

Doebritz Square Bar Impeller - Official Technical Overview & Datasheet

DOEBRITZ SQUARE BAR IMPELLER: EXECUTIVE SUMMARY

The Doebritz Square Bar Impeller represents a paradigm shift in high-abrasion, high-temperature pneumatic conveying and gravity discharging applications. Unlike conventional fabricated or cast rotors, the Square Bar Impeller utilizes a precision-engineered, multi-faceted bar geometry that minimizes particulate entrapment and drastically reduces radial wear. Designed for duty cycles exceeding 8,000 hours in cement, minerals, and chemical processing, this airlock provides exceptional volumetric efficiency while maintaining ultra-tight tip-to-housing clearances down to 0.10 mm. Manufactured at Doebritz' s ISO 9001:2025-certified facilities, each unit undergoes 100% hydrostatic and dynamic leak testing prior to dispatch.



HOUSING & ROTOR METALLURGY

The housing is precision cast from ASTM A395 ductile iron or optional 316L stainless steel, featuring a stress-relieved design to prevent deformation under differential pressures up to 3.5 bar (50 psi). The namesake Square Bar rotor is machined from solid hardened tool steel (HRC 58-62) or Stellite-faced for extreme abrasive service. Each bar is mechanically locked into heavy-duty end discs using interference-fit dowels, eliminating weld fatigue common in fabricated rotors. Bearing isolators and four-row contact seals prevent fine powder ingress into the outboard bearing housings.

KEY FEATURES

- Square Bar Rotor Geometry: Four or six independently replaceable square bars create a non-jamming, self-cleaning action that reduces material buildup and blowback.
- Extreme Wear Resistance: Bar faces and housing liners available in tungsten carbide, ceramic, or chrome oxide; triple service life compared to standard rotary valves.
- High-Pressure Integrity: Reinforced end covers and lantern ring purge ports maintain seal integrity up to 3.5 bar differential.
- Drop-Through or Blow-Through Configurations: Modular housing adapts to gravity discharge, dilute-phase, or dense-phase pneumatic systems.

- Low Maintenance Design: Outboard bearing housings allow bar replacement or clearance adjustment without removing the valve from the pipeline.

COMPLIANCE & SAFETY STANDARDS

All Doebritz Square Bar Impellers are certified for global industrial deployment. Standard compliance includes ATEX Directive 2014/34/EU for gas and dust explosive atmospheres (II 2D c T110°C, II 2G c T4), NFPA 69 explosion isolation, and EC Type Examination. Units are available with FDA-compliant seals and polished food-contact surfaces. Pressure Equipment Directive (PED) 2014/68/EU Category III and ASME B31.3 process piping conformity available upon request. Each valve includes a permanent nameplate with CE, UKCA, and EAC markings.

TECHNICAL SPECIFICATIONS

Operating Temperature Range: -20°C to +280°C (with high-temp seals)

Max Differential Pressure: 3.5 bar (50 psi) standard; 5.0 bar (72 psi) reinforced

Rotor Tip Speed: ≤ 1.5 m/s for abrasive materials; ≤ 3.0 m/s for free-flowing powders

Volumetric Efficiency: 98-99% at 1.0 bar differential

Housing Materials: ASTM A395 (Ductile Iron) / 316L / Hastelloy C-22

Rotor Materials: Hardened tool steel / Stellite 6 / 316L with carbide coating

Shaft Diameter: 45 mm – 110 mm depending on model

Bearings: Heavy-duty spherical roller, lifetime grease-packed or oil bath

Sealing: Four-lip PTFE/carbon fiber or mechanical purge seal with nitrogen/air connection

Inspection Ports: Two hinged access covers with sight glasses on all models \geq DN150

| Parameter | Specification |
|---------------------------|--|
| Capacity / Volume | 3.0 to 120 Liters/rev (6 model sizes: DN100 to DN500) |
| Flange Standard | DIN EN 1092-1 PN10 / ANSI B16.5 150# (others on request) |
| Drive Configuration | Chain drive with torque limiter, direct drive IEC motor, or SmartDrive VFD-ready |
| Max Differential Pressure | 3.5 bar standard, 5.0 bar reinforced housing |
| Temperature Range | -20 °C to +280 °C (standard seals to 200°C) |
| Typical Clearances | 0.10 mm to 0.25 mm (rotor tip to housing liner) |

INDUSTRIAL DEPLOYMENT

The Square Bar Impeller excels in cement preheater towers, fly ash collection systems, titanium dioxide conveying, carbon black metering, and petrochemical catalyst injection. Typical installations combine the impeller with Doebritz' s SmartDrive variable frequency drive package and RotorClear automated purge system. For hygroscopic or sticky materials (lime hydrate, soda ash), optional polished cavities and heated purge air ports prevent bridging. Doebritz provides full integration support including flange mating drawings, torque curves, and commissioning assistance.

