EXAMPLES OF SEAL FAILURES AND THEIR CAUSES

| Types 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 | THEFT | 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 | With Multin | 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. |

The information and drawings were provided by Hercules Bulldog Sealing Products.

EXAMPLES OF SEAL FAILURES AND THEIR CAUSES

| Types 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 |
| | | LOADERS | |
| SCRAPERS | | TILT TILT LIFT STEERING | |
| | EXCAVATORS | васкное | |
| | STICK (CROWD) | BUCKET DIPPER (CROWD) | |



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