

Chemical Powder Sifter - Official Technical Overview & Datasheet

EXECUTIVE SUMMARY

The Doebritz Chemical Powder Sifter represents a paradigm shift in dry powder classification for pneumatic conveying, food, pharmaceutical, chemical, and plastics processing industries. Engineered to deliver high-capacity sieving with near-zero dust migration, this rotary sifter integrates a heavy-duty airlock rotor with a vibratory screen deck, enabling simultaneous product classification and pressure sealing. Its primary value proposition lies in eliminating auxiliary rotary valves and reducing plant footprint while maintaining sanitary integrity and explosion resistance in ATEX-classified environments.

Designed for continuous operation with bulk densities from 0.3 to 1.5 kg/L, the Doebritz sifter achieves classification efficiencies above 98% for particle sizes between 150 μ m and 5mm. The unit's modular architecture allows seamless integration into lean-phase or dense-phase pneumatic conveying lines, with pressure differential ratings up to 1.5 bar(g). By combining screening and airlock functions into a single housing, operators gain significant savings in installation height, maintenance access, and purge gas consumption.



HOUSING & ROTOR METALLURGY

The sifter housing is manufactured from either GGG-40.3 nodular cast iron for abrasive chemical powders or investment-cast SS316L (1.4404) for pharmaceutical and food-grade applications. All product-contact surfaces are mechanically polished to $Ra \leq 0.8\mu\text{m}$, with full traceability per EN 10204 3.1. The housing features split-plane construction with O-ring-sealed access covers, allowing rapid rotor inspection without disturbing downstream piping.

The rotor assembly is CNC-machined from solid stainless steel billet, featuring 6, 8, or 12 radially arranged vanes with anti-jam tapered tips. Laser-profiled rotor-to-housing clearances are factory-set to 0.08mm – 0.12mm on SS316L models, ensuring maximum air retention efficiency ($\geq 99.5\%$ pressure hold at 1 bar differential). Rotor vanes are provided with optional PTFE tip inserts for

handling sticky hygroscopic powders. All cast surfaces undergo 100% radiographic inspection and dye penetrant testing per ASTM E165.

KEY FEATURES

- **Outboard Bearing Isolation:** Bearings are positioned completely outside the product zone, separated by triple-labyrinth seals with a pressurized air purge port (0.2–0.6 bar N₂ or dry air). This design eliminates lubricant migration into the powder stream and allows hot-Sterilization-in-Place (SIP) at 150°C.
- **Dual-Action Shaft Sealing System:** A combination of PTFE lip seals (primary) and carbon-filled PTFE gland packing (secondary) with a lantern ring for purge injection. The system self-adjusts via Belleville spring washers, extending seal life beyond 12,000 hours in abrasive silica service.
- **Direct Drive Integral Gearmotor:** IE3 premium-efficiency motor coupled through a hardened steel parallel-shaft reducer with cast iron housing. No chains or belts — the rotor is spline-coupled directly to the reducer output, enabling speed adjustment from 5 to 50 RPM via a VFD without backlash.
- **Quick-Release Screen Deck:** The trampoline-style tensioned screen frame (mesh 20 to 200 US mesh) is clamped externally with six swing bolts and can be replaced in under 5 minutes without tools. An integrated ultrasonic anti-blinding probe (optional for cohesive powders) prevents mesh blockage.
- **ATEX-Certified Explosion Venting:** The sifter is equipped with a burst panel (0.1 bar rupture pressure) and flame-arresting mesh on the vent port, compliant

with EN 14491 and NFPA 68 for St1 and St2 dust explosions.

COMPLIANCE & SAFETY STANDARDS

All Doebritz Chemical Powder Sifters carry full CE marking and are certified per ATEX Directive 2014/34/EU for gas and dust hazard zones: Zone 20 (internal) and Zone 21/22 (external). Units are third-party certified by DEKRA and comply with NFPA 654 for combustible dust handling, EHEDG guidelines for hygienic design (Type EL Class I), and FDA 21 CFR Part 177 for elastomeric components. Welding procedures are qualified per ASME Section IX, and pressure-containing castings are proof-tested at 3 × maximum working pressure.

TECHNICAL SPECIFICATIONS

The following table summarizes key dimensional, capacity, and performance parameters for the standard Doebritz CPS series. Custom materials (Hastelloy C22, Duplex 2205) and ANSI flanges are available upon request.

Parameter	Specification
Capacity / Volume	2.5 to 100 Liters/rev (15 model sizes)
Flange Standard	DIN PN10 / ANSI 150# (DN80 to

	DN400)
Drive Configuration	Direct Drive IE3 Gearmotor, 0.75 – 22 kW, 400V/3Ph/50Hz
Max Pressure Differential	1.5 bar(g) standard, 3.0 bar(g) optional
Operating Temperature	-20 ° C to +220 ° C (with high-temp seals)
Screen Mesh Range	20 to 200 US mesh (0.841mm to 0.074mm)
Sifting Efficiency	≥ 98% at 200µm cut point, powder density 0.5 kg/L
Materials of Construction	SS316L (1.4404) / GGG-40.3 / Duplex 2205
Surface Finish	Ra ≤ 0.8µm electropolished (product contact)
Certifications	ATEX Zone 20/21/22, CE, EHEDG, FDA, NFPA 654

