



# O-Ring Failure Reference Guide\*

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\*Fargo provides this chart for general reference only. Consult your engineering professional for specific questions and uses.

Condition	Description + correction suggestion	If you often notice signs of o-ring degradation, you may have serious issues at hand.	
<b>Abrasion</b> 	Part of the o-ring appears flat. Loose particles or surface scrapes may be due to excessive temperature, rough surfaces or abrasive particles making contact. <b>Suggestions</b> Check for correct surface finishes; try internally lubed options.	<b>Use this chart to help you pinpoint the causes of o-ring failure and to explore possible solutions.</b>	
<b>Compression Set</b> 	In cross-section view, part of the o-ring appears flat. Compression set may be attributed to excessive temperature, compression or swelling in chemicals. <b>Suggestions</b> Confirm material compatibility; check for proper gland design for specified elastomer.		
<b>Chemical Degradation</b> 	Typically marked by blistering, cracking, or discoloration and most often caused by incompatible chemical or temperature uses/environments. <b>Suggestion</b> Confirm material compatibility; look for a more chemically resistant o-ring.	<b>Outgassing</b> 	Difficult to spot to the naked eye, out-gassing results in an overall decrease in size (sometimes referred to as 'extraction'). May be due to too-low hardness or an improperly cured o-ring. <b>Suggestion</b> Avoid plasticized o-rings and ensure correct curing prior to use.
<b>Explosive Decompression</b> 	The o-ring's surface appears blistered with pock marks. Usually attributed to a rupture due to the rapid pressure changes or release of built-up gasses. <b>Suggestion</b> Look for higher hardness rating or lower decompression rating.	<b>Plasma Degradation</b> 	The o-ring may be discoloured or its surface have powdered residue. Often due to chemical reactivity or improper seal material. <b>Suggestion</b> Check for plasma compatibility and minimize the exposed area.
<b>Extrusion</b> 	Sometimes called 'nibbling', the o-ring's edges are ragged and tattered, usually due to improper sizing, excessive clearances or excessive pressure. <b>Suggestion</b> Check clearances; try a harder material, or polymer backup.	<b>Overcompensation</b> 	The o-ring has splits along flattened areas. May be due a design issue, excessive compression or not accounting for changes in volume or heat. <b>Suggestion</b> Review the responses to chemical and thermal environments.
<b>Installation Damage</b> 	Look for cuts, gashes or slashes. Often caused by improper installation, sharp edges, improper sizing or contamination. <b>Suggestion</b> Remove sharp edges; check for correct sizing and hardness rating.	<b>Spiral Failure</b> 	Look for cuts that spiral around the o-ring's surface. There are <i>many</i> causes not limited to tight installation, slow reciprocating speed, irregular or rough surface finishes. <b>Suggestion</b> Check installation procedures.
		<b>Thermal Degradation</b> 	Look for softening, shininess and/or radiating cracks on the higher temperature surface. <b>Suggestion</b> Choose a replacement with better thermal stability. Evaluate the possibility of cooling the sealing surfaces.

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