

Resilient Metal Seals

Used in high temperature, high pressure and critical high performance applications.



Metal seals are used where it is not possible to use elastomeric or polymer seals due to extremely demanding application requirements such as high temperatures, high pressures, cryogenic temperatures, ultra-high vacuum, radiation and gas permeability.



High performance for challenging and critical seal applications.



Extreme high & low temperature performance and resistance to highly aggressive chemicals.



Wide range of base materials and precious metal plating combinations.



Complete seal design service from experienced application engineers using the latest 2D/3D and FEA software.

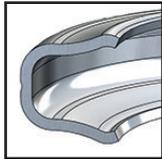
Metal seal profiles



Metal Wire-Ring External/Internal Pressure Face Seal
High load "crush sealing"
High pressure capability
Low cost



Spring Energised Metal C-Ring, Internal/External Pressure Face Seal
Low leak rate, high load
High pressure capability
Good spring-back & fatigue resistance



U-Ring Internal/External Pressure
Low load, high spring-back
Moderate sealing
Can accommodate wide tolerances



Metal C-Ring Internal/External Pressure Face Seal
Moderate load
Good spring-back
High pressure capability



L-Seal
Dynamic radial sealing
High temperature
High pressure
Low pressure



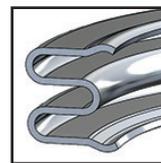
Metal O-Ring Internally/Externally Vented Pressure-Energised Face Seal
Moderate load
High pressure capability



Metal O-Ring External/Internal Gas-Energised Face Seal
High load
Low leak rate
Moderate pressure capability



Metal O-Ring Internal/External Face Seal
Avoids ingress of the working fluid into the seal
Moderate load/ Moderate pressure capability



E-Seal Internal/External Pressure
Low load
Moderate leak rate
Accommodates hardware deflection/ wide tolerances



Metal C-Ring, Axial Seal
Close tolerance seal
Suitable for light installation loads
Static & low cycling



Spring Energised Metal C-Ring, Axial Seal
Capable of sealing higher reversing pressure

Seal Selection at a glance

- Excellent
- Very Good
- Good
- Fair
- Not recommended

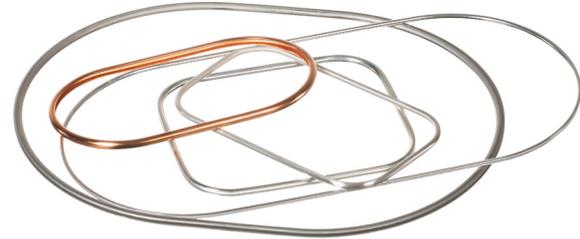
Seal Type	Sealing Requirements					
	High Springback	Low Load	High Load	Low Leak rate	Pressure Capability	Low Cost
C Ring						
E-Ring						
O-Ring						
U-Ring						
Wire Ring						
Spring Energised C-Ring						

Standard seal size range

Each seal profile is available in a standard size range.

This table shows the general diameter size range, seal section height and material thickness for C-rings.

Seal Section/Free Height	General Size Range (Dia)	Material Thickness
0.79	5.00 - 25.00	0.15 / 0.18
1.19	8.00 - 50.00	0.15 / 0.20
1.57	9.00 - 200.00	0.15 / 0.25
2.39	10.00 - 400.00	0.25 / 0.38
3.18	20.00 - 600.00	0.38 / 0.51
3.96	32.00 - 750.00	0.41 / 0.61
4.78	75.00 - 900.00	0.51 / 0.76
6.35	100.00 - 1200.00	0.64 / 0.97
9.53	300.00 - 2000.00	0.97 / 1.27
12.70	600.00 - 3000.00	1.27 / 1.65



This table shows an overview of the available range of base materials for seal jackets and springs.

Various grades of stainless steel, high strength nickel alloys and special materials are available for the most demanding of applications.

Material selection



Material & Max recommended Temp °C	Material & Max recommended Temp °C
304 Stainless Steel (316°C)	Waspaloy (730°C)
316 Stainless Steel (316°C)	Rene 41 (790°C)
321 Stainless Steel (430°C)	Monel 400 (316°C)
347 Stainless Steel (430°C)	Haynes 282 (1000°C)
Stainless Steel Alloy A-286 (650°C)	17- 4 PH Stainless Steel (316°C)
Alloy 600 (540°C)	Titanium (260°C)
Alloy 625 (540°C)	Aluminium Al 1100-0 (200°C)
Alloy 718 (700°C)	Hastelloy C-276 (650°C)
Alloy X-750 (600°C)	Copper Wire (316°C)
Gold Wire (700°C)	Silver Wire (650°C)

Plating finish & thickness

Finish Material	Properties, Uses and Limitations
Silver (AG)	Closest to ideal plating therefore most frequently selected. Good corrosion and temperature resistance. Excellent anti-galling properties. Less expensive than other coatings. Max temp. 430°C (oxidizing), 650°C (non-oxidizing)
Gold (Au)	Soft metal with excellent chemical and oxidation resistance with high temperature capability. Expensive for larger sizes. Max temp. 930°C
Copper (Cu)	Relatively soft and inexpensive plating. Good temperature resistance. Not for use with Waspaloy. Max temp. 930°C
Nickel (Ni)	Very high temperature capability but harder than Silver or Copper even when annealed. Used instead of silver in hot, oxidizing environments. Max temp. 1200°C
Indium (In)	Extremely soft, excellent for cryogenics, low strength flanges, optical components and vacuum. Not for use with high load seals or at high pressures due to creep and extrusion . Max temp. 65°C
Lead (Pb)	Similar properties to Indium, although slightly harder with slightly higher temperature capabilities. Not for use with high load seals. Max temp. 200°C
Tin (Sn)	Similar properties to Silver, although capable of lower load sealing. Good performance in vacuum applications. Max temp is 190°C
Teflon (PTFE)	Chemically inert soft polymer. Not or use with high load seals. Allows some permeation of gases. Max temp. 230°C.
PVD & Chromium Carbide	Used to prevent galling in slightly dynamic applications. Reduces the wear rate by acting as a solid lubricant when partially oxidized.
Unplated	Typically used for air applications where total leak tightness is not required. Lowest cost. Temperature range depends on the base material.

Design & Development

Unrivalled technical and engineering support means our customers benefit from the best possible seal performance at optimum cost.

Experienced application engineers support every project; from concept to approval ✓

Complete seal design service ✓

Seal geometry and profile choice ✓

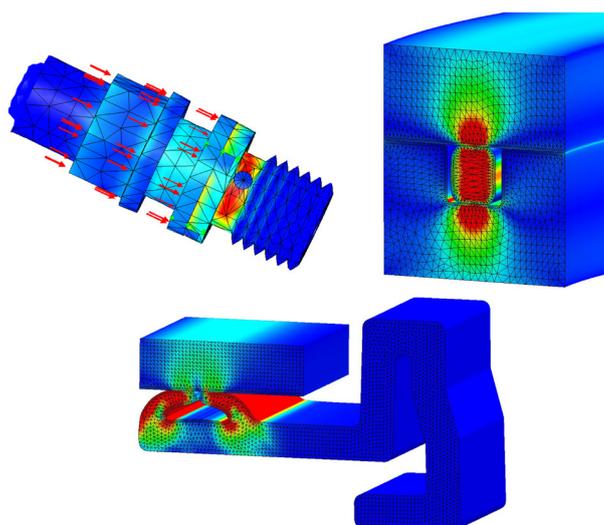
Material selection and development ✓

3D CAD modelling and FEA Simulation ✓

3D printing for concept testing ✓

Prototyping through to final production ✓

Online Technical Hub and interactive tools ✓



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