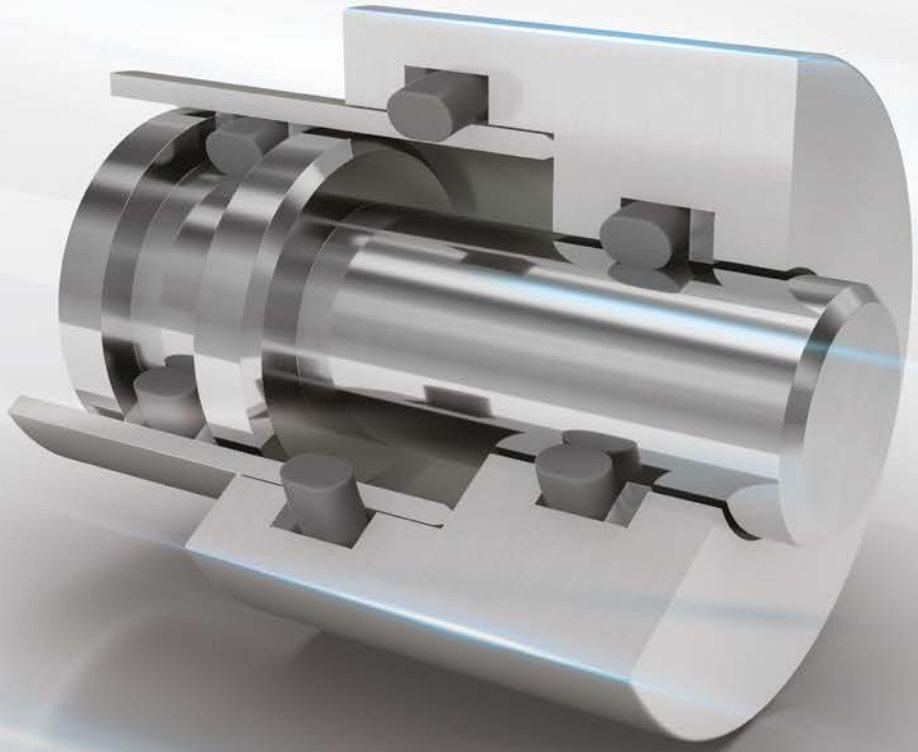
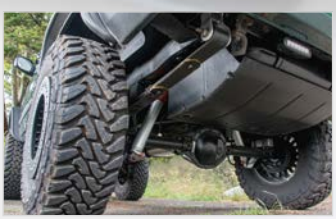
# AS568 O-Rings





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Trelleborg Sealing Solutions is a major international developer, manufacturer and supplier of seals, bearings and molded components in polymers. We are uniquely placed to offer dedicated design and development from our market-leading product and material portfolio: a one-stop-shop providing the best in elastomer, silicone, thermoplastic, PTFE and composite technologies for applications in aerospace, industrial and automotive industries.

With 50 years of experience, Trelleborg Sealing Solutions engineers support customers with design, prototyping, production, test and installation using state-of-the-art design tools. An international network of over 80 facilities worldwide includes over 20 manufacturing sites, strategically-positioned research and development centers, including materials and development laboratories and locations specializing in design and applications.

Developing and formulating materials in-house, we utilize the resource of our material database, including over 2,000 proprietary compounds and a range of unique products. Trelleborg Sealing Solutions fulfills challenging service requirements, supplying standard parts in volume or a single custom-manufactured component, through our integrated logistical support, which effectively delivers over 40,000 sealing products to customers worldwide.

Trelleborg Sealing Solutions facilities are certified according to current market-related quality standards. In addition to the established ISO 9001 standard, our facilities are certified to environmental, health and safety standards, as well as specific customer specifications. These certifications are in many cases prerequisites, allowing us to comply to all market segment requirements.

**ISO 9001**

# Contents

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# General Information

## DESCRIPTION

O-Rings offer the designer an efficient and economical sealing element for a wide range of static or dynamic applications.

Inexpensive production methods and its ease of use have made the O-Ring the most widely used seal.

A broad range of elastomer materials for both standard and special applications allow the O-Ring to be used to seal practically all liquid and gaseous media.

O-Rings are vulcanized in molds and are characterized by their circular form with annular cross section. The dimensions of the O-Ring are defined by the inside diameter $d_1$ and the cross section $d_2$ (Figure 1).

AS568 O-Ring sizes are available with cross sections of approximately 0.040 inch / 1.02 mm to 0.275 inch / 6.99 mm and inside diameters up to 26.000 inch / 660.40 mm and more.

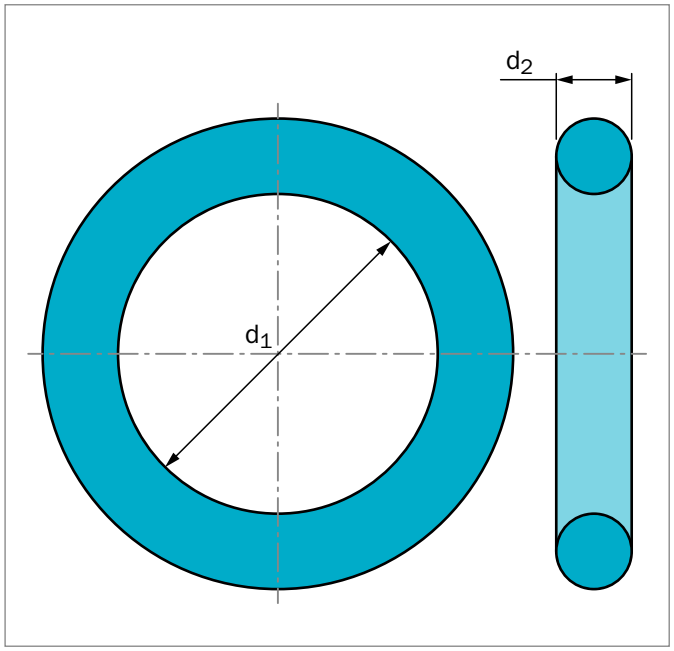



Figure 1: O-Ring dimensioning

## ADVANTAGES

Compared with other sealing elements, the O-Ring has a wide range of advantages:

- Simple, one-piece groove design reduces hardware and design costs
- Compact design allows smaller hardware
- Easy, failsafe installation reduces risk
- Applicable to a wide range of sealing applications: static, dynamic, single- or double-acting

## APPLICATIONS

O-Rings are used as sealing elements or energizing elements for hydraulic slipper seals and wipers and thus cover a large number of fields of application. There are no areas of industry where the O-Ring is not used. From an individual seal for repairs or maintenance, to a quality assured application in aerospace, automotive or general engineering.

The O-Ring is used predominantly for static sealing applications:

- As a radial static seal, e.g. for bushings, covers, pipes, cylinders
- As an axial static seal, e.g. for flanges, plates, caps.

O-Rings in dynamic applications are recommended **only for moderate service conditions**. They are limited by the speed and the pressure against which they are to seal:

- For low duty sealing of reciprocating pistons, rods, plungers, etc.
- For sealing of slowly pivoting, rotating or spiral movements on shafts, spindles, rotary transmissions leadthroughs, etc.

## METHOD OF OPERATION

O-Rings are double-acting sealing elements. The initial squeeze, which acts in a radial or axial direction depending on the installation, gives the O-Ring its initial sealing capability. This force is superimposed with the system pressure to create the total sealing force, which increases as the system pressure increases (Figure 2).

Under pressure, the O-Ring behaves in a similar way to a fluid with high surface tension. The pressure is transmitted uniformly in all directions.

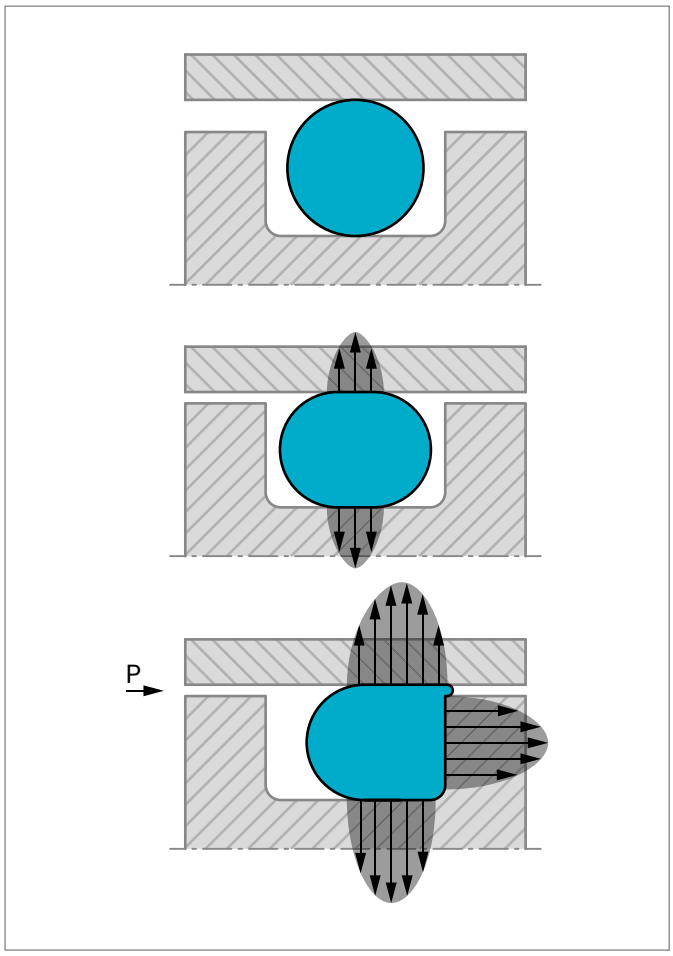



Figure 2: O-Ring sealing forces without and with system pressure

## MATERIALS

### Table 1: General field of application

| Material and Properties | Applications | Operating Temperature | | | |
|---|---|---|---|---|---|
| | | Normal | | Short period | |
| | | °F | °C | °F | °C |
| **FKM (Fluorocarbon Rubber)**<br>- Non-flammability, low gas permeability<br>- Excellent resistance to ozone, weathering and aging | FKM is also often used with mineral based oils and greases at high temperatures | -4 to +392 | -20 to +200 | up to +446 | up to +230 |
| **NBR (Nitrile Butadiene Rubber)**<br>- The properties of nitrile rubber depend mainly on the ACN content, which ranges between 18% and 50%<br>- Good mechanical properties | NBR is mostly used with mineral based oils and greases | -22 to +212 | -30 to +100 | up to +248 | up to +120 |

## QUALITY CRITERIA

O-Rings ordered using the material codes specified in Table 2 meet dimensional tolerances according to AS568 / ISO 3601-1 Class A.

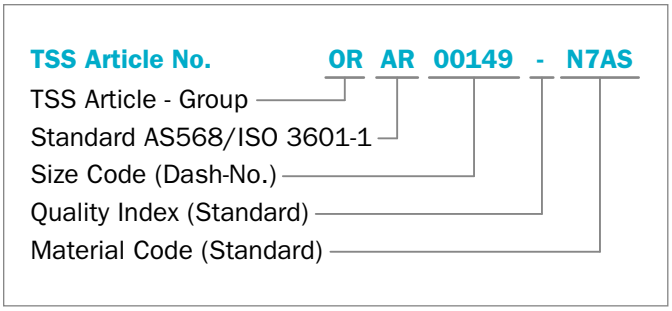
**Features (Quality Index (Standard)):**
1. Individual material data sheets upon request
2. ID & CS tolerances: AS568 / ISO 3601-1 Class A
3. Surface quality: ISO 3601-1 Grade N. ISO 2859-1. AQL 1.0. general inspection level II. normal

### Table 2: Materials for AS568 / ISO 3601-1 Class A O-Rings

| Material Code | Type | Hardness Shore A | Color |
|---|---|---|---|
| N7AS | NBR | 70 | Black |
| N9AS | NBR | 90 | Black |
| VCAS | FKM | 75 | Brown |
| V9AS | FKM | 90 | Black |

## ORDERING EXAMPLE

| | |
|---|---|
| **Type:** | O-Ring, AS568 and ISO 3601-1<br>reference no. 149 |
| **Dimensions:** | Inside diameter $d_1$ = 2.800 inch (71.12 mm)<br>Cross section $d_2$ = 0.103 inch (2.62 mm) |
| **Material:** | NBR 70<br>(Nitrile-Butadiene Rubber 70 Shore A) |




Other material codes for specific AS568 sizes available upon request. Contact your local Customer Solutions Center to obtain the best recommendation from Trelleborg Sealing Solutions.

# Product Range

## O-RING DIMENSIONS IN ACCORDANCE WITH AS568 AND ISO 3601-1

The following tables show the preferred O-Ring dimensions in accordance with the American standard AS568 and the international standard ISO 3601-1, including appropriate reference numbers.

AS568 O-Rings are identical with the ISO 3601-1 Class A standard and available in the materials specified in Table 2.

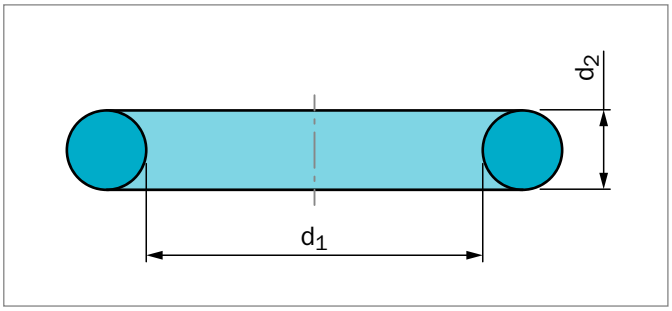



Figure 3: O-Ring dimensions

### Table 3: AS568 / ISO 3601-1 Class A O-Rings - Inch and Metric

| TSS Part No. | Dash No. AS568 ISO 3601-1 | Inside-Ø | | Cross-Section-Ø | | Inside-Ø | | Cross-Section-Ø | |
|---|---|---|---|---|---|---|---|---|---|
| | | $d_1$ | Tolerance ± | $d_2$ | Tolerance ± | $d_1$ | Tolerance ± | $d_2$ | Tolerance ± |
| | | inch | | | | mm | | | |
| ORAR00001 | 001 | 0.029 | | 0.040 | | 0.74 | | 1.02 | |
| ORAR00002 | 002 | 0.042 | 0.004 | 0.050 | | 1.07 | 0.10 | 1.27 | |
| ORAR00003 | 003 | 0.056 | | 0.060 | | 1.42 | | 1.52 | |
| ORAR00004 | 004 | 0.070 | | 0.070 | | 1.78 | | 1.78 | |
| ORAR00005 | 005 | 0.101 | | 0.070 | | 2.57 | | 1.78 | |
| ORAR00006 | 006 | 0.114 | | 0.070 | | 2.90 | | 1.78 | |
| ORAR00007 | 007 | 0.145 | | 0.070 | | 3.68 | | 1.78 | |
| ORAR00008 | 008 | 0.176 | | 0.070 | | 4.47 | | 1.78 | |
| ORAR00009 | 009 | 0.208 | 0.005 | 0.070 | | 5.28 | 0.13 | 1.78 | |
| ORAR00010 | 010 | 0.239 | | 0.070 | | 6.07 | | 1.78 | |
| ORAR00011 | 011 | 0.301 | | 0.070 | | 7.65 | | 1.78 | |
| ORAR00012 | 012 | 0.364 | | 0.070 | 0.003 | 9.25 | | 1.78 | 0.08 |
| ORAR00013 | 013 | 0.426 | | 0.070 | | 10.82 | | 1.78 | |
| ORAR00014 | 014 | 0.489 | | 0.070 | | 12.42 | | 1.78 | |
| ORAR00015 | 015 | 0.551 | 0.007 | 0.070 | | 14.00 | 0.18 | 1.78 | |
| ORAR00016 | 016 | 0.614 | | 0.070 | | 15.60 | | 1.78 | |
| ORAR00017 | 017 | 0.676 | | 0.070 | | 17.17 | | 1.78 | |
| ORAR00018 | 018 | 0.739 | 0.009 | 0.070 | | 18.77 | 0.23 | 1.78 | |
| ORAR00019 | 019 | 0.801 | | 0.070 | | 20.35 | | 1.78 | |
| ORAR00020 | 020 | 0.864 | | 0.070 | | 21.95 | | 1.78 | |
| ORAR00021 | 021 | 0.926 | | 0.070 | | 23.52 | | 1.78 | |
| ORAR00022 | 022 | 0.989 | | 0.070 | | 25.12 | | 1.78 | |
| ORAR00023 | 023 | 1.051 | 0.010 | 0.070 | | 26.70 | 0.25 | 1.78 | |
| ORAR00024 | 024 | 1.114 | | 0.070 | | 28.30 | | 1.78 | |

| TSS Part No. | Dash No. AS568 ISO 3601-1 | Inside-Ø | | Cross-Section-Ø | | Inside-Ø | | Cross-Section-Ø | |
|---|---|---|---|---|---|---|---|---|---|
| | | $d_1$ | Tolerance ± | $d_2$ | Tolerance ± | $d_1$ | Tolerance ± | $d_2$ | Tolerance ± |
| | | inch | | | | mm | | | |
| ORAR00025 | 025 | 1.176 | | 0.070 | | 29.87 | | 1.78 | |
| ORAR00026 | 026 | 1.239 | 0.011 | 0.070 | | 31.47 | 0.28 | 1.78 | |
| ORAR00027 | 027 | 1.301 | | 0.070 | | 33.05 | | 1.78 | |
| ORAR00028 | 028 | 1.364 | | 0.070 | | 34.65 | | 1.78 | |
| ORAR00029 | 029 | 1.489 | 0.013 | 0.070 | | 37.82 | 0.33 | 1.78 | |
| ORAR00030 | 030 | 1.614 | | 0.070 | | 41.00 | | 1.78 | |
| ORAR00031 | 031 | 1.739 | 0.015 | 0.070 | | 44.17 | 0.38 | 1.78 | |
| ORAR00032 | 032 | 1.864 | | 0.070 | | 47.35 | | 1.78 | |
| ORAR00033 | 033 | 1.989 | | 0.070 | | 50.52 | | 1.78 | |
| ORAR00034 | 034 | 2.114 | | 0.070 | | 53.70 | | 1.78 | |
| ORAR00035 | 035 | 2.239 | 0.018 | 0.070 | | 56.87 | 0.46 | 1.78 | |
| ORAR00036 | 036 | 2.364 | | 0.070 | | 60.05 | | 1.78 | |
| ORAR00037 | 037 | 2.489 | | 0.070 | | 63.22 | | 1.78 | |
| ORAR00038 | 038 | 2.614 | | 0.070 | | 66.40 | | 1.78 | |
| ORAR00039 | 039 | 2.739 | 0.020 | 0.070 | | 69.57 | 0.51 | 1.78 | |
| ORAR00040 | 040 | 2.864 | | 0.070 | | 72.75 | | 1.78 | |
| ORAR00041 | 041 | 2.989 | | 0.070 | | 75.92 | | 1.78 | |
| ORAR00042 | 042 | 3.239 | 0.024 | 0.070 | | 82.27 | 0.61 | 1.78 | |
| ORAR00043 | 043 | 3.489 | | 0.070 | | 88.62 | | 1.78 | |
| ORAR00044 | 044 | 3.739 | 0.027 | 0.070 | 0.003 | 94.97 | 0.69 | 1.78 | 0.08 |
| ORAR00045 | 045 | 3.989 | | 0.070 | | 101.32 | | 1.78 | |
| ORAR00046 | 046 | 4.239 | | 0.070 | | 107.67 | | 1.78 | |
| ORAR00047 | 047 | 4.489 | 0.030 | 0.070 | | 114.02 | 0.76 | 1.78 | |
| ORAR00048 | 048 | 4.739 | | 0.070 | | 120.37 | | 1.78 | |
| ORAR00049 | 049 | 4.989 | 0.037 | 0.070 | | 126.72 | 0.94 | 1.78 | |
| ORAR00050 | 050 | 5.239 | | 0.070 | | 133.07 | | 1.78 | |
| ORAR00102 | 102 | 0.049 | | 0.103 | | 1.24 | | 2.62 | |
| ORAR00103 | 103 | 0.081 | | 0.103 | | 2.06 | | 2.62 | |
| ORAR00104 | 104 | 0.112 | | 0.103 | | 2.84 | | 2.62 | |
| ORAR00105 | 105 | 0.143 | | 0.103 | | 3.63 | | 2.62 | |
| ORAR00106 | 106 | 0.174 | | 0.103 | | 4.42 | | 2.62 | |
| ORAR00107 | 107 | 0.206 | 0.005 | 0.103 | | 5.23 | 0.13 | 2.62 | |
| ORAR00108 | 108 | 0.237 | | 0.103 | | 6.02 | | 2.62 | |
| ORAR00109 | 109 | 0.299 | | 0.103 | | 7.59 | | 2.62 | |
| ORAR00110 | 110 | 0.362 | | 0.103 | | 9.19 | | 2.62 | |
| ORAR00111 | 111 | 0.424 | | 0.103 | | 10.77 | | 2.62 | |
| ORAR00112 | 112 | 0.487 | | 0.103 | | 12.37 | | 2.62 | |
| ORAR00113 | 113 | 0.549 | 0.007 | 0.103 | | 13.94 | 0.18 | 2.62 | |
| ORAR00114 | 114 | 0.612 | 0.009 | 0.103 | | 15.54 | 0.23 | 2.62 | |
| ORAR00115 | 115 | 0.674 | | 0.103 | | 17.12 | | 2.62 | |

| TSS Part No. | Dash No. AS568 ISO 3601-1 | Inside-Ø | | Cross-Section-Ø | | Inside-Ø | | Cross-Section-Ø | |
|---|---|---|---|---|---|---|---|---|---|
| | | $d_1$ | Tolerance ± | $d_2$ | Tolerance ± | $d_1$ | Tolerance ± | $d_2$ | Tolerance ± |
| | | inch | | | | mm | | | |
| ORAR00116 | 116 | 0.737 | 0.009 | 0.103 | | 18.72 | 0.23 | 2.62 | |
| ORAR00117 | 117 | 0.799 | | 0.103 | | 20.29 | | 2.62 | |
| ORAR00118 | 118 | 0.862 | | 0.103 | | 21.89 | | 2.62 | |
| ORAR00119 | 119 | 0.924 | 0.010 | 0.103 | | 23.47 | 0.25 | 2.62 | |
| ORAR00120 | 120 | 0.987 | | 0.103 | | 25.07 | | 2.62 | |
| ORAR00121 | 121 | 1.049 | | 0.103 | | 26.64 | | 2.62 | |
| ORAR00122 | 122 | 1.112 | | 0.103 | | 28.24 | | 2.62 | |
| ORAR00123 | 123 | 1.174 | | 0.103 | | 29.82 | | 2.62 | |
| ORAR00124 | 124 | 1.237 | | 0.103 | | 31.42 | | 2.62 | |
| ORAR00125 | 125 | 1.299 | 0.012 | 0.103 | | 32.99 | 0.30 | 2.62 | |
| ORAR00126 | 126 | 1.362 | | 0.103 | | 34.59 | | 2.62 | |
| ORAR00127 | 127 | 1.424 | | 0.103 | | 36.17 | | 2.62 | |
| ORAR00128 | 128 | 1.487 | | 0.103 | | 37.77 | | 2.62 | |
| ORAR00129 | 129 | 1.549 | | 0.103 | | 39.34 | | 2.62 | |
| ORAR00130 | 130 | 1.612 | | 0.103 | | 40.94 | | 2.62 | |
| ORAR00131 | 131 | 1.674 | 0.015 | 0.103 | | 42.52 | 0.38 | 2.62 | |
| ORAR00132 | 132 | 1.737 | | 0.103 | | 44.12 | | 2.62 | |
| ORAR00133 | 133 | 1.799 | | 0.103 | | 45.69 | | 2.62 | |
| ORAR00134 | 134 | 1.862 | | 0.103 | | 47.29 | | 2.62 | |
| ORAR00135 | 135 | 1.925 | | 0.103 | 0.003 | 48.90 | | 2.62 | 0.08 |
| ORAR00136 | 136 | 1.987 | | 0.103 | | 50.47 | | 2.62 | |
| ORAR00137 | 137 | 2.050 | 0.017 | 0.103 | | 52.07 | 0.43 | 2.62 | |
| ORAR00138 | 138 | 2.112 | | 0.103 | | 53.64 | | 2.62 | |
| ORAR00139 | 139 | 2.175 | | 0.103 | | 55.25 | | 2.62 | |
| ORAR00140 | 140 | 2.237 | | 0.103 | | 56.82 | | 2.62 | |
| ORAR00141 | 141 | 2.300 | | 0.103 | | 58.42 | | 2.62 | |
| ORAR00142 | 142 | 2.362 | | 0.103 | | 59.99 | | 2.62 | |
| ORAR00143 | 143 | 2.425 | 0.020 | 0.103 | | 61.60 | 0.51 | 2.62 | |
| ORAR00144 | 144 | 2.487 | | 0.103 | | 63.17 | | 2.62 | |
| ORAR00145 | 145 | 2.550 | | 0.103 | | 64.77 | | 2.62 | |
| ORAR00146 | 146 | 2.612 | | 0.103 | | 66.34 | | 2.62 | |
| ORAR00147 | 147 | 2.675 | | 0.103 | | 67.95 | | 2.62 | |
| ORAR00148 | 148 | 2.737 | 0.022 | 0.103 | | 69.52 | 0.56 | 2.62 | |
| ORAR00149 | 149 | 2.800 | | 0.103 | | 71.12 | | 2.62 | |
| ORAR00150 | 150 | 2.862 | | 0.103 | | 72.69 | | 2.62 | |
| ORAR00151 | 151 | 2.987 | | 0.103 | | 75.87 | | 2.62 | |
| ORAR00152 | 152 | 3.237 | 0.024 | 0.103 | | 82.22 | 0.61 | 2.62 | |
| ORAR00153 | 153 | 3.487 | | 0.103 | | 88.57 | | 2.62 | |
| ORAR00154 | 154 | 3.737 | 0.028 | 0.103 | | 94.92 | 0.71 | 2.62 | |
| ORAR00155 | 155 | 3.987 | | 0.103 | | 101.27 | | 2.62 | |

| TSS Part No. | Dash No. AS568 ISO 3601-1 | Inside-Ø | | Cross-Section-Ø | | Inside-Ø | | Cross-Section-Ø | |
|---|---|---|---|---|---|---|---|---|---|
| | | $d_1$ | Tolerance ± | $d_2$ | Tolerance ± | $d_1$ | Tolerance ± | $d_2$ | Tolerance ± |
| | | inch | | | | mm | | | |
| ORAR00156 | 156 | 4.237 | | 0.103 | | 107.62 | | 2.62 | |
| ORAR00157 | 157 | 4.487 | 0.030 | 0.103 | | 113.97 | 0.76 | 2.62 | |
| ORAR00158 | 158 | 4.737 | | 0.103 | | 120.32 | | 2.62 | |
| ORAR00159 | 159 | 4.987 | | 0.103 | | 126.67 | | 2.62 | |
| ORAR00160 | 160 | 5.237 | | 0.103 | | 133.02 | | 2.62 | |
| ORAR00161 | 161 | 5.487 | 0.035 | 0.103 | | 139.37 | 0.89 | 2.62 | |
| ORAR00162 | 162 | 5.737 | | 0.103 | | 145.72 | | 2.62 | |
| ORAR00163 | 163 | 5.987 | | 0.103 | | 152.07 | | 2.62 | |
| ORAR00164 | 164 | 6.237 | | 0.103 | | 158.42 | | 2.62 | |
| ORAR00165 | 165 | 6.487 | 0.040 | 0.103 | | 164.77 | 1.02 | 2.62 | |
| ORAR00166 | 166 | 6.737 | | 0.103 | | 171.12 | | 2.62 | |
| ORAR00167 | 167 | 6.987 | | 0.103 | 0.003 | 177.47 | | 2.62 | 0.08 |
| ORAR00168 | 168 | 7.237 | | 0.103 | | 183.82 | | 2.62 | |
| ORAR00169 | 169 | 7.487 | 0.045 | 0.103 | | 190.17 | 1.14 | 2.62 | |
| ORAR00170 | 170 | 7.737 | | 0.103 | | 196.52 | | 2.62 | |
| ORAR00171 | 171 | 7.987 | | 0.103 | | 202.87 | | 2.62 | |
| ORAR00172 | 172 | 8.237 | | 0.103 | | 209.22 | | 2.62 | |
| ORAR00173 | 173 | 8.487 | 0.050 | 0.103 | | 215.57 | 1.27 | 2.62 | |
| ORAR00174 | 174 | 8.737 | | 0.103 | | 221.92 | | 2.62 | |
| ORAR00175 | 175 | 8.987 | | 0.103 | | 228.27 | | 2.62 | |
| ORAR00176 | 176 | 9.237 | | 0.103 | | 234.62 | | 2.62 | |
| ORAR00177 | 177 | 9.487 | 0.055 | 0.103 | | 240.97 | 1.40 | 2.62 | |
| ORAR00178 | 178 | 9.737 | | 0.103 | | 247.32 | | 2.62 | |
| ORAR00201 | 201 | 0.171 | | 0.139 | | 4.34 | | 3.53 | |
| ORAR00202 | 202 | 0.234 | | 0.139 | | 5.94 | | 3.53 | |
| ORAR00203 | 203 | 0.296 | 0.005 | 0.139 | | 7.52 | 0.13 | 3.53 | |
| ORAR00204 | 204 | 0.359 | | 0.139 | | 9.12 | | 3.53 | |
| ORAR00205 | 205 | 0.421 | | 0.139 | | 10.69 | | 3.53 | |
| ORAR00206 | 206 | 0.484 | | 0.139 | | 12.29 | | 3.53 | |
| ORAR00207 | 207 | 0.546 | 0.007 | 0.139 | | 13.87 | 0.18 | 3.53 | |
| ORAR00208 | 208 | 0.609 | 0.009 | 0.139 | | 15.47 | 0.23 | 3.53 | |
| ORAR00209 | 209 | 0.671 | | 0.139 | 0.004 | 17.04 | | 3.53 | 0.10 |
| ORAR00210 | 210 | 0.734 | | 0.139 | | 18.64 | | 3.53 | |
| ORAR00211 | 211 | 0.796 | | 0.139 | | 20.22 | | 3.53 | |
| ORAR00212 | 212 | 0.859 | 0.010 | 0.139 | | 21.82 | 0.25 | 3.53 | |
| ORAR00213 | 213 | 0.921 | | 0.139 | | 23.39 | | 3.53 | |
| ORAR00214 | 214 | 0.984 | | 0.139 | | 24.99 | | 3.53 | |
| ORAR00215 | 215 | 1.046 | | 0.139 | | 26.57 | | 3.53 | |
| ORAR00216 | 216 | 1.109 | 0.012 | 0.139 | | 28.17 | 0.30 | 3.53 | |
| ORAR00217 | 217 | 1.171 | | 0.139 | | 29.74 | | 3.53 | |

| TSS Part No. | Dash No. AS568 ISO 3601-1 | Inside-Ø | | Cross-Section-Ø | | Inside-Ø | | Cross-Section-Ø | |
|---|---|---|---|---|---|---|---|---|---|
| | | $d_1$ | Tolerance ± | $d_2$ | Tolerance ± | $d_1$ | Tolerance ± | $d_2$ | Tolerance ± |
| | | inch | | | | mm | | | |
| ORAR00218 | 218 | 1.234 | 0.012 | 0.139 | 0.004 | 31.34 | 0.30 | 3.53 | 0.10 |
| ORAR00219 | 219 | 1.296 | | 0.139 | | 32.92 | | 3.53 | |
| ORAR00220 | 220 | 1.359 | | 0.139 | | 34.52 | | 3.53 | |
| ORAR00221 | 221 | 1.421 | | 0.139 | | 36.09 | | 3.53 | |
| ORAR00222 | 222 | 1.484 | 0.015 | 0.139 | | 37.69 | 0.38 | 3.53 | |
| ORAR00223 | 223 | 1.609 | | 0.139 | | 40.87 | | 3.53 | |
| ORAR00224 | 224 | 1.734 | | 0.139 | | 44.04 | | 3.53 | |
| ORAR00225 | 225 | 1.859 | 0.018 | 0.139 | | 47.22 | 0.46 | 3.53 | |
| ORAR00226 | 226 | 1.984 | | 0.139 | | 50.39 | | 3.53 | |
| ORAR00227 | 227 | 2.109 | | 0.139 | | 53.57 | | 3.53 | |
| ORAR00228 | 228 | 2.234 | 0.020 | 0.139 | | 56.74 | 0.51 | 3.53 | |
| ORAR00229 | 229 | 2.359 | | 0.139 | | 59.92 | | 3.53 | |
| ORAR00230 | 230 | 2.484 | | 0.139 | | 63.09 | | 3.53 | |
| ORAR00231 | 231 | 2.609 | | 0.139 | | 66.27 | | 3.53 | |
| ORAR00232 | 232 | 2.734 | 0.024 | 0.139 | | 69.44 | 0.61 | 3.53 | |
| ORAR00233 | 233 | 2.859 | | 0.139 | | 72.62 | | 3.53 | |
| ORAR00234 | 234 | 2.984 | | 0.139 | | 75.79 | | 3.53 | |
| ORAR00235 | 235 | 3.109 | | 0.139 | | 78.97 | | 3.53 | |
| ORAR00236 | 236 | 3.234 | | 0.139 | | 82.14 | | 3.53 | |
| ORAR00237 | 237 | 3.359 | | 0.139 | | 85.32 | | 3.53 | |
| ORAR00238 | 238 | 3.484 | | 0.139 | | 88.49 | | 3.53 | |
| ORAR00239 | 239 | 3.609 | 0.028 | 0.139 | | 91.67 | 0.71 | 3.53 | |
| ORAR00240 | 240 | 3.734 | | 0.139 | | 94.84 | | 3.53 | |
| ORAR00241 | 241 | 3.859 | | 0.139 | | 98.02 | | 3.53 | |
| ORAR00242 | 242 | 3.984 | | 0.139 | | 101.19 | | 3.53 | |
| ORAR00243 | 243 | 4.109 | | 0.139 | | 104.37 | | 3.53 | |
| ORAR00244 | 244 | 4.234 | 0.030 | 0.139 | | 107.54 | 0.76 | 3.53 | |
| ORAR00245 | 245 | 4.359 | | 0.139 | | 110.72 | | 3.53 | |
| ORAR00246 | 246 | 4.484 | | 0.139 | | 113.89 | | 3.53 | |
| ORAR00247 | 247 | 4.609 | | 0.139 | | 117.07 | | 3.53 | |
| ORAR00248 | 248 | 4.734 | | 0.139 | | 120.24 | | 3.53 | |
| ORAR00249 | 249 | 4.859 | 0.035 | 0.139 | | 123.42 | 0.89 | 3.53 | |
| ORAR00250 | 250 | 4.984 | | 0.139 | | 126.59 | | 3.53 | |
| ORAR00251 | 251 | 5.109 | | 0.139 | | 129.77 | | 3.53 | |
| ORAR00252 | 252 | 5.234 | | 0.139 | | 132.94 | | 3.53 | |
| ORAR00253 | 253 | 5.359 | | 0.139 | | 136.12 | | 3.53 | |
| ORAR00254 | 254 | 5.484 | | 0.139 | | 139.29 | | 3.53 | |
| ORAR00255 | 255 | 5.609 | | 0.139 | | 142.47 | | 3.53 | |
| ORAR00256 | 256 | 5.734 | | 0.139 | | 145.64 | | 3.53 | |
| ORAR00257 | 257 | 5.859 | | 0.139 | | 148.82 | | 3.53 | |

| TSS Part No. | Dash No. AS568 ISO 3601-1 | Inside-Ø | | Cross-Section-Ø | | Inside-Ø | | Cross-Section-Ø | |
|---|---|---|---|---|---|---|---|---|---|
| | | $d_1$ | Tolerance ± | $d_2$ | Tolerance ± | $d_1$ | Tolerance ± | $d_2$ | Tolerance ± |
| | | inch | | | | mm | | | |
| ORAR00258 | 258 | 5.984 | 0.035 | 0.139 | | 151.99 | 0.89 | 3.53 | |
| ORAR00259 | 259 | 6.234 | | 0.139 | | 158.34 | | 3.53 | |
| ORAR00260 | 260 | 6.484 | 0.040 | 0.139 | | 164.69 | 1.02 | 3.53 | |
| ORAR00261 | 261 | 6.734 | | 0.139 | | 171.04 | | 3.53 | |
| ORAR00262 | 262 | 6.984 | | 0.139 | | 177.39 | | 3.53 | |
| ORAR00263 | 263 | 7.234 | | 0.139 | | 183.74 | | 3.53 | |
| ORAR00264 | 264 | 7.484 | 0.045 | 0.139 | | 190.09 | 1.14 | 3.53 | |
| ORAR00265 | 265 | 7.734 | | 0.139 | | 196.44 | | 3.53 | |
| ORAR00266 | 266 | 7.984 | | 0.139 | | 202.79 | | 3.53 | |
| ORAR00267 | 267 | 8.234 | | 0.139 | | 209.14 | | 3.53 | |
| ORAR00268 | 268 | 8.484 | 0.050 | 0.139 | | 215.49 | 1.27 | 3.53 | |
| ORAR00269 | 269 | 8.734 | | 0.139 | | 221.84 | | 3.53 | |
| ORAR00270 | 270 | 8.984 | | 0.139 | | 228.19 | | 3.53 | |
| ORAR00271 | 271 | 9.234 | | 0.139 | 0.004 | 234.54 | | 3.53 | 0.10 |
| ORAR00272 | 272 | 9.484 | | 0.139 | | 240.89 | | 3.53 | |
| ORAR00273 | 273 | 9.734 | 0.055 | 0.139 | | 247.24 | 1.40 | 3.53 | |
| ORAR00274 | 274 | 9.984 | | 0.139 | | 253.59 | | 3.53 | |
| ORAR00275 | 275 | 10.484 | | 0.139 | | 266.29 | | 3.53 | |
| ORAR00276 | 276 | 10.984 | | 0.139 | | 278.99 | | 3.53 | |
| ORAR00277 | 277 | 11.484 | | 0.139 | | 291.69 | | 3.53 | |
| ORAR00278 | 278 | 11.984 | 0.065 | 0.139 | | 304.39 | 1.65 | 3.53 | |
| ORAR00279 | 279 | 12.984 | | 0.139 | | 329.79 | | 3.53 | |
| ORAR00280 | 280 | 13.984 | | 0.139 | | 355.19 | | 3.53 | |
| ORAR00281 | 281 | 14.984 | | 0.139 | | 380.59 | | 3.53 | |
| ORAR00282 | 282 | 15.955 | 0.075 | 0.139 | | 405.26 | 1.91 | 3.53 | |
| ORAR00283 | 283 | 16.955 | 0.080 | 0.139 | | 430.66 | 2.03 | 3.53 | |
| ORAR00284 | 284 | 17.955 | 0.085 | 0.139 | | 456.06 | 2.16 | 3.53 | |
| ORAR00309 | 309 | 0.412 | 0.005 | 0.210 | | 10.46 | 0.13 | 5.33 | |
| ORAR00310 | 310 | 0.475 | | 0.210 | | 12.07 | | 5.33 | |
| ORAR00311 | 311 | 0.537 | 0.007 | 0.210 | | 13.64 | 0.18 | 5.33 | |
| ORAR00312 | 312 | 0.600 | 0.009 | 0.210 | | 15.24 | 0.23 | 5.33 | |
| ORAR00313 | 313 | 0.662 | | 0.210 | | 16.81 | | 5.33 | |
| ORAR00314 | 314 | 0.725 | | 0.210 | | 18.42 | | 5.33 | |
| ORAR00315 | 315 | 0.787 | | 0.210 | 0.005 | 19.99 | | 5.33 | 0.13 |
| ORAR00316 | 316 | 0.850 | 0.010 | 0.210 | | 21.59 | 0.25 | 5.33 | |
| ORAR00317 | 317 | 0.912 | | 0.210 | | 23.16 | | 5.33 | |
| ORAR00318 | 318 | 0.975 | | 0.210 | | 24.77 | | 5.33 | |
| ORAR00319 | 319 | 1.037 | | 0.210 | | 26.34 | | 5.33 | |
| ORAR00320 | 320 | 1.100 | 0.012 | 0.210 | | 27.94 | 0.30 | 5.33 | |
| ORAR00321 | 321 | 1.162 | | 0.210 | | 29.51 | | 5.33 | |

| TSS Part No. | Dash No. AS568 ISO 3601-1 | Inside-Ø | | Cross-Section-Ø | | Inside-Ø | | Cross-Section-Ø | |
|---|---|---|---|---|---|---|---|---|---|
| | | $d_1$ | Tolerance ± | $d_2$ | Tolerance ± | $d_1$ | Tolerance ± | $d_2$ | Tolerance ± |
| | | inch | | | | mm | | | |
| ORAR00322 | 322 | 1.225 | 0.012 | 0.210 | 0.005 | 31.12 | 0.30 | 5.33 | 0.13 |
| ORAR00323 | 323 | 1.287 | | 0.210 | | 32.69 | | 5.33 | |
| ORAR00324 | 324 | 1.350 | | 0.210 | | 34.29 | | 5.33 | |
| ORAR00325 | 325 | 1.475 | 0.015 | 0.210 | | 37.47 | 0.38 | 5.33 | |
| ORAR00326 | 326 | 1.600 | | 0.210 | | 40.64 | | 5.33 | |
| ORAR00327 | 327 | 1.725 | | 0.210 | | 43.82 | | 5.33 | |
| ORAR00328 | 328 | 1.850 | | 0.210 | | 46.99 | | 5.33 | |
| ORAR00329 | 329 | 1.975 | 0.018 | 0.210 | | 50.17 | 0.46 | 5.33 | |
| ORAR00330 | 330 | 2.100 | | 0.210 | | 53.34 | | 5.33 | |
| ORAR00331 | 331 | 2.225 | | 0.210 | | 56.52 | | 5.33 | |
| ORAR00332 | 332 | 2.350 | | 0.210 | | 59.69 | | 5.33 | |
| ORAR00333 | 333 | 2.475 | 0.020 | 0.210 | | 62.87 | 0.51 | 5.33 | |
| ORAR00334 | 334 | 2.600 | | 0.210 | | 66.04 | | 5.33 | |
| ORAR00335 | 335 | 2.725 | | 0.210 | | 69.22 | | 5.33 | |
| ORAR00336 | 336 | 2.850 | | 0.210 | | 72.39 | | 5.33 | |
| ORAR00337 | 337 | 2.975 | 0.024 | 0.210 | | 75.57 | 0.61 | 5.33 | |
| ORAR00338 | 338 | 3.100 | | 0.210 | | 78.74 | | 5.33 | |
| ORAR00339 | 339 | 3.225 | | 0.210 | | 81.92 | | 5.33 | |
| ORAR00340 | 340 | 3.350 | | 0.210 | | 85.09 | | 5.33 | |
| ORAR00341 | 341 | 3.475 | | 0.210 | | 88.27 | | 5.33 | |
| ORAR00342 | 342 | 3.600 | 0.028 | 0.210 | | 91.44 | 0.71 | 5.33 | |
| ORAR00343 | 343 | 3.725 | | 0.210 | | 94.62 | | 5.33 | |
| ORAR00344 | 344 | 3.850 | | 0.210 | | 97.79 | | 5.33 | |
| ORAR00345 | 345 | 3.975 | | 0.210 | | 100.97 | | 5.33 | |
| ORAR00346 | 346 | 4.100 | | 0.210 | | 104.14 | | 5.33 | |
| ORAR00347 | 347 | 4.225 | 0.030 | 0.210 | | 107.32 | 0.76 | 5.33 | |
| ORAR00348 | 348 | 4.350 | | 0.210 | | 110.49 | | 5.33 | |
| ORAR00349 | 349 | 4.475 | | 0.210 | | 113.67 | | 5.33 | |
| ORAR00350 | 350 | 4.600 | | 0.210 | | 116.84 | | 5.33 | |
| ORAR00351 | 351 | 4.725 | | 0.210 | | 120.02 | | 5.33 | |
| ORAR00352 | 352 | 4.850 | | 0.210 | | 123.19 | | 5.33 | |
| ORAR00353 | 353 | 4.975 | 0.037 | 0.210 | | 126.37 | 0.94 | 5.33 | |
| ORAR00354 | 354 | 5.100 | | 0.210 | | 129.54 | | 5.33 | |
| ORAR00355 | 355 | 5.225 | | 0.210 | | 132.72 | | 5.33 | |
| ORAR00356 | 356 | 5.350 | | 0.210 | | 135.89 | | 5.33 | |
| ORAR00357 | 357 | 5.475 | | 0.210 | | 139.07 | | 5.33 | |
| ORAR00358 | 358 | 5.600 | | 0.210 | | 142.24 | | 5.33 | |
| ORAR00359 | 359 | 5.725 | | 0.210 | | 145.42 | | 5.33 | |
| ORAR00360 | 360 | 5.850 | | 0.210 | | 148.59 | | 5.33 | |
| ORAR00361 | 361 | 5.975 | | 0.210 | | 151.77 | | 5.33 | |

| TSS Part No. | Dash No. AS568 ISO 3601-1 | Inside-Ø | | Cross-Section-Ø | | Inside-Ø | | Cross-Section-Ø | |
|---|---|---|---|---|---|---|---|---|---|
| | | $d_1$ | Tolerance ± | $d_2$ | Tolerance ± | $d_1$ | Tolerance ± | $d_2$ | Tolerance ± |
| | | inch | | | | mm | | | |
| ORAR00362 | 362 | 6.225 | 0.040 | 0.210 | 0.005 | 158.12 | 1.02 | 5.33 | 0.13 |
| ORAR00363 | 363 | 6.475 | | 0.210 | | 164.47 | | 5.33 | |
| ORAR00364 | 364 | 6.725 | | 0.210 | | 170.82 | | 5.33 | |
| ORAR00365 | 365 | 6.975 | | 0.210 | | 177.17 | | 5.33 | |
| ORAR00366 | 366 | 7.225 | 0.045 | 0.210 | | 183.52 | 1.14 | 5.33 | |
| ORAR00367 | 367 | 7.475 | | 0.210 | | 189.87 | | 5.33 | |
| ORAR00368 | 368 | 7.725 | | 0.210 | | 196.22 | | 5.33 | |
| ORAR00369 | 369 | 7.975 | | 0.210 | | 202.57 | | 5.33 | |
| ORAR00370 | 370 | 8.225 | 0.050 | 0.210 | | 208.92 | 1.27 | 5.33 | |
| ORAR00371 | 371 | 8.475 | | 0.210 | | 215.27 | | 5.33 | |
| ORAR00372 | 372 | 8.725 | | 0.210 | | 221.62 | | 5.33 | |
| ORAR00373 | 373 | 8.975 | | 0.210 | | 227.97 | | 5.33 | |
| ORAR00374 | 374 | 9.225 | 0.055 | 0.210 | | 234.32 | 1.40 | 5.33 | |
| ORAR00375 | 375 | 9.475 | | 0.210 | | 240.67 | | 5.33 | |
| ORAR00376 | 376 | 9.725 | | 0.210 | | 247.02 | | 5.33 | |
| ORAR00377 | 377 | 9.975 | | 0.210 | | 253.37 | | 5.33 | |
| ORAR00378 | 378 | 10.475 | 0.060 | 0.210 | | 266.07 | 1.52 | 5.33 | |
| ORAR00379 | 379 | 10.975 | | 0.210 | | 278.77 | | 5.33 | |
| ORAR00380 | 380 | 11.475 | 0.065 | 0.210 | | 291.47 | 1.65 | 5.33 | |
| ORAR00381 | 381 | 11.975 | | 0.210 | | 304.17 | | 5.33 | |
| ORAR00382 | 382 | 12.975 | | 0.210 | | 329.57 | | 5.33 | |
| ORAR00383 | 383 | 13.975 | 0.070 | 0.210 | | 354.97 | 1.78 | 5.33 | |
| ORAR00384 | 384 | 14.975 | | 0.210 | | 380.37 | | 5.33 | |
| ORAR00385 | 385 | 15.955 | 0.075 | 0.210 | | 405.26 | 1.91 | 5.33 | |
| ORAR00386 | 386 | 16.955 | 0.080 | 0.210 | | 430.66 | 2.03 | 5.33 | |
| ORAR00387 | 387 | 17.955 | 0.085 | 0.210 | | 456.06 | 2.16 | 5.33 | |
| ORAR00388 | 388 | 18.955 | 0.090 | 0.210 | | 481.46 | 2.29 | 5.33 | |
| ORAR00389 | 389 | 19.955 | 0.095 | 0.210 | | 506.86 | 2.41 | 5.33 | |
| ORAR00390 | 390 | 20.955 | | 0.210 | | 532.26 | | 5.33 | |
| ORAR00391 | 391 | 21.955 | 0.100 | 0.210 | | 557.66 | 2.54 | 5.33 | |
| ORAR00392 | 392 | 22.940 | 0.105 | 0.210 | | 582.68 | 2.67 | 5.33 | |
| ORAR00393 | 393 | 23.940 | 0.110 | 0.210 | | 608.08 | 2.79 | 5.33 | |
| ORAR00394 | 394 | 24.940 | 0.115 | 0.210 | | 633.48 | 2.92 | 5.33 | |
| ORAR00395 | 395 | 25.940 | 0.120 | 0.210 | | 658.88 | 3.05 | 5.33 | |
| ORAR00425 | 425 | 4.475 | 0.033 | 0.275 | 0.006 | 113.67 | 0.84 | 6.99 | 0.15 |
| ORAR00426 | 426 | 4.600 | | 0.275 | | 116.84 | | 6.99 | |
| ORAR00427 | 427 | 4.725 | | 0.275 | | 120.02 | | 6.99 | |
| ORAR00428 | 428 | 4.850 | | 0.275 | | 123.19 | | 6.99 | |
| ORAR00429 | 429 | 4.975 | 0.037 | 0.275 | | 126.37 | 0.94 | 6.99 | |
| ORAR00430 | 430 | 5.100 | | 0.275 | | 129.54 | | 6.99 | |

| TSS Part No. | Dash No. AS568 ISO 3601-1 | Inside-Ø | | Cross-Section-Ø | | Inside-Ø | | Cross-Section-Ø | |
|---|---|---|---|---|---|---|---|---|---|
| | | $d_1$ | Tolerance ± | $d_2$ | Tolerance ± | $d_1$ | Tolerance ± | $d_2$ | Tolerance ± |
| | | inch | | | | mm | | | |
| ORAR00431 | 431 | 5.225 | | 0.275 | | 132.72 | | 6.99 | |
| ORAR00432 | 432 | 5.350 | | 0.275 | | 135.89 | | 6.99 | |
| ORAR00433 | 433 | 5.475 | | 0.275 | | 139.07 | | 6.99 | |
| ORAR00434 | 434 | 5.600 | 0.037 | 0.275 | | 142.24 | 0.94 | 6.99 | |
| ORAR00435 | 435 | 5.725 | | 0.275 | | 145.42 | | 6.99 | |
| ORAR00436 | 436 | 5.850 | | 0.275 | | 148.59 | | 6.99 | |
| ORAR00437 | 437 | 5.975 | | 0.275 | | 151.77 | | 6.99 | |
| ORAR00438 | 438 | 6.225 | | 0.275 | | 158.12 | | 6.99 | |
| ORAR00439 | 439 | 6.475 | 0.040 | 0.275 | | 164.47 | 1.02 | 6.99 | |
| ORAR00440 | 440 | 6.725 | | 0.275 | | 170.82 | | 6.99 | |
| ORAR00441 | 441 | 6.975 | | 0.275 | | 177.17 | | 6.99 | |
| ORAR00442 | 442 | 7.225 | | 0.275 | | 183.52 | | 6.99 | |
| ORAR00443 | 443 | 7.475 | 0.045 | 0.275 | | 189.87 | 1.14 | 6.99 | |
| ORAR00444 | 444 | 7.725 | | 0.275 | | 196.22 | | 6.99 | |
| ORAR00445 | 445 | 7.975 | | 0.275 | | 202.57 | | 6.99 | |
| ORAR00446 | 446 | 8.475 | | 0.275 | | 215.27 | | 6.99 | |
| ORAR00447 | 447 | 8.975 | 0.055 | 0.275 | | 227.97 | 1.40 | 6.99 | |
| ORAR00448 | 448 | 9.475 | | 0.275 | | 240.67 | | 6.99 | |
| ORAR00449 | 449 | 9.975 | | 0.275 | | 253.37 | | 6.99 | |
| ORAR00450 | 450 | 10.475 | | 0.275 | 0.006 | 266.07 | | 6.99 | 0.15 |
| ORAR00451 | 451 | 10.975 | | 0.275 | | 278.77 | | 6.99 | |
| ORAR00452 | 452 | 11.475 | 0.060 | 0.275 | | 291.47 | 1.52 | 6.99 | |
| ORAR00453 | 453 | 11.975 | | 0.275 | | 304.17 | | 6.99 | |
| ORAR00454 | 454 | 12.475 | | 0.275 | | 316.87 | | 6.99 | |
| ORAR00455 | 455 | 12.975 | | 0.275 | | 329.57 | | 6.99 | |
| ORAR00456 | 456 | 13.475 | | 0.275 | | 342.27 | | 6.99 | |
| ORAR00457 | 457 | 13.975 | | 0.275 | | 354.97 | | 6.99 | |
| ORAR00458 | 458 | 14.475 | 0.070 | 0.275 | | 367.67 | 1.78 | 6.99 | |
| ORAR00459 | 459 | 14.975 | | 0.275 | | 380.37 | | 6.99 | |
| ORAR00460 | 460 | 15.475 | | 0.275 | | 393.07 | | 6.99 | |
| ORAR00461 | 461 | 15.955 | 0.075 | 0.275 | | 405.26 | 1.91 | 6.99 | |
| ORAR00462 | 462 | 16.455 | | 0.275 | | 417.96 | | 6.99 | |
| ORAR00463 | 463 | 16.955 | 0.080 | 0.275 | | 430.66 | 2.03 | 6.99 | |
| ORAR00464 | 464 | 17.455 | | 0.275 | | 443.36 | | 6.99 | |
| ORAR00465 | 465 | 17.955 | 0.085 | 0.275 | | 456.06 | 2.16 | 6.99 | |
| ORAR00466 | 466 | 18.455 | | 0.275 | | 468.76 | | 6.99 | |
| ORAR00467 | 467 | 18.955 | 0.090 | 0.275 | | 481.46 | 2.29 | 6.99 | |
| ORAR00468 | 468 | 19.455 | | 0.275 | | 494.16 | | 6.99 | |
| ORAR00469 | 469 | 19.955 | 0.095 | 0.275 | | 506.86 | 2.41 | 6.99 | |
| ORAR00470 | 470 | 20.955 | | 0.275 | | 532.26 | | 6.99 | |

| TSS Part No. | Dash No. AS568 ISO 3601-1 | Inside-Ø | | Cross-Section-Ø | | Inside-Ø | | Cross-Section-Ø | |
|---|---|---|---|---|---|---|---|---|---|
| | | $d_1$ | Tolerance ± | $d_2$ | Tolerance ± | $d_1$ | Tolerance ± | $d_2$ | Tolerance ± |
| | | inch | | | | mm | | | |
| ORAR00471 | 471 | 21.955 | 0.100 | 0.275 | | 557.66 | 2.54 | 6.99 | |
| ORAR00472 | 472 | 22.940 | 0.105 | 0.275 | | 582.68 | 2.67 | 6.99 | |
| ORAR00473 | 473 | 23.940 | 0.110 | 0.275 | 0.006 | 608.08 | 2.79 | 6.99 | 0.15 |
| ORAR00474 | 474 | 24.940 | 0.115 | 0.275 | | 633.48 | 2.92 | 6.99 | |
| ORAR00475 | 475 | 25.940 | 0.120 | 0.275 | | 658.88 | 3.05 | 6.99 | |

## O-RING DIMENSIONS FOR STRAIGHT THREAD TUBE FITTINGS

### Table 4: O-Ring dimensions for straight thread tube fittings in accordance with AS568 with valid tolerances in accordance with AS568 – Inch and Metric

| TSS Part No. | Dash No. AS568 | Inside-Ø | | Cross-Section-Ø | | Inside-Ø | | Cross-Section-Ø | | Tube size |
|---|---|---|---|---|---|---|---|---|---|---|
| | | $d_1$ | Tolerance ± | $d_2$ | Tolerance ± | $d_1$ | Tolerance ± | $d_2$ | Tolerance ± | Outside-Ø (OD) inch |
| | | inch | | | | mm | | | | |
| ORAR00901 | 901 | 0.185 | | 0.056 | | 4.70 | | 1.42 | | 3/32 |
| ORAR00902 | 902 | 0.239 | | 0.064 | | 6.07 | | 1.63 | | 1/8 |
| ORAR00903 | 903 | 0.301 | 0.005 | 0.064 | | 7.65 | 0.13 | 1.63 | | 3/16 |
| ORAR00904 | 904 | 0.351 | | 0.072 | | 8.92 | | 1.83 | | 1/4 |
| ORAR00905 | 905 | 0.414 | | 0.072 | 0.003 | 10.52 | | 1.83 | 0.08 | 5/16 |
| ORAR00906 | 906 | 0.468 | | 0.078 | | 11.89 | | 1.98 | | 3/8 |
| ORAR00907 | 907 | 0.530 | 0.007 | 0.082 | | 13.46 | 0.18 | 2.08 | | 7/16 |
| ORAR00908 | 908 | 0.644 | | 0.087 | | 16.36 | | 2.21 | | 1/2 |
| ORAR00909 | 909 | 0.706 | | 0.097 | | 17.93 | | 2.46 | | 9/16 |
| ORAR00910 | 910 | 0.755 | 0.009 | 0.097 | | 19.18 | 0.23 | 2.46 | | 5/8 |
| ORAR00911 | 911 | 0.863 | | 0.116 | | 21.92 | | 2.95 | | 11/16 |
| ORAR00912 | 912 | 0.924 | | 0.116 | | 23.47 | | 2.95 | | 3/4 |
| ORAR00913 | 913 | 0.986 | | 0.116 | | 25.04 | | 2.95 | | 13/16 |
| ORAR00914 | 914 | 1.047 | 0.010 | 0.116 | | 26.59 | 0.25 | 2.95 | | 7/8 |
| ORAR00916 | 916 | 1.171 | | 0.116 | 0.004 | 29.74 | | 2.95 | 0.10 | 1 |
| ORAR00918 | 918 | 1.355 | 0.012 | 0.116 | | 34.42 | 0.30 | 2.95 | | 11/8 |
| ORAR00920 | 920 | 1.475 | 0.014 | 0.118 | | 37.47 | 0.36 | 3.00 | | 11/4 |
| ORAR00924 | 924 | 1.720 | | 0.118 | | 43.69 | | 3.00 | | 11/2 |
| ORAR00928 | 928 | 2.090 | 0.018 | 0.118 | | 53.09 | 0.46 | 3.00 | | 13/4 |
| ORAR00932 | 932 | 2.337 | | 0.118 | | 59.36 | | 3.00 | | 2 |

# General Quality Criteria

The cost-effective use of seals and bearings is highly influenced by the quality criteria applied in production. Seals and bearings from Trelleborg Sealing Solutions are continuously monitored according to strict quality standards from material acquisition through to delivery.

Production facilities are certified according to relevant quality management system standards. Depending on the requirements of the customer or market and in addition to the current ISO 9001, these locations may have further certifications: IATF 16949 for Automotive customers, EN/AS 9100 for Aerospace customers, ISO 13485 for Healthcare & Medical customers and ISO 29001 for Oil & Gas customers. This enables us to provide all market segments with the required quality standards.

Our quality policy is consistently controlled by strict procedures and guidelines which are implemented within all areas of the company.

All testing of materials and products is performed in accordance with accepted test standards and specifications, e.g. random sample testing in accordance with ISO 2859-1 AQL 1.0 general inspection level II, normal inspection.

Inspection specifications correspond to standards applicable to individual product groups (e.g. for O-Rings: ISO 3601).

# Guidelines for the Storage of Polymer Products Based on ISO 2230

Many polymer products and components are stored for long periods of time before being put into service, so it is important they are stored in conditions that minimize unwanted changes in properties. Such changes may result from degradation, in which case they may include excessive hardening, softening, cracking, crazing and other surface effects. Other changes may be caused by deformation, contamination or mechanical damage.

**Packaging**
Unless otherwise specified in the appropriate product specification, rubber products should be enclosed in individual sealed envelopes. The packaging should be carried out in an atmosphere in which the relative humidity is less than 70%, or if polyurethanes are being packed, less than 65%. Where there is serious risk of ingress of moisture (e.g. rubber-metal-bonded parts), aluminum foil/paper/polyethylene laminate or other similar means of protection should be used to ensure protection from ingress of moisture.

**Temperature**
The preferred storage temperature for elastomer parts is +15 °C (+59 °F) and should not exceed +25 °C (+77 °F). The products should be stored away from direct sources of heat such as boilers, radiators and direct sunlight. If the storage temperature is below +15 °C (+59 °F), care should be exercised during handling of stored products, as they may have stiffened and have become susceptible to distortion if not handled carefully.

**Humidity**
The relative humidity should be such that, given in the variations of temperature in storage, condensation does not occur. In all cases, the relative humidity of the atmosphere in storage should be less than 70%, or if polyurethanes are being stored, less than 65%.

**Light**
Rubber should be protected from light sources, in particular direct sunlight or intense light having a high ultra-violet content. It is advisable that any windows of storage rooms be covered with a red or orange coating or screen.

**Radiation**
Precautions should be taken to protect stored products from all sources of ionizing radiation likely to cause damage to the products.

**Ozone**
Ozone has a particularly harmful effect on rubber. Storage rooms should not contain any equipment that is capable of generating ozone, such as mercury vapor lamps or highvoltage electrical equipment giving rise to electric sparks or electrical discharges. Combustion gases and organic vapors should also be excluded, as they may give rise to ozone via photo-chemical processes. When equipment such as a fork-lift truck is used to handle large rubber products, care needs to be taken to ensure this equipment is not a source of pollution that may affect the rubber. Combustion gases should be considered separately. While they are responsible for generating ground-level ozone, they may also contain unburned fuel which, by condensing on rubber products, can cause additional deterioration.

**Deformation**
Rubber should be stored free from tension, compressive stresses or other causes of deformation. Where products are packaged in a strain-free condition, they should be stored in their original packaging. In case of doubt, the manufacturer's advice should be sought. It is advisable that rings of large internal diameter are formed into three equal loops so as to avoid creasing or twisting. It is not possible to achieve this condition by forming just two loops.

**Contact with liquids and semi-liquid materials**
Rubber should not be allowed to come into contact with liquid or semi-liquid materials (for example, petrol, greases, acids, disinfectants, cleaning fluids) or their vapors at any time during storage, unless these materials are by design an integral part of the product or the manufacturer's packaging. When rubber products are received coated with their operational media, they should be stored in this condition.

**Contact with metals**
Certain metals and their alloys (in particular, copper and manganese) are known to have harmful effects on some rubbers. Rubber should not be stored in contact with such metals except when bonded to them. They should be protected by wrapping in, or by separation with, a suitable material, e.g. paper or polyethylene.

**Contact with dusting powder**
Dusting powders should only be used for the packaging of rubber items in order to prevent adhesion. In such cases, the minimum quantity of powder to prevent adhesion should be used. Any powder used should be free from any constituent that would have a harmful effect on the rubber or the subsequent application of the rubber.

**Contact between different products**
Contact between products made from rubbers of different compositions should be avoided. This includes products of the same type but differing in color.

**Rubber-to-metal bonded products**
The metal part of rubber-to-metal bonded products should not come into contact with the rubber of other products. Preservative used on the metal should be of a type that it will not adversely affect the rubber or the bond to such an extent that it does not comply with the product specification.

**Storage life**
This is the maximum period of time that a rubber product, appropriately packaged, may be stored. After this time the product is regarded as unserviceable for the purposes for which it was originally manufactured. The storage life of a rubber product is influenced by its shape and size as well as its composition. Thick products usually undergo slower changes through degradation than thinner ones.

**Initial storage period**
This is the maximum period, starting from the time of manufacture, for which a rubber product, appropriately packaged, may be stored under specified conditions before a sample needs to be inspected or re-tested.

**Extension storage period**
This is the period for which a rubber product, appropriately packaged, may be stored after the initial storage period, before further inspection and re-testing is necessary.

**Assembly**
These are products or components containing more than one element, one or more of which is made of rubber. Generally it is not recommended to store elastomeric products in an assembled condition. If it is necessary to do so, the units should be checked more often. The inspection interval depends on the design and geometry of the components.

**Inspection before extension storage**
Before any items are to be stored for an extension period, representative samples of each type should be selected for inspection at the end of the appropriate initial storage period. Inspection should be in accordance with the relevant product specification.

**Visual inspection**
Inspect each of the items for the following:
1. Permanent distortions, such as creases or flats.
2. Mechanical damage, such as cuts, tears, abraded areas or delaminated plies.
3. Surface cracking when viewed under a microscope at x10 magnification.
4. Changes in surface condition, such as hardening, softening or tackiness.

**Assessment at the end of the initial period**
If, following the visual inspection procedure the items are not satisfactory, they should not be stored for an extended period. If the items are satisfactory and are stored for an extended period a record should be kept of the date initial storage began as well as the date the extended storage period began. Items stored for an extended period should be inspected and tested at, or before, the expiry of the extension storage period before they are put into service or stored for a further extended period.

## Table 5: Initial and extension storage periods for unassembled components

| Material Group | Initial Storage Period | Extended Storage Period |
|---|---|---|
| AU, EU, NR, SBR | 5 years | 2 years |
| ACM, AEM, CR, ECO, HNBR, IIR, NBR | 7 years | 3 years |
| CSM, EPDM, FKM, VMQ, FVMQ | 10 years | 5 years |
| FFKM Isolast® | 20 years | 5 years |
| Zurcon® | 10 years | 5 years |
| PTFE | unlimited | |

Note 1: If the storage temperature is over or under +25 °C (+77 °F) this will influence the storage time. Storage at +10 °C (+50 °F) higher will reduce the storage time by about 50%. Storage at +10 °C (+50 °F) lower will increase the storage time by around 100%.

Note 2: In application areas such as aerospace the storage periods can differ from this specification. These specific storage conditions have to be agreed between the supplier and the buyer.

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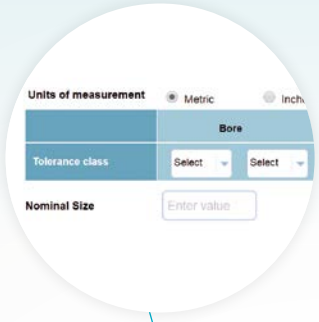
# Design Support & Engineering Tools



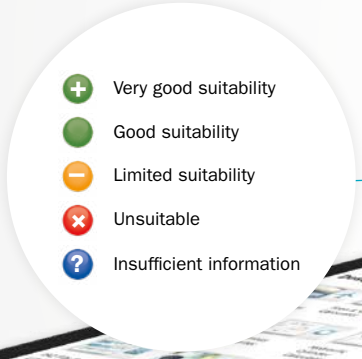

## ONLINE TOOLS MAKE LIFE EASIER

Trelleborg Sealing Solutions has developed a number of online tools that make the working life of an engineer specifying seals easier. All these industry-leading tools are available free-of-charge from the Trelleborg Sealing Solutions website at www.trelleborg.com/seals. To use these advanced services all you have to do is register on the Members Area.

There is also a continually increasing range of innovative engineering apps available for smartphones, both for iOS and Android devices. Just search for "Trelleborg" in the App Store or GooglePlay to find the tools to optimize your daily productivity.

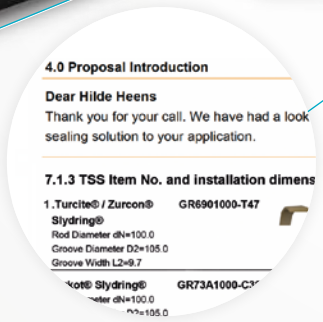
### Materials Search and Chemical Compatibility Check

These two programs allow you to find out the compatibility of sealing materials with hundreds of different media and help identify the most suitable material for your application.








### Sealing Solutions Configurator

The Sealing Solutions Configurator is the first tool of its kind offered by any seal supplier. It allows engineers to identify a proven sealing solution for their specific application in just four easy steps.

### Technical Proposals Online

Enhance your communication with Trelleborg Sealing Solutions with the Technical Proposals Online tool. Instantly access all your proposed solutions anywhere at any time and benefit from quicker dialog with our sealing specialists.

## ISO Fits & Tolerances

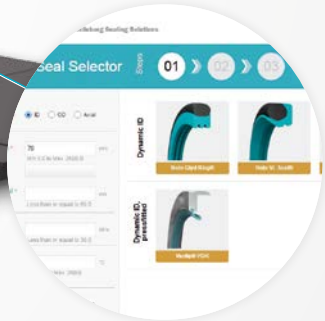
Our Fits & Tolerances Calculator allows you to easily determine type of fits using the tolerances according to DIN ISO 286. In addition, upon entering the nominal diameter the tool calculates lower and upper limit deviations plus the maximum and minimum interferences dependent on the selected tolerance classes for bore and shaft.

## Versatile CAD Service

The CAD download functionality provides thousands of drawings of a wide range of seals. It gives the option of 2- or 3-dimensional files in a range of formats to suit most commonly used CAD systems.

## Hydraulic System Calculator

Hydraulic System Calculator helps you design a solution around the cylinder which may involve motor, pump, orifice and pipe calculations. The application is in compliance with ISO 3320, ISO 3321 & ISO 4393.



## Rotary Seal Selector

The Rotary Seal Selector allows you to search through the wide range of rotary seals and materials available based on application conditions and offers detailed information on installation and seal capabilities.

## O-Ring Calculator

An industry-leading tool, the easy to use O-Ring calculator includes sizing capabilities, compression forces, design parameter recommendations and complete measurements. Results and comments may be printed, shared or filed as PDF.

Discover our design support and engineering tools at **www.trelleborg.com/seals**

# Mobile Tools & Apps

We understand the needs of engineers on the go. Check out our latest mobile tools and apps, ranging from an O-Ring calculator to unit and hardness converters. Just search for "Trelleborg" in the App Store or Google Play to find the tools to optimize your daily productivity.

Android App on **Google Play**

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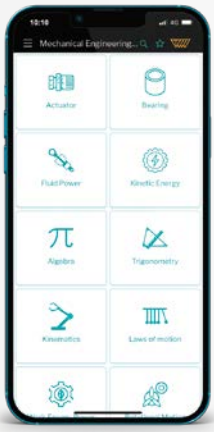
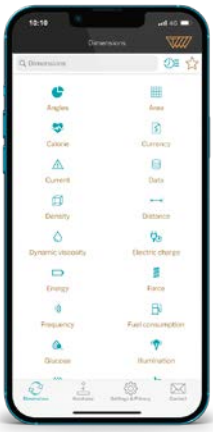




### ISO Fits & Tolerances

Simply enter the nominal diameter and select the tolerance classes for bore and shaft to find the complete ISO fits definition. It contains all relevant values, including type of fit, with handy graphs to illustrate the classes by bore and shaft. The results of this application are based on DIN ISO 286.

### Mechanical Engineering Calculator

A useful app containing over 250 formula calculators in 16 categories, with more being added with every update. Categories include the fields of mathematics, physics and mechanical engineering.

### Aerospace Groove Selector

This app covers five of the most important SAE Aerospace groove standards for hydraulic systems, making it quick and easy to find the size of grooves and hardware needed. Includes dimensions for AS4716 Rev B, AS5857 Rev A, AS6235 Rev A, AS4088 Rev E and AS4832 Rev A.

### Installation Instructions

Videos demonstrate the best practice methods for installing seals, providing all relevant documentation within the interface. It guides you to successful installation of Radial Oil Seals, Mechanical Face Seals and Turcon® and Zurcon® rod and piston seals.

### Converter – Universal

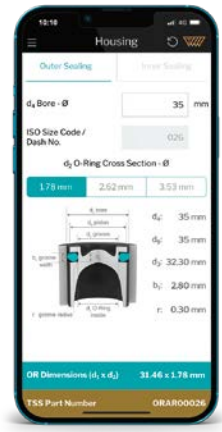
By simply selecting the dimension and entering a value for conversion, the app offers a wide range of engineering and scientific units for each dimension. It also has other useful features like currency conversion, timezone conversion, percentage calculations, a running pace calculator and more.


### *in the groove*

Our *in the groove* magazine provides news, technical and product information on seals, as well as insights into the markets they are used in. The magazine is also available in print and as an interactive PDF.

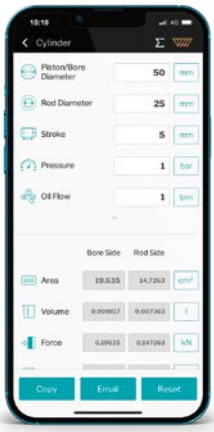
### Rotary Seal Selector

This app is specifically for the selection of rotary seals based on application information, including size, operating parameters and the lubricant used. It also considers installation type and seal function.




### O-Ring Selector

When a user enters installation specifications into the O-Ring Selector app, such as the bore or rod/shaft diameter, the app quickly calculates O-Ring and housing dimensions in both metric and inch. Standards covered are ISO 3601-1, NFT 47-502, JIS B 2401 and SMS 1586.

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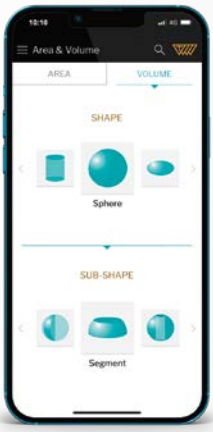
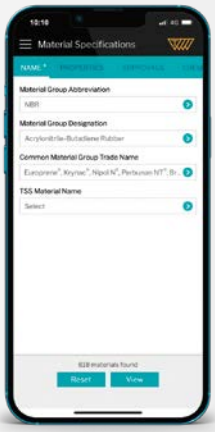



### Area and Volume Calculator

Speeds up and simplifies calculating the area and volume of more than 170 geometric shapes. The app supports both metric and inch, and conveniently displays the formulas used. Fill your shape with solids or liquids, choosing from 1500 different materials to calculate the weight.


### Healthcare Materials

A quick and easy overview of the compatibility of 34 materials with 35 chemical environments that are commonly encountered in the healthcare and medical industries. Select up to 20 materials and environments at once to produce a chart that rates each material from 'excellent' to 'not recommended'.




### Sealing Materials Selector

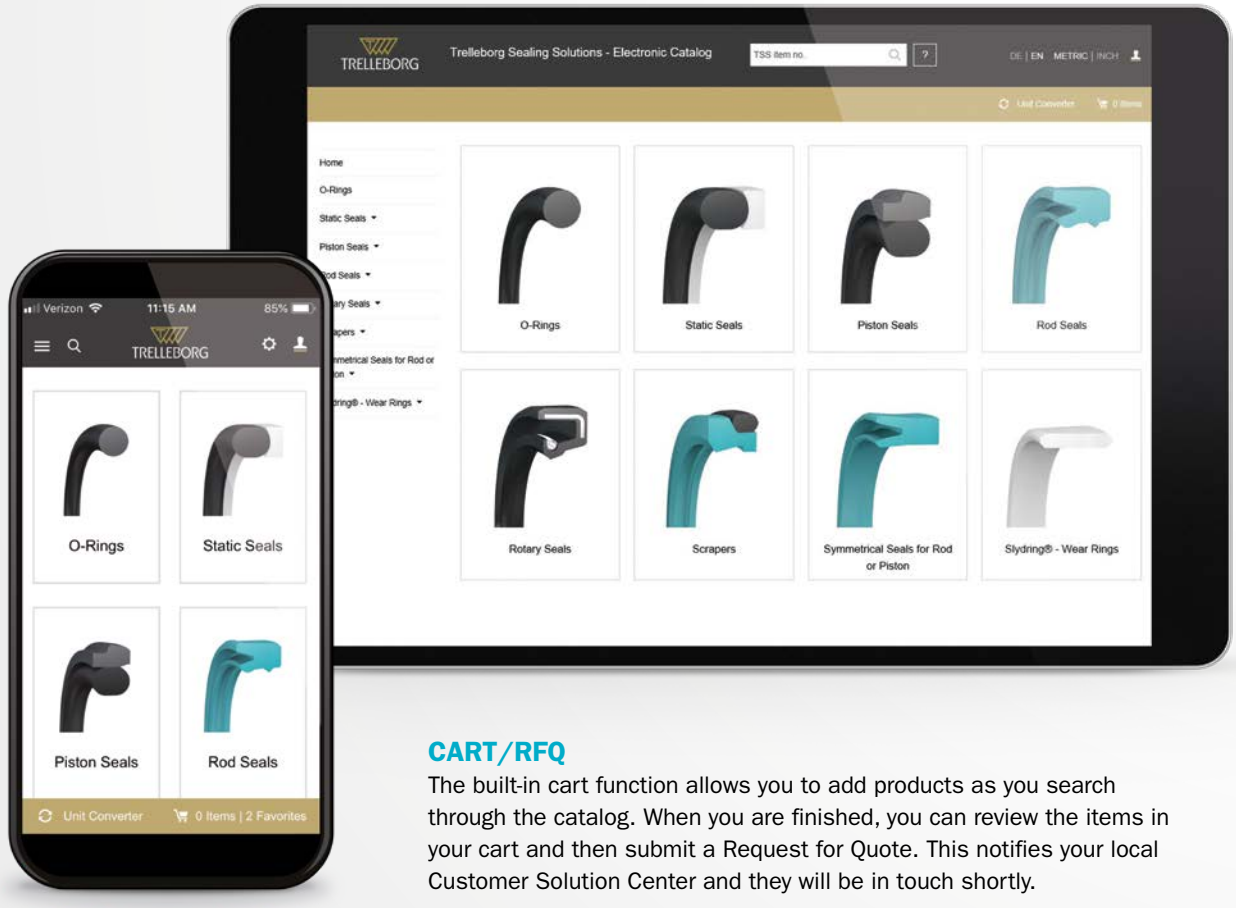
Enter material specifications and required parameters, such as application temperature or hardness, to receive instant material proposals. The app features filters to limit searches based on chemical compatibility, institute approvals and product type. Data sheets can be requested from within the interface.

# Electronic Catalog

Discover the Electronic Catalog online as an app or on our website

The Electronic Catalog is a user-friendly service that connects you to the broad range of products Trelleborg Sealing Solutions offers. The products are arranged based on product type and product group, making it easy to find the exact one you need.

Many functions are also included within the Electronic Catalog that allow you to understand product capabilities, compare similar seals, request a quote and much more. The Electronic Catalog is available from the Trelleborg Sealing Solutions website and in the App Store and GooglePlay for mobile use.

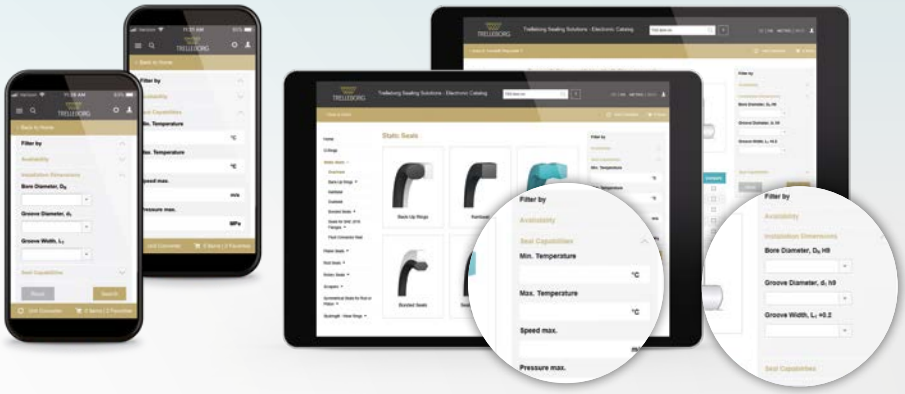



## CART/RFQ

The built-in cart function allows you to add products as you search through the catalog. When you are finished, you can review the items in your cart and then submit a Request for Quote. This notifies your local Customer Solution Center and they will be in touch shortly.

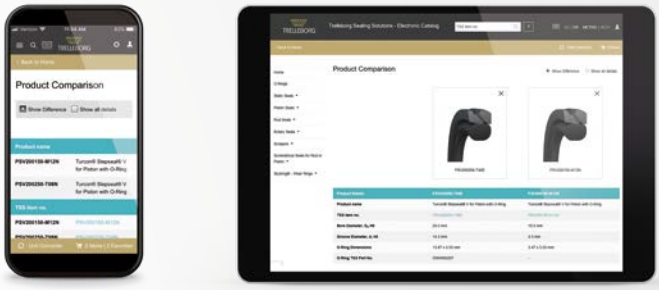
## FILTERING

If you have specific operating conditions that the seal must meet and/or installation dimensions, the Electronic Catalog offers a filtering function within the product groups. Here you can input your temperatures, pressure, speed and various installation dimensions to filter products that can meet your needs.



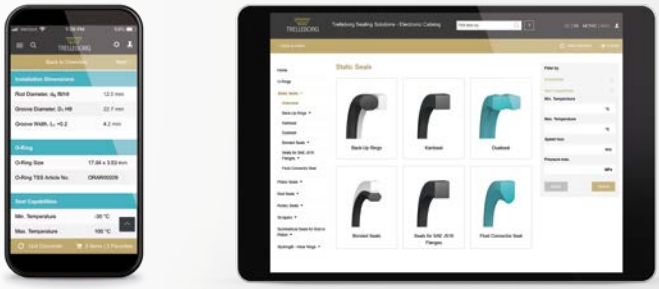

## PRODUCT COMPARISON

When looking through the catalog, you can choose to compare multiple products. The product comparison function allows you to select which products you are interested in, and then puts all relevant information into a table for your review. You can even choose to display all product details side by side or to only show the fields where they differ.



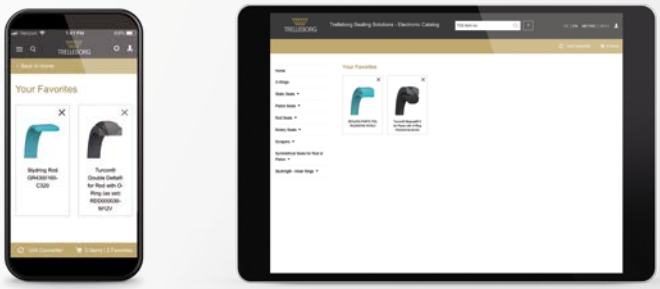

## PRODUCT INFORMATION

Detailed product information is available for each part number. Once you select a specific part number, you will be able to see its installation dimensions, seal capabilities, related catalogs and other information. From this page, registered users can access the material data sheets that are applicable to the part number.



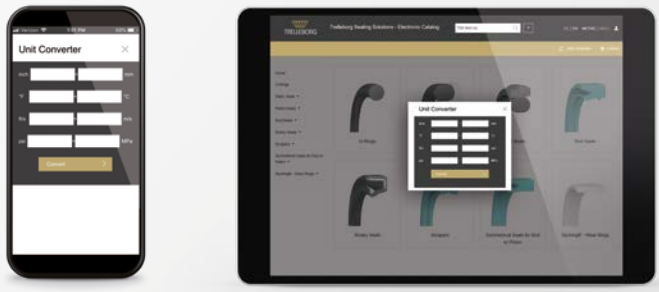
## ADD TO FAVORITES

Do you have a part that you frequently look up or need information on? You can now save any of our part numbers as a favorite that is linked to your account. Anytime you log in to the Electronic Catalog, your favorites will be a click away!




## UNIT CONVERTER

If you are looking at a product and need to know the conversion between metric and imperial, you can use the Unit Converter tool that is available at the top of the screen for web users and at the bottom for mobile.



Trelleborg is a world leader in engineered polymer solutions that seal, damp and protect critical applications in demanding environments. Its innovative solutions accelerate performance for customers in a sustainable way.

Trelleborg Sealing Solutions is a leading developer, manufacturer and supplier of precision seals, bearings and custom-molded polymer components. It focuses on meeting the most demanding needs of aerospace, automotive and general industrial customers with innovative solutions.

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