

Pneumatic piston seals — Product parameter table

Parameter	Typical values / notes
Seal family / types	Floating O-ring / piston ring (floating), U-cup / U-profile piston seals, PTFE-cap + elastomer energizer (2-part), symmetrical piston profiles, polyurethane (PU/TPU) sliding rings
Typical constructions	Single-piece molded PU piston rings (high wear), two-piece PTFE sliding ring + elastomer energizer (low friction), rubber-energized PTFE cap, U-cup (lip) seals for higher pressure/extrusion resistance
Common sealing materials	Polyurethane (PU/TPU) for abrasion & durability; NBR (Buna-N), HNBR, FKM (Viton) as energizers/energising O-rings; PTFE / filled PTFE sliding rings for low friction and wide temp range; polyamide/PA wear rings (guides).
Typical operating temperature (pneumatic applications)	Standard PU seals / ISO pneumatic cylinders: commonly $\approx -20\text{ }^{\circ}\text{C}$ to $+80\text{ }^{\circ}\text{C}$; with special elastomers (FKM/Viton/PTFE combinations) serviceable up to $\sim +150\text{ }^{\circ}\text{C}$ to $+230\text{ }^{\circ}\text{C}$ for specialty profiles — check material datasheet.
Typical working pressure (pneumatic cylinders)	ISO pneumatic cylinders and most pneumatic piston seals designed for up to 10 bar (1 MPa / 145 psi) nominal working pressure; some profiles rated for slightly different ranges — verify per cylinder/seal family.
Recommended surface finish & tolerances	Manufacturer gland & O-ring handbooks recommend specific surface roughness and tolerances for low friction / long life (e.g., Ra and Rmax bands for contact and groove surfaces in Parker O-Ring handbook). Use the OEM gland table for exact tolerance values.
Typical dynamic behaviour / selection notes	Floating O-ring designs reduce friction (no static compression) — used in pneumatic pistons; U-cup and PU seals provide abrasion resistance but higher friction; PTFE sliding rings give low friction and better dry-running capability. Selection depends on: pressure, speed, media (oiled/dry air), cylinder bore and expected lifetime.
Typical failure modes to mitigate	Abrasion (select PU or PTFE), extrusion (use backup rings / correct cross-section), dry run/lack of lubrication (use PTFE or lubricated design), improper groove tolerances or surface finish, chemical attack vs. elastomer material