

Doebritz Fine Particle Size Reduction - Official Technical Overview & Datasheet

DOEBRITZ FINE PARTICLE SIZE REDUCTION: EXECUTIVE SUMMARY

Doebritz introduces its advanced Fine Particle Size Reduction system, engineered for the most demanding industrial milling, classifying, and de-agglomeration applications. Leveraging decades of precision machining expertise, this equipment provides consistent, high-efficiency particle size reduction for friable, hygroscopic, and heat-sensitive materials across the chemical, food, pharmaceutical, and mineral processing sectors. The system integrates seamlessly into pneumatic conveying and gravity-fed lines, delivering superior control over particle size distribution (PSD) with minimal fines generation and low specific energy consumption.



HOUSING & ROTOR METALLURGY

The main housing is manufactured from marine-grade cast iron (GGG-40) or 316L stainless steel with an internal mirror finish to prevent material adhesion and facilitate rapid cleaning. The rotor assembly features a proprietary staggered pin or beater plate configuration, hardfaced with tungsten carbide or Stellite alloy for extended service life against abrasive particulates. All contact parts meet FDA and EC 1935/2004 standards for food-contact applications. Rotors are dynamically balanced to ISO 1940-1 Grade G6.3, ensuring vibration-free operation at speeds up to 4500 RPM.

KEY FEATURES

- Precision Rotor Clearances: Adjustable gap settings from 0.2 mm to 2.0 mm for tailoring PSD from $d_{50} = 50 \mu\text{m}$ to $2000 \mu\text{m}$.
- Modular Screening Media: Quick-change perforated screens or wire mesh cassettes (apertures 0.3 mm – 12 mm) enable rapid product changeovers.
- Dual Shaft Sealing: Nitrogen-purged, labyrinth-style or mechanical cartridge seals prevent product migration and maintain pressure differentials up to 3.5 bar(g).
- ATEX 95/2 Compliance: Certified for dust explosion zones 20/21/22 (Gas IIB, Dust IIIC). Optional inert gas injection integrated.
- Low Temperature Rise: Cooling jackets for housing and shaft minimize thermal degradation of heat-sensitive compounds.

COMPLIANCE & SAFETY STANDARDS

Doebritz Fine Particle Size Reduction systems are fully compliant with:

- Machinery Directive 2006/42/EC (CE marked)
- ATEX Directive 2014/34/EU (Category 2D/2G)
- NFPA 652 & 69 (explosion venting and suppression ready)
- ISO 12100:2010 (risk assessment)
- EHEDG guidelines (hygienic design, CIP/SIP compatible)

TECHNICAL SPECIFICATIONS

Operating Principle: High-speed impact / shear milling with integrated classification

Rotor Tip Speed Range: 30 – 120 m/s

Drive Power: 5.5 kW to 250 kW

Throughput Range (dry powder): 10 kg/h to 25,000 kg/h (depending on material density and target fineness)

Maximum Feed Particle Size: Up to 20 mm (friable materials)

Product Temperature Range: -20°C to +150°C (with optional jacket)

Pressure Shock Resistance: 10 barg (design)

Connections: Inlet/Outlet DN150 to DN600, DIN/ANSI mating flanges

Parameter	Specification
Capacity / Throughput	10 – 25,000 kg/h (depending on material & target fineness)
Rotor Tip Speed Range	30 – 120 m/s
Drive Power	5.5 – 250 kW
Max Feed Particle Size	Up to 20 mm (friable materials)
Product Temperature Range	-20°C to +150°C (with optional jacket)
Flange Standard	DN150 – DN600 / ANSI 150# – 300#
ATEX Certification	Category 2D/2G for zones 20/21/22 and IIB gas groups

INDUSTRIAL DEPLOYMENT

Typical installations include: fine grinding of lactose and APIs in pharma, pulverizing of PVC and masterbatch in plastics, reducing sodium bicarbonate and activated carbon for flue gas treatment, and de-agglomerating milk powder or cocoa presscake in food processing. The system can be configured for batch or continuous operation and is available with PLC integration (Profinet, EtherNet/IP) for full process control, remote diagnostics, and predictive maintenance logging.

