
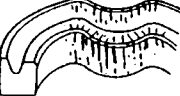











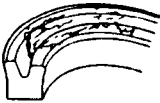

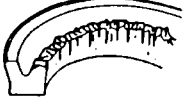


EXAMPLES OF SEAL FAILURES AND THEIR CAUSES

TYPE OF FAILURE	VISIBLE CONDITION	PROBABLE CAUSE	POSSIBLE CURE
HARDENING	Hardening of the dynamic face causing glazing and cracks 	Heat generated by high speed	Slow stroke speed Use alternative seal device
	Hardening of the whole seal. Loss of elasticity. 	High fluid temperature. Deterioration of fluid. Compatibility of seal to fluid	Lower oil temperature. Renew Fluid Change to different seal compound
WEAR	Dynamic face is worn to glossy mirror-like finish 	Insufficient lubrication	Check oil viscosity Use alternative seal device
	Wear on dynamic lip is egg-shaped 	Rod or piston bore not concentric	Hone to within seal specs Replace worn rod or cylinder tube
	Abnormal wear on one side of the dynamic lip 	Worn bearing or wear ring. Excessive lateral load	Replace bearings Increase bearing area
SCARRING	Cut or dent on the lip 	Storage on a nail or peg. Improper installation tool	Store flat in a plastic bag in a closed cardboard box Installation tools should not have sharp edges
	Scratches on the dynamic side 	Scars on the rod or bore. Foreign material in fluid	Hone, polish, and de-burr metal parts Flush system
SWELLING	Material soft and misshaped 	Absorption of fluid. Fluid and seal are incompatible. Water in system	Change seal compound or system fluid Flush system
DETERIORATION	Cracks and loss of elasticity. Material easily crumbles 	High fluid temperature. Exposure to ozone or sunlight	Lower oil temperature Store seals away from sunlight and arc welding area.
GROOVING	Axial cuts on the dynamic side 	Metal chips or other foreign material in system. Imploded air bubbles	Flush system Bleed air from system
EXTRUSION	Extruded material on dynamic side of heel 	Gap between mating surfaces too wide. Worn bearings. Pressure extreme	Employ back-up ring. Replace bearings. Use alternative seal
	Extruded material on static side of seal 	Uneven support surface. Undersize back-up ring	Machine surface. Correct back-up size

EXAMPLES OF SEAL FAILURES AND THEIR CAUSES

TYPE OF FAILURE	VISIBLE CONDITION	PROBABLE CAUSE	POSSIBLE CURE
FRACTURING	Chunks of material torn from dynamic side 	Excessive back pressure	Check relief valves
	Pressure side of seal burned and broken 	Explosion of residual air at high pressure. "Dieseling"	Check maximum pressure. Bleed air from system
	Long cracks in the "V" portion of the seal 	Frequent high pressure shocks or spikes. Low temperature start-up	Use alternative style seal. Warm system before applying pressure
	Breaking off of entire dynamic side 	Deterioration of material and/or fluid	Use alternative material or seal. Flush system

For a professional analysis of seal failure, send your damaged seals to our Engineering Department.

SEAL FAILURE INSPECTION CHECK LIST

When trying to determine the cause of a seal failure it is imperative that all aspects of the situation be investigated. Often, a seal failure points to another part of the hydraulic system that has failed or been compromised in some way. To help you determine where the potential cause of a failure lies, we have developed a seal failure check list. By filling in the necessary information you should be able to determine the cause of a failure and decide what measures to take to assure future trouble free operation. If you have any questions regarding this form, please contact our sales staff at 504-259-4910.

Please Fill This Out Completely

1. Describe the application:

A. Type: Telescopic Piston-rod cylinder Pump/Motor Other _____

B. Fluid Medium: Type: _____

Pressure: normal: _____psi Temperature: system: _____°F ambient: _____°F

min: _____psi min: _____°F

max: _____psi max: _____°F

C. Speed: Cycles/min: _____ Length of stroke: _____in Average speed: _____

2. Inspect the application before seal removal:

A. Amount of leakage: Slight Moderate Heavy leakage

B. Condition of area: Clean Dusty Mud packed

Painted Other

C. Leakage source: Between wiper lip and rod Wiper blown out

At gland bolt holes At gland OD

Between piston and rod Across piston seal Other _____

3. Inspect external cylinder conditions:

Collision that caused a pressure spike in cylinder Cylinder dented Side loading present

4. Remove seals and inspect internal cylinder conditions

A. Shaft: Rod diameter out of tolerance (check entire length) Rod is scratched or scarred
 Eccentricity of rod and cylinder head Surface finish (RMS) is too smooth or too rough

B. Bore: Bore diameter out of tolerance (check entire length) Bore is scratched or scarred
 Bore is out of round Surface finish (RMS) is too smooth or too rough
 Eccentricity of piston head and cylinder bore

C. Groove: Groove dimensions are out of tolerance Surface is nicked or scratched
 Surface is dirty or rusted Surface finish (RMS) is too smooth or too rough

D. Bearing surfaces: Improper support causing eccentricity Abnormal wear of wear ring and/or bearing surfaces

5. Inspect the seals for signs of failure:

A. Describe the failed seal

i. Seal type: Piston Rod Static

Part Number: _____ Size: _____ Material: _____ Profile: _____

Companion parts: _____

ii. Operation: Dynamic: Rotary Reciprocating Oscillating

Static: Radial Face

B. Describe the conditions of failure

i. Service length until failure: _____

ii. Describe seal condition:

