







Eg 4 life time test with compression in long time

① O - ring used	
· Piston seal	P - 44 (NOK A305)
· rod seal	P - 18 (NOK A305)
· compression	P - 44 4, 9, 14, 18% P - 18 17%
② test condition	
· Liquid: air (no oil injected)	· temperature: normal temperature
· Pressure, 0.5Mpa	· diameter of cylinder— $\phi 50$
· Speed, 0.3m/s	· diameter of rod— $\phi 18$
· Stroke, 300mm	· transverse load, 7kg
· Circulation, 30C. P. M	· lubricant, No. 2 lithium base ester
③ result	
No leakage in piston sealing ring after work of 800km, but a little wear.	
A little leakage in rod sealing ring after work of 600km, by means of soap water.	

9-4 Cause of failure and solution for pneumatic dynamic sealing O - ring

If leakage is observed, please refer to the following table to check the cause of failure and find solutions.






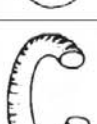
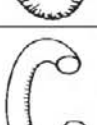
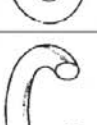
Cause of failure and solution for pneumatic dynamic sealing O - ring

failure	appearance		cause	solution
	status			
twisted	O - ring is twisted, deformed, and leaking.		① moving too fast. ② eccentric movement exists. ③ roughness of the sliding surface un - uniform. ④ twisted in installation.	① change to lip packing seal. ② avoid eccentric movement. ③ roughness of the sliding surface should be 1.6S. ④ apply grease in installation.
blocked	Local hurt and leakage in O - ring.		① hole, screw and end portion are in poor condition in installation.	① caution the end of chamfer, use special tool for installation.
all the circle worn	All the circle of the O - ring is worn, so leakage happen.		① poor machining of sliding surface. ② no lubricant. ③ dust or metal powder.	① roughness of the sliding surface should be 1.65S. ② apply enough lubricant. ③ remove dust or powder, filter and use dust seal.
elasticity lost	O - ring section part is squeezed and deformed in groove.		① used in too high temperature.	① cool the sealing portion.
local worn	Local worn in the O - ring, so leakage happen.		① the sliding surface of housing is worn.	① standardize the roughness of sliding surface of housing.

2-5 Cause of failure and solution for static sealing O-ring

If leakage is observed, please refer to the following table to check the cause of failure and find solutions.

Cause of failure and solution for static sealing O-ring

failure	appearance		cause	solution
		status		
hardened	if subject to pressure, the O-ring will bend and chap.		① working temperature is over the heat resistance limitation of rubber material.	① { <ul style="list-style-type: none"> • lower working temperature. • use material with better heat resistance.
swelling (softened)	the whole O-ring is softened and swelled.		① rubber material is not fit for sealing medium. ② detergent such as light oil and gasoline remains on the O-ring after cleaning.	① use other material. ② remove the detergent.
elasticity lost	O-ring section part is squeezed and deformed in groove.		① { <ul style="list-style-type: none"> • too much compression • high temperature } current case is synergism sealing medium mostly.	① redesign groove dimension and material.
extrusion	extrusion exists on the O-ring.		① too much pressure and clearance, and swelling.	① { <ul style="list-style-type: none"> • keep proper clearance, use backup ring. • use other rubber material
scrapes or gouges	part of O-ring surface is extruded and bitten.		① unjust installation to the housing and shaft which is not enough chamfer. ② unjust installation to the groove which is shallower than standard compared with the thickness of o-ring.	① chamfer properly. ② redesign groove dimension.
ozone crack	crack on the O-ring.		① O-ring is elongated and damaged by ozone in air.	① { <ul style="list-style-type: none"> • do not leave O-ring elongated in air. • apply grease of lubricant on the O-ring, so it will not be exposed.
crack	crack on the O-ring internal or external circle.		① O-ring is damaged by screw teeth in installation.	① use special tool in installation, so the screw teeth can not damage O-ring.
friction	friction on the contact portion of O-ring.		① poor machining of contact portion of O-ring, so friction happens when pressure varies.	① machine the contact portion according to standard roughness.