



# Full Pneumatic Seals Catalogue

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# 1. Piston seals (pneumatic)

## 1.1. Short description

Piston seals retain compressed air on one side of the piston and minimize internal leakage. In pneumatics they prioritize low friction (to avoid stick-slip), long cycle life, and often compatibility with dry-air operation.



## 1.2. Typical applications

General-purpose pneumatic cylinders, compact actuators, guided actuators, indexing drives.

## 1.3. Typical performance parameters (procurement table)

Parameter	Typical range / value	Notes
<b>Operating pressure</b>	0.1–1.0 MPa (typical industrial ~0.5–0.8 MPa).	Pneumatic service — much lower pressure than hydraulic systems.
<b>Temperature</b>	NBR: approx. –30°C to +100°C; HNBR: –40°C to +150°C; FKM: –20°C to +150°C; PTFE: wide range (caps).	Final limits are compound-specific — confirm with supplier.
<b>Friction / speed</b>	Low friction designs (PTFE caps or low-friction compounds) reduce stick-slip and improve positioning.	For positioning cylinders choose PTFE capped or low-friction compounds.
<b>Typical materials</b>	NBR, HNBR, FKM, PU (TPE-U for some vendors), PTFE caps	Selection depends on air quality (oiled vs dry), temperature and cycle life.

## 1.4. Common sizes/spec guidance

Typical vendor bores: 12, 16, 20, 25, 32, 40, 50, 63, 80, 100 mm (many series follow these common sizes).

Typical profiles: O-ring energized piston rings; molded PU rings; PTFE cap seals with elastomeric energizers.



## 2. Rod / plunger (dynamic) seals

### 2.1. Short description

Rod seals (dynamic) prevent compressed air leakage past the piston rod in the gland. They must balance low friction, good wear resistance and compatibility with dust-exclusion wipers.



### 2.2. Typical applications

Pneumatic cylinders, valve spindles, actuators in automation lines.

### 2.3. Typical performance parameters

Parameter	Typical range / value	Notes
Operating pressure	Up to ~1.0 MPa; common industrial operating range 0.2–0.8 MPa.	Check anti-extrusion needs only if system approaches the higher end.
Temperature	NBR/HNBR/FKM ranges as in section 3.	Use FKM if higher temperature or oils are present.
Speed / cycles	Designed for frequent cycles; low stick-slip preferred for positioning.	PTFE cap rod seals reduce friction for frequent starts/stops.
Materials	NBR, HNBR, FKM, TPE-U (PU), PTFE composite w/energizer.	Bi-functional rod seal/wiper combos are common (one profile acts as seal+fixing+wipe).

### 2.4. Common sizes/spec guidance

Typical rod diameters: small metric (2–50 mm in many cylinder series), match vendor spare parts by series and rod diameter.

## 3. Wipers / scrapers (rod wipers)

### 3.1. Short description

Wipers scrape away dust, dirt and superficial liquids from the rod to protect internal seals. In pneumatic cylinders they are essential for outdoor or dirty environments.



### 3.2. Typical applications

Outdoor actuators, packaging machinery, food-process equipment (select food-grade compounds), machine tools.



### 3.3. Typical performance parameters

Parameter	Typical range / value	Notes
Function	Exclude contaminants and drain superficial liquid	Primary protection for rod seals.
Materials	NBR, TPE-U (PU), PTFE (special)	For wet environments select hydrolysis-resistant compounds (some vendors offer water-resistant options).
Profile selection	Multi-lip for dusty service; hard scrapers for heavy contamination	Confirm with vendor maintenance recommendations.

### 3.4. Common sizes/spec guidance

Wipers are sized to rod/gland diameter and are usually sold as part of maintenance kits for cylinder series.

## 4. Guide rings / wear rings (pneumatic)

### 4.1. Short description

Guide rings maintain alignment and prevent metal-to-metal contact; they carry lateral loads and protect seals.



### 4.2. Typical applications

Guided cylinders, long stroke actuators, side-loaded cylinders.

### 4.3. Typical performance parameters

Parameter	Typical range / value	Notes
Function	Support lateral loads; protect seals; reduce friction	Not a pressure seal but essential for longevity.
Materials	PTFE composites, POM, engineered plastics	Vendor-specific compounds used to optimize wear and friction.



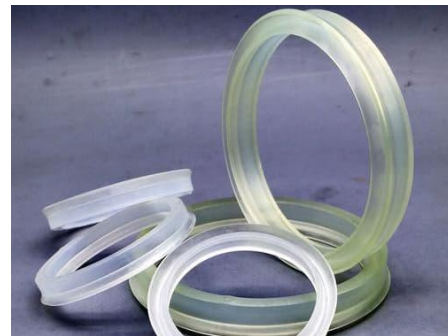
## 4.4. Common sizes/spec guidance

Match guide ring width and O.D./I.D. to piston and bore; vendor tables give exact widths per series.

# 5. Elastomeric profiles (U-cups, V-rings, polyurethane)

## 5.1. Short description

U-cups and V-rings provide sealing and energizing action; PU is chosen for abrasion resistance; TPE and special compounds used where hydrolysis or cleanroom compatibility is required.



## 5.2. Typical applications

General-purpose cylinders, high-cycle actuators, cleanroom and food industry (with compliant compounds).

## 5.3. Typical performance parameters

Parameter	Typical range / value	Notes
Pressure	Pneumatic profiles rated to ~1.0 MPa; typical design practice at lower pressure	Verify compound ratings with vendor.
Temperature	See section 3 material guidance	For clean or wet environments choose compounds accordingly.
Hardness	PU 85–95 Shore A (wear grades); NBR ~70 Shore A typical	Hardness affects sealing force and wear.

## 5.4. Common sizes/spec guidance

Standard cross-sections exist for common grooves; manufacturer charts list cross-section dimensions and part numbers.



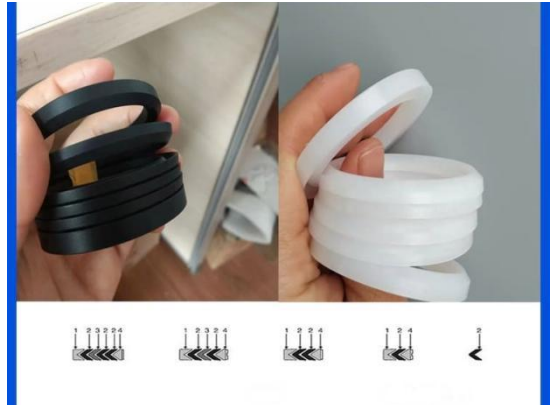
## 6. PTFE & low-friction composite seals

### 6.1. Short description

PTFE-capped seals and composite designs (PTFE sliding surface + elastomer energizer) reduce dynamic friction and stick-slip; used in high-cycle positioning and low-actuation-force applications.

### 6.2. Typical applications

Precision positioning actuators, vacuum/low-friction systems, high-cycle indexing.



### 6.3. Typical performance parameters

Parameter	Typical range / value	Notes
<b>Friction</b>	Very low dynamic friction	Ideal where precise positioning or low breakaway force are required.
<b>Temperature &amp; compatibility</b>	PTFE wide temp capability; energizer sets overall limit	Confirm combined materials with manufacturer datasheet.

### 6.4. Common sizes/spec guidance

PTFE cap rings are available for standard bore/rod diameters—consult vendor catalogs for exact profile and groove codes.