Granule Size Reduction Mill - Official Technical Overview & Datasheet

EXECUTIVE SUMMARY

The Doebritz Granule Size Reduction Mill is a precision-engineered milling solution designed for the pneumatic conveying, food, pharmaceutical, chemical, and plastics industries. Combining controlled size reduction with superior airlock performance, this mill operates as an integrated system that reduces oversized granules, agglomerates, and friable materials while maintaining closed-loop pressure differentials. Its primary value proposition lies in delivering consistent particle size distribution (PSD) downstream without auxiliary sifting or recirculation loops, directly improving process efficiency and product quality.

Engineered for continuous operation in hygienic and industrial environments, the Doebritz mill reduces material holdup and heat generation through a unique rotor-stator cutting geometry. Target applications include size reduction of friable plastics, de-agglomeration of food powders, delumping of chemical intermediates, and milling of pharmaceutical granules prior to tablet compression. With ATEX-certified configurations for potentially explosive dust atmospheres, the unit provides both safety and productivity in one compact footprint.

HOUSING & ROTOR METALLURGY

The mill housing and rotor are manufactured from high-grade cast materials including GGG-40 ductile cast iron for industrial applications or investment-cast 316L stainless steel for sanitary and corrosive environments. All wetted surfaces are mechanically polished to Ra < 0.8 µm (sanitary versions to Ra < 0.4 µm) to prevent product adhesion and facilitate cleaning. The housing is CNC-machined to achieve rotor-to-stator radial clearances as tight as 0.15 mm to 0.5 mm, depending on product specification, enabling efficient milling action while preserving airlock functionality. Rotors feature staggered or helical cutter configurations precision-balanced to ISO 1940 G6.3 standards, ensuring vibration-free operation at full speed. Replaceable wear liners and hardened tool steel cutting edges (optionally ceramic-coated) extend service life when processing abrasive materials.

KEY FEATURES

- Outboard Heavy-Duty Bearing Configuration: Bearings are mounted externally from the product zone, eliminating contact with process materials. This design prevents contamination and allows grease or oil lubrication without risk of product ingress. Bearing life exceeds 50,000 hours at full load, with temperature monitoring ports standard.

- Dual Shaft Sealing with Air Purge Option: Primary shaft seal is a PTFE lip seal contacting a hardened sleeve; secondary labyrinth seal provides backup containment. For abrasive or toxic products, a continuous dry air or nitrogen purge (0.2–0.5 bar above process pressure) creates a positive barrier against dust leakage. Purge consumption is typically 5–20 NL/min depending on shaft diameter.

- Direct Drive Gearmotor or Belt Drive: Standard configuration uses a IE3/IE4 premium efficiency helical-bevel gearmotor mounted directly to the mill flange, eliminating alignment issues. For variable speed applications (200–1500 RPM), a belt-driven pulley system with inverter-ready motor allows PSD tuning without mechanical changes.

- Quick-Open Housing and Tool-Free Screen Access: Hinged housing with swing-away design allows full rotor exposure within five minutes using no special tools. Interchangeable perforated screens (0.5 mm to 12 mm round holes or square mesh) provide secondary particle classification.

- Low RPM High Torque Milling Action: Unlike high-speed hammer mills, the Doebritz operates at 150–600 RPM typical, generating minimal frictional heat rise (<10°C across the mill), making it suitable for thermolabile products such as pharmaceutical granules, resins, and cocoa powder.

COMPLIANCE & SAFETY STANDARDS

The Doebritz Granule Size Reduction Mill is fully compliant with ATEX Directive 2014/34/EU for equipment in potentially explosive dust atmospheres, with certifications available for Zones 20, 21, and 22 (internal and external). NFPA 69 (standard on explosion prevention systems) compliance is standard when fitted with deflagration venting or isolation valves. CE marked to Machinery Directive 2006/42/EC and Low Voltage Directive 2014/35/EU. For food and pharmaceutical applications, materials meet FDA 21 CFR and EC No 1935/2004 requirements; sanitary configurations are EHEDG-certified and CIP/SIP capable. Optional IECEx and UKCA certifications available upon request.

TECHNICAL SPECIFICATIONS

All performance parameters are validated under standard conditions (ambient temperature 20 °C, barometric pressure, non-sticky free-flowing granules of bulk density 0.6 kg/L). Values are subject to application review.

Parameter	**Specification**
Capacity Throughput	0.5 to 40 metric tons/hour (depending on material, rotor speed, screen size)
Rotor Diameter	150 mm, 250 mm, 350 mm, 500 mm
Rotor Speed Range	150 – 1500 RPM (direct drive); 50 – 600 RPM (belt drive, typical milling)
Flange Standard	DIN EN 1092-1 PN10/PN16 / ANSI B16.5 150# / JIS 10K
Housing Material	Cast iron GGG-40 / SS304 / SS316L (investment cast)
Sealing Type	PTFE lip seal + labyrinth; optional air/nitrogen purge
Bearing Type	Outboard-mounted, sealed spherical roller bearings (ISO 15) with grease fittings
Motor Power	1.5 kW to 37 kW (IE3 or IE4)

ATEX Certification	II 2D Ex h IIIC T125°C Db (internal Zone 20, external Zone 21/22)
Operating Temperature Range	-20 ° C to +150 ° C (with appropriate seals and lubricants)
Maximum Pressure Differential	0.5 bar (standard); 1.5 bar (high pressure variant)