

## Portable Cone Mill - Official Technical Overview & Datasheet

### EXECUTIVE SUMMARY

The Doebritz Portable Cone Mill represents a paradigm shift in flexible particle size reduction for batch-dependent process environments. Engineered for the pharmaceutical, food, chemical, and plastics industries, this modular milling platform delivers deagglomeration, sizing, and reclaiming of dry or wet granules with rapid changeover capability. Unlike fixed inline mills, the portable configuration allows operators to position the unit between bins, hoppers, or vacuum conveyors, making it ideal for low-to-medium volume production, R&D, and pilot plants where cleanability and mobility are paramount.

Leveraging a cantilevered rotor design and conical screen housing, the Doebritz Portable Cone Mill achieves gentle milling action with low dust generation and minimal temperature rise—critical for heat-sensitive or explosive materials. The unit supports ATEX-certified operation (Zone 20/21/22), integrates seamlessly with pneumatic conveying systems, and offers tool-less screen and rotor removal. With throughput ranges from 50 kg/h to over 5,000 kg/h depending on rotor speed, screen perforation, and material characteristics, this mill sets a new benchmark for sanitary, portable size reduction.



## HOUSING & ROTOR METALLURGY

The housing is manufactured from investment-cast 316L stainless steel (EN 1.4404) as standard, with optional SS304 or electropolished finishes for aggressive or ultra-clean applications. All product-contact surfaces achieve  $R_a \leq 0.4 \mu\text{m}$  (16  $\mu\text{in}$ ) without mechanical polishing, reducing bacterial adhesion and enabling rapid CIP/SIP validation. The conical screen housing incorporates a patented clamping ring system that eliminates dead zones and ensures repeatable screen tension across all batch sizes.

The rotor is CNC-machined from a single billet of 316L, featuring either 2-arm, 4-arm, or multi-impeller geometries depending on target duty. Rotor-to-screen clearances are held to  $\pm 0.1 \text{ mm}$  across the entire conical interface, ensuring consistent shear without metal-to-metal contact. Blade tips are radiused and

polished to minimize product degradation. For abrasive or high-density materials (e.g., pigments, ceramics), optional tungsten carbide-coated rotors and screens are available, extending wear life by up to 400% compared to standard stainless steel.

## KEY FEATURES

- Cantilevered Rotor with Outboard Bearings: The rotor is supported by two permanently sealed, high-precision bearings located entirely outside the product zone. This prevents lubricant migration, eliminates shaft seal contamination risks, and allows the entire milling chamber to be cleaned without bearing disassembly. Bearing housing includes labyrinth seals and optional air purge (0.2-0.5 bar) for dust-tight operation.
- Tool-less Screen & Rotor Changeover: Patented quick-release cam levers secure the conical screen, enabling screen swaps in under 30 seconds without tools. The rotor is mounted via a splined hub and retained by a single hand-knob, allowing complete rotor geometry changes in under 2 minutes. All components are keyed for foolproof reassembly.
- Variable Frequency Drive (VFD) Ready: The direct-drive IE3 gearmotor (0.55 kW to 4.0 kW) is controlled by an external VFD, enabling stepless speed adjustment from 200 to 3,600 rpm. This allows precise tuning of peripheral tip speed (3 to 25 m/s) to match friability, moisture content, and target particle size (100  $\mu\text{m}$  to 5 mm). An optional integrated torque sensor detects overload or blockages.

- Interchangeable Conical Screens: Screens are laser-cut from 1.2 mm or 1.5 mm 316L sheet with round, square, or slotted perforations (0.5 mm to 12 mm openings). Reinforced retention ribs prevent doming under high feed pressures. Each screen is serialized and traceable to DIN EN 10204 3.1 certification.
- Multi-Configuration Inlet & Discharge: The portable mill accepts standard DN100/150 tri-clamp or ISO-KF vacuum inlets, and discharges via a 30° gravity chute, a sanitary butterfly valve, or direct connection to a pneumatic receiver (vacuum up to -0.8 barg). The stainless steel dolly cart includes locking casters and vibration-damping feet.

## COMPLIANCE & SAFETY STANDARDS

The Doebritz Portable Cone Mill is fully compliant with global process safety and sanitary regulations. All product-contact materials are FDA Title 21 CFR 177, EU 1935/2004, and USP Class VI certified. ATEX certification is available for Gas (II 2G Ex h IIB T4) and Dust (II 2D Ex h IIIC T125°C Db) environments, Zone 20/21/22, with conductive seals and grounding continuity verified per EN ISO 80079-36. CE Marking includes Machinery Directive 2006/42/EC, Low Voltage Directive 2014/35/EU, and RoHS 3 (2015/863). NFPA 652 compliance for combustible dust handling is supported with optional passive explosion venting (bursting panel) or flameless vent kit. EHEDG (European Hygienic Engineering & Design Group) Type EL Class I certification is standard for all 316L models,

confirming drainability and cleanability without crevices.

## TECHNICAL SPECIFICATIONS

The following table summarizes the standard technical parameters of the Doebritz Portable Cone Mill series. Values apply to baseline 316L construction with 4-arm rotor, round-perforation 1.5 mm screen, and direct-drive VFD-controlled gearmotor at 50 Hz supply. Customizations are available upon request.

<b>Parameter</b>	<b>Specification</b>
Throughput Range	50 - 5,000 kg/h (dependent on material, rotor speed, screen size)
Rotor Speed (VFD)	200 - 3,600 rpm (tip speed 3 - 25 m/s)
Screen Perforation Range	0.5 mm to 12 mm (round, square, slotted)
Motor Power (IE3)	0.55 kW / 0.75 HP (standard), up to 4.0 kW / 5.4 HP (heavy-duty)
Product Contact Material	316L stainless steel (EN 1.4404), Ra ≤ 0.4 μm, electropolish optional
Inlet / Outlet Connection	DN100 / DN150 tri-clamp (ISO 2852), ISO-KF, or sanitary butterfly valve

Maximum Operating Pressure	-0.8 barg (vacuum) to +1.0 barg (gravity / pneumatic assist)
Ambient & Product Temp.	-20°C to +120°C (silicone seals); -20° C to +200°C (Viton/FKM optional)
Weight (dry)	48 kg (including dolly cart and garmotor)
Dimensions (L x W x H)	580 x 620 x 950 mm (with discharge chute closed)
Certifications (standard)	CE, EHEDG Type EL, FDA, EC 1935/2004, USP Class VI
ATEX Option	II 2D Ex h IIIC T125°C Db (dust), II 2G Ex h IIB T4 (gas)

