loose agglomerates can break up at this point, while stronger agglomerates remain intact.

03 In the state of expanded air, the powder is drawn directly into the liquid and surrounded by it.

04 As the process continues, the powder enters the outer region of the process chamber in which there is a strong overpressure due to the centrifugal effect of the rotor. Here, the previously expanded air is strongly compressed and the surrounding liquid is forced into the core of the agglomerate structure.

05 Agglomerates wetted in this way can be dispersed with considerably less energy input. The desired fineness is achieved through subsequent dispersion, in which the product repeatedly passes through the negative pressure and overpressure region and is exposed to strong turbulence and micro-cavitation. The product is also automatically deaerated during subsequent dispersion. Air is drawn from the product in the negative pressure area and returned as large air bubbles to the tank, where they easily rise and outgas. Due to the gentle operation, significantly less energy is applied, in contrast to shear-based systems, so that even low temperature limits can be easily maintained.



NETZSCH Plant Construction & Application

Process Technology and Plant Construction

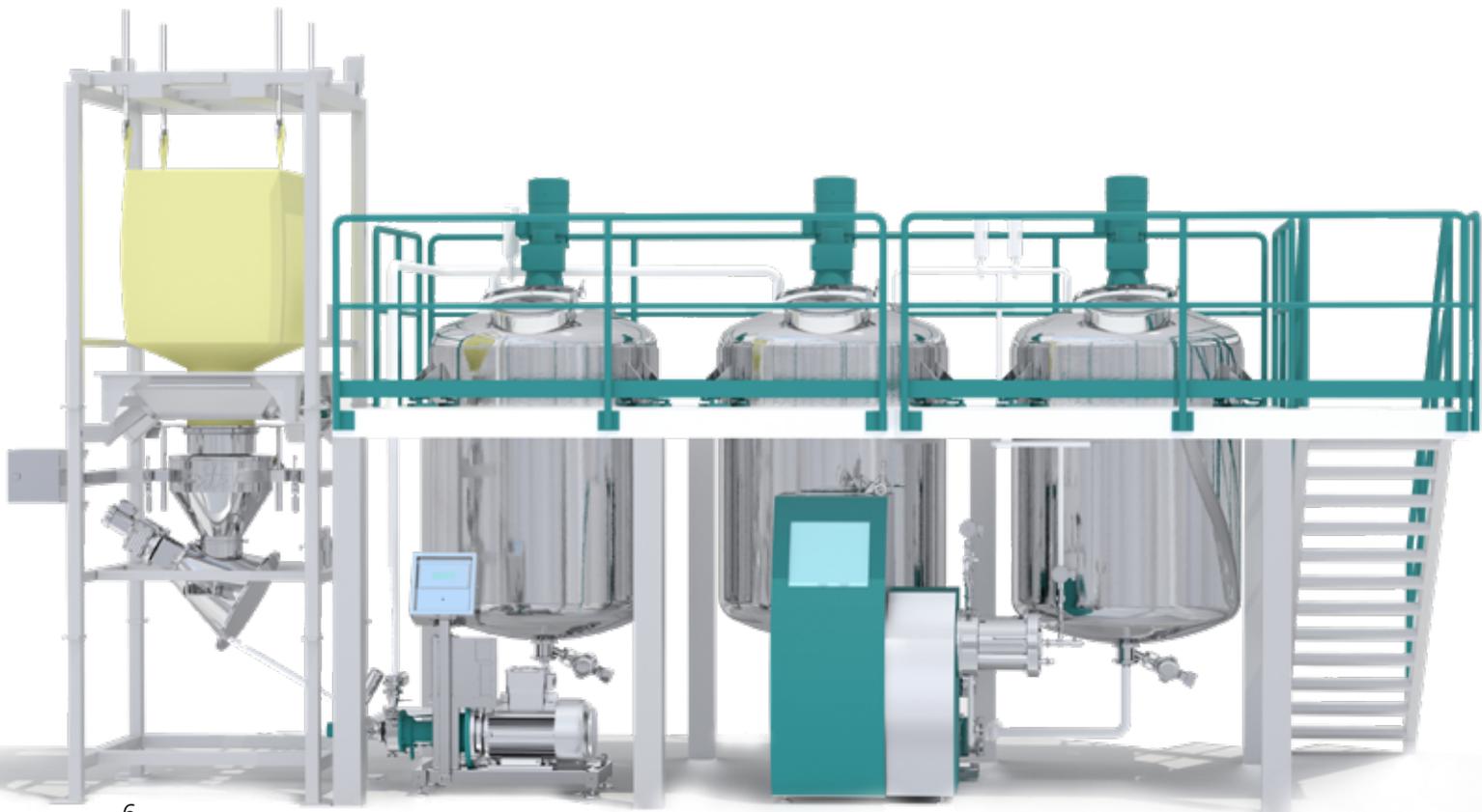
- Turnkey plant design, plant expansion and modernization using the latest machine and process technology.
- Project management from start to finish with performance guarantee.
- Worldwide customer service for spare parts, training, service and plant maintenance, etc.

System Integration

- Installation and operation on one level
- Compact dimensions
- Continuous batch production through, for example, combination with 2 or more process tanks and agitator bead mills

Options

- Connection for drawing in small quantities of liquid
- Residue drainage
- All optional connections can be operated manually or automatically
- Explosion-proof models for gas, dust and conductive dusts-integration into the customer's process control system
- Individual programming and process integration possible
- Remote maintenance service
- Noise protection enclosure



Digital Inkjet

- Very good printability
- Better open time
- Huge time savings when releasing photoinitiators
- Very good stability
- Easy to stay within temperature limits



Water-based Primer and Top Coat, Spray Coating

- Better fineness than conventional process
- Lower coarse fraction, better particle size distribution
- Deaeration of the product
- Easy to stay within temperature limits



Solvent-based Clear Coat, Semi-finished Product/ Incorporation of Fumed Silica

- Better fineness
- Easy to stay within temperature limits
- Deaeration of the product



Predispersion of Products for Grinding

- Optimal predispersion with very good wetting of the pigment surface
- Increase in the efficiency of the milling process through better wetting
- Consistent quality of predispersion, thus consistent conditions for the grinding process



APPLICATION EXAMPLES

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

NETZSCH-Feinmahltechnik GmbH
Selb, Germany

NETZSCH Lohnmahltechnik GmbH
Bobingen, Germany

NETZSCH Premier Technologies,
LLC. Exton PA, USA

NETZSCH Indústria e Comércio de
Equipamentos de Moagem Ltda.
Pomerode, Brazil

NETZSCH Technologies India
Private Ltd.
Chennai, India

NETZSCH Trockenmahltechnik GmbH
Hanau, Germany

NETZSCH España, S.A.U.
Terrassa/Barcelona, Spain

NETZSCH Mastermix Ltd.
Lichfield, Great Britain

NETZSCH (Shanghai) Machinery
and Instruments Co., Ltd.
Shanghai, China

NETZSCH FRÈRES S.A.R.L.
Arpajon, France

NETZSCH Vakumix GmbH
Weyhe-Dreye, Germany

AO NETZSCH Tula
Tula, Russia

NETZSCH Korea Co., Ltd.
Goyang, Korea

NETZSCH Makine Sanayi ve
Ticaret Ltd. Sti.
Izmir, Turkey

ECUTEK S.L.
Barcelona, Spain

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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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