

tech note

tech note #2 O-ring Static Face Seal for external pressure

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This issue's tech note provided by
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(Source: Parker O-Ring Handbook, OR5700)

There is no better design reference for o-ring seals than the Parker O-ring Handbook (OR5700). It is recommended reading. Designers can follow Parkers' short form, where general allowances are given (Parker OR5700, Design Chart A5-1), or refine the design for a specific application, including stretching an o-ring for a groove slightly larger than spec. A stretched o-ring results in a smaller cross-sectional area, and the depth of the groove, which is part of the seal "gland," must be adjusted to maintain recommended squeeze. On the other hand, o-rings will not compress into a smaller groove.

Face seals are preferred to bore seals because it is easier to create a zero clearance gap that supports the o-ring better. Larger cross sections better tolerate surface imperfections, higher durometers better resist extrusion, but are more sensitive to contamination. Grease should be used sparingly.

Use of DeepSea Power & Light's free program, "UnderPressure" (<http://www.deepsea.com/tools.html>) will assist the designer in determining optimal pressure case dimensions.

Circular Face Seal Design flowchart for external pressure
(variables correspond to Parker Handbook Table A5-1)

Clr hole or tubing ID, T = _____

O-ring ID (I) > T = _____ Caution: Make sure the inner o-ring groove wall has enough "meat" to withstand the load applied by the external pressure.

O-RING SIZE: _____

Hi = Groove ID = _____

W = cross-section = _____

Mean o-ring OD (ref) = _____

L = Gland depth (ref.) = _____

G = Groove width (ref.) = _____

Squeeze (ref.) = _____

Squeeze (calc.) = (W-L) = _____

% Compression (ref.) = _____

% Compression (calc.) = squeeze (calc.)/W*100%= _____

% ID stretch (calc.) = ((Hi - I)/I)*100% = _____

% Reduction in cross-section: (See "Stretch", OR5700, pg A4-5-A4-6) = _____

Volume of o-ring (Section "Sizes", Table B6, col. 15) = _____

Volume of groove = $PL((Hi/2+G)^2 - (Hi/2)^2) =$ _____

Next month:

O-ring Static Bore Seal Design for External Pressure to Parker Specs

