

IR Sensor Lid - O-Ring Report

Guidelines for Industrial O-Ring Groove Design, Static Seal:

Squeeze %: 20-30% (at least 007" compression)

Stretch %: 1-5%

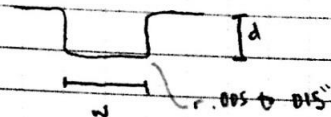
Gland Fill %: 60-85%

O-Ring cross-section diameter chosen: .070" (nominal 1/16" actual .070")

For O-Ring cross-section diameter chosen:

Gland size: depth, $d = .050$ to $.054$ "

width $w = .101$ to $.107$ "

Static Piston Seal

- Inner perimeter of O-Ring Gland: $2\pi r_{\text{inner}} + 2L_1 + 2L_2$

$$= 2\pi(.20) + 2(1.45) + 2(0.95) = 6.057"$$

\Rightarrow Assume circular O-Ring Going Forward

$$\therefore \pi D = P$$

$$\pi D = 6.057" \Rightarrow \therefore D = 1.928" \Rightarrow$$

O-Ring chosen - 2-032

ID - 1 7/8" (1.864")

OD - 2" (2.004")

CSO - .070" (nominal 1/16")

$$\text{Stretch \%} \Rightarrow \% \text{ Stretch} = \frac{|\text{ID} - \text{Gland ID}|}{\text{ID}}$$

$$= \frac{|1.864 - 1.928|}{1.864}$$

\Rightarrow

$$\text{Stretch \%} = 3.4\% \quad (\text{OK} \rightarrow \% \text{ stretch} < 5\%)$$

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Squeeze %

Percent Reduction on cross-section diameter detailed in previous report

This application, for 3.4% stretch \Rightarrow 2.52% reduction on cross-section \emptyset

$$\therefore \text{New CS } \emptyset = 0.066''$$

$$\text{Squeeze \%} = \frac{\text{CS} - \text{Gland Depth}}{\text{CS}} = \frac{0.066 - 0.050}{0.066}$$

$$\text{Squeeze \%} = 26.5\%$$

$$(OK \Rightarrow 20 < \%_{\text{Squeeze}} < 30)$$

Gland Fill % Gland size = .104" x .050"

$$\text{Cross-Sectional Area} \Rightarrow .0052''$$

Area of O-Ring, assuming no volume change $\Rightarrow .0038 \text{ in}^2$

$$\text{Fill \%} = \frac{\text{Area of O-Ring}}{\text{Gland Area}}$$

$$\text{F.11\%} = 73\%$$

$$\Rightarrow OK (60 < \%_{\text{Fill}} < 85)$$

Final Design

O-Ring - 2-032

$$ID = 1\frac{7}{8}'' (1.5625'')$$

$$OD = 2.0'' (2.004'')$$

$$CSO = .070 (1/16'')$$

$$\text{Stretch \%} = 3.4\%$$

$$\text{Squeeze \%} = 26.5\%$$

$$\text{Gland F.11 \%} = 73\%$$

Gland size: width = .104"

Depth = .050"

Corner radius = .20"

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