

Pneumatic Rod Seals — Product parameter table

| Parameter | Typical values / notes (pneumatic rod applications) |
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| Seal families / common profile types | U-cup / lip rod seals (single-acting), PTFE sliding rings with elastomer energizer (low friction), polyurethane (PU) rod rings, chevron/packing (heavy duty), integrated rod wipers/scrapers |
| Typical constructions | Single-piece molded PU (wear resistant), two-part PTFE cap + elastomer energizer (low friction & wide temp), asymmetrical lip profiles for dynamic sealing, rod wipers (scrapers) as separate components |
| Common materials | Sliding elements: polyurethane (PU/ECOPUR), PTFE (and filled PTFE); Energizers / lips: NBR (Buna-N), HNBR, FKM/Viton; Guide rings often POM/PA or PTFE blends |
| Typical operating temperature (pneumatic) | Standard PU / NBR solutions: $\approx -20^{\circ}\text{C}$ to $+80^{\circ}\text{C}$; PTFE + special elastomer combinations extend to higher temperatures. |
| Typical working pressure | Pneumatic service: up to ~ 10 bar (1 MPa / 145 psi) for ISO-type cylinders; some sealing profiles (and hydraulic variants) are rated for higher pressures — confirm per profile. |
| Recommended rod surface finish & tolerance | Sliding surface finish typically Ra 0.05 - 0.3 μm (or Rt/Rmax bands per OEM table); groove faces and bottoms have larger allowed roughness — follow manufacturer surface-finish/gland tables. |
| Extrusion / backup strategy | For higher pressure or larger extrusion gaps, use backup rings, metal energizers, or select profiles designed to resist extrusion; manufacturers provide “max radial extrusion gap” and recommended groove clearance. |
| Typical dynamic speed behaviour | Pneumatic rod seals are designed for reciprocating speeds common to pneumatic cylinders (high stroke frequency possible); PTFE sliding rings offer lower friction and better performance in dry/low-lubrication conditions. |
| Common failure drivers / selection warnings | Abrasion from contaminated air, wrong material selection for media/temperature, insufficient groove chamfers (installation damage), improper surface finish, extrusion under pressure — mitigation: proper rod wipers, filtration, correct groove & material choice. |