

Product parameters (rod seals — summary)

Parameter	Typical / recommended value or note
Name / role	Rod seal (rod wiper / rod lip seal) — the dynamic seal in a cylinder that prevents pressurised hydraulic fluid escaping along the piston rod while allowing reciprocating motion.
Common constructions / profiles	Single-lip asymmetric hydraulic rod seals (U-cup variants), low-friction lip seals, composite assemblies with integrated anti-extrusion elements, and segmented cartridges. Typical catalogue families are shown by SKF, Parker and Trelleborg.
Primary materials (seal lips / jackets)	NBR (Buna-N), HNBR, FKM / Viton, PU / Polyurethane (for high wear), and PTFE / filled PTFE for low friction or aggressive fluids. Metal/stainless steel reinforcement is used for cartridges. Select by fluid, temperature and abrasion.
Energizers / springs / supporting parts	Elastomer energizers (in some PTFE jackets), garter springs in specific designs, and separate buffer/back-up rings (PTFE, nylon) for extrusion protection at high pressure.
Temperature guidance	Depends on compound: NBR \approx -30° C to $+100^{\circ}$ C, HNBR \approx -40° C to $+150^{\circ}$ C, FKM \approx -20° C to $+200^{\circ}$ C, PTFE variants extend to much higher temps.

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Pressure capability (typical)	Many modern rod seal systems (rod seal + buffer/back-up) are used in low → very high hydraulic pressures; catalogue examples show standard rod seals for mobile & industrial hydraulics and specialised designs for several hundred bar service — high-pressure duty requires anti-extrusion rings and correct gland design. Confirm per profile datasheet.
Surface finish & tolerance (rod)	Manufacturers specify rod surface finish, hardness and tolerance (e.g., polished chrome rods, typical Ra and micro-geometry limits). Correct rod finish and dimensioning (ISO/standard gland tolerances) are critical to rod seal life.
Extrusion protection	For narrow clearances or very high pressure, use backup rings / buffer seals; some seal assemblies integrate anti-extrusion elements. Buffer seals protect the rod seal from pressure spikes.
Common failure modes	Abrasion (contaminants), extrusion (incorrect groove/clearance), chemical incompatibility, dry run / inadequate lubrication, rod surface damage or nicking — follow manufacturer installation & rod-finish guidance.