Radial Shaft Seal (Oil Seal) Size Guide — Designations, Lip Types and Material Limits

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How radial shaft seals are designated (shaft × housing × width), what HMS5/HMSA10 and TC/SC lip codes mean, NBR vs FKM speed and temperature limits, installation rules and how to measure an unknown seal.

Designation = shaft × bore × width

Every standard radial shaft seal is named by three numbers: shaft diameter × housing-bore diameter × width, all in millimetres. A 25×47×7 seal runs on a 25 mm shaft, presses into a 47 mm bore and is 7 mm wide — the same triple every manufacturer uses, so dimensionally the brands interchange (SKF 25×47×10 HMS5 RG and HMSA10 RG are catalogue examples). Metric seal sizes follow ISO 6194/DIN 3760; inch seals use the same logic in inches.

Lip codes

Industry code | SKF code | Construction | Use |

SC / type A | HMS5 | Single lip, spring loaded, rubber OD | Oil retention, clean environment |

TC / type AS | HMSA10 | Main lip + auxiliary dust lip, rubber OD | Oil retention with dust/splash outside — the default |

SB/TB | CRW1/CRW5 | Metal-cased OD versions | Thin-wall or heat-dissipating housings |

VR/VA | CT/V-ring | All-rubber axial seal on the shaft | Secondary flinger in front of the main seal |

Material limits

Lip material | Temp. range | Shaft speed* | Media |

NBR (R suffix) | " 40…+100 °C (peaks 120) | to ~14 m/s | Mineral oils, greases, water |

FKM (V suffix) | " 25…+200 °C | to ~32 m/s | Hot oil, EP additives, fuels, chemicals |

PTFE lip | " 70…+200 °C | dry-running capable | Poor lubrication, chemicals |

*Surface speed = < r 6† gB , r pm; a 50 mm shaft at 3,000 rpm runs 7.9 m/s — NBR territory. Above ~120 °C sump temperature or with EP gear oils, step to FKM.

Installation rules that save the seal

Shaft surface: ground to Ra 0.2–0.8 µm, hardness "e 45 HRC where dirt is present, no spiral grinding lead.

Chamfers: shaft lead-in 15–25°, burr-free; never push a lip over a keyway or spline without a fitting sleeve.

Orientation: main lip faces the medium to be retained; the spring side looks at the oil.

Lubricate the lip and fill 30–50 % of the space between main and dust lip with grease at assembly; a dry start scores the lip in seconds.

Worn groove on the shaft? Press the new seal to a different depth, or fit a thin repair sleeve, rather than letting the lip run in the old track.

Measure an unknown seal with calipers across OD, bore of the old housing and shaft; the stamped face usually carries the triple and material code anyway. Hydraulic cylinder sealing (rod/piston/wiper profiles) is a different family — see the hydraulic seal size finder; bearing housings and their seatings are covered by the bearing dimension chart.

Frequently asked questions
How do I read oil seal size 25x47x7?Shaft diameter 25 mm, housing bore 47 mm, seal width 7 mm — every radial shaft seal is designated by this triple.What is the difference between SC and TC oil seals?SC (SKF HMS5) has a single spring-loaded sealing lip; TC (SKF HMSA10) adds an auxiliary dust lip for contaminated surroundings — TC is the safer default outside clean gearboxes.When should an FKM (Viton) seal replace NBR?Above roughly 100–120 °C continuous, at shaft surface speeds beyond ~14 m/s, or with aggressive media and EP-additive gear oils — FKM handles 200 °C and ~32 m/s.Which way should the seal lip face?The main spring-loaded lip faces the medium being sealed in (the oil side); the dust lip, when present, faces outward.Can different brands of shaft seal be interchanged?Yes — metric seals follow ISO 6194/DIN 3760 dimensions, so a 35×62×10 from any major maker fits the same seat; match lip type and material, not just size.

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