

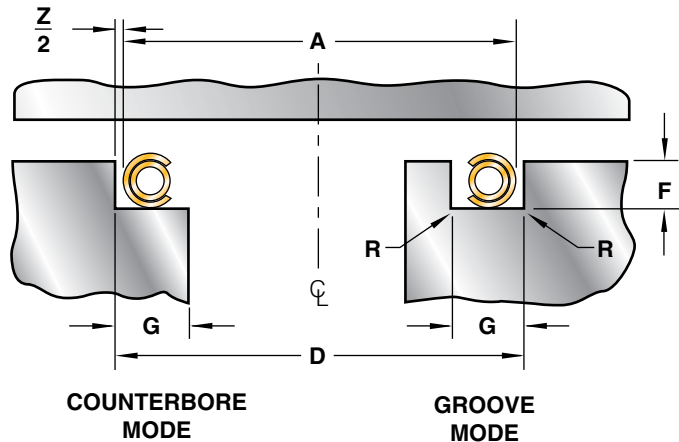
ESI Spring Energized Metal C-Ring Internal Pressure Face Seal

Applications:

- Similar to ECI, but higher loads for use with rougher mating surfaces.
- Excellent for pressure vessel closures; manways, hand-holes; steam generators, gasoline/diesel engine fire rings, exhaust joints, flanges with a rougher surface finish.
- Best choice for non-flat mating surfaces.
- For internally pressurized joints.
- For externally pressurized joints to avoid passage of working fluid into the seal cavity (reduced working pressure rating).

Features:

- Lowest leak rate.
- Internal Spring provides high pressure capabilities of up to 38,000 psi and above.
- All plating options available.
- Excellent footprint with good plastic flow of plating material.
- Available in any diameter from 0.750" to 120", plus hundreds of preferred sizes (see page E-88).
- Wide range of eight standard free heights from 1/16" to 1/2".
- Multiple material choices for high temperature strength, good spring-back, corrosion and fatigue resistance.
- Uses jacket forces, spring forces and hydrostatic forces additively to increase sealing forces at higher pressures.
- Circular, race-track and other custom shapes available. Tri-lobed or elliptical Spring Energized C-rings available for snap-in/snap-out convenience.



Cavity Dimensions

Nominal Cross Section	D	F	G	R
	O.D. Range Tolerance H10	Depth Range	Minimum Width	Maximum Radius
1/16	0.750 – 8.000	0.050 – 0.054	0.090	0.015
3/32	1.000 – 16.000	0.075 – 0.079	0.125	0.020
1/8	1.000 – 24.000	0.100 – 0.105	0.160	0.030
5/32	1.250 – 30.000	0.125 – 0.130	0.200	0.050
3/16	3.000 – 36.000	0.151 – 0.157	0.250	0.050
1/4	4.000 – 72.000	0.200 – 0.208	0.350	0.060
3/8	12.000 – 120.000	0.300 – 0.316	0.500	0.060
1/2	24.0000 – 300.000	0.400 – 0.420	0.650	0.060

All dimensions are in inches.
The tolerance reference table can be found on page E-92.

Part Numbering:

Refer to Section A, page A-9 for part numbering convention.
The seal size is specified in the part number as follows:

ESI - 000000 - 00 - 00 - 0 - XXX

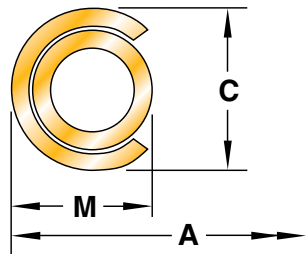
Seal O.D. prior to plating
(dimension A) to three decimal
places. (Example: A 3.000 inch
seal is specified as 003000)

Metal Seal Cross Section Code

Material (Section D)

Temper (Section D)

Plating, Coating or Finish (Section D)



Seal and Cavity Sizing:

Seal free height is based on cavity diameter and depth alone.
Seal diameter (dimension A) is derived below.

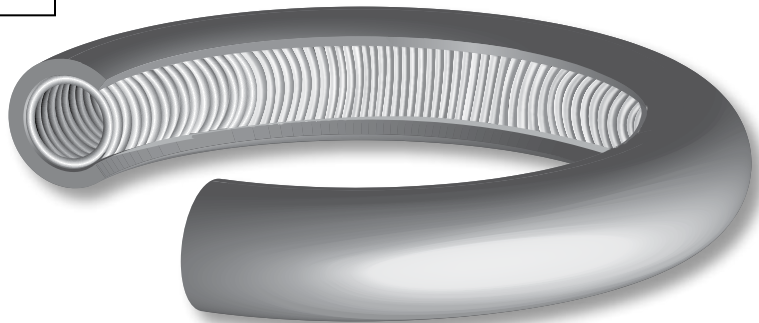
$$A = D - Z - 2P_{\max}$$

(tolerance h11, see page E-92)

Where: D = Minimum cavity O.D.

Z = Diametral clearance between cavity and seal

P_{max} = Maximum plating thickness (from page D-60)



Section C
Metal Seal Size Selection

Seal Dimensions				
Nominal Cross Section	Z	M	C	Cross Section Code
	Diametral Clearance	Maximum Radial Width	Free Height	
1/16	0.006	0.059	0.062 ^{+0.003} _{-0.002}	05
3/32	0.008	0.087	0.094 ^{+0.004} _{-0.002}	07
1/8	0.012	0.114	0.125 ^{+0.004} _{-0.003}	09
5/32	0.016	0.144	0.156 ^{+0.004} _{-0.003}	11
3/16	0.018	0.173	0.188 ^{+0.005} _{-0.004}	13
1/4	0.020	0.230	0.250 ^{+0.006} _{-0.004}	15
3/8	0.030	0.342	0.375 ^{+0.008} _{-0.004}	17
1/2	0.040	0.456	0.500 ^{+0.010} _{-0.005}	19

All dimensions are in inches and prior to plating.
Performance data is based on Alloy 750 jacket and spring. Seal performance is discussed in Section E.
If working pressures exceed these ratings consult Parker for recommendations.

Performance		
Seating Load (pounds per inch circumference)	Springback (inches)	Working Pressure Rating (psi)
500	0.003	29000
850	0.005	32500
950	0.006	38000
1300	0.008	31000
1500	0.009	32500
2000	0.011	30000
2500	0.017	30500
2900	0.022	30000

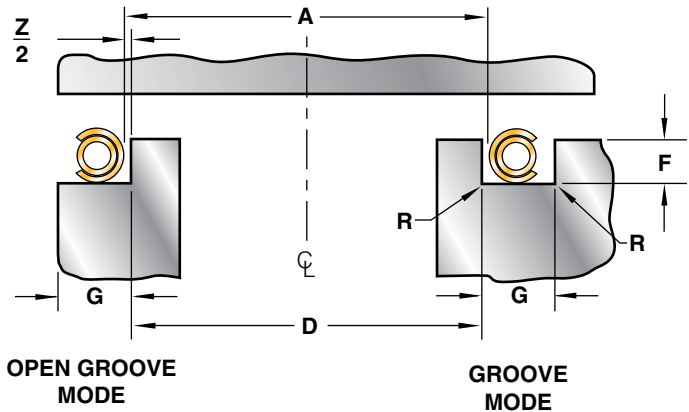
ESE Spring Energized Metal C-Ring External Pressure Face Seal

Applications:

- Similar to ECE, but higher loads for use with rougher mating surfaces.
- Externally pressurized joints. Flanges with a rougher surface finish.
- Internally pressurized joints to avoid passage of working fluid into the seal cavity (reduced working pressure rating).

Features:

- Lowest leak rate.
- Internal spring provides high pressure capabilities of up to 38,000 psi.
- All plating options available.
- Excellent footprint with good plastic flow of plating material.
- Available in any diameter from 0.650" to 120", plus hundreds of preferred sizes (see page E-90).
- Wide range of eight standard free heights from 1/16" to 1/2".
- Multiple material choices for high temperature strength, good spring-back, corrosion and fatigue resistance.
- Uses jacket forces, spring forces and hydrostatic forces additively to increase sealing forces at higher pressures when used with external pressurization.
- Circular, race-track and other custom shapes available. Tri-lobed or elliptical Spring Energized C-rings available for snap-in/snap-out convenience.



Cavity Dimensions

Nominal Cross Section	D	F	G	R
	I.D. Range Tolerance h10	Depth Range	Minimum Width	Maximum Radius
1/16	0.650 – 8.000	0.050 – 0.054	0.090	0.015
3/32	0.900 – 16.000	0.075 – 0.079	0.125	0.020
1/8	1.000 – 24.000	0.100 – 0.105	0.160	0.030
5/32	1.250 – 30.000	0.125 – 0.130	0.200	0.050
3/16	3.000 – 36.000	0.151 – 0.157	0.250	0.050
1/4	4.000 – 72.000	0.200 – 0.208	0.350	0.060
3/8	12.000 – 120.000	0.300 – 0.316	0.500	0.060
1/2	24.0000 – 300.000	0.400 – 0.420	0.650	0.060

All dimensions are in inches.
The tolerance reference table can be found on page E-92.



Part Numbering:

Refer to Section A, page A-9 for part numbering convention.
The seal size is specified in the part number as follows:

ESE - 000000 - 00 - 00 - 0 - XXX

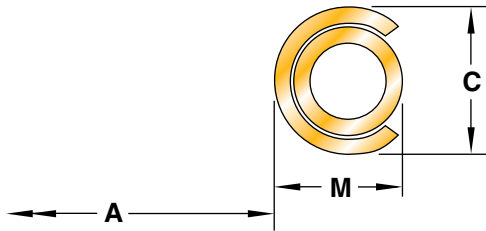
Seal I.D. prior to plating
(dimension A) to three decimal
places. (Example: A 3.000 inch
seal is specified as 003000)

Metal Seal Cross Section Code

Material (Section D)

Temper (Section D)

Plating, Coating or Finish (Section D)



Seal and Cavity Sizing:

Seal free height is based on cavity diameter and depth alone.
Seal diameter (dimension A) is derived below.

$$A = D + Z + 2P_{\max}$$

(tolerance H11, see page E-92)

Where: D = Maximum cavity I.D.

Z = Diametral clearance between cavity and seal

P_{max} = Maximum plating thickness (from page D-60)



Section C
Metal Seal Size Selection

Seal Dimensions				
Nominal Cross Section	Z	M	C	Cross Section Code
	Diametral Clearance	Maximum Radial Width	Free Height	
1/16	0.006	0.059	0.062 ^{+0.003} _{-0.002}	05
3/32	0.008	0.087	0.094 ^{+0.004} _{-0.002}	07
1/8	0.012	0.114	0.125 ^{+0.004} _{-0.002}	09
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3/16	0.018	0.173	0.188 ^{+0.005} _{-0.004}	13
1/4	0.020	0.230	0.250 ^{+0.006} _{-0.004}	15
3/8	0.030	0.342	0.375 ^{+0.008} _{-0.004}	17
1/2	0.040	0.456	0.500 ^{+0.010} _{-0.005}	19

All dimensions are in inches.

Performance data is based on Alloy X-750 jacket and spring. Seal performance is discussed in Section E.
If working pressures exceed these ratings consult Parker for recommendations.

Performance		
Seating Load (pounds per inch circumference)	Springback (inches)	Working Pressure Rating (psi)
500	0.003	29000
850	0.005	32500
950	0.006	38000
1300	0.008	31000
1500	0.009	32500
2000	0.011	30000
2500	0.017	30500
2900	0.022	30000