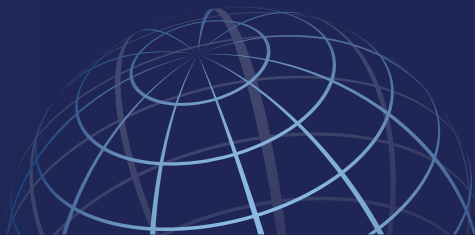




An INTEGRATED POLYMER SOLUTIONS Company



Astra Seal[®]

A unique extreme temperature
and pressure
sealing
solution



www.nes-ips.com

Astra Seal® - World class encapsulated O rings

There is simply no better seal for cryogenic applications



NES - experts in every respect for elastomer seals, experienced, fast & flexible.
Astra Seal® - a unique temperature & pressure sealing solution.

Extreme low temperatures make most O Rings brittle which in turn leads to failure. The Astra Seal® was created by an Aerospace Engineer to combat the harsh environments associated with liquid oxygen and the problems associated in sealing other cold media, such as liquid nitrogen and hydrogen.

Our Astra Seal® has been successfully used in several space shuttle/rocket launches and a multitude of other applications by organisations such as Boeing, NASA and Lockheed.

The Astra Seal® comprises of 302 stainless flat wound ribbon spring encapsulated in either a FEP or PFA jacket to form an O Ring.

Temperature Range:
 FEP/Astra -250°C to +204°C (-420F to + 428F)
 PFA/Astra -250°C to +260°C (-420F to +500F)

ASTM Type 302 AMS 5059

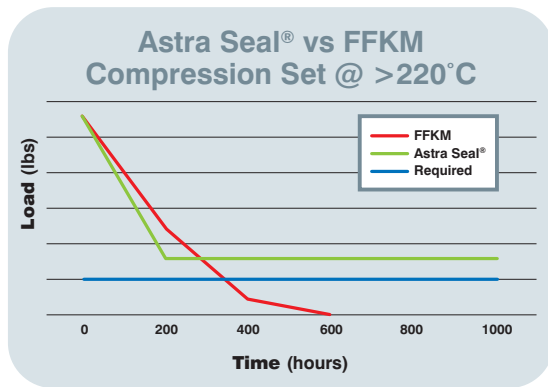
Please note: Excessive stretching must be avoided when installing Astra Seals® to ensure the coils do not separate. Astra Seals® are best used in axial sealing applications.



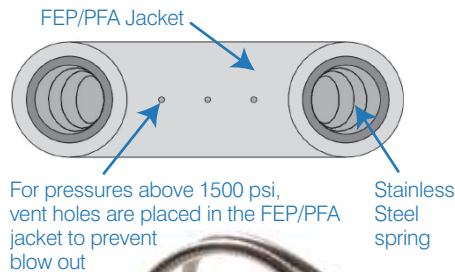
Available cross sections and force required to compress (pounds per linear inch)

| Cross Section | Squeeze | Groove Depth | Groove Width | Minimum ID | Force Pounds |
|---------------|---------|--------------|--------------|------------|--------------|
| 1.91mm | 0.56mm | 1.35mm | 2.67mm | 12.70mm | 40 |
| 2.40mm | 0.61mm | 1.78mm | 3.18mm | 19.05mm | 40 |
| 2.62mm | 0.71mm | 1.90mm | 3.53mm | 19.05mm | 45 |
| 2.92mm | 0.76mm | 2.16mm | 3.94mm | 31.75mm | 40 |
| 3.00mm | 0.76mm | 2.24mm | 3.96mm | 31.75mm | 45 |
| 3.10mm | 0.76mm | 2.34mm | 4.07mm | 31.75mm | 50 |
| 3.53mm | 0.76mm | 2.79mm | 4.95mm | 31.75mm | 65 |
| 3.80mm | 0.84mm | 2.92mm | 4.95mm | 38.10mm | 85 |
| 4.00mm | 0.89mm | 3.10mm | 5.08mm | 38.10mm | 70 |
| 4.32mm | 1.02mm | 3.30mm | 5.84mm | 38.10mm | 90 |
| 4.50mm | 1.02mm | 3.48mm | 6.02mm | 38.10mm | 100 |
| 4.88mm | 1.12mm | 3.76mm | 6.48mm | 44.45mm | 110 |
| 5.34mm | 1.14mm | 4.19mm | 7.11mm | 50.80mm | 140 |
| 6.35mm | 1.27mm | 5.08mm | 8.25mm | 76.20mm | 110 |
| 6.99mm | 1.27mm | 5.71mm | 8.89mm | 88.90mm | 95 |
| 8.00mm | 1.52mm | 6.48mm | 9.90mm | 101.60mm | 80 |

The table above is strictly for guidance only. Further cross section sizes are available upon request.



Extended rigorous testing in harsh environments revealed NES Ltd Astra seal out performs FFKM for compression set, for more details contact us.



All our products are manufactured through our world class quality system; our quality rating is so high that we achieve a reject rate of less than 0.03%.

As always all our products are supported by our excellent levels of customer service, which allow you to improve your profits, increase your market share plus add value to your business.

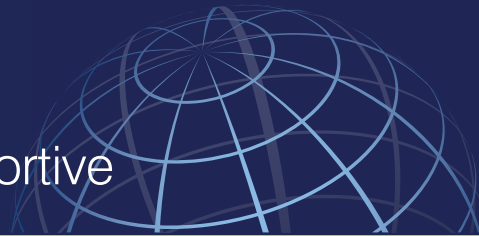
We would welcome any questions or enquiries you have in relation to this product, please contact our customer support team, with any further requests.

Tel: +44 (0) 1909 560 203
 Email: sales@nes-ips.com

www.nes-ips.com

NES sealing solutions

Innovative, versatile,
high-performance, supportive



Astra Seal® Tolerances

| Cross Section | Tol. +/- | Inside Diameter Minimum |
|---------------|----------|-------------------------|
| 1.78 | 0.12mm | 10.60mm |
| 1.91 | 0.15mm | 12.70mm |
| 2.00 | 0.15mm | 19.05mm |
| 2.40 | 0.15mm | 19.05mm |
| 2.62 | 0.15mm | 19.05mm |
| 2.72 | 0.15mm | 19.08mm |
| 2.92 | 0.15mm | 31.75mm |
| 2.95 | 0.15mm | 31.75mm |
| 2.97 | 0.15mm | 31.75mm |
| 3.00 | 0.15mm | 31.75mm |
| 3.10 | 0.15mm | 31.75mm |
| 3.18 | 0.15mm | 31.75mm |
| 3.53/3.56 | 0.15mm | 31.75mm |
| 3.80 | 0.20mm | 38.10mm |
| 4.00 | 0.20mm | 38.10mm |
| 4.32 | 0.20mm | 38.10mm |
| 4.8/4.88 | 0.20mm | 44.45mm |
| 5.00 | 0.25mm | 50.80mm |
| 5.34 | 0.25mm | 50.80mm |
| 6.35 | 0.43mm | 76.20mm |
| 6.99 | 0.43mm | 88.90mm |
| 8.00 | 0.43mm | 101.60mm |

| Inside Diameter | Tol. +/- |
|------------------|----------|
| 10.60 - 16.09mm | 0.20mm |
| 16.10 - 25.09mm | 0.25mm |
| 25.10 - 40.09mm | 0.35mm |
| 40.10 - 63.09mm | 0.40mm |
| 63.10 - 100.09mm | 0.50mm |
| 100.10 - 160.0mm | 0.70mm |
| Over 160mm | 0.50% |

NES is dedicated to providing the complete package; not just excellent products that perform as required, but also comprehensive customer support and technical advice on any sealing solutions matter.

Our team of experts provide a complete consultancy service to assist with material selection, compatibility assessment and trouble shooting.

A collaborative approach, with client interaction throughout, is our tried and tested formula for a successful project. It works - and we would like you to put it to the test.

Our Value Proposition

NES is an agile business that has a diverse range of **capabilities** that facilitate the provision of high quality **value** added solutions to a wide range of customers and end markets. With strong technical capabilities and expertise provided in-house through our dedicated **people** we provide **customer focus** that is responsive to ever changing circumstances.

People

- Experienced
- Approachable
- Technical expertise
- Socially responsible
- Continuous improvement culture

Customer Focus

- Responsive to needs
- Strong customer loyalty
- Emergency service
- New product development

Capabilities

- Innovative solutions
- Scalable production
- Purpose built
- In house extrusion
- Comprehensive product range

Value

- Repeatable quality
- Value added product
- Build to print
- Technical competence and advice

NES Sheffield is the Integrated Polymer Solutions European HQ



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