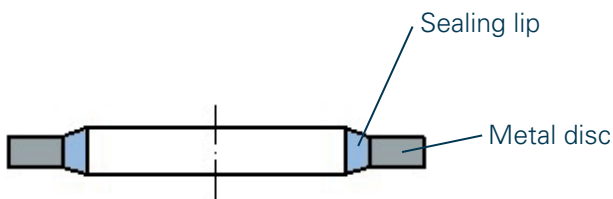
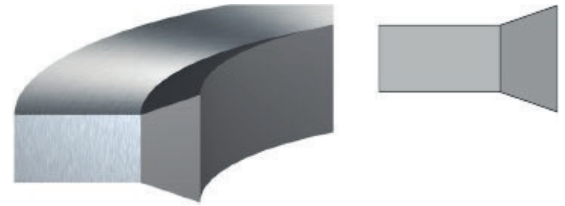


BS-10

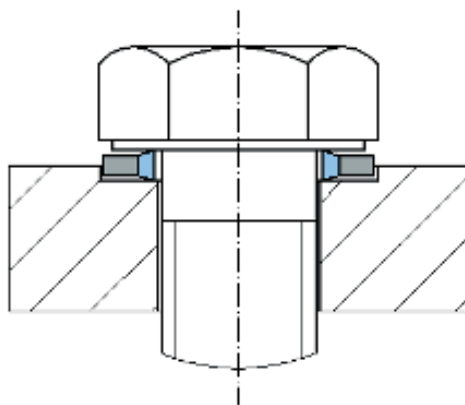
Description

Bonded seals or bolt seals are standard sealing elements for sealing off bolt connections. Bonded seals act like a washer with an additional sealing effect. This is achieved by a trapezoidal sealing lip made of elastomer, which is vulcanised onto the inner diameter of the metal disc.

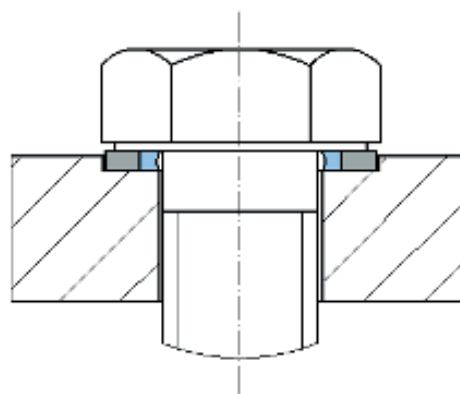


Function

When the bolt connection is tightened, the sealing bead is pressed in the axial direction. The maximum extent of the pressing is defined and limited by the thickness of the metal disc. As the internal pressure rises, the contact pressure of the resilient sealing material on the sealing surfaces increases even more.



Loose screw connection



Tightened screw connection

Advantages

- Simple, cost-effective sealing element
- Easy to assemble
- Automatic assembly possible
- Defined compression of the seal
- Wide range of uses with various tools
- Good sealing effect at low and high pressures
- Available for metric, imperial and BSP threads
- Suitable for many common bolt connections

Applications

Static sealing of screw connections, e.g.:

- machinery
 - tank and apparatus construction
 - screw connections
 - flange seals
 - engines
- and much more

Materials / Operating parameters

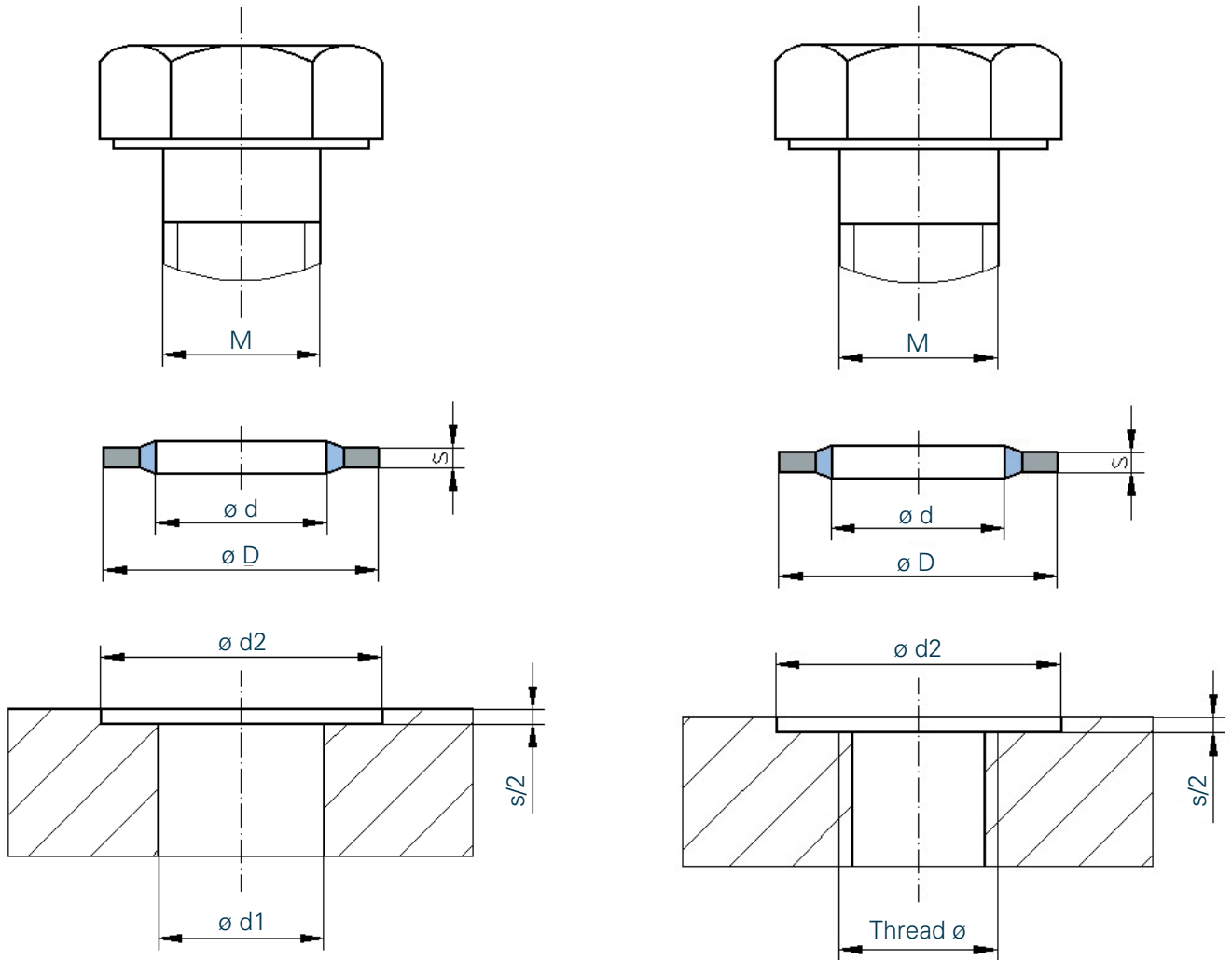
Standard elastomers:

| | | |
|--------|-------|-----------------|
| NBR 70 | Black | (-30 to +100°C) |
| FKM 70 | Brown | (-15 to +200°C) |

Standard steel material: JIS G3141 SPCC, zinc-chromated, (Cr(VI)-free)
Equivalent to 1.0330 (AISI 1008)

Other elastomer materials are available on request.

Installation space and design recommendations



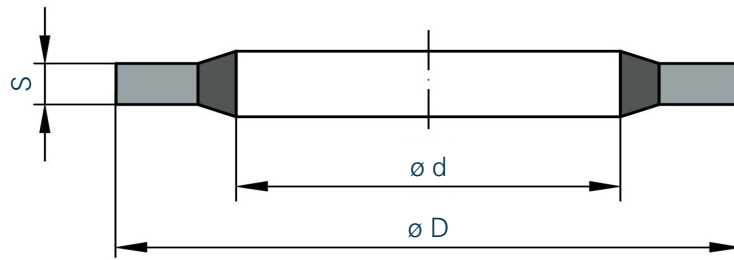
The diameter d_1 must be selected so that the sealing lip always rests securely on the flat surface outside of the bore.

Surface properties of the mating surface:

$R_a \leq 3.2 \mu\text{m}$

$R_{\text{max}} \leq 15 \mu\text{m}$

BS-10



| Metric thread | Inch thread | BSP | $\varnothing d$ | $\varnothing D$ | s | Type |
|---------------|-------------|-----|-----------------|-----------------|------|------|
| | 6BA | | 3.05 | 6.35 | 1.22 | BS10 |
| M2.5 | | | 3.1 | 6.4 | 1.3 | BS10 |
| M3 | | | 3.6 | 7.5 | 1 | BS10 |
| M3(M3.5) | | | 4.1 | 7.2 | 1 | BS10 |
| | 4BA | | 4.12 | 7.26 | 1.22 | BS10 |
| M4 | | | 4.5 | 7 | 1 | BS10 |
| M4 | | | 4.6 | 9 | 1 | BS10 |
| | 2BA | | 5.21 | 8.38 | 1.22 | BS10 |
| M5 | | | 5.6 | 10 | 1 | BS10 |
| M5 | | | 5.7 | 10 | 1 | BS10 |
| M5 | | | 5.7 | 9 | 1 | BS10 |
| M5(M5.5) | | | 6.2 | 9.2 | 1 | BS10 |
| M6 | | | 6.6 | 11 | 1 | BS10 |
| M6 | | | 6.7 | 11 | 1 | BS10 |
| M6 | | | 6.7 | 10 | 1 | BS10 |
| M6 | | | 6.7 | 11 | 2.5 | BS10 |
| M6 | | | 6.85 | 13.27 | 1.3 | BS10 |
| | 1/4 | | 6.86 | 13.21 | 1.22 | BS10 |
| M6 | | | 6.9 | 13.2 | 1.3 | BS10 |
| | 1/4 | | 6.99 | 13.34 | 1.22 | BS10 |
| M6 | | | 7 | 11.4 | 1 | BS10 |
| M6(M6.5) | | | 7.1 | 12 | 1 | BS10 |
| M6(M6.7) | | | 7.3 | 10.2 | 1 | BS10 |
| M6 | | | 8.3 | 12.7 | 1.25 | BS10 |
| | 5/16 | | 8.31 | 13.34 | 1.22 | BS10 |
| M6(M8) | | | 8.5 | 13.4 | 1 | BS10 |
| M8 | | | 8.6 | 13 | 1 | BS10 |
| | 5/16 | | 8.64 | 14.22 | 1.22 | BS10 |
| M8 | | | 8.7 | 13 | 1 | BS10 |
| M8 | | | 8.7 | 14 | 1 | BS10 |
| M8 | | | 8.7 | 16 | 1 | BS10 |
| M8 | | | 8.7 | 14.2 | 1.3 | BS10 |
| M8(M8.5) | | | 9.3 | 13.3 | 1 | BS10 |

| Metric thread | Inch thread | BSP | Ød | ØD | s | Type |
|---------------|-------------|-----|-------|-------|------|------|
| M10 | | | 10.35 | 16 | 2 | BS10 |
| | 3/8 | 1/8 | 10.37 | 15.88 | 2.03 | BS10 |
| | 3/8 | 1/8 | 10.37 | 15.88 | 2 | BS10 |
| M10 | | | 10.4 | 14.7 | 1.25 | BS10 |
| M8(M10) | | | 10.7 | 18 | 1.5 | BS10 |
| M10 | | | 10.7 | 17 | 1.5 | BS10 |
| M8(M10) | | | 10.7 | 16 | 1.5 | BS10 |
| | 40 | | 11.26 | 18.36 | 2.03 | BS10 |
| M10 | | | 11.26 | 18.36 | 2 | BS10 |
| M10(M11) | | | 11.4 | 16.3 | 1.5 | BS10 |
| | 7/16 | | 11.69 | 19.05 | 2.03 | BS10 |
| | 7/16 | | 11.69 | 19.05 | 2 | BS10 |
| M10(M11) | | | 11.8 | 18.5 | 1.5 | BS10 |
| M10(M11) | | | 11.8 | 19.1 | 1.5 | BS10 |
| M11 | | | 11.8 | 18.1 | 1.5 | BS10 |
| M10(M12) | | | 12.7 | 18 | 1.5 | BS10 |
| M10(M12) | | | 12.7 | 20 | 1.5 | BS10 |
| M12 | | | 12.7 | 19 | 1.5 | BS10 |
| M12(M13) | | | 13.7 | 20 | 1.5 | BS10 |
| | 1/2 | | 13.7 | 22 | 1.5 | BS10 |
| M12 | | | 13.7 | 20.6 | 2.1 | BS10 |
| | 1/2 | 1/4 | 13.74 | 20.57 | 2.03 | BS10 |
| | 1/2 | 1/4 | 13.74 | 20.57 | 2 | BS10 |
| M13 | | | 13.8 | 20.1 | 1.5 | BS10 |
| M12(M13.5) | | | 13.85 | 18.7 | 1.25 | BS10 |
| M12(M13.5) | | | 13.9 | 18.7 | 1.25 | BS10 |
| M12(M13.5) | | | 14 | 18.7 | 1.5 | BS10 |
| M12(M14) | | | 14.7 | 22 | 1.5 | BS10 |
| M12(M14) | | | 14.7 | 21 | 1.5 | BS10 |
| | 9/16 | | 14.86 | 22.23 | 2.03 | BS10 |
| | 9/16 | | 14.86 | 22.23 | 2 | BS10 |
| | 60 | | 15.83 | 22.23 | 2.03 | BS10 |
| | 60 | | 15.83 | 22.23 | 2 | BS10 |
| M14 | | | 16 | 22.7 | 1.5 | BS10 |
| | 5/8 | | 16.51 | 25.4 | 2.03 | BS10 |
| | 5/8 | | 16.52 | 25.4 | 2 | BS10 |
| M14(M16) | | | 16.7 | 24 | 1.5 | BS10 |
| M16 | | | 16.7 | 23 | 1.5 | BS10 |
| M16.5 | | | 17.2 | 23.9 | 2.1 | BS10 |
| | | 3/8 | 17.28 | 23.8 | 2.03 | BS10 |
| | | 3/8 | 17.28 | 23.8 | 2 | BS10 |

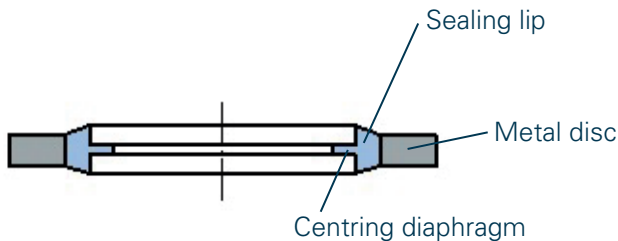
| Metric thread | Inch thread | BSP | Ød | ØD | s | Type |
|---------------|-------------|-----|-------|-------|------|------|
| | | 3/8 | 17.3 | 22.7 | 1.25 | BS10 |
| | | 3/8 | 17.35 | 22.7 | 1.25 | BS10 |
| M14(M17) | | | 17.4 | 24 | 1.5 | BS10 |
| M16(M17.5) | | | 18 | 24.7 | 1.5 | BS10 |
| | 11/16 | | 18.16 | 25.4 | 2.34 | BS10 |
| M16(M18) | | | 18.7 | 26 | 1.5 | BS10 |
| M18 | | | 18.7 | 27 | 2 | BS10 |
| | 3/4 | | 19.69 | 26.92 | 2.34 | BS10 |
| M20 | | | 20.7 | 29 | 2 | BS10 |
| M18(M20) | | | 20.7 | 28 | 1.5 | BS10 |
| | 13/16 | | 21.5 | 28.7 | 2.5 | BS10 |
| | 13/16 | 1/2 | 21.54 | 28.58 | 2.34 | BS10 |
| | 13/16 | | 21.65 | 26.7 | 1.25 | BS10 |
| | M21 | | 21.7 | 30 | 2 | BS10 |
| | 13/16 | | 21.7 | 26.7 | 1.25 | BS10 |
| M20(M22) | | | 22.5 | 28 | 1.5 | BS10 |
| M20(M22) | | | 22.7 | 30 | 2 | BS10 |
| M20(M22) | | | 22.7 | 30 | 3 | BS10 |
| M22 | | | 22.7 | 31 | 2 | BS10 |
| | 7/8 | 5/8 | 23.49 | 31.75 | 2.34 | BS10 |
| M23 | | | 23.7 | 32 | 2 | BS10 |
| | 15/16 | | 24.26 | 33.27 | 2.34 | BS10 |
| M20(M24) | | | 24.7 | 32 | 2 | BS10 |
| M24 | | | 24.7 | 33 | 2 | BS10 |
| M22 | | | 26.7 | 35 | 2 | BS10 |
| M26 | | | 27 | 35.3 | 2 | BS10 |
| | 1 | 3/4 | 27.05 | 34.93 | 2.34 | BS10 |
| M24(M27) | | | 27.2 | 36 | 2 | BS10 |
| M26 | | | 27.3 | 32.6 | 1.25 | BS10 |
| M26 | | | 27.3 | 32.6 | 2 | BS10 |
| M26 | | | 27.3 | 32.5 | 1.25 | BS10 |
| M27 | | | 27.7 | 36 | 2 | BS10 |
| | 1 1/16 | | 27.82 | 38.61 | 2.34 | BS10 |
| M28 | | | 28.6 | 36 | 2 | BS10 |
| M24 | | | 28.7 | 37 | 2 | BS10 |
| M28.5 | | | 29.2 | 37.5 | 2 | BS10 |
| | 1 1/8 | | 29.33 | 36.58 | 2.34 | BS10 |
| M30 | | | 30.7 | 39 | 2 | BS10 |
| | 1 3/16 | 7/8 | 30.81 | 38.1 | 2.34 | BS10 |
| M27(M30) | | | 31 | 39 | 2 | BS10 |
| | 1 1/4 | | 32.64 | 41.4 | 3.25 | BS10 |

| Metric thread | Inch thread | BSP | Ød | ØD | s | Type |
|---------------|-------------|-------|-------|--------|------|------|
| | 1 5/16 | 1 | 33.89 | 42.8 | 3.25 | BS10 |
| | 1 5/16 | 1 | 33.89 | 42.8 | 2.34 | BS10 |
| M27 | | | 33.9 | 42.8 | 3.25 | BS10 |
| M27 | | | 34.2 | 39.5 | 2 | BS10 |
| M30(M33) | | | 34.3 | 43 | 2 | BS10 |
| | 1 3/8 | | 35.94 | 44.45 | 3.25 | BS10 |
| M30(M36) | | | 36.7 | 46 | 2 | BS10 |
| M36 | | | 37 | 48 | 2.5 | BS10 |
| | 1 1/2 | | 38.96 | 47.75 | 3.25 | BS10 |
| M36(M42) | | | 42.7 | 53 | 3 | BS10 |
| M36(M42) | | | 42.8 | 49.5 | 2 | BS10 |
| | 1 5/8 | 1 1/4 | 42.93 | 52.38 | 3.25 | BS10 |
| M42 | | | 43 | 54 | 2.5 | BS10 |
| | 1 3/4 | | 45.34 | 57.15 | 3.25 | BS10 |
| M45 | | | 46 | 57 | 2.5 | BS10 |
| | 1 7/8 | 1 1/2 | 48.44 | 58.6 | 3.25 | BS10 |
| M36(M48) | | | 48.7 | 59 | 3 | BS10 |
| M36(M48) | | | 48.7 | 55.5 | 2 | BS10 |
| M48 | | | 49 | 60 | 2.5 | BS10 |
| | 2 | | 51.69 | 63.5 | 3.25 | BS10 |
| M42 | | | 51.7 | 63.5 | 3.25 | BS10 |
| M42(M51) | | | 52 | 60 | 3 | BS10 |
| M48(M52) | | | 53.3 | 64.5 | 3 | BS10 |
| | 2 1/8 | 1 3/4 | 54.89 | 69.85 | 3.25 | BS10 |
| | 2 1/4 | | 58.04 | 70.36 | 3.25 | BS10 |
| M48 | | | 60.5 | 68.5 | 2 | BS10 |
| | | 2 | 60.58 | 73.03 | 3.25 | BS10 |
| M48(M60) | | | 60.7 | 73 | 3 | BS10 |
| | 2 1/2 | | 64.39 | 77.22 | 3.25 | BS10 |
| | | 2 1/4 | 66.68 | 79.5 | 3.25 | BS10 |
| M68 | | | 68.6 | 79.5 | 3.5 | BS10 |
| | | 2 1/2 | 76.08 | 90.17 | 3.25 | BS10 |
| | | 2 1/2 | 76.08 | 90.3 | 3.38 | BS10 |
| M75 | | | 76.1 | 90.3 | 3.38 | BS10 |
| M88 | | | 89.09 | 101.35 | 3.25 | BS10 |
| M88 | | | 89.09 | 101.48 | 3.25 | BS10 |

BS-11 self-centring

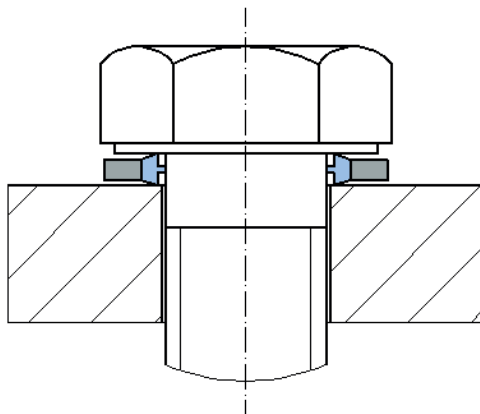
Description

Bonded seals or bolt seals are standard sealing elements for sealing off bolt connections. Bonded seals act like a washer with an additional sealing effect. This is achieved by a trapezoidal sealing lip made of elastomer, which is vulcanised onto the inner diameter of the metal disc. The BS-11 self-centring version has an additional centring diaphragm on the inner diameter. This makes it possible to pre-assemble the seal on the bolts.

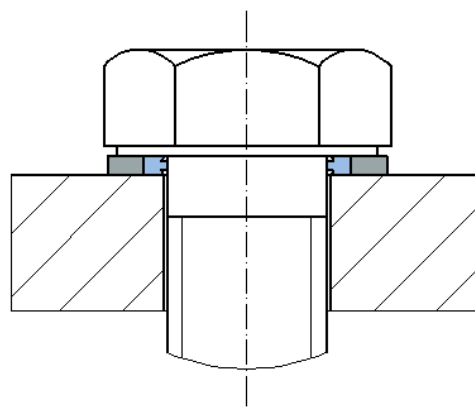


Function

When the bolt connection is tightened, the sealing bead is pressed in the axial direction. The maximum extent of the pressing is defined and limited by the thickness of the metal disc. As the internal pressure rises, the contact pressure of the resilient sealing material on the sealing surfaces increases even more. The centring diaphragm on the inner diameter ensures that the seal is centred in relation to the screw.



Loose screw connection



Tightened screw connection

Advantages

- Self-centring version
- Captive component pre-assembly possible
- Simple, cost-effective sealing element
- Easy to assemble
- Automatic assembly possible
- Defined compression of the seal
- Wide range of uses with various tools
- Good sealing effect at low and high pressures
- Available for metric and BSP threads
- Suitable for many common bolt connections
- Captive pre-assembly

Applications

Static sealing of screw connections, e.g.:

- machinery
 - tank and apparatus construction
 - screw connections
 - flange seals
 - engines
- and much more

Materials / Operating parameters

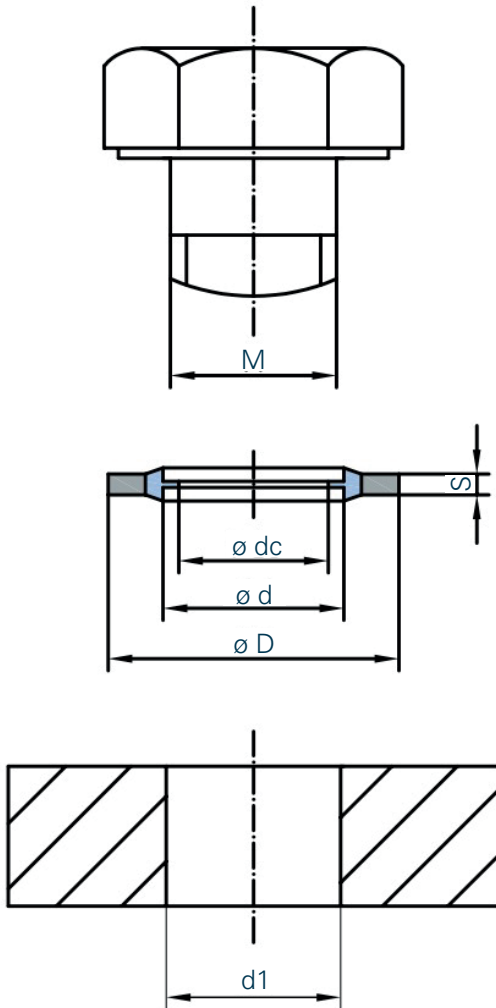
Standard elastomers:

| | | |
|--------|-------|-----------------|
| NBR 70 | Black | (-30 to +100°C) |
| FKM 70 | Brown | (-15 to +200°C) |

Standard steel material: JIS G3141 SPCC, zinc-chromated
Equivalent to 1.0330 (AISI 1008)

Other elastomer materials or stainless steel (1.4301 / AISI 304) variants are available on request.

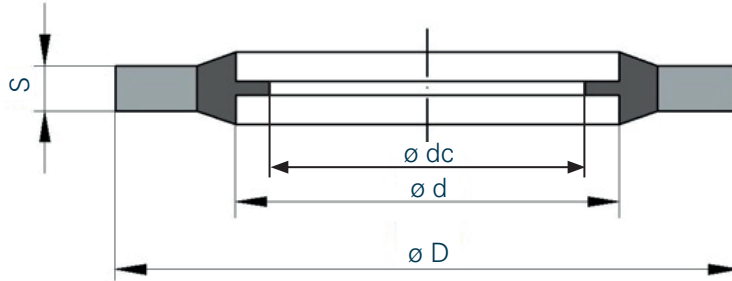
Installation space and design recommendations



Surface properties of the mating surface:

Ra $\leq 3.2 \mu\text{m}$
Rmax $\leq 15 \mu\text{m}$

BS-11



| Metric thread | BSP | ØD | Ød | Ødc ID with centring | s |
|---------------|--------|-------|-------|-------------------------|------|
| | | 9 | 5.7 | | 1 |
| M5 | | 10 | 5.7 | 4.45 | 1 |
| M6 | | 10 | 6.7 | 5.6 | 1 |
| M8 | | 14 | 8.7 | 6.4 | 1 |
| M8 | | 13 | 8.7 | 6.4 | 1 |
| | 1/8 | 15.88 | 10.37 | 8.26 | 2.03 |
| | 1/8 | 15.88 | 10.37 | 8.26 | 2 |
| M10 | | 16 | 10.7 | 8.05 | 1.5 |
| M10 | | 18 | 10.7 | 8.05 | 1.5 |
| | | 19 | 12.7 | 9.73 | 1.5 |
| M12 | | 18 | 12.7 | 9.73 | 1.5 |
| M12 | | 20 | 12.7 | 9.73 | 1.5 |
| | 1/4 | 20.57 | 13.74 | 11.18 | 2.03 |
| | 1/4 | 20.57 | 13.74 | 11.18 | 2 |
| M14 | | 22 | 14.7 | 11.38 | 1.5 |
| | 5/8 | 25.4 | 16.51 | 12.9 | 2.03 |
| | 5/8 | 25.4 | 16.51 | 12.9 | 2 |
| M16 | | 24 | 16.7 | 13.41 | 1.5 |
| | 3/8 | 23.8 | 17.28 | 14.76 | 2.03 |
| | 3/8 | 23.8 | 17.28 | 14.76 | 2 |
| | 1 1/16 | 25.4 | 18.16 | 14.5 | 2.34 |
| | 1 1/16 | 25.4 | 18.16 | 14.5 | 2.4 |
| M18 | | 26 | 18.7 | 14.76 | 1.5 |
| | | 28 | 20.7 | | 1.5 |
| | 1/2 | 28.58 | 21.54 | 18.24 | 2.34 |
| | 1/2 | 28.58 | 21.54 | 18.24 | 2.47 |
| M22 | | 30 | 22.7 | 18.74 | 2 |
| | 5/8 | 31.75 | 23.49 | 20.27 | 2.34 |
| | 5/8 | 31.75 | 23.49 | 20.27 | 2.47 |
| M24 | | 32 | 24.7 | 20.11 | 2 |
| | | 35 | 26.7 | | 2 |
| | 3/4 | 34.93 | 27.05 | 23.83 | 2.34 |
| | 3/4 | 34.93 | 27.05 | 23.83 | 2.47 |

| Metric thread | BSP | ØD | Ød | Ødc ID with centring | s |
|---------------|-------|-------|-------|----------------------|------|
| | | 36 | 27.7 | | 2 |
| | | 39 | 30.7 | | 2 |
| | 7/8 | 38.1 | 30.81 | 27.51 | 2.34 |
| | 7/8 | 38.1 | 30.81 | 27.51 | 2.47 |
| | | 42 | 33.7 | | 2 |
| | 1 | 42.8 | 33.89 | 29.92 | 3.25 |
| | 1 | 42.8 | 33.89 | 29.92 | 3.4 |
| | | 46 | 36.7 | | 2 |
| | 1 1/4 | 52.38 | 42.93 | 38.45 | 3.25 |
| | 1 1/4 | 52.38 | 42.93 | 38.45 | 3.4 |
| | 1 1/2 | 58.6 | 48.44 | 44.45 | 3.2 |
| | 1 1/2 | 58.6 | 48.44 | 44.45 | 3.4 |
| | 1 3/4 | 69.85 | 54.89 | 50.42 | 3.25 |
| | 1 3/4 | 69.85 | 54.89 | 50.42 | 3.4 |
| | 2 | 73.03 | 60.58 | 56.26 | 3.25 |
| | 2 1/4 | 79.5 | 66.68 | 62.36 | 3.25 |
| | 2 1/2 | 90.17 | 76.08 | 71.5 | 3.25 |