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Master Seals Catalogue Metric 2022 / 2023

NR Seals Catalogue

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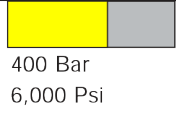
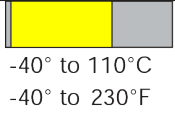
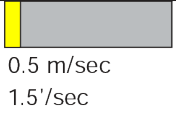

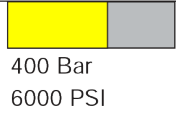
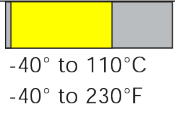
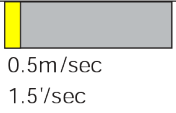

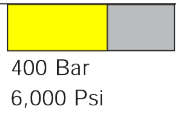
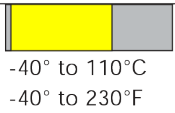
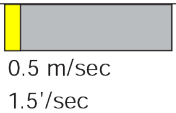

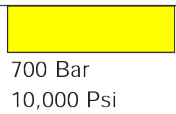
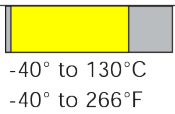
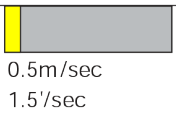

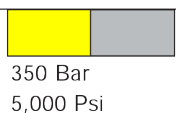
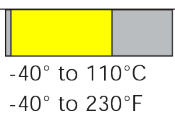


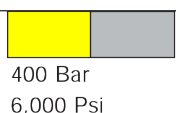
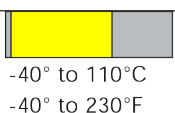
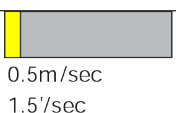

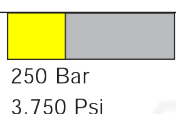
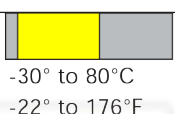
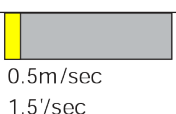


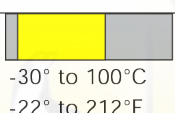




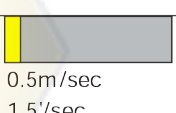

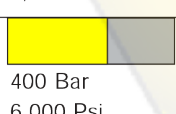

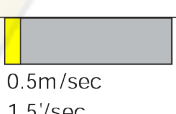

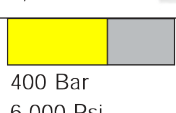
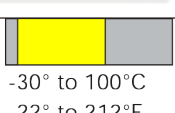
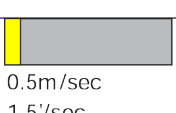




Designs

Double Acting Seals

01 Piston Seals


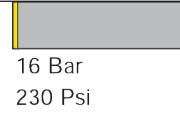
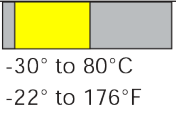
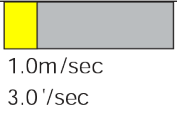

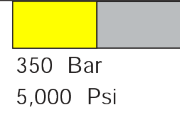
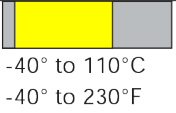
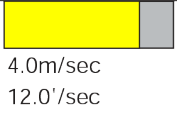

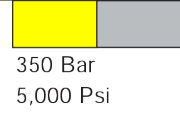
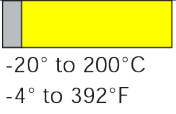
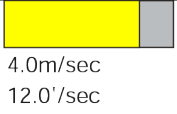

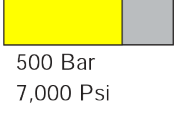
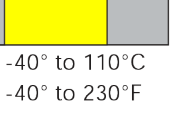


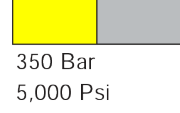
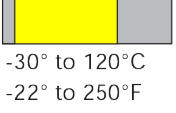
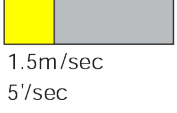

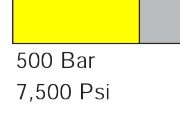
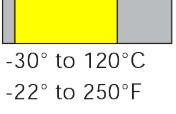
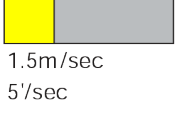

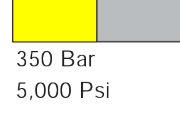
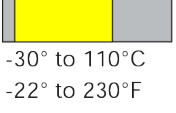
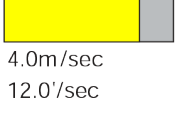
| Type | Composition | Pressure | Temperature | Speed |
|---|---|---|---|---|
|  | DAS NBR element Hytel support Polyacetal wear rings |  400 Bar 6,000 Psi |  -40° to 110°C -40° to 230°F |  0.5 m/sec 1.5'/sec |
|  | DAS NBR element Hytel support Polyacetal wear rings |  400 Bar 6000 PSI |  -40° to 110°C -40° to 230°F |  0.5m/sec 1.5'/sec |
|  | SPE NBR element Hytel support Polyacetal extrusion rings |  400 Bar 6,000 Psi |  -40° to 110°C -40° to 230°F |  0.5 m/sec 1.5'/sec |
|  | DSM NBR element NBR fabric support Polyacetal wear rings |  700 Bar 10,000 Psi |  -40° to 130°C -40° to 266°F |  0.5m/sec 1.5'/sec |
|  | DPS NBR fabric face NBR element Polyacetal wear rings |  350 Bar 5,000 Psi |  -40° to 110°C -40° to 230°F |  0.5m/sec 1.5'/sec |
|  | EUD Urethane face NBR element Polyacetal wear rings |  400 Bar 6,000 Psi |  -40° to 110°C -40° to 230°F |  0.5m/sec 1.5'/sec |
|  | SPL NBR element PTFE supports Polyacetal wear rings |  250 Bar 3,750 Psi |  -30° to 80°C -22° to 176°F |  0.5m/sec 1.5'/sec |
|  | DPWL NBR fabric element Polyacetal wear rings |  400 Bar 6,000 Psi |  -30° to 100°C -22° to 212°F |  0.5m/sec 1.5'/sec |
|  | DPW NBR fabric element Polyacetal wear rings |  400 Bar 6,000 Psi |  -30° to 100°C -22° to 212°F |  0.5m/sec 1.5'/sec |
|  | DPE NBR fabric element Polyacetal extrusion rings |  400 Bar 6,000 Psi |  -30° to 100°C -22° to 212°F |  0.5m/sec 1.5'/sec |
|  | DP NBR fabric element |  400 Bar 6,000 Psi |  -30° to 100°C -22° to 212°F |  0.5m/sec 1.5'/sec |




Designs

Double Acting Seals

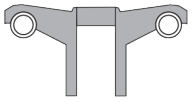
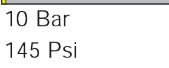
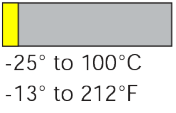

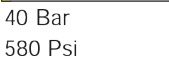
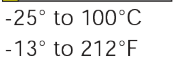
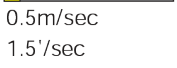
02 Glide Rings

| Type | Composition | Pressure | Temperature | Speed |
|---|---|--|---|--|
|  KPDP | Polyurethane Face NBR o-ring |  16 Bar 230 Psi |  -30° to 80°C -22° to 176°F |  1.0m/sec 3.0'/sec |
|  GP2 | Filled PTFE Face NBR o-ring |  350 Bar 5,000 Psi |  -40° to 110°C -40° to 230°F |  4.0m/sec 12.0'/sec |
|  GP4 | Filled PTFE Face Viton o-ring |  350 Bar 5,000 Psi |  -20° to 200°C -4° to 392°F |  4.0m/sec 12.0'/sec |
|  GP6 | Polyurethane Face NBR o-ring |  500 Bar 7,000 Psi |  -40° to 110°C -40° to 230°F |  0.8m/sec 2.5'/sec |
|  GP8 | Step Cut nylon face, NBR Expander |  350 Bar 5,000 Psi |  -30° to 120°C -22° to 250°F |  1.5m/sec 5'/sec |
|  PHD | Filled PTFE face T-Expander NBR Hard AE rings |  500 Bar 7,500 Psi |  -30° to 120°C -22° to 250°F |  1.5m/sec 5'/sec |
|  GP3 | Filled PTFE Face NBR o-ring |  350 Bar 5,000 Psi |  -30° to 110°C -22° to 230°F |  4.0m/sec 12.0'/sec |

03 Piston Rings

| | | |
|---|-----------|--|
|  PR1 | Cast iron | Pressure, temperature and speed have little effect on the piston ring. |
|---|-----------|--|

04 Pneumatic Piston and Seal

| | | | | | |
|---|--|------------------|---|---|---|
|  TET | NBR bonded to Steel Piston with Garter Springs | Pneumatic |  10 Bar 145 Psi |  -25° to 100°C -13° to 212°F |  0.5m/sec 1.5'/sec |
| | | Hydraulic |  40 Bar 580 Psi |  -25° to 100°C -13° to 212°F |  0.5m/sec 1.5'/sec |



Designs

Single Acting Seals

05 Piston Seals



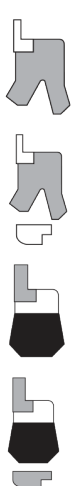
| Type | Composition | Pressure | Temperature | Speed |
|------|--|---|--------------------------------|-----------------------|
| RSE | Polyurethane Asymmetrical | 400 Bar 6,000 Psi | -40° to 105°C -40° to 221°F | 0.8m/sec 2.5'/sec |
| RSEA | Polyurethane shell Polyacetal AE ring Asymmetrical | 400 Bar 6,000 Psi | -40° to 105°C -40° to 221°F | 0.8m/sec 2.5'/sec |
| RSEA | Polyurethane shell Nylon backup Asymmetrical | 400 Bar 6,000 Psi | -40° to 105°C -40° to 221°F | 0.8 m/sec 2.5'/sec |
| RSS | Polyurethane Symmetrical | 400 Bar 6,000 Psi | -40° to 105°C -40° to 221°F | 0.8m/sec 2.5'/sec |
| MAD | Polyurethane Symmetrical | 400 Bar 6,000 Psi | -30° to 100°C -22° to 212°F | 0.8m/sec 2.5'/sec |
| JPS | NBR shell Nylon backup Asymmetrical | Replacement part for Asian construction equipment only. | | |
| CPE | NBR fabric element Polyacetal AE ring Asymmetrical | 400 Bar 6,000 Psi | -30° to 100°C -22° to 212°F | 0.5m/sec 1.5'/sec |
| CP | NBR fabric element Symmetrical | 400 Bar 6,000 Psi | -30° to 100°C -22° to 212°F | 0.5m/sec 1.5'/sec |
| 19M | Nylon or PTFE Symmetrical | Used in conjunction with Rod and/or Piston U-Rings. | | |




Designs

Single Acting Seals


06 Piston Seals with Wear Rings

| Type | Composition | Pressure | Temperature | Speed |
|--|---|----------------------|--------------------------------|----------------------|
|  | RSEW Polyurethane shell Polyacetal wear ring | 400 Bar 6,000 Psi | -40° to 105°C -40° to 221°F | 0.8m/sec 2.5'/sec |
| | RSEWR Polyurethane shell Polyacetal wear ring & retainer | 400 Bar 6,000 Psi | -40° to 105°C -40° to 221°F | 0.8m/sec 2.5'/sec |
| | CPL NBR fabric element Polyacetal wear ring | 400 Bar 6,000 Psi | -30° to 100°C -22° to 212°F | 0.5m/sec 1.5'/sec |
| | CPLR NBR fabric element Polyacetal wear ring & retainer | 400 Bar 6,000 Psi | -30° to 100°C -22° to 212°F | 0.5m/sec 1.5'/sec |

07 Piston V Pack Sets

| | | | | |
|---|-------------------|-----------------------|--------------------------------|-----------------------|
|  | VS1 NBR fabric | 700 Bar 10,000 Psi | -40° to 110°C -40° to 230°F | 0.5 m/sec 1.5'/sec |
|---|-------------------|-----------------------|--------------------------------|-----------------------|

08 Piston Seals Pneumatic

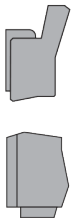
| | | | | |
|---|---------------------------------------|---------------------|--------------------------------|----------------------|
|  | GPP Polyurethane Asymmetrical | 16 Bar 230 Psi | -30° to 80°C -22° to 176°F | 1.0m/sec 3.0'/sec |
| | DE NBR Asymmetrical | 16 Bar 230 Psi | -30° to 100°C -22° to 212°F | 0.5m/sec 1.5'/sec |
| | U-70 NBR 70 Shore A Symmetrical | 16 Bar 230 Psi | -30° to 100°C -22° to 212°F | 0.5m/sec 1.5'/sec |
| | U-90 NBR 90 Shore A Symmetrical | 85 Bar 1,250 Psi | -30° to 100°C -22° to 212°F | 0.5m/sec 1.5'/sec |



Designs

Cushion Seals

09 Pneumatic Cushion Seals



| Type | Composition | Pressure | Temperature | Speed |
|------|--------------|-------------------|-------------------------------|----------------------|
| AMM | Polyurethane | 16 Bar 230 Psi | -30° to 80°C -22° to 176°F | 1.0/sec 3.0'/sec |
| AMV | Polyurethane | 16 Bar 230 Psi | -30° to 80°C -22° to 176°F | 1.0m/sec 3.0'/sec |

10 Hydraulic Cushion Seals



| | | |
|-----|-------------------------|---|
| JCS | Nylon or phenolic resin | Replacement part for Asian construction equipment only. |
|-----|-------------------------|---|

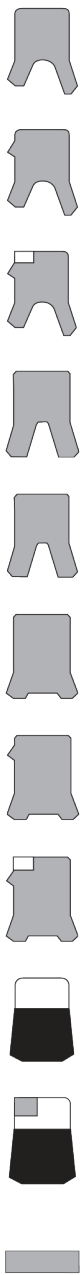




Designs

Rod Seals

11 Hydraulic Seals























| Type | Composition | Pressure | Temperature | Speed |
|------|--|---|--------------------------------|----------------------|
| RS | Polyurethane asymmetrical | 400 Bar 6,000 Psi | -40° to 105°C -40° to 221°F | 0.8m/sec 2.5'/sec |
| RSL | Polyurethane asymmetrical Twin lip design | 400 Bar 6,000 Psi | -40° to 105°C -40° to 221°F | 0.8m/sec 2.5'/sec |
| RSLA | Polyurethane asymmetrical Polyacetal AE ring | 400 Bar 6,000 Psi | -40° to 105°C -40° to 221°F | 0.8m/sec 2.5'/sec |
| RSS | Polyurethane Symmetrical | 400 Bar 6,000 Psi | -40° to 105°C -40° to 221°F | 0.8m/sec 2.5'/sec |
| MAD | Polyurethane Symmetrical | 400 Bar 6,000 Psi | -30° to 100°C -22° to 212°F | 0.8m/sec 2.5'/sec |
| TS | Polyurethane Symmetrical | 400 Bar 6,000 Psi | -40° to 105°C -40° to 221°F | 0.8m/sec 2.5'/sec |
| TSL | Polyurethane Twin lip | 400 Bar 6,000 Psi | -40° to 105°C -40° to 221°F | 0.8m/sec 2.5'/sec |
| TSLA | Polyurethane Polyacetal AE ring Twin Lip | 400 Bar 6,000 Psi | -40° to 105°C -40° to 221°F | 0.8m/sec 2.5'/sec |
| CP | NBR fabric | 400 Bar 6,000 Psi | -30° to 100°C -22° to 212°F | 0.5m/sec 1.5'/sec |
| CPI | NBR fabric Polyacetal AE ring | 400 Bar 6,000 Psi | -30° to 100°C -22° to 212°F | 0.5m/sec 1.5'/sec |
| 19M | Nylon or PTFE | Used in conjunction with Rod and/or Piston U-Rings. | | |











Designs

Rod Seals

12 Glide & Buffer Rings

| Type | Composition | Pressure | Temperature | Speed |
|---|--|--|---|--|
|  GR2 | Filled PTFE flat face NBR o-ring |  400 Bar 6,000 Psi |  -40° to 110°C -40° to 230°F |  4.0m/sec 12.0'/sec |
|  GR3 | Filled PTFE stepped face NBR o-ring |  350 Bar 5,000 Psi |  -40° to 110°C -40° to 230°F |  4.0m/sec 12.0'/sec |
|  GR5 | Filled PTFE stepped face Viton o-ring |  350 Bar 5,000 Psi |  -20° to 200°C -4° to 392°F |  4.0m/sec 12.0'/sec |
|  GRU | Polyurethane ring |  350 Bar 5,000 Psi |  -40° to 105°C -40° to 221°F |  0.8m/sec 2.5'/sec |
|  HBY | Polyurethane buffer Nylon AE ring |  500 Bar 7,000 Psi |  -40° to 105°C -40° to 221°F |  0.8m/sec 2.5'/sec |

13 V Pack Sets

| | | | | |
|---|--|---|---|---|
|  VS1 | NBR fabric |  700 Bar 10,000 Psi |  -30° to 100°C -22° to 212°F |  0.5m/sec 1.5'/sec |
|  SM1 | Hytrell top NBR element Polyacetal AE ring |  700 Bar 10,000 Psi |  -40° to 130°C -40° to 266°F |  0.5m/sec 1.5'/sec |



Designs

Rod Seals

14 Pneumatic Seals



| Type | Composition | Pressure | Temperature | Speed |
|------|-------------------------------|----------------------|--------------------------------|----------------------|
| GSP | Polyurethane Asymmetrical | 16 Bar 230 Psi | -30° to 80°C -22° to 176°F | 1.0m/sec 3.0'/sec |
| DI | NBR Asymmetrical | 115 Bar 1,500 Psi | -30° to 100°C -22° to 212°F | 0.5m/sec 1.5'/sec |
| U-70 | NBR 70 Shore A Symmetrical | 16 Bar 230 Psi | -30° to 100°C -22° to 212°F | 0.5m/sec 1.5'/sec |
| U-90 | NBR 90 Shore A Symmetrical | 85 Bar 1,250 Psi | -30° to 100°C -22° to 212°F | 0.5m/sec 1.5'/sec |

15 Pneumatic Seal & Wiper Combination



| | | | | |
|-----|--------------|-------------------|-------------------------------|----------------------|
| RBP | Polyurethane | 16 Bar 230 Psi | -30° to 80°C -22° to 176°F | 1.0m/sec 3.0'/sec |
| RCA | Polyurethane | 16 Bar 230 Psi | -30° to 80°C -22° to 176°F | 1.0m/sec 3.0'/sec |





Designs

Rod Wipers

16 Inserted & Metal Encased



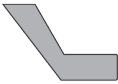

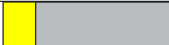
























| Type | Composition | Pressure | Temperature | Speed |
|------|--|-------------------|--------------------------------|-----------------------|
| CSW | Nylon MOS ₂ filler Inserted | | -40° to 100°C -40° to 212°F | 5.0m/sec 15.0'/sec |
| DH | Polyurethane Twin lip design Inserted | | -30° to 100°C -22° to 212°F | 1.0m/sec 3.0'/sec |
| DSI | Polyurethane Inserted | | -30° to 100°C -22° to 212°F | 1.0m/sec 3.0'/sec |
| PW | Polyurethane Inserted | | -40° to 105°C -40° to 221°F | 0.8m/sec 2.5'/sec |
| PWF | Polyurethane Inserted | | -40° to 105°C -40° to 221°F | 0.8m/sec 2.5'/sec |
| PWM | NBR Inserted | | -30° to 100°C -22° to 212° | 3.0m/sec 9.0'/sec |
| PWS | NBR Inserted | | -30° to 100°C -22° to 212°F | 3.0m/sec 9.0'/sec |
| RBP | Polyurethane Inserted | 16 Bar 230 Psi | -30° to 80°C -22° to 176°F | 1.0m/sec 3.0'/sec |
| RCA | Polyurethane Inserted | 16 Bar 230 Psi | -30° to 80°C -22° to 176°F | 1.0m/sec 3.0'/sec |
| RTI | Polyurethane Inserted | | -40° to 105°C -40° to 221°F | 0.8m/sec 2.5'/sec |
| RTL | Polyurethane Inserted | | -40° to 105°C -40° to 221°F | 0.8m/sec 2.5'/sec |



Designs

Rod Wipers

16 Inserted & Metal Encased

















| Type | Composition | Pressure | Temperature | Speed |
|---|---|----------|---|--|
|  | Polyurethane or NBR Inserted | |  -30° to 100°C -22° to 212°F |  1.0m/sec 3.0'/sec |
|  | PTFE wiper ring NBR o-ring Inserted | |  -30° to 120°C -22° to 250°F |  15.0m/sec 50.0'/sec |
|  | PTFE wiper ring Viton o-ring Inserted | |  -20° to 200°C -4° to 392°C |  15.0m/sec 50.0'/sec |
|  | NBR wiper Metal Encased | |  -30° to 105°C -22° to 220°F |  3.0m/sec 9.0'/sec |
|  | Polyurethane Metal Encased | |  -30° to 105°C -22° to 220°F |  3.0m/sec 9.0'/sec |
|  | Polyurethane Metal Encased | |  -30° to 105°C -22° to 220°F |  3.0m/sec 9.0'/sec |
|  | NBR Metal Encased | |  -30° to 105°C -22° to 220°F |  3.0m/sec 9.0'/sec |
|  | Polyurethane Metal Encased | |  -30° to 105°C -22° to 220°F |  3.0m/sec 9.0'/sec |
|  | NBR Metal Encased | |  -30° to 105°C -22° to 220°F |  3.0m/sec 9.0'/sec |



Designs

Bearings

17 Bearing Rings & Strip

| Type | Composition | Dynamic Load | Temperature | Speed |
|---|------------------------------------|---|---|---|
|  | GT Bronze filled PTFE Strip |  15N/mm ² @ 25°C Max |  -50° to 200°C -58° to 392°F |  5.0m/sec 15.0'/sec |
|  | B1 Glass filled Nylon rings |  45N/mm ² @ 25°C Max |  -40° to 120°C -40° to 250°F |  3.0m/sec 9.0'/sec |
|  | B6 Glass filled Acetal rings |  40N/mm ² @ 25°C Max |  -40° to 110°C -40° to 230°F |  3.0m/sec 9.0'/sec |
|  | B8 Phenolic Resin rings |  50N/mm ² @ 25°C Max |  -40° to 120°C -40° to 250°F |  3.0m/sec 9.0'/sec |

18 DU Bushes

| | | | | |
|---|---|--|---|--|
|  | DUB Steel bronze bush PTFE coated | |  -195° to 270°C -319° to 518°F |  4.0m/sec 12.0'/sec |
|---|---|--|---|--|


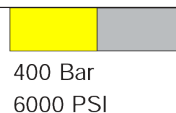
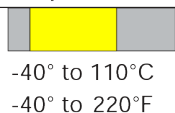

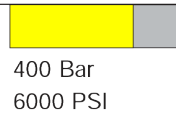
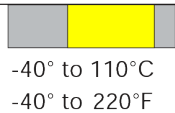


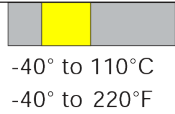

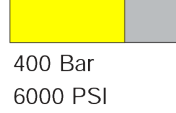
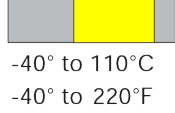

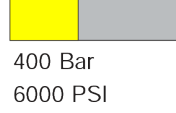
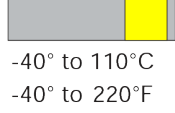


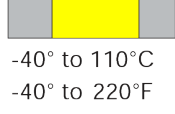

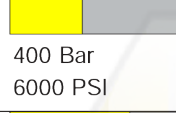
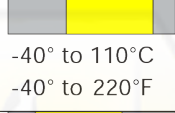

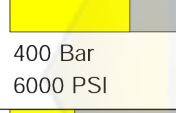
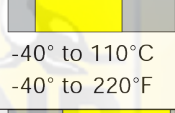

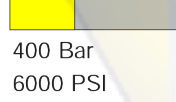
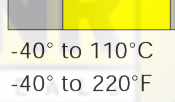




Designs

Ancillary

19 O-rings, Backup Washers & Quad Rings

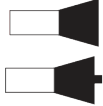
| Type | Composition | Pressure | Temperature |
|---|---|---|---|
|  2- 3- | NBR70 O-ring Imperial NBR70 O-ring Metric |  400 Bar 6000 PSI |  -40° to 110°C -40° to 220°F |
|  2- 3- | NBR90 O-ring Imperial NBR90 O-ring Metric |  400 Bar 6000 PSI |  -40° to 110°C -40° to 220°F |
|  2- 3- | Polyurethane O-ring Imperial O-ring Metric |  400 Bar 6000 PSI |  -40° to 110°C -40° to 220°F |
|  2- 3- | Viton O-ring Imperial Viton O-ring Metric |  400 Bar 6000 PSI |  -40° to 110°C -40° to 220°F |
|  4- | NBR70 Quad rings Imperial corresponding to BS1806 / AS568 |  400 Bar 6000 PSI |  -40° to 110°C -40° to 220°F |
|  8- | NBR90 backup washer Imperial contoured |  400 Bar 6000 PSI |  -40° to 110°C -40° to 220°F |
|  8- | Polyurethane BU washer Imperial |  400 Bar 6000 PSI |  -40° to 110°C -40° to 220°F |
|  8- 9- | Hytrel BU washer Imp. Hytrel BU washer Met. |  400 Bar 6000 PSI |  -40° to 110°C -40° to 220°F |
|  8- 9- | PTFE BU washer Imp. PTFE BU washer Met. |  400 Bar 6000 PSI |  -40° to 110°C -40° to 220°F |








Designs

Ancillary

20 Grab Kits, Tools, Flange Seals, Bonded Washers & Rotary Joint Seals



| Type | Composition | Pressure | Temperature | Speed |
|------|---|--|--|---|
| GK | O-rings, Backups Bonded washers Flange seals | | | |
| CFS | Rubber element Hytrel support Acetal wear rings |  400 Bar 6000 PSI |  -40° to 110°C -40° to 220°F |  0.8 m/sec 1.5'/sec |
| BW | Rubber element Hytrel support Acetal wear rings | | | |
| RJS | NBR element Rubber fabric support |  350 Bar |  -40° to 110°C | |





DAS

Piston Seals

Design

DAS are primarily used on one piece pistons, the five part assembly consists of an endless precision moulded Nitrile rubber sealing element supported at each side with anti-extrusion angle split support rings made of Polyester. The support rings are designed to accommodate split Polyacetal anti-extrusion bearing rings. This design allows the anti-extrusion bearing rings to react to increasing cylinder bores as pressures rise. The final assembly achieves a robust sealing unit designed for work at higher pressures. DAS are also suitable for use on two piece pistons of the same housing dimensions.

Operating Conditions

Pressure

400 Bar
6,000 Psi



Temperature

-40° to 110°C
-40° to 230°F



Speed

0.5m/sec
1.5'/sec



Surface Finish μmRa

| $\varnothing D$ | $\varnothing d1$ | $\varnothing d2$ | $\varnothing d3$ | L1 | L2 |
|-----------------|------------------|------------------|------------------|-----|-----|
| 0.1 to 0.25 | ≤ 0.8 | 1.0 | 2.0 | 2.0 | 2.0 |

Tolerances

| $\varnothing D$ | $\varnothing d1$ | $\varnothing d2$ | $\varnothing d3$ | L1 | L2 |
|-----------------|------------------|------------------|------------------|--------------|--------------|
| H10 | -0.0 +0.1 | -0.05 +0.00 | -0.2 +0.2 | -0.0 +0.2 | -0.1 +0.1 |

Chamfer Radii

| C/S | $\varnothing d1$ | $\varnothing d2$ | $\varnothing d3$ | L1 | L2 |
|-----|------------------|------------------|------------------|------|-----|
| 5.0 | 8.0 | 10.0 | 12.5 | 15.0 | |
| C | 2.4 | 5.0 | 5.0 | 6.5 | 7.5 |
| r1 | 0.4 | 0.4 | 0.4 | 0.8 | 0.8 |
| r2 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 |

Typical Examples

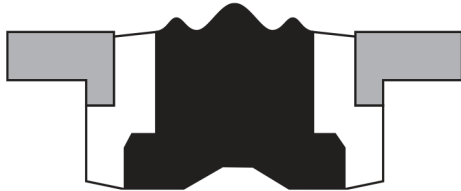
Reciprocating Rotary Oscillating Helix



Similar Styles



Double acting seals



Key Features

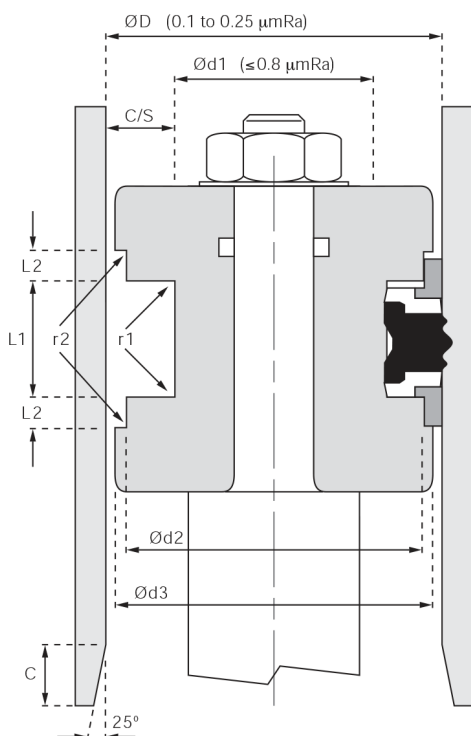
Medium duty

One piece piston

Relatively compact

Easy assembly

Medium / high pressure capability





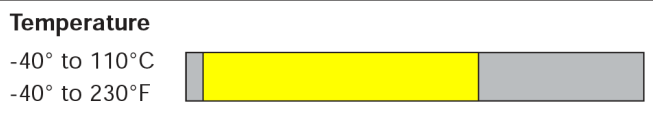
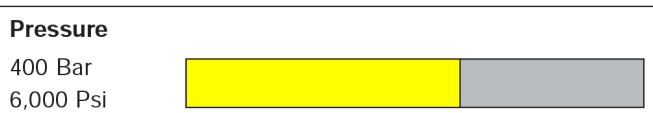
DAS

Piston Seals

Design

DAS are primarily used on one piece pistons, the five part assembly consists of an endless precision moulded Nitrile rubber sealing element supported at each side with anti-extrusion angle split support rings made of Polyester. The support rings are backed up by full depth Polyacetal anti-extrusion bearing rings. The final assembly achieves a robust sealing unit designed for work at higher pressures. DAS are also suitable for use on two piece pistons of the same housing dimensions.

Operating Conditions



Surface Finish μmRa

| $\text{\O}D$ | $\text{\O}d1$ | $\text{\O}d2$ | $\text{\O}d3$ | L1 | L2 |
|--------------|---------------|---------------|---------------|-----|-----|
| 0.1 to 0.25 | ≤ 0.8 | 1.0 | 2.0 | 2.0 | 2.0 |

Tolerances

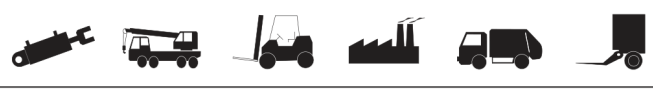
| $\text{\O}D$ | $\text{\O}d1$ | $\text{\O}d2$ | $\text{\O}d3$ | L1 | L2 |
|--------------|---------------|----------------|---------------|--------------|--------------|
| H10 | -0.0 +0.1 | -0.05 +0.00 | -0.2 +0.2 | -0.0 +0.2 | -0.1 +0.1 |

Chamfer Radii

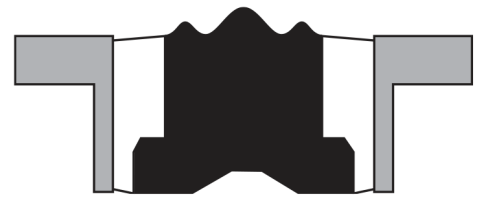
| | 5.0 | 8.0 | 10.0 | 12.5 | 15.0 |
|-----|-----|-----|------|------|------|
| C/S | | | | | |
| C | 2.4 | 5.0 | 5.0 | 6.5 | 7.5 |
| r1 | 0.4 | 0.4 | 0.4 | 0.8 | 0.8 |
| r2 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 |

Typical Examples

Reciprocating Rotary Oscillating Helix

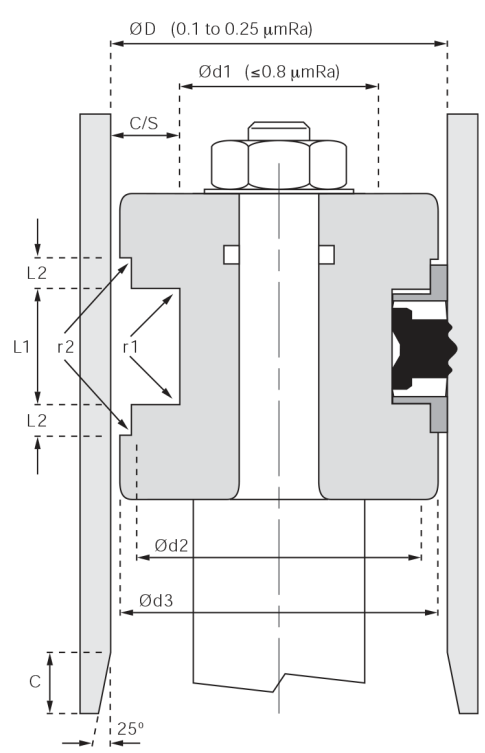


Double acting seals



Key Features

- Medium duty
- One piece piston
- Relatively compact
- Easy assembly
- Medium / high pressure capability

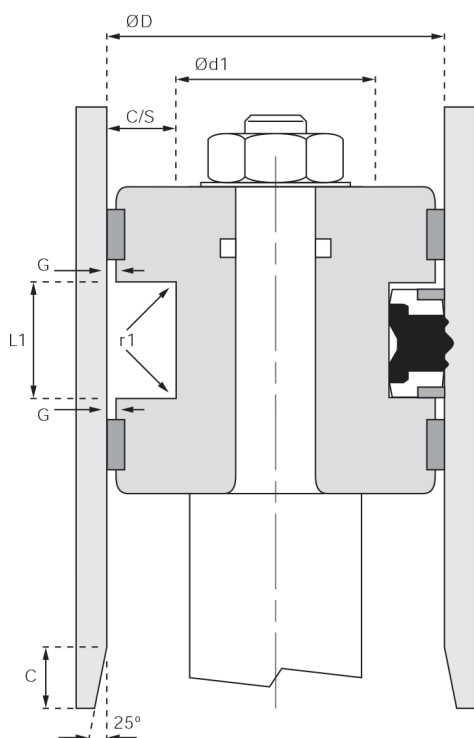


Double acting seals



Key Features

- Medium to heavy duty
- One piece piston
- Compact piston
- Higher pressure capability



SPE

Piston Seals

Design

SPE are primarily used on one piece pistons, the five part assembly consists of an endless precision moulded Nitrile rubber sealing element supported at each side with anti-extrusion angle split support rings made of Polyester. The support rings are designed to accommodate split Polyacetal anti-extrusion rings. This design allows the anti-extrusion rings to react to increasing cylinder bores as pressures rise. The final assembly achieves a robust sealing unit designed for work at higher pressures. SPE are also suitable for use on two piece pistons of the same housing dimensions.

Operating Conditions

Pressure



Temperature



Speed



Surface Finish μmRa

| $\varnothing D$ | $\varnothing d1$ | L1 |
|-----------------|------------------|-----|
| 0.1 to 0.25 | ≤ 0.8 | 2.0 |

Tolerances

| $\varnothing D$ | $\varnothing d1$ | G | L |
|-----------------|------------------|------|-------|
| H10 | -0.0 | 0.25 | -0.00 |
| | +0.1 | | +0.20 |

Chamfer Radii

| | 5.0 | 8.0 | 10.0 | 12.5 | 15.0 |
|-----|-----|-----|------|------|------|
| C/S | 5.0 | 8.0 | 10.0 | 12.5 | 15.0 |
| C | 2.4 | 5.0 | 5.0 | 6.5 | 7.5 |
| r1 | 0.4 | 0.4 | 0.4 | 0.8 | 0.8 |

Typical Examples

Reciprocating Rotary Oscillating Helix





DSM

Piston Seals

Design

DSM piston seal is a five piece assembly, consisting of a Nitrile rubber sealing element supported by two thermoplastic elastomer headers with Polyacetal anti-extrusion bearing rings on the outside diameter. The complete assembly forms a highly robust sealing unit for use in high pressure applications where shock loads and pressure spikes are present. The rubber element has grease/oil retaining grooves to help reduce friction and wear. The two thermoplastic elastomer headers can be angle cut to ease fitting if required.

Operating Conditions

Pressure

700 Bar
10,000 Psi



Temperature

-40° to 130°C
-40° to 266°F



Speed

0.5m/sec
1.5'/sec



Surface Finish μmRa

| $\text{\O}D$ | $\text{\O}d1$ | $\text{\O}d2$ | $\text{\O}d3$ | L1 | L2 |
|--------------|---------------|---------------|---------------|-----|-----|
| 0.1 to 0.25 | ≤ 0.8 | 1.0 | 2.0 | 2.0 | 2.0 |

Tolerances

| $\text{\O}D$ | $\text{\O}d1$ | $\text{\O}d2$ | $\text{\O}d3$ | L1 | L2 |
|--------------|---------------|----------------|----------------|--------------|--------------|
| H11 | H10 | -0.05 +0.05 | -0.07 +0.07 | -0.0 +0.2 | -0.0 +0.1 |

Chamfer Radii

| | | | |
|-----|-----|-----|------|
| C/S | 8 | 10 | 12.5 |
| C | 5.0 | 5.0 | 6.5 |
| r1 | 0.4 | 0.4 | 0.4 |
| r2 | 0.2 | 0.4 | 0.4 |

Typical Examples

Reciprocating Rotary Oscillating Helix



Double acting seals



Key Features

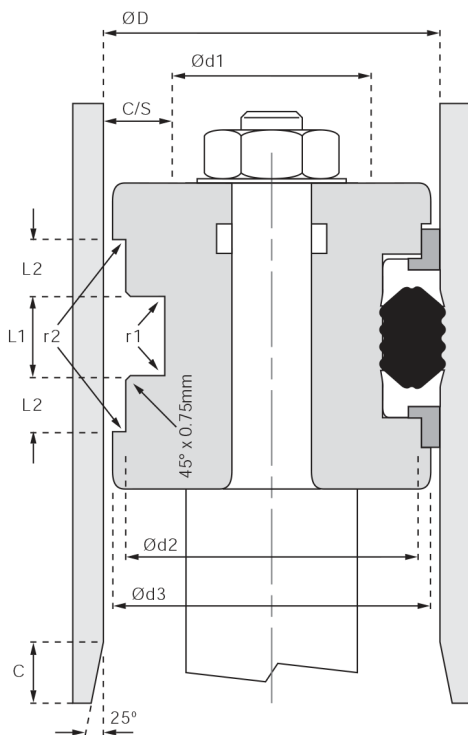
Heavy duty

One piece piston

Solid 5 part design

High pressure capability

Shock load resistant





DPS

Piston Seals

Design

DPS are particularly suitable for double acting hydraulic cylinders subjected to severe thermal and mechanical conditions generated by high speed and pressure. Fabric reinforcement with high mechanical strength, optimum thermal stability and lubricating properties are incorporated over the whole dynamic contact area of the sealing element and extended radially inwards for additional extrusion resistance. Bearing/anti-extrusion rings in Polyacetal resin give improved stability and increase resistance to distortion and extrusion. DPS seals provide a wide bearing surface, maximum stability with fabric reinforcement protecting the elastomeric element from excessive distortion.

Operating Conditions

| | | |
|-----------------|----------------------|--|
| Pressure | 350 Bar 5,000 Psi | |
|-----------------|----------------------|--|

| | | |
|--------------------|--------------------------------|--|
| Temperature | -40° to 110°C -40° to 230°F | |
|--------------------|--------------------------------|--|

| | | |
|--------------|----------------------|--|
| Speed | 0.5m/sec 1.5'/sec | |
|--------------|----------------------|--|

| | | | | | |
|--|---------------|---------------|---------------|-----|-----|
| Surface Finish μmRa | | | | | |
| $\text{\O}D$ | $\text{\O}d1$ | $\text{\O}d2$ | $\text{\O}d3$ | L1 | L2 |
| 0.1 to 0.25 | ≤ 0.8 | 1.0 | 2.0 | 2.0 | 2.0 |

| | | | | | |
|-------------------|---------------|----------------|---------------|--------------|--------------|
| Tolerances | | | | | |
| $\text{\O}D$ | $\text{\O}d1$ | $\text{\O}d2$ | $\text{\O}d3$ | L1 | L2 |
| H11 | -0.0 +0.15 | -0.05 +0.05 | -0.2 +0.2 | -0.0 +0.2 | -0.0 +0.1 |

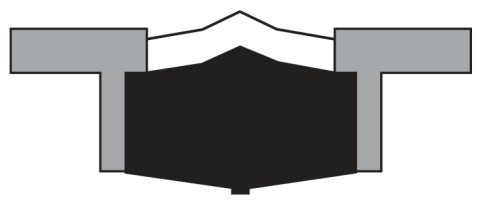
| | | | | | |
|----------------------|-----|-----|-----|------|--|
| Chamfer Radii | | | | | |
| C/S | 5.0 | 7.5 | 8.5 | 10.0 | |
| C | 2.4 | 5.0 | 5.0 | 5.0 | |
| r1 | 0.4 | 0.4 | 0.4 | 0.4 | |
| r2 | 0.2 | 0.2 | 0.2 | 0.2 | |

Typical Examples

Reciprocating Rotary Oscillating Helix

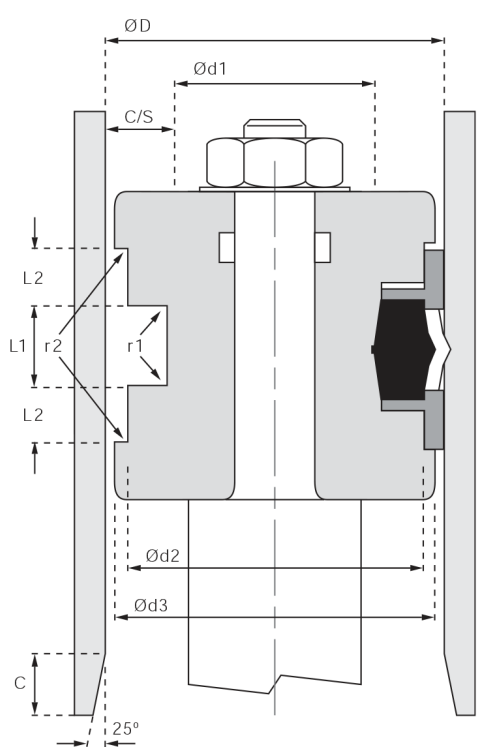
Similar Styles

Double acting seals



Key Features

- Medium duty
- One piece piston
- Relatively compact
- Easy assembly
- Medium / high pressure capability





EUD

Piston Seals

Design

EUD are primarily used on one piece pistons, the four part assembly consists of a central dynamic sealing element made from Polyurethane, a Nitrile rubber rectangular energiser and sealing element and two integral bearing/anti-extrusion rings from Polyacetal resin. The cross section design of the Polyurethane element ensures the applied pressure is directly related to the load applied by the elastomeric ring. Therefore the seal load on the cylinder bore is uniform and proportional to the hydraulic pressure. As the guide/anti-extrusion rings are integral there is no need for separate bearing rings. The final assembly achieves a robust sealing unit designed for work at higher pressures. EUD are also suitable for use on two piece pistons of the same housing dimensions.

Operating Conditions

Pressure

400 Bar
6,000 Psi



Temperature

-40° to 110°C
-40° to 230°F



Speed

0.5m/sec
1.5'/sec



Surface Finish μmRa

| $\varnothing D$ | $\varnothing d1$ | $\varnothing d2$ | $\varnothing d3$ | L1 | L2 |
|-----------------|------------------|------------------|------------------|-----|-----|
| 0.1 to 0.25 | ≤ 0.8 | 1.0 | 2.0 | 2.0 | 2.0 |

Tolerances

| $\varnothing D$ | $\varnothing d1$ | $\varnothing d2$ | $\varnothing d3$ | L1 | L2 |
|-----------------|------------------|------------------|------------------|------|------|
| H11 | -0.0 | -0.05 | -0.2 | -0.0 | -0.0 |
| | +0.15 | +0.05 | +0.2 | +0.2 | +0.1 |

Chamfer Radii

| | | | |
|-----|-----|-----|-----|
| C/S | 6.0 | 7.0 | 8.5 |
| C | 4.0 | 5.0 | 6.0 |
| r1 | 0.4 | 0.4 | 0.4 |
| r2 | 0.2 | 0.2 | 0.2 |

Typical Examples

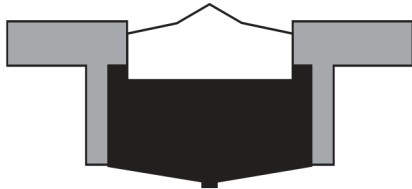
Reciprocating Rotary Oscillating Helix



Similar Styles



Double acting seals



Key Features

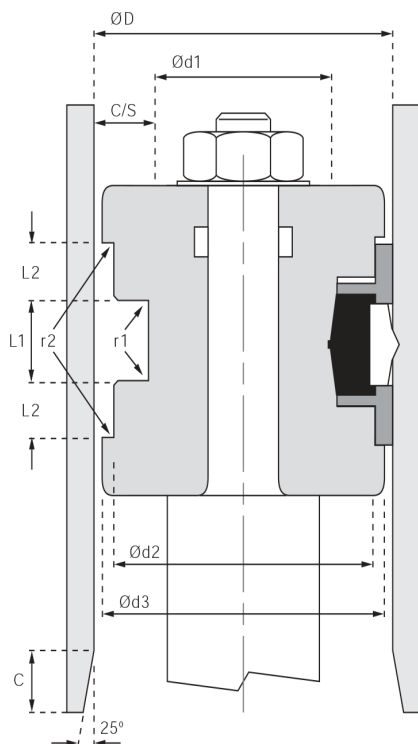
Medium duty

One piece piston

Relatively compact

Easy assembly

Medium / high pressure capability





SPL

Piston Seals

Design

SPL five part assembly comprises a precision moulded Nitrile rubber sealing element with endless PTFE anti-extrusion rings to the outside diameter. These rings are designed to be pre loaded on assembly, providing a more positive seal. Split Polyacetal anti-extrusion bearing rings are added on either side to provide support for the piston head. This compact one piece piston seal has proven effective over a wide range of applications.

Double acting seals



Key Features

- Light to medium duty
- One piece piston
- Compact design
- Easy assembly
- Low pressure sealing

Operating Conditions

| | |
|-------------------------------|--|
| Pressure | |
| 250 Bar 3,750 Psi | |
| Temperature | |
| -30° to 80°C -22° to 176°F | |
| Speed | |
| 0.5m/sec 1.5'/sec | |

| | | | | | |
|--|------------------|------------------|------------------|-----|-----|
| Surface Finish μmRa | | | | | |
| $\varnothing D$ | $\varnothing d1$ | $\varnothing d2$ | $\varnothing d3$ | L1 | L2 |
| 0.1 to 0.25 ± 0.8 | 1.0 | 2.0 | 2.0 | 2.0 | 2.0 |

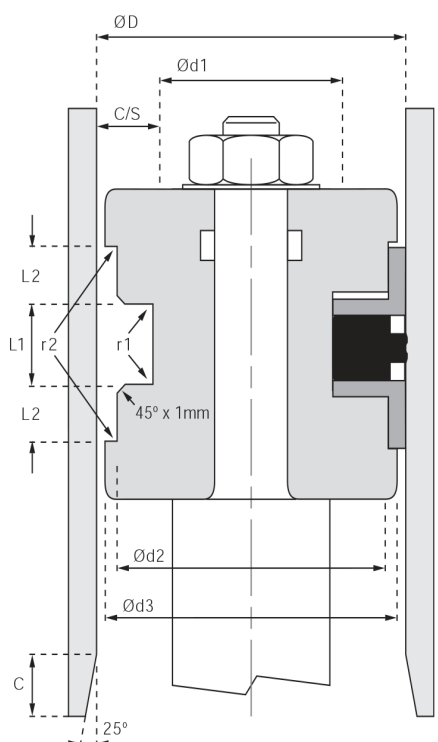
| | | | | | |
|-------------------|------------------|------------------|------------------|---------------|---------------|
| Tolerances | | | | | |
| $\varnothing D$ | $\varnothing d1$ | $\varnothing d2$ | $\varnothing d3$ | L1 | L2 |
| H10 | h9 | h9 | h9 | -0.0 +0.27 | -0.13 +0.0 |

| | | | | | |
|----------------------|------|-----|-----|-----|--|
| Chamfer Radii | | | | | |
| C/S | 3.75 | 4.5 | 5.0 | 6.5 | |
| C | 2.0 | 2.5 | 3.0 | 4.0 | |
| r1 | 0.2 | 0.2 | 0.2 | 0.4 | |
| r2 | 0.2 | 0.2 | 0.2 | 0.4 | |

Typical Examples
 Reciprocating Rotary Oscillating Helix



Similar Styles

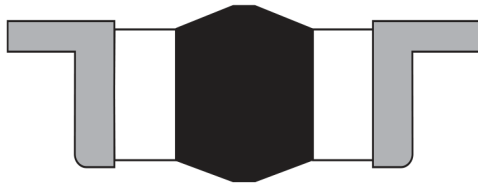




DPWL

Piston Seals

Double acting seals



Key Features

- Medium to heavy duty
- Split piston
- Will tolerate contamination
- High load capability
- Proven robust design

Design

DPWL is for use on split pistons. This precision moulded Nitrile rubber element is bonded with rubberised fabric reinforcements and with additional full width Polyacetal anti-extrusion rings at each end to allow for larger machining clearances between piston head and cylinder bore and higher system pressures. Designed with enough radial interference to effectively seal at low pressure, its cross section is taller and narrower than its housing. Can appear to have too much room after fitting to piston however this allows for dramatic expansion upon assembly. Rubberised fabric has the advantage of retaining the sealing media within its surface, reducing friction and wear.

Operating Conditions

Pressure



Temperature



Speed



Surface Finish μmRa

| $\varnothing D$ | $\varnothing d1$ | $\varnothing d2$ | $\varnothing d3$ | L1 | L2 |
|-----------------|------------------|------------------|------------------|-----|-----|
| 0.1 to 0.25 | ≤ 0.8 | 1.0 | 2.0 | 2.0 | 2.0 |

Tolerances

| $\varnothing D$ | $\varnothing d1$ | $\varnothing d2$ | $\varnothing d3$ | L1 | L2 |
|-----------------|------------------|------------------|------------------|---------------|---------------|
| H11 | js11 | h9 | js11 | -0.0 +0.25 | -0.0 +0.15 |

Chamfer Radii

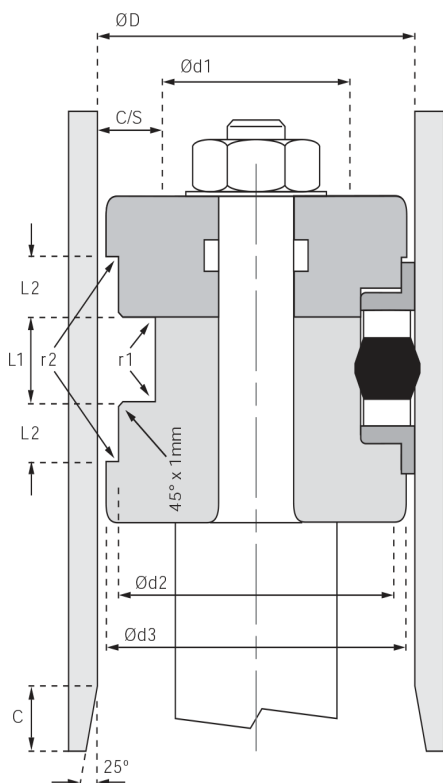
| C/S | 5.0 | 7.5 | 10.0 | 12.5 |
|-----|-----|-----|------|------|
| C | 3.0 | 4.0 | 5.0 | 6.5 |
| r1 | 0.2 | 0.2 | 0.2 | 0.4 |
| r2 | 0.2 | 0.2 | 0.2 | 0.4 |

Typical Examples

Reciprocating Rotary Oscillating Helix



Similar Styles





DPW

Piston Seals

Design

DPW is for use on split pistons. This precision moulded Nitrile rubber element is bonded with rubberised fabric reinforcements. Fitted to the outside diameter at each edge are Polyacetal anti-extrusion rings to allow larger machining clearances between the piston head and cylinder bore and also higher working pressures. The Polyacetal bearing rings also support the piston head under side load conditions preventing metal to metal contact. The bearings, being an integral part of the unit, react quickly to increasing pressures closing the extrusion gap. Designed with enough radial interference to effectively seal at low pressure, its cross section is taller and narrower than its housing. Can appear to have too much room after fitting to piston however this allows for dramatic expansion upon assembly. Rubberised fabric has the advantage of retaining the sealing media within its surface, reducing friction and wear.

Operating Conditions

| | |
|-----------------|--|
| Pressure | |
| 400 Bar | |
| 6,000 Psi | |

| | |
|--------------------|--|
| Temperature | |
| -30° to 100°C | |
| -22° to 212°F | |

| | |
|--------------|--|
| Speed | |
| 0.5m/sec | |
| 1.5'/sec | |

| | | | | | |
|--|---------------|---------------|---------------|-----|-----|
| Surface Finish μmRa | | | | | |
| $\text{\O}D$ | $\text{\O}d1$ | $\text{\O}d2$ | $\text{\O}d3$ | L1 | L2 |
| 0.1 to 0.25 | ≤ 0.8 | 1.0 | 2.0 | 2.0 | 2.0 |

| | | | | | |
|-------------------|---------------|---------------|---------------|-------|------|
| Tolerances | | | | | |
| $\text{\O}D$ | $\text{\O}d1$ | $\text{\O}d2$ | $\text{\O}d3$ | L1 | L2 |
| H11 | js11 | js10 | js11 | -0.0 | -0.0 |
| | | | | +0.25 | +0.1 |

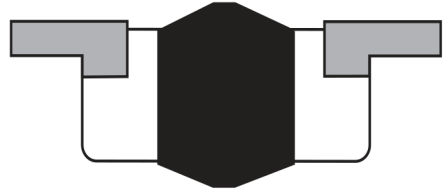
| | | | | | |
|----------------------|-----|-----|------|------|------|
| Chamfer Radii | | | | | |
| C/S | 6.5 | 8.0 | 10.0 | 12.5 | 15.0 |
| C | 2.5 | 4.0 | 5.0 | 6.5 | 7.5 |
| r1 | 0.4 | 0.4 | 0.8 | 1.2 | 1.2 |
| r2 | 0.2 | 0.2 | 0.2 | 0.4 | 0.4 |

Typical Examples
 Reciprocating Rotary Oscillating Helix



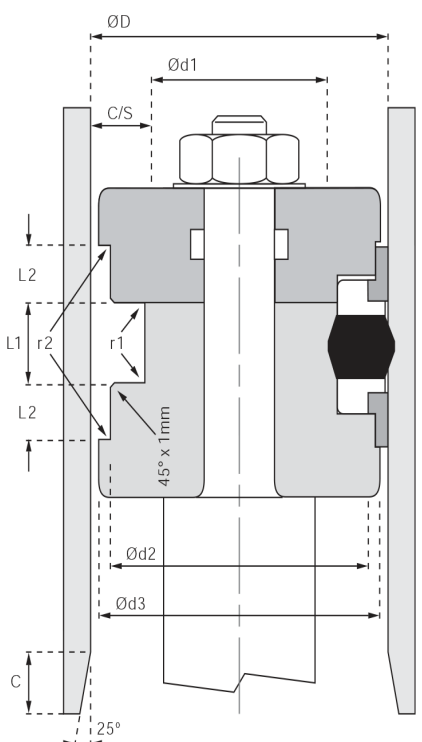
Similar Styles

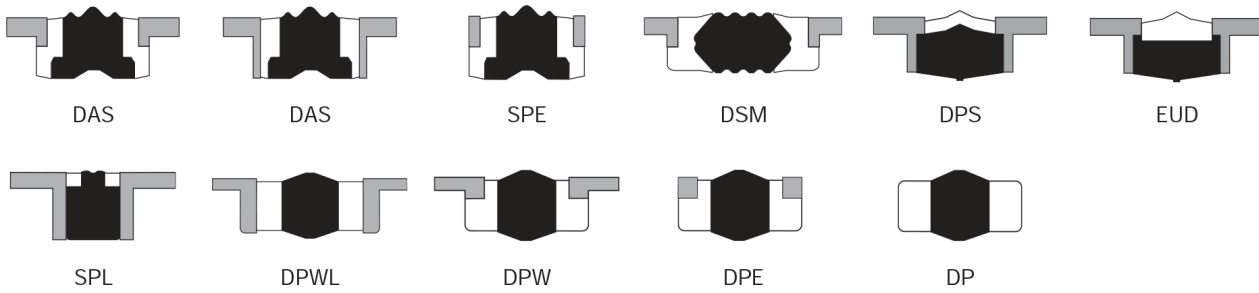
Double acting seals



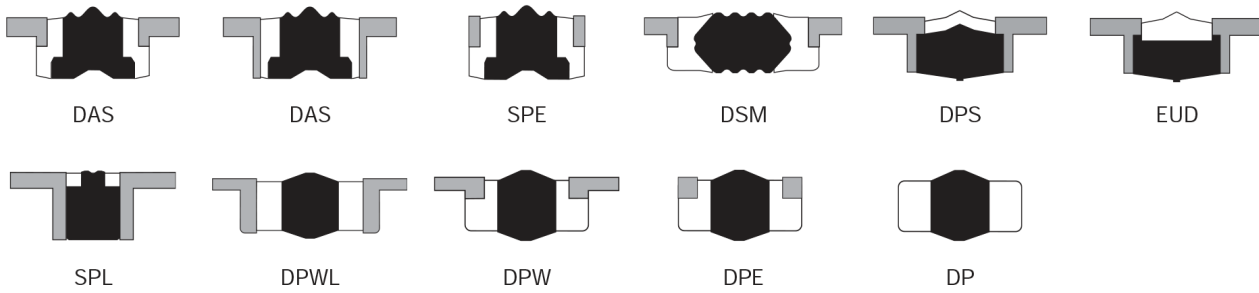
Key Features

- Medium to heavy duty
- Split piston
- Proven robust design
- Will tolerate contamination
- Pressure activated bearing rings

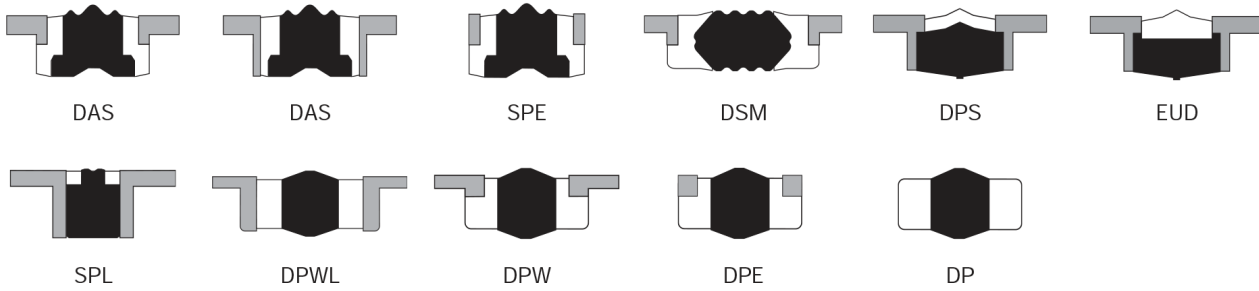




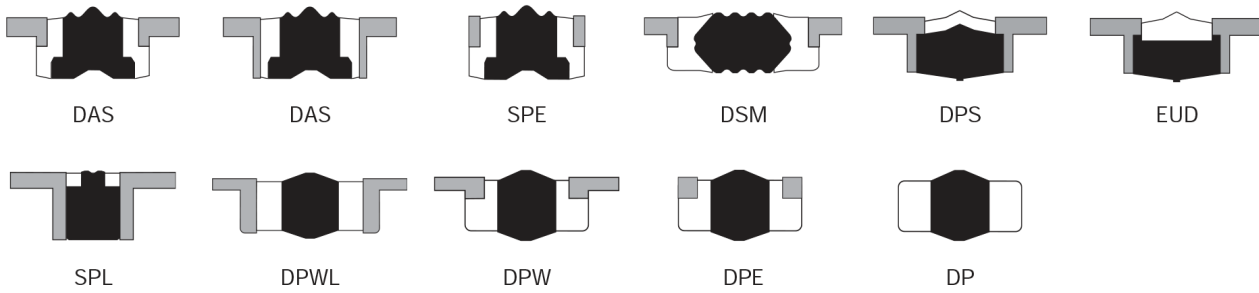
| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
|-------|-------|-------|------|-------|-------|------------------|
| 20.00 | 11.00 | 13.50 | 2.10 | 17.00 | 19.00 | DAS-020011-135 |
| 22.00 | 13.00 | 13.50 | 2.10 | 19.00 | 21.00 | DAS-022013-135 |
| 25.00 | 15.00 | 12.00 | 4.00 | 21.00 | 23.00 | DAS-025015-125/1 |
| 25.00 | 15.00 | 12.50 | 4.00 | 22.00 | 24.00 | DAS-025015-125/2 |
| 25.00 | 15.00 | 16.40 | 6.35 | 21.45 | 23.50 | DAS-025015-164 |
| 25.00 | 16.00 | 13.50 | 2.10 | 22.00 | 24.00 | DAS-025016-135 |
| 25.00 | 17.00 | 10.00 | 4.00 | 22.00 | 24.00 | DPS-025017-100 |
| 25.00 | 17.00 | 10.00 | 4.00 | 22.00 | 24.00 | DAS-025017-100 |
| 25.00 | 17.00 | 13.50 | 3.20 | 21.00 | 24.40 | DAS-025017-135 |
| 25.00 | 17.50 | 8.50 | 3.25 | 21.30 | 24.00 | SPL-025017-085 |
| 28.00 | 19.00 | 13.50 | 2.10 | 25.00 | 27.00 | DAS-028019-135 |
| 30.00 | 17.00 | 15.40 | 6.35 | 26.50 | 28.50 | DAS-030017-154 |
| 30.00 | 20.00 | 12.50 | 0.00 | 0.00 | 0.00 | DP-030020-125 |
| 30.00 | 21.00 | 13.50 | 2.10 | 27.00 | 29.00 | DAS-030021-135 |
| 30.00 | 22.00 | 13.50 | 3.20 | 26.00 | 29.40 | DAS-030022-135 |
| 32.00 | 19.00 | 15.40 | 6.35 | 28.75 | 30.90 | DPW-032019-154 |
| 32.00 | 22.00 | 11.13 | 4.00 | 27.50 | 31.00 | DS-032022-111 |
| 32.00 | 22.00 | 12.50 | 4.00 | 29.00 | 31.00 | DAS-032022-125 |
| 32.00 | 22.00 | 15.50 | 2.60 | 28.00 | 31.00 | DAS-032022-155 |
| 32.00 | 22.00 | 16.40 | 6.35 | 28.50 | 30.50 | DAS-032022-164 |
| 32.00 | 24.00 | 10.00 | 4.00 | 29.00 | 31.00 | DAS-032024-100 |
| 32.00 | 24.00 | 15.50 | 3.20 | 28.00 | 31.40 | DAS-032024-155 |
| 35.00 | 25.00 | 15.50 | 2.60 | 31.00 | 34.00 | DAS-035025-155 |
| 35.00 | 25.00 | 16.40 | 6.35 | 31.40 | 33.50 | DAS-035025-164 |
| 36.00 | 26.00 | 15.50 | 2.60 | 32.00 | 35.00 | DAS-036026-155 |
| 40.00 | 24.00 | 18.40 | 6.35 | 35.40 | 38.50 | DAS-040024-184 |
| 40.00 | 24.00 | 18.40 | 6.35 | 35.40 | 38.65 | DPW-040024-184 |
| 40.00 | 25.00 | 24.00 | 6.00 | 34.80 | 39.00 | DPWL-040025-240 |
| 40.00 | 26.00 | 15.50 | 2.60 | 36.00 | 39.00 | DAS-040026-155 |
| 40.00 | 30.00 | 10.00 | 5.00 | 36.50 | 39.00 | DAS-040030-100 |
| 40.00 | 30.00 | 11.00 | 4.00 | 35.50 | 39.00 | SPL-040030-110 |



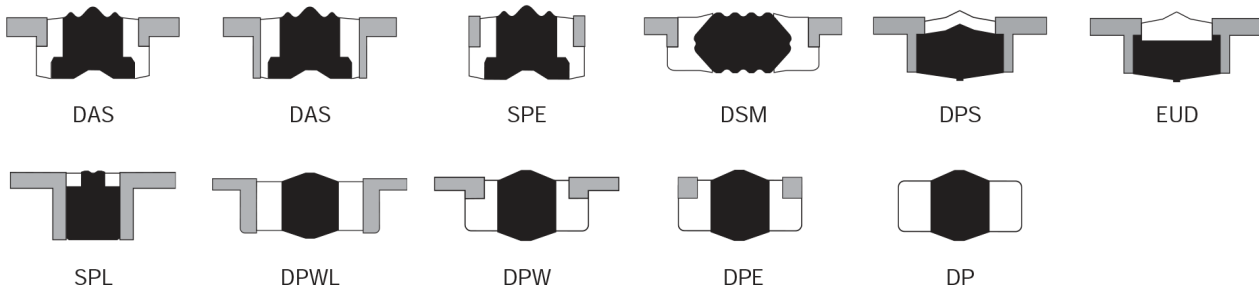
| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
|-------|-------|-------|------|-------|-------|------------------|
| 40.00 | 30.00 | 12.50 | 4.00 | 36.00 | 38.00 | DAS-040030-125/1 |
| 40.00 | 30.00 | 12.50 | 4.00 | 37.00 | 39.00 | DAS-040030-125/2 |
| 40.00 | 30.00 | 16.40 | 6.35 | 35.40 | 38.50 | DAS-040030-164 |
| 40.00 | 32.00 | 10.00 | 0.00 | 0.00 | 0.00 | SPE-040032-100 |
| 40.00 | 32.00 | 10.00 | 4.20 | 36.00 | 39.00 | EUD-040032-100 |
| 40.00 | 32.00 | 10.00 | 4.00 | 37.00 | 39.00 | DPS-040032-100 |
| 40.00 | 32.00 | 10.00 | 4.00 | 37.00 | 39.00 | DAS-040032-100 |
| 40.00 | 32.00 | 15.50 | 3.20 | 36.00 | 39.40 | DPS-040032-155 |
| 40.00 | 32.00 | 15.50 | 3.20 | 36.00 | 39.40 | DAS-040032-155 |
| 45.00 | 26.00 | 31.00 | 6.35 | 0.00 | 0.00 | DPWL-045026-310 |
| 45.00 | 29.00 | 18.40 | 6.35 | 40.40 | 43.70 | DAS-045029-184 |
| 45.00 | 29.00 | 32.00 | 6.35 | 38.80 | 42.85 | DSM-045029-320 |
| 45.00 | 31.00 | 15.50 | 2.60 | 41.00 | 44.00 | DAS-045031-155 |
| 45.00 | 35.00 | 16.40 | 0.00 | 0.00 | 0.00 | SPE-045035-164 |
| 45.00 | 35.00 | 16.40 | 6.35 | 40.40 | 43.50 | DAS-045035-164 |
| 45.00 | 37.00 | 15.50 | 3.20 | 41.00 | 44.40 | DAS-045037-155 |
| 50.00 | 30.00 | 25.40 | 6.35 | 44.30 | 48.30 | DPW-050030-254 |
| 50.00 | 34.00 | 18.40 | 6.35 | 45.40 | 48.50 | DAS-050034-184 |
| 50.00 | 34.00 | 20.50 | 3.10 | 46.00 | 49.00 | DAS-050034-205 |
| 50.00 | 34.00 | 32.00 | 6.35 | 43.77 | 47.85 | DSM-050034-320 |
| 50.00 | 35.00 | 20.00 | 5.00 | 46.00 | 48.50 | DAS-050035-200 |
| 50.00 | 35.00 | 24.00 | 6.00 | 44.80 | 48.50 | DPWL-050035-240 |
| 50.00 | 38.00 | 20.50 | 4.20 | 46.00 | 49.40 | DAS-050038-205 |
| 50.00 | 40.00 | 11.00 | 4.00 | 45.50 | 49.00 | SPL-050040-110 |
| 50.00 | 40.00 | 12.50 | 4.20 | 46.00 | 49.00 | EUD-050040-125 |
| 50.00 | 40.00 | 12.50 | 4.00 | 47.00 | 49.00 | DAS-050040-125 |
| 55.00 | 39.00 | 18.40 | 6.35 | 50.36 | 53.50 | DAS-055039-184 |
| 55.00 | 39.00 | 20.50 | 3.10 | 51.00 | 54.00 | DAS-055039-205 |
| 55.00 | 40.00 | 24.00 | 6.00 | 49.85 | 53.50 | DPWL-055040-240 |
| 55.00 | 40.00 | 32.00 | 6.35 | 48.77 | 52.85 | DSM-055040-320 |
| 55.00 | 43.00 | 20.50 | 4.20 | 51.00 | 54.40 | EUD-055043-205 |



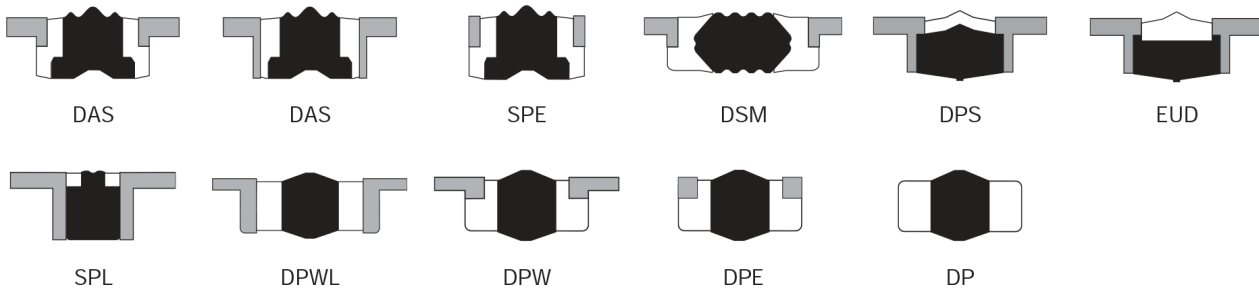
| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
|-------|-------|-------|------|-------|-------|-----------------|
| 55.00 | 43.00 | 20.50 | 4.20 | 51.00 | 54.40 | DAS-055043-205 |
| 55.00 | 45.00 | 11.00 | 4.00 | 50.50 | 54.00 | SPL-055045-110 |
| 55.00 | 45.00 | 12.50 | 4.00 | 52.00 | 54.00 | DAS-055045-125 |
| 56.00 | 40.00 | 20.50 | 3.10 | 52.00 | 55.00 | DAS-056040-205 |
| 60.00 | 40.00 | 31.00 | 7.00 | 53.80 | 58.50 | DPWL-060040-310 |
| 60.00 | 44.00 | 18.40 | 0.00 | 0.00 | 0.00 | SPE-060044-184 |
| 60.00 | 44.00 | 18.40 | 6.35 | 55.40 | 58.50 | DAS-060044-184 |
| 60.00 | 44.00 | 19.40 | 6.35 | 55.39 | 58.65 | DAS-060044-194 |
| 60.00 | 44.00 | 20.50 | 3.10 | 56.00 | 59.00 | DAS-060044-205 |
| 60.00 | 44.00 | 32.00 | 6.35 | 53.80 | 57.80 | DSM-060044-320 |
| 60.00 | 45.00 | 22.50 | 0.00 | 0.00 | 0.00 | SPE-060045-225 |
| 60.00 | 48.00 | 20.50 | 4.20 | 56.00 | 59.40 | EUD-060048-205 |
| 60.00 | 48.00 | 20.50 | 4.20 | 56.00 | 59.40 | DAS-060048-205 |
| 63.00 | 47.00 | 18.40 | 6.35 | 58.40 | 61.50 | DAS-063047-184 |
| 63.00 | 47.00 | 19.40 | 6.35 | 58.40 | 61.50 | DAS-063047-194 |
| 63.00 | 47.00 | 20.50 | 3.10 | 59.00 | 62.00 | DAS-063047-205 |
| 63.00 | 47.00 | 32.00 | 6.35 | 56.74 | 60.81 | DSM-063047-320 |
| 63.00 | 48.00 | 20.00 | 5.00 | 59.00 | 61.50 | DAS-063048-200 |
| 63.00 | 48.00 | 24.00 | 7.00 | 57.80 | 61.50 | DPWL-063048-240 |
| 63.00 | 51.00 | 20.50 | 4.20 | 59.00 | 62.40 | DAS-063051-205 |
| 63.00 | 53.00 | 11.00 | 4.00 | 58.50 | 61.50 | SPL-063053-110 |
| 63.00 | 53.00 | 12.50 | 4.00 | 60.00 | 62.00 | DAS-063053-125 |
| 65.00 | 49.00 | 20.50 | 3.10 | 61.00 | 64.00 | DAS-065049-205 |
| 65.00 | 49.00 | 32.00 | 6.35 | 58.70 | 62.80 | DSM-065049-320 |
| 65.00 | 50.00 | 18.40 | 6.35 | 60.40 | 63.50 | DAS-065050-184 |
| 65.00 | 53.00 | 20.50 | 4.20 | 61.00 | 64.40 | DPS-065053-205 |
| 70.00 | 50.00 | 22.00 | 0.00 | 0.00 | 0.00 | DPE-070050-220 |
| 70.00 | 50.00 | 22.40 | 6.35 | 64.20 | 68.30 | DAS-070050-224 |
| 70.00 | 50.00 | 31.00 | 7.00 | 63.80 | 68.00 | DPWL-070050-310 |
| 70.00 | 50.00 | 35.00 | 9.52 | 62.62 | 67.54 | DSM-070050-350 |
| 70.00 | 54.00 | 20.50 | 3.10 | 66.00 | 69.00 | DAS-070054-205 |



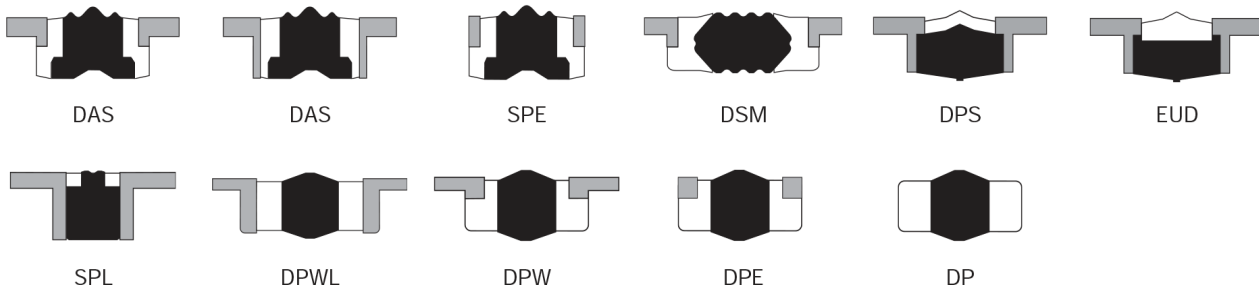
| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
|-------|-------|-------|-------|-------|-------|-----------------|
| 70.00 | 55.00 | 20.00 | 5.00 | 66.00 | 68.50 | DAS-070055-200 |
| 70.00 | 55.00 | 22.50 | 0.00 | 0.00 | 0.00 | SPE-070055-225 |
| 70.00 | 58.00 | 20.50 | 4.20 | 66.00 | 69.40 | EUD-070058-205 |
| 70.00 | 58.00 | 20.50 | 4.20 | 66.00 | 69.40 | DAS-070058-205 |
| 75.00 | 55.00 | 0.00 | 0.00 | 0.00 | 0.00 | SPE-075055-224 |
| 75.00 | 55.00 | 22.40 | 6.35 | 69.20 | 73.30 | DAS-075055-224 |
| 75.00 | 55.00 | 35.00 | 9.52 | 67.70 | 72.54 | DSM-075055-350 |
| 75.00 | 59.00 | 20.50 | 3.10 | 71.00 | 74.00 | DAS-075059-205 |
| 75.00 | 63.00 | 18.00 | 18.50 | 0.00 | 0.00 | SPE-075063-185 |
| 75.00 | 63.00 | 20.50 | 4.20 | 71.00 | 74.40 | DPS-075063-205 |
| 75.00 | 63.00 | 20.50 | 4.20 | 71.00 | 74.40 | DAS-075063-205 |
| 78.00 | 68.00 | 16.20 | 6.35 | 74.20 | 77.00 | DAS-078068-162 |
| 80.00 | 60.00 | 22.40 | 0.00 | 0.00 | 0.00 | SPE-080060-224 |
| 80.00 | 60.00 | 22.40 | 6.35 | 74.15 | 78.30 | DAS-080060-224 |
| 80.00 | 60.00 | 25.00 | 0.00 | 0.00 | 0.00 | DP-080060-250 |
| 80.00 | 60.00 | 25.00 | 6.35 | 75.00 | 78.00 | DAS-080060-250 |
| 80.00 | 60.00 | 31.00 | 7.00 | 73.80 | 78.00 | DPWL-080060-310 |
| 80.00 | 60.00 | 35.00 | 9.52 | 72.62 | 77.52 | DSM-080060-350 |
| 80.00 | 62.00 | 22.50 | 0.00 | 0.00 | 0.00 | SPE-080062-225 |
| 80.00 | 62.00 | 22.50 | 3.60 | 76.00 | 79.00 | DAS-080062-225 |
| 80.00 | 64.00 | 32.00 | 9.52 | 72.62 | 77.52 | DSM-080064-320 |
| 80.00 | 65.00 | 20.00 | 5.00 | 76.00 | 78.50 | DAS-080065-200 |
| 80.00 | 65.00 | 22.50 | 0.00 | 0.00 | 0.00 | SPE-080065-225 |
| 80.00 | 65.00 | 22.50 | 6.35 | 74.15 | 78.35 | DAS-080065-225 |
| 80.00 | 66.00 | 22.50 | 5.20 | 76.00 | 79.40 | DAS-080066-225 |
| 80.00 | 70.00 | 11.00 | 4.00 | 75.50 | 78.50 | SPL-080070-110 |
| 85.00 | 65.00 | 22.40 | 0.00 | 0.00 | 0.00 | SPE-085065-224 |
| 85.00 | 65.00 | 22.40 | 6.35 | 79.15 | 83.30 | DAS-085065-224 |
| 85.00 | 65.00 | 35.00 | 9.52 | 77.62 | 82.54 | DSM-085065-350 |
| 85.00 | 71.00 | 22.50 | 5.20 | 81.00 | 84.40 | EUD-085071-225 |
| 85.00 | 71.00 | 22.50 | 5.20 | 81.00 | 84.40 | DAS-085071-225 |



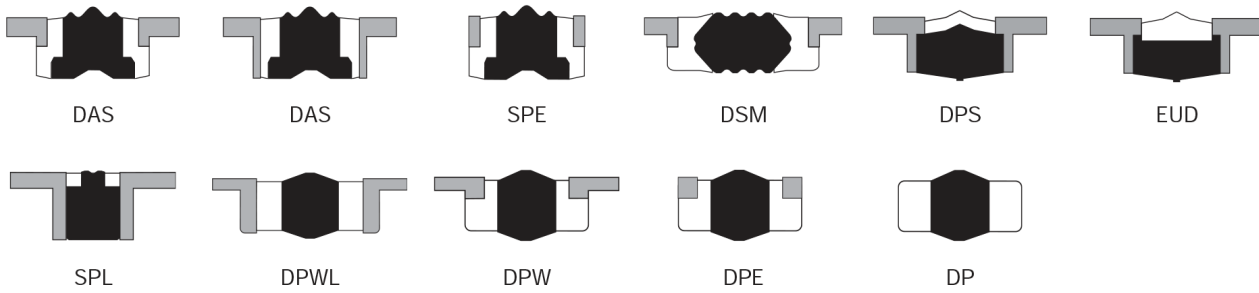
| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
|--------|-------|-------|-------|-------|-------|-----------------|
| 85.00 | 75.00 | 20.00 | 4.00 | 81.00 | 83.34 | DAS-085075-200 |
| 90.00 | 70.00 | 22.40 | 6.35 | 84.15 | 88.30 | DAS-090070-224 |
| 90.00 | 70.00 | 30.00 | 0.00 | 0.00 | 0.00 | SPE-090070-300 |
| 90.00 | 70.00 | 31.00 | 7.00 | 83.80 | 88.00 | DPWL-090070-310 |
| 90.00 | 70.00 | 35.00 | 9.52 | 82.58 | 87.79 | DSM-090070-350 |
| 90.00 | 72.00 | 22.50 | 0.00 | 0.00 | 0.00 | SPE-090072-225 |
| 90.00 | 72.00 | 22.50 | 3.60 | 86.00 | 89.00 | DAS-090072-225 |
| 90.00 | 74.00 | 32.00 | 9.50 | 82.87 | 87.79 | DSM-090074-320 |
| 90.00 | 75.00 | 20.00 | 0.00 | 0.00 | 0.00 | SPE-090075-200 |
| 90.00 | 75.00 | 20.00 | 5.00 | 86.00 | 88.50 | DAS-090075-200 |
| 90.00 | 76.00 | 22.50 | 5.20 | 86.00 | 89.40 | EUD-090076-225 |
| 90.00 | 76.00 | 22.50 | 5.20 | 86.00 | 89.40 | DAS-090076-225 |
| 92.00 | 82.00 | 12.50 | 6.35 | 88.00 | 91.00 | DAS-092082-124 |
| 95.00 | 75.00 | 22.40 | 0.00 | 0.00 | 0.00 | SPE-095075-224 |
| 95.00 | 75.00 | 22.40 | 6.35 | 89.15 | 93.30 | DAS-095075-224 |
| 95.00 | 75.00 | 35.00 | 9.52 | 87.60 | 92.50 | DSM-095075-350 |
| 100.00 | 75.00 | 22.00 | 6.35 | 93.15 | 98.00 | DAS-100075-220 |
| 100.00 | 75.00 | 22.40 | 6.35 | 93.15 | 98.00 | DAS-100075-224 |
| 100.00 | 75.00 | 25.00 | 6.35 | 93.20 | 98.00 | DPW-100075-250 |
| 100.00 | 75.00 | 26.00 | 9.50 | 93.85 | 0.00 | DPWL-100075-260 |
| 100.00 | 80.00 | 22.00 | 10.00 | 94.00 | 98.00 | DAS-100080-222 |
| 100.00 | 80.00 | 22.40 | 6.35 | 94.15 | 98.35 | DPW-100080-224 |
| 100.00 | 80.00 | 25.00 | 0.00 | 0.00 | 0.00 | DPE-100080-250 |
| 100.00 | 80.00 | 25.00 | 6.35 | 94.15 | 98.35 | DPW-100080-250 |
| 100.00 | 80.00 | 25.00 | 6.35 | 95.00 | 98.00 | DAS-100080-250 |
| 100.00 | 80.00 | 25.40 | 6.35 | 94.15 | 98.30 | DAS-100080-254 |
| 100.00 | 80.00 | 30.00 | 0.00 | 0.00 | 0.00 | SPE-100080-300 |
| 100.00 | 80.00 | 30.00 | 6.35 | 94.15 | 98.35 | DAS-100080-300 |
| 100.00 | 80.00 | 31.00 | 7.00 | 93.80 | 98.00 | DPWL-100080-310 |
| 100.00 | 80.00 | 35.00 | 9.52 | 92.60 | 97.50 | DSM-100080-350 |
| 100.00 | 82.00 | 22.50 | 3.60 | 96.00 | 99.00 | DAS-100082-225 |



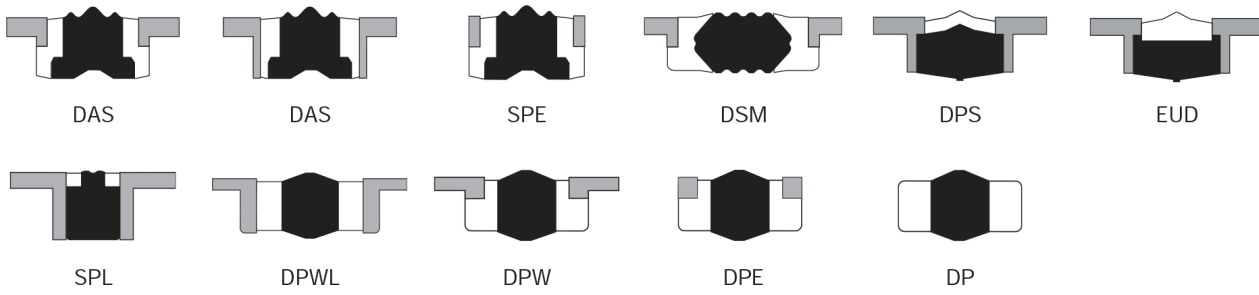
| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
|--------|--------|-------|-------|--------|--------|-----------------|
| 100.00 | 85.00 | 19.50 | 20.00 | 0.00 | 0.00 | SPE-100085-200 |
| 100.00 | 85.00 | 20.00 | 5.00 | 96.00 | 98.50 | DAS-100085-200 |
| 100.00 | 86.00 | 22.50 | 5.20 | 96.00 | 99.40 | DAS-100086-225 |
| 100.00 | 87.00 | 14.00 | 6.00 | 93.80 | 98.50 | SPL-100087-140 |
| 105.00 | 80.00 | 22.40 | 0.00 | 0.00 | 0.00 | SPE-105080-224 |
| 105.00 | 80.00 | 22.40 | 6.35 | 98.10 | 103.00 | DAS-105080-224 |
| 105.00 | 92.50 | 14.30 | 6.35 | 98.80 | 104.30 | DAS-105092-143 |
| 110.00 | 85.00 | 22.40 | 6.35 | 103.10 | 108.00 | DAS-110085-224 |
| 110.00 | 85.00 | 25.00 | 0.00 | 0.00 | 0.00 | DP-110085-250 |
| 110.00 | 85.00 | 25.00 | 6.35 | 103.10 | 108.00 | DPW-110085-250 |
| 110.00 | 85.00 | 25.40 | 6.35 | 103.10 | 108.00 | DAS-110085-254 |
| 110.00 | 85.00 | 45.00 | 12.70 | 101.82 | 107.33 | DSM-110085-450 |
| 110.00 | 90.00 | 25.00 | 0.00 | 0.00 | 0.00 | DP-110090-250 |
| 110.00 | 90.00 | 25.40 | 6.40 | 104.10 | 108.30 | DAS-110090-254 |
| 110.00 | 90.00 | 35.00 | 9.52 | 102.70 | 107.51 | DSM-110090-350 |
| 110.00 | 92.00 | 22.50 | 0.00 | 0.00 | 0.00 | SPE-110092-225 |
| 110.00 | 92.00 | 22.50 | 3.60 | 106.00 | 109.00 | DAS-110092-225 |
| 110.00 | 95.00 | 20.00 | 5.00 | 105.00 | 108.00 | DAS-110095-200 |
| 110.00 | 96.00 | 22.50 | 5.20 | 106.00 | 109.40 | EUD-110096-225 |
| 110.00 | 96.00 | 22.50 | 5.20 | 106.00 | 109.40 | DAS-110096-225 |
| 115.00 | 90.00 | 22.00 | 0.00 | 0.00 | 0.00 | DPE-115090-220 |
| 115.00 | 90.00 | 22.40 | 6.35 | 108.10 | 113.00 | DAS-115090-224 |
| 115.00 | 90.00 | 45.00 | 12.70 | 106.82 | 112.33 | DSM-115090-450 |
| 115.00 | 95.00 | 31.00 | 7.00 | 108.85 | 113.00 | DPWL-115095-310 |
| 115.00 | 97.00 | 22.50 | 3.60 | 111.00 | 114.00 | DAS-115097-225 |
| 120.00 | 95.00 | 22.40 | 6.35 | 113.10 | 118.10 | DAS-120095-224 |
| 120.00 | 95.00 | 45.00 | 12.70 | 111.82 | 117.33 | DSM-120095-450 |
| 120.00 | 100.00 | 25.40 | 6.35 | 114.10 | 118.30 | WDA-120100-254 |
| 120.00 | 100.00 | 30.00 | 0.00 | 0.00 | 0.00 | SPE-120100-300 |
| 120.00 | 100.00 | 31.00 | 7.00 | 113.80 | 118.00 | DPWL-120100-310 |
| 120.00 | 100.00 | 35.00 | 9.52 | 112.80 | 117.51 | DSM-120100-350 |



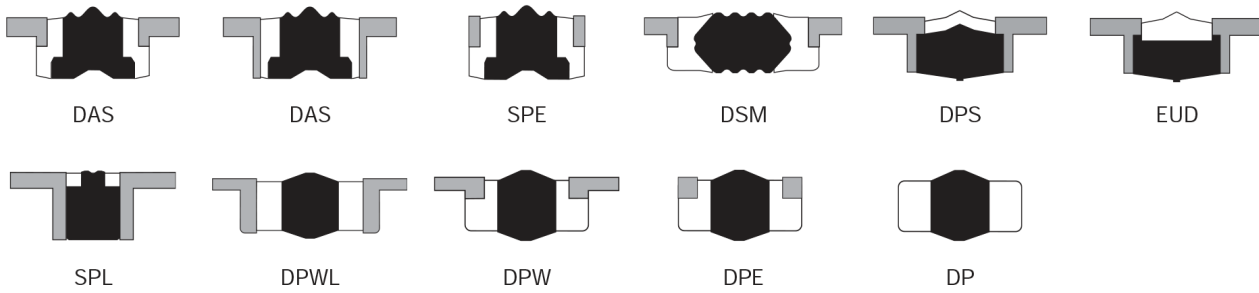
| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
|--------|--------|-------|-------|--------|--------|------------------|
| 120.00 | 106.00 | 22.50 | 5.20 | 116.00 | 119.40 | EUD-120106-225 |
| 120.00 | 106.00 | 22.50 | 5.20 | 116.00 | 119.40 | DAS-120106-225 |
| 125.00 | 100.00 | 25.00 | 12.70 | 118.00 | 123.00 | DAS-125100-250 |
| 125.00 | 100.00 | 25.40 | 0.00 | 0.00 | 0.00 | SPE-125100-254 |
| 125.00 | 100.00 | 25.40 | 6.35 | 118.10 | 123.00 | DAS-125100-254 |
| 125.00 | 100.00 | 25.40 | 6.45 | 118.50 | 123.00 | DPW-125100-254 |
| 125.00 | 100.00 | 25.40 | 6.45 | 118.50 | 123.00 | DPWL-125100-254 |
| 125.00 | 100.00 | 32.00 | 0.00 | 0.00 | 0.00 | DP-125100-320 |
| 125.00 | 100.00 | 38.00 | 9.50 | 118.80 | 123.00 | DPWL-125100-380 |
| 125.00 | 100.00 | 45.00 | 12.70 | 116.82 | 122.33 | DSM-125100-450 |
| 125.00 | 103.00 | 26.50 | 5.10 | 121.00 | 124.00 | DAS-125103-265 |
| 125.00 | 105.00 | 25.00 | 6.30 | 120.00 | 123.00 | DAS-125105-250 |
| 125.00 | 105.00 | 25.40 | 6.35 | 119.10 | 123.30 | DAS-125105-254 |
| 125.00 | 108.00 | 26.50 | 7.20 | 121.00 | 124.40 | DAS-125108-265 |
| 125.00 | 112.00 | 14.00 | 6.00 | 118.80 | 123.50 | SPL-125112-140 |
| 130.00 | 104.00 | 38.00 | 9.50 | 123.85 | 128.00 | DPWL-130104-380 |
| 130.00 | 105.00 | 0.00 | 0.00 | 0.00 | 0.00 | SPE-130105-254 |
| 130.00 | 105.00 | 25.40 | 9.50 | 122.60 | 127.50 | DAS-130105-254 |
| 130.00 | 105.00 | 25.40 | 9.50 | 122.60 | 128.50 | EUD-130105-254 |
| 130.00 | 105.00 | 25.40 | 6.35 | 123.10 | 128.00 | DAS-130105-254/1 |
| 130.00 | 105.00 | 45.00 | 12.70 | 121.82 | 127.33 | DSM-130105-450 |
| 130.00 | 110.00 | 30.00 | 0.00 | 0.00 | 0.00 | SPE-130110-300 |
| 130.00 | 110.00 | 35.00 | 9.52 | 122.70 | 127.33 | DSM-130110-350 |
| 135.00 | 110.00 | 0.00 | 0.00 | 0.00 | 0.00 | SPE-135110-254 |
| 135.00 | 110.00 | 25.40 | 9.50 | 127.60 | 132.50 | DAS-135110-254 |
| 135.00 | 110.00 | 25.40 | 6.35 | 128.10 | 133.00 | DAS-135110-254/1 |
| 135.00 | 110.00 | 38.00 | 9.50 | 128.35 | 133.00 | DPWL-135110-380 |
| 135.00 | 110.00 | 45.00 | 12.70 | 126.82 | 132.33 | DSM-135110-450 |
| 140.00 | 115.00 | 25.40 | 0.00 | 0.00 | 0.00 | SPE-140115-254 |
| 140.00 | 115.00 | 25.40 | 9.50 | 132.60 | 137.50 | DAS-140115-254 |
| 140.00 | 115.00 | 25.40 | 6.35 | 133.00 | 138.00 | DAS-140115-254/1 |



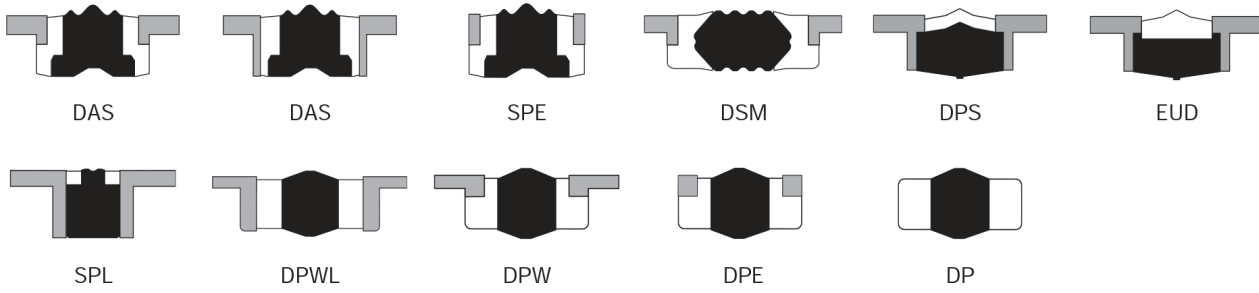
| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
|--------|--------|-------|-------|--------|--------|------------------|
| 140.00 | 115.00 | 45.00 | 12.70 | 131.72 | 137.30 | DSM-140115-450 |
| 140.00 | 118.00 | 26.50 | 5.10 | 136.00 | 139.00 | DAS-140118-265 |
| 140.00 | 120.00 | 25.00 | 6.35 | 135.00 | 138.00 | DAS-140120-250 |
| 140.00 | 120.00 | 31.00 | 7.00 | 133.80 | 138.00 | DPWL-140120-310 |
| 140.00 | 120.00 | 35.00 | 9.52 | 132.70 | 137.30 | DSM-140120-350 |
| 140.00 | 123.00 | 26.50 | 7.20 | 136.00 | 139.40 | DPS-140123-265 |
| 140.00 | 123.00 | 26.50 | 7.20 | 136.00 | 139.40 | DAS-140123-265 |
| 145.00 | 120.00 | 25.40 | 9.50 | 137.60 | 142.50 | DAS-145120-254 |
| 145.00 | 120.00 | 25.40 | 6.35 | 138.30 | 142.95 | DAS-145120-254/1 |
| 145.00 | 120.00 | 45.00 | 12.70 | 136.72 | 142.30 | DSM-145120-450 |
| 145.00 | 125.00 | 31.00 | 7.00 | 138.80 | 143.00 | DPWL-145125-310 |
| 145.00 | 130.00 | 25.40 | 6.35 | 138.30 | 142.50 | DAS-145130-254 |
| 150.00 | 120.00 | 44.00 | 9.50 | 143.85 | 148.00 | DPWL-150120-440 |
| 150.00 | 125.00 | 25.40 | 9.50 | 142.60 | 147.50 | DAS-150125-254 |
| 150.00 | 125.00 | 25.40 | 6.35 | 143.00 | 148.00 | DAS-150125-254/1 |
| 150.00 | 125.00 | 45.00 | 12.70 | 141.72 | 147.30 | DSM-150125-450 |
| 150.00 | 128.00 | 26.50 | 5.10 | 146.00 | 149.00 | DAS-150128-265 |
| 150.00 | 130.00 | 25.40 | 6.35 | 144.10 | 148.30 | DAS-150130-254 |
| 150.00 | 133.00 | 26.50 | 7.20 | 146.00 | 149.40 | DAS-150133-265 |
| 155.00 | 130.00 | 25.40 | 9.50 | 147.60 | 152.50 | DAS-155130-254 |
| 155.00 | 130.00 | 25.40 | 6.35 | 148.00 | 153.00 | DAS-155130-254/1 |
| 160.00 | 130.00 | 25.40 | 0.00 | 0.00 | 0.00 | SPE-160130-254 |
| 160.00 | 130.00 | 25.40 | 9.50 | 152.60 | 157.50 | DAS-160130-254/1 |
| 160.00 | 130.00 | 25.40 | 6.35 | 153.00 | 157.50 | DAS-160130-254 |
| 160.00 | 130.00 | 32.00 | 10.00 | 154.00 | 158.00 | DAS-160130-320 |
| 160.00 | 135.00 | 25.40 | 9.50 | 152.60 | 157.50 | DAS-160135-254 |
| 160.00 | 135.00 | 32.00 | 10.00 | 154.00 | 158.00 | DAS-160135-320 |
| 160.00 | 135.00 | 38.00 | 9.50 | 153.80 | 158.00 | DPWL-160135-380 |
| 160.00 | 135.00 | 45.00 | 12.70 | 151.72 | 157.10 | DSM-160135-450 |
| 160.00 | 138.00 | 26.50 | 5.10 | 156.00 | 159.00 | DAS-160138-265 |
| 160.00 | 140.00 | 25.00 | 12.50 | 151.40 | 158.50 | DS-160140-250 |



| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
|--------|--------|-------|--------|--------|--------|------------------|
| 160.00 | 140.00 | 25.00 | 6.35 | 155.00 | 158.00 | DAS-160140-250/1 |
| 160.00 | 143.00 | 7.20 | 0.00 | 156.00 | 159.40 | DAS-160143-265 |
| 160.00 | 143.00 | 19.00 | 20.00 | 0.00 | 0.00 | DPE-160143-200 |
| 165.00 | 135.00 | 45.00 | 12.70 | 158.00 | 162.10 | DSM-165135-450 |
| 165.00 | 140.00 | 25.15 | 12.70 | 158.00 | 0.00 | DAS-165140-251/1 |
| 165.00 | 140.00 | 25.40 | 9.50 | 157.60 | 162.50 | DAS-165140-254 |
| 165.00 | 143.00 | 26.50 | 5.10 | 161.00 | 164.40 | DAS-165143-265 |
| 165.00 | 143.00 | 26.50 | 5.10 | 161.00 | 164.40 | EUD-165143-265 |
| 170.00 | 140.00 | 25.40 | 162.95 | 162.95 | 167.87 | DAS-170140-254 |
| 170.00 | 140.00 | 25.40 | 6.35 | 163.00 | 168.00 | DPW-170140-254 |
| 170.00 | 140.00 | 45.00 | 12.70 | 163.00 | 167.87 | DSM-170140-450 |
| 170.00 | 145.00 | 25.40 | 12.70 | 161.70 | 167.10 | DAS-170145-254 |
| 170.00 | 148.00 | 26.50 | 5.10 | 166.00 | 169.00 | DAS-170148-265 |
| 175.00 | 145.00 | 35.40 | 6.35 | 167.95 | 173.50 | DPW-175145-354 |
| 175.00 | 150.00 | 25.40 | 12.70 | 166.70 | 172.10 | DAS-175150-254 |
| 175.00 | 150.00 | 25.40 | 9.50 | 167.60 | 172.50 | DAS-175150-254/1 |
| 180.00 | 150.00 | 35.40 | 6.35 | 172.95 | 177.87 | DAS-180150-354 |
| 180.00 | 150.00 | 35.40 | 6.35 | 172.95 | 178.50 | DPW-180150-354 |
| 180.00 | 155.00 | 25.40 | 12.70 | 171.70 | 177.10 | DAS-180155-254 |
| 180.00 | 155.00 | 45.00 | 12.70 | 171.60 | 177.10 | DSM-180155-450 |
| 180.00 | 158.00 | 26.50 | 5.10 | 176.00 | 179.00 | DAS-180158-265 |
| 180.00 | 158.00 | 26.50 | 5.10 | 176.00 | 179.60 | EUD-180158-265 |
| 180.00 | 160.00 | 31.40 | 6.35 | 172.95 | 178.50 | DPW-180160-314 |
| 180.00 | 163.00 | 26.50 | 7.20 | 176.00 | 179.40 | DPS-180163-265 |
| 180.00 | 163.00 | 26.50 | 7.20 | 176.00 | 179.40 | DAS-180163-265 |
| 185.00 | 160.00 | 25.40 | 12.70 | 176.70 | 182.10 | DAS-185160-254 |
| 185.00 | 160.00 | 45.00 | 12.70 | 176.72 | 182.10 | DSM-185160-450 |
| 190.00 | 165.00 | 25.40 | 12.70 | 181.70 | 187.00 | DAS-190165-254 |
| 190.00 | 165.00 | 45.00 | 12.70 | 181.72 | 187.10 | DSM-190165-450 |
| 190.00 | 170.00 | 30.00 | 6.35 | 183.00 | 188.00 | DAS-190170-305 |
| 195.00 | 170.00 | 25.40 | 12.70 | 186.70 | 192.00 | DAS-195170-254 |



| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
|--------|--------|-------|-------|--------|--------|-----------------|
| 200.00 | 170.00 | 35.40 | 6.35 | 193.00 | 198.00 | DAS-200170-354 |
| 200.00 | 170.00 | 36.00 | 12.50 | 192.00 | 197.00 | DAS-200170-360 |
| 200.00 | 175.00 | 25.40 | 12.70 | 191.60 | 197.00 | DAS-200175-254 |
| 200.00 | 175.00 | 31.50 | 6.60 | 196.00 | 199.00 | DAS-200175-315 |
| 200.00 | 175.00 | 45.00 | 12.70 | 191.72 | 197.10 | DSM-200175-450 |
| 200.00 | 180.00 | 31.50 | 9.20 | 196.00 | 199.40 | DPS-200180-315 |
| 200.00 | 180.00 | 31.50 | 9.20 | 196.00 | 199.40 | DAS-200180-315 |
| 210.00 | 185.00 | 25.40 | 12.70 | 201.60 | 207.00 | DAS-210185-254 |
| 210.00 | 185.00 | 45.00 | 12.70 | 201.60 | 207.10 | DSM-210185-450 |
| 220.00 | 190.00 | 35.40 | 6.35 | 212.70 | 217.90 | DAS-220190-354 |
| 220.00 | 195.00 | 25.40 | 12.70 | 211.60 | 217.00 | DAS-220195-254 |
| 220.00 | 195.00 | 45.00 | 12.70 | 211.60 | 217.10 | DSM-220195-450 |
| 220.00 | 200.00 | 31.50 | 9.20 | 216.00 | 219.40 | DAS-220200-315 |
| 225.00 | 200.00 | 25.40 | 12.70 | 216.62 | 222.00 | DAS-225200-254 |
| 225.00 | 200.00 | 31.50 | 6.60 | 221.00 | 224.00 | DAS-225200-315 |
| 230.00 | 205.00 | 25.40 | 12.70 | 221.60 | 227.00 | DAS-230205-254 |
| 230.00 | 205.00 | 45.00 | 12.70 | 221.72 | 227.10 | DSM-230205-450 |
| 240.00 | 213.00 | 30.00 | 11.00 | 231.00 | 238.50 | EUD-240213-300 |
| 240.00 | 215.00 | 25.40 | 12.70 | 231.60 | 237.00 | DAS-240215-254 |
| 240.00 | 215.00 | 45.00 | 12.70 | 231.72 | 237.10 | DSM-240215-450 |
| 250.00 | 220.00 | 30.00 | 15.00 | 242.00 | 247.00 | DAS-250220-300 |
| 250.00 | 220.00 | 35.40 | 6.35 | 242.90 | 247.85 | DAS-250220-354 |
| 250.00 | 220.00 | 36.00 | 12.50 | 242.00 | 247.00 | DAS-250220-360 |
| 250.00 | 220.00 | 44.00 | 12.00 | 243.85 | 248.00 | DPWL-250220-450 |
| 250.00 | 225.00 | 25.40 | 0.00 | 0.00 | 0.00 | SPE-250225-254 |
| 250.00 | 225.00 | 25.40 | 12.70 | 241.60 | 247.00 | DAS-250225-254 |
| 250.00 | 225.00 | 31.50 | 6.60 | 246.00 | 249.00 | DAS-250225-315 |
| 250.00 | 225.00 | 45.00 | 12.70 | 241.72 | 247.10 | DSM-250225-450 |
| 250.00 | 230.00 | 31.50 | 9.20 | 246.00 | 249.40 | DPS-250230-315 |
| 250.00 | 230.00 | 31.50 | 9.20 | 246.00 | 249.40 | DAS-250230-315 |
| 260.00 | 235.00 | 35.40 | 12.70 | 252.90 | 257.00 | DAS-260235-354 |



| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
|--------|--------|-------|-------|--------|--------|----------------|
| 260.00 | 235.00 | 45.00 | 12.70 | 251.72 | 257.10 | DSM-260235-450 |
| 270.00 | 245.00 | 45.00 | 12.70 | 261.72 | 267.10 | DSM-270245-450 |
| 280.00 | 250.00 | 35.40 | 9.52 | 272.90 | 277.00 | DAS-280250-354 |
| 280.00 | 255.00 | 45.00 | 12.70 | 271.72 | 277.10 | DSM-280255-450 |
| 290.00 | 265.00 | 45.00 | 12.70 | 281.72 | 287.10 | DSM-290265-450 |
| 300.00 | 275.00 | 45.00 | 12.70 | 291.72 | 297.10 | DSM-300275-450 |
| 320.00 | 290.00 | 35.40 | 9.52 | 312.40 | 317.00 | DAS-320290-354 |
| 320.00 | 290.00 | 36.00 | 12.50 | 312.00 | 317.00 | DAS-320290-360 |
| 360.00 | 335.00 | 44.50 | 12.70 | 351.76 | 357.33 | DSM-360335-445 |



KPDP

Glide Rings

Design

KPDP are a two piece double acting pneumatic piston seal. The outer ring is made from a modified Polyester resin with specific fillers to improve wear resistance and reduce friction. The inner ring is usually an o-ring to BS 1806 standard in 70 Shore A Nitrile with low compression set and high modulus of elasticity. Due to the properties of both materials, the inner and outer rings are easy to stretch over the piston and will return to size almost immediately for ease of assembly into the bore.

Operating Conditions

Pressure

16 Bar
230 Psi

Pneumatic

Temperature

-30° to 80°C
-22° to 176°F

Speed

1.0m/sec
3.0' /sec

Surface Finish μmRa

| | |
|-------------|-------------|
| ØD | Ød |
| 0.1 - 0.25 | ≤ 0.8 |

Tolerances

| | | | |
|-------------|-------------|------|------|
| ØD | Ød | L | G |
| H9 | h9 | +0.1 | 0.25 |

Chamfer Radii

| | | | | |
|-----|-----|-----|-----|-----|
| C/S | 3.5 | 4.5 | 6.0 | 7.5 |
| C | 2.0 | 2.5 | 3.0 | 4.0 |
| r1 | 0.2 | 0.2 | 0.2 | 0.2 |

Typical Examples

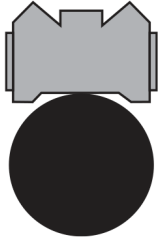
Reciprocating Rotary Oscillating Helix



Similar Styles



Double acting seals



Key Features

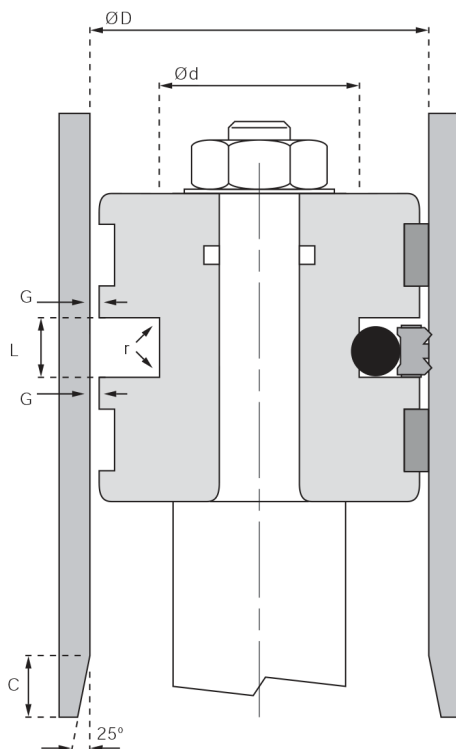
Dry or lubricated pneumatics

Lower pressures

Compact design

Reduced coefficient of friction

Easy to fit

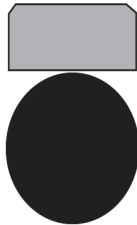




GP2

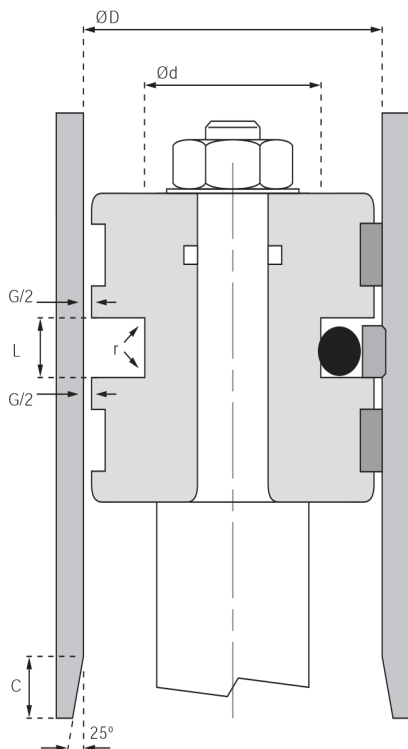
Glide Rings

Double acting seals



Key Features

- Medium to heavy duty
- One piece piston
- Very compact
- Low friction
- Excellent wear resistance
- Eliminates stiction
- Good pressure capability

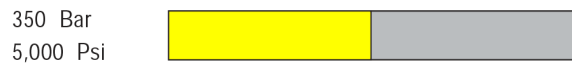


Design

GP2 are designed as high pressure, low friction double acting piston seals for use in heavy duty hydraulic and pneumatic applications. Standard materials are Bronze filled PTFE with a Nitrile o-ring or square ring as the energiser. This design results in low break out force and the ability to run at speeds as high as 15 m/s. By changing the energiser material it can easily become a high temperature seal at relatively low cost.

Operating Conditions

Pressure



Temperature



Speed



Surface Finish μmRa

| ØD | Ød | L |
|-------------|-------------|-----|
| 0.1 - 0.25 | ≤ 0.8 | 1.0 |

Tolerances

| ØD | Ød | L |
|-------------|-------------|-------------|
| H9 | h9 | - 0.0 + 0.2 |

Chamfer Radii

| C/S | 2.5 | 3.75 | 5.50 | 7.75 | 10.5 | 12.25 |
|-----|-----|------|------|------|------|-------|
| C | 1.5 | 2.0 | 2.5 | 5.0 | 7.5 | 10.0 |
| r1 | 0.3 | 0.5 | 0.8 | 1.2 | 1.6 | 2.0 |

Extrusion Gap

| Pressure | Bar | 100 | 200 | 300 | 400 |
|----------|-----|-----|------|-----|------|
| G | | 0.8 | 0.65 | 0.5 | 0.35 |

Typical Examples

Reciprocating Rotary Oscillating Helix

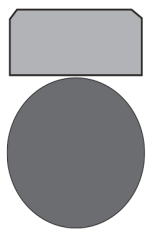




GP4

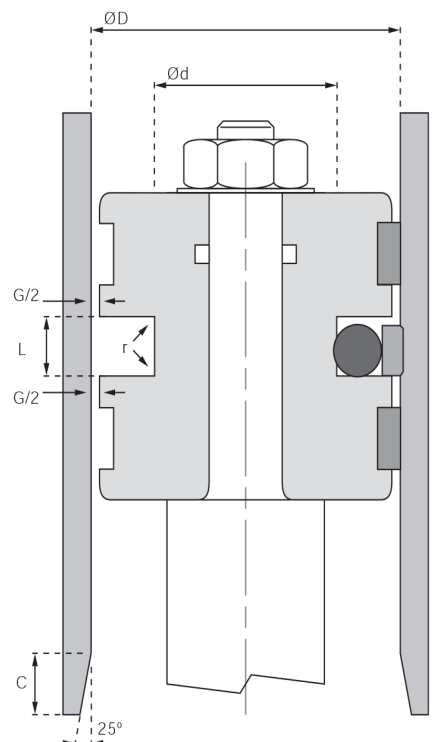
Glide Rings

Double acting seals



Key Features


- Medium to heavy duty
- One piece piston
- Cost effective high temperature
- Very compact
- Excellent wear resistance
- Eliminates stiction




Design

GP4 are designed as high pressure, low friction double acting piston seals for use in heavy duty hydraulic and pneumatic applications. This variation of GP2 use Bronze filled PTFE for the outer dynamic sealing ring with an energiser ring of Viton for higher temperature applications. This design results in low break out force and the ability to run at speeds as high as 15 m/s. The result is an economical high speed, high temperature double acting piston seal.

Operating Conditions

| | |
|-----------------|--|
| Pressure | |
| 350 Bar |  |
| 5,000 Psi | |

| | |
|--------------------|--|
| Temperature | |
| -20° to 200°C |  |
| -4° to 392°F | |

| | |
|--------------|--|
| Speed | |
| 4.0m/sec |  |
| 12.0'/sec | |

| | | |
|--|-------------|-----|
| Surface Finish μmRa | | |
| ØD | Ød | L |
| 0.1 - 0.25 | ≤ 0.8 | 1.0 |

| | | |
|-------------------|-------------|-------------|
| Tolerances | | |
| ØD | Ød | L |
| H9 | h9 | - 0.0 + 0.2 |

| | | | | | | |
|----------------------|-----|------|------|------|------|-------|
| Chamfer Radii | | | | | | |
| C/S | 2.5 | 3.75 | 5.50 | 7.75 | 10.5 | 12.25 |
| C | 1.5 | 2.0 | 2.5 | 5.0 | 7.5 | 10.0 |
| r | 0.3 | 0.5 | 0.8 | 1.2 | 1.6 | 2.0 |

| | | | | | |
|----------------------|-----|-----|------|-----|------|
| Extrusion Gap | | | | | |
| Pressure | Bar | 100 | 200 | 300 | 400 |
| | G | 0.8 | 0.65 | 0.5 | 0.35 |

Typical Examples

Reciprocating Rotary Oscillating Helix

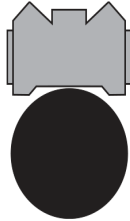




GP6

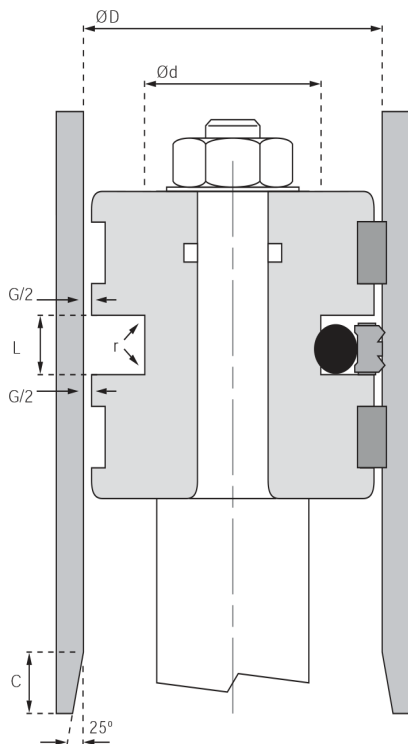
Glide Rings

Double acting seals



Key Features

- Medium duty
- One piece piston
- Snap back to size
- Compact design
- Better abrasive resistance

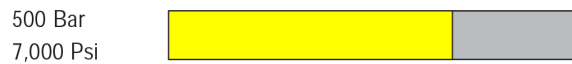


Design

GP6 glide rings with o-ring expanders consist of a Nitrile 70 Shore A o-ring over which sits an outer sleeve of 60 Shore D abrasion resistant liquid cast Polyurethane. They allow for a very compact piston design, permit higher pressures than o-rings and back up's and are relatively easy to stretch over one piece pistons. Unlike PTFE and Bronze/PTFE rings, Polyurethane will snap back to size quickly and will give longer service life due to better abrasion resistance.

Operating Conditions

Pressure



Temperature



Speed



Surface Finish µmRa

| ØD | Ød | L |
|------------|------|-----|
| 0.1 - 0.25 | ≤0.8 | 1.0 |

Tolerances

| ØD | Ød | L |
|----|-------------|------------|
| H9 | - 0.0 + 0.1 | -0.0 + 0.2 |

Chamfer Radii

| | 3.75 | 5.50 | 7.75 | 10.5 | 12.25 |
|-----|------|------|------|------|-------|
| C/S | 3.75 | 5.50 | 7.75 | 10.5 | 12.25 |
| C | 2.0 | 2.5 | 5.0 | 7.5 | 10.0 |
| r | 0.5 | 0.8 | 1.2 | 1.6 | 2.0 |

Extrusion Gap

| Pressure | Bar | 100 | 200 | 300 | 400 | 500 |
|----------|-----|-----|-----|------|------|------|
| G | | 0.8 | 0.4 | 0.25 | 0.17 | 0.10 |

Typical Examples

Reciprocating Rotary Oscillating Helix

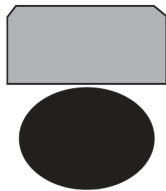




GP8

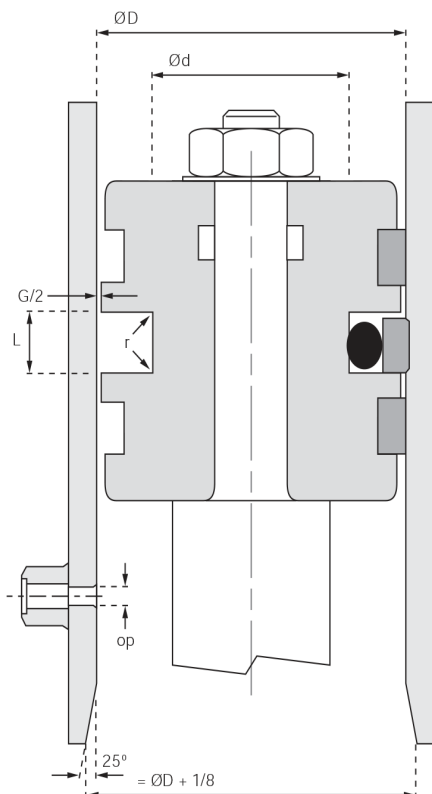
Glide Rings

Double acting seals



Key Features

- Heavy duty
- One piece piston
- Higher pressure capability
- Compact design
- Shock load resistant
- Will traverse holes and slots



Design

GP8 two part double acting piston seals consist of a step cut oval outer dynamic ring of glass filled Nylon with a Nitrile rubber rectangular section energiser. The outer dynamic ring is very tough, capable of higher pressures and some amount of shock loading. Another advantage is the ability to pass over ports and machined grooves, notches without harm and are relatively easy to install.

NOTE:

Do not trim / cut Nylon ring.

Operating Conditions

Pressure

350 Bar
5,000 Psi



Temperature

-40° to 105°C
-40° to 220°F



Speed

1.5m/sec
4.5'/sec



Surface Finish µmRa

| ØD | Ød | L |
|------------|------|-----|
| 0.1 - 0.25 | ≤0.8 | 1.0 |

Tolerances

| ØD | Ød | L | G | op |
|-------|-------|-------|------|-----------|
| +0.15 | -0.00 | +0.15 | 1.00 | 117% of L |
| -0.00 | +0.15 | -0.00 | | |

Chamfer Radii

| C/S | 3.75 | 5.50 | 7.75 | 10.5 | 12.25 |
|-----|------|------|------|------|-------|
| r | 0.5 | 0.8 | 1.2 | 1.6 | 2.0 |

Typical Examples

Reciprocating Rotary Oscillating Helix



Similar Styles





PHD

Glide Rings

Design

PHD are used on one piece pistons. The assembly consists of a filled PTFE high performance outer sleeve, pre loaded and pressure energised by a precision moulded Nitrile rubber element. These two components are protected from extrusion at either side by fitting two Polyacetal anti-extrusion rings. This seal is highly resistant to shock loads due to its excellent anti-extrusion abilities.

Operating Conditions

Pressure

500 Bar
7,500 Psi



Temperature

-30° to 120°C
-22° to 250°F



Speed

1.5m/sec
4.5'/sec



Surface Finish μmRa

| $\varnothing D$ | $\varnothing d$ | L |
|-----------------|-----------------|-----|
| 0.1 - 0.25 | ≤ 0.8 | 1.0 |

Tolerances

| $\varnothing D$ | $\varnothing d$ | L |
|-----------------|-----------------|-------------|
| H9 | h9 | - 0.0 + 0.2 |

Chamfer Radii

| | 7.0 | 7.5 | 11.5 | 14 |
|-----|-----|-----|------|-----|
| C/S | 7.0 | 7.5 | 11.5 | 14 |
| C | 4.0 | 5.0 | 6.5 | 7.5 |
| r | 0.3 | 0.5 | 0.6 | 0.8 |

Extrusion Gap

| Pressure | Bar | 350 | 450 |
|----------|-----|------|------|
| G | | 1.00 | 0.60 |

Typical Examples

Reciprocating Rotary Oscillating Helix

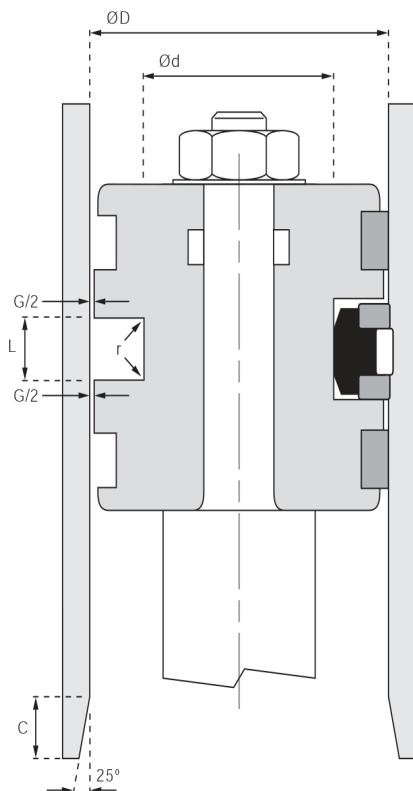


Double acting seals



Key Features

- Medium to heavy duty
- One piece piston
- Higher pressure capability
- Compact design
- Low stiction
- High shock resistance

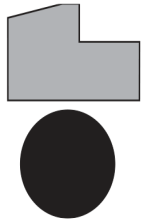




GP3

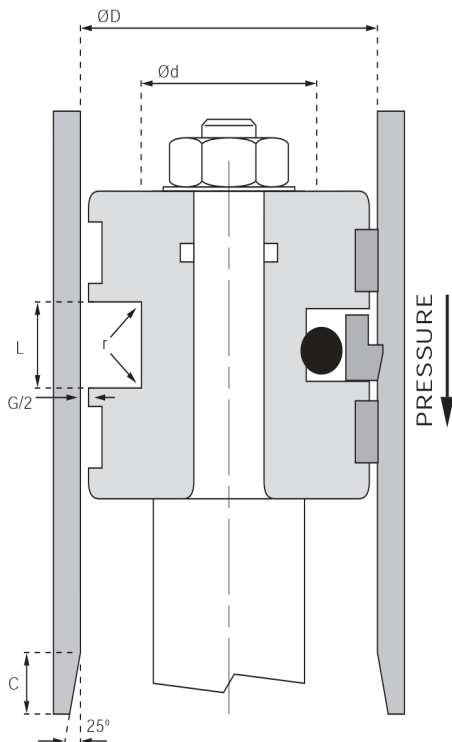
Glide Rings

Double acting seals



Key Features

- Medium to heavy duty
- One piece piston
- Very compact
- Low friction
- Excellent wear resistance
- Eliminates stiction
- Good pressure capability



Design

GP3 are designed as high pressure, low friction single acting piston seals for use in heavy duty hydraulic and pneumatic applications. Standard materials are Bronze filled PTFE with a Nitrile o-ring or square ring as the energiser. This design results in low break out force and the ability to run at speeds as high as 15 m/sec. By changing the energiser material it can easily become a high temperature seal at relatively low cost.

Operating Conditions

Pressure

350 Bar
5,000 Psi



Temperature

-30° to 110°C
-22° to 230°F



Speed

4.0m/sec
12.0'/sec



Surface Finish μmRa

| ØD | Ød | L |
|-------------|-------------|-----|
| 0.1 - 0.25 | ≤ 0.8 | 1.0 |

Tolerances

| ØD | Ød | L |
|-------------|-------------|-------------|
| H9 | h9 | - 0.0 + 0.2 |

Chamfer Radii

| C/S | 2.5 | 3.75 | 5.50 | 7.75 | 10.5 | 12.25 |
|-----|-----|------|------|------|------|-------|
| C | 1.5 | 2.0 | 2.5 | 5.0 | 7.5 | 10.0 |
| r | 0.3 | 0.5 | 0.8 | 1.2 | 1.6 | 2.0 |

Extrusion Gap

| Pressure | Bar | 100 | 200 | 300 | 400 |
|----------|-----|-----|------|-----|------|
| G | | 0.8 | 0.65 | 0.5 | 0.35 |

Typical Examples

Reciprocating Rotary Oscillating Helix



KPDP



GP2



GP4



GP6



GP8



PHD



GP3 (Made to order)

| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
|-------|-------|------|------|------|-----------|-----------------|
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | K108-030019-042 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | PHD-160143-200 |
| 0.50 | 0.24 | 0.08 | 0.00 | 0.00 | 0.00 | GP2-0050024-008 |
| 1.00 | 0.69 | 0.13 | 0.00 | 0.00 | 0.00 | GP6-0100069-012 |
| 6.50 | 5.59 | 0.63 | 0.00 | 0.00 | 0.00 | GP8-0650559-063 |
| 10.00 | 5.10 | 2.20 | 0.00 | 0.00 | 0.00 | GP2-010005-022 |
| 12.00 | 7.10 | 2.20 | 0.00 | 0.00 | 0.00 | GP4-012007-022 |
| 12.00 | 7.10 | 2.20 | 0.00 | 0.00 | 0.00 | GP2-012007-022 |
| 13.00 | 8.10 | 2.20 | 0.00 | 0.00 | 0.00 | GP2-013008-022 |
| 15.00 | 7.50 | 3.20 | 0.00 | 0.00 | 0.00 | GP2-015007-032 |
| 15.00 | 10.10 | 2.20 | 0.00 | 0.00 | 0.00 | GP2-015010-022 |
| 16.00 | 8.50 | 3.20 | 0.00 | 0.00 | 0.00 | GP4-016008-032 |
| 16.00 | 8.50 | 3.20 | 0.00 | 0.00 | 0.00 | GP6-016008-032 |
| 16.00 | 8.50 | 3.20 | 0.00 | 0.00 | 0.00 | GP2-016008-032 |
| 16.00 | 9.00 | 2.10 | 2.50 | 0.00 | 16,009.00 | KPDP-016009-025 |
| 16.00 | 11.10 | 2.20 | 0.00 | 0.00 | 0.00 | GP2-016011-022 |
| 18.00 | 10.50 | 3.20 | 0.00 | 0.00 | 0.00 | GP4-018010-032 |
| 18.00 | 10.50 | 3.20 | 0.00 | 0.00 | 0.00 | GP2-018010-032 |
| 20.00 | 12.50 | 3.20 | 0.00 | 0.00 | 0.00 | GP6-020012-032 |
| 20.00 | 12.50 | 3.20 | 0.00 | 0.00 | 0.00 | GP4-020012-032 |
| 20.00 | 12.50 | 3.20 | 0.00 | 0.00 | 0.00 | GP2-020012-032 |
| 20.00 | 13.00 | 2.10 | 2.50 | 0.00 | 0.00 | KPDP-020013-025 |
| 20.00 | 15.10 | 2.20 | 0.00 | 0.00 | 0.00 | GP2-020015-022 |
| 22.00 | 14.50 | 3.20 | 0.00 | 0.00 | 0.00 | GP6-022014-032 |
| 22.00 | 14.50 | 3.20 | 0.00 | 0.00 | 0.00 | GP2-022014-032 |
| 22.00 | 14.50 | 4.20 | 0.00 | 0.00 | 0.00 | GP2-022014-042 |
| 24.00 | 16.50 | 3.20 | 0.00 | 0.00 | 0.00 | GP4-024016-032 |
| 24.00 | 16.50 | 3.20 | 0.00 | 0.00 | 0.00 | GP2-024016-032 |
| 25.00 | 14.00 | 4.20 | 0.00 | 0.00 | 0.00 | GP6-025014-042 |
| 25.00 | 14.00 | 4.20 | 0.00 | 0.00 | 0.00 | GP2-025014-042 |
| 25.00 | 17.50 | 3.20 | 0.00 | 0.00 | 0.00 | GP6-025017-032 |



KPDP



GP2



GP4



GP6



GP8



PHD



GP3 (Made to order)

| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
|-------|-------|------|------|------|------|-----------------|
| 25.00 | 17.50 | 3.20 | 0.00 | 0.00 | 0.00 | GP4-025017-032 |
| 25.00 | 17.50 | 3.20 | 0.00 | 0.00 | 0.00 | GP2-025017-032 |
| 25.00 | 18.00 | 2.50 | 0.00 | 0.00 | 0.00 | KPDP-025018-025 |
| 28.00 | 20.50 | 3.20 | 0.00 | 0.00 | 0.00 | GP4-028020-032 |
| 28.00 | 20.50 | 3.20 | 0.00 | 0.00 | 0.00 | GP2-028020-032 |
| 30.00 | 19.00 | 4.20 | 0.00 | 0.00 | 0.00 | GP2-030019-042 |
| 30.00 | 22.50 | 0.00 | 0.00 | 0.00 | 0.00 | GP4-030022-032 |
| 30.00 | 22.50 | 3.20 | 0.00 | 0.00 | 0.00 | GP6-030022-032 |
| 30.00 | 22.50 | 3.20 | 0.00 | 0.00 | 0.00 | GP2-030022-032 |
| 32.00 | 23.00 | 3.00 | 0.00 | 0.00 | 0.00 | KPDP-032023-030 |
| 32.00 | 24.50 | 3.20 | 0.00 | 0.00 | 0.00 | GP6-032024-032 |
| 32.00 | 24.50 | 3.20 | 0.00 | 0.00 | 0.00 | GP4-032024-032 |
| 32.00 | 24.50 | 3.20 | 0.00 | 0.00 | 0.00 | GP2-032024-032 |
| 35.00 | 24.00 | 4.20 | 0.00 | 0.00 | 0.00 | GP6-035024-042 |
| 35.00 | 24.00 | 4.20 | 0.00 | 0.00 | 0.00 | GP2-035024-042 |
| 35.00 | 26.00 | 3.00 | 0.00 | 0.00 | 0.00 | KPDP-035026-030 |
| 35.00 | 27.20 | 3.60 | 0.00 | 0.00 | 0.00 | GP2-035027-036 |
| 35.00 | 27.50 | 3.20 | 0.00 | 0.00 | 0.00 | GP6-035027-032 |
| 35.00 | 27.50 | 3.20 | 0.00 | 0.00 | 0.00 | GP4-035027-032 |
| 35.00 | 27.50 | 3.20 | 0.00 | 0.00 | 0.00 | GP2-035027-032 |
| 36.00 | 28.50 | 3.20 | 0.00 | 0.00 | 0.00 | GP4-036028-032 |
| 36.00 | 28.50 | 3.20 | 0.00 | 0.00 | 0.00 | GP2-036028-032 |
| 38.00 | 28.50 | 3.20 | 0.00 | 0.00 | 0.00 | GP2-038028-032 |
| 38.00 | 30.50 | 3.20 | 0.00 | 0.00 | 0.00 | GP6-038030-032 |
| 38.00 | 30.50 | 3.20 | 0.00 | 0.00 | 0.00 | GP4-038030-032 |
| 38.00 | 30.50 | 3.20 | 0.00 | 0.00 | 0.00 | GP2-038030-032 |
| 40.00 | 20.00 | 4.30 | 4.50 | 0.00 | 0.00 | GP2-040030-045 |
| 40.00 | 29.00 | 4.20 | 0.00 | 0.00 | 0.00 | GP4-040029-042 |
| 40.00 | 29.00 | 4.20 | 0.00 | 0.00 | 0.00 | GP6-040029-042 |
| 40.00 | 29.00 | 4.20 | 0.00 | 0.00 | 0.00 | GP2-040029-042 |
| 40.00 | 32.50 | 3.20 | 0.00 | 0.00 | 0.00 | GP6-040032-032 |





KPDP



GP2



GP4



GP6



GP8



PHD



GP3 (Made to order)

| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
|-------|-------|------|------|------|------|-----------------|
| 40.00 | 32.50 | 3.20 | 0.00 | 0.00 | 0.00 | GP2-040032-032 |
| 42.00 | 31.00 | 4.20 | 0.00 | 0.00 | 0.00 | GP6-042031-042 |
| 42.00 | 31.00 | 4.20 | 0.00 | 0.00 | 0.00 | GP2-042031-042 |
| 45.00 | 29.50 | 6.30 | 0.00 | 0.00 | 0.00 | GP6-045029-063 |
| 45.00 | 34.00 | 4.20 | 0.00 | 0.00 | 0.00 | GP6-045034-042 |
| 45.00 | 34.00 | 4.20 | 0.00 | 0.00 | 0.00 | GP4-045034-042 |
| 45.00 | 34.00 | 4.20 | 0.00 | 0.00 | 0.00 | GP2-045034-042 |
| 45.00 | 35.00 | 4.50 | 0.00 | 0.00 | 0.00 | GP2-045035-045 |
| 45.00 | 36.00 | 3.00 | 0.00 | 0.00 | 0.00 | KPDP-045036-030 |
| 48.00 | 37.00 | 0.00 | 0.00 | 0.00 | 0.00 | CASP-048037-100 |
| 48.00 | 37.00 | 4.20 | 0.00 | 0.00 | 0.00 | GP4-048037-042 |
| 48.00 | 37.00 | 4.20 | 0.00 | 0.00 | 0.00 | GP2-048037-042 |
| 49.00 | 38.00 | 4.20 | 0.00 | 0.00 | 0.00 | GP6-049038-042 |
| 50.00 | 34.50 | 6.30 | 0.00 | 0.00 | 0.00 | GP4-050034-063 |
| 50.00 | 34.50 | 6.30 | 0.00 | 0.00 | 0.00 | GP6-050034-063 |
| 50.00 | 34.50 | 6.30 | 0.00 | 0.00 | 0.00 | GP2-050034-063 |
| 50.00 | 36.00 | 9.00 | 0.00 | 0.00 | 0.00 | PHD-050036-090 |
| 50.00 | 37.50 | 6.30 | 0.00 | 0.00 | 0.00 | GP6-050037-063 |
| 50.00 | 39.00 | 4.20 | 0.00 | 0.00 | 0.00 | GP4-050039-042 |
| 50.00 | 39.00 | 4.20 | 0.00 | 0.00 | 0.00 | GP6-050039-042 |
| 50.00 | 39.00 | 4.20 | 0.00 | 0.00 | 0.00 | GP2-050039-042 |
| 50.00 | 40.00 | 4.50 | 0.00 | 0.00 | 0.00 | GP2-050040-045 |
| 50.00 | 40.00 | 8.00 | 0.00 | 0.00 | 0.00 | PHD-050040-080 |
| 52.00 | 36.50 | 6.30 | 0.00 | 0.00 | 0.00 | GP6-052036-063 |
| 52.00 | 41.00 | 4.20 | 0.00 | 0.00 | 0.00 | GP2-052041-042 |
| 54.00 | 43.00 | 4.20 | 0.00 | 0.00 | 0.00 | GP6-054043-042 |
| 55.00 | 39.50 | 6.30 | 0.00 | 0.00 | 0.00 | GP6-055039-063 |
| 55.00 | 41.00 | 9.00 | 0.00 | 0.00 | 0.00 | PHD-055041-090 |
| 55.00 | 44.00 | 4.20 | 0.00 | 0.00 | 0.00 | GP4-055044-042 |
| 55.00 | 44.00 | 4.20 | 0.00 | 0.00 | 0.00 | GP6-055044-042 |
| 55.00 | 44.00 | 4.20 | 0.00 | 0.00 | 0.00 | GP2-055044-042 |



KPDP



GP2



GP4



GP6



GP8



PHD



GP3 (Made to order)

| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
|-------|-------|-------|------|------|------|-----------------|
| 55.00 | 45.00 | 4.50 | 0.00 | 0.00 | 0.00 | GP2-055045-045 |
| 57.00 | 46.00 | 4.20 | 0.00 | 0.00 | 0.00 | GP4-057046-042 |
| 57.00 | 46.00 | 4.20 | 0.00 | 0.00 | 0.00 | GP2-057046-042 |
| 60.00 | 44.50 | 6.30 | 0.00 | 0.00 | 0.00 | GP6-060044-063 |
| 60.00 | 44.50 | 6.30 | 0.00 | 0.00 | 0.00 | GP2-060044-063 |
| 60.00 | 46.00 | 9.00 | 0.00 | 0.00 | 0.00 | PHD-060046-090 |
| 60.00 | 49.00 | 4.20 | 0.00 | 0.00 | 0.00 | GP4-060049-042 |
| 60.00 | 49.00 | 4.20 | 0.00 | 0.00 | 0.00 | GP6-060049-042 |
| 60.00 | 49.00 | 4.20 | 0.00 | 0.00 | 0.00 | GP2-060049-042 |
| 60.00 | 50.00 | 4.50 | 0.00 | 0.00 | 0.00 | GP2-060050-043 |
| 60.00 | 50.00 | 8.00 | 0.00 | 0.00 | 0.00 | PHD-060050-080 |
| 63.00 | 47.50 | 0.00 | 0.00 | 0.00 | 0.00 | GP8-063047-063 |
| 63.00 | 47.50 | 6.30 | 0.00 | 0.00 | 0.00 | GP6-063047-063 |
| 63.00 | 47.50 | 6.30 | 0.00 | 0.00 | 0.00 | GP2-063047-063 |
| 63.00 | 48.00 | 7.50 | 0.00 | 0.00 | 0.00 | GP2-063048-075 |
| 63.00 | 48.00 | 11.00 | 0.00 | 0.00 | 0.00 | PHD-063048-110 |
| 63.00 | 50.00 | 6.30 | 0.00 | 0.00 | 0.00 | GP6-063050-063 |
| 63.00 | 51.00 | 4.00 | 0.00 | 0.00 | 0.00 | KPDP-063051-040 |
| 63.00 | 52.00 | 4.20 | 0.00 | 0.00 | 0.00 | GP6-063052-042 |
| 63.00 | 52.00 | 4.20 | 0.00 | 0.00 | 0.00 | GP4-063052-042 |
| 63.00 | 52.00 | 4.20 | 0.00 | 0.00 | 0.00 | GP2-063052-042 |
| 63.00 | 53.00 | 8.00 | 0.00 | 0.00 | 0.00 | PHD-063053-080 |
| 63.00 | 55.50 | 3.20 | 0.00 | 0.00 | 0.00 | GP2-063055-032 |
| 65.00 | 49.50 | 6.30 | 0.00 | 0.00 | 0.00 | GP2-065049-063 |
| 65.00 | 49.50 | 6.30 | 0.00 | 0.00 | 0.00 | GP6-065049-063 |
| 65.00 | 50.00 | 11.00 | 0.00 | 0.00 | 0.00 | PHD-065050-110 |
| 65.00 | 51.00 | 9.00 | 0.00 | 0.00 | 0.00 | PHD-065051-090 |
| 65.00 | 52.00 | 6.30 | 0.00 | 0.00 | 0.00 | GP6-065052-063 |
| 65.00 | 54.00 | 4.20 | 0.00 | 0.00 | 0.00 | GP4-065054-042 |
| 65.00 | 54.00 | 4.20 | 0.00 | 0.00 | 0.00 | GP6-065054-042 |
| 65.00 | 54.00 | 4.20 | 0.00 | 0.00 | 0.00 | GP2-065054-042 |





KPDP



GP2



GP4



GP6



GP8



PHD



GP3 (Made to order)

| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
|-------|-------|-------|------|------|------|----------------|
| 70.00 | 54.50 | 6.30 | 0.00 | 0.00 | 0.00 | GP6-070054-063 |
| 70.00 | 54.50 | 6.30 | 0.00 | 0.00 | 0.00 | GP2-070054-063 |
| 70.00 | 55.00 | 0.00 | 0.00 | 0.00 | 0.00 | GP2-070055-075 |
| 70.00 | 55.00 | 11.00 | 0.00 | 0.00 | 0.00 | PHD-070055-110 |
| 70.00 | 55.00 | 12.50 | 0.00 | 0.00 | 0.00 | PHD-070055-125 |
| 70.00 | 57.00 | 6.30 | 0.00 | 0.00 | 0.00 | GP6-070057-063 |
| 70.00 | 59.00 | 4.20 | 0.00 | 0.00 | 0.00 | GP6-070059-042 |
| 70.00 | 59.00 | 4.20 | 0.00 | 0.00 | 0.00 | GP2-070059-042 |
| 70.00 | 60.00 | 8.00 | 0.00 | 0.00 | 0.00 | PHD-070060-080 |
| 75.00 | 54.00 | 0.00 | 0.00 | 0.00 | 0.00 | GP8-075054-081 |
| 75.00 | 59.50 | 6.30 | 0.00 | 0.00 | 0.00 | GP6-075059-063 |
| 75.00 | 59.50 | 6.30 | 0.00 | 0.00 | 0.00 | GP2-075059-063 |
| 75.00 | 60.00 | 7.50 | 0.00 | 0.00 | 0.00 | GP2-075060-075 |
| 75.00 | 60.00 | 11.00 | 0.00 | 0.00 | 0.00 | PHD-075060-110 |
| 75.00 | 62.00 | 6.30 | 0.00 | 0.00 | 0.00 | GP6-075062-063 |
| 75.00 | 62.30 | 6.30 | 0.00 | 0.00 | 0.00 | GP2-075062-063 |
| 75.00 | 63.00 | 9.10 | 0.00 | 0.00 | 0.00 | PHD-075063-091 |
| 75.00 | 64.00 | 4.20 | 0.00 | 0.00 | 0.00 | GP6-075064-042 |
| 75.00 | 64.00 | 4.20 | 0.00 | 0.00 | 0.00 | GP4-075064-042 |
| 75.00 | 64.00 | 4.20 | 0.00 | 0.00 | 0.00 | GP2-075064-042 |
| 75.00 | 90.00 | 0.00 | 0.00 | 0.00 | 0.00 | GP2-090075-075 |
| 80.00 | 59.00 | 8.10 | 0.00 | 0.00 | 0.00 | GP8-080059-081 |
| 80.00 | 64.50 | 0.00 | 0.00 | 0.00 | 0.00 | GP8-080064-063 |
| 80.00 | 64.50 | 6.30 | 0.00 | 0.00 | 0.00 | GP6-080064-063 |
| 80.00 | 64.50 | 6.30 | 0.00 | 0.00 | 0.00 | GP4-080064-063 |
| 80.00 | 64.50 | 6.30 | 0.00 | 0.00 | 0.00 | GP2-080064-063 |
| 80.00 | 65.00 | 7.50 | 0.00 | 0.00 | 0.00 | GP2-080065-075 |
| 80.00 | 65.00 | 11.00 | 0.00 | 0.00 | 0.00 | PHD-080065-110 |
| 80.00 | 65.00 | 12.00 | 0.00 | 0.00 | 0.00 | PHD-080065-120 |
| 80.00 | 65.00 | 12.50 | 0.00 | 0.00 | 0.00 | PHD-080065-125 |
| 80.00 | 68.00 | 4.20 | 0.00 | 0.00 | 0.00 | GP2-080068-042 |



KPDP



GP2



GP4



GP6



GP8



PHD



GP3 (Made to order)

| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
|--------|-------|-------|------|------|------|-----------------|
| 80.00 | 69.00 | 4.20 | 0.00 | 0.00 | 0.00 | GP2-080069-042 |
| 80.00 | 69.00 | 5.00 | 0.00 | 0.00 | 0.00 | GP6-080069-050 |
| 80.00 | 70.00 | 4.20 | 0.00 | 0.00 | 0.00 | GP2-080070-042 |
| 85.00 | 64.00 | 0.00 | 0.00 | 0.00 | 0.00 | GP8-085064-081 |
| 85.00 | 64.00 | 0.00 | 0.00 | 0.00 | 0.00 | GP8-0-85064-081 |
| 85.00 | 69.50 | 6.30 | 0.00 | 0.00 | 0.00 | GP6-085069-063 |
| 85.00 | 69.50 | 6.30 | 0.00 | 0.00 | 0.00 | GP2-085069-063 |
| 85.00 | 70.00 | 7.50 | 0.00 | 0.00 | 0.00 | GP2-085070-073 |
| 85.00 | 70.00 | 11.00 | 0.00 | 0.00 | 0.00 | PHD-085070-110 |
| 85.00 | 71.50 | 6.30 | 0.00 | 0.00 | 0.00 | GP6-085071-063 |
| 90.00 | 69.00 | 8.10 | 0.00 | 0.00 | 0.00 | GP8-090069-081 |
| 90.00 | 74.50 | 0.00 | 0.00 | 0.00 | 0.00 | GP8-090074-063 |
| 90.00 | 74.50 | 6.30 | 0.00 | 0.00 | 0.00 | GP6-090074-063 |
| 90.00 | 74.50 | 6.30 | 0.00 | 0.00 | 0.00 | GP4-090074-063 |
| 90.00 | 74.50 | 6.30 | 0.00 | 0.00 | 0.00 | GP2-090074-063 |
| 90.00 | 75.00 | 11.00 | 0.00 | 0.00 | 0.00 | PHD-090075-110 |
| 90.00 | 75.00 | 12.00 | 0.00 | 0.00 | 0.00 | PHD-090075-120 |
| 90.00 | 75.00 | 13.00 | 0.00 | 0.00 | 0.00 | PHD-090075-130 |
| 95.00 | 74.00 | 8.10 | 0.00 | 0.00 | 0.00 | GP2-095074-081 |
| 95.00 | 79.50 | 6.30 | 0.00 | 0.00 | 0.00 | GP6-095079-063 |
| 95.00 | 79.50 | 6.30 | 0.00 | 0.00 | 0.00 | GP4-095079-063 |
| 95.00 | 79.50 | 6.30 | 0.00 | 0.00 | 0.00 | GP2-095079-063 |
| 95.00 | 80.00 | 7.50 | 0.00 | 0.00 | 0.00 | GP2-095080-073 |
| 95.00 | 80.00 | 11.00 | 0.00 | 0.00 | 0.00 | PHD-095080-110 |
| 95.00 | 80.00 | 12.50 | 0.00 | 0.00 | 0.00 | PHD-095080-125 |
| 95.00 | 85.00 | 8.80 | 0.00 | 0.00 | 0.00 | GP6-095085-088 |
| 100.00 | 79.00 | 8.10 | 0.00 | 0.00 | 0.00 | GP8-100079-081 |
| 100.00 | 84.50 | 6.30 | 0.00 | 0.00 | 0.00 | GP4-100084-063 |
| 100.00 | 84.50 | 6.30 | 0.00 | 0.00 | 0.00 | GP2-100084-063 |
| 100.00 | 84.60 | 6.30 | 0.00 | 0.00 | 0.00 | GP6-100084-063 |
| 100.00 | 85.00 | 7.50 | 0.00 | 0.00 | 0.00 | GP2-100085-075 |





KPDP



GP2



GP4



GP6



GP8



PHD



GP3 (Made to order)

| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
|--------|--------|-------|------|------|------|----------------|
| 100.00 | 85.00 | 7.50 | 0.00 | 0.00 | 0.00 | GP6-100085-075 |
| 100.00 | 85.00 | 12.50 | 0.00 | 0.00 | 0.00 | PHD-100085-125 |
| 100.00 | 85.75 | 7.24 | 0.00 | 0.00 | 0.00 | GP8-100085-072 |
| 100.00 | 86.50 | 6.30 | 0.00 | 0.00 | 0.00 | GP6-100086-063 |
| 105.00 | 84.00 | 8.10 | 0.00 | 0.00 | 0.00 | GP8-105084-081 |
| 105.00 | 84.00 | 8.10 | 0.00 | 0.00 | 0.00 | GP2-105084-081 |
| 105.00 | 89.50 | 6.30 | 0.00 | 0.00 | 0.00 | GP6-105089-063 |
| 105.00 | 89.50 | 6.30 | 0.00 | 0.00 | 0.00 | GP4-105089-063 |
| 105.00 | 89.50 | 6.30 | 0.00 | 0.00 | 0.00 | GP2-105089-063 |
| 105.00 | 90.00 | 12.50 | 0.00 | 0.00 | 0.00 | PHD-105090-125 |
| 110.00 | 89.00 | 8.10 | 0.00 | 0.00 | 0.00 | GP8-110089-081 |
| 110.00 | 89.00 | 8.10 | 0.00 | 0.00 | 0.00 | GP6-110089-081 |
| 110.00 | 89.00 | 8.10 | 0.00 | 0.00 | 0.00 | GP2-110089-081 |
| 110.00 | 94.00 | 0.00 | 0.00 | 0.00 | 0.00 | GP6-110094-040 |
| 110.00 | 94.00 | 7.50 | 0.00 | 0.00 | 0.00 | GP2-110094-075 |
| 110.00 | 94.50 | 6.30 | 0.00 | 0.00 | 0.00 | GP6-110094-063 |
| 110.00 | 94.50 | 6.30 | 0.00 | 0.00 | 0.00 | GP4-110094-063 |
| 110.00 | 94.50 | 6.30 | 0.00 | 0.00 | 0.00 | GP2-110094-063 |
| 110.00 | 95.00 | 12.50 | 0.00 | 0.00 | 0.00 | PHD-110095-125 |
| 110.00 | 95.00 | 16.00 | 0.00 | 0.00 | 0.00 | PHD-110095-160 |
| 110.00 | 95.75 | 7.24 | 0.00 | 0.00 | 0.00 | GP8-110095-072 |
| 115.00 | 94.00 | 8.10 | 0.00 | 0.00 | 0.00 | GP8-115094-081 |
| 115.00 | 94.00 | 8.10 | 0.00 | 0.00 | 0.00 | GP2-115094-081 |
| 115.00 | 99.50 | 6.30 | 0.00 | 0.00 | 0.00 | GP4-115099-063 |
| 115.00 | 99.50 | 6.30 | 0.00 | 0.00 | 0.00 | GP6-115099-063 |
| 115.00 | 99.50 | 6.30 | 0.00 | 0.00 | 0.00 | GP2-115099-063 |
| 115.00 | 100.00 | 12.50 | 0.00 | 0.00 | 0.00 | PHD-115100-125 |
| 115.00 | 100.76 | 7.24 | 0.00 | 0.00 | 0.00 | GP8-115100-072 |
| 120.00 | 99.00 | 0.00 | 0.00 | 0.00 | 0.00 | GP8-120099-105 |
| 120.00 | 99.00 | 8.10 | 0.00 | 0.00 | 0.00 | GP8-120099-081 |
| 120.00 | 100.00 | 16.00 | 0.00 | 0.00 | 0.00 | PHD-120100-160 |



KPDP



GP2



GP4



GP6



GP8



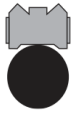
PHD



GP3 (Made to order)

| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
|--------|--------|-------|------|------|------|-----------------|
| 120.00 | 104.50 | 6.30 | 0.00 | 0.00 | 0.00 | GP6-120104-063 |
| 120.00 | 104.50 | 6.30 | 0.00 | 0.00 | 0.00 | GP4-120104-063 |
| 120.00 | 104.50 | 6.30 | 0.00 | 0.00 | 0.00 | GP2-120104-063 |
| 120.00 | 105.00 | 12.00 | 0.00 | 0.00 | 0.00 | PHD-120105-125 |
| 120.00 | 105.75 | 7.24 | 0.00 | 0.00 | 0.00 | GP8-120105-072 |
| 120.00 | 107.00 | 8.30 | 0.00 | 0.00 | 0.00 | AQ5-120107-083 |
| 125.00 | 102.00 | 16.00 | 0.00 | 0.00 | 0.00 | PHD-125102-160 |
| 125.00 | 104.00 | 8.10 | 0.00 | 0.00 | 0.00 | GP8-125104-081 |
| 125.00 | 104.00 | 8.10 | 0.00 | 0.00 | 0.00 | GP6-125104-081 |
| 125.00 | 104.00 | 8.10 | 0.00 | 0.00 | 0.00 | GP2-125104-081 |
| 125.00 | 105.00 | 16.00 | 0.00 | 0.00 | 0.00 | PHD-125105-160 |
| 125.00 | 109.00 | 7.30 | 0.00 | 0.00 | 0.00 | GP6-125109-075 |
| 125.00 | 109.50 | 6.30 | 0.00 | 0.00 | 0.00 | GP3-125109-063 |
| 125.00 | 109.50 | 6.30 | 0.00 | 0.00 | 0.00 | GP6-125109-063 |
| 125.00 | 109.50 | 6.30 | 0.00 | 0.00 | 0.00 | GP4-125109-063 |
| 125.00 | 109.50 | 6.30 | 0.00 | 0.00 | 0.00 | GP2-125109-063 |
| 125.00 | 110.00 | 5.00 | 0.00 | 0.00 | 0.00 | KPDP-125110-050 |
| 130.00 | 107.00 | 16.00 | 0.00 | 0.00 | 0.00 | PHD-130107-160 |
| 130.00 | 109.00 | 8.10 | 0.00 | 0.00 | 0.00 | GP6-130109-081 |
| 130.00 | 109.00 | 8.10 | 0.00 | 0.00 | 0.00 | GP8-130109-081 |
| 130.00 | 109.00 | 8.10 | 0.00 | 0.00 | 0.00 | GP2-130109-081 |
| 130.00 | 114.50 | 6.30 | 0.00 | 0.00 | 0.00 | GP6-130114-063 |
| 130.00 | 114.50 | 6.30 | 0.00 | 0.00 | 0.00 | GP3-130114-063 |
| 130.00 | 114.50 | 6.30 | 0.00 | 0.00 | 0.00 | GP4-130114-063 |
| 130.00 | 114.50 | 6.30 | 0.00 | 0.00 | 0.00 | GP2-130114-063 |
| 130.00 | 115.75 | 7.24 | 0.00 | 0.00 | 0.00 | GP8-130115-072 |
| 135.00 | 112.00 | 16.00 | 0.00 | 0.00 | 0.00 | PHD-135112-160 |
| 135.00 | 114.00 | 8.10 | 0.00 | 0.00 | 0.00 | GP4-135114-081 |
| 135.00 | 114.00 | 8.10 | 0.00 | 0.00 | 0.00 | GP2-135114-081 |
| 140.00 | 117.00 | 16.00 | 0.00 | 0.00 | 0.00 | PHD-140117-160 |
| 140.00 | 119.00 | 8.10 | 0.00 | 0.00 | 0.00 | GP8-140119-081 |





KPDP



GP2



GP4



GP6



GP8

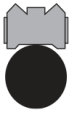


PHD



GP3 (Made to order)

| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
|--------|--------|-------|------|------|------|----------------|
| 140.00 | 119.00 | 8.10 | 0.00 | 0.00 | 0.00 | GP4-140119-081 |
| 140.00 | 119.00 | 8.10 | 0.00 | 0.00 | 0.00 | GP6-140119-081 |
| 140.00 | 119.00 | 8.10 | 0.00 | 0.00 | 0.00 | GP2-140119-081 |
| 140.00 | 120.00 | 16.00 | 0.00 | 0.00 | 0.00 | PHD-140120-160 |
| 140.00 | 120.00 | 19.00 | 0.00 | 0.00 | 0.00 | PHD-140120-190 |
| 140.00 | 120.62 | 9.63 | 0.00 | 0.00 | 0.00 | GP8-140120-096 |
| 140.00 | 124.00 | 0.00 | 0.00 | 0.00 | 0.00 | GP2-140124-075 |
| 145.00 | 122.00 | 16.00 | 0.00 | 0.00 | 0.00 | PHD-145122-160 |
| 145.00 | 124.00 | 8.10 | 0.00 | 0.00 | 0.00 | GP4-145124-081 |
| 145.00 | 124.00 | 8.10 | 0.00 | 0.00 | 0.00 | GP2-145124-081 |
| 150.00 | 127.00 | 16.00 | 0.00 | 0.00 | 0.00 | PHD-150127-160 |
| 150.00 | 129.00 | 8.10 | 0.00 | 0.00 | 0.00 | GP8-150129-081 |
| 150.00 | 129.00 | 8.10 | 0.00 | 0.00 | 0.00 | GP6-150129-081 |
| 150.00 | 129.00 | 8.10 | 0.00 | 0.00 | 0.00 | GP4-150129-081 |
| 150.00 | 129.00 | 8.10 | 0.00 | 0.00 | 0.00 | GP2-150129-081 |
| 150.00 | 130.00 | 19.00 | 0.00 | 0.00 | 0.00 | PHD-150130-190 |
| 150.00 | 130.63 | 9.63 | 0.00 | 0.00 | 0.00 | GP8-150130-096 |
| 150.00 | 170.00 | 15.50 | 0.00 | 0.00 | 0.00 | PHD-170150-160 |
| 155.00 | 134.00 | 8.10 | 0.00 | 0.00 | 0.00 | GP4-155134-081 |
| 155.00 | 134.00 | 8.10 | 0.00 | 0.00 | 0.00 | GP2-155134-081 |
| 160.00 | 137.00 | 16.00 | 0.00 | 0.00 | 0.00 | PHD-160137-160 |
| 160.00 | 139.00 | 8.10 | 0.00 | 0.00 | 0.00 | GP8-160139-081 |
| 160.00 | 139.00 | 8.10 | 0.00 | 0.00 | 0.00 | GP6-160139-081 |
| 160.00 | 139.00 | 8.10 | 0.00 | 0.00 | 0.00 | GP4-160139-081 |
| 160.00 | 139.00 | 8.10 | 0.00 | 0.00 | 0.00 | GP2-160139-081 |
| 160.00 | 139.00 | 11.00 | 0.00 | 0.00 | 0.00 | GP2-160139-110 |
| 160.00 | 140.00 | 16.00 | 0.00 | 0.00 | 0.00 | PHD-160140-160 |
| 160.00 | 140.00 | 17.00 | 0.00 | 0.00 | 0.00 | PHD-160140-170 |
| 160.00 | 140.00 | 19.00 | 0.00 | 0.00 | 0.00 | PHD-160140-190 |
| 160.00 | 140.62 | 9.63 | 0.00 | 0.00 | 0.00 | GP8-160140-096 |
| 160.00 | 144.50 | 6.30 | 0.00 | 0.00 | 0.00 | GP2-160144-063 |



KPDP



GP2



GP4



GP6



GP8



PHD



GP3 (Made to order)

| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
|--------|--------|-------|------|------|------|----------------|
| 165.00 | 142.00 | 16.00 | 0.00 | 0.00 | 0.00 | PHD-165142-160 |
| 165.00 | 144.00 | 8.10 | 0.00 | 0.00 | 0.00 | GP3-165144-081 |
| 165.00 | 144.00 | 8.10 | 0.00 | 0.00 | 0.00 | GP4-165144-081 |
| 165.00 | 144.00 | 8.10 | 0.00 | 0.00 | 0.00 | GP2-165144-081 |
| 170.00 | 147.00 | 16.00 | 0.00 | 0.00 | 0.00 | PHD-170147-160 |
| 170.00 | 149.00 | 8.10 | 0.00 | 0.00 | 0.00 | GP8-170149-081 |
| 170.00 | 149.00 | 8.10 | 0.00 | 0.00 | 0.00 | GP6-170149-081 |
| 170.00 | 149.00 | 8.10 | 0.00 | 0.00 | 0.00 | GP4-170149-081 |
| 170.00 | 149.00 | 8.10 | 0.00 | 0.00 | 0.00 | GP2-170149-081 |
| 170.00 | 150.62 | 9.63 | 0.00 | 0.00 | 0.00 | GP8-170150-096 |
| 170.00 | 154.00 | 12.50 | 0.00 | 0.00 | 0.00 | PHD-170154-125 |
| 180.00 | 157.00 | 15.50 | 0.00 | 0.00 | 0.00 | PHD-180157-160 |
| 180.00 | 159.00 | 8.10 | 0.00 | 0.00 | 0.00 | GP6-180159-081 |
| 180.00 | 159.00 | 8.10 | 0.00 | 0.00 | 0.00 | GP8-180159-081 |
| 180.00 | 159.00 | 8.10 | 0.00 | 0.00 | 0.00 | GP4-180159-081 |
| 180.00 | 159.00 | 8.10 | 0.00 | 0.00 | 0.00 | GP2-180159-081 |
| 180.00 | 160.00 | 16.00 | 0.00 | 0.00 | 0.00 | PHD-180160-160 |
| 180.00 | 160.62 | 9.63 | 0.00 | 0.00 | 0.00 | GP8-180160-096 |
| 180.00 | 164.50 | 6.30 | 0.00 | 0.00 | 0.00 | GP2-180164-063 |
| 185.00 | 162.00 | 16.00 | 0.00 | 0.00 | 0.00 | PHD-185162-160 |
| 185.00 | 164.00 | 8.10 | 0.00 | 0.00 | 0.00 | GP2-185164-081 |
| 190.00 | 167.00 | 16.00 | 0.00 | 0.00 | 0.00 | PHD-190167-160 |
| 190.00 | 169.00 | 0.00 | 0.00 | 0.00 | 0.00 | GP8-190169-081 |
| 190.00 | 169.00 | 8.10 | 0.00 | 0.00 | 0.00 | GP4-190169-081 |
| 190.00 | 169.00 | 8.10 | 0.00 | 0.00 | 0.00 | GP2-190169-081 |
| 190.00 | 170.00 | 15.50 | 0.00 | 0.00 | 0.00 | PHD-190170-160 |
| 199.00 | 220.00 | 0.00 | 0.00 | 0.00 | 0.00 | GP8-220199-081 |
| 200.00 | 177.00 | 16.00 | 0.00 | 0.00 | 0.00 | PHD-200177-160 |
| 200.00 | 179.00 | 8.10 | 0.00 | 0.00 | 0.00 | GP8-200179-081 |
| 200.00 | 179.00 | 8.10 | 0.00 | 0.00 | 0.00 | GP4-200179-081 |
| 200.00 | 179.00 | 8.10 | 0.00 | 0.00 | 0.00 | GP6-200179-081 |





KPDP



GP2



GP4



GP6



GP8



PHD



GP3 (Made to order)

| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
|--------|--------|-------|------|------|------|-----------------|
| 200.00 | 179.00 | 8.10 | 0.00 | 0.00 | 0.00 | GP2-200179-081M |
| 200.00 | 180.00 | 8.00 | 0.00 | 0.00 | 0.00 | GP3-200180-080 |
| 200.00 | 180.00 | 20.00 | 0.00 | 0.00 | 0.00 | PHD-200180-200 |
| 210.00 | 187.00 | 16.00 | 0.00 | 0.00 | 0.00 | PHD-210187-160 |
| 210.00 | 189.00 | 8.10 | 0.00 | 0.00 | 0.00 | GP4-210189-081 |
| 210.00 | 189.00 | 8.10 | 0.00 | 0.00 | 0.00 | GP2-210189-081 |
| 215.00 | 194.00 | 8.10 | 0.00 | 0.00 | 0.00 | GP2-215194-081 |
| 220.00 | 197.00 | 16.00 | 0.00 | 0.00 | 0.00 | PHD-220197-160 |
| 220.00 | 199.00 | 8.10 | 0.00 | 0.00 | 0.00 | GP3-220199-081 |
| 225.00 | 202.00 | 16.00 | 0.00 | 0.00 | 0.00 | PHD-225202-160 |
| 225.00 | 204.00 | 8.10 | 0.00 | 0.00 | 0.00 | GP4-225204-081 |
| 225.00 | 204.00 | 8.10 | 0.00 | 0.00 | 0.00 | GP2-225204-081 |
| 230.00 | 204.73 | 9.63 | 0.00 | 0.00 | 0.00 | GP2-230204-096 |
| 230.00 | 207.00 | 16.00 | 0.00 | 0.00 | 0.00 | PHD-230207-160 |
| 230.00 | 209.00 | 0.00 | 0.00 | 0.00 | 0.00 | GP8-230209-081 |
| 230.00 | 209.00 | 8.10 | 0.00 | 0.00 | 0.00 | GP3-230209-081 |
| 230.00 | 209.00 | 8.10 | 0.00 | 0.00 | 0.00 | GP4-230209-081 |
| 230.00 | 214.00 | 6.30 | 0.00 | 0.00 | 0.00 | GP2-230214-063 |
| 240.00 | 217.00 | 16.00 | 0.00 | 0.00 | 0.00 | PHD-240217-160 |
| 240.00 | 219.00 | 8.10 | 0.00 | 0.00 | 0.00 | GP4-240219-081 |
| 240.00 | 219.00 | 8.10 | 0.00 | 0.00 | 0.00 | GP2-240219-081 |
| 250.00 | 222.00 | 17.50 | 0.00 | 0.00 | 0.00 | PHD-250222-175 |
| 250.00 | 229.00 | 8.10 | 0.00 | 0.00 | 0.00 | GP6-250229-081 |
| 250.00 | 229.00 | 8.10 | 0.00 | 0.00 | 0.00 | GP4-250229-081 |
| 250.00 | 229.00 | 8.10 | 0.00 | 0.00 | 0.00 | GP2-250229-081 |
| 260.00 | 232.00 | 17.50 | 0.00 | 0.00 | 0.00 | PHD-260232-175 |
| 260.00 | 239.00 | 8.10 | 0.00 | 0.00 | 0.00 | GP4-260239-081 |
| 260.00 | 239.00 | 8.10 | 0.00 | 0.00 | 0.00 | GP2-260239-081 |
| 280.00 | 252.00 | 17.50 | 0.00 | 0.00 | 0.00 | PHD-280252-175 |
| 280.00 | 259.00 | 8.10 | 0.00 | 0.00 | 0.00 | GP2-280259-081 |
| 300.00 | 272.00 | 17.50 | 0.00 | 0.00 | 0.00 | PHD-300272-175 |



KPDP



GP2



GP4



GP6



GP8



PHD



GP3 (Made to order)

| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
|--------|--------|------|------|------|------|----------------|
| 300.00 | 279.00 | 8.10 | 0.00 | 0.00 | 0.00 | GP4-300279-081 |
| 300.00 | 279.00 | 8.10 | 0.00 | 0.00 | 0.00 | GP2-300279-081 |
| 306.00 | 285.00 | 8.10 | 0.00 | 0.00 | 0.00 | GP3-306285-081 |
| 320.00 | 292.00 | 9.50 | 0.00 | 0.00 | 0.00 | GP2-320292-095 |
| 320.00 | 299.00 | 8.10 | 0.00 | 0.00 | 0.00 | GP4-320299-081 |
| 320.00 | 299.00 | 8.10 | 0.00 | 0.00 | 0.00 | GP2-320299-081 |
| 340.00 | 312.00 | 9.50 | 0.00 | 0.00 | 0.00 | GP2-340312-095 |
| 345.00 | 324.00 | 8.10 | 0.00 | 0.00 | 0.00 | GP3-345324-081 |
| 360.00 | 332.00 | 9.50 | 0.00 | 0.00 | 0.00 | GP2-360332-095 |
| 400.00 | 375.50 | 8.10 | 0.00 | 0.00 | 0.00 | GP2-400375-081 |
| 420.00 | 392.00 | 9.50 | 0.00 | 0.00 | 0.00 | GP2-420392-095 |
| 440.00 | 412.00 | 9.50 | 0.00 | 0.00 | 0.00 | GP2-440412-095 |
| 500.00 | 475.50 | 8.10 | 0.00 | 0.00 | 0.00 | GP2-500475-081 |

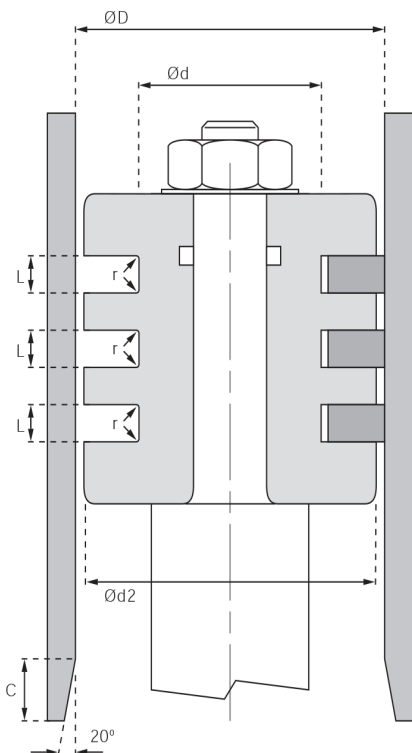


Double acting seals



Key Features

- Heavy duty
- One piece piston
- Very compact design
- Gapping not required
- Hole or slot passability
- High extrusion resistance
- High shock load resistance
- High speed



PR1

Piston Rings

Design

PR1 are manufactured from cast iron. These piston rings are double acting seals. The joint, known as 'Permaseal', over locks both on cross section and width simultaneously. This prevents the end of the rings from moving radially outward when passing open ports. Cast iron piston rings can withstand higher and lower temperatures, are compatible with most media and will resist wear in rougher cylinder bores. End clearance in the ring not only compensates for cylinder diameter tolerances and thermal expansion, it allows for ring and cylinder wear during operation.

Operating Conditions

Pressure, Temperature and Speed

Pressure temperature and speed have very little effect on Cast Iron Rings. Thermal Expansion is allowed for in the joint.

Surface Finish

Cylinder Wall - Satisfactory results can be obtained in bores ranging from 4 to 80 Ra. It has been found however, that excellent ring seating takes place in cylinders with wall finishes from 16 to 40 Ra. Piston groove finish 43 Ra Max.

Tolerances

| ØD | Ød | L | C | r |
|-----|----------------|----------------|-----|-----|
| H10 | +0.00 -0.20 | -0.00 +0.10 | 3.2 | 0.2 |

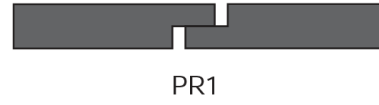
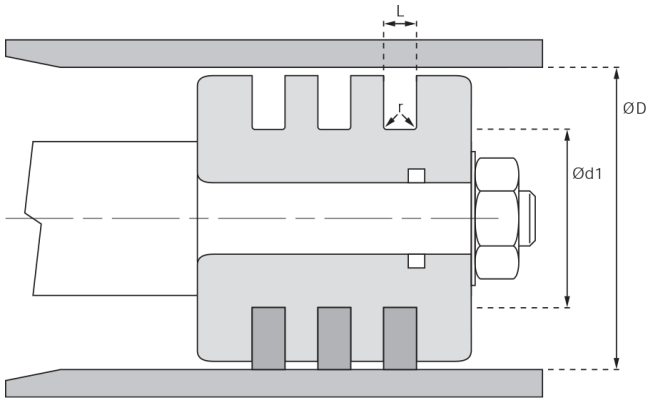
Dia d2 can accept radial clearances 1/3 of the ring radial wall dimension without losing sealing effectiveness. However, the piston bearing diameter should be fitted closely enough to the maximum cylinder bore diameter to ensure parallelism between the side faces of the piston ring and the ring groove.

Typical Examples

- Reciprocating Rotary Oscillating Helix
- 

Other Similar Styles





| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
|--------|--------|------|------|------|------------|-----------------|
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | L102-070059-040 |
| 40.00 | 34.70 | 2.00 | 2.00 | 0.00 | 1.00 | PR1-040034-020 |
| 40.00 | 36.40 | 3.50 | 0.00 | 0.00 | 0.00 | PR1-040036-035 |
| 45.00 | 39.00 | 2.50 | 2.50 | 0.00 | 0.00 | PR1-045039-025 |
| 58.80 | 54.20 | 4.90 | 5.00 | 0.00 | 0.00 | L102-058054-050 |
| 60.00 | 55.00 | 2.50 | 0.00 | 0.00 | 0.00 | PR1-060055-025 |
| 80.00 | 71.00 | 4.80 | 4.90 | 0.00 | 0.00 | PR1-080071-049 |
| 90.00 | 81.00 | 4.00 | 3.50 | 0.00 | 90,081.00 | PR1-090081-040 |
| 100.00 | 88.00 | 4.00 | 4.20 | 0.00 | 100,080.00 | PR1-100088-040 |
| 125.00 | 113.00 | 4.00 | 5.00 | 0.00 | 0.00 | PR1-125113-040 |
| 130.00 | 116.00 | 4.00 | 5.40 | 0.00 | 130,116.00 | PR1-130116-040 |
| 135.00 | 121.00 | 4.00 | 5.40 | 0.00 | 0.00 | PR1-135123-040 |
| 140.00 | 125.00 | 4.00 | 5.70 | 0.00 | 0.00 | PR1-140125-040 |
| 150.00 | 139.00 | 8.00 | 0.00 | 0.00 | 0.00 | PR1-150139-080 |
| 200.00 | 185.00 | 8.10 | 8.00 | 0.00 | 0.00 | PR1-200185-081 |





TET

Piston and Seal

Design

TET are a complete double acting piston, comprising a moulded Nitrile piston head with vulcanised metal support ring. Both sealing lips are reinforced by garter springs to ensure proper radial contact pressure. Complete piston heads are primarily used in pneumatics with oily and non-processed compressed air and dry oil free air. Moulded into the outside diameter between the sealing lips is a bearing support area. Complete piston heads are installed with the rubber covered side of the packing base resting against the shoulder of the rod.

Operating Conditions

Pressure

10 Bar
145 Psi

Pneumatic

40 Bar
580 Psi

Hydraulic

Temperature

-25° to 100°C
-13° to 212°F

Speed

0.5m/sec
1.5"/sec

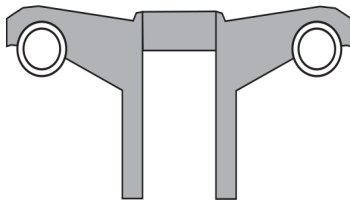
Surface Finish μmRa

$\varnothing d1$ Rt <2um

Tolerance

$\varnothing d1$ H12

Double acting seals



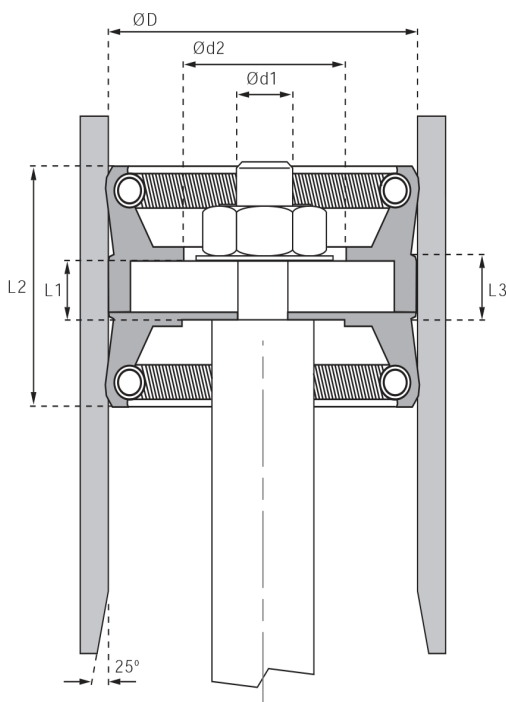
Key Features

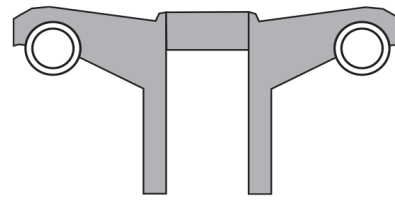
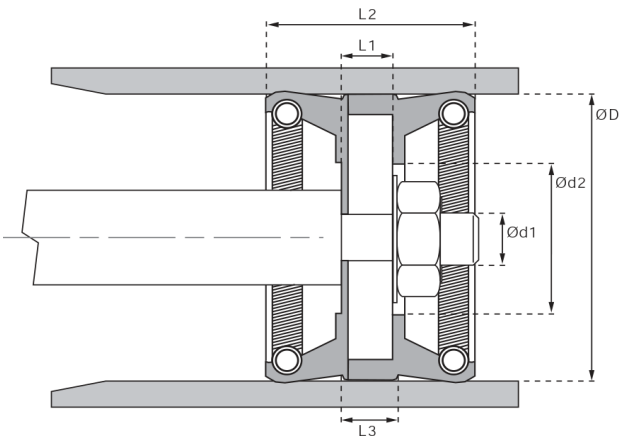
Low pressures

Compact design

Complete piston with bearing support

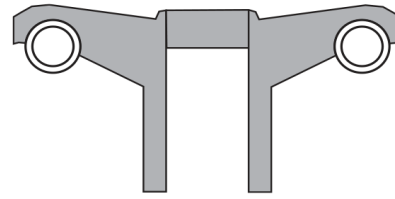
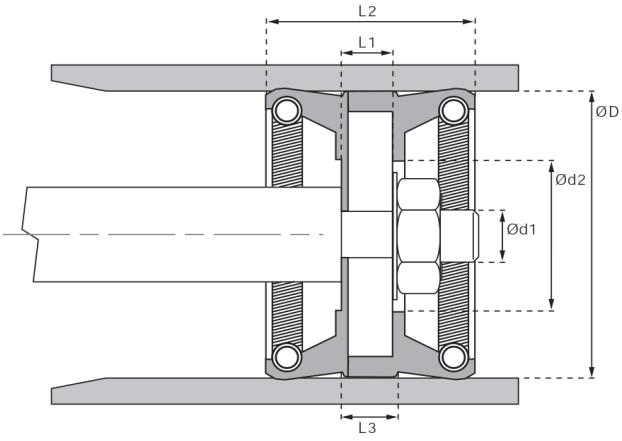
Can run dry oil free air





TET

| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
|--------|-------|-------|-------|-------|-------|----------------|
| 16.00 | 5.00 | 0.00 | 0.00 | 0.00 | 0.00 | TET-050016-020 |
| 25.00 | 8.20 | 3.00 | 22.00 | 15.00 | 6.00 | TET-025008-220 |
| 26.00 | 8.20 | 3.00 | 22.00 | 16.00 | 6.00 | TET-026008-220 |
| 30.00 | 8.20 | 3.00 | 22.00 | 16.00 | 6.00 | TET-030008-220 |
| 32.00 | 8.00 | 6.00 | 15.00 | 26.50 | 16.00 | TET-032008-150 |
| 32.00 | 8.20 | 25.00 | 0.00 | 0.00 | 0.00 | TET-032008-250 |
| 35.00 | 8.20 | 3.00 | 26.00 | 20.00 | 6.00 | TET-035008-260 |
| 40.00 | 10.20 | 4.00 | 18.00 | 0.00 | 0.00 | TET-040010-180 |
| 45.00 | 10.20 | 4.00 | 25.00 | 22.00 | 7.00 | TET-045010-250 |
| 50.00 | 10.00 | 0.00 | 0.00 | 0.00 | 0.00 | TET-050010-140 |
| 50.00 | 10.00 | 18.00 | 0.00 | 0.00 | 0.00 | TET-050010-180 |
| 55.00 | 10.20 | 4.00 | 25.00 | 32.00 | 7.00 | TET-055010-250 |
| 60.00 | 12.20 | 22.00 | 0.00 | 0.00 | 0.00 | TET-060012-220 |
| 63.00 | 12.20 | 4.00 | 25.00 | 40.00 | 7.00 | TET-063012-250 |
| 63.00 | 12.20 | 22.00 | 0.00 | 0.00 | 0.00 | TET-063012-220 |
| 65.00 | 12.20 | 4.00 | 25.00 | 41.00 | 7.00 | TET-065012-250 |
| 70.00 | 12.00 | 22.00 | 0.00 | 0.00 | 0.00 | TET-070012-220 |
| 70.00 | 12.20 | 5.00 | 30.00 | 44.00 | 8.00 | TET-070012-300 |
| 75.00 | 12.20 | 0.00 | 0.00 | 0.00 | 0.00 | TET-075012-225 |
| 75.00 | 12.20 | 5.00 | 30.00 | 50.00 | 8.00 | TET-075012-300 |
| 80.00 | 12.20 | 5.00 | 30.00 | 54.00 | 10.00 | TET-080012-300 |
| 80.00 | 16.20 | 25.00 | 0.00 | 0.00 | 0.00 | TET-080016-225 |
| 80.00 | 16.20 | 25.00 | 0.00 | 0.00 | 0.00 | TET-080016-250 |
| 85.00 | 12.20 | 35.00 | 0.00 | 0.00 | 0.00 | TET-085012-350 |
| 90.00 | 12.20 | 35.00 | 0.00 | 0.00 | 0.00 | TET-090012-350 |
| 90.00 | 16.20 | 25.00 | 0.00 | 0.00 | 0.00 | TET-090016-250 |
| 100.00 | 12.20 | 6.00 | 35.00 | 72.00 | 10.00 | TET-100012-350 |
| 100.00 | 16.00 | 25.00 | 0.00 | 0.00 | 0.00 | TET-100016-250 |
| 100.00 | 20.00 | 0.00 | 0.00 | 0.00 | 0.00 | TET-100020-250 |
| 110.00 | 12.20 | 6.00 | 40.00 | 78.00 | 10.00 | TET-110012-400 |
| 115.00 | 20.20 | 8.00 | 30.00 | 83.00 | 13.00 | TET-115020-300 |



TET

| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
|--------|-------|-------|-------|--------|-------|----------------|
| 120.00 | 20.20 | 8.00 | 40.00 | 88.00 | 13.00 | TET-120020-400 |
| 125.00 | 20.20 | 0.00 | 0.00 | 0.00 | 0.00 | TET-125020-260 |
| 125.00 | 20.20 | 8.00 | 40.00 | 85.00 | 14.00 | TET-125020-400 |
| 130.00 | 20.20 | 40.00 | 0.00 | 0.00 | 0.00 | TET-130020-400 |
| 140.00 | 20.20 | 0.00 | 0.00 | 0.00 | 0.00 | TET-140020-300 |
| 140.00 | 20.20 | 9.00 | 40.00 | 100.00 | 15.00 | TET-140020-400 |
| 150.00 | 20.20 | 10.00 | 40.00 | 105.00 | 15.00 | TET-150020-400 |
| 160.00 | 20.20 | 10.00 | 40.00 | 115.00 | 15.00 | TET-160020-400 |
| 160.00 | 27.00 | 30.00 | 0.00 | 0.00 | 0.00 | TET-160027-300 |
| 175.00 | 20.20 | 10.00 | 40.00 | 120.00 | 15.00 | TET-175020-400 |
| 180.00 | 20.20 | 10.00 | 40.00 | 130.00 | 15.00 | TET-180020-400 |
| 180.00 | 20.20 | 38.00 | 0.00 | 0.00 | 0.00 | TET-180020-380 |
| 200.00 | 20.20 | 10.00 | 40.00 | 146.00 | 15.00 | TET-200020-400 |
| 250.00 | 30.20 | 12.00 | 40.00 | 200.00 | 17.00 | TET-250030-400 |
| 300.00 | 35.20 | 12.00 | 40.00 | 250.00 | 17.00 | TET-300035-400 |
| 300.00 | 60.20 | 12.00 | 40.00 | 250.00 | 17.00 | TET-300060-400 |



RSE

Piston Seals

Design

RSE u-cup seals are a specialised piston seal design manufactured from Polyurethane 94 Shore A. Having an inside diameter smaller than the groove for which it is intended, insures a tight fit in the groove to prevent movement during operation. It also provides sufficient preload to prevent interference with the cylinder wall due to thermal expansion of the seal at higher operating temperatures. The static lip is thinner as it's in full contact with the groove diameter the dynamic lip is heavier to improve higher pressure capability. Both lips have precision knife trimmed chamfers to provide complete circumferential lip contact.

Operating Conditions

Pressure

400 Bar
6,000 Psi



Temperature

-40° to 105°C
-40° to 221°F



Speed

0.8m/sec
2.5'/sec



Surface Finish μmRa

| $\varnothing D$ | $\varnothing d$ | L |
|-----------------|-----------------|-----|
| 0.1 - 0.25 | ≤ 0.8 | 2.0 |

Tolerances

| $\varnothing D$ | $\varnothing d$ | L |
|-----------------|-----------------|-----------|
| H10 | f7 | - 0 +0.25 |

Chamfer Radii

| C/S | 4.0 | 5.0 | 7.5 | 10.0 |
|-----|-----|-----|-----|------|
| C | 3.0 | 3.5 | 5.0 | 6.5 |
| r | 0.2 | 0.4 | 0.8 | 0.8 |

Extrusion Gap - G

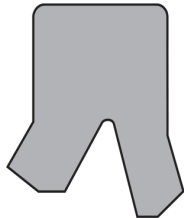
| Pressure (Bar) | 50 | 100 | 200 | 300 | 400 | 500 |
|----------------|------|------|------|------|------|------|
| Seal Only (mm) | 1.20 | 0.80 | 0.40 | 0.25 | 0.17 | 0.10 |
| Seal + BU (mm) | n/a | 1.10 | 0.80 | 0.70 | 0.60 | 0.50 |

Typical Examples

Reciprocating Rotary Oscillating Helix



Single acting seals



Key Features

Medium to heavy duty

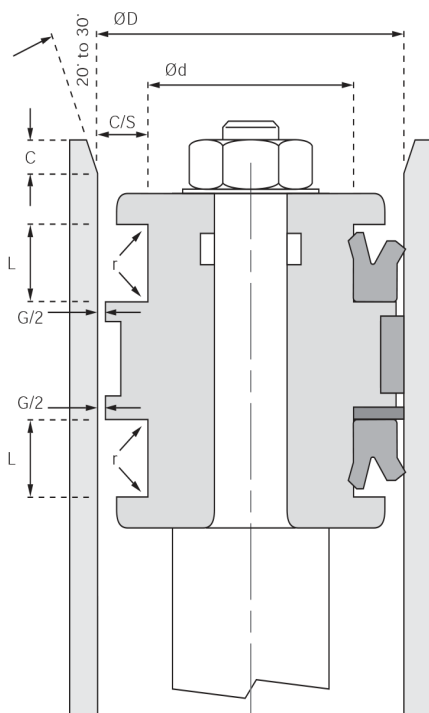
Piston only

Asymmetrical lip design

Excellent wear resistance

Good extrusion resistance

Flexible to fit





RSEA

Piston Seals

Design

RSEA u-cup are a specialised piston seal design manufactured from Polyurethane 94 Shore A, with an anti-extrusion ring made from Polyacetal resin on the outside heel of the seal. Having an inside diameter smaller than the groove for which it is intended, insures a tight fit in the groove to prevent movement during operation. It also provides sufficient preload to prevent interference with the cylinder wall due to thermal expansion of the seal at higher operating temperatures. The static lip is thinner as it's in full contact with the groove diameter, the dynamic lip is heavier, improving high pressure sealing. Both lips have precision knife trimmed chamfers to provide complete circumferential lip contact.

Operating Conditions

Pressure

400 Bar
6,000 Psi



Temperature

-40° to 105°C
-40° to 221°F



Speed

0.8m/sec
2.5'/sec



Surface Finish μmRa

| | | |
|--------------|--------------|-----|
| $\text{\O}D$ | $\text{\O}d$ | L |
| 0.1 - 0.25 | ≤ 0.8 | 2.0 |

Tolerances

| | | |
|--------------|--------------|-------------|
| $\text{\O}D$ | $\text{\O}d$ | L |
| H10 | f7 | -0.00 +0.25 |

Chamfer Radii

| | | | | |
|-----|-----|-----|-----|------|
| c/s | 4.0 | 5.0 | 7.5 | 10.0 |
| C | 3.0 | 3.5 | 5.0 | 6.5 |
| r | 0.2 | 0.4 | 0.8 | 0.8 |

Extrusion Gap - G

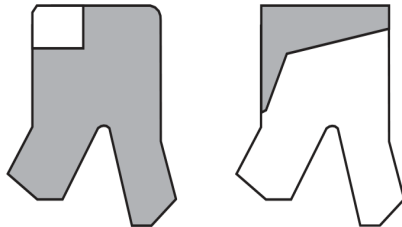
| | | | | | | |
|----------------|------|------|------|------|------|------|
| Pressure (Bar) | 50 | 100 | 200 | 300 | 400 | 500 |
| Seal Only (mm) | 1.20 | 0.80 | 0.40 | 0.25 | 0.17 | 0.10 |
| Seal + BU (mm) | n/a | 1.10 | 0.80 | 0.70 | 0.60 | 0.50 |

Typical Examples

Reciprocating Rotary Oscillating Helix



Single acting seals



Key Features

Medium to heavy duty

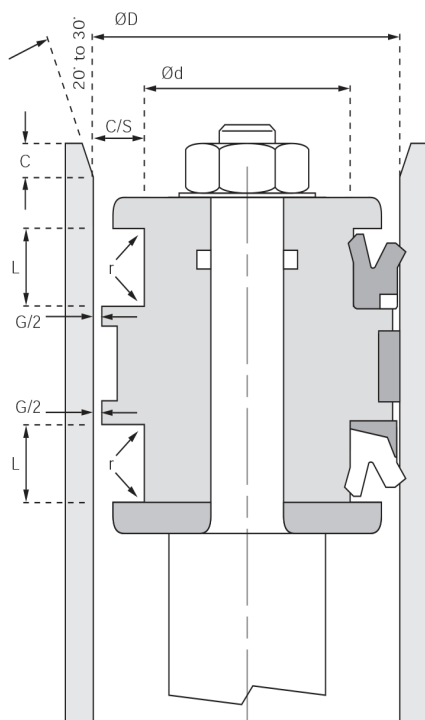
Piston only

Asymmetrical lip design

Excellent wear resistance

Excellent extrusion resistance

Flexible to fit





RSS

Piston Seals

Design

RSS are a symmetrical U-cup made from 94 Shore A Polyurethane with a high modulus of elasticity and low permanent deformation. Its excellent wear resistance offers long service life in a wide range of applications. The symmetrical configuration, with equal lip interference and equal heal clearance on both the inside and outside diameters, provides a seal which is capable for use in both piston and rod applications. The sealing lips are knife trimmed to eliminate all moulding flash and to provide superior low pressure sealing performance.

Operating Conditions

Pressure

400 Bar
6,000 Psi



Temperature

-40° to 105°C
-40° to 221°F



Speed

0.8m/sec
2.5'/sec



Surface Finish μmRa

| $\varnothing D$ | $\varnothing d$ | L |
|-----------------|-----------------|-----|
| 0.1 - 0.25 | ≤ 0.8 | 2.0 |

Tolerances

| $\varnothing D$ | $\varnothing d$ | L |
|-----------------|-----------------|-------------|
| H10 | f7 | -0.00 +0.25 |

Chamfer Radii

| c/s | 4.0 | 5.0 | 7.5 | 10.0 |
|-----|-----|-----|-----|------|
| C | 3.0 | 3.5 | 5.0 | 6.5 |
| r | 0.2 | 0.4 | 0.8 | 0.8 |

Extrusion Gap - G

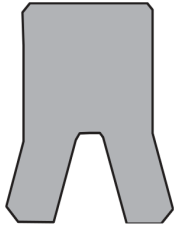
| Pressure (Bar) | 50 | 100 | 200 | 300 | 400 | 500 |
|----------------|------|------|------|------|------|------|
| Seal Only (mm) | 1.20 | 0.80 | 0.40 | 0.25 | 0.17 | 0.10 |
| Seal + BU (mm) | n/a | 1.10 | 0.80 | 0.70 | 0.60 | 0.50 |

Typical Examples

Reciprocating Rotary Oscillating Helix



Single acting seals



Key Features

Medium to heavy duty

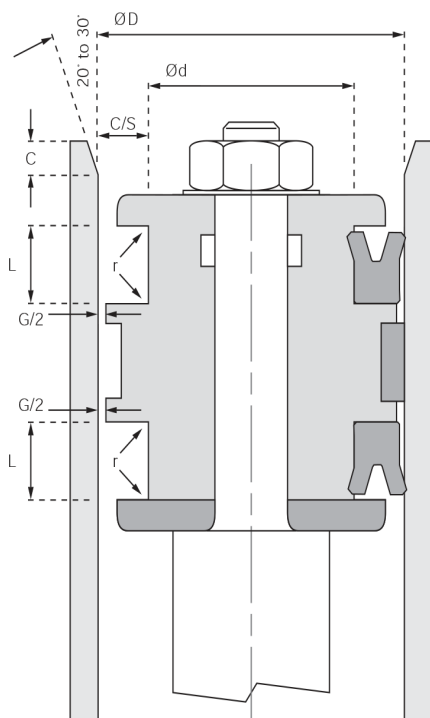
Piston or rod

Symmetrical lip design

Excellent wear resistance

Good extrusion resistance

Flexible to fit

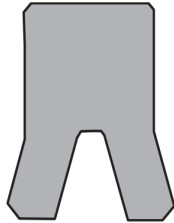




MAD

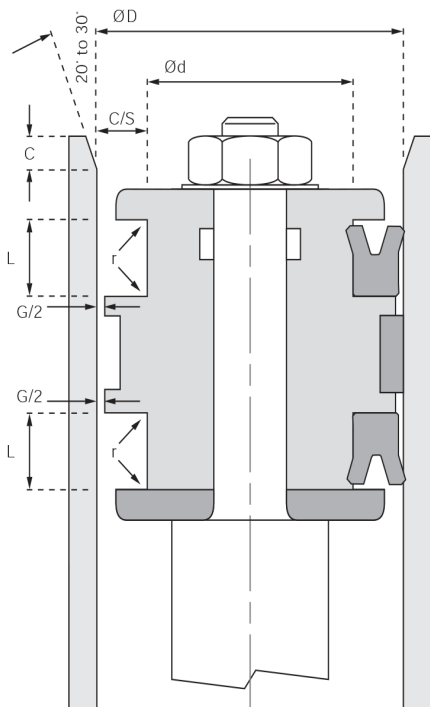
Piston Seals

Single acting seals



Key Features

- Medium to heavy duty
- Piston or rod
- Symmetrical lip design
- Excellent wear resistance
- Good extrusion resistance
- Flexible to fit



Design

MAD are a symmetrical U-cup made from 95 Shore A Polyurethane with a high modulus of elasticity and low permanent deformation. Its excellent wear resistance offers long service life in a wide range of applications. The symmetrical configuration, with equal lip interference and equal heel clearance on both the inside and outside diameters, provides a seal which is capable for use in both piston and rod applications. The sealing lips are knife trimmed to eliminate all moulding flash and to provide superior low pressure sealing performance.

Operating Conditions

Pressure

400 Bar
6,000 Psi



Temperature

-30° to 100°C
-22° to 212°F



Speed

0.8m/sec
2.5'/sec



Surface Finish μmRa

| $\text{\O}D$ | $\text{\O}d$ | L |
|--------------|--------------|-----|
| 0.1 - 0.25 | ≤ 0.8 | 2.0 |

Tolerances

| $\text{\O}D$ | $\text{\O}d$ | L |
|--------------|--------------|-------------|
| H9 | js11 | -0.00 +0.20 |

Chamfer Radii

| c/s | 5.0 | 7.5 | 10.0 | 15.0 | 20.0 |
|-----|-----|-----|------|------|------|
| C | 2.5 | 4.0 | 5.0 | 7.5 | 10.0 |
| r | 0.4 | 0.8 | 0.8 | 1.6 | 1.6 |

Extrusion Gap - G

| Pressure (Bar) | 50 | 100 | 200 | 300 | 400 | 500 |
|----------------|------|------|------|------|------|------|
| Seal Only (mm) | 1.20 | 0.80 | 0.40 | 0.25 | 0.17 | 0.10 |
| Seal + BU (mm) | n/a | 1.10 | 0.80 | 0.70 | 0.60 | 0.50 |

Typical Examples

Reciprocating Rotary Oscillating Helix

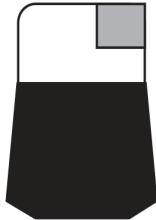




CPE

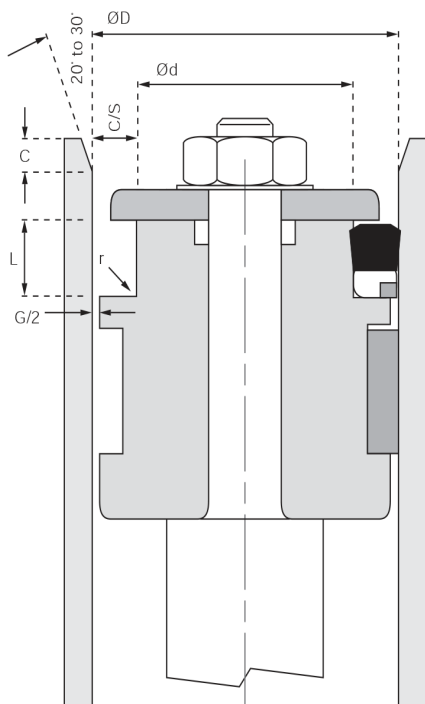
Piston Seals

Single acting seals



Key Features

- Medium to heavy duty
- Piston only
- Tolerant of surface imperfections
- Good service life
- Excellent extrusion resistance



Design

CPE are for use as single acting piston seals. This seal is a precision moulded Nitrile rubber sealing element with a fabric reinforced base to resist extrusion. This design incorporates an Polyacetal anti-extrusion ring to the outside diameter heel of the seal to protect from rapid pressure changes. Manufactured with initial radial interference to effect low pressure sealing, as pressure increases the seal is energised thus increasing the sealing force. Rubberised fabric has the advantage of retaining the sealing media within its surfaces reducing friction and wear. The radial grooves incorporated into the face of the seal on the pressure side, ensure rapid energisation of the seal without excessive end float and resultant wear.

Operating Conditions

Pressure

400 Bar
6,000 Psi



Temperature

-30° to 100°C
-22° to 212°F



Speed

0.5m/sec
1.5'/sec



Surface Finish µmRa

| ØD | Ød | L |
|------------|------|-----|
| 0.1 - 0.25 | ≤0.8 | 2.0 |

Tolerances

| ØD | Ød | L |
|-----|------|----------|
| H10 | js11 | -0 +0.25 |

Chamfer Radii

| | 6.0 | 7.5 | 10.0 |
|-----|-----|-----|------|
| c/s | | | |
| C | 3.0 | 4.0 | 5.0 |
| r | 0.4 | 0.4 | 0.4 |

Extrusion Gap - G

| Pressure (Bar) | 100 | 200 | 300 | 400 |
|----------------|------|------|------|------|
| Seal Only (mm) | 0.80 | 0.60 | 0.50 | 0.40 |
| Seal + BU (mm) | 1.10 | 0.80 | 0.70 | 0.60 |

Typical Examples

Reciprocating Rotary Oscillating Helix



Similar Styles





CP

Piston Seals

Design

CP are designed with a symmetrical profile for use as a single acting piston or rod seal. The seal is a precision moulded Nitrile rubber sealing element with a bonded fabric reinforced base to resist extrusion. Manufactured with initial radial interference to effect low pressure sealing, as pressure increases the seal is energised thus increasing the sealing force. Rubberised fabric has the advantage of retaining the sealing media within its surfaces reducing friction and wear. The radial grooves incorporated into the face of the seal on the pressure side, ensure rapid energisation of the seal without excessive end float and resultant wear.

Operating Conditions

Pressure



Temperature



Speed



Surface Finish μmRa

| $\text{\O}D$ | $\text{\O}d$ | L |
|--------------|--------------|-----|
| 0.1 - 0.25 | ≤ 0.8 | 2.0 |

Tolerances

| $\text{\O}D$ | $\text{\O}d$ | L |
|--------------|--------------|----------|
| H10 | js11 | -0 +0.25 |

Chamfer Radii

| c/s | 4.0 | 5.0 | 7.5 | 10.0 |
|-----|-----|-----|-----|------|
| C | 2.0 | 2.5 | 4.0 | 5.0 |
| r | 0.2 | 0.4 | 0.8 | 0.8 |

Extrusion Gap - G

| Pressure (Bar) | 100 | 200 | 300 | 400 |
|----------------|------|------|------|------|
| Seal Only (mm) | 0.40 | 0.30 | 0.18 | 0.10 |
| Seal + BU (mm) | 1.10 | 0.80 | 0.70 | 0.60 |

Typical Examples

Reciprocating Rotary Oscillating Helix



Similar Styles

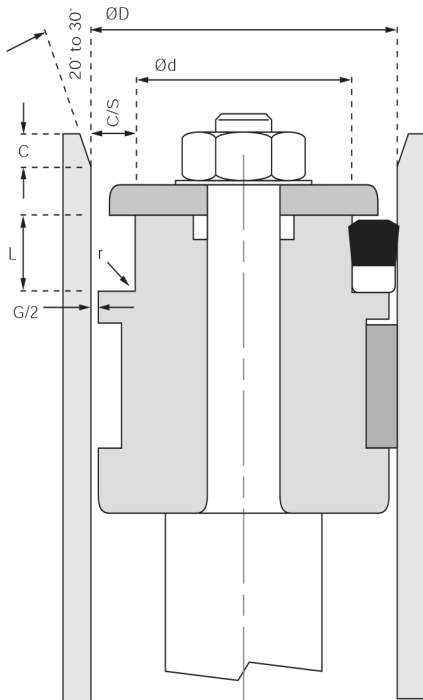


Single acting seals



Key Features

- Medium to heavy duty
- Piston or rod
- Tolerant of surface imperfections
- Good service life
- Good extrusion resistance





RSE



RSEA



RSEA



RSS



MAD



JPS



CPE



CP



19M

| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
|-------|------|------|------|-------|------|-----------------|
| 9.00 | 3.00 | 4.50 | 5.00 | 5.00 | 0.00 | RSS-003009-050 |
| 9.00 | 4.00 | 4.00 | 4.50 | 0.00 | 0.00 | RSS-004009-045 |
| 10.00 | 4.00 | 4.00 | 4.50 | 6.00 | 0.00 | RSS-004010-045 |
| 10.00 | 4.00 | 4.50 | 5.00 | 6.00 | 0.00 | RSS-004010-050 |
| 10.00 | 4.00 | 6.00 | 6.50 | 0.00 | 0.00 | RSS-004010-065 |
| 10.00 | 5.00 | 4.00 | 0.00 | 0.00 | 0.00 | RSS-005010-045 |
| 10.00 | 6.00 | 3.00 | 3.50 | 0.00 | 0.00 | RSS-006010-035 |
| 11.00 | 4.00 | 5.00 | 5.50 | 0.00 | 0.00 | RSS-004011-055A |
| 11.00 | 4.50 | 5.00 | 5.50 | 6.50 | 0.00 | RSS-004011-055 |
| 11.00 | 5.00 | 5.00 | 0.00 | 0.00 | 0.00 | RSS-005011-055 |
| 12.00 | 4.00 | 4.00 | 4.50 | 0.00 | 0.00 | RSS-004012-045 |
| 12.00 | 5.00 | 5.00 | 5.50 | 7.00 | 0.00 | RSS-005012-055 |
| 12.00 | 5.00 | 5.50 | 6.00 | 8.00 | 0.00 | RSE-005012-060 |
| 12.00 | 5.00 | 6.00 | 6.50 | 7.00 | 0.00 | RSS-005012-065 |
| 12.00 | 6.00 | 4.00 | 4.50 | 8.00 | 0.00 | RSS-006012-045 |
| 12.00 | 6.00 | 5.00 | 0.00 | 0.00 | 0.00 | RSS-006012-055 |
| 12.00 | 6.00 | 5.20 | 5.80 | 0.00 | 0.00 | RSS-006012-058 |
| 12.00 | 6.00 | 6.00 | 6.50 | 8.00 | 0.00 | RSS-006012-065 |
| 12.00 | 8.00 | 2.40 | 3.50 | 10.00 | 0.00 | RSS-008012-035 |
| 12.50 | 4.50 | 4.50 | 5.00 | 6.50 | 0.00 | RSS-004012-050 |
| 12.70 | 5.00 | 8.00 | 9.00 | 7.00 | 0.00 | RSS-005012-090 |
| 12.70 | 6.00 | 5.50 | 6.50 | 8.00 | 0.00 | RSS-006127-065 |
| 14.00 | 6.00 | 4.00 | 4.50 | 0.00 | 0.00 | RSS-006014-045 |
| 14.00 | 7.00 | 3.50 | 4.20 | 9.00 | 0.00 | RSS-007014-042 |
| 14.00 | 8.00 | 6.00 | 7.00 | 10.00 | 0.00 | RSS-008014-070 |
| 14.00 | 8.00 | 6.30 | 6.80 | 11.00 | 0.00 | RSE-008014-068 |
| 15.00 | 6.00 | 8.00 | 9.00 | 9.00 | 0.00 | RSS-006015-090 |
| 15.00 | 7.00 | 4.00 | 4.50 | 0.00 | 0.00 | RSS-007015-045 |
| 15.00 | 7.00 | 7.00 | 8.00 | 9.00 | 0.00 | RSS-007015-080 |
| 15.00 | 8.00 | 5.80 | 6.30 | 10.00 | 0.00 | RSS-008015-063 |
| 15.00 | 8.00 | 8.00 | 9.00 | 10.00 | 0.00 | RSS-008015-090 |



RSE



RSEA



RSEA



RSS



MAD



JPS



CPE



CP



19M

| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
|-------|-------|------|-------|-------|-----------|----------------|
| 15.00 | 10.00 | 4.00 | 4.50 | 0.00 | 0.00 | RSS-010015-045 |
| 16.00 | 8.00 | 5.80 | 6.30 | 10.00 | 0.00 | RSS-008016-063 |
| 16.00 | 10.00 | 4.00 | 4.50 | 0.00 | 0.00 | RSS-010016-045 |
| 16.00 | 10.00 | 4.50 | 0.00 | 0.00 | 0.00 | RSS-010016-050 |
| 16.00 | 10.00 | 5.70 | 6.30 | 0.00 | 0.00 | RSE-010016-063 |
| 16.00 | 10.00 | 6.00 | 6.50 | 12.00 | 0.00 | RSS-010016-065 |
| 16.00 | 10.00 | 6.00 | 6.50 | 13.00 | 0.00 | RSE-010016-065 |
| 16.00 | 10.00 | 8.00 | 9.00 | 13.00 | 0.00 | RSE-010016-090 |
| 17.00 | 5.00 | 9.00 | 10.00 | 11.00 | 0.00 | RSS-005017-100 |
| 17.00 | 10.00 | 5.80 | 6.40 | 0.00 | 0.00 | CP-010017-064 |
| 17.00 | 11.00 | 4.00 | 4.50 | 13.00 | 0.00 | RSS-011017-045 |
| 17.10 | 7.10 | 8.00 | 9.00 | 0.00 | 0.00 | RSS-007017-090 |
| 18.00 | 8.00 | 2.00 | 0.00 | 0.00 | 0.00 | 19M-008018-020 |
| 18.00 | 8.00 | 7.50 | 8.50 | 0.00 | 0.00 | RSE-008018-085 |
| 18.00 | 8.00 | 8.00 | 9.00 | 0.00 | 0.00 | RSS-008018-090 |
| 18.00 | 8.00 | 9.00 | 10.00 | 11.00 | 0.00 | RSS-008018-100 |
| 18.00 | 10.00 | 5.00 | 6.00 | 12.00 | 0.00 | RSS-010018-060 |
| 18.00 | 10.00 | 5.70 | 0.00 | 0.00 | 0.00 | RSS-010018-063 |
| 18.00 | 10.00 | 6.00 | 7.00 | 12.00 | 0.00 | RSS-010018-070 |
| 18.00 | 10.00 | 8.00 | 9.00 | 12.00 | 0.00 | RSS-010018-090 |
| 18.00 | 12.00 | 4.00 | 0.00 | 0.00 | 0.00 | RSS-012018-045 |
| 18.00 | 12.00 | 4.80 | 5.50 | 14.00 | 0.00 | RSS-012018-055 |
| 18.00 | 12.00 | 6.00 | 7.00 | 14.00 | 0.00 | RSS-012018-070 |
| 19.00 | 9.00 | 6.00 | 7.00 | 12.00 | 0.00 | RSS-009019-070 |
| 19.00 | 9.00 | 8.00 | 9.00 | 0.00 | 0.00 | RSS-009019-090 |
| 19.20 | 11.20 | 5.00 | 5.70 | 0.00 | 0.00 | RSS-011019-057 |
| 20.00 | 8.00 | 6.00 | 7.00 | 0.00 | 0.00 | RSS-008020-070 |
| 20.00 | 10.00 | 5.00 | 0.00 | 0.00 | 0.00 | RSS-010020-060 |
| 20.00 | 10.00 | 6.00 | 7.00 | 0.00 | 0.00 | RSS-010020-070 |
| 20.00 | 10.00 | 8.00 | 9.00 | 12.00 | 0.00 | RSS-010020-090 |
| 20.00 | 12.00 | 5.80 | 6.50 | 0.00 | 12,020.00 | CP-012020-065 |



RSE



RSEA



RSEA



RSS



MAD



JPS



CPE



CP



19M

| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
|-------|-------|-------|-------|-------|------|-----------------|
| 20.00 | 12.00 | 6.50 | 7.50 | 15.00 | 0.00 | RSE-012020-075 |
| 20.00 | 12.00 | 8.00 | 9.00 | 14.00 | 0.00 | RSS-012020-090 |
| 20.00 | 14.00 | 4.00 | 0.00 | 0.00 | 0.00 | RSS-014020-045 |
| 20.00 | 14.00 | 4.80 | 5.30 | 16.00 | 0.00 | RSS-014020-053 |
| 20.00 | 14.00 | 5.50 | 6.00 | 17.00 | 0.00 | RSE-014020-060 |
| 20.50 | 11.00 | 6.00 | 7.00 | 13.00 | 0.00 | RSS-011020-070 |
| 21.20 | 11.20 | 8.00 | 9.00 | 0.00 | 0.00 | RSS-011021-090 |
| 22.00 | 8.00 | 8.00 | 9.00 | 11.00 | 0.00 | RSS-008022-090 |
| 22.00 | 10.00 | 6.00 | 7.00 | 13.00 | 0.00 | RSS-010022-070 |
| 22.00 | 10.00 | 8.00 | 9.00 | 13.00 | 0.00 | RSS-010022-090 |
| 22.00 | 12.00 | 5.00 | 6.00 | 15.00 | 0.00 | RSS-012022-060 |
| 22.00 | 12.00 | 7.00 | 8.00 | 15.00 | 0.00 | RSS-012022-080 |
| 22.00 | 12.00 | 8.00 | 9.00 | 15.00 | 0.00 | RSS-012022-090 |
| 22.00 | 12.00 | 8.00 | 9.00 | 16.00 | 0.00 | RSE-012022-090 |
| 22.00 | 14.00 | 4.00 | 4.50 | 16.00 | 0.00 | RSS-014022-045 |
| 22.00 | 14.00 | 4.40 | 0.00 | 0.00 | 0.00 | RSS-014022-050 |
| 22.00 | 14.00 | 5.00 | 5.70 | 0.00 | 0.00 | RSS-014022-057 |
| 22.00 | 14.00 | 6.00 | 7.00 | 16.00 | 0.00 | RSS-014022-070 |
| 22.00 | 14.00 | 8.00 | 9.00 | 16.00 | 0.00 | RSS-014022-090 |
| 22.00 | 14.00 | 11.00 | 12.00 | 16.00 | 0.00 | RSS-014022-120 |
| 22.00 | 16.00 | 4.00 | 4.50 | 18.00 | 0.00 | RSS-016022-045 |
| 22.00 | 16.00 | 5.00 | 5.50 | 18.00 | 0.00 | RSS-016022-055 |
| 22.50 | 12.50 | 8.00 | 9.00 | 0.00 | 0.00 | RSS-012022-090A |
| 24.00 | 12.00 | 8.00 | 9.00 | 15.00 | 0.00 | RSS-012024-090 |
| 24.00 | 12.00 | 10.00 | 0.00 | 0.00 | 0.00 | RSS-012024-110 |
| 24.00 | 12.50 | 5.00 | 6.00 | 0.00 | 0.00 | RSS-012024-060 |
| 24.00 | 14.00 | 5.00 | 0.00 | 0.00 | 0.00 | RSS-014024-055 |
| 24.00 | 14.00 | 8.00 | 9.00 | 16.00 | 0.00 | RSS-014024-090 |
| 24.00 | 16.00 | 5.00 | 5.70 | 18.00 | 0.00 | RSS-016024-057 |
| 24.00 | 16.00 | 5.80 | 6.30 | 0.00 | 0.00 | CP-016024-063 |
| 24.00 | 16.00 | 6.50 | 7.00 | 0.00 | 0.00 | CP-016024-070 |



RSE



RSEA



RSEA



RSS



MAD



JPS



CPE



CP



19M

| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
|-------|-------|-------|-------|-------|------|----------------|
| 24.00 | 16.00 | 9.00 | 10.00 | 18.00 | 0.00 | RSS-016024-100 |
| 24.00 | 18.00 | 8.00 | 0.00 | 0.00 | 0.00 | RSS-018024-090 |
| 25.00 | 10.00 | 10.00 | 11.00 | 14.00 | 0.00 | RSE-010025-110 |
| 25.00 | 12.00 | 8.00 | 9.00 | 15.00 | 0.00 | RSS-012025-090 |
| 25.00 | 12.00 | 10.00 | 11.00 | 15.00 | 0.00 | RSS-012025-110 |
| 25.00 | 13.00 | 7.00 | 8.00 | 18.00 | 0.00 | RSE-013025-080 |
| 25.00 | 15.00 | 6.00 | 7.00 | 0.00 | 0.00 | RSE-015025-070 |
| 25.00 | 15.00 | 8.00 | 9.00 | 18.00 | 0.00 | RSS-015025-090 |
| 25.00 | 15.00 | 8.00 | 9.00 | 19.00 | 0.00 | RSE-015025-090 |
| 25.00 | 15.00 | 10.00 | 11.00 | 18.00 | 0.00 | RSS-015025-110 |
| 25.00 | 17.00 | 4.00 | 4.50 | 0.00 | 0.00 | RSS-017025-045 |
| 25.00 | 17.00 | 5.70 | 6.30 | 0.00 | 0.00 | RSE-017025-063 |
| 25.00 | 17.00 | 6.00 | 7.00 | 0.00 | 0.00 | RSS-017025-070 |
| 25.00 | 17.00 | 10.00 | 11.00 | 19.00 | 0.00 | RSS-017025-110 |
| 25.00 | 18.00 | 5.00 | 5.50 | 20.00 | 0.00 | RSS-018025-055 |
| 25.00 | 18.00 | 6.50 | 7.00 | 0.00 | 0.00 | CP-018025-070 |
| 25.00 | 19.00 | 6.00 | 7.00 | 21.00 | 0.00 | RSS-019025-070 |
| 26.00 | 16.00 | 5.00 | 6.00 | 19.00 | 0.00 | RSS-016026-060 |
| 26.00 | 16.00 | 8.00 | 9.00 | 19.00 | 0.00 | RSS-016026-090 |
| 26.00 | 16.00 | 10.00 | 11.00 | 19.00 | 0.00 | RSS-016026-110 |
| 26.00 | 16.75 | 5.80 | 6.30 | 0.00 | 0.00 | CP-016026-063 |
| 26.00 | 18.00 | 5.00 | 5.70 | 0.00 | 0.00 | RSS-018026-057 |
| 26.00 | 18.00 | 6.50 | 7.50 | 20.00 | 0.00 | RSS-018026-075 |
| 26.00 | 18.00 | 8.00 | 9.00 | 20.00 | 0.00 | RSS-018026-090 |
| 26.00 | 18.00 | 8.50 | 9.50 | 20.00 | 0.00 | RSS-018026-095 |
| 26.00 | 20.00 | 0.00 | 0.00 | 0.00 | 0.00 | RSS-020026-055 |
| 27.00 | 15.00 | 6.00 | 7.00 | 18.00 | 0.00 | RSS-015027-070 |
| 27.00 | 20.00 | 6.00 | 0.00 | 0.00 | 0.00 | RSS-020027-070 |
| 27.00 | 20.00 | 6.00 | 6.40 | 0.00 | 0.00 | CP-020027-064 |
| 28.00 | 14.00 | 10.00 | 11.00 | 0.00 | 0.00 | RSS-014028-110 |
| 28.00 | 15.00 | 10.00 | 11.00 | 18.00 | 0.00 | RSS-015028-110 |



RSE



RSEA



RSEA



RSS



MAD



JPS



CPE



CP



19M

| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
|-------|-------|-------|-------|-------|-----------|----------------|
| 28.00 | 16.00 | 6.00 | 7.00 | 19.00 | 0.00 | RSS-016028-070 |
| 28.00 | 18.00 | 8.00 | 9.00 | 21.00 | 0.00 | RSS-018028-090 |
| 28.00 | 20.00 | 4.00 | 5.00 | 22.00 | 0.00 | RSS-020028-050 |
| 28.00 | 20.00 | 5.00 | 5.70 | 0.00 | 0.00 | RSS-020028-057 |
| 28.00 | 20.00 | 5.80 | 6.30 | 0.00 | 0.00 | CP-020028-063 |
| 28.00 | 20.00 | 5.80 | 6.30 | 0.00 | 20,028.00 | RSE-020028-063 |
| 28.00 | 20.00 | 6.50 | 7.00 | 0.00 | 0.00 | RSS-020028-070 |
| 28.00 | 20.00 | 6.50 | 7.00 | 0.00 | 0.00 | CP-020028-070 |
| 28.00 | 20.00 | 8.00 | 9.00 | 22.00 | 0.00 | RSS-020028-090 |
| 28.00 | 22.00 | 8.00 | 9.00 | 24.00 | 0.00 | RSS-022028-090 |
| 29.00 | 19.00 | 8.00 | 8.50 | 0.00 | 0.00 | CP-019029-085 |
| 29.00 | 20.00 | 5.00 | 5.50 | 22.00 | 0.00 | RSS-020029-055 |
| 30.00 | 14.00 | 5.00 | 6.00 | 0.00 | 0.00 | RSS-014030-060 |
| 30.00 | 15.00 | 8.00 | 9.00 | 0.00 | 0.00 | RSS-015030-090 |
| 30.00 | 15.00 | 10.00 | 11.00 | 0.00 | 0.00 | RSS-015030-110 |
| 30.00 | 15.00 | 10.00 | 11.00 | 19.00 | 0.00 | RSE-015030-110 |
| 30.00 | 18.00 | 6.00 | 6.50 | 0.00 | 0.00 | RSS-018030-065 |
| 30.00 | 18.00 | 8.00 | 9.00 | 21.00 | 0.00 | RSS-018030-090 |
| 30.00 | 18.00 | 10.00 | 0.00 | 0.00 | 0.00 | RSS-018030-110 |
| 30.00 | 20.00 | 5.00 | 0.00 | 0.00 | 0.00 | RSS-020030-055 |
| 30.00 | 20.00 | 6.00 | 0.00 | 0.00 | 0.00 | RSS-020030-070 |
| 30.00 | 20.00 | 8.00 | 9.00 | 23.00 | 0.00 | RSS-020030-090 |
| 30.00 | 20.00 | 10.00 | 11.00 | 23.00 | 0.00 | RSS-020030-110 |
| 30.00 | 22.00 | 4.40 | 5.00 | 0.00 | 0.00 | RSS-022030-050 |
| 30.00 | 22.00 | 6.00 | 7.00 | 24.00 | 0.00 | RSS-022030-070 |
| 30.00 | 22.00 | 6.50 | 7.00 | 25.00 | 0.00 | RSE-022030-070 |
| 30.00 | 22.00 | 7.00 | 0.00 | 0.00 | 0.00 | RSS-022030-080 |
| 30.00 | 22.00 | 10.00 | 11.00 | 24.00 | 0.00 | RSS-022030-110 |
| 30.00 | 22.40 | 5.00 | 5.70 | 0.00 | 0.00 | RSS-022030-057 |
| 31.00 | 20.00 | 8.00 | 9.00 | 0.00 | 0.00 | RSS-020031-090 |
| 31.00 | 25.00 | 6.00 | 0.00 | 0.00 | 0.00 | RSS-025031-065 |



RSE



RSEA



RSEA



RSS



MAD



JPS



CPE



CP



19M

| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
|-------|-------|-------|-------|-------|------|-----------------|
| 31.50 | 23.50 | 5.00 | 6.00 | 0.00 | 0.00 | RSS-023031-060 |
| 32.00 | 16.00 | 8.00 | 10.00 | 0.00 | 0.00 | RSS-016032-100 |
| 32.00 | 20.00 | 7.50 | 8.50 | 23.00 | 0.00 | RSS-020032-085 |
| 32.00 | 22.00 | 5.00 | 5.50 | 0.00 | 0.00 | RSS-022032-055 |
| 32.00 | 22.00 | 6.00 | 7.00 | 0.00 | 0.00 | RSS-022032-070 |
| 32.00 | 22.00 | 8.00 | 9.00 | 25.00 | 0.00 | RSS-022032-090 |
| 32.00 | 22.00 | 8.00 | 9.00 | 26.00 | 0.00 | RSE-022032-090 |
| 32.00 | 22.00 | 10.00 | 11.00 | 25.00 | 0.00 | RSS-022032-110 |
| 32.00 | 22.00 | 10.00 | 11.00 | 26.00 | 0.00 | RSE-022032-110 |
| 32.00 | 24.00 | 5.50 | 6.50 | 0.00 | 0.00 | RSS-024032-065 |
| 32.00 | 24.00 | 6.00 | 6.50 | 0.00 | 0.00 | RSS-024032-065 |
| 32.00 | 24.00 | 7.00 | 7.50 | 0.00 | 0.00 | CP-024032-075 |
| 32.00 | 24.00 | 7.00 | 8.00 | 26.00 | 0.00 | RSS-024032-080 |
| 32.00 | 25.00 | 7.00 | 0.00 | 0.00 | 0.00 | RSS-025032-080 |
| 32.00 | 26.00 | 5.00 | 6.00 | 28.00 | 0.00 | RSE-026032-060 |
| 32.00 | 46.00 | 10.00 | 11.00 | 0.00 | 0.00 | RSS-032046-110 |
| 32.40 | 22.40 | 8.00 | 9.00 | 0.00 | 0.00 | RSS-022032-090A |
| 33.00 | 25.00 | 4.00 | 4.50 | 0.00 | 0.00 | RSS-025033-045 |
| 33.00 | 25.00 | 5.00 | 0.00 | 0.00 | 0.00 | GLY-25 |
| 33.00 | 25.00 | 5.00 | 5.70 | 0.00 | 0.00 | RSS-025033-057 |
| 34.00 | 18.00 | 8.00 | 9.00 | 0.00 | 0.00 | RSS-018034-090 |
| 35.00 | 20.00 | 10.00 | 11.00 | 0.00 | 0.00 | RSS-020035-110 |
| 35.00 | 20.00 | 12.00 | 13.00 | 23.00 | 0.00 | RSS-020035-130 |
| 35.00 | 22.00 | 10.00 | 11.00 | 25.00 | 0.00 | RSS-022035-110 |
| 35.00 | 23.00 | 9.00 | 10.00 | 0.00 | 0.00 | RSS-023035-100 |
| 35.00 | 25.00 | 5.00 | 5.50 | 28.00 | 0.00 | RSS-025035-055 |
| 35.00 | 25.00 | 6.00 | 0.00 | 0.00 | 0.00 | RSS-025035-070 |
| 35.00 | 25.00 | 7.00 | 0.00 | 0.00 | 0.00 | RSS-025035-080 |
| 35.00 | 25.00 | 8.00 | 9.00 | 28.00 | 0.00 | RSS-025035-090 |
| 35.00 | 25.00 | 8.50 | 9.00 | 0.00 | 0.00 | CP-025035-090 |
| 35.00 | 25.00 | 10.00 | 11.00 | 28.00 | 0.00 | RSS-025035-110 |



RSE



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| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
|-------|-------|-------|-------|-------|-----------|----------------|
| 35.00 | 27.00 | 5.00 | 0.00 | 0.00 | 0.00 | RSS-027035-055 |
| 35.00 | 27.00 | 6.00 | 0.00 | 0.00 | 0.00 | RSS-027035-070 |
| 35.00 | 27.00 | 10.00 | 11.00 | 30.00 | 0.00 | RSE-027035-110 |
| 35.00 | 28.00 | 5.00 | 5.50 | 30.00 | 0.00 | RSS-028035-055 |
| 35.00 | 28.00 | 6.00 | 0.00 | 0.00 | 0.00 | RSS-028035-070 |
| 35.50 | 28.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-028035-030 |
| 35.50 | 28.00 | 5.00 | 5.70 | 0.00 | 0.00 | RSS-028035-057 |
| 36.00 | 22.00 | 8.00 | 9.00 | 0.00 | 0.00 | RSS-022036-090 |
| 36.00 | 28.00 | 5.00 | 5.70 | 0.00 | 0.00 | RSS-028036-057 |
| 36.00 | 28.00 | 5.80 | 6.40 | 0.00 | 0.00 | CP-028036-064 |
| 36.00 | 28.00 | 6.50 | 7.50 | 30.00 | 0.00 | RSS-028036-075 |
| 37.00 | 20.00 | 12.00 | 13.00 | 0.00 | 0.00 | RSS-020037-130 |
| 37.00 | 21.00 | 12.00 | 13.00 | 25.00 | 0.00 | RSE-021037-130 |
| 37.00 | 25.00 | 7.00 | 8.00 | 0.00 | 0.00 | RSS-025037-080 |
| 37.00 | 30.00 | 6.00 | 7.00 | 32.00 | 0.00 | RSS-030037-070 |
| 37.50 | 30.00 | 6.00 | 6.50 | 0.00 | 0.00 | CP-030037-065 |
| 38.00 | 25.00 | 8.00 | 0.00 | 0.00 | 0.00 | RSS-025038-090 |
| 38.00 | 25.00 | 10.00 | 11.00 | 28.00 | 0.00 | RSS-025038-110 |
| 38.00 | 28.00 | 5.60 | 6.30 | 0.00 | 0.00 | RSS-028038-063 |
| 38.00 | 28.00 | 8.00 | 9.00 | 31.00 | 0.00 | RSS-028038-090 |
| 38.00 | 28.00 | 10.00 | 11.00 | 0.00 | 0.00 | RSS-028038-110 |
| 38.00 | 30.00 | 4.00 | 4.50 | 0.00 | 0.00 | RSS-030038-045 |
| 38.00 | 30.00 | 5.80 | 6.40 | 0.00 | 0.00 | CP-030038-064 |
| 38.00 | 30.00 | 5.80 | 6.50 | 32.00 | 0.00 | RSS-030038-065 |
| 38.00 | 30.00 | 7.00 | 8.00 | 0.00 | 30,038.00 | RSS-030038-080 |
| 38.00 | 31.00 | 4.70 | 5.20 | 34.00 | 0.00 | RSE-031038-052 |
| 39.00 | 20.00 | 10.00 | 11.00 | 23.00 | 0.00 | RSS-020039-110 |
| 39.00 | 32.00 | 5.00 | 5.50 | 0.00 | 0.00 | RSE-032039-055 |
| 40.00 | 20.00 | 10.00 | 11.00 | 24.00 | 0.00 | RSS-020040-110 |
| 40.00 | 20.00 | 12.00 | 13.00 | 24.00 | 0.00 | RSS-020040-130 |
| 40.00 | 22.00 | 10.00 | 11.00 | 0.00 | 0.00 | RSS-022040-110 |



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| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
|-------|-------|-------|-------|-------|-----------|----------------|
| 40.00 | 24.00 | 8.00 | 9.00 | 27.00 | 0.00 | RSS-024040-090 |
| 40.00 | 25.00 | 8.00 | 9.00 | 0.00 | 0.00 | RSS-025040-090 |
| 40.00 | 25.00 | 10.00 | 11.00 | 28.00 | 0.00 | RSS-025040-110 |
| 40.00 | 26.00 | 9.20 | 10.00 | 0.00 | 0.00 | RSS-026040-100 |
| 40.00 | 26.00 | 9.20 | 10.00 | 0.00 | 0.00 | CP-026040-100 |
| 40.00 | 28.00 | 6.00 | 6.50 | 0.00 | 0.00 | RSS-028040-065 |
| 40.00 | 28.00 | 10.00 | 11.00 | 31.00 | 0.00 | RSS-028040-110 |
| 40.00 | 30.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-030040-030 |
| 40.00 | 30.00 | 5.00 | 5.50 | 33.00 | 0.00 | RSS-030040-055 |
| 40.00 | 30.00 | 6.00 | 7.00 | 0.00 | 0.00 | RSS-030040-070 |
| 40.00 | 30.00 | 7.00 | 0.00 | 0.00 | 0.00 | RSS-030040-080 |
| 40.00 | 30.00 | 7.00 | 7.50 | 0.00 | 0.00 | CP-030040-075 |
| 40.00 | 30.00 | 8.00 | 9.00 | 0.00 | 0.00 | RSS-030040-090 |
| 40.00 | 30.00 | 10.00 | 11.00 | 33.00 | 0.00 | RSS-030040-110 |
| 40.00 | 30.00 | 10.00 | 11.00 | 34.00 | 0.00 | RSE-030040-110 |
| 40.00 | 32.00 | 5.00 | 0.00 | 0.00 | 0.00 | RSS-032040-055 |
| 40.00 | 32.00 | 5.50 | 6.00 | 34.00 | 0.00 | RSS-032040-060 |
| 40.00 | 32.00 | 5.80 | 6.40 | 0.00 | 0.00 | CP-032040-064 |
| 40.00 | 32.00 | 8.00 | 9.00 | 34.00 | 0.00 | RSS-032040-090 |
| 40.00 | 32.00 | 8.00 | 9.00 | 35.00 | 0.00 | RSE-032040-090 |
| 40.00 | 32.00 | 10.00 | 0.00 | 0.00 | 0.00 | RSS-032040-110 |
| 41.50 | 31.50 | 6.00 | 7.00 | 0.00 | 31,041.00 | RSS-031041-070 |
| 42.00 | 30.00 | 8.00 | 9.00 | 0.00 | 0.00 | RSS-030042-090 |
| 42.00 | 30.00 | 9.00 | 10.00 | 33.00 | 0.00 | RSS-030042-100 |
| 42.00 | 30.00 | 10.00 | 11.00 | 33.00 | 0.00 | RSS-030042-110 |
| 42.00 | 32.00 | 6.00 | 7.00 | 0.00 | 0.00 | RSS-032042-070 |
| 42.00 | 32.00 | 10.00 | 11.00 | 35.00 | 0.00 | RSS-032042-110 |
| 42.00 | 32.00 | 10.00 | 11.00 | 36.00 | 0.00 | RSE-032042-110 |
| 43.00 | 25.00 | 9.00 | 10.00 | 29.00 | 0.00 | RSE-025043-100 |
| 43.00 | 28.00 | 9.00 | 10.00 | 0.00 | 0.00 | RSS-028043-100 |
| 43.00 | 28.00 | 10.00 | 11.00 | 0.00 | 0.00 | RSS-028043-110 |



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| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
|-------|-------|-------|-------|-------|-----------|-----------------|
| 43.00 | 30.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-030043-030 |
| 44.00 | 20.00 | 11.00 | 12.00 | 25.00 | 0.00 | RSE-020044-120 |
| 45.00 | 25.00 | 10.00 | 11.00 | 0.00 | 0.00 | RSS-025045-110 |
| 45.00 | 27.00 | 12.10 | 12.50 | 0.00 | 0.00 | JPS-027045-125 |
| 45.00 | 28.50 | 12.00 | 13.00 | 33.00 | 0.00 | RSE-028045-130 |
| 45.00 | 30.00 | 8.00 | 9.00 | 0.00 | 0.00 | RSS-030045-090 |
| 45.00 | 30.00 | 10.00 | 11.00 | 34.00 | 0.00 | RSS-030045-110 |
| 45.00 | 32.00 | 8.00 | 0.00 | 0.00 | 0.00 | RSS-032045-090 |
| 45.00 | 32.00 | 10.00 | 11.00 | 35.00 | 0.00 | RSS-032045-110 |
| 45.00 | 34.00 | 7.00 | 8.00 | 37.00 | 0.00 | RSS-034045-080 |
| 45.00 | 34.00 | 9.00 | 10.00 | 37.00 | 0.00 | RSS-034045-100 |
| 45.00 | 35.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-035045-030 |
| 45.00 | 35.00 | 5.00 | 5.50 | 0.00 | 0.00 | RSS-035045-055 |
| 45.00 | 35.00 | 6.00 | 7.00 | 0.00 | 0.00 | RSS-035045-070 |
| 45.00 | 35.00 | 7.00 | 0.00 | 0.00 | 0.00 | RSS-035045-080 |
| 45.00 | 35.00 | 8.00 | 9.00 | 38.00 | 0.00 | RSS-035045-090 |
| 45.00 | 35.00 | 10.00 | 11.00 | 38.00 | 0.00 | RSS-035045-110 |
| 45.00 | 35.50 | 6.00 | 7.00 | 0.00 | 0.00 | RSS-035045-070A |
| 45.00 | 38.00 | 5.00 | 5.50 | 40.00 | 0.00 | RSS-038045-055 |
| 46.00 | 36.00 | 5.00 | 5.50 | 0.00 | 0.00 | RSS-036046-055 |
| 46.00 | 36.00 | 6.00 | 0.00 | 0.00 | 0.00 | RSS-036046-070 |
| 46.00 | 36.00 | 7.00 | 8.00 | 39.00 | 0.00 | RSS-036046-080 |
| 46.00 | 38.00 | 6.50 | 7.50 | 40.00 | 0.00 | RSS-038046-075 |
| 46.50 | 31.50 | 10.00 | 11.00 | 0.00 | 0.00 | RSS-031046-110 |
| 48.00 | 28.00 | 10.00 | 11.00 | 0.00 | 0.00 | RSS-028048-110 |
| 48.00 | 32.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-032048-030 |
| 48.00 | 32.00 | 10.00 | 11.00 | 0.00 | 0.00 | RSS-032048-110 |
| 48.00 | 35.00 | 10.00 | 11.00 | 38.00 | 0.00 | RSS-035048-110 |
| 48.00 | 36.00 | 8.00 | 9.00 | 0.00 | 36,048.00 | RSS-036048-090 |
| 48.00 | 38.00 | 6.00 | 7.00 | 0.00 | 0.00 | RSS-038048-070 |
| 48.00 | 40.00 | 0.00 | 0.00 | 0.00 | 0.00 | CP-040048-065 |



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19M

| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
|-------|-------|-------|-------|-------|-----------|-----------------|
| 48.00 | 40.00 | 11.00 | 12.00 | 42.00 | 0.00 | RSS-040048-120 |
| 50.00 | 30.00 | 10.00 | 11.00 | 34.00 | 0.00 | RSS-030050-110 |
| 50.00 | 30.00 | 12.00 | 13.00 | 34.00 | 0.00 | RSS-030050-130 |
| 50.00 | 30.00 | 12.00 | 13.00 | 35.00 | 0.00 | RSE-030050-130 |
| 50.00 | 30.00 | 14.00 | 14.50 | 0.00 | 0.00 | CPE-030050-145 |
| 50.00 | 32.00 | 10.00 | 11.00 | 0.00 | 0.00 | RSS-032050-110 |
| 50.00 | 32.00 | 10.00 | 11.00 | 35.00 | 0.00 | RSE-032050-110 |
| 50.00 | 32.00 | 12.00 | 13.00 | 36.00 | 0.00 | RSS-032050-130 |
| 50.00 | 32.00 | 12.10 | 12.50 | 0.00 | 0.00 | JPS-032050-125 |
| 50.00 | 34.00 | 14.00 | 15.00 | 37.00 | 0.00 | RSS-034050-150 |
| 50.00 | 35.00 | 9.00 | 10.00 | 0.00 | 0.00 | RSS-035050-100 |
| 50.00 | 35.00 | 10.00 | 11.00 | 0.00 | 0.00 | CP-035050-110 |
| 50.00 | 35.00 | 10.00 | 11.00 | 39.00 | 0.00 | RSS-035050-110 |
| 50.00 | 35.00 | 10.00 | 11.00 | 40.00 | 35,050.00 | RSEA-035050-110 |
| 50.00 | 38.00 | 5.50 | 6.50 | 0.00 | 0.00 | RSS-038050-065 |
| 50.00 | 38.00 | 9.00 | 10.00 | 41.00 | 0.00 | RSS-038050-100 |
| 50.00 | 39.00 | 7.80 | 8.60 | 44.00 | 0.00 | RSEA-039050-086 |
| 50.00 | 40.00 | 0.00 | 0.00 | 0.00 | 0.00 | RSS-040050-055 |
| 50.00 | 40.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-040050-030 |
| 50.00 | 40.00 | 5.00 | 5.50 | 44.00 | 0.00 | RSE-040050-055 |
| 50.00 | 40.00 | 6.00 | 7.00 | 0.00 | 0.00 | RSS-040050-070 |
| 50.00 | 40.00 | 6.50 | 7.50 | 43.00 | 0.00 | RSS-040050-075 |
| 50.00 | 40.00 | 7.00 | 8.00 | 0.00 | 0.00 | RSS-040050-080 |
| 50.00 | 40.00 | 8.00 | 9.00 | 43.00 | 0.00 | RSS-040050-090 |
| 50.00 | 40.00 | 9.00 | 0.00 | 0.00 | 0.00 | RSS-040050-100 |
| 50.00 | 40.00 | 9.00 | 10.00 | 0.00 | 0.00 | RSEA-040050-100 |
| 50.00 | 40.00 | 10.00 | 11.00 | 43.00 | 0.00 | RSS-040050-110 |
| 50.00 | 42.00 | 5.00 | 0.00 | 0.00 | 0.00 | RSS-042050-055 |
| 50.00 | 42.00 | 5.50 | 6.00 | 45.00 | 0.00 | RSE-042050-060 |
| 50.00 | 42.00 | 6.00 | 7.00 | 0.00 | 0.00 | RSS-042050-070 |
| 50.00 | 42.00 | 8.00 | 9.00 | 44.00 | 0.00 | RSS-042050-090 |



RSE



RSEA



RSEA



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19M

| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
|-------|-------|-------|-------|-------|-----------|-----------------|
| 50.00 | 42.00 | 8.00 | 9.00 | 45.00 | 0.00 | RSE-042050-090 |
| 50.00 | 42.00 | 10.00 | 11.00 | 45.00 | 0.00 | RSE-042050-110 |
| 50.50 | 35.50 | 10.00 | 11.00 | 0.00 | 0.00 | RSS-035050-110A |
| 51.00 | 36.00 | 10.50 | 11.00 | 0.00 | 0.00 | CP-036051-110 |
| 52.00 | 40.00 | 9.00 | 10.00 | 0.00 | 0.00 | RSS-040052-100 |
| 52.00 | 42.00 | 6.00 | 7.00 | 0.00 | 0.00 | RSS-042052-070 |
| 52.00 | 42.00 | 9.00 | 10.00 | 45.00 | 0.00 | RSS-042052-100 |
| 52.00 | 42.00 | 10.00 | 10.60 | 46.00 | 0.00 | RSE-042052-106 |
| 53.00 | 45.00 | 6.50 | 7.50 | 0.00 | 45,053.00 | RSS-045053-075 |
| 55.00 | 35.00 | 10.00 | 11.00 | 39.00 | 0.00 | RSS-035055-110 |
| 55.00 | 35.00 | 12.00 | 13.00 | 39.00 | 0.00 | RSS-035055-130 |
| 55.00 | 37.00 | 12.10 | 12.50 | 0.00 | 0.00 | JPS-037055-125 |
| 55.00 | 38.00 | 10.00 | 11.00 | 41.00 | 0.00 | RSS-038055-110 |
| 55.00 | 40.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-040055-030 |
| 55.00 | 40.00 | 10.00 | 11.00 | 44.00 | 0.00 | RSS-040055-110 |
| 55.00 | 43.00 | 6.00 | 7.00 | 0.00 | 0.00 | RSS-043055-070 |
| 55.00 | 45.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-045055-030 |
| 55.00 | 45.00 | 6.00 | 7.00 | 0.00 | 0.00 | RSS-045055-070 |
| 55.00 | 45.00 | 6.50 | 7.50 | 48.00 | 0.00 | RSS-045055-075 |
| 55.00 | 45.00 | 7.50 | 8.00 | 0.00 | 0.00 | CP-045055-080 |
| 55.00 | 45.00 | 8.00 | 0.00 | 0.00 | 0.00 | RSS-045055-090 |
| 55.00 | 45.00 | 10.00 | 11.00 | 48.00 | 0.00 | RSS-045055-110 |
| 56.00 | 40.00 | 8.00 | 0.00 | 0.00 | 0.00 | RSS-040056-090 |
| 56.00 | 40.00 | 10.00 | 11.00 | 44.00 | 0.00 | RSS-040056-110 |
| 56.00 | 45.00 | 7.00 | 8.00 | 0.00 | 0.00 | RSS-045056-080 |
| 57.00 | 45.00 | 6.00 | 6.50 | 0.00 | 0.00 | RSS-045057-065 |
| 58.00 | 38.00 | 10.00 | 11.00 | 42.00 | 0.00 | RSS-038058-110 |
| 58.00 | 45.00 | 10.00 | 0.00 | 0.00 | 0.00 | RSS-045058-110 |
| 58.00 | 48.00 | 6.50 | 0.00 | 0.00 | 0.00 | RSS-048058-075 |
| 58.00 | 48.00 | 10.00 | 11.00 | 51.00 | 0.00 | RSS-048058-110 |
| 58.00 | 50.00 | 8.00 | 0.00 | 0.00 | 0.00 | RSS-050058-090 |



RSE



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RSEA



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19M

| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
|-------|-------|-------|-------|-------|------|-----------------|
| 60.00 | 40.00 | 10.00 | 11.00 | 45.00 | 0.00 | RSS-040060-110 |
| 60.00 | 40.00 | 12.00 | 0.00 | 0.00 | 0.00 | RSS-040060-130 |
| 60.00 | 40.00 | 12.00 | 13.00 | 45.00 | 0.00 | RSEA-040060-130 |
| 60.00 | 40.00 | 12.00 | 13.00 | 45.00 | 0.00 | RSE-040060-130 |
| 60.00 | 40.00 | 13.00 | 14.00 | 45.00 | 0.00 | RSS-040060-140 |
| 60.00 | 40.00 | 13.50 | 14.50 | 45.00 | 0.00 | RSE-040060-145 |
| 60.00 | 40.00 | 14.00 | 14.50 | 0.00 | 0.00 | CP-040060-145 |
| 60.00 | 40.00 | 18.00 | 19.00 | 45.00 | 0.00 | RSS-040060-190 |
| 60.00 | 42.00 | 12.10 | 12.50 | 0.00 | 0.00 | JPS-042060-125 |
| 60.00 | 44.00 | 11.60 | 12.50 | 0.00 | 0.00 | RSE-044060-125 |
| 60.00 | 44.00 | 12.00 | 13.00 | 0.00 | 0.00 | RSS-044060-130 |
| 60.00 | 45.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-045060-030 |
| 60.00 | 45.00 | 9.00 | 10.00 | 0.00 | 0.00 | RSE-045060-100 |
| 60.00 | 45.00 | 9.30 | 10.00 | 0.00 | 0.00 | RSEA-045060-100 |
| 60.00 | 45.00 | 10.00 | 11.00 | 49.00 | 0.00 | RSS-045060-110 |
| 60.00 | 45.00 | 11.00 | 11.50 | 0.00 | 0.00 | CP-045060-115 |
| 60.00 | 48.00 | 9.00 | 10.00 | 0.00 | 0.00 | RSS-048060-100 |
| 60.00 | 50.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-050060-030 |
| 60.00 | 50.00 | 5.00 | 5.50 | 0.00 | 0.00 | RSS-050060-055 |
| 60.00 | 50.00 | 5.00 | 5.50 | 54.00 | 0.00 | RSE-050060-055 |
| 60.00 | 50.00 | 6.00 | 7.00 | 0.00 | 0.00 | RSS-050060-070 |
| 60.00 | 50.00 | 7.00 | 0.00 | 0.00 | 0.00 | RSS-050060-080 |
| 60.00 | 50.00 | 7.00 | 8.00 | 54.00 | 0.00 | RSE-050060-080 |
| 60.00 | 50.00 | 10.00 | 11.00 | 53.00 | 0.00 | RSS-050060-110 |
| 60.00 | 52.00 | 8.00 | 9.00 | 55.00 | 0.00 | RSE-052060-090 |
| 62.00 | 40.00 | 15.00 | 16.00 | 0.00 | 0.00 | RSS-040062-160 |
| 62.00 | 42.00 | 12.00 | 13.00 | 47.00 | 0.00 | RSS-042062-130 |
| 62.00 | 50.00 | 9.00 | 10.00 | 53.00 | 0.00 | RSS-050062-100 |
| 62.00 | 52.00 | 12.00 | 13.00 | 55.00 | 0.00 | RSS-052062-130 |
| 63.00 | 43.00 | 12.00 | 13.00 | 47.00 | 0.00 | RSE-043063-130 |
| 63.00 | 45.00 | 10.00 | 11.00 | 49.00 | 0.00 | RSS-045063-110 |



RSE



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| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
|-------|-------|-------|-------|-------|------|-----------------|
| 63.00 | 45.00 | 10.00 | 11.00 | 50.00 | 0.00 | RSE-045063-110 |
| 63.00 | 48.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-048063-030 |
| 63.00 | 48.00 | 9.00 | 10.00 | 0.00 | 0.00 | RSE-048063-100 |
| 63.00 | 48.00 | 9.30 | 0.00 | 0.00 | 0.00 | RSEA-048063-100 |
| 63.00 | 48.00 | 10.00 | 11.00 | 0.00 | 0.00 | RSS-048063-110 |
| 63.00 | 48.00 | 12.00 | 13.00 | 53.00 | 0.00 | RSE-048063-130 |
| 63.00 | 50.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-050063-030 |
| 63.00 | 50.00 | 6.00 | 7.00 | 54.00 | 0.00 | RSS-050063-070 |
| 63.00 | 50.00 | 10.00 | 0.00 | 0.00 | 0.00 | RSS-050063-110 |
| 63.00 | 53.00 | 5.00 | 5.50 | 0.00 | 0.00 | RSS-053063-055 |
| 63.00 | 53.00 | 6.00 | 7.00 | 0.00 | 0.00 | RSS-053063-070 |
| 63.00 | 53.00 | 6.50 | 7.50 | 56.00 | 0.00 | RSS-053063-075 |
| 63.00 | 53.00 | 12.00 | 13.00 | 57.00 | 0.00 | RSE-053063-130 |
| 65.00 | 40.00 | 12.00 | 13.00 | 45.00 | 0.00 | RSS-040065-130 |
| 65.00 | 45.00 | 10.00 | 11.00 | 50.00 | 0.00 | RSS-045065-110 |
| 65.00 | 45.00 | 12.00 | 13.00 | 50.00 | 0.00 | RSS-045065-130 |
| 65.00 | 47.00 | 12.10 | 12.50 | 0.00 | 0.00 | JPS-047065-125 |
| 65.00 | 49.00 | 12.00 | 13.00 | 0.00 | 0.00 | RSE-049065-130 |
| 65.00 | 50.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-050065-030 |
| 65.00 | 50.00 | 9.00 | 10.00 | 55.00 | 0.00 | RSEA-050065-100 |
| 65.00 | 50.00 | 10.00 | 0.00 | 0.00 | 0.00 | 19M-050065-100 |
| 65.00 | 50.00 | 10.00 | 11.00 | 0.00 | 0.00 | RSE-050065-110 |
| 65.00 | 50.00 | 10.00 | 11.00 | 54.00 | 0.00 | RSS-050065-110 |
| 65.00 | 50.00 | 10.50 | 11.00 | 0.00 | 0.00 | CP-050065-110 |
| 65.00 | 50.00 | 12.00 | 0.00 | 0.00 | 0.00 | RSS-050065-130 |
| 65.00 | 52.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-052065-030 |
| 65.00 | 52.00 | 8.00 | 9.00 | 0.00 | 0.00 | RSE-052065-090 |
| 65.00 | 55.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-055065-030 |
| 65.00 | 55.00 | 6.00 | 7.00 | 0.00 | 0.00 | RSS-055065-070 |
| 65.00 | 55.00 | 6.00 | 7.00 | 0.00 | 0.00 | RSE-055065-070 |
| 65.00 | 55.00 | 8.00 | 9.00 | 0.00 | 0.00 | RSE-055065-090 |



RSE



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19M

| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
|-------|-------|-------|-------|-------|-----------|-----------------|
| 65.00 | 55.00 | 10.00 | 11.00 | 58.00 | 0.00 | RSS-055065-110 |
| 65.00 | 55.00 | 12.00 | 13.00 | 58.00 | 0.00 | RSS-055065-130 |
| 65.00 | 55.00 | 13.50 | 14.50 | 59.00 | 0.00 | RSE-055065-145 |
| 66.00 | 56.00 | 6.00 | 7.00 | 0.00 | 0.00 | RSS-056066-070 |
| 68.00 | 48.00 | 10.00 | 11.00 | 53.00 | 0.00 | RSE-048068-110 |
| 68.00 | 55.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-055068-030 |
| 68.00 | 58.00 | 6.00 | 7.00 | 0.00 | 0.00 | RSS-058068-070 |
| 69.00 | 61.00 | 8.00 | 8.50 | 0.00 | 0.00 | CP-061069-085 |
| 70.00 | 36.00 | 10.00 | 11.00 | 39.00 | 0.00 | RSS-036070-110 |
| 70.00 | 48.00 | 14.50 | 15.00 | 0.00 | 0.00 | JPS-048070-150 |
| 70.00 | 50.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-050070-030 |
| 70.00 | 50.00 | 10.00 | 11.00 | 55.00 | 0.00 | RSS-050070-110 |
| 70.00 | 50.00 | 12.00 | 13.00 | 0.00 | 0.00 | RSE-050070-130 |
| 70.00 | 50.00 | 12.00 | 13.00 | 55.00 | 0.00 | RSS-050070-130 |
| 70.00 | 50.00 | 12.00 | 13.00 | 55.00 | 0.00 | RSEA-050070-130 |
| 70.00 | 50.00 | 13.50 | 14.50 | 55.00 | 0.00 | RSE-050070-145 |
| 70.00 | 50.00 | 14.00 | 0.00 | 0.00 | 0.00 | CP-050070-145 |
| 70.00 | 50.00 | 15.00 | 16.00 | 55.00 | 0.00 | RSE-050070-160 |
| 70.00 | 50.00 | 18.00 | 19.00 | 55.00 | 0.00 | RSS-050070-190 |
| 70.00 | 54.00 | 12.00 | 13.00 | 0.00 | 0.00 | RSS-054070-130 |
| 70.00 | 55.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-055070-030 |
| 70.00 | 55.00 | 7.50 | 0.00 | 0.00 | 0.00 | RSS-055070-085 |
| 70.00 | 55.00 | 8.50 | 9.50 | 60.00 | 0.00 | RSEA-055070-095 |
| 70.00 | 55.00 | 10.00 | 11.00 | 0.00 | 55,070.00 | RSS-055070-110 |
| 70.00 | 55.00 | 10.50 | 11.00 | 0.00 | 0.00 | RSEA-055070-115 |
| 70.00 | 55.00 | 12.00 | 13.00 | 0.00 | 55,070.00 | RSEA-055070-130 |
| 70.00 | 55.00 | 12.00 | 13.00 | 59.00 | 0.00 | RSS-055070-130 |
| 70.00 | 55.00 | 12.00 | 13.00 | 60.00 | 0.00 | RSE-055070-130 |
| 70.00 | 60.00 | 0.00 | 0.00 | 0.00 | 0.00 | 19M-060070-025 |
| 70.00 | 60.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-060070-030 |
| 70.00 | 60.00 | 5.00 | 5.50 | 0.00 | 0.00 | RSS-060070-055 |



RSE



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19M

| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
|-------|-------|-------|-------|-------|------|----------------|
| 70.00 | 60.00 | 6.00 | 7.00 | 0.00 | 0.00 | RSS-060070-070 |
| 70.00 | 60.00 | 6.00 | 7.00 | 0.00 | 0.00 | RSE-060070-070 |
| 70.00 | 60.00 | 7.00 | 0.00 | 0.00 | 0.00 | RSS-060070-080 |
| 70.00 | 60.00 | 7.00 | 8.00 | 64.00 | 0.00 | RSE-060070-080 |
| 70.00 | 60.00 | 7.50 | 8.00 | 0.00 | 0.00 | CP-060070-080 |
| 70.00 | 60.00 | 8.00 | 9.00 | 63.00 | 0.00 | RSS-060070-090 |
| 70.00 | 60.00 | 10.00 | 11.00 | 63.00 | 0.00 | RSS-060070-110 |
| 70.00 | 60.00 | 12.00 | 13.00 | 63.00 | 0.00 | RSS-060070-130 |
| 70.00 | 60.00 | 13.50 | 14.50 | 0.00 | 0.00 | RSE-060070-145 |
| 70.00 | 62.00 | 7.50 | 8.50 | 0.00 | 0.00 | RSE-062070-085 |
| 71.00 | 60.00 | 7.00 | 8.00 | 0.00 | 0.00 | RSS-060071-080 |
| 71.00 | 61.00 | 6.00 | 7.00 | 0.00 | 0.00 | RSE-061071-070 |
| 72.00 | 58.00 | 12.00 | 13.00 | 0.00 | 0.00 | RSE-058072-130 |
| 73.00 | 53.00 | 12.00 | 13.00 | 0.00 | 0.00 | RSS-053073-130 |
| 73.00 | 60.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-060073-030 |
| 73.00 | 63.00 | 6.00 | 7.00 | 0.00 | 0.00 | RSS-063073-070 |
| 73.00 | 63.00 | 7.00 | 8.00 | 0.00 | 0.00 | RSS-063073-080 |
| 74.00 | 34.00 | 10.00 | 11.00 | 44.00 | 0.00 | RSS-034074-110 |
| 75.00 | 50.00 | 14.00 | 15.00 | 55.00 | 0.00 | RSE-050075-150 |
| 75.00 | 55.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-055075-030 |
| 75.00 | 55.00 | 12.00 | 13.00 | 60.00 | 0.00 | RSS-055075-130 |
| 75.00 | 55.00 | 13.50 | 14.50 | 0.00 | 0.00 | RSE-055075-145 |
| 75.00 | 60.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-060075-030 |
| 75.00 | 60.00 | 10.00 | 11.00 | 64.00 | 0.00 | RSS-060075-110 |
| 75.00 | 60.00 | 12.00 | 13.00 | 64.00 | 0.00 | RSS-060075-130 |
| 75.00 | 60.00 | 12.50 | 13.00 | 0.00 | 0.00 | CPE-060075-130 |
| 75.00 | 62.00 | 7.70 | 8.50 | 0.00 | 0.00 | GPY-062075-085 |
| 75.00 | 63.00 | 9.00 | 9.60 | 0.00 | 0.00 | CP-063075-096 |
| 75.00 | 63.00 | 10.00 | 11.00 | 66.00 | 0.00 | RSS-063075-110 |
| 75.00 | 65.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-065075-030 |
| 75.00 | 65.00 | 5.00 | 5.50 | 69.00 | 0.00 | RSE-065075-055 |



RSE



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19M

| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
|-------|-------|-------|-------|-------|------|-----------------|
| 75.00 | 65.00 | 6.00 | 7.00 | 0.00 | 0.00 | RSS-065075-070 |
| 75.00 | 65.00 | 6.00 | 7.00 | 0.00 | 0.00 | RSE-065075-070 |
| 75.00 | 65.00 | 6.70 | 7.50 | 69.00 | 0.00 | RSE-065075-075 |
| 75.00 | 65.00 | 7.00 | 8.00 | 69.00 | 0.00 | RSE-065075-080 |
| 75.00 | 65.00 | 9.00 | 10.00 | 0.00 | 0.00 | RSS-065075-100 |
| 75.00 | 65.00 | 10.00 | 0.00 | 0.00 | 0.00 | RSS-065075-110 |
| 75.00 | 65.00 | 12.00 | 13.00 | 68.00 | 0.00 | RSS-065075-130 |
| 75.00 | 65.00 | 13.50 | 14.50 | 60.00 | 0.00 | RSE-065075-145 |
| 75.00 | 67.00 | 8.80 | 0.00 | 0.00 | 0.00 | RSE-075067-097 |
| 76.00 | 66.00 | 8.00 | 9.00 | 69.00 | 0.00 | RSS-066076-090 |
| 76.00 | 70.00 | 5.50 | 6.00 | 0.00 | 0.00 | CP-070076-060 |
| 77.00 | 65.00 | 9.00 | 9.60 | 0.00 | 0.00 | CP-065077-096 |
| 77.00 | 67.00 | 6.00 | 7.00 | 0.00 | 0.00 | RSS-067077-070 |
| 77.00 | 67.00 | 10.00 | 11.00 | 70.00 | 0.00 | RSS-067077-110 |
| 77.00 | 67.00 | 12.00 | 13.00 | 70.00 | 0.00 | RSS-067077-130 |
| 78.00 | 62.00 | 10.00 | 11.00 | 0.00 | 0.00 | RSS-062078-110 |
| 78.00 | 63.00 | 10.00 | 11.00 | 67.00 | 0.00 | RSS-063078-110 |
| 78.00 | 65.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-065078-030 |
| 80.00 | 55.00 | 12.00 | 13.00 | 60.00 | 0.00 | RSS-055080-130 |
| 80.00 | 55.00 | 15.00 | 17.00 | 60.00 | 0.00 | RSS-055080-170 |
| 80.00 | 58.00 | 14.50 | 15.00 | 0.00 | 0.00 | JPS-058080-150 |
| 80.00 | 60.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-060080-030 |
| 80.00 | 60.00 | 10.00 | 11.00 | 65.00 | 0.00 | RSS-060080-110 |
| 80.00 | 60.00 | 12.00 | 13.00 | 65.00 | 0.00 | RSS-060080-130 |
| 80.00 | 60.00 | 12.00 | 13.00 | 65.00 | 0.00 | RSEA-060080-130 |
| 80.00 | 60.00 | 14.00 | 14.50 | 0.00 | 0.00 | CPE-060080-145 |
| 80.00 | 60.00 | 18.00 | 19.00 | 65.00 | 0.00 | RSS-060080-190 |
| 80.00 | 65.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-065080-030 |
| 80.00 | 65.00 | 9.00 | 9.50 | 0.00 | 0.00 | RSE-065080-095 |
| 80.00 | 65.00 | 9.00 | 9.50 | 70.00 | 0.00 | RSEA-065080-095 |
| 80.00 | 65.00 | 9.00 | 10.00 | 0.00 | 0.00 | RSE-065080-100 |



RSE



RSEA



RSEA



RSS



MAD



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CPE



CP



19M

| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
|-------|-------|-------|-------|-------|------|-----------------|
| 80.00 | 65.00 | 10.00 | 0.00 | 0.00 | 0.00 | RSS-065080-110 |
| 80.00 | 65.00 | 11.00 | 12.00 | 66.00 | 0.00 | RSS-065080-120 |
| 80.00 | 65.00 | 12.00 | 13.00 | 0.00 | 0.00 | RSE-065080-130 |
| 80.00 | 65.00 | 12.00 | 13.00 | 69.00 | 0.00 | RSS-065080-130 |
| 80.00 | 66.00 | 10.00 | 11.00 | 69.00 | 0.00 | RSS-066080-110 |
| 80.00 | 66.00 | 13.00 | 14.00 | 69.00 | 0.00 | RSS-066080-140 |
| 80.00 | 68.00 | 9.00 | 10.00 | 0.00 | 0.00 | RSS-068080-100 |
| 80.00 | 70.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-070080-030 |
| 80.00 | 70.00 | 5.00 | 6.00 | 73.00 | 0.00 | RSS-070080-060 |
| 80.00 | 70.00 | 6.00 | 7.00 | 0.00 | 0.00 | RSS-070080-070 |
| 80.00 | 70.00 | 8.00 | 9.00 | 73.00 | 0.00 | RSS-070080-090 |
| 80.00 | 70.00 | 10.00 | 11.00 | 73.00 | 0.00 | RSS-070080-110 |
| 80.00 | 70.00 | 12.00 | 13.00 | 73.00 | 0.00 | RSS-070080-130 |
| 80.00 | 71.00 | 6.00 | 7.00 | 0.00 | 0.00 | RSS-071080-070 |
| 80.00 | 72.00 | 12.00 | 13.00 | 0.00 | 0.00 | RSE-072080-130 |
| 82.00 | 66.00 | 12.00 | 13.00 | 0.00 | 0.00 | RSS-066082-130 |
| 83.00 | 63.00 | 13.50 | 14.00 | 0.00 | 0.00 | CP-063083-140 |
| 83.00 | 70.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-070083-030 |
| 84.00 | 70.00 | 10.00 | 11.00 | 0.00 | 0.00 | RSS-070084-110 |
| 85.00 | 60.00 | 12.50 | 13.50 | 65.00 | 0.00 | RSS-060085-135 |
| 85.00 | 63.00 | 14.50 | 15.00 | 0.00 | 0.00 | JPS-063085-150 |
| 85.00 | 65.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-065085-030 |
| 85.00 | 65.00 | 10.00 | 11.00 | 70.00 | 0.00 | RSS-065085-110 |
| 85.00 | 65.00 | 12.00 | 13.00 | 0.00 | 0.00 | RSE-065085-130 |
| 85.00 | 65.00 | 12.00 | 13.00 | 70.00 | 0.00 | RSS-065085-130 |
| 85.00 | 65.00 | 13.50 | 14.50 | 0.00 | 0.00 | RSE-065085-145 |
| 85.00 | 65.00 | 14.00 | 14.50 | 0.00 | 0.00 | CPE-065085-145 |
| 85.00 | 70.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-070085-030 |
| 85.00 | 70.00 | 8.50 | 9.50 | 0.00 | 0.00 | RSEA-070085-095 |
| 85.00 | 70.00 | 9.00 | 10.00 | 0.00 | 0.00 | RSE-070085-100 |
| 85.00 | 70.00 | 10.00 | 11.00 | 0.00 | 0.00 | RSS-070085-110 |



RSE



RSEA



RSEA



RSS



MAD



JPS



CPE



CP



19M

| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
|-------|-------|-------|-------|-------|------|-----------------|
| 85.00 | 70.00 | 12.00 | 13.00 | 74.00 | 0.00 | RSS-070085-130 |
| 85.00 | 75.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-075085-030 |
| 85.00 | 75.00 | 6.00 | 7.00 | 0.00 | 0.00 | RSS-075085-070 |
| 85.00 | 75.00 | 6.00 | 7.00 | 0.00 | 0.00 | RSE-075085-070 |
| 85.00 | 75.00 | 7.00 | 0.00 | 0.00 | 0.00 | RSS-075085-080 |
| 85.00 | 75.00 | 10.00 | 11.00 | 0.00 | 0.00 | RSS-075085-110 |
| 85.00 | 75.00 | 10.00 | 11.00 | 0.00 | 0.00 | RSE-075085-110 |
| 85.00 | 75.00 | 12.00 | 13.00 | 0.00 | 0.00 | RSE-075085-130 |
| 85.00 | 75.00 | 12.00 | 13.00 | 78.00 | 0.00 | RSS-075085-130 |
| 87.00 | 67.00 | 12.00 | 13.00 | 0.00 | 0.00 | RSS-067087-130 |
| 88.00 | 75.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-075088-030 |
| 90.00 | 60.00 | 15.00 | 16.00 | 65.00 | 0.00 | RSS-060090-160 |
| 90.00 | 65.00 | 19.00 | 20.00 | 0.00 | 0.00 | RSS-065090-200 |
| 90.00 | 68.00 | 14.50 | 15.00 | 0.00 | 0.00 | JPS-068090-150 |
| 90.00 | 70.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-070090-030 |
| 90.00 | 70.00 | 10.00 | 11.00 | 0.00 | 0.00 | RSS-070090-110 |
| 90.00 | 70.00 | 12.00 | 13.00 | 0.00 | 0.00 | RSE-070090-130 |
| 90.00 | 70.00 | 12.00 | 13.00 | 75.00 | 0.00 | RSS-070090-130 |
| 90.00 | 70.00 | 12.00 | 13.00 | 75.00 | 0.00 | RSEA-070090-130 |
| 90.00 | 70.00 | 13.50 | 14.50 | 0.00 | 0.00 | RSE-070090-145 |
| 90.00 | 70.00 | 14.00 | 14.50 | 0.00 | 0.00 | CP-070090-145 |
| 90.00 | 70.00 | 18.00 | 19.00 | 75.00 | 0.00 | RSS-070090-190 |
| 90.00 | 75.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-075090-030 |
| 90.00 | 75.00 | 7.00 | 8.00 | 0.00 | 0.00 | RSS-075090-080 |
| 90.00 | 75.00 | 7.50 | 8.50 | 79.00 | 0.00 | RSS-075090-085 |
| 90.00 | 75.00 | 9.00 | 10.00 | 0.00 | 0.00 | RSE-075090-100 |
| 90.00 | 75.00 | 10.00 | 11.00 | 79.00 | 0.00 | RSS-075090-110 |
| 90.00 | 75.00 | 12.00 | 13.00 | 0.00 | 0.00 | RSE-075090-130 |
| 90.00 | 75.00 | 12.00 | 13.00 | 79.00 | 0.00 | RSS-075090-130 |
| 90.00 | 80.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-080090-030 |
| 90.00 | 80.00 | 4.50 | 5.50 | 0.00 | 0.00 | RSS-080090-055 |



RSE



RSEA



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JPS



CPE



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19M

| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
|-------|-------|-------|-------|-------|-----------|----------------|
| 90.00 | 80.00 | 5.00 | 5.50 | 0.00 | 0.00 | RSE-080090-055 |
| 90.00 | 80.00 | 6.00 | 7.00 | 0.00 | 0.00 | RSS-080090-070 |
| 90.00 | 80.00 | 6.00 | 7.00 | 0.00 | 0.00 | RSE-080090-070 |
| 90.00 | 80.00 | 7.50 | 8.00 | 0.00 | 0.00 | CP-080090-080 |
| 90.00 | 80.00 | 8.00 | 9.00 | 0.00 | 0.00 | RSS-080090-090 |
| 90.00 | 80.00 | 10.00 | 11.00 | 83.00 | 0.00 | RSS-080090-110 |
| 90.00 | 80.00 | 12.00 | 13.00 | 83.00 | 0.00 | RSS-080090-130 |
| 90.00 | 80.00 | 13.00 | 14.00 | 0.00 | 0.00 | RSE-080090-140 |
| 92.00 | 76.00 | 12.00 | 13.00 | 0.00 | 0.00 | RSS-076092-130 |
| 92.00 | 81.00 | 7.00 | 8.00 | 0.00 | 0.00 | RSE-081092-080 |
| 92.00 | 82.00 | 10.00 | 11.00 | 85.00 | 0.00 | RSS-082092-110 |
| 92.00 | 84.00 | 5.00 | 6.00 | 0.00 | 0.00 | CP-084092-060 |
| 93.00 | 78.00 | 10.50 | 11.50 | 82.00 | 0.00 | RSS-078093-115 |
| 93.00 | 80.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-080093-030 |
| 94.00 | 84.50 | 8.00 | 8.80 | 89.50 | 0.00 | RSS-084094-088 |
| 95.00 | 69.00 | 10.00 | 0.00 | 0.00 | 0.00 | 19M-069095-100 |
| 95.00 | 70.00 | 12.00 | 13.00 | 75.00 | 0.00 | RSS-070095-130 |
| 95.00 | 75.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-075095-030 |
| 95.00 | 75.00 | 12.00 | 13.00 | 80.00 | 0.00 | RSS-075095-130 |
| 95.00 | 75.00 | 13.50 | 14.50 | 0.00 | 0.00 | RSE-075095-145 |
| 95.00 | 75.00 | 13.50 | 14.50 | 0.00 | 75,095.00 | RSS-075095-145 |
| 95.00 | 80.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-080095-030 |
| 95.00 | 80.00 | 8.00 | 0.00 | 0.00 | 0.00 | RSS-080095-090 |
| 95.00 | 80.00 | 10.00 | 11.00 | 0.00 | 0.00 | RSE-080095-110 |
| 95.00 | 80.00 | 12.00 | 13.00 | 84.00 | 0.00 | RSS-080095-130 |
| 95.00 | 85.00 | 5.00 | 0.00 | 0.00 | 0.00 | RSS-085095-055 |
| 95.00 | 85.00 | 6.70 | 7.50 | 89.00 | 0.00 | RSE-085095-075 |
| 95.00 | 85.00 | 7.00 | 8.00 | 89.00 | 0.00 | RSE-085095-080 |
| 95.00 | 85.00 | 7.50 | 8.00 | 0.00 | 0.00 | CP-085095-080 |
| 95.00 | 85.00 | 8.50 | 9.50 | 88.00 | 0.00 | RSS-085095-095 |
| 95.00 | 85.00 | 12.00 | 13.00 | 88.00 | 0.00 | RSS-085095-130 |



RSE



RSEA



RSEA



RSS



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19M

| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
|--------|-------|-------|-------|-------|-----------|-----------------|
| 95.00 | 85.00 | 13.50 | 14.50 | 89.00 | 0.00 | RSE-085095-145 |
| 96.50 | 76.50 | 12.00 | 13.00 | 0.00 | 76,096.00 | RSS-076096-130 |
| 100.00 | 75.00 | 18.00 | 19.00 | 0.00 | 0.00 | RSE-075100-190 |
| 100.00 | 78.00 | 14.50 | 15.00 | 0.00 | 0.00 | JPS-078100-150 |
| 100.00 | 80.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-080100-030 |
| 100.00 | 80.00 | 9.50 | 10.50 | 0.00 | 80,100.00 | RSS-080100-105 |
| 100.00 | 80.00 | 10.00 | 0.00 | 0.00 | 0.00 | RSS-080100-110 |
| 100.00 | 80.00 | 12.00 | 13.00 | 85.00 | 0.00 | RSS-080100-130 |
| 100.00 | 80.00 | 12.00 | 13.00 | 85.00 | 0.00 | RSEA-080100-130 |
| 100.00 | 80.00 | 13.50 | 14.50 | 85.00 | 0.00 | RSE-080100-145 |
| 100.00 | 85.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-085100-030 |
| 100.00 | 85.00 | 9.00 | 10.00 | 89.00 | 0.00 | RSS-085100-100 |
| 100.00 | 85.00 | 10.00 | 11.00 | 0.00 | 0.00 | RSE-085100-110 |
| 100.00 | 85.00 | 12.00 | 13.00 | 89.00 | 0.00 | RSS-085100-130 |
| 100.00 | 85.00 | 12.00 | 13.00 | 90.00 | 0.00 | RSE-085100-130 |
| 100.00 | 85.00 | 14.00 | 15.00 | 90.00 | 0.00 | RSEA-085100-150 |
| 100.00 | 86.00 | 12.00 | 13.00 | 90.00 | 0.00 | RSE-086100-130 |
| 100.00 | 88.00 | 9.00 | 10.00 | 0.00 | 0.00 | RSS-088100-100 |
| 100.00 | 90.00 | 7.00 | 8.00 | 93.00 | 0.00 | RSS-090100-080 |
| 100.00 | 90.00 | 7.00 | 8.00 | 94.00 | 0.00 | RSE-090100-080 |
| 100.00 | 90.00 | 8.00 | 9.00 | 93.00 | 0.00 | RSS-090100-090 |
| 100.00 | 90.00 | 12.00 | 13.00 | 93.00 | 0.00 | RSS-090100-130 |
| 101.60 | 80.00 | 12.00 | 13.00 | 85.00 | 0.00 | RSE-080101-130 |
| 105.00 | 80.00 | 12.00 | 13.00 | 0.00 | 0.00 | RSS-080105-130 |
| 105.00 | 80.00 | 15.00 | 16.00 | 0.00 | 0.00 | RSS-080105-160 |
| 105.00 | 85.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-085105-030 |
| 105.00 | 85.00 | 12.00 | 13.00 | 90.00 | 0.00 | RSS-085105-130 |
| 105.00 | 90.00 | 2.00 | 0.00 | 0.00 | 0.00 | 19M-090105-020 |
| 105.00 | 90.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-090105-030 |
| 105.00 | 90.00 | 8.50 | 9.50 | 0.00 | 0.00 | CP-090105-095 |
| 105.00 | 90.00 | 9.00 | 9.50 | 0.00 | 0.00 | CP-090105-095 |



RSE



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19M

| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
|--------|--------|-------|-------|--------|------|-----------------|
| 105.00 | 90.00 | 9.00 | 10.00 | 0.00 | 0.00 | RSS-090105-100 |
| 105.00 | 90.00 | 9.00 | 10.00 | 0.00 | 0.00 | RSE-090105-100 |
| 105.00 | 90.00 | 12.00 | 13.00 | 94.00 | 0.00 | RSS-090105-130 |
| 105.00 | 90.00 | 12.00 | 13.00 | 95.00 | 0.00 | RSE-090105-130 |
| 105.00 | 95.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-095105-030 |
| 107.00 | 95.70 | 7.00 | 8.00 | 0.00 | 0.00 | RSE-095107-080 |
| 110.00 | 88.00 | 14.50 | 15.00 | 0.00 | 0.00 | JPS-088110-150 |
| 110.00 | 90.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-090110-030 |
| 110.00 | 90.00 | 10.00 | 11.00 | 0.00 | 0.00 | RSS-090110-110 |
| 110.00 | 90.00 | 12.00 | 13.00 | 0.00 | 0.00 | RSEA-090110-130 |
| 110.00 | 90.00 | 12.00 | 13.00 | 95.00 | 0.00 | RSS-090110-130 |
| 110.00 | 90.00 | 15.00 | 0.00 | 0.00 | 0.00 | RSS-090110-160 |
| 110.00 | 90.00 | 18.00 | 19.00 | 95.00 | 0.00 | RSS-090110-190 |
| 110.00 | 95.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-095110-030 |
| 110.00 | 95.00 | 9.00 | 10.00 | 0.00 | 0.00 | RSS-095110-100 |
| 110.00 | 95.00 | 9.50 | 10.50 | 100.00 | 0.00 | RSEA-095110-105 |
| 110.00 | 95.00 | 12.00 | 13.00 | 99.00 | 0.00 | RSS-095110-130 |
| 110.00 | 95.00 | 12.00 | 13.00 | 100.00 | 0.00 | RSEA-095110-130 |
| 110.00 | 95.00 | 12.00 | 13.00 | 100.00 | 0.00 | RSE-095110-130 |
| 110.00 | 95.00 | 15.00 | 16.00 | 99.00 | 0.00 | RSS-095110-160 |
| 110.00 | 100.00 | 6.00 | 7.00 | 0.00 | 0.00 | RSS-100110-070 |
| 110.00 | 100.00 | 7.00 | 8.00 | 104.00 | 0.00 | RSE-100110-080 |
| 110.00 | 100.00 | 8.00 | 9.00 | 0.00 | 0.00 | RSS-100110-090 |
| 110.00 | 100.00 | 13.50 | 14.50 | 104.00 | 0.00 | RSE-100110-145 |
| 111.00 | 101.00 | 6.50 | 7.00 | 0.00 | 0.00 | CP-101111-070 |
| 112.00 | 95.00 | 11.00 | 12.00 | 99.00 | 0.00 | RSS-095112-120 |
| 112.00 | 98.00 | 9.00 | 10.00 | 0.00 | 0.00 | RSS-098112-100 |
| 115.00 | 90.00 | 15.00 | 16.00 | 95.00 | 0.00 | RSS-090115-160 |
| 115.00 | 93.00 | 14.50 | 15.00 | 0.00 | 0.00 | JPS-093115-150 |
| 115.00 | 95.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-095115-030 |
| 115.00 | 95.00 | 12.00 | 13.00 | 104.00 | 0.00 | RSS-095115-130 |



RSE



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19M

| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
|--------|--------|-------|-------|--------|------------|-----------------|
| 115.00 | 95.00 | 18.00 | 19.00 | 100.00 | 0.00 | RSS-095115-190 |
| 115.00 | 100.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-100115-030 |
| 115.00 | 100.00 | 7.00 | 8.00 | 0.00 | 0.00 | RSS-100115-080 |
| 115.00 | 100.00 | 9.00 | 10.00 | 0.00 | 0.00 | RSS-100115-100 |
| 115.00 | 100.00 | 9.00 | 10.00 | 0.00 | 0.00 | RSE-100115-100 |
| 115.00 | 100.00 | 12.00 | 13.00 | 105.00 | 0.00 | RSS-100115-130 |
| 115.00 | 105.00 | 13.50 | 14.50 | 109.00 | 0.00 | RSE-105115-145 |
| 120.00 | 95.00 | 12.00 | 13.00 | 100.00 | 0.00 | RSE-095120-130 |
| 120.00 | 98.00 | 14.50 | 15.00 | 0.00 | 0.00 | JPS-098120-150 |
| 120.00 | 100.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-100120-030 |
| 120.00 | 100.00 | 10.00 | 11.00 | 0.00 | 0.00 | RSS-100120-110 |
| 120.00 | 100.00 | 12.00 | 13.00 | 105.00 | 0.00 | RSS-100120-130 |
| 120.00 | 103.00 | 16.00 | 17.00 | 108.00 | 0.00 | RSE-103120-170 |
| 120.00 | 105.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-105120-030 |
| 120.00 | 105.00 | 8.00 | 9.00 | 109.00 | 0.00 | RSS-105120-090 |
| 120.00 | 105.00 | 11.50 | 12.00 | 0.00 | 0.00 | CP-105120-120 |
| 120.00 | 105.00 | 11.50 | 12.50 | 0.00 | 0.00 | CP-105120-125 |
| 120.00 | 105.00 | 15.00 | 16.00 | 109.00 | 0.00 | RSS-105120-160 |
| 120.00 | 106.00 | 8.50 | 9.50 | 0.00 | 0.00 | RSE-106120-095 |
| 120.00 | 106.00 | 8.50 | 9.50 | 111.00 | 0.00 | RSS-106120-095 |
| 121.00 | 111.00 | 5.50 | 6.50 | 0.00 | 0.00 | RSS-111121-065 |
| 125.00 | 100.00 | 12.00 | 13.00 | 105.00 | 0.00 | RSS-100125-130 |
| 125.00 | 100.00 | 15.00 | 16.00 | 105.00 | 0.00 | RSS-100125-160 |
| 125.00 | 100.00 | 19.00 | 20.00 | 0.00 | 100,125.00 | CP-100125-200 |
| 125.00 | 103.00 | 14.50 | 15.00 | 0.00 | 0.00 | JPS-103125-150 |
| 125.00 | 105.00 | 12.00 | 13.00 | 110.00 | 0.00 | RSEA-105125-130 |
| 125.00 | 105.00 | 12.00 | 13.00 | 114.00 | 0.00 | RSS-105125-130 |
| 125.00 | 105.00 | 15.00 | 16.00 | 110.00 | 0.00 | RSS-105125-160 |
| 125.00 | 105.00 | 15.00 | 16.00 | 110.00 | 0.00 | RSE-105125-160 |
| 125.00 | 110.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-110125-030 |
| 125.00 | 110.00 | 9.00 | 10.00 | 0.00 | 0.00 | RSS-110125-100 |



RSE



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19M

| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
|--------|--------|-------|-------|--------|------|----------------|
| 125.00 | 110.00 | 12.00 | 13.00 | 114.00 | 0.00 | RSS-110125-130 |
| 125.00 | 110.00 | 15.00 | 16.00 | 110.00 | 0.00 | RSS-110125-160 |
| 125.00 | 112.00 | 9.00 | 10.00 | 0.00 | 0.00 | RSS-112125-100 |
| 125.00 | 112.00 | 9.00 | 10.00 | 0.00 | 0.00 | RSE-112125-100 |
| 125.00 | 113.00 | 9.50 | 10.50 | 116.00 | 0.00 | RSS-113125-105 |
| 125.00 | 115.00 | 8.00 | 9.00 | 0.00 | 0.00 | RSS-115125-090 |
| 125.00 | 115.00 | 15.00 | 16.00 | 119.00 | 0.00 | RSE-115125-160 |
| 126.00 | 106.00 | 16.00 | 17.00 | 0.00 | 0.00 | RSS-106126-170 |
| 126.00 | 115.00 | 15.00 | 16.00 | 118.00 | 0.00 | RSS-115126-160 |
| 130.00 | 104.00 | 19.00 | 19.50 | 0.00 | 0.00 | CP-104130-195 |
| 130.00 | 108.00 | 14.50 | 15.00 | 0.00 | 0.00 | JPS-108130-150 |
| 130.00 | 110.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-110130-030 |
| 130.00 | 110.00 | 12.00 | 13.00 | 0.00 | 0.00 | RSS-110130-130 |
| 130.00 | 110.00 | 15.00 | 16.00 | 115.00 | 0.00 | RSE-110130-160 |
| 130.00 | 110.00 | 18.00 | 19.00 | 115.00 | 0.00 | RSS-110130-190 |
| 130.00 | 115.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-115130-030 |
| 130.00 | 115.00 | 9.00 | 10.00 | 0.00 | 0.00 | RSE-115130-100 |
| 130.00 | 115.00 | 11.00 | 12.00 | 0.00 | 0.00 | RSS-115130-120 |
| 130.00 | 118.00 | 12.00 | 12.50 | 0.00 | 0.00 | CP-118130-125 |
| 130.00 | 120.00 | 7.50 | 8.00 | 0.00 | 0.00 | CP-120130-080 |
| 130.00 | 120.00 | 13.50 | 14.50 | 124.00 | 0.00 | RSE-120130-145 |
| 130.00 | 120.00 | 14.00 | 15.00 | 123.00 | 0.00 | RSS-120130-150 |
| 132.00 | 112.00 | 16.00 | 17.00 | 0.00 | 0.00 | RSS-112132-170 |
| 133.00 | 121.00 | 7.50 | 8.00 | 0.00 | 0.00 | CP-121133-080 |
| 134.00 | 126.00 | 7.50 | 8.00 | 0.00 | 0.00 | CP-126134-080 |
| 135.00 | 110.00 | 18.00 | 19.00 | 0.00 | 0.00 | RSS-110135-190 |
| 135.00 | 115.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-115135-030 |
| 135.00 | 115.00 | 13.50 | 14.50 | 0.00 | 0.00 | RSS-115135-145 |
| 135.00 | 115.00 | 15.00 | 16.00 | 118.00 | 0.00 | RSS-115135-160 |
| 135.00 | 120.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-120135-030 |
| 135.00 | 120.00 | 9.00 | 10.00 | 0.00 | 0.00 | RSS-120135-100 |



RSE



RSEA



RSEA



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19M

| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
|--------|--------|-------|-------|--------|------------|-----------------|
| 135.00 | 120.00 | 15.00 | 16.00 | 124.00 | 0.00 | RSS-120135-160 |
| 140.00 | 110.00 | 15.00 | 0.00 | 0.00 | 0.00 | RSS-110140-160 |
| 140.00 | 114.00 | 12.00 | 13.00 | 119.00 | 0.00 | RSE-114140-130 |
| 140.00 | 115.00 | 15.00 | 16.00 | 0.00 | 0.00 | RSEA-115140-160 |
| 140.00 | 115.00 | 15.00 | 16.00 | 120.00 | 0.00 | RSS-115140-160 |
| 140.00 | 115.00 | 22.00 | 23.00 | 120.00 | 0.00 | RSS-115140-230 |
| 140.00 | 118.00 | 14.50 | 15.00 | 0.00 | 0.00 | JPS-118140-150 |
| 140.00 | 120.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-120140-030 |
| 140.00 | 120.00 | 10.00 | 11.00 | 0.00 | 0.00 | RSS-120140-110 |
| 140.00 | 120.00 | 10.00 | 11.00 | 0.00 | 120,140.00 | RSE-120140-110 |
| 140.00 | 120.00 | 12.00 | 12.50 | 0.00 | 0.00 | CP-120140-125 |
| 140.00 | 120.00 | 12.00 | 13.00 | 0.00 | 0.00 | RSS-120140-130 |
| 140.00 | 120.00 | 12.00 | 13.00 | 125.00 | 0.00 | RSEA-120140-130 |
| 140.00 | 120.00 | 15.00 | 16.00 | 0.00 | 0.00 | RSE-120140-160 |
| 140.00 | 120.00 | 15.00 | 16.00 | 125.00 | 0.00 | RSS-120140-160 |
| 140.00 | 125.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-125140-030 |
| 140.00 | 125.00 | 9.00 | 10.00 | 0.00 | 0.00 | RSS-125140-100 |
| 140.00 | 125.00 | 11.00 | 12.00 | 129.00 | 0.00 | RSS-125140-120 |
| 140.00 | 125.00 | 11.50 | 12.00 | 0.00 | 0.00 | CP-125140-120 |
| 140.00 | 125.00 | 15.00 | 16.00 | 130.00 | 0.00 | RSS-125140-160 |
| 145.00 | 125.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-125145-030 |
| 145.00 | 125.00 | 11.50 | 12.50 | 0.00 | 0.00 | RSS-125145-125 |
| 145.00 | 125.00 | 15.00 | 16.00 | 130.00 | 0.00 | RSS-125145-160 |
| 145.00 | 125.00 | 18.00 | 19.00 | 130.00 | 0.00 | RSS-125145-190 |
| 145.00 | 130.00 | 2.00 | 0.00 | 0.00 | 0.00 | 19M-130145-020 |
| 145.00 | 130.00 | 9.00 | 10.00 | 0.00 | 0.00 | RSS-130145-100 |
| 150.00 | 120.00 | 18.50 | 19.50 | 0.00 | 0.00 | RSEA-120150-195 |
| 150.00 | 125.00 | 13.50 | 14.50 | 130.00 | 0.00 | RSE-125150-145 |
| 150.00 | 125.00 | 18.00 | 20.00 | 0.00 | 0.00 | RSS-125150-200 |
| 150.00 | 125.00 | 19.00 | 20.00 | 0.00 | 0.00 | RSE-125150-200 |
| 150.00 | 128.00 | 14.50 | 15.00 | 0.00 | 0.00 | JPS-128150-150 |



RSE



RSEA



RSEA



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MAD



JPS



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19M

| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
|--------|--------|-------|-------|--------|------------|-----------------|
| 150.00 | 129.00 | 2.30 | 0.00 | 0.00 | 0.00 | 19M-129150-023 |
| 150.00 | 130.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-130150-030 |
| 150.00 | 130.00 | 12.00 | 0.00 | 0.00 | 0.00 | RSS-130150-130 |
| 150.00 | 130.00 | 12.00 | 13.00 | 0.00 | 0.00 | RSE-130150-130 |
| 150.00 | 130.00 | 15.00 | 16.00 | 135.00 | 0.00 | RSS-130150-160 |
| 150.00 | 130.00 | 15.00 | 16.00 | 135.00 | 0.00 | RSE-130150-160 |
| 150.00 | 135.00 | 9.00 | 10.00 | 0.00 | 0.00 | RSE-135150-100 |
| 150.00 | 135.00 | 11.00 | 12.00 | 0.00 | 0.00 | RSS-135150-120 |
| 150.00 | 135.00 | 15.00 | 16.00 | 140.00 | 0.00 | RSS-135150-160 |
| 150.00 | 136.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-136150-030 |
| 150.00 | 136.00 | 8.50 | 9.50 | 0.00 | 0.00 | RSE-136150-095 |
| 150.00 | 136.00 | 9.00 | 10.00 | 0.00 | 0.00 | RSS-136150-100 |
| 150.00 | 140.00 | 7.00 | 8.00 | 144.00 | 0.00 | RSE-140150-080 |
| 155.00 | 125.00 | 15.00 | 16.00 | 130.00 | 0.00 | RSS-125155-160 |
| 155.00 | 135.00 | 15.00 | 16.00 | 140.00 | 0.00 | RSS-135155-160 |
| 155.00 | 140.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-140155-030 |
| 155.00 | 140.00 | 9.00 | 10.00 | 0.00 | 0.00 | RSS-140155-100 |
| 155.00 | 140.00 | 15.00 | 16.00 | 144.00 | 0.00 | RSS-140155-160 |
| 158.00 | 146.00 | 7.50 | 8.00 | 0.00 | 0.00 | CP-146158-080 |
| 160.00 | 135.00 | 15.00 | 16.00 | 140.00 | 0.00 | RSS-135160-160 |
| 160.00 | 135.00 | 19.00 | 20.00 | 0.00 | 0.00 | RSE-135160-200 |
| 160.00 | 135.00 | 32.00 | 33.00 | 0.00 | 0.00 | RSS-135160-330 |
| 160.00 | 138.00 | 14.50 | 15.00 | 0.00 | 0.00 | JPS-138160-150 |
| 160.00 | 140.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-140160-030 |
| 160.00 | 140.00 | 11.50 | 12.50 | 0.00 | 140,160.00 | RSEA-140160-125 |
| 160.00 | 140.00 | 12.00 | 13.00 | 0.00 | 0.00 | RSE-140160-130 |
| 160.00 | 140.00 | 15.00 | 16.00 | 145.00 | 0.00 | RSS-140160-160 |
| 160.00 | 145.00 | 2.00 | 0.00 | 0.00 | 0.00 | 19M-145160-020 |
| 160.00 | 145.00 | 9.00 | 10.00 | 0.00 | 0.00 | RSS-145160-100 |
| 160.00 | 145.00 | 9.00 | 10.00 | 0.00 | 0.00 | RSE-145160-100 |
| 160.00 | 148.00 | 7.10 | 7.50 | 153.00 | 0.00 | RSE-148160-075 |



RSE



RSEA



RSEA



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JPS



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19M

| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
|--------|--------|-------|-------|--------|------|-----------------|
| 165.00 | 140.00 | 19.00 | 20.00 | 0.00 | 0.00 | RSE-140165-200 |
| 165.00 | 140.00 | 19.00 | 20.00 | 0.00 | 0.00 | RSS-140165-200 |
| 165.00 | 145.00 | 15.00 | 16.00 | 150.00 | 0.00 | RSS-145165-160 |
| 165.00 | 150.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-150165-030 |
| 165.00 | 150.00 | 9.00 | 10.00 | 0.00 | 0.00 | RSS-150165-100 |
| 170.00 | 140.00 | 18.00 | 20.00 | 0.00 | 0.00 | RSS-140170-200 |
| 170.00 | 145.00 | 19.00 | 20.00 | 0.00 | 0.00 | RSE-145170-200 |
| 170.00 | 148.00 | 14.50 | 15.00 | 0.00 | 0.00 | JPS-148170-150 |
| 170.00 | 150.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-150170-030 |
| 170.00 | 150.00 | 4.00 | 0.00 | 0.00 | 0.00 | 19M-150170-040 |
| 170.00 | 150.00 | 10.00 | 0.00 | 0.00 | 0.00 | RSS-150170-110 |
| 170.00 | 150.00 | 11.50 | 12.50 | 0.00 | 0.00 | RSEA-150170-125 |
| 170.00 | 150.00 | 15.00 | 16.00 | 155.00 | 0.00 | RSS-150170-160 |
| 170.00 | 150.00 | 15.00 | 16.00 | 155.00 | 0.00 | RSE-150170-160 |
| 170.00 | 150.00 | 18.00 | 19.00 | 155.00 | 0.00 | RSS-150170-190 |
| 170.00 | 155.00 | 2.00 | 0.00 | 0.00 | 0.00 | 19M-155170-020 |
| 170.00 | 155.00 | 9.00 | 10.00 | 0.00 | 0.00 | RSS-155170-100 |
| 170.00 | 155.00 | 9.00 | 10.00 | 0.00 | 0.00 | RSE-155170-100 |
| 170.00 | 155.00 | 10.00 | 0.00 | 0.00 | 0.00 | RSS-155170-110 |
| 170.00 | 155.00 | 11.00 | 12.00 | 0.00 | 0.00 | RSS-155170-120 |
| 174.80 | 165.20 | 7.30 | 7.50 | 170.00 | 0.00 | RSE-165174-075 |
| 175.00 | 160.00 | 9.00 | 10.00 | 0.00 | 0.00 | RSS-160175-100 |
| 175.00 | 160.00 | 9.00 | 10.00 | 0.00 | 0.00 | RSE-160175-100 |
| 180.00 | 150.00 | 18.50 | 19.00 | 0.00 | 0.00 | RSEA-150180-190 |
| 180.00 | 155.00 | 12.00 | 13.00 | 0.00 | 0.00 | RSE-155180-130 |
| 180.00 | 158.00 | 14.50 | 15.00 | 0.00 | 0.00 | JPS-158180-150 |
| 180.00 | 160.00 | 4.00 | 0.00 | 0.00 | 0.00 | 19M-160180-040 |
| 180.00 | 160.00 | 12.00 | 13.00 | 0.00 | 0.00 | RSE-160180-130 |
| 180.00 | 160.00 | 13.50 | 14.50 | 165.00 | 0.00 | RSE-160180-145 |
| 180.00 | 160.00 | 15.00 | 16.00 | 165.00 | 0.00 | RSS-160180-160 |
| 180.00 | 160.00 | 16.00 | 17.00 | 0.00 | 0.00 | RSE-160180-170 |



RSE



RSEA



RSEA



RSS



MAD



JPS



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19M

| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
|--------|--------|-------|-------|--------|------|-----------------|
| 180.00 | 165.00 | 0.00 | 0.00 | 0.00 | 0.00 | 19M-165180-030 |
| 180.00 | 165.00 | 9.00 | 10.00 | 0.00 | 0.00 | RSS-165180-100 |
| 180.00 | 165.00 | 9.00 | 10.00 | 0.00 | 0.00 | RSE-165180-100 |
| 180.00 | 166.00 | 15.50 | 16.50 | 170.00 | 0.00 | RSE-166180-165 |
| 182.70 | 170.00 | 9.50 | 10.00 | 0.00 | 0.00 | CP-170182-100 |
| 183.00 | 171.00 | 7.50 | 8.00 | 0.00 | 0.00 | CP-171183-080 |
| 185.00 | 160.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-160185-030 |
| 185.00 | 160.00 | 12.00 | 13.00 | 0.00 | 0.00 | RSS-160185-130 |
| 185.00 | 160.00 | 15.00 | 0.00 | 0.00 | 0.00 | RSS-160185-160 |
| 185.00 | 165.00 | 15.00 | 0.00 | 0.00 | 0.00 | RSS-165185-160 |
| 190.00 | 165.00 | 19.00 | 20.00 | 0.00 | 0.00 | RSE-165190-200 |
| 190.00 | 168.00 | 14.50 | 15.00 | 0.00 | 0.00 | JPS-168190-150 |
| 190.00 | 170.00 | 4.00 | 0.00 | 0.00 | 0.00 | 19M-170190-040 |
| 190.00 | 170.00 | 12.00 | 13.00 | 0.00 | 0.00 | RSE-170190-130 |
| 190.00 | 170.00 | 15.00 | 16.00 | 175.00 | 0.00 | RSS-170190-160 |
| 190.00 | 170.00 | 15.00 | 16.00 | 175.00 | 0.00 | RSE-170190-160 |
| 190.00 | 175.00 | 2.00 | 0.00 | 0.00 | 0.00 | 19M-175190-020 |
| 190.00 | 175.00 | 9.00 | 10.00 | 0.00 | 0.00 | RSS-175190-100 |
| 195.00 | 170.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-170195-030 |
| 195.00 | 170.00 | 15.00 | 17.00 | 0.00 | 0.00 | RSS-170195-170 |
| 200.00 | 170.00 | 18.00 | 19.00 | 175.00 | 0.00 | RSS-170200-190 |
| 200.00 | 175.00 | 4.00 | 0.00 | 0.00 | 0.00 | 19M-175200-040 |
| 200.00 | 175.00 | 14.00 | 14.50 | 0.00 | 0.00 | CP-175200-145 |
| 200.00 | 175.00 | 15.00 | 16.00 | 0.00 | 0.00 | RSEA-175200-160 |
| 200.00 | 175.00 | 15.00 | 16.00 | 180.00 | 0.00 | RSS-175200-160 |
| 200.00 | 175.00 | 19.00 | 20.00 | 0.00 | 0.00 | RSE-175200-200 |
| 200.00 | 178.00 | 14.50 | 15.00 | 0.00 | 0.00 | JPS-178200-150 |
| 200.00 | 180.00 | 4.00 | 0.00 | 0.00 | 0.00 | 19M-180200-040 |
| 200.00 | 180.00 | 12.00 | 13.00 | 0.00 | 0.00 | RSS-180200-130 |
| 200.00 | 180.00 | 12.00 | 13.00 | 0.00 | 0.00 | RSE-180200-130 |
| 200.00 | 180.00 | 15.00 | 16.00 | 185.00 | 0.00 | RSS-180200-160 |



RSE



RSEA



RSEA



RSS



MAD



JPS



CPE



CP



19M

| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
|--------|--------|-------|-------|--------|------------|----------------|
| 205.00 | 180.00 | 15.00 | 16.00 | 0.00 | 180,205.00 | RSS-180205-160 |
| 205.00 | 180.00 | 19.00 | 20.00 | 0.00 | 0.00 | RSE-180205-200 |
| 205.00 | 185.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-185205-030 |
| 209.00 | 197.00 | 7.50 | 8.00 | 0.00 | 0.00 | CP-197209-080 |
| 210.00 | 190.00 | 4.00 | 0.00 | 0.00 | 0.00 | 19M-190210-040 |
| 210.00 | 190.00 | 12.00 | 13.00 | 0.00 | 0.00 | RSE-190210-130 |
| 210.00 | 190.00 | 12.00 | 13.00 | 0.00 | 190,210.00 | RSS-190210-130 |
| 210.00 | 190.00 | 15.00 | 16.00 | 0.00 | 0.00 | RSS-190210-160 |
| 210.00 | 195.00 | 2.50 | 0.00 | 0.00 | 0.00 | 19M-195210-025 |
| 210.00 | 195.00 | 9.00 | 10.00 | 0.00 | 0.00 | RSS-195210-100 |
| 215.00 | 190.00 | 4.00 | 0.00 | 0.00 | 0.00 | 19M-190215-040 |
| 215.00 | 190.00 | 12.00 | 13.00 | 0.00 | 0.00 | RSS-190215-130 |
| 215.00 | 190.00 | 15.00 | 16.00 | 0.00 | 190,215.00 | RSS-190215-160 |
| 215.00 | 190.00 | 16.00 | 17.00 | 0.00 | 0.00 | RSE-190215-170 |
| 215.00 | 190.00 | 19.00 | 20.00 | 0.00 | 0.00 | RSS-190215-200 |
| 220.00 | 200.00 | 12.00 | 13.00 | 0.00 | 0.00 | RSS-200220-130 |
| 220.00 | 200.00 | 12.00 | 13.00 | 0.00 | 0.00 | RSE-200220-130 |
| 220.00 | 200.00 | 15.00 | 16.00 | 0.00 | 0.00 | RSS-200220-160 |
| 224.00 | 204.00 | 12.00 | 13.00 | 0.00 | 0.00 | RSE-204224-130 |
| 225.00 | 200.00 | 15.00 | 17.00 | 0.00 | 0.00 | RSS-200225-170 |
| 225.00 | 200.00 | 18.00 | 19.00 | 206.00 | 0.00 | RSS-200225-190 |
| 225.00 | 203.00 | 14.50 | 15.00 | 0.00 | 0.00 | JPS-203225-150 |
| 225.00 | 205.00 | 12.00 | 13.00 | 0.00 | 0.00 | RSE-205225-130 |
| 230.00 | 205.00 | 20.00 | 21.00 | 0.00 | 0.00 | RSE-205230-210 |
| 230.00 | 210.00 | 4.00 | 0.00 | 0.00 | 0.00 | 19M-210230-040 |
| 230.00 | 210.00 | 12.00 | 13.00 | 0.00 | 0.00 | RSE-210230-130 |
| 235.00 | 210.00 | 19.00 | 20.00 | 0.00 | 0.00 | RSS-210235-200 |
| 235.00 | 223.00 | 7.50 | 8.00 | 0.00 | 0.00 | CP-223235-080 |
| 240.00 | 220.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-220240-030 |
| 240.00 | 220.00 | 12.00 | 13.00 | 0.00 | 0.00 | RSS-220240-130 |
| 240.00 | 220.00 | 12.00 | 13.00 | 0.00 | 0.00 | RSE-220240-130 |



RSE



RSEA



RSEA



RSS



MAD



JPS



CPE



CP



19M

| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
|--------|--------|-------|-------|--------|------|----------------|
| 245.00 | 220.00 | 0.00 | 0.00 | 0.00 | 0.00 | 19M-220245-040 |
| 245.00 | 225.00 | 15.00 | 16.00 | 230.00 | 0.00 | RSS-225245-160 |
| 247.00 | 235.00 | 10.00 | 11.00 | 0.00 | 0.00 | RSS-235247-110 |
| 250.00 | 220.00 | 18.00 | 19.00 | 225.00 | 0.00 | RSS-220250-190 |
| 250.00 | 225.00 | 19.00 | 20.00 | 0.00 | 0.00 | RSS-225250-200 |
| 250.00 | 230.00 | 12.00 | 13.00 | 0.00 | 0.00 | RSE-230250-130 |
| 250.00 | 230.00 | 15.00 | 16.00 | 0.00 | 0.00 | RSE-230250-160 |
| 250.00 | 230.00 | 15.00 | 16.00 | 0.00 | 0.00 | RSS-230250-160 |
| 255.00 | 240.00 | 12.00 | 13.00 | 0.00 | 0.00 | CP-240255-130 |
| 260.00 | 235.00 | 16.00 | 17.00 | 0.00 | 0.00 | RSE-235260-170 |
| 260.00 | 240.00 | 4.00 | 0.00 | 0.00 | 0.00 | 19M-240260-040 |
| 261.00 | 249.00 | 7.00 | 8.00 | 0.00 | 0.00 | CP-249261-080 |
| 270.00 | 240.00 | 22.00 | 23.00 | 0.00 | 0.00 | RSS-240270-230 |
| 270.00 | 245.00 | 15.00 | 16.00 | 250.00 | 0.00 | RSS-245270-160 |
| 270.00 | 250.00 | 4.00 | 0.00 | 0.00 | 0.00 | 19M-250270-040 |
| 270.00 | 250.00 | 12.00 | 13.00 | 0.00 | 0.00 | RSE-250270-130 |
| 270.00 | 250.00 | 15.00 | 16.00 | 0.00 | 0.00 | RSS-250270-160 |
| 280.00 | 250.00 | 18.00 | 19.00 | 256.00 | 0.00 | RSE-250280-190 |
| 280.00 | 255.00 | 19.00 | 20.00 | 0.00 | 0.00 | RSE-255280-200 |
| 280.00 | 260.00 | 15.00 | 16.00 | 0.00 | 0.00 | RSS-260280-160 |
| 290.00 | 260.00 | 4.00 | 0.00 | 0.00 | 0.00 | 19M-260290-040 |
| 290.00 | 265.00 | 12.00 | 13.00 | 0.00 | 0.00 | RSS-265290-130 |
| 290.00 | 265.00 | 16.00 | 17.00 | 0.00 | 0.00 | RSE-265290-170 |
| 290.00 | 265.00 | 17.00 | 18.00 | 270.00 | 0.00 | RSS-265290-180 |
| 290.00 | 270.00 | 17.00 | 18.00 | 275.00 | 0.00 | RSS-270290-180 |
| 300.00 | 270.00 | 15.00 | 16.00 | 275.00 | 0.00 | RSS-270300-160 |
| 300.00 | 270.00 | 18.00 | 20.00 | 0.00 | 0.00 | RSS-270300-200 |
| 300.00 | 270.00 | 19.00 | 20.00 | 0.00 | 0.00 | RSE-270300-200 |
| 300.00 | 280.00 | 15.00 | 16.00 | 285.00 | 0.00 | RSS-280300-160 |
| 305.00 | 280.00 | 12.00 | 13.00 | 0.00 | 0.00 | RSS-280305-130 |
| 305.00 | 280.00 | 19.00 | 20.00 | 0.00 | 0.00 | RSS-280305-200 |



RSE



RSEA



RSEA



RSS



MAD



JPS



CPE



CP



19M

| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
|--------|--------|-------|-------|--------|------|----------------|
| 310.00 | 290.00 | 15.00 | 16.00 | 0.00 | 0.00 | RSS-290310-160 |
| 320.00 | 285.00 | 20.00 | 21.00 | 290.00 | 0.00 | RSE-285320-210 |
| 320.00 | 290.00 | 18.00 | 20.00 | 0.00 | 0.00 | RSS-290320-200 |
| 320.00 | 290.00 | 21.00 | 22.00 | 0.00 | 0.00 | RSE-290320-220 |
| 320.00 | 290.00 | 24.00 | 25.00 | 0.00 | 0.00 | RSE-290320-250 |
| 320.00 | 295.00 | 19.00 | 20.00 | 0.00 | 0.00 | RSS-295320-200 |
| 320.00 | 300.00 | 15.00 | 16.00 | 0.00 | 0.00 | RSS-300320-160 |
| 320.00 | 305.00 | 17.00 | 18.00 | 310.00 | 0.00 | RSS-305320-180 |
| 330.00 | 300.00 | 18.00 | 20.00 | 0.00 | 0.00 | RSS-300330-200 |
| 340.00 | 320.00 | 15.00 | 16.00 | 0.00 | 0.00 | RSS-320340-160 |
| 350.00 | 320.00 | 22.00 | 23.00 | 0.00 | 0.00 | RSS-320350-230 |
| 350.00 | 325.00 | 19.00 | 20.00 | 0.00 | 0.00 | RSS-325350-200 |
| 360.00 | 340.00 | 15.00 | 16.00 | 0.00 | 0.00 | RSS-340360-160 |
| 370.00 | 350.00 | 15.00 | 16.00 | 0.00 | 0.00 | RSS-350370-160 |
| 380.00 | 340.00 | 21.00 | 22.00 | 0.00 | 0.00 | RSS-340380-220 |
| 380.00 | 360.00 | 15.00 | 16.00 | 0.00 | 0.00 | RSS-360380-160 |
| 385.00 | 350.00 | 24.40 | 25.40 | 0.00 | 0.00 | CP-350385-254 |
| 390.00 | 360.00 | 22.00 | 23.00 | 365.00 | 0.00 | RSS-360390-230 |
| 390.00 | 370.00 | 15.00 | 16.00 | 0.00 | 0.00 | RSS-370390-160 |
| 400.00 | 380.00 | 15.00 | 16.00 | 0.00 | 0.00 | RSS-380400-160 |
| 410.00 | 385.00 | 12.00 | 13.00 | 0.00 | 0.00 | RSS-385410-130 |



RSEW

Piston Seals with Wear Rings

Design

RSEW u-cup are a specialised piston seal design manufactured from Polyurethane 92 Shore A, with an anti-extrusion, guidance wear ring, made from Polyacetyl resin on the outside heel of the seal. Having an inside diameter smaller than the groove for which it is intended, insures a tight fit in the groove to prevent movement during operation. It also provides sufficient preload to prevent interference with the cylinder wall due to thermal expansion of the seal at higher operating temperatures. The static lip is thinner as it's in full contact with groove diameter the dynamic lip is heavier to improve higher pressure capability. Both lips have precision knife trimmed chamfers to provide complete circumferential lip contact.

Operating Conditions

Pressure

400 Bar
6,000 Psi



Temperature

-40° to 105°C
-40° to 221°F



Speed

0.8m/sec
2.5'/sec



Surface Finish μmRa

| ØD | Ød1 | Ød2 | Ød3 | L1 | L2 |
|-------------|--------------|--------------|--------------|-----|-----|
| 0.1 - 0.25 | ≤ 0.8 | 2.0 | 2.0 | 2.0 | 2.0 |

Tolerances

| ØD | Ød1 | Ød2 | Ød3 | L1 | L2 |
|-------------|--------------|----------------|--------------|---------------|--------------|
| H10 | -0.0 +0.1 | -0.05 +0.00 | -0.0 +0.1 | -0.0 +0.25 | -0.0 +0.1 |

Chamfer Radii

| | 5.0 | 7.5 | 10.0 |
|-----|-----|-----|------|
| c/s | 5.0 | 7.5 | 10.0 |
| C | 2.5 | 4.0 | 5.0 |
| r1 | 0.4 | 0.6 | 0.8 |
| r2 | 0.2 | 0.2 | 0.2 |

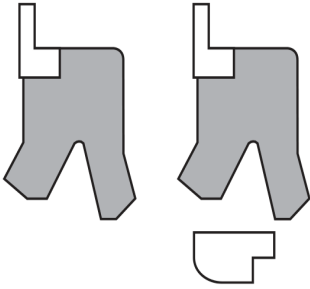
Typical Examples

Reciprocating Rotary Oscillating Helix



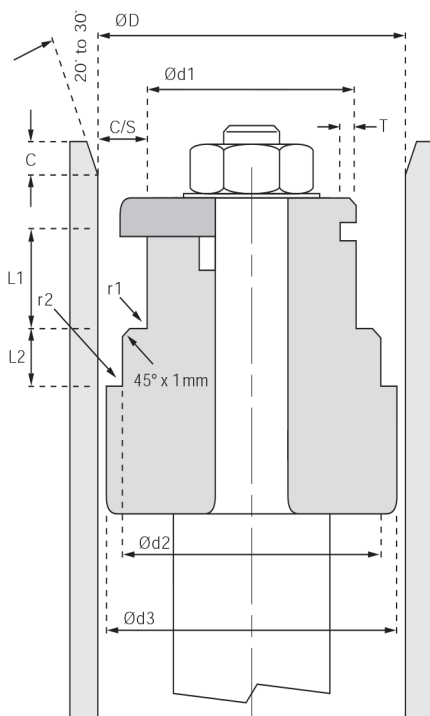
Similar Styles

Single acting seals



Key Features

- Medium to heavy duty
- Piston only
- Excellent wear properties
- Medium to higher pressures
- Excellent extrusion resistance

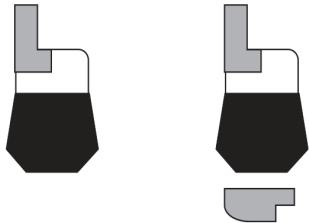




CPLR

Piston Seals with Wear Rings

Single acting seals



Key Features

- Medium to heavy duty
- Piston only
- Excellent extrusion resistance
- Medium to higher pressures
- Excellent wear properties

Design

CPLR are for use as a single acting piston seal on solid pistons with Polyacetyl circlip provided. The seal is a precision moulded Nitrile rubber sealing element with a fabric reinforced base. The seal is fitted with a Polyacetyl anti-extrusion bearing ring to the outside diameter heel to allow larger machining clearances between the piston head and cylinder bore and to permit higher working pressures. Manufactured with initial radial interference to effect low pressure sealing, as pressure increases the seal is energised thus increasing the sealing force. Rubberised fabric has the advantage of retaining the sealing media within its surfaces reducing friction and wear.

Operating Conditions

Pressure



Temperature



Speed



Surface Finish μmRa

| $\text{\O}D$ | $\text{\O}d1$ | $\text{\O}d2$ | $\text{\O}d3$ | L1 | L2 |
|--------------|---------------|---------------|---------------|-----|-----|
| 0.1 - 0.25 | ≤ 0.8 | 2.0 | 2.0 | 1.0 | 2.0 |

Tolerances

| $\text{\O}D$ | $\text{\O}d1$ | $\text{\O}d2$ | $\text{\O}d3$ | L1 | L2 |
|--------------|---------------|---------------|---------------|----------|----------|
| H10 | js11 | js10 | js11 | -0 +0.25 | -0 +0.10 |

Chamfer Radii

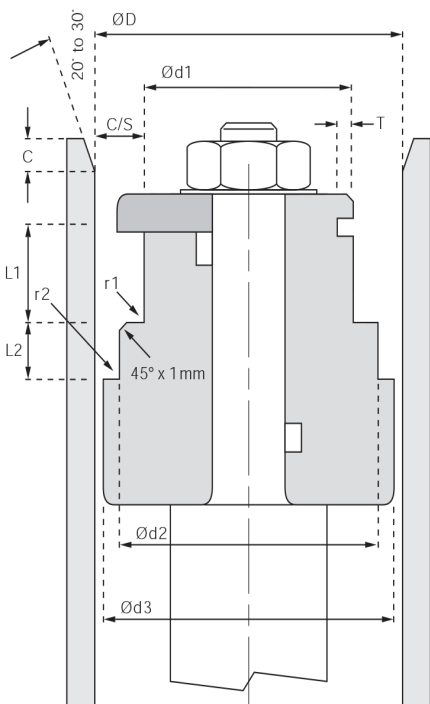
| c/s | 5.0 | 7.5 | 10.0 |
|-----|-----|-----|------|
| C | 2.5 | 4.0 | 5.0 |
| r1 | 0.4 | 0.6 | 0.8 |
| r2 | 0.2 | 0.2 | 0.2 |

Typical Examples

Reciprocating Rotary Oscillating Helix



Similar Styles





RSEW



RSEWR



CPW



CPLR

| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
|--------|-------|-------|-------|-------|--------|-------------------|
| 32.00 | 20.00 | 8.00 | 9.00 | 0.00 | 0.00 | RSEW-020032-090 |
| 35.00 | 22.00 | 9.00 | 10.00 | 31.40 | 0.00 | RSEW-022035-100 |
| 40.00 | 26.00 | 8.50 | 9.50 | 0.00 | 0.00 | RSEW-026040-095 |
| 40.00 | 28.00 | 9.00 | 6.35 | 35.40 | 38.70 | CPLR-028040-095 |
| 45.00 | 30.00 | 9.00 | 10.00 | 0.00 | 0.00 | RSEW-030045-100 |
| 45.00 | 35.00 | 8.50 | 9.50 | 40.40 | 43.50 | RSEW-035045-095 |
| 50.00 | 30.00 | 13.50 | 6.30 | 44.30 | 48.30 | CPLR-030050-145 |
| 50.00 | 30.00 | 13.50 | 6.35 | 44.30 | 48.30 | RSEW-030050-145 |
| 50.00 | 35.00 | 10.00 | 11.00 | 0.00 | 0.00 | RSEW-035050-110 |
| 50.00 | 40.00 | 10.00 | 11.00 | 0.00 | 0.00 | RSEW-040050-110 |
| 55.00 | 40.00 | 10.00 | 11.00 | 0.00 | 0.00 | RSEW-040055-110 |
| 60.00 | 40.00 | 13.50 | 14.50 | 54.20 | 58.50 | RSEW-040060-145/1 |
| 60.00 | 40.00 | 13.50 | 14.50 | 55.40 | 58.50 | RSEW-040060-145 |
| 60.00 | 45.00 | 10.00 | 6.35 | 54.20 | 58.50 | RSEW-045060-110/1 |
| 60.00 | 45.00 | 10.00 | 6.35 | 55.40 | 58.50 | RSEW-045060-110 |
| 63.00 | 45.00 | 10.00 | 11.00 | 0.00 | 0.00 | RSEW-045063-110 |
| 63.00 | 45.00 | 10.50 | 6.30 | 58.40 | 61.00 | CPLR-045063-110 |
| 65.00 | 45.00 | 14.00 | 6.30 | 0.00 | 0.00 | CPLR-045065-145 |
| 65.00 | 50.00 | 10.00 | 11.00 | 0.00 | 0.00 | RSEW-050065-110 |
| 70.00 | 50.00 | 13.50 | 6.30 | 64.20 | 68.30 | CPLR-050070-145 |
| 70.00 | 50.00 | 13.50 | 14.50 | 0.00 | 0.00 | RSEW-050070-145 |
| 80.00 | 60.00 | 12.00 | 6.35 | 74.15 | 78.50 | RSEW-060080-130 |
| 80.00 | 60.00 | 13.50 | 6.35 | 74.15 | 58.50 | RSEW-060080-145/1 |
| 90.00 | 70.00 | 12.00 | 6.35 | 84.15 | 88.50 | RSEW-070090-130 |
| 90.00 | 70.00 | 13.50 | 6.35 | 84.15 | 88.50 | RSEW-070090-145/1 |
| 95.00 | 75.00 | 0.00 | 0.00 | 0.00 | 0.00 | CPLR-075095-145 |
| 100.00 | 80.00 | 13.50 | 6.35 | 93.15 | 98.50 | RSEW-080100-145 |
| 100.00 | 80.00 | 13.50 | 6.35 | 94.15 | 98.50 | RSEW-080100-145/1 |
| 100.00 | 80.00 | 14.00 | 6.30 | 94.20 | 98.30 | CPLR-080100-145 |
| 104.50 | 85.00 | 12.50 | 6.30 | 98.70 | 102.80 | CPLR-085104-130 |
| 105.00 | 85.00 | 13.50 | 6.35 | 99.20 | 103.20 | CPLR-085105-140 |



RSEW



RSEWR



CPW



CPLR

| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
|--------|--------|-------|------|--------|--------|-------------------|
| 110.00 | 95.00 | 12.00 | 6.35 | 103.10 | 108.50 | RSEW-095110-130 |
| 115.00 | 95.00 | 14.00 | 6.35 | 108.10 | 113.00 | CPLR-095115-145 |
| 120.00 | 100.00 | 13.50 | 6.35 | 113.10 | 118.50 | RSEW-100120-145 |
| 120.00 | 100.00 | 13.50 | 6.35 | 114.10 | 118.50 | RSEW-100120-145/1 |
| 125.00 | 105.00 | 12.00 | 6.30 | 119.10 | 123.30 | CPLR-105125-125 |



VS1

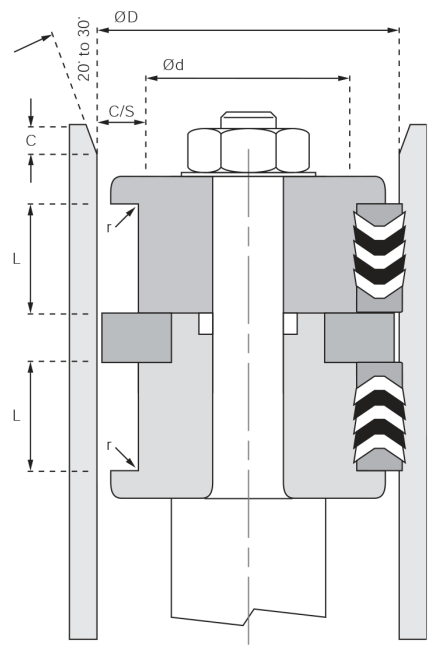
Piston Seal V Pack Sets

Single acting seals



Key Features

- Medium to heavy duty
- Piston or rod
- Wide size range
- Handles some misalignment
- Hard wearing



Design

VS1 are a single acting rod or piston seal for medium to heavy duty applications. The assembly consists of a male and female adaptor with a series of 'V' shaped rings. The number of 'V' rings may be varied to alter the assembled height. The material is generally fabric reinforced Nitrile rubber, although some sets incorporate Nitrile only 'V' rings to assist low pressure sealing. This is a non preferred design but it still has a place in applications where difficult conditions prevail such as pressure surges and misalignment.

Operating Conditions

Pressure



Temperature



Speed



Surface Finish µmRa

| ØD | Ød | L |
|------------|------|-----|
| 0.1 - 0.25 | ≤0.8 | 2.0 |

Tolerances

| ØD | Ød | L |
|-----|-----|----------|
| H10 | h10 | -0 + 0.2 |

Chamfer Radii

| c/s | 5.0 | 7.5 | 10.0 |
|-----|-----|-----|------|
| C | 2.5 | 4.0 | 5.0 |
| r | 0.3 | 0.4 | 0.6 |

Typical Examples

- Reciprocating Rotary Oscillating Helix



Similar Styles



VS1

| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
|-------|-------|-------|------|------|------|----------------|
| 26.00 | 16.00 | 18.50 | 0.00 | 0.00 | 0.00 | VS1-016026-185 |
| 28.00 | 18.00 | 18.50 | 0.00 | 0.00 | 0.00 | VS1-018028-185 |
| 30.00 | 20.00 | 18.50 | 0.00 | 0.00 | 0.00 | VS1-020030-185 |
| 31.50 | 20.00 | 17.30 | 0.00 | 0.00 | 0.00 | VS1-020031-175 |
| 32.00 | 18.00 | 23.50 | 0.00 | 0.00 | 0.00 | VS1-018032-235 |
| 32.00 | 20.00 | 22.50 | 0.00 | 0.00 | 0.00 | VS1-020032-225 |
| 32.00 | 22.00 | 0.00 | 0.00 | 0.00 | 0.00 | VS1-022032-181 |
| 32.00 | 22.00 | 17.90 | 0.00 | 0.00 | 0.00 | VS1-022032-185 |
| 35.00 | 25.00 | 17.10 | 0.00 | 0.00 | 0.00 | VS1-025035-173 |
| 37.00 | 25.00 | 22.50 | 0.00 | 0.00 | 0.00 | VS1-025037-225 |
| 40.00 | 25.00 | 22.50 | 0.00 | 0.00 | 0.00 | VS1-025040-225 |
| 40.00 | 28.00 | 22.50 | 0.00 | 0.00 | 0.00 | VS1-028040-225 |
| 40.00 | 30.00 | 18.50 | 0.00 | 0.00 | 0.00 | VS1-030040-185 |
| 42.00 | 27.00 | 11.00 | 0.00 | 0.00 | 0.00 | VS1-027042-110 |
| 42.00 | 30.00 | 22.50 | 0.00 | 0.00 | 0.00 | VS1-030042-225 |
| 44.00 | 32.00 | 22.50 | 0.00 | 0.00 | 0.00 | VS1-032044-225 |
| 45.00 | 30.00 | 0.00 | 0.00 | 0.00 | 0.00 | VS1-030045-185 |
| 45.00 | 30.00 | 22.50 | 0.00 | 0.00 | 0.00 | VS1-030045-225 |
| 47.00 | 32.00 | 22.50 | 0.00 | 0.00 | 0.00 | VS1-032047-225 |
| 47.00 | 35.00 | 22.50 | 0.00 | 0.00 | 0.00 | VS1-035047-225 |
| 48.00 | 36.00 | 22.50 | 0.00 | 0.00 | 0.00 | VS1-036048-225 |
| 50.00 | 35.00 | 11.50 | 0.00 | 0.00 | 0.00 | VS1-035050-115 |
| 50.00 | 35.00 | 22.50 | 0.00 | 0.00 | 0.00 | VS1-035050-225 |
| 50.00 | 40.00 | 23.00 | 0.00 | 0.00 | 0.00 | VS1-040050-230 |
| 54.00 | 42.00 | 22.50 | 0.00 | 0.00 | 0.00 | VS1-042054-225 |
| 55.00 | 40.00 | 22.50 | 0.00 | 0.00 | 0.00 | VS1-040055-225 |
| 60.00 | 40.00 | 30.00 | 0.00 | 0.00 | 0.00 | VS1-040060-300 |
| 60.00 | 45.00 | 22.50 | 0.00 | 0.00 | 0.00 | VS1-045060-225 |
| 63.00 | 48.00 | 13.00 | 0.00 | 0.00 | 0.00 | VS1-048063-130 |
| 65.00 | 45.00 | 27.50 | 0.00 | 0.00 | 0.00 | VS1-045065-275 |
| 65.00 | 50.00 | 22.50 | 0.00 | 0.00 | 0.00 | VS1-050065-225 |



VS1

| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
|--------|-------|-------|------|------|-----------|-----------------|
| 70.00 | 50.00 | 30.00 | 0.00 | 0.00 | 0.00 | VS1-050070-300 |
| 70.00 | 55.00 | 22.50 | 0.00 | 0.00 | 0.00 | VS1-055070-225 |
| 70.00 | 55.00 | 26.50 | 0.00 | 0.00 | 0.00 | VS1-055070-265 |
| 71.00 | 56.00 | 22.50 | 0.00 | 0.00 | 0.00 | VS1-056071-225 |
| 75.00 | 55.00 | 26.00 | 0.00 | 0.00 | 55,075.00 | VS1-055075-260 |
| 75.00 | 55.00 | 30.00 | 0.00 | 0.00 | 0.00 | VS1-055075-300 |
| 75.00 | 60.00 | 22.50 | 0.00 | 0.00 | 0.00 | VS1-060075-225A |
| 75.00 | 60.00 | 22.50 | 0.00 | 0.00 | 0.00 | VS1-060075-225 |
| 78.00 | 63.00 | 22.50 | 0.00 | 0.00 | 0.00 | VS1-063078-225 |
| 80.00 | 60.00 | 15.20 | 0.00 | 0.00 | 0.00 | VS1-060080-152 |
| 80.00 | 60.00 | 26.00 | 0.00 | 0.00 | 0.00 | VS1-060080-260 |
| 80.00 | 60.00 | 37.00 | 0.00 | 0.00 | 0.00 | VS1-060080-370 |
| 80.00 | 65.00 | 22.50 | 0.00 | 0.00 | 0.00 | VS1-065080-225 |
| 83.00 | 63.00 | 37.00 | 0.00 | 0.00 | 0.00 | VS1-063083-370 |
| 85.00 | 65.00 | 30.00 | 0.00 | 0.00 | 0.00 | VS1-065085-300 |
| 85.00 | 65.00 | 40.00 | 0.00 | 0.00 | 0.00 | VS1-065085-400 |
| 85.00 | 70.00 | 22.50 | 0.00 | 0.00 | 70,085.00 | VS1-070085-225 |
| 90.00 | 70.00 | 21.20 | 0.00 | 0.00 | 0.00 | VS1-070090-212 |
| 90.00 | 70.00 | 30.00 | 0.00 | 0.00 | 0.00 | VS1-070090-300 |
| 90.00 | 70.00 | 40.00 | 0.00 | 0.00 | 0.00 | VS1-070090-400 |
| 90.00 | 75.00 | 22.50 | 0.00 | 0.00 | 0.00 | VS1-075090-225 |
| 95.00 | 75.00 | 30.00 | 0.00 | 0.00 | 0.00 | VS1-075095-300 |
| 95.00 | 75.00 | 40.00 | 0.00 | 0.00 | 0.00 | VS1-075095-400 |
| 95.00 | 80.00 | 22.50 | 0.00 | 0.00 | 0.00 | VS1-080095-225 |
| 100.00 | 80.00 | 40.00 | 0.00 | 0.00 | 0.00 | VS1-080100-400 |
| 100.00 | 85.00 | 22.50 | 0.00 | 0.00 | 0.00 | VS1-085100-225 |
| 105.00 | 85.00 | 40.00 | 0.00 | 0.00 | 0.00 | VS1-085105-400 |
| 105.00 | 90.00 | 22.50 | 0.00 | 0.00 | 0.00 | VS1-090105-225 |
| 110.00 | 90.00 | 40.00 | 0.00 | 0.00 | 0.00 | VS1-090110-400 |
| 110.00 | 95.00 | 24.00 | 0.00 | 0.00 | 0.00 | VS1-095110-240 |
| 115.00 | 90.00 | 27.41 | 0.00 | 0.00 | 0.00 | VS1-090115-274 |



VS1

| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
|--------|--------|-------|------|------|------|-----------------|
| 115.00 | 100.00 | 30.00 | 0.00 | 0.00 | 0.00 | VS1-100115-300 |
| 120.00 | 100.00 | 30.00 | 0.00 | 0.00 | 0.00 | VS1-100120-300 |
| 120.00 | 100.00 | 40.00 | 0.00 | 0.00 | 0.00 | VS1-100120-400 |
| 125.00 | 105.00 | 40.00 | 0.00 | 0.00 | 0.00 | VS1-105125-400 |
| 125.00 | 110.00 | 30.00 | 0.00 | 0.00 | 0.00 | VS1-110125-300 |
| 130.00 | 110.00 | 40.00 | 0.00 | 0.00 | 0.00 | VS1-110130-400 |
| 135.00 | 110.00 | 40.00 | 0.00 | 0.00 | 0.00 | VS1-110135-400A |
| 135.00 | 110.00 | 40.00 | 0.00 | 0.00 | 0.00 | VS1-110135-400 |
| 140.00 | 110.00 | 60.00 | 0.00 | 0.00 | 0.00 | VS1-110140-600 |
| 140.00 | 115.00 | 25.80 | 0.00 | 0.00 | 0.00 | VS1-115140-258 |
| 140.00 | 115.00 | 46.00 | 0.00 | 0.00 | 0.00 | VS1-115140-460 |
| 140.00 | 120.00 | 30.00 | 0.00 | 0.00 | 0.00 | VS1-120140-300 |
| 140.00 | 125.00 | 34.00 | 0.00 | 0.00 | 0.00 | VS1-125140-340 |
| 145.00 | 125.00 | 29.60 | 0.00 | 0.00 | 0.00 | VS1-125145-296 |
| 145.00 | 125.00 | 32.00 | 0.00 | 0.00 | 0.00 | VS1-125145-320 |
| 150.00 | 120.00 | 29.00 | 0.00 | 0.00 | 0.00 | VS1-120150-290 |
| 150.00 | 120.00 | 44.00 | 0.00 | 0.00 | 0.00 | VS1-120150-440 |
| 150.00 | 125.00 | 27.20 | 0.00 | 0.00 | 0.00 | VS1-125150-274 |
| 150.00 | 125.00 | 46.00 | 0.00 | 0.00 | 0.00 | VS1-125150-460 |
| 150.00 | 130.00 | 29.56 | 0.00 | 0.00 | 0.00 | VS1-130150-297 |
| 150.00 | 130.00 | 39.68 | 0.00 | 0.00 | 0.00 | VS1-130150-396 |
| 155.00 | 125.00 | 36.00 | 0.00 | 0.00 | 0.00 | VS1-125155-410 |
| 155.00 | 140.00 | 34.00 | 0.00 | 0.00 | 0.00 | VS1-140155-340 |
| 160.00 | 130.00 | 29.00 | 0.00 | 0.00 | 0.00 | VS1-130160-290M |
| 160.00 | 130.00 | 29.00 | 0.00 | 0.00 | 0.00 | VS1-130160-290A |
| 160.00 | 130.00 | 29.00 | 0.00 | 0.00 | 0.00 | VS1-130160-290 |
| 160.00 | 130.00 | 41.50 | 0.00 | 0.00 | 0.00 | VS1-130160-415 |
| 165.00 | 140.00 | 40.00 | 0.00 | 0.00 | 0.00 | VS1-140165-400 |
| 165.00 | 140.00 | 46.00 | 0.00 | 0.00 | 0.00 | VS1-140165-460 |
| 170.00 | 140.00 | 59.00 | 0.00 | 0.00 | 0.00 | VS1-140170-590 |
| 170.00 | 150.00 | 40.00 | 0.00 | 0.00 | 0.00 | VS1-150170-400 |



VS1

| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
|--------|--------|-------|------|------|------|----------------|
| 180.00 | 150.00 | 60.00 | 0.00 | 0.00 | 0.00 | VS1-150180-600 |
| 180.00 | 160.00 | 40.00 | 0.00 | 0.00 | 0.00 | VS1-160180-400 |
| 190.00 | 160.00 | 0.00 | 0.00 | 0.00 | 0.00 | VS1-160190-600 |
| 190.00 | 160.00 | 33.00 | 0.00 | 0.00 | 0.00 | VS1-160190-330 |
| 190.00 | 170.00 | 51.00 | 0.00 | 0.00 | 0.00 | VS1-170190-510 |
| 195.00 | 170.00 | 37.50 | 0.00 | 0.00 | 0.00 | VS1-170195-375 |
| 200.00 | 170.00 | 32.50 | 0.00 | 0.00 | 0.00 | VS1-170200-335 |
| 200.00 | 180.00 | 40.00 | 0.00 | 0.00 | 0.00 | VS1-180200-400 |
| 210.00 | 180.00 | 60.00 | 0.00 | 0.00 | 0.00 | VS1-180210-600 |
| 220.00 | 190.00 | 60.00 | 0.00 | 0.00 | 0.00 | VS1-190220-600 |
| 220.00 | 200.00 | 40.00 | 0.00 | 0.00 | 0.00 | VS1-200220-400 |
| 225.00 | 195.00 | 33.50 | 0.00 | 0.00 | 0.00 | VS1-195225-335 |
| 230.00 | 200.00 | 0.00 | 0.00 | 0.00 | 0.00 | VS1-200230-850 |
| 230.00 | 200.00 | 32.97 | 0.00 | 0.00 | 0.00 | VS1-200230-330 |
| 230.00 | 200.00 | 60.00 | 0.00 | 0.00 | 0.00 | VS1-200230-600 |
| 237.00 | 212.00 | 32.00 | 0.00 | 0.00 | 0.00 | VS1-212237-320 |
| 250.00 | 220.00 | 32.50 | 0.00 | 0.00 | 0.00 | VS1-220250-335 |
| 250.00 | 220.00 | 52.00 | 0.00 | 0.00 | 0.00 | VS1-220250-520 |
| 250.00 | 220.00 | 62.50 | 0.00 | 0.00 | 0.00 | VS1-220250-625 |
| 270.00 | 240.00 | 45.00 | 0.00 | 0.00 | 0.00 | VS1-240270-450 |
| 270.00 | 250.00 | 32.00 | 0.00 | 0.00 | 0.00 | VS1-250270-320 |
| 275.00 | 245.00 | 33.50 | 0.00 | 0.00 | 0.00 | VS1-245275-335 |
| 280.00 | 250.00 | 33.00 | 0.00 | 0.00 | 0.00 | VS1-250280-330 |
| 315.00 | 280.00 | 38.45 | 0.00 | 0.00 | 0.00 | VS1-280315-384 |
| 320.00 | 290.00 | 50.80 | 0.00 | 0.00 | 0.00 | VS1-290320-508 |
| 320.00 | 300.00 | 32.00 | 0.00 | 0.00 | 0.00 | VS1-300320-320 |
| 330.00 | 300.00 | 52.00 | 0.00 | 0.00 | 0.00 | VS1-300330-520 |
| 330.00 | 310.00 | 30.00 | 0.00 | 0.00 | 0.00 | VS1-310330-300 |
| 350.00 | 315.00 | 38.45 | 0.00 | 0.00 | 0.00 | VS1-315350-384 |
| 350.00 | 320.00 | 0.00 | 0.00 | 0.00 | 0.00 | VS1-320350-762 |
| 350.00 | 320.00 | 84.00 | 0.00 | 0.00 | 0.00 | VS1-320350-840 |





VS1

| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
|--------|--------|--------|------|------|------|----------------|
| 365.00 | 320.00 | 55.00 | 0.00 | 0.00 | 0.00 | VS1-320365-550 |
| 380.00 | 340.00 | 58.00 | 0.00 | 0.00 | 0.00 | VS1-340380-580 |
| 380.00 | 340.00 | 60.00 | 0.00 | 0.00 | 0.00 | VS1-340380-600 |
| 390.00 | 360.00 | 60.00 | 0.00 | 0.00 | 0.00 | VS1-360390-600 |
| 440.00 | 400.00 | 0.00 | 0.00 | 0.00 | 0.00 | VS1-400440-810 |
| 460.00 | 420.00 | 72.50 | 0.00 | 0.00 | 0.00 | VS1-420460-725 |
| 600.00 | 550.00 | 102.00 | 0.00 | 0.00 | 0.00 | VS1-550600-102 |
| 758.00 | 720.00 | 68.00 | 0.00 | 0.00 | 0.00 | VS1-720758-680 |





GPP

Pneumatic Piston Seals

Design

GPP is designed for use as a piston seal in either single or double acting applications where two seals are mounted back-to-back in separate grooves. An easy to fit low pressure seal, type GPP are made from extremely flexible wear resistant Polyurethane 90 Shore A to increase seal life and to facilitate being used in NON-LUBRICATED air applications. Type GPP have a thicker and longer static sealing lip to form a buffer against axial movement. The dynamic lip with no sharp edge reduces friction.

Operating Conditions

Pressure

16 Bar
230 Psi

Pneumatic

Temperature

-30° to 80°C
-22° to 176°F

Speed

1.0m/sec
3.0'/sec

Surface Finish μmRa

| $\text{\O}D$ | $\text{\O}d$ | L |
|--------------|--------------|-----|
| 0.1 - 0.25 | ≤ 0.8 | 2.0 |

Tolerances

| $\text{\O}D$ | $\text{\O}d$ | L | G |
|--------------|--------------|----------|------|
| H10 | h10 | -0 + 0.2 | 0.25 |

Chamfer Radii

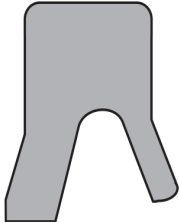
| | 1.5 | 3.0 | 5.0 | 7.5 | 10.0 |
|-----|-----|-----|-----|-----|------|
| c/s | 1.5 | 3.0 | 5.0 | 7.5 | 10.0 |
| C | 1.0 | 2.0 | 2.5 | 3.0 | 3.0 |
| r | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 |

Typical Examples

Reciprocating Rotary Oscillating Helix



Single acting seals



Key Features

Lubricated / non-lubricated
air applications

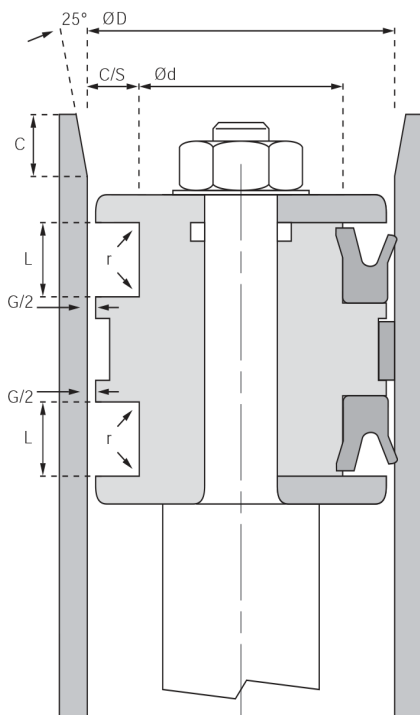
Piston only

Low pressure capability

Dynamic lip reaction

Low friction

Excellent wear resistance





DE

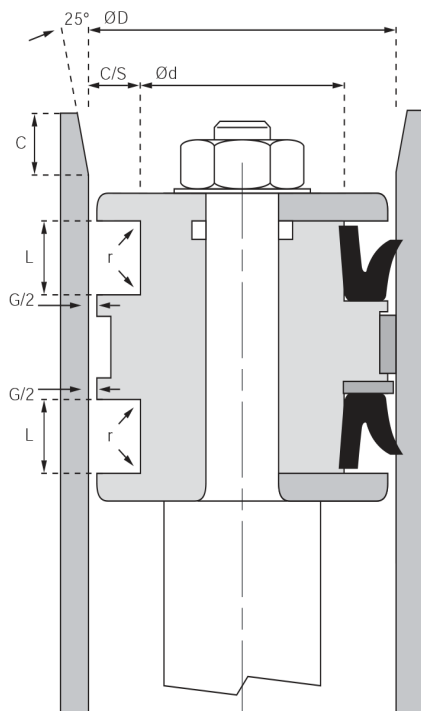
Pneumatic Piston Seals

Single acting seals



Key Features

- Light duty
- Piston only
- Low pressure capability
- Dynamic lip reaction
- Low friction
- Easy to fit



Design

DE are designed as an easy to fit low pressure seal, type DE are made from Nitrile rubber 75 Shore A intended for LUBRICATED pneumatic applications. Type DE have a thicker and longer static sealing lip to form a buffer against axial movement. To ensure that type DE seals are fitted snugly in the grooves, they are moulded somewhat smaller than groove sizes and in the free state appear to be too small for their respective housings. However, the correct dynamic sealing lip interference is provided when the seal is stretched into its groove. In double acting applications the two seals should always be in separate grooves and facing away from one another to avoid a pressure trap. (For NON LUBRICATED air pneumatic applications refer to GPP style)

Operating Conditions

Pressure

16 Bar
230 Psi

Pneumatic

Temperature

-30° to 100°C
-22° to 212°F

Speed

0.5m/sec
1.5'/sec

Surface Finish μmRa

| ØD | Ød | L |
|-------------|-------------|-----|
| 0.1 - 0.25 | ≤ 0.8 | 2.0 |

Tolerances

| ØD | Ød | L | G |
|-------------|-------------|----------|------|
| H8 | f7 | -0 + 0.2 | 0.25 |

Chamfer Radii

| C/S | 5.0 | 7.5 | 10.0 |
|-----|-----|-----|------|
| C | 2.5 | 4.0 | 5.0 |
| r | 0.2 | 0.4 | 0.4 |

Typical Examples

Reciprocating Rotary Oscillating Helix





U-70

Pneumatic Piston Seals

Design

U-70 type rubber single acting seals are designed for rods or pistons. Made from Nitrile 70 Shore A this type can handle low pressure applications, although predominately used in pneumatic cylinders, low pressure hydraulic cylinders can be accommodated. These precision moulded seals have equally distributed heel clearance and lip to housing interference. In double acting applications the two seals should always be in separate grooves and facing away from one another to avoid a pressure trap.

Operating Conditions

Pressure

16 Bar
230 Psi

Pneumatic

Temperature

-30° to 100°C
-22° to 212°F

Speed

0.5m/sec
1.5'/sec

Surface Finish μmRa

| ØD | Ød | L |
|-------------|-------------|-----|
| 0.1 - 0.25 | ≤ 0.8 | 2.0 |

Tolerances

| ØD | Ød | L | G |
|-------------|-------------|----------|------|
| H8 | f7 | -0 + 0.2 | 0.25 |

Chamfer Radii

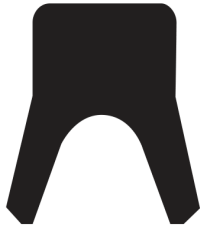
| | 5.0 | 7.5 | 10.0 |
|-----|-----|-----|------|
| C/S | 5.0 | 7.5 | 10.0 |
| C | 2.5 | 4.0 | 5.0 |
| r | 0.2 | 0.4 | 0.4 |

Typical Examples

Reciprocating Rotary Oscillating Helix

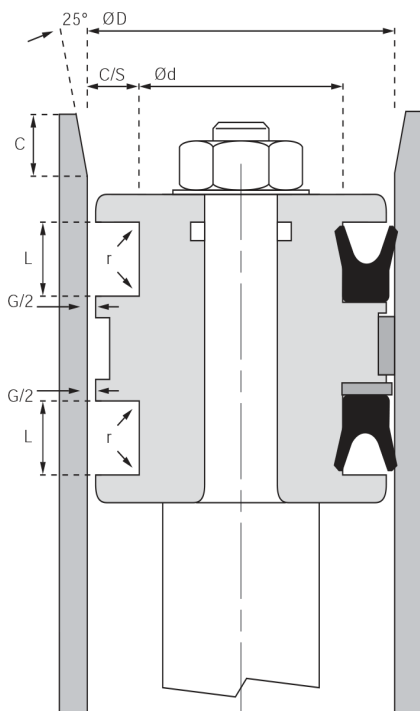


Single acting seals



Key Features

- Light duty
- Piston or rod
- Low pressure capability
- Dynamic lip reaction
- Low friction
- Easy to fit

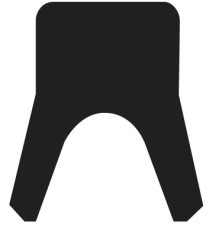




U-90

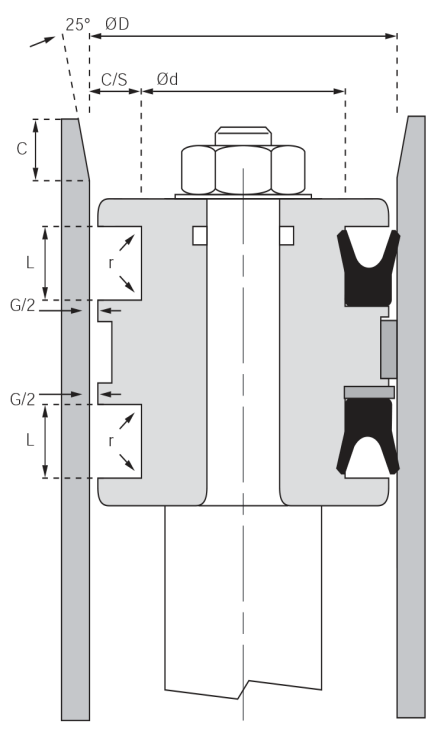
Pneumatic Piston Seals

Single acting seals



Key Features

- Light to medium duty
- Piston or rod
- Dynamic lip reaction
- Low friction
- Easy to fit



Design

U-90 type rubber single acting seals are designed for rods or pistons. Made from Nitrile 90 Shore A this type can handle low to medium pressure applications, although predominately used in pneumatic cylinders, low to medium pressure hydraulic cylinders can be accommodated. These precision moulded seals have equally distributed heel clearance and lip to housing interference. In double acting applications the two seals should always be in separate grooves and facing away from one another to avoid a pressure trap.

Operating Conditions

| | | |
|--------------------|----------------------------------|--|
| Pressure | 85 Bar 1,250 Psi | |
| Temperature | -30° to 100° C -22° to 212° F | |
| Speed | 0.5m/sec 1.5'/sec | |

| | | | |
|--|--------------|-----|--|
| Surface Finish μmRa | | | |
| $\text{\O}D$ | $\text{\O}d$ | L | |
| 0.1 - 0.25 | ≤ 0.8 | 2.0 | |

| | | | |
|-------------------|---------------|----------|------|
| Tolerances | | | |
| $\text{\O}D$ | $\text{\O}d1$ | L | G |
| H8 | f7 | -0 + 0.2 | 0.25 |

| | | | |
|----------------------|-----|-----|------|
| Chamfer Radii | | | |
| C/S | 5.0 | 7.5 | 10.0 |
| C | 2.5 | 4.0 | 5.0 |
| r | 0.2 | 0.4 | 0.4 |

Typical Examples
 Reciprocating Rotary Oscillating Helix



GPP



DE



U-70



U-90



19M

| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
|-------|--------|-------|------|-------|------|-----------------|
| 6.00 | 3.00 | 2.00 | 2.50 | 5.60 | 0.00 | GPP-003006-025 |
| 8.00 | 4.00 | 2.55 | 3.00 | 7.60 | 0.00 | GPP-004008-030 |
| 8.00 | 4.80 | 2.30 | 2.70 | 7.60 | 0.00 | GPP-004008-027 |
| 8.00 | 4.80 | 2.55 | 3.00 | 7.60 | 0.00 | GPP-004008-030A |
| 10.00 | 6.00 | 2.55 | 3.00 | 9.60 | 0.00 | GPP-006010-030 |
| 12.00 | 6.00 | 4.00 | 5.50 | 0.00 | 0.00 | DE-006012-055 |
| 12.00 | 7.00 | 2.55 | 3.00 | 11.60 | 0.00 | GPP-007012-030 |
| 13.00 | 8.00 | 2.55 | 3.00 | 12.60 | 0.00 | GPP-008013-030 |
| 14.00 | 8.00 | 2.55 | 3.00 | 13.60 | 0.00 | GPP-008014-030 |
| 15.00 | 9.00 | 2.55 | 3.00 | 0.00 | 0.00 | GPP-009015-030 |
| 15.00 | 135.00 | 10.00 | 0.00 | 0.00 | 0.00 | DE-135150-115 |
| 16.00 | 10.00 | 2.55 | 3.00 | 15.60 | 0.00 | GPP-010016-030 |
| 17.00 | 11.00 | 2.55 | 3.00 | 16.60 | 0.00 | GPP-011017-030 |
| 18.00 | 8.00 | 2.00 | 0.00 | 0.00 | 0.00 | 19M-008018-020 |
| 18.00 | 12.00 | 2.55 | 3.00 | 17.60 | 0.00 | GPP-012018-030 |
| 20.00 | 12.00 | 5.50 | 7.00 | 0.00 | 0.00 | DE-012020-070 |
| 20.00 | 14.00 | 2.55 | 3.00 | 19.60 | 0.00 | GPP-014020-030 |
| 20.00 | 14.00 | 4.00 | 4.50 | 19.40 | 0.00 | DE-014020-045 |
| 20.00 | 14.00 | 4.00 | 4.50 | 19.60 | 0.00 | GPP-014020-045 |
| 22.00 | 16.00 | 2.55 | 3.00 | 21.40 | 0.00 | GPP-016022-030 |
| 24.00 | 18.00 | 2.55 | 3.00 | 23.40 | 0.00 | GPP-018024-030 |
| 25.00 | 17.00 | 5.50 | 6.00 | 21.00 | 0.00 | GPP-017025-060 |
| 25.00 | 17.00 | 5.50 | 7.00 | 0.00 | 0.00 | DE-017025-070 |
| 25.00 | 18.00 | 4.00 | 4.50 | 0.00 | 0.00 | GPP-018025-045 |
| 25.00 | 19.00 | 3.25 | 3.50 | 23.40 | 0.00 | GPP-019025-035 |
| 25.00 | 19.00 | 4.00 | 4.50 | 24.40 | 0.00 | GPP-019025-045 |
| 27.20 | 22.00 | 2.70 | 3.00 | 0.00 | 0.00 | DE-022027-030 |
| 28.00 | 18.00 | 7.00 | 7.50 | 23.00 | 0.00 | GPP-018028-075 |
| 28.00 | 22.00 | 3.25 | 3.50 | 27.40 | 0.00 | GPP-022028-035 |
| 30.00 | 22.00 | 3.25 | 3.50 | 29.40 | 0.00 | GPP-022030-035 |
| 30.26 | 24.00 | 2.70 | 3.00 | 0.00 | 0.00 | DE-024030-030 |



GPP



DE



U-70



U-90



19M

| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
|-------|-------|------|------|-------|------|----------------|
| 32.00 | 24.00 | 3.25 | 3.50 | 31.40 | 0.00 | GPP-024032-035 |
| 32.00 | 24.00 | 5.50 | 6.00 | 28.00 | 0.00 | GPP-024032-060 |
| 32.00 | 24.00 | 5.50 | 7.00 | 0.00 | 0.00 | DE-024032-070 |
| 33.44 | 27.00 | 2.70 | 3.00 | 0.00 | 0.00 | DE-027033-030 |
| 34.94 | 28.50 | 2.70 | 3.00 | 0.00 | 0.00 | DE-028034-030 |
| 35.00 | 27.00 | 3.25 | 3.50 | 34.40 | 0.00 | GPP-027035-035 |
| 35.50 | 28.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-028035-030 |
| 36.00 | 28.00 | 3.25 | 3.50 | 35.40 | 0.00 | GPP-028036-035 |
| 38.00 | 30.00 | 3.25 | 3.50 | 37.40 | 0.00 | GPP-030038-035 |
| 38.00 | 30.00 | 5.50 | 6.00 | 0.00 | 0.00 | GPP-030038-060 |
| 39.92 | 31.80 | 2.70 | 3.00 | 0.00 | 0.00 | DE-031039-030 |
| 40.00 | 30.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-030040-030 |
| 40.00 | 30.00 | 7.00 | 7.50 | 39.40 | 0.00 | GPP-030040-075 |
| 40.00 | 30.00 | 7.00 | 8.50 | 0.00 | 0.00 | DE-030040-085 |
| 40.00 | 32.00 | 3.25 | 3.50 | 39.40 | 0.00 | GPP-032040-035 |
| 42.00 | 30.00 | 6.00 | 6.50 | 41.40 | 0.00 | GPP-030042-065 |
| 42.00 | 34.00 | 3.25 | 3.50 | 41.40 | 0.00 | GPP-034042-035 |
| 43.00 | 30.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-030043-030 |
| 45.00 | 35.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-035045-030 |
| 45.00 | 37.00 | 3.25 | 3.50 | 44.40 | 0.00 | GPP-037045-035 |
| 48.00 | 32.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-032048-030 |
| 50.00 | 40.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-040050-030 |
| 50.00 | 40.00 | 7.00 | 7.50 | 45.00 | 0.00 | GPP-040050-075 |
| 50.00 | 42.00 | 3.25 | 3.50 | 49.40 | 0.00 | GPP-042050-035 |
| 52.00 | 42.00 | 4.25 | 4.50 | 51.40 | 0.00 | GPP-042052-045 |
| 55.00 | 40.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-040055-030 |
| 55.00 | 45.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-045055-030 |
| 55.00 | 45.00 | 7.00 | 7.50 | 50.00 | 0.00 | GPP-045055-075 |
| 58.00 | 48.00 | 4.25 | 4.50 | 57.40 | 0.00 | GPP-048058-045 |
| 60.00 | 45.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-045060-030 |
| 60.00 | 50.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-050060-030 |



GPP



DE



U-70



U-90



19M

| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
|-------|-------|-------|-------|-------|------|----------------|
| 60.00 | 50.00 | 5.00 | 5.70 | 55.00 | 0.00 | GPP-050060-057 |
| 60.00 | 50.00 | 7.00 | 7.50 | 55.00 | 0.00 | GPP-050060-075 |
| 63.00 | 48.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-048063-030 |
| 63.00 | 50.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-050063-030 |
| 63.00 | 53.00 | 4.25 | 4.50 | 0.00 | 0.00 | DE-053063-045 |
| 63.00 | 53.00 | 4.25 | 4.50 | 62.40 | 0.00 | GPP-053063-045 |
| 63.00 | 53.00 | 7.00 | 7.50 | 58.00 | 0.00 | GPP-053063-075 |
| 63.00 | 53.00 | 7.00 | 8.50 | 0.00 | 0.00 | DE-053063-085 |
| 65.00 | 50.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-050065-030 |
| 65.00 | 50.00 | 10.00 | 0.00 | 0.00 | 0.00 | 19M-050065-100 |
| 65.00 | 52.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-052065-030 |
| 65.00 | 52.00 | 7.70 | 8.50 | 0.00 | 0.00 | DE-052065-085 |
| 65.00 | 55.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-055065-030 |
| 65.00 | 55.00 | 7.00 | 7.50 | 60.00 | 0.00 | GPP-055065-075 |
| 65.00 | 55.00 | 7.00 | 8.50 | 0.00 | 0.00 | DE-055065-085 |
| 68.00 | 55.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-055068-030 |
| 68.00 | 58.00 | 4.70 | 5.50 | 63.00 | 0.00 | GPP-058068-055 |
| 70.00 | 50.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-050070-030 |
| 70.00 | 55.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-055070-030 |
| 70.00 | 58.00 | 8.50 | 9.50 | 64.00 | 0.00 | GPP-058070-095 |
| 70.00 | 60.00 | 0.00 | 0.00 | 0.00 | 0.00 | 19M-060070-025 |
| 70.00 | 60.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-060070-030 |
| 70.00 | 60.00 | 7.00 | 7.50 | 65.00 | 0.00 | GPP-060070-075 |
| 73.00 | 60.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-060073-030 |
| 75.00 | 55.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-055075-030 |
| 75.00 | 60.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-060075-030 |
| 75.00 | 62.00 | 7.70 | 8.50 | 0.00 | 0.00 | DE-062075-085 |
| 75.00 | 63.00 | 8.50 | 9.50 | 69.00 | 0.00 | GPP-063075-095 |
| 75.00 | 63.00 | 8.50 | 10.00 | 0.00 | 0.00 | DE-063075-100 |
| 75.00 | 65.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-065075-030 |
| 78.00 | 65.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-065078-030 |



GPP



DE



U-70



U-90



19M

| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
|--------|-------|-------|-------|-------|------|----------------|
| 80.00 | 60.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-060080-030 |
| 80.00 | 65.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-065080-030 |
| 80.00 | 68.00 | 8.50 | 9.50 | 74.00 | 0.00 | GPP-068080-095 |
| 80.00 | 68.00 | 8.50 | 10.00 | 0.00 | 0.00 | DE-068080-100 |
| 80.00 | 70.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-070080-030 |
| 80.00 | 70.00 | 4.25 | 4.50 | 0.00 | 0.00 | DE-070080-045 |
| 83.00 | 70.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-070083-030 |
| 85.00 | 65.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-065085-030 |
| 85.00 | 70.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-070085-030 |
| 85.00 | 73.00 | 8.50 | 9.50 | 79.00 | 0.00 | GPP-073085-095 |
| 85.00 | 75.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-075085-030 |
| 88.00 | 75.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-075088-030 |
| 90.00 | 70.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-070090-030 |
| 90.00 | 75.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-075090-030 |
| 90.00 | 78.00 | 8.50 | 9.50 | 84.00 | 0.00 | GPP-078090-095 |
| 90.00 | 80.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-080090-030 |
| 90.00 | 80.00 | 4.25 | 4.50 | 89.40 | 0.00 | GPP-080090-045 |
| 93.00 | 80.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-080093-030 |
| 95.00 | 69.00 | 10.00 | 0.00 | 0.00 | 0.00 | 19M-069095-100 |
| 95.00 | 75.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-075095-030 |
| 95.00 | 80.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-080095-030 |
| 100.00 | 80.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-080100-030 |
| 100.00 | 85.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-085100-030 |
| 100.00 | 88.00 | 8.50 | 9.50 | 94.00 | 0.00 | GPP-088100-095 |
| 100.00 | 90.00 | 4.25 | 4.50 | 99.40 | 0.00 | GPP-090100-045 |
| 105.00 | 85.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-085105-030 |
| 105.00 | 90.00 | 2.00 | 0.00 | 0.00 | 0.00 | 19M-090105-020 |
| 105.00 | 90.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-090105-030 |
| 105.00 | 95.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-095105-030 |
| 110.00 | 90.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-090110-030 |
| 110.00 | 95.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-095110-030 |



GPP



DE



U-70



U-90



19M

| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
|--------|--------|-------|-------|--------|------|----------------|
| 110.00 | 95.00 | 10.00 | 11.00 | 102.50 | 0.00 | GPP-095110-110 |
| 115.00 | 95.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-095115-030 |
| 115.00 | 100.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-100115-030 |
| 120.00 | 100.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-100120-030 |
| 120.00 | 105.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-105120-030 |
| 120.00 | 105.00 | 10.00 | 11.00 | 112.50 | 0.00 | GPP-105120-110 |
| 125.00 | 105.00 | 8.25 | 8.50 | 123.80 | 0.00 | GPP-105125-085 |
| 125.00 | 110.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-110125-030 |
| 125.00 | 110.00 | 10.00 | 11.00 | 117.50 | 0.00 | GPP-110125-110 |
| 130.00 | 110.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-110130-030 |
| 130.00 | 115.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-115130-030 |
| 130.00 | 115.00 | 10.00 | 11.00 | 122.50 | 0.00 | GPP-115130-110 |
| 135.00 | 115.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-115135-030 |
| 135.00 | 120.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-120135-030 |
| 140.00 | 120.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-120140-030 |
| 140.00 | 120.00 | 8.25 | 8.50 | 138.80 | 0.00 | GPP-120140-085 |
| 140.00 | 125.00 | 0.00 | 0.00 | 0.00 | 0.00 | DE-125140-110 |
| 140.00 | 125.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-125140-030 |
| 145.00 | 125.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-125145-030 |
| 145.00 | 130.00 | 2.00 | 0.00 | 0.00 | 0.00 | 19M-130145-020 |
| 150.00 | 129.00 | 2.30 | 0.00 | 0.00 | 0.00 | 19M-129150-023 |
| 150.00 | 130.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-130150-030 |
| 150.00 | 136.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-136150-030 |
| 155.00 | 140.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-140155-030 |
| 160.00 | 140.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-140160-030 |
| 160.00 | 140.00 | 8.25 | 8.50 | 158.80 | 0.00 | GPP-140160-085 |
| 160.00 | 145.00 | 2.00 | 0.00 | 0.00 | 0.00 | 19M-145160-020 |
| 160.00 | 145.00 | 10.00 | 11.00 | 152.50 | 0.00 | GPP-145160-110 |
| 165.00 | 150.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-150165-030 |
| 170.00 | 150.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-150170-030 |
| 170.00 | 150.00 | 4.00 | 0.00 | 0.00 | 0.00 | 19M-150170-040 |



GPP



DE



U-70



U-90



19M

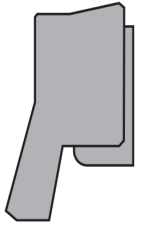
| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
|--------|--------|-------|-------|--------|------|----------------|
| 170.00 | 155.00 | 2.00 | 0.00 | 0.00 | 0.00 | 19M-155170-020 |
| 180.00 | 160.00 | 4.00 | 0.00 | 0.00 | 0.00 | 19M-160180-040 |
| 180.00 | 160.00 | 14.00 | 15.00 | 170.00 | 0.00 | GPP-160180-150 |
| 180.00 | 165.00 | 0.00 | 0.00 | 0.00 | 0.00 | 19M-165180-030 |
| 185.00 | 160.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-160185-030 |
| 190.00 | 170.00 | 4.00 | 0.00 | 0.00 | 0.00 | 19M-170190-040 |
| 190.00 | 175.00 | 2.00 | 0.00 | 0.00 | 0.00 | 19M-175190-020 |
| 195.00 | 170.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-170195-030 |
| 200.00 | 175.00 | 4.00 | 0.00 | 0.00 | 0.00 | 19M-175200-040 |
| 200.00 | 180.00 | 4.00 | 0.00 | 0.00 | 0.00 | 19M-180200-040 |
| 200.00 | 180.00 | 8.25 | 8.50 | 198.80 | 0.00 | GPP-180200-085 |
| 200.00 | 180.00 | 14.00 | 15.00 | 190.00 | 0.00 | GPP-180200-150 |
| 205.00 | 185.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-185205-030 |
| 210.00 | 190.00 | 4.00 | 0.00 | 0.00 | 0.00 | 19M-190210-040 |
| 210.00 | 195.00 | 2.50 | 0.00 | 0.00 | 0.00 | 19M-195210-025 |
| 215.00 | 190.00 | 4.00 | 0.00 | 0.00 | 0.00 | 19M-190215-040 |
| 230.00 | 210.00 | 4.00 | 0.00 | 0.00 | 0.00 | 19M-210230-040 |
| 240.00 | 220.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-220240-030 |
| 245.00 | 220.00 | 0.00 | 0.00 | 0.00 | 0.00 | 19M-220245-040 |
| 260.00 | 240.00 | 4.00 | 0.00 | 0.00 | 0.00 | 19M-240260-040 |
| 270.00 | 250.00 | 4.00 | 0.00 | 0.00 | 0.00 | 19M-250270-040 |
| 290.00 | 260.00 | 4.00 | 0.00 | 0.00 | 0.00 | 19M-260290-040 |



AMM

Pneumatic Cushion Seals

Cushion seals






Key Features

- Dry or lubricated air
- Low pressure
- Two sealing systems
- Easy to fit
- Handle misalignment

Design

AMM is a specifically designed cushion seal, providing cushioning at the end of the stroke in pneumatic cylinders. The profile eliminates the limitations in this particular application that some seal types, like o-rings and lip seals have. The inlet chamfer on the sealing lip and the groove on the sealing border at the bottom makes the cushion very effective. Another advantage is the utilisation of Polyurethane 90 Shore A which with it's high impact and abrasion resistance, gives the seal a very long life.

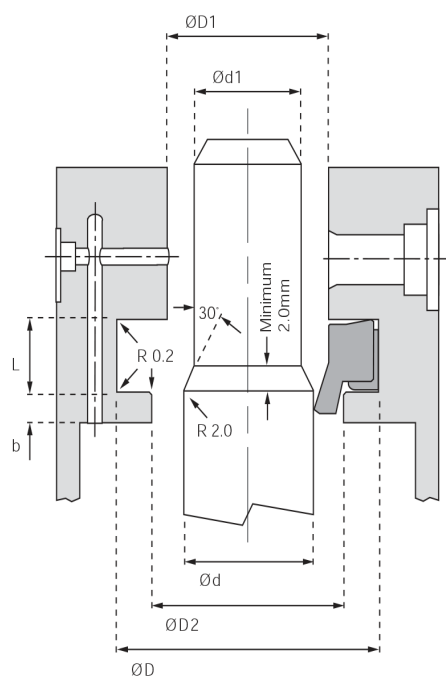
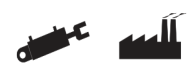
Operating Conditions

| Pressure | 16 Bar 230 Psi |  | | | | | | |
|----------------------------|---|--|----|---|------------|------|-----|--|
| Temperature | -30° to 80°C -22° to 176°F |  | | | | | | |
| Speed | 1.0m/sec 3.0'/sec |  | | | | | | |
| Surface Finish µmRa | <table border="1"> <thead> <tr> <th>ØD</th> <th>Ød</th> <th>L</th> </tr> </thead> <tbody> <tr> <td>0.1 - 0.25</td> <td>≤0.8</td> <td>2.0</td> </tr> </tbody> </table> | ØD | Ød | L | 0.1 - 0.25 | ≤0.8 | 2.0 | |
| ØD | Ød | L | | | | | | |
| 0.1 - 0.25 | ≤0.8 | 2.0 | | | | | | |

| Tolerances | <table border="1"> <thead> <tr> <th>Ød</th> <th>ØD</th> <th>ØD1</th> <th>ØD2</th> <th>Ød1</th> <th>L</th> <th>b</th> </tr> </thead> <tbody> <tr> <td>h10</td> <td>H11</td> <td>H11</td> <td>H11</td> <td>h11</td> <td>± 0.10</td> <td>+ 0.2 - 0.0</td> </tr> </tbody> </table> | Ød | ØD | ØD1 | ØD2 | Ød1 | L | b | h10 | H11 | H11 | H11 | h11 | ± 0.10 | + 0.2 - 0.0 |
|-------------------|--|-----|-----|-----|--------|----------------|---|---|-----|-----|-----|-----|-----|--------|----------------|
| Ød | ØD | ØD1 | ØD2 | Ød1 | L | b | | | | | | | | | |
| h10 | H11 | H11 | H11 | h11 | ± 0.10 | + 0.2 - 0.0 | | | | | | | | | |

Chamfer Radii
As noted!

Typical Examples
 Reciprocating Rotary Oscillating Helix

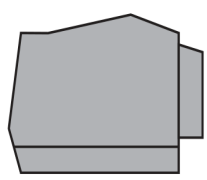




AMV

Pneumatic Cushion Seals

Cushion seals



Key Features

- Light duty
- Low pressure
- Easy to fit
- Compact housing
- Handle misalignment

Design

AMV are designed specially to provide cushioning to pneumatic cylinders. Made from a high impact and abrasion resistant polyurethane 90 Shore A this seal functions as a non return valve so no separate valve is required. It provides high cushioning consistency due to automatic centralising, even in the case of misalignment of the cushioning spear to the cylinder head. The housing required is similar in size to an o-ring which provides for simple housings and easy installation.

Operating Conditions

Pressure



Temperature



Speed



Surface Finish μmRa

| $\varnothing D$ | $\varnothing d$ | L |
|-----------------|-----------------|-----|
| 0.1 | 0.8 | 2.0 |
| <0.25 | | |

Tolerances

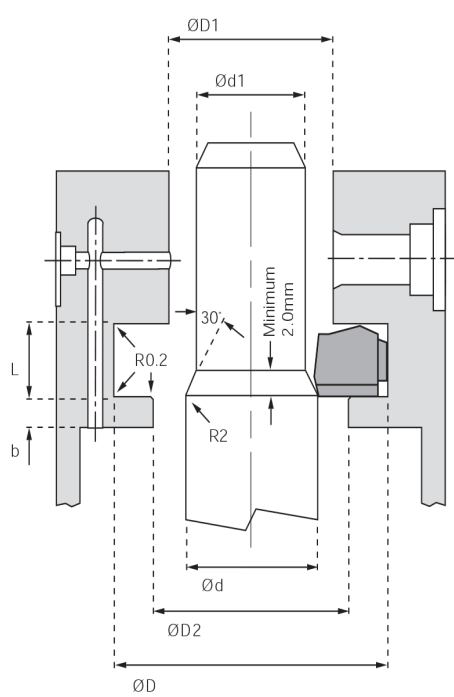
| $\varnothing d$ | $\varnothing D$ | $\varnothing D1$ | $\varnothing D2$ | L | $\varnothing d1$ | b |
|-----------------|-----------------|------------------|------------------|-----------|------------------|----------------|
| h10 | H11 | H11 | H11 | ± 0.1 | h11 | + 0.2 - 0.0 |

Chamfer Radii

As noted!

Typical Examples

- Reciprocating Rotary Oscillating Helix





AMM



AMV

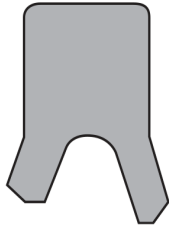
| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
|-------|-------|-------|-------|-------|-------|----------------|
| 10.00 | 6.00 | 3.70 | 4.00 | 6.50 | 8.00 | AMM-006010-037 |
| 11.60 | 8.00 | 3.30 | 3.50 | 8.50 | 10.00 | AMM-008011-033 |
| 15.00 | 9.50 | 4.50 | 4.50 | 10.00 | 12.00 | AMM-009015-045 |
| 18.00 | 10.00 | 7.00 | 7.80 | 11.00 | 15.00 | AMM-010018-070 |
| 18.00 | 12.00 | 4.80 | 5.00 | 13.00 | 15.50 | AMM-012018-048 |
| 20.00 | 12.00 | 7.00 | 7.80 | 13.00 | 17.00 | AMM-012020-070 |
| 22.00 | 14.00 | 7.00 | 7.80 | 15.00 | 19.00 | AMM-014022-070 |
| 24.00 | 16.00 | 4.00 | 4.80 | 18.00 | 0.00 | AMV-016024-048 |
| 24.00 | 16.00 | 7.00 | 7.80 | 17.00 | 21.00 | AMM-016024-070 |
| 26.00 | 18.00 | 7.00 | 7.80 | 19.00 | 23.00 | AMM-018026-070 |
| 26.00 | 20.00 | 0.00 | 0.00 | 0.00 | 0.00 | AMM-020026-035 |
| 28.00 | 20.00 | 7.00 | 7.80 | 21.00 | 24.00 | AMM-020028-070 |
| 30.00 | 22.00 | 7.00 | 7.80 | 23.00 | 26.00 | AMM-022030-070 |
| 32.00 | 25.00 | 0.00 | 0.00 | 0.00 | 0.00 | AMM-025032-044 |
| 33.00 | 25.00 | 7.00 | 7.80 | 26.00 | 29.00 | AMM-025033-070 |
| 36.00 | 28.00 | 7.00 | 7.80 | 29.00 | 32.00 | AMM-028036-070 |
| 38.00 | 30.00 | 0.00 | 0.00 | 0.00 | 0.00 | PP-030038-058 |
| 42.00 | 32.00 | 7.00 | 7.80 | 33.50 | 37.00 | AMM-032042-070 |
| 44.40 | 35.00 | 0.00 | 0.00 | 0.00 | 0.00 | AMM-035044-061 |
| 46.00 | 36.00 | 7.00 | 7.80 | 37.50 | 41.00 | AMM-036046-070 |
| 50.00 | 40.00 | 6.00 | 6.00 | 40.60 | 42.00 | AMV-040050-060 |
| 50.00 | 40.00 | 7.00 | 7.80 | 41.50 | 45.00 | AMM-040050-070 |
| 60.00 | 50.00 | 7.00 | 7.80 | 51.50 | 55.00 | AMM-050060-070 |
| 87.00 | 70.00 | 11.00 | 12.50 | 0.00 | 0.00 | AMM-070087-125 |



RS

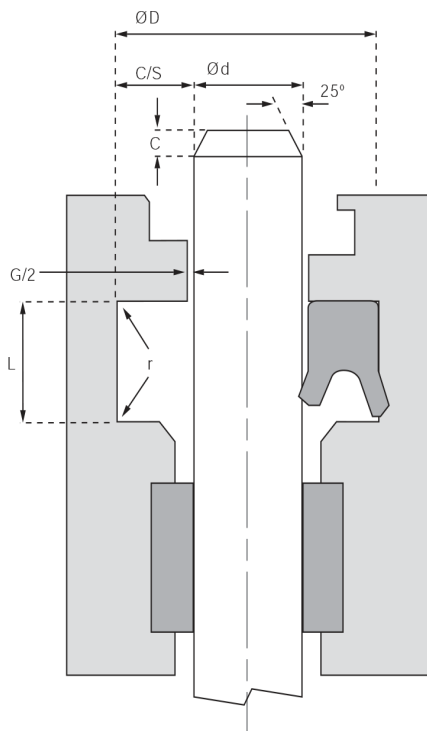
Hydraulic
Design

Rod seals



Key Features

- Medium to heavy duty
- Rod seal only
- Asymmetrical lip design
- Excellent wear resistance
- Good extrusion resistance
- Flexible to fit



RS u-cup is a specialised rod seal design manufactured from 94 Shore A Polyurethane. Developed from the standard symmetrical U-cup, type RS has an outside diameter larger than the groove for which it is intended. This insures a tight fit in the groove to prevent movement of the seal during cylinder operation and helps overcome problems with shrinkage and low temperature leakage. The static lip is thinner as it's in full contact with the groove diameter, the dynamic lip is heavier to improve higher pressure capability. Both lips have precision knife trimmed chamfers to provide complete circumferential lip contact.

Operating Conditions

Pressure

400 Bar
6,000 Psi



Temperature

-40° to 105°C
-40° to 221°F



Speed

0.8m/sec
2.5'/sec



Surface Finish μmRa

| | | |
|-------------|-------------|-----|
| Ød | ØD | L |
| 0.1 - 0.25 | ≤ 0.8 | 2.0 |

Tolerances

| | | |
|-------------|-------------|-------------|
| Ød | ØD | L |
| f7 | H10 | - 0.0 + 0.2 |

Chamfer Radii

| | | | | | |
|-----|-----|-----|------|------|------|
| C/S | 5.0 | 7.5 | 10.0 | 15.0 | 20.0 |
| C | 2.5 | 4.0 | 5.0 | 7.5 | 10.0 |
| r | 0.4 | 0.8 | 0.8 | 1.6 | 1.6 |

Extrusion Gap - G

| | | | | | | |
|----------------|------|------|------|------|------|------|
| Pressure (Bar) | 50 | 100 | 200 | 300 | 400 | 500 |
| Seal Only (mm) | 1.20 | 0.80 | 0.40 | 0.25 | 0.17 | 0.10 |
| Seal + BU (mm) | n/a | 1.10 | 0.80 | 0.70 | 0.60 | 0.50 |

Typical Examples

Reciprocating Rotary Oscillating Helix





RSL

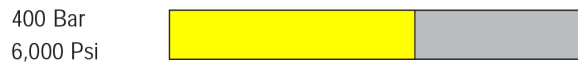
Hydraulic

Design

RSL asymmetrical single acting rod seal is made from Polyurethane 94 Shore A and has two sealing lips on the dynamic surface. The outside diameter is greater than the nominal dimension for the housing and a fluid ring is moulded between the primary and secondary sealing lips. This helps to reduce the area of contact and consequently the friction and stick slip phenomena. The second sealing lip also has the function of keeping the entire packing in contact with the static housing particularly when temperatures get so low they cause contractions of the sealing ring. Both lips have precision knife trimmed chamfers to provide complete circumferential lip contact.

Operating Conditions

Pressure



Temperature



Speed



Surface Finish μmRa

| | | |
|-----------------|-----------------|-----|
| $\varnothing d$ | $\varnothing D$ | L |
| 0.1 - 0.25 | ≤ 0.8 | 2.0 |

Tolerances

| | | |
|-----------------|-----------------|-------------|
| $\varnothing d$ | $\varnothing D$ | L |
| f7 | H10 | - 0.0 + 0.2 |

Chamfer Radii

| | | | | | |
|-----|-----|-----|------|------|------|
| C/S | 5.0 | 7.5 | 10.0 | 15.0 | 20.0 |
| C | 2.5 | 4.0 | 5.0 | 7.5 | 10.0 |
| r | 0.4 | 0.8 | 0.8 | 1.6 | 1.6 |

Extrusion Gap - G

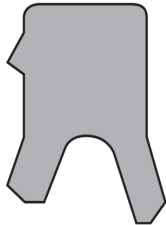
| | | | | | | |
|----------------|------|------|------|------|------|------|
| Pressure (Bar) | 50 | 100 | 200 | 300 | 400 | 500 |
| Seal Only (mm) | 1.20 | 0.80 | 0.40 | 0.25 | 0.17 | 0.10 |
| Seal + BU (mm) | n/a | 1.10 | 0.80 | 0.70 | 0.60 | 0.50 |

Typical Examples

Reciprocating Rotary Oscillating Helix

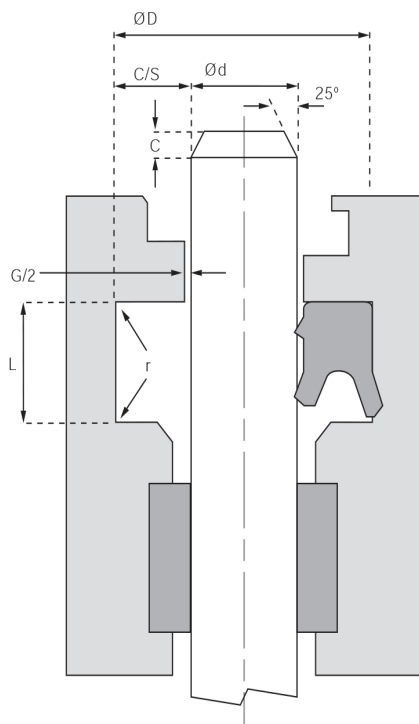


Rod seals



Key Features

- Medium to heavy duty
- Rod seal only
- Good at low temperatures
- Excellent stability
- Lower in friction
- Easy to fit

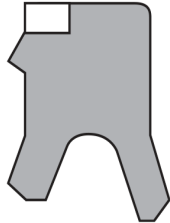




RSLA

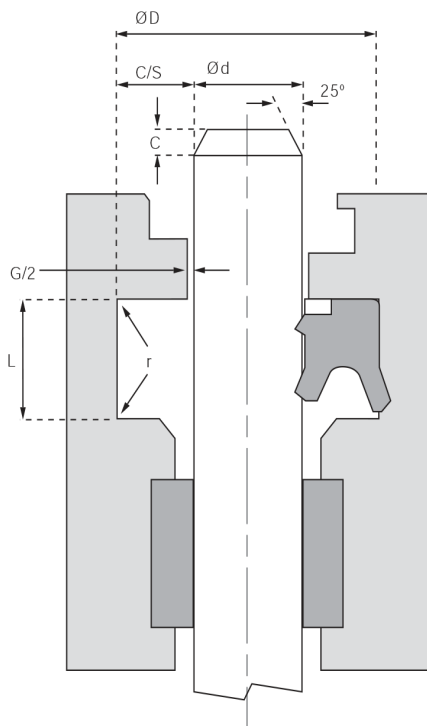
Hydraulic

Rod seals



Key Features

- Higher pressures
- Shock load capability
- Good at low temperatures
- Anti-extrusion ring
- Twin lip design for stability



Design

RSLA asymmetrical single acting rod seal is made from Polyurethane 94 Shore A and has two sealing lips on the dynamic surface. The outside diameter is greater than the nominal dimension for the housing and a fluid ring is moulded between the primary and secondary sealing lips. This helps to reduce the area of contact and consequently the friction and stick slip phenomena. The second sealing lip also has the function of keeping the entire packing in contact with the static housing particularly when temperatures get so low they cause contractions of the sealing ring. Both lips have precision knife trimmed chamfers to provide complete circumferential lip contact. In addition an anti-extrusion ring is present for added protection against wide clearances and extreme pressures.

Operating Conditions

Pressure



Temperature



Speed



Surface Finish μmRa

| | | |
|--------------|--------------|-----|
| $\text{\O}d$ | $\text{\O}D$ | L |
| 0.1 - 0.25 | ≤ 0.8 | 2.0 |

Tolerances

| | | |
|--------------|--------------|-------------|
| $\text{\O}d$ | $\text{\O}D$ | L |
| f7 | H10 | - 0.0 + 0.2 |

Chamfer Radii

| | | | | | |
|-----|-----|-----|------|------|------|
| C/S | 5.0 | 7.5 | 10.0 | 15.0 | 20.0 |
| C | 2.5 | 4.0 | 5.0 | 7.5 | 10.0 |
| r1 | 0.4 | 0.8 | 0.8 | 1.6 | 1.6 |

Extrusion Gap - G

| | | | | | | |
|----------------|------|------|------|------|------|------|
| Pressure (Bar) | 50 | 100 | 200 | 300 | 400 | 500 |
| Seal Only (mm) | 1.20 | 0.80 | 0.40 | 0.25 | 0.17 | 0.10 |
| Seal + BU (mm) | n/a | 1.10 | 0.80 | 0.70 | 0.60 | 0.50 |

Typical Examples

Reciprocating Rotary Oscillating Helix

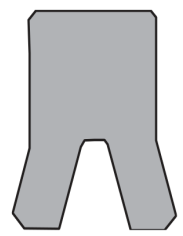




RSS

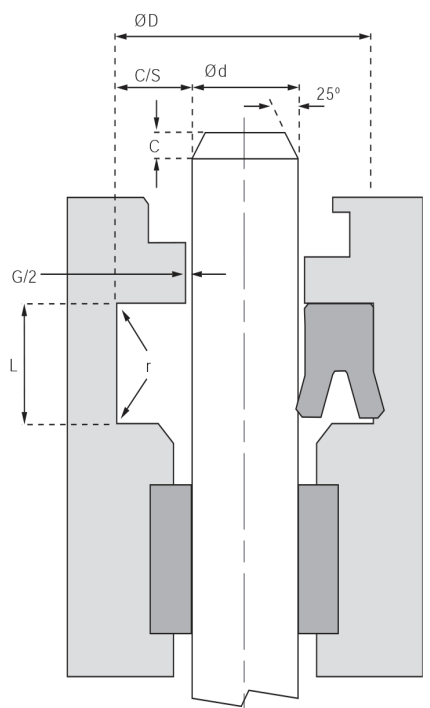
Hydraulic

Rod seals



Key Features

- Medium to heavy duty
- Piston or rod
- Symmetrical lip design
- Excellent wear resistance
- Good extrusion resistance
- Flexible to fit

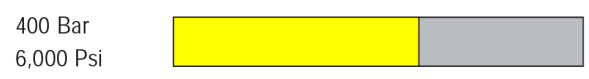


Design

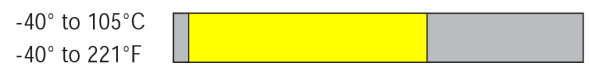
RSS are a symmetrical U-cup made from 94 Shore A Polyurethane with a high modulus of elasticity and low permanent deformation. Its excellent wear resistance offers long service life in a wide range of applications. The symmetrical configuration, with equal lip interference and equal heel clearance on both the inside and outside diameters, provides a seal which is capable for use in both piston and rod applications. The sealing lips are knife trimmed to eliminate all moulding flash and to provide superior low pressure sealing performance.

Operating Conditions

Pressure



Temperature



Speed



Surface Finish µmRa

| | | |
|------------|------|-----|
| Ød | ØD | L |
| 0.1 - 0.25 | ≤0.8 | 2.0 |

Tolerances

| | | |
|----|-----|-----------|
| Ød | ØD | L |
| f7 | H10 | - 0 + 0.2 |

Chamfer Radii

| | | | | | |
|-----|-----|-----|------|------|------|
| C/S | 5.0 | 7.5 | 10.0 | 15.0 | 20.0 |
| C | 2.5 | 4.0 | 5.0 | 7.5 | 10.0 |
| r | 0.4 | 0.8 | 0.8 | 1.6 | 1.6 |

Extrusion Gap - G

| | | | | | | |
|----------------|------|------|------|------|------|------|
| Pressure (Bar) | 50 | 100 | 200 | 300 | 400 | 500 |
| Seal Only (mm) | 1.20 | 0.80 | 0.40 | 0.25 | 0.17 | 0.10 |
| Seal + BU (mm) | n/a | 1.10 | 0.80 | 0.70 | 0.60 | 0.50 |

Typical Examples

- Reciprocating Rotary Oscillating Helix





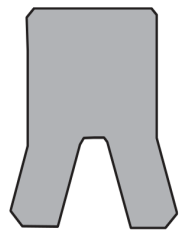
MAD

Hydraulic

Design

MAD are a symmetrical U-cup made from 95 Shore A Polyurethane with a high modulus of elasticity and low permanent deformation. Its excellent wear resistance offers long service life in a wide range of applications. The symmetrical configuration, with equal lip interference and equal heel clearance on both the inside and outside diameters, provides a seal which is capable for use in both piston and rod applications. The sealing lips are knife trimmed to eliminate all moulding flash and to provide superior low pressure sealing performance.

Rod seals



Key Features

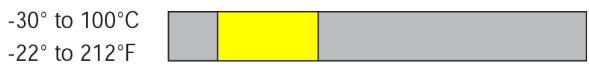
- Medium to heavy duty
- Piston or rod
- Symmetrical lip design
- Excellent wear resistance
- Good extrusion resistance
- Flexible to fit

Operating Conditions

Pressure



Temperature



Speed



Surface Finish μmRa

| | | |
|-----------------|-----------------|-----|
| $\varnothing d$ | $\varnothing D$ | L |
| 0.1 - 0.25 | ≤ 0.8 | 2.0 |

Tolerances

| | | |
|-----------------|-----------------|-------------|
| $\varnothing d$ | $\varnothing D$ | L |
| f7 | H10 | - 0.0 + 0.2 |

Chamfer Radii

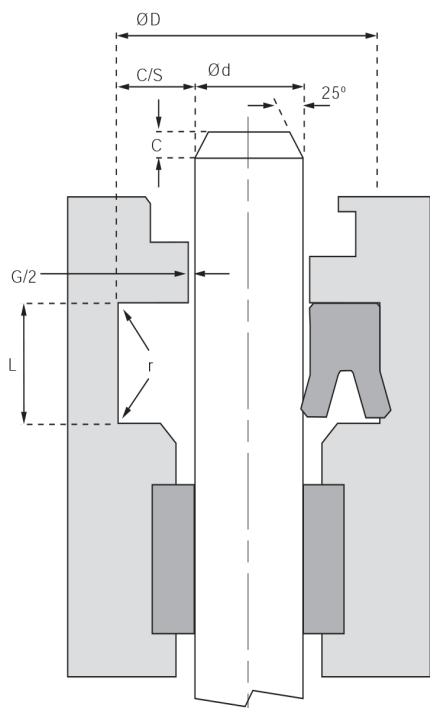
| | | | | | |
|-----|-----|-----|------|------|------|
| C/S | 5.0 | 7.5 | 10.0 | 15.0 | 20.0 |
| C | 2.5 | 4.0 | 5.0 | 7.5 | 10.0 |
| r | 0.4 | 0.8 | 0.8 | 1.6 | 1.6 |

Extrusion Gap - G

| | | | | | | |
|----------------|------|------|------|------|------|------|
| Pressure (Bar) | 50 | 100 | 200 | 300 | 400 | 500 |
| Seal Only (mm) | 1.20 | 0.80 | 0.40 | 0.25 | 0.17 | 0.10 |
| Seal + BU (mm) | n/a | 1.10 | 0.80 | 0.70 | 0.60 | 0.50 |

Typical Examples

- Reciprocating Rotary Oscillating Helix





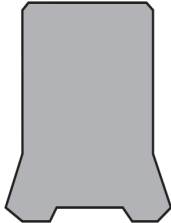
TS

Hydraulic

Design

TS symmetrical single acting rod seal is made from Polyurethane 94 Shore A. The outside diameter is greater than the nominal dimension for the housing and when assembled the seal has an asymmetrical configuration. The entire outer wall of the packing adheres to the static sealing surface, whilst the area of contact with the rod is greatly reduced, resulting in a concentration of the load. Both lips have precision knife trimmed chamfers to provide complete circumferential lip contact.

Rod seals



Key Features

- Medium to heavy duty
- Piston or rod
- Symmetrical lip design
- Excellent wear resistance
- Good extrusion resistance
- Flexible to fit

Operating Conditions

Pressure



Temperature



Speed



Surface Finish μmRa

| | | |
|-----------------|-----------------|-----|
| $\varnothing d$ | $\varnothing D$ | L |
| 0.1 - 0.25 | ≤ 0.8 | 2.0 |

Tolerances

| | | |
|-----------------|-----------------|-------------|
| $\varnothing d$ | $\varnothing D$ | L |
| f7 | H10 | - 0.0 + 0.2 |

Chamfer Radii

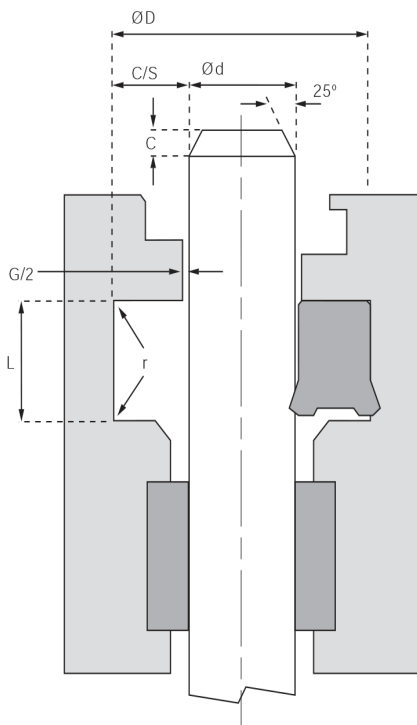
| | | | | | |
|-----|-----|-----|------|------|------|
| C/S | 5.0 | 7.5 | 10.0 | 15.0 | 20.0 |
| C | 2.5 | 4.0 | 5.0 | 7.5 | 10.0 |
| r | 0.4 | 0.8 | 0.8 | 1.6 | 1.6 |

Extrusion Gap - G

| | | | | | | |
|----------------|------|------|------|------|------|------|
| Pressure (Bar) | 50 | 100 | 200 | 300 | 400 | 500 |
| Seal Only (mm) | 1.20 | 0.80 | 0.40 | 0.25 | 0.17 | 0.10 |
| Seal + BU (mm) | n/a | 1.10 | 0.80 | 0.70 | 0.60 | 0.50 |

Typical Examples

Reciprocating Rotary Oscillating Helix





TSL

Hydraulic

Design

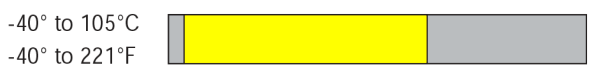
TSL asymmetrical single acting rod seal is made from Polyurethane 94 Shore A and has two sealing lips on the dynamic surface. The outside diameter is greater than the nominal dimension for the housing and a fluid ring is moulded between the primary and secondary sealing lips. This helps to reduce the area of contact and consequently the friction and stick slip phenomena. The second sealing lip also has the function of keeping the entire packing in contact with the static housing particularly when temperatures get so low they cause contractions of the sealing ring. Both lips have precision knife trimmed chamfers to provide complete circumferential lip contact.

Operating Conditions

Pressure



Temperature



Speed



Surface Finish μmRa

| | | |
|-----------------|-----------------|-----|
| $\varnothing d$ | $\varnothing D$ | L |
| 0.1 - 0.25 | ≤ 0.8 | 2.0 |

Tolerances

| | | |
|-----------------|-----------------|-------------|
| $\varnothing d$ | $\varnothing D$ | L |
| f7 | H10 | - 0.0 + 0.2 |

Chamfer Radii

| | | | | | |
|-----|-----|-----|------|------|------|
| C/S | 5.0 | 7.5 | 10.0 | 15.0 | 20.0 |
| C | 2.5 | 4.0 | 5.0 | 7.5 | 10.0 |
| r | 0.4 | 0.8 | 0.8 | 1.6 | 1.6 |

Extrusion Gap - G

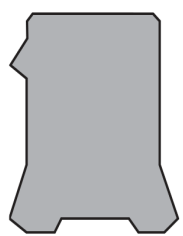
| | | | | | | |
|----------------|------|------|------|------|------|------|
| Pressure (Bar) | 50 | 100 | 200 | 300 | 400 | 500 |
| Seal Only (mm) | 1.20 | 0.80 | 0.40 | 0.25 | 0.17 | 0.10 |
| Seal + BU (mm) | n/a | 1.10 | 0.80 | 0.70 | 0.60 | 0.50 |

Typical Examples

Reciprocating Rotary Oscillating Helix

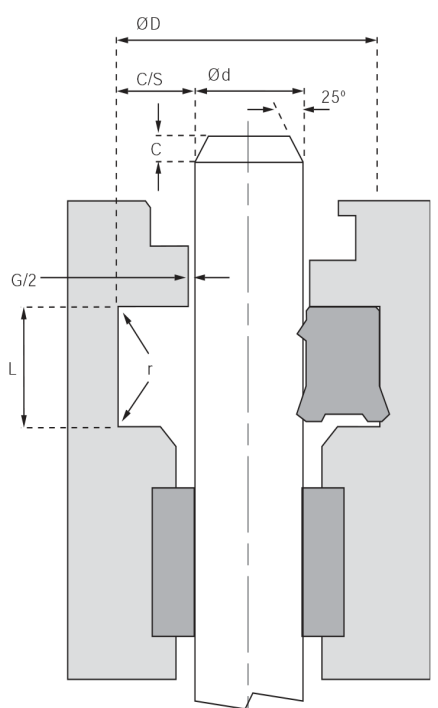


Rod seals



Key Features

- Medium to heavy duty
- Rod seal only
- Good at low temperatures
- Excellent stability
- Lower in friction
- Easy to fit





TSLA

Hydraulic

Design

TSLA asymmetrical single acting rod seal is made from Polyurethane 94 Shore A and has two sealing lips on the dynamic surface. The outside diameter is greater than the nominal dimension for the housing and a fluid ring is moulded between the primary and secondary sealing lips. This helps to reduce the area of contact and consequently the friction and stick slip phenomena. The second sealing lip also has the function of keeping the entire packing in contact with the static housing particularly when temperatures get so low they cause contractions of the sealing ring. Both lips have precision knife trimmed chamfers to provide complete circumferential lip contact. In addition an anti-extrusion ring is present for added protection against wide clearances and extreme pressures.

Operating Conditions

Pressure

400 Bar
6,000 Psi



Temperature

-40° to 105°C
-40° to 221°F



Speed

0.8m/sec
2.5'/sec



Surface Finish μmRa

| | | |
|-----------------|-----------------|-----|
| $\varnothing d$ | $\varnothing D$ | L |
| 0.1 - 0.25 | ≤ 0.8 | 2.0 |

Tolerances

| | | |
|-----------------|-----------------|-------------|
| $\varnothing d$ | $\varnothing D$ | L |
| f7 | H10 | - 0.0 + 0.2 |

Chamfer Radii

| | | | | | |
|-----|-----|-----|------|------|------|
| C/S | 5.0 | 7.5 | 10.0 | 15.0 | 20.0 |
| C | 2.5 | 4.0 | 5.0 | 7.5 | 10.0 |
| r | 0.4 | 0.8 | 0.8 | 1.6 | 1.6 |

Extrusion Gap - G

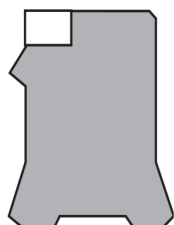
| | | | | | | |
|----------------|------|------|------|------|------|------|
| Pressure (Bar) | 50 | 100 | 200 | 300 | 400 | 500 |
| Seal Only (mm) | 1.20 | 0.80 | 0.40 | 0.25 | 0.17 | 0.10 |
| Seal + BU (mm) | n/a | 1.10 | 0.80 | 0.70 | 0.60 | 0.50 |

Typical Examples

Reciprocating Rotary Oscillating Helix



Rod seals



Key Features

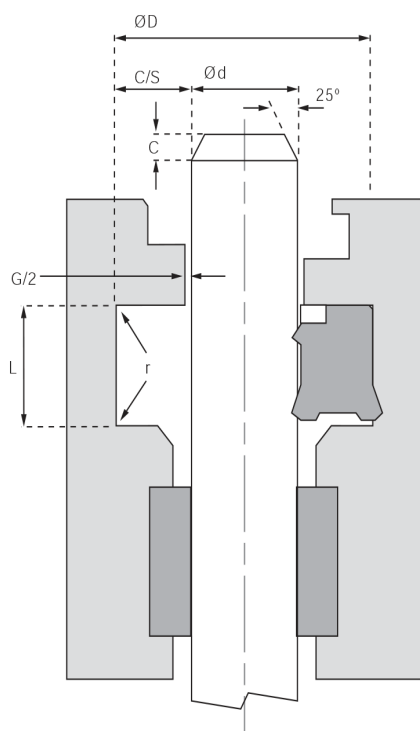
Higher pressures

Shock load capability

Good at low temperature

Anti-extrusion ring

Twin lip design for stability





CP

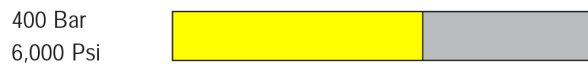
Hydraulic

Design

CP are designed with a symmetrical profile for use as a single acting piston or rod seal. The seal is a precision moulded Nitrile rubber sealing element with a bonded fabric reinforced base to resist extrusion. Manufactured with initial radial interference to effect low pressure sealing, as pressures increase the seal is energised thus increasing the sealing force. Rubberised fabric has the advantage of retaining the sealing media within its surfaces reducing friction and wear. The radial grooves incorporated into the top of the seal on the pressure side, ensure rapid energisation of the seal without excessive end float and resultant wear.

Operating Conditions

Pressure



Temperature



Speed



Surface Finish μmRa

| | | |
|-----------------|-----------------|-----|
| $\varnothing d$ | $\varnothing D$ | L |
| 0.1 - 0.25 | ≤ 0.8 | 2.0 |

Tolerances

| | | |
|-----------------|-----------------|-----------|
| $\varnothing d$ | $\varnothing D$ | L |
| f8 | js11 | -0 + 0.25 |

Chamfer Radii

| | | | | |
|-----|-----|-----|-----|------|
| C/S | 4.0 | 5.0 | 7.5 | 10.0 |
| C | 2.0 | 2.5 | 4.0 | 5.0 |
| r | 0.2 | 0.4 | 0.8 | 0.8 |

Extrusion Gap - G

| | | | | |
|----------------|------|------|------|------|
| Pressure (Bar) | 100 | 200 | 300 | 400 |
| Seal Only (mm) | 0.80 | 0.40 | 0.25 | 0.17 |
| Seal + BU (mm) | 1.10 | 0.80 | 0.70 | 0.60 |

Typical Examples

Reciprocating Rotary Oscillating Helix

Rod seals



Key Features

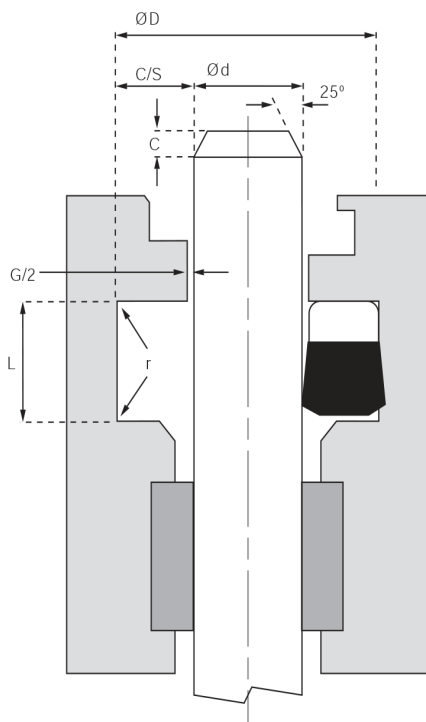
Medium to heavy duty

Piston or rod

Tolerant of surface imperfections

Good service life

Good extrusion resistance

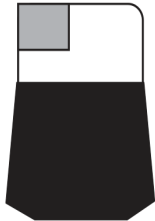




CPI

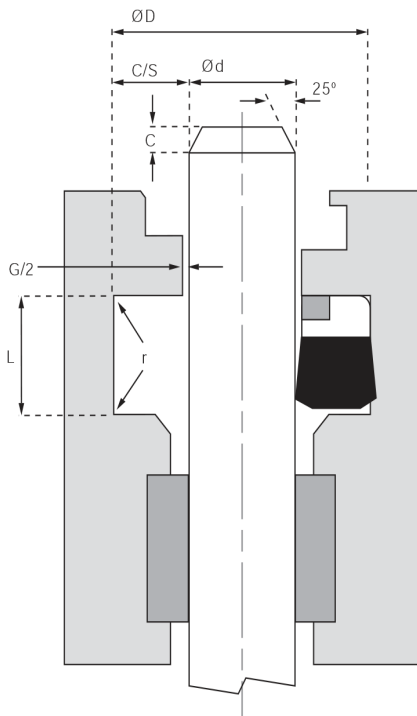
Hydraulic

Rod seals



Key Features

- Medium and heavy duty
- Higher pressure
- Hard wearing
- Anti-extrusion ring
- Tolerant of surface imperfections
- Excellent extrusion resistance

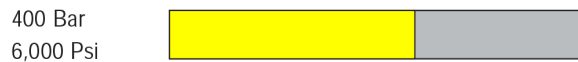


Design

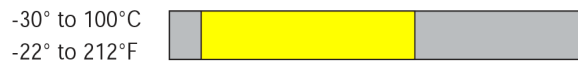
CPI are used as anti-extrusion single acting rod seals. This seal is a precision moulded Nitrile rubber sealing element with a fabric reinforced base and an Polyacetal support ring to resist extrusion. The Polyacetal anti-extrusion ring allows larger clearances and higher pressures. Designed with initial radial interference to effect low pressure sealing, as pressures increase the seal is progressively energised increasing sealing force. Rubberised fabric has the advantage of retaining the sealing media within its surfaces reducing friction and wear. The radial grooves incorporated into the face of the seal on the pressure side, ensure rapid energisation of the seal without excessive end float and resultant wear.

Operating Conditions

Pressure



Temperature



Speed



Surface Finish µmRa

| Ød | ØD | L |
|------------|------|-----|
| 0.1 - 0.25 | ≤0.8 | 2.0 |

Tolerances

| Ød | ØD | L |
|----|------|-----------|
| f8 | Js11 | -0 + 0.25 |

Chamfer Radii

| | 6.0 | 7.5 | 10.0 |
|-----|-----|-----|------|
| C/S | | | |
| C | 3.0 | 4.0 | 5.0 |
| r | 0.4 | 0.4 | 0.4 |

Extrusion Gap - G

| Pressure (Bar) | 100 | 200 | 300 | 400 |
|----------------|------|------|------|------|
| Seal Only (mm) | 0.80 | 0.60 | 0.47 | 0.40 |
| Seal + BU (mm) | 1.10 | 0.80 | 0.70 | 0.60 |

Typical Examples

Reciprocating Rotary Oscillating Helix





RS



RSL



RSLA



RSS



MAD



TS



TSL



TSLA



CP



CPI



19M

| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
|-------|------|------|-------|-------|------|-----------------|
| 9.00 | 3.00 | 4.50 | 5.00 | 5.00 | 0.00 | RSS-003009-050 |
| 9.00 | 4.00 | 4.00 | 4.50 | 0.00 | 0.00 | RSS-004009-045 |
| 10.00 | 4.00 | 4.00 | 4.50 | 6.00 | 0.00 | RSS-004010-045 |
| 10.00 | 4.00 | 4.50 | 5.00 | 6.00 | 0.00 | RSS-004010-050 |
| 10.00 | 4.00 | 6.00 | 6.50 | 0.00 | 0.00 | RSS-004010-065 |
| 10.00 | 5.00 | 4.00 | 0.00 | 0.00 | 0.00 | RSS-005010-045 |
| 10.00 | 6.00 | 3.00 | 3.50 | 0.00 | 0.00 | RSS-006010-035 |
| 11.00 | 4.00 | 5.00 | 5.50 | 0.00 | 0.00 | RSS-004011-055A |
| 11.00 | 4.50 | 5.00 | 5.50 | 6.50 | 0.00 | RSS-004011-055 |
| 11.00 | 5.00 | 5.00 | 0.00 | 0.00 | 0.00 | RSS-005011-055 |
| 12.00 | 4.00 | 4.00 | 4.50 | 0.00 | 0.00 | RSS-004012-045 |
| 12.00 | 5.00 | 5.00 | 5.50 | 7.00 | 0.00 | RSS-005012-055 |
| 12.00 | 5.00 | 6.00 | 6.50 | 7.00 | 0.00 | RSS-005012-065 |
| 12.00 | 6.00 | 4.00 | 4.50 | 8.00 | 0.00 | RSS-006012-045 |
| 12.00 | 6.00 | 5.00 | 0.00 | 0.00 | 0.00 | RSS-006012-055 |
| 12.00 | 6.00 | 5.20 | 5.80 | 0.00 | 0.00 | RSS-006012-058 |
| 12.00 | 6.00 | 6.00 | 6.50 | 8.00 | 0.00 | RSS-006012-065 |
| 12.00 | 8.00 | 2.40 | 3.50 | 10.00 | 0.00 | RSS-008012-035 |
| 12.50 | 4.50 | 4.50 | 5.00 | 6.50 | 0.00 | RSS-004012-050 |
| 12.70 | 5.00 | 8.00 | 9.00 | 7.00 | 0.00 | RSS-005012-090 |
| 12.70 | 6.00 | 5.50 | 6.50 | 8.00 | 0.00 | RSS-006127-065 |
| 13.00 | 6.00 | 5.50 | 0.00 | 0.00 | 0.00 | RS-006013-060 |
| 14.00 | 6.00 | 4.00 | 4.50 | 0.00 | 0.00 | RSS-006014-045 |
| 14.00 | 6.00 | 5.80 | 6.30 | 0.00 | 0.00 | TSL-006014-063 |
| 14.00 | 7.00 | 3.50 | 4.20 | 9.00 | 0.00 | RSS-007014-042 |
| 14.00 | 8.00 | 6.00 | 7.00 | 10.00 | 0.00 | RSS-008014-070 |
| 14.40 | 8.00 | 9.50 | 10.50 | 0.00 | 0.00 | RS-008014-105 |
| 15.00 | 6.00 | 8.00 | 9.00 | 9.00 | 0.00 | RSS-006015-090 |
| 15.00 | 7.00 | 4.00 | 4.50 | 0.00 | 0.00 | RSS-007015-045 |
| 15.00 | 7.00 | 7.00 | 8.00 | 9.00 | 0.00 | RSS-007015-080 |
| 15.00 | 8.00 | 5.70 | 6.30 | 0.00 | 0.00 | TSL-008015-063 |



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| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
|-------|-------|------|-------|-------|------|----------------|
| 15.00 | 8.00 | 5.80 | 6.30 | 10.00 | 0.00 | RSS-008015-063 |
| 15.00 | 8.00 | 8.00 | 9.00 | 10.00 | 0.00 | RSS-008015-090 |
| 15.00 | 10.00 | 4.00 | 4.50 | 0.00 | 0.00 | RSS-010015-045 |
| 16.00 | 8.00 | 5.80 | 6.30 | 10.00 | 0.00 | RSS-008016-063 |
| 16.00 | 10.00 | 4.00 | 4.50 | 0.00 | 0.00 | RSS-010016-045 |
| 16.00 | 10.00 | 4.50 | 0.00 | 0.00 | 0.00 | RSS-010016-050 |
| 16.00 | 10.00 | 4.80 | 5.40 | 0.00 | 0.00 | TSL-010016-054 |
| 16.00 | 10.00 | 6.00 | 6.50 | 12.00 | 0.00 | RSS-010016-065 |
| 17.00 | 5.00 | 9.00 | 10.00 | 11.00 | 0.00 | RSS-005017-100 |
| 17.00 | 10.00 | 5.80 | 6.40 | 0.00 | 0.00 | CP-010017-064 |
| 17.00 | 11.00 | 4.00 | 4.50 | 13.00 | 0.00 | RSS-011017-045 |
| 17.00 | 11.00 | 4.50 | 5.00 | 0.00 | 0.00 | RS-011017-050 |
| 17.00 | 12.00 | 3.50 | 4.00 | 0.00 | 0.00 | RS-012017-040 |
| 17.10 | 7.10 | 8.00 | 9.00 | 0.00 | 0.00 | RSS-007017-090 |
| 18.00 | 8.00 | 2.00 | 0.00 | 0.00 | 0.00 | 19M-008018-020 |
| 18.00 | 8.00 | 8.00 | 9.00 | 0.00 | 0.00 | RSS-008018-090 |
| 18.00 | 8.00 | 8.00 | 9.00 | 0.00 | 0.00 | RS-008018-090 |
| 18.00 | 8.00 | 9.00 | 10.00 | 11.00 | 0.00 | RSS-008018-100 |
| 18.00 | 10.00 | 5.00 | 6.00 | 12.00 | 0.00 | RSS-010018-060 |
| 18.00 | 10.00 | 5.70 | 0.00 | 0.00 | 0.00 | RSS-010018-063 |
| 18.00 | 10.00 | 6.00 | 7.00 | 12.00 | 0.00 | RSS-010018-070 |
| 18.00 | 10.00 | 8.00 | 9.00 | 12.00 | 0.00 | RSS-010018-090 |
| 18.00 | 12.00 | 4.00 | 0.00 | 0.00 | 0.00 | RSS-012018-045 |
| 18.00 | 12.00 | 4.00 | 4.50 | 0.00 | 0.00 | RSL-012018-045 |
| 18.00 | 12.00 | 4.80 | 5.50 | 14.00 | 0.00 | RSS-012018-055 |
| 18.00 | 12.00 | 6.00 | 7.00 | 14.00 | 0.00 | RSS-012018-070 |
| 19.00 | 9.00 | 6.00 | 7.00 | 12.00 | 0.00 | RSS-009019-070 |
| 19.00 | 9.00 | 8.00 | 9.00 | 0.00 | 0.00 | RSS-009019-090 |
| 19.00 | 12.00 | 5.00 | 0.00 | 0.00 | 0.00 | TSL-012019-056 |
| 19.20 | 11.20 | 5.00 | 5.70 | 0.00 | 0.00 | RSS-011019-057 |
| 20.00 | 8.00 | 6.00 | 7.00 | 0.00 | 0.00 | RSS-008020-070 |



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| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
|-------|-------|-------|-------|-------|-----------|----------------|
| 20.00 | 10.00 | 5.00 | 0.00 | 0.00 | 0.00 | RSS-010020-060 |
| 20.00 | 10.00 | 6.00 | 7.00 | 0.00 | 0.00 | RSS-010020-070 |
| 20.00 | 10.00 | 7.00 | 8.00 | 0.00 | 0.00 | RS-010020-080 |
| 20.00 | 10.00 | 8.00 | 9.00 | 12.00 | 0.00 | RSS-010020-090 |
| 20.00 | 12.00 | 5.80 | 6.30 | 0.00 | 0.00 | TSL-012020-063 |
| 20.00 | 12.00 | 5.80 | 6.50 | 0.00 | 12,020.00 | CP-012020-065 |
| 20.00 | 12.00 | 8.00 | 9.00 | 14.00 | 0.00 | RSS-012020-090 |
| 20.00 | 14.00 | 4.00 | 0.00 | 0.00 | 0.00 | RSS-014020-045 |
| 20.00 | 14.00 | 4.80 | 5.30 | 16.00 | 0.00 | RSS-014020-053 |
| 20.50 | 11.00 | 6.00 | 7.00 | 13.00 | 0.00 | RSS-011020-070 |
| 20.50 | 12.50 | 5.00 | 5.70 | 0.00 | 0.00 | RS-012020-057 |
| 21.00 | 14.00 | 5.10 | 5.60 | 0.00 | 0.00 | TSL-014021-056 |
| 21.20 | 11.20 | 8.00 | 9.00 | 0.00 | 0.00 | RSS-011021-090 |
| 21.50 | 15.00 | 4.20 | 5.00 | 0.00 | 0.00 | TSL-015021-050 |
| 22.00 | 8.00 | 8.00 | 9.00 | 11.00 | 0.00 | RSS-008022-090 |
| 22.00 | 10.00 | 6.00 | 7.00 | 13.00 | 0.00 | RSS-010022-070 |
| 22.00 | 10.00 | 8.00 | 9.00 | 13.00 | 0.00 | RSS-010022-090 |
| 22.00 | 12.00 | 5.00 | 6.00 | 15.00 | 0.00 | RSS-012022-060 |
| 22.00 | 12.00 | 7.00 | 8.00 | 15.00 | 0.00 | RSS-012022-080 |
| 22.00 | 12.00 | 8.00 | 9.00 | 0.00 | 0.00 | RS-012022-090 |
| 22.00 | 12.00 | 8.00 | 9.00 | 15.00 | 0.00 | RSS-012022-090 |
| 22.00 | 14.00 | 4.00 | 4.50 | 16.00 | 0.00 | RSS-014022-045 |
| 22.00 | 14.00 | 4.40 | 0.00 | 0.00 | 0.00 | RSS-014022-050 |
| 22.00 | 14.00 | 5.00 | 5.70 | 0.00 | 0.00 | RSS-014022-057 |
| 22.00 | 14.00 | 5.80 | 6.30 | 0.00 | 0.00 | TSL-014022-063 |
| 22.00 | 14.00 | 6.00 | 7.00 | 16.00 | 0.00 | RSS-014022-070 |
| 22.00 | 14.00 | 8.00 | 9.00 | 16.00 | 0.00 | RSS-014022-090 |
| 22.00 | 14.00 | 11.00 | 12.00 | 16.00 | 0.00 | RSS-014022-120 |
| 22.00 | 16.00 | 4.00 | 4.50 | 18.00 | 0.00 | RSS-016022-045 |
| 22.00 | 16.00 | 4.50 | 5.00 | 0.00 | 0.00 | RSL-016022-050 |
| 22.00 | 16.00 | 5.00 | 5.50 | 18.00 | 0.00 | RSS-016022-055 |



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| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
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| 22.00 | 18.00 | 4.00 | 4.50 | 0.00 | 0.00 | TSL-018022-045 |
| 22.50 | 12.50 | 8.00 | 9.00 | 0.00 | 0.00 | RSS-012022-090A |
| 23.00 | 12.00 | 6.50 | 7.50 | 0.00 | 0.00 | TSL-012023-075 |
| 23.00 | 15.00 | 5.00 | 5.70 | 0.00 | 0.00 | RS-015023-057 |
| 23.00 | 15.00 | 5.70 | 6.30 | 0.00 | 0.00 | TSL-015023-063 |
| 23.00 | 15.00 | 5.70 | 6.30 | 0.00 | 0.00 | RS-015023-063 |
| 24.00 | 12.00 | 8.00 | 9.00 | 15.00 | 0.00 | RSS-012024-090 |
| 24.00 | 12.00 | 10.00 | 0.00 | 0.00 | 0.00 | RSS-012024-110 |
| 24.00 | 12.50 | 5.00 | 6.00 | 0.00 | 0.00 | RSS-012024-060 |
| 24.00 | 14.00 | 5.00 | 0.00 | 0.00 | 0.00 | RSS-014024-055 |
| 24.00 | 14.00 | 7.20 | 8.00 | 0.00 | 0.00 | RSL-014024-080 |
| 24.00 | 14.00 | 8.00 | 9.00 | 0.00 | 0.00 | RS-014024-090 |
| 24.00 | 14.00 | 8.00 | 9.00 | 16.00 | 0.00 | RSS-014024-090 |
| 24.00 | 16.00 | 5.00 | 5.70 | 18.00 | 0.00 | RSS-016024-057 |
| 24.00 | 16.00 | 5.80 | 6.30 | 0.00 | 0.00 | TSL-016024-063 |
| 24.00 | 16.00 | 5.80 | 6.30 | 0.00 | 0.00 | CP-016024-063 |
| 24.00 | 16.00 | 6.00 | 7.00 | 0.00 | 0.00 | RS-016024-070 |
| 24.00 | 16.00 | 6.50 | 7.00 | 0.00 | 0.00 | CPI-016024-070 |
| 24.00 | 16.00 | 6.50 | 7.00 | 0.00 | 0.00 | CP-016024-070 |
| 24.00 | 16.00 | 9.00 | 10.00 | 18.00 | 0.00 | RSS-016024-100 |
| 24.00 | 18.00 | 4.70 | 5.20 | 0.00 | 0.00 | RS-018024-052 |
| 24.00 | 18.00 | 8.00 | 0.00 | 0.00 | 0.00 | RSS-018024-090 |
| 25.00 | 12.00 | 8.00 | 9.00 | 15.00 | 0.00 | RSS-012025-090 |
| 25.00 | 12.00 | 10.00 | 11.00 | 15.00 | 0.00 | RSS-012025-110 |
| 25.00 | 15.00 | 8.00 | 9.00 | 18.00 | 0.00 | RSS-015025-090 |
| 25.00 | 15.00 | 10.00 | 11.00 | 18.00 | 0.00 | RSS-015025-110 |
| 25.00 | 17.00 | 4.00 | 4.50 | 0.00 | 0.00 | RSS-017025-045 |
| 25.00 | 17.00 | 6.00 | 7.00 | 0.00 | 0.00 | RSS-017025-070 |
| 25.00 | 17.00 | 10.00 | 11.00 | 19.00 | 0.00 | RSS-017025-110 |
| 25.00 | 18.00 | 5.00 | 5.50 | 20.00 | 0.00 | RSS-018025-055 |
| 25.00 | 18.00 | 5.00 | 5.70 | 0.00 | 0.00 | TSL-018025-057 |



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| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
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| 25.00 | 18.00 | 6.50 | 7.00 | 0.00 | 0.00 | CP-018025-070 |
| 25.00 | 19.00 | 6.00 | 7.00 | 21.00 | 0.00 | RSS-019025-070 |
| 25.00 | 20.00 | 3.00 | 3.50 | 0.00 | 0.00 | TS-020025-035 |
| 25.00 | 20.00 | 3.70 | 4.50 | 0.00 | 0.00 | TS-020025-045 |
| 26.00 | 15.00 | 7.00 | 8.00 | 0.00 | 0.00 | RSL-015026-080 |
| 26.00 | 16.00 | 5.00 | 6.00 | 19.00 | 0.00 | RSS-016026-060 |
| 26.00 | 16.00 | 7.00 | 8.00 | 0.00 | 0.00 | RS-016026-080 |
| 26.00 | 16.00 | 8.00 | 9.00 | 0.00 | 0.00 | RS-016026-090 |
| 26.00 | 16.00 | 8.00 | 9.00 | 19.00 | 0.00 | RSS-016026-090 |
| 26.00 | 16.00 | 9.00 | 10.00 | 0.00 | 0.00 | RS-016026-100 |
| 26.00 | 16.00 | 10.00 | 11.00 | 19.00 | 0.00 | RSS-016026-110 |
| 26.00 | 16.75 | 5.80 | 6.30 | 0.00 | 0.00 | CP-016026-063 |
| 26.00 | 18.00 | 5.00 | 5.70 | 0.00 | 0.00 | RSS-018026-057 |
| 26.00 | 18.00 | 5.80 | 6.30 | 0.00 | 0.00 | TSL-018026-063 |
| 26.00 | 18.00 | 6.30 | 7.00 | 0.00 | 0.00 | RSL-018026-070 |
| 26.00 | 18.00 | 6.50 | 7.50 | 20.00 | 0.00 | RSS-018026-075 |
| 26.00 | 18.00 | 8.00 | 9.00 | 0.00 | 0.00 | TSL-018026-090 |
| 26.00 | 18.00 | 8.00 | 9.00 | 0.00 | 0.00 | RSL-018026-090 |
| 26.00 | 18.00 | 8.00 | 9.00 | 20.00 | 0.00 | RSS-018026-090 |
| 26.00 | 18.00 | 8.50 | 9.50 | 20.00 | 0.00 | RSS-018026-095 |
| 26.00 | 19.00 | 6.00 | 7.00 | 0.00 | 0.00 | RS-019026-070 |
| 26.00 | 20.00 | 0.00 | 0.00 | 0.00 | 0.00 | RSS-020026-055 |
| 26.00 | 20.00 | 5.20 | 6.00 | 0.00 | 0.00 | TSL-020026-060 |
| 27.00 | 15.00 | 6.00 | 7.00 | 18.00 | 0.00 | RSS-015027-070 |
| 27.00 | 20.00 | 5.80 | 6.50 | 0.00 | 0.00 | TSL-020027-065 |
| 27.00 | 20.00 | 6.00 | 0.00 | 0.00 | 0.00 | RSS-020027-070 |
| 27.00 | 20.00 | 6.00 | 6.40 | 0.00 | 0.00 | CPI-020027-064 |
| 27.00 | 20.00 | 6.00 | 6.40 | 0.00 | 0.00 | CP-020027-064 |
| 27.50 | 19.50 | 8.00 | 9.00 | 0.00 | 0.00 | TSL-019027-090 |
| 28.00 | 14.00 | 10.00 | 11.00 | 0.00 | 0.00 | RSS-014028-110 |
| 28.00 | 15.00 | 10.00 | 11.00 | 18.00 | 0.00 | RSS-015028-110 |



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| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
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| 28.00 | 16.00 | 6.00 | 7.00 | 19.00 | 0.00 | RSS-016028-070 |
| 28.00 | 18.00 | 5.80 | 6.30 | 0.00 | 0.00 | TSL-018028-063 |
| 28.00 | 18.00 | 5.80 | 6.30 | 0.00 | 0.00 | CPI-018028-063 |
| 28.00 | 18.00 | 7.00 | 8.00 | 0.00 | 0.00 | TSL-018028-080 |
| 28.00 | 18.00 | 8.00 | 9.00 | 0.00 | 0.00 | RS-018028-090 |
| 28.00 | 18.00 | 8.00 | 9.00 | 21.00 | 0.00 | RSS-018028-090 |
| 28.00 | 20.00 | 4.00 | 5.00 | 22.00 | 0.00 | RSS-020028-050 |
| 28.00 | 20.00 | 5.00 | 5.70 | 0.00 | 0.00 | RSS-020028-057 |
| 28.00 | 20.00 | 5.00 | 5.70 | 0.00 | 0.00 | RS-020028-057 |
| 28.00 | 20.00 | 5.80 | 6.30 | 0.00 | 0.00 | TSL-020028-063 |
| 28.00 | 20.00 | 5.80 | 6.30 | 0.00 | 0.00 | CP-020028-063 |
| 28.00 | 20.00 | 6.00 | 7.00 | 0.00 | 0.00 | RS-020028-070 |
| 28.00 | 20.00 | 6.40 | 7.00 | 0.00 | 0.00 | CPI-020028-063 |
| 28.00 | 20.00 | 6.50 | 7.00 | 0.00 | 0.00 | RSS-020028-070 |
| 28.00 | 20.00 | 6.50 | 7.00 | 0.00 | 0.00 | CP-020028-070 |
| 28.00 | 20.00 | 7.00 | 8.00 | 0.00 | 0.00 | TSL-020028-080 |
| 28.00 | 20.00 | 8.00 | 9.00 | 22.00 | 0.00 | RSS-020028-090 |
| 28.00 | 22.00 | 4.50 | 5.50 | 0.00 | 0.00 | TS-022028-055 |
| 28.00 | 22.00 | 8.00 | 9.00 | 24.00 | 0.00 | RSS-022028-090 |
| 29.00 | 19.00 | 8.00 | 8.50 | 0.00 | 0.00 | CP-019029-085 |
| 29.00 | 20.00 | 5.00 | 5.50 | 22.00 | 0.00 | RSS-020029-055 |
| 29.00 | 22.00 | 5.00 | 5.60 | 0.00 | 0.00 | TSL-022029-056 |
| 30.00 | 14.00 | 5.00 | 6.00 | 0.00 | 0.00 | RSS-014030-060 |
| 30.00 | 15.00 | 8.00 | 9.00 | 0.00 | 0.00 | RSS-015030-090 |
| 30.00 | 15.00 | 10.00 | 11.00 | 0.00 | 0.00 | RSS-015030-110 |
| 30.00 | 18.00 | 6.00 | 6.50 | 0.00 | 0.00 | RSS-018030-065 |
| 30.00 | 18.00 | 8.00 | 9.00 | 21.00 | 0.00 | RSS-018030-090 |
| 30.00 | 18.00 | 10.00 | 0.00 | 0.00 | 0.00 | RSS-018030-110 |
| 30.00 | 20.00 | 5.00 | 0.00 | 0.00 | 0.00 | RSS-020030-055 |
| 30.00 | 20.00 | 6.00 | 0.00 | 0.00 | 0.00 | RSS-020030-070 |
| 30.00 | 20.00 | 6.00 | 7.00 | 0.00 | 0.00 | RSL-020030-070 |



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| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
|-------|-------|-------|-------|-------|------|----------------|
| 30.00 | 20.00 | 7.00 | 8.00 | 0.00 | 0.00 | TSL-020030-080 |
| 30.00 | 20.00 | 8.00 | 8.50 | 0.00 | 0.00 | CPI-020030-085 |
| 30.00 | 20.00 | 8.00 | 9.00 | 0.00 | 0.00 | TS-020030-090 |
| 30.00 | 20.00 | 8.00 | 9.00 | 23.00 | 0.00 | RSS-020030-090 |
| 30.00 | 20.00 | 10.00 | 11.00 | 0.00 | 0.00 | TS-020030-110 |
| 30.00 | 20.00 | 10.00 | 11.00 | 23.00 | 0.00 | RSS-020030-110 |
| 30.00 | 22.00 | 4.40 | 5.00 | 0.00 | 0.00 | RSS-022030-050 |
| 30.00 | 22.00 | 5.00 | 5.50 | 0.00 | 0.00 | TS-022030-055 |
| 30.00 | 22.00 | 5.80 | 6.30 | 0.00 | 0.00 | TSL-022030-063 |
| 30.00 | 22.00 | 6.00 | 0.00 | 0.00 | 0.00 | TSL-022030-070 |
| 30.00 | 22.00 | 6.00 | 7.00 | 24.00 | 0.00 | RSS-022030-070 |
| 30.00 | 22.00 | 6.50 | 7.00 | 0.00 | 0.00 | CPI-022030-070 |
| 30.00 | 22.00 | 7.00 | 0.00 | 0.00 | 0.00 | RSS-022030-080 |
| 30.00 | 22.00 | 7.00 | 8.00 | 0.00 | 0.00 | TSL-022030-080 |
| 30.00 | 22.00 | 8.00 | 9.00 | 0.00 | 0.00 | RS-022030-090 |
| 30.00 | 22.00 | 10.00 | 11.00 | 24.00 | 0.00 | RSS-022030-110 |
| 30.00 | 22.40 | 5.00 | 5.70 | 0.00 | 0.00 | RSS-022030-057 |
| 30.00 | 22.40 | 5.00 | 5.70 | 0.00 | 0.00 | RS-022030-057 |
| 30.00 | 24.00 | 4.50 | 5.00 | 0.00 | 0.00 | RS-024030-050 |
| 31.00 | 20.00 | 8.00 | 9.00 | 0.00 | 0.00 | RSS-020031-090 |
| 31.00 | 25.00 | 6.00 | 0.00 | 0.00 | 0.00 | RSS-025031-065 |
| 31.50 | 23.50 | 5.00 | 6.00 | 0.00 | 0.00 | RSS-023031-060 |
| 32.00 | 16.00 | 8.00 | 10.00 | 0.00 | 0.00 | RSS-016032-100 |
| 32.00 | 20.00 | 7.50 | 8.50 | 23.00 | 0.00 | RSS-020032-085 |
| 32.00 | 22.00 | 5.00 | 5.50 | 0.00 | 0.00 | RSS-022032-055 |
| 32.00 | 22.00 | 6.00 | 7.00 | 0.00 | 0.00 | RSS-022032-070 |
| 32.00 | 22.00 | 7.00 | 8.00 | 0.00 | 0.00 | TSL-022032-080 |
| 32.00 | 22.00 | 8.00 | 9.00 | 25.00 | 0.00 | RSS-022032-090 |
| 32.00 | 22.00 | 10.00 | 11.00 | 25.00 | 0.00 | RSS-022032-110 |
| 32.00 | 24.00 | 5.50 | 6.50 | 0.00 | 0.00 | RSS-024032-065 |
| 32.00 | 24.00 | 6.00 | 6.50 | 0.00 | 0.00 | RSS-024032-065 |



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| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
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| 32.00 | 24.00 | 7.00 | 7.50 | 0.00 | 0.00 | CP-024032-075 |
| 32.00 | 24.00 | 7.00 | 8.00 | 26.00 | 0.00 | RSS-024032-080 |
| 32.00 | 25.00 | 4.00 | 5.00 | 0.00 | 0.00 | TS-025032-050 |
| 32.00 | 25.00 | 6.00 | 7.00 | 0.00 | 0.00 | TSL-025032-070 |
| 32.00 | 25.00 | 7.00 | 0.00 | 0.00 | 0.00 | RSS-025032-080 |
| 32.00 | 46.00 | 10.00 | 11.00 | 0.00 | 0.00 | RSS-032046-110 |
| 32.40 | 22.40 | 8.00 | 9.00 | 0.00 | 0.00 | RSS-022032-090A |
| 33.00 | 25.00 | 4.00 | 4.50 | 0.00 | 0.00 | RSS-025033-045 |
| 33.00 | 25.00 | 5.00 | 0.00 | 0.00 | 0.00 | GLY-25 |
| 33.00 | 25.00 | 5.00 | 5.70 | 0.00 | 0.00 | RSS-025033-057 |
| 33.00 | 25.00 | 5.00 | 5.70 | 0.00 | 0.00 | RS-025033-057 |
| 33.00 | 25.00 | 5.80 | 6.30 | 0.00 | 0.00 | TSL-025033-063 |
| 33.00 | 25.00 | 5.80 | 6.30 | 0.00 | 0.00 | CPI-025033-063 |
| 33.00 | 25.00 | 6.00 | 7.00 | 0.00 | 0.00 | RSL-025033-070 |
| 33.00 | 25.00 | 6.50 | 7.50 | 0.00 | 0.00 | TSL-025033-075 |
| 33.00 | 25.00 | 7.00 | 8.00 | 0.00 | 0.00 | TSL-025033-080 |
| 33.00 | 25.00 | 8.00 | 9.00 | 0.00 | 0.00 | TSL-025033-090 |
| 34.00 | 18.00 | 8.00 | 9.00 | 0.00 | 0.00 | RSS-018034-090 |
| 34.00 | 24.00 | 5.70 | 6.50 | 0.00 | 0.00 | TSL-024034-065 |
| 34.00 | 24.00 | 7.20 | 8.00 | 0.00 | 0.00 | RS-024034-080 |
| 35.00 | 20.00 | 10.00 | 11.00 | 0.00 | 0.00 | RSS-020035-110 |
| 35.00 | 20.00 | 12.00 | 13.00 | 23.00 | 0.00 | RSS-020035-130 |
| 35.00 | 22.00 | 10.00 | 11.00 | 25.00 | 0.00 | RSS-022035-110 |
| 35.00 | 23.00 | 9.00 | 10.00 | 0.00 | 0.00 | RSS-023035-100 |
| 35.00 | 25.00 | 5.00 | 5.50 | 28.00 | 0.00 | RSS-025035-055 |
| 35.00 | 25.00 | 5.00 | 6.00 | 0.00 | 0.00 | TS-025035-060 |
| 35.00 | 25.00 | 5.80 | 6.30 | 0.00 | 0.00 | TSL-025035-063 |
| 35.00 | 25.00 | 6.00 | 0.00 | 0.00 | 0.00 | RSS-025035-070 |
| 35.00 | 25.00 | 7.00 | 0.00 | 0.00 | 0.00 | RSS-025035-080 |
| 35.00 | 25.00 | 7.00 | 8.00 | 0.00 | 0.00 | TSL-025035-080 |
| 35.00 | 25.00 | 7.50 | 8.00 | 0.00 | 0.00 | CPI-025035-090 |



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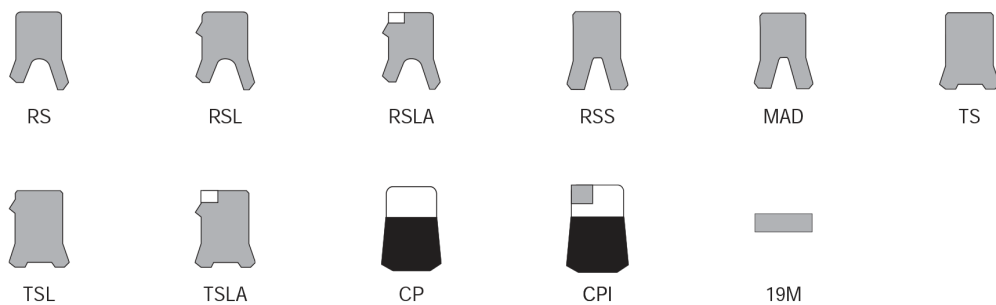


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| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
|-------|-------|-------|-------|-------|------|----------------|
| 35.00 | 25.00 | 8.00 | 9.00 | 0.00 | 0.00 | TSL-025035-090 |
| 35.00 | 25.00 | 8.00 | 9.00 | 28.00 | 0.00 | RSS-025035-090 |
| 35.00 | 25.00 | 8.50 | 9.00 | 0.00 | 0.00 | CP-025035-090 |
| 35.00 | 25.00 | 9.00 | 10.00 | 0.00 | 0.00 | TS-025035-100 |
| 35.00 | 25.00 | 10.00 | 11.00 | 28.00 | 0.00 | RSS-025035-110 |
| 35.00 | 27.00 | 5.00 | 0.00 | 0.00 | 0.00 | RSS-027035-055 |
| 35.00 | 27.00 | 6.00 | 0.00 | 0.00 | 0.00 | RSS-027035-070 |
| 35.00 | 28.00 | 5.00 | 5.50 | 30.00 | 0.00 | RSS-028035-055 |
| 35.00 | 28.00 | 6.00 | 0.00 | 0.00 | 0.00 | RSS-028035-070 |
| 35.00 | 29.00 | 5.00 | 5.70 | 0.00 | 0.00 | RS-029035-057 |
| 35.00 | 29.00 | 5.60 | 6.30 | 0.00 | 0.00 | RS-029035-063 |
| 35.50 | 28.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-028035-030 |
| 35.50 | 28.00 | 5.00 | 5.70 | 0.00 | 0.00 | RSS-028035-057 |
| 36.00 | 22.00 | 8.00 | 9.00 | 0.00 | 0.00 | RSS-022036-090 |
| 36.00 | 25.00 | 5.00 | 0.00 | 0.00 | 0.00 | TSL-025036-060 |
| 36.00 | 28.00 | 0.00 | 0.00 | 0.00 | 0.00 | TSL-028036-090 |
| 36.00 | 28.00 | 5.00 | 5.70 | 0.00 | 0.00 | RSS-028036-057 |
| 36.00 | 28.00 | 5.80 | 6.30 | 0.00 | 0.00 | TSL-028036-063 |
| 36.00 | 28.00 | 5.80 | 6.40 | 0.00 | 0.00 | CPI-028036-064 |
| 36.00 | 28.00 | 5.80 | 6.40 | 0.00 | 0.00 | CP-028036-064 |
| 36.00 | 28.00 | 6.50 | 7.50 | 30.00 | 0.00 | RSS-028036-075 |
| 37.00 | 20.00 | 12.00 | 13.00 | 0.00 | 0.00 | RSS-020037-130 |
| 37.00 | 25.00 | 7.00 | 8.00 | 0.00 | 0.00 | RSS-025037-080 |
| 37.00 | 30.00 | 6.00 | 7.00 | 0.00 | 0.00 | RS-030037-070 |
| 37.00 | 30.00 | 6.00 | 7.00 | 32.00 | 0.00 | RSS-030037-070 |
| 37.50 | 30.00 | 6.00 | 6.50 | 0.00 | 0.00 | CP-030037-065 |
| 38.00 | 25.00 | 8.00 | 0.00 | 0.00 | 0.00 | RSS-025038-090 |
| 38.00 | 25.00 | 10.00 | 11.00 | 0.00 | 0.00 | TS-025038-110 |
| 38.00 | 25.00 | 10.00 | 11.00 | 28.00 | 0.00 | RSS-025038-110 |
| 38.00 | 28.00 | 5.60 | 6.30 | 0.00 | 0.00 | RSS-028038-063 |
| 38.00 | 28.00 | 5.80 | 6.30 | 0.00 | 0.00 | TSL-028038-063 |



| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
|-------|-------|-------|-------|-------|-----------|----------------|
| 38.00 | 28.00 | 7.00 | 8.00 | 0.00 | 0.00 | TSL-028038-080 |
| 38.00 | 28.00 | 7.50 | 8.00 | 0.00 | 0.00 | CPI-028038-080 |
| 38.00 | 28.00 | 7.50 | 8.50 | 0.00 | 0.00 | RSL-028038-085 |
| 38.00 | 28.00 | 8.00 | 9.00 | 31.00 | 0.00 | RSS-028038-090 |
| 38.00 | 28.00 | 10.00 | 11.00 | 0.00 | 0.00 | RSS-028038-110 |
| 38.00 | 30.00 | 4.00 | 4.50 | 0.00 | 0.00 | RSS-030038-045 |
| 38.00 | 30.00 | 4.80 | 0.00 | 0.00 | 0.00 | TSL-030038-053 |
| 38.00 | 30.00 | 5.80 | 6.30 | 0.00 | 0.00 | TSL-030038-063 |
| 38.00 | 30.00 | 5.80 | 6.40 | 0.00 | 0.00 | CPI-030038-064 |
| 38.00 | 30.00 | 5.80 | 6.40 | 0.00 | 0.00 | CP-030038-064 |
| 38.00 | 30.00 | 5.80 | 6.50 | 32.00 | 0.00 | RSS-030038-065 |
| 38.00 | 30.00 | 6.30 | 7.00 | 0.00 | 0.00 | RSL-030038-070 |
| 38.00 | 30.00 | 7.00 | 8.00 | 0.00 | 0.00 | TSL-030038-080 |
| 38.00 | 30.00 | 7.00 | 8.00 | 0.00 | 30,038.00 | RSS-030038-080 |
| 38.00 | 30.00 | 8.00 | 9.00 | 0.00 | 0.00 | TS-030038-090 |
| 39.00 | 20.00 | 10.00 | 11.00 | 23.00 | 0.00 | RSS-020039-110 |
| 40.00 | 20.00 | 10.00 | 11.00 | 24.00 | 0.00 | RSS-020040-110 |
| 40.00 | 20.00 | 12.00 | 13.00 | 24.00 | 0.00 | RSS-020040-130 |
| 40.00 | 22.00 | 10.00 | 11.00 | 0.00 | 0.00 | RSS-022040-110 |
| 40.00 | 24.00 | 8.00 | 9.00 | 27.00 | 0.00 | RSS-024040-090 |
| 40.00 | 25.00 | 8.00 | 9.00 | 0.00 | 0.00 | RSS-025040-090 |
| 40.00 | 25.00 | 9.00 | 10.00 | 0.00 | 0.00 | RS-025040-100 |
| 40.00 | 25.00 | 10.00 | 11.00 | 0.00 | 0.00 | RS-025040-110 |
| 40.00 | 25.00 | 10.00 | 11.00 | 28.00 | 0.00 | RSS-025040-110 |
| 40.00 | 26.00 | 9.20 | 10.00 | 0.00 | 0.00 | RSS-026040-100 |
| 40.00 | 26.00 | 9.20 | 10.00 | 0.00 | 0.00 | CP-026040-100 |
| 40.00 | 28.00 | 6.00 | 6.50 | 0.00 | 0.00 | RSS-028040-065 |
| 40.00 | 28.00 | 7.00 | 8.00 | 0.00 | 0.00 | RS-028040-080 |
| 40.00 | 28.00 | 8.00 | 9.00 | 0.00 | 0.00 | RSL-028040-090 |
| 40.00 | 28.00 | 8.50 | 9.00 | 0.00 | 0.00 | CPI-028040-090 |
| 40.00 | 28.00 | 8.50 | 9.50 | 0.00 | 0.00 | RS-028040-095 |



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| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
|-------|-------|-------|-------|-------|-----------|----------------|
| 40.00 | 28.00 | 9.00 | 9.50 | 0.00 | 0.00 | CPI-028040-095 |
| 40.00 | 28.00 | 10.00 | 11.00 | 0.00 | 0.00 | RS-028040-110 |
| 40.00 | 28.00 | 10.00 | 11.00 | 31.00 | 0.00 | RSS-028040-110 |
| 40.00 | 30.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-030040-030 |
| 40.00 | 30.00 | 5.00 | 5.50 | 33.00 | 0.00 | RSS-030040-055 |
| 40.00 | 30.00 | 6.00 | 7.00 | 0.00 | 0.00 | RSS-030040-070 |
| 40.00 | 30.00 | 6.00 | 7.00 | 0.00 | 0.00 | RS-030040-070 |
| 40.00 | 30.00 | 6.50 | 7.50 | 0.00 | 0.00 | TSL-030040-075 |
| 40.00 | 30.00 | 7.00 | 0.00 | 0.00 | 0.00 | RSS-030040-080 |
| 40.00 | 30.00 | 7.00 | 7.50 | 0.00 | 0.00 | CP-030040-075 |
| 40.00 | 30.00 | 7.00 | 8.00 | 0.00 | 0.00 | CPI-030040-080 |
| 40.00 | 30.00 | 7.00 | 8.00 | 0.00 | 0.00 | RS-030040-080 |
| 40.00 | 30.00 | 8.00 | 0.00 | 0.00 | 0.00 | RS-030040-090 |
| 40.00 | 30.00 | 8.00 | 9.00 | 0.00 | 0.00 | RSS-030040-090 |
| 40.00 | 30.00 | 10.00 | 11.00 | 0.00 | 0.00 | TSL-030040-110 |
| 40.00 | 30.00 | 10.00 | 11.00 | 33.00 | 0.00 | RSS-030040-110 |
| 40.00 | 32.00 | 5.00 | 0.00 | 0.00 | 0.00 | RSS-032040-055 |
| 40.00 | 32.00 | 5.50 | 6.00 | 34.00 | 0.00 | RSS-032040-060 |
| 40.00 | 32.00 | 5.80 | 6.30 | 0.00 | 0.00 | TSL-032040-063 |
| 40.00 | 32.00 | 5.80 | 6.40 | 0.00 | 0.00 | CP-032040-064 |
| 40.00 | 32.00 | 6.00 | 7.00 | 0.00 | 0.00 | RS-032040-070 |
| 40.00 | 32.00 | 6.70 | 7.70 | 0.00 | 0.00 | TSL-032040-077 |
| 40.00 | 32.00 | 8.00 | 9.00 | 0.00 | 0.00 | TSL-032040-090 |
| 40.00 | 32.00 | 8.00 | 9.00 | 34.00 | 0.00 | RSS-032040-090 |
| 40.00 | 32.00 | 8.50 | 9.00 | 0.00 | 0.00 | CPI-032040-090 |
| 40.00 | 32.00 | 10.00 | 0.00 | 0.00 | 0.00 | RSS-032040-110 |
| 41.50 | 31.50 | 6.00 | 7.00 | 0.00 | 0.00 | RS-031041-070 |
| 41.50 | 31.50 | 6.00 | 7.00 | 0.00 | 31,041.00 | RSS-031041-070 |
| 41.50 | 32.00 | 8.00 | 8.90 | 0.00 | 0.00 | RSL-032041-089 |
| 42.00 | 30.00 | 8.00 | 9.00 | 0.00 | 0.00 | RSS-030042-090 |
| 42.00 | 30.00 | 9.00 | 10.00 | 33.00 | 0.00 | RSS-030042-100 |



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| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
|-------|-------|-------|-------|-------|------|----------------|
| 42.00 | 30.00 | 10.00 | 11.00 | 33.00 | 0.00 | RSS-030042-110 |
| 42.00 | 32.00 | 4.80 | 5.50 | 0.00 | 0.00 | TSL-032042-055 |
| 42.00 | 32.00 | 6.00 | 7.00 | 0.00 | 0.00 | RSS-032042-070 |
| 42.00 | 32.00 | 6.00 | 7.00 | 0.00 | 0.00 | RS-032042-070 |
| 42.00 | 32.00 | 7.00 | 8.00 | 0.00 | 0.00 | TSL-032042-080 |
| 42.00 | 32.00 | 10.00 | 11.00 | 0.00 | 0.00 | TSL-032042-110 |
| 42.00 | 32.00 | 10.00 | 11.00 | 35.00 | 0.00 | RSS-032042-110 |
| 42.00 | 35.00 | 7.00 | 8.00 | 0.00 | 0.00 | RS-035042-080 |
| 42.53 | 32.00 | 8.00 | 9.00 | 0.00 | 0.00 | TSL-032042-090 |
| 42.70 | 33.00 | 7.50 | 8.50 | 0.00 | 0.00 | RSL-033042-085 |
| 42.70 | 33.00 | 8.50 | 9.50 | 0.00 | 0.00 | RSL-033042-095 |
| 43.00 | 28.00 | 9.00 | 10.00 | 0.00 | 0.00 | RSS-028043-100 |
| 43.00 | 28.00 | 10.00 | 11.00 | 0.00 | 0.00 | RSS-028043-110 |
| 43.00 | 28.00 | 11.50 | 12.50 | 0.00 | 0.00 | RS-028043-125 |
| 43.00 | 30.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-030043-030 |
| 43.00 | 30.00 | 9.00 | 10.00 | 0.00 | 0.00 | RS-030043-100 |
| 43.00 | 33.00 | 10.00 | 11.00 | 0.00 | 0.00 | RS-033043-110 |
| 43.00 | 35.00 | 5.80 | 6.30 | 0.00 | 0.00 | TSL-035043-063 |
| 43.00 | 35.00 | 5.80 | 6.50 | 0.00 | 0.00 | CPI-035043-064 |
| 43.00 | 35.00 | 6.00 | 7.00 | 0.00 | 0.00 | TSL-035043-070 |
| 43.00 | 35.00 | 7.20 | 8.00 | 0.00 | 0.00 | RSL-035043-080 |
| 43.00 | 35.00 | 8.00 | 9.00 | 0.00 | 0.00 | TSL-035043-090 |
| 43.00 | 36.00 | 5.80 | 6.40 | 0.00 | 0.00 | CPI-036043-064 |
| 44.00 | 35.00 | 7.00 | 8.00 | 0.00 | 0.00 | TSL-035044-080 |
| 44.00 | 36.00 | 5.80 | 6.30 | 0.00 | 0.00 | TSL-036044-063 |
| 44.00 | 36.00 | 6.30 | 7.00 | 0.00 | 0.00 | RSL-036044-070 |
| 44.00 | 36.00 | 8.00 | 9.00 | 0.00 | 0.00 | TSL-036044-090 |
| 45.00 | 25.00 | 10.00 | 11.00 | 0.00 | 0.00 | RSS-025045-110 |
| 45.00 | 30.00 | 8.00 | 9.00 | 0.00 | 0.00 | RSS-030045-090 |
| 45.00 | 30.00 | 8.00 | 9.00 | 0.00 | 0.00 | CPI-030045-090 |
| 45.00 | 30.00 | 9.00 | 10.00 | 0.00 | 0.00 | RS-030045-100 |



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| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
|-------|-------|-------|-------|-------|------|-----------------|
| 45.00 | 30.00 | 10.00 | 11.00 | 34.00 | 0.00 | RSS-030045-110 |
| 45.00 | 32.00 | 8.00 | 0.00 | 0.00 | 0.00 | RSS-032045-090 |
| 45.00 | 32.00 | 9.50 | 10.00 | 0.00 | 0.00 | CPI-032045-100 |
| 45.00 | 32.00 | 9.50 | 10.50 | 0.00 | 0.00 | TSLA-032045-105 |
| 45.00 | 32.00 | 10.00 | 11.00 | 35.00 | 0.00 | RSS-032045-110 |
| 45.00 | 34.00 | 7.00 | 8.00 | 37.00 | 0.00 | RSS-034045-080 |
| 45.00 | 34.00 | 9.00 | 10.00 | 37.00 | 0.00 | RSS-034045-100 |
| 45.00 | 35.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-035045-030 |
| 45.00 | 35.00 | 5.00 | 5.50 | 0.00 | 0.00 | RSS-035045-055 |
| 45.00 | 35.00 | 6.00 | 7.00 | 0.00 | 0.00 | RSS-035045-070 |
| 45.00 | 35.00 | 6.00 | 7.00 | 0.00 | 0.00 | RS-035045-070 |
| 45.00 | 35.00 | 6.50 | 7.00 | 0.00 | 0.00 | CPI-035045-070 |
| 45.00 | 35.00 | 7.00 | 0.00 | 0.00 | 0.00 | RSS-035045-080 |
| 45.00 | 35.00 | 7.00 | 8.00 | 0.00 | 0.00 | TSL-035045-080 |
| 45.00 | 35.00 | 8.00 | 9.00 | 38.00 | 0.00 | RSS-035045-090 |
| 45.00 | 35.00 | 10.00 | 11.00 | 0.00 | 0.00 | TSL-035045-110 |
| 45.00 | 35.00 | 10.00 | 11.00 | 38.00 | 0.00 | RSS-035045-110 |
| 45.00 | 35.00 | 12.50 | 13.50 | 0.00 | 0.00 | TSL-035045-135 |
| 45.00 | 35.50 | 6.00 | 7.00 | 0.00 | 0.00 | RSS-035045-070A |
| 45.00 | 37.00 | 5.80 | 6.30 | 0.00 | 0.00 | RS-037045-063 |
| 45.00 | 38.00 | 5.00 | 5.50 | 0.00 | 0.00 | RS-038045-055 |
| 45.00 | 38.00 | 5.00 | 5.50 | 40.00 | 0.00 | RSS-038045-055 |
| 45.00 | 38.00 | 6.00 | 7.00 | 0.00 | 0.00 | TSL-038045-070 |
| 46.00 | 30.00 | 9.00 | 10.00 | 0.00 | 0.00 | RS-030046-100 |
| 46.00 | 35.00 | 8.00 | 9.00 | 0.00 | 0.00 | RS-035046-090 |
| 46.00 | 35.00 | 9.00 | 10.00 | 0.00 | 0.00 | RS-035046-100 |
| 46.00 | 36.00 | 5.00 | 5.50 | 0.00 | 0.00 | RSS-036046-055 |
| 46.00 | 36.00 | 6.00 | 0.00 | 0.00 | 0.00 | RSS-036046-070 |
| 46.00 | 36.00 | 6.00 | 7.00 | 0.00 | 0.00 | RS-036046-070 |
| 46.00 | 36.00 | 7.00 | 0.00 | 0.00 | 0.00 | TSL-036046-080 |
| 46.00 | 36.00 | 7.00 | 8.00 | 0.00 | 0.00 | TSLA-036046-080 |



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| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
|-------|-------|-------|-------|-------|-----------|-----------------|
| 46.00 | 36.00 | 7.00 | 8.00 | 39.00 | 0.00 | RSS-036046-080 |
| 46.00 | 36.00 | 8.00 | 8.50 | 0.00 | 0.00 | CPI-036046-085 |
| 46.00 | 36.00 | 10.00 | 11.00 | 0.00 | 0.00 | TSL-036046-110 |
| 46.00 | 38.00 | 6.50 | 7.50 | 40.00 | 0.00 | RSS-038046-075 |
| 46.00 | 40.00 | 7.00 | 8.00 | 0.00 | 0.00 | RS-040046-080 |
| 46.50 | 31.50 | 10.00 | 11.00 | 0.00 | 0.00 | RSS-031046-110 |
| 47.00 | 32.00 | 9.00 | 10.00 | 0.00 | 0.00 | RSL-032047-100 |
| 47.00 | 32.00 | 10.00 | 11.00 | 0.00 | 0.00 | RS-032047-110 |
| 48.00 | 28.00 | 10.00 | 11.00 | 0.00 | 0.00 | RSS-028048-110 |
| 48.00 | 32.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-032048-030 |
| 48.00 | 32.00 | 10.00 | 11.00 | 0.00 | 0.00 | RSS-032048-110 |
| 48.00 | 35.00 | 10.00 | 11.00 | 38.00 | 0.00 | RSS-035048-110 |
| 48.00 | 36.00 | 7.00 | 8.00 | 0.00 | 0.00 | RS-036048-080 |
| 48.00 | 36.00 | 8.00 | 9.00 | 0.00 | 0.00 | RS-036048-090 |
| 48.00 | 36.00 | 8.00 | 9.00 | 0.00 | 36,048.00 | RSS-036048-090 |
| 48.00 | 36.00 | 9.00 | 9.50 | 0.00 | 0.00 | CPI-036048-095 |
| 48.00 | 38.00 | 6.00 | 7.00 | 0.00 | 0.00 | RSS-038048-070 |
| 48.00 | 38.00 | 6.00 | 7.00 | 0.00 | 0.00 | RS-038048-070 |
| 48.00 | 38.00 | 8.00 | 9.00 | 0.00 | 0.00 | TSL-038048-090 |
| 48.00 | 38.00 | 8.00 | 9.00 | 0.00 | 0.00 | RS-038048-090 |
| 48.00 | 40.00 | 0.00 | 0.00 | 0.00 | 0.00 | CP-040048-065 |
| 48.00 | 40.00 | 5.80 | 6.30 | 0.00 | 0.00 | TSL-040048-063 |
| 48.00 | 40.00 | 6.00 | 6.50 | 0.00 | 0.00 | CPI-040048-065 |
| 48.00 | 40.00 | 8.00 | 9.00 | 0.00 | 0.00 | TSLA-040048-090 |
| 48.00 | 40.00 | 8.00 | 9.00 | 0.00 | 0.00 | TSL-040048-090 |
| 48.00 | 40.00 | 11.00 | 12.00 | 42.00 | 0.00 | RSS-040048-120 |
| 49.52 | 40.00 | 9.50 | 10.50 | 0.00 | 0.00 | RSL-040049-105 |
| 50.00 | 30.00 | 10.00 | 11.00 | 34.00 | 0.00 | RSS-030050-110 |
| 50.00 | 30.00 | 12.00 | 13.00 | 34.00 | 0.00 | RSS-030050-130 |
| 50.00 | 30.00 | 14.00 | 14.50 | 0.00 | 0.00 | CPI-030050-145 |
| 50.00 | 32.00 | 10.00 | 11.00 | 0.00 | 0.00 | RSS-032050-110 |



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| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
|-------|-------|-------|-------|-------|------|-----------------|
| 50.00 | 32.00 | 12.00 | 13.00 | 36.00 | 0.00 | RSS-032050-130 |
| 50.00 | 34.00 | 12.00 | 13.00 | 0.00 | 0.00 | RS-034050-130 |
| 50.00 | 34.00 | 14.00 | 15.00 | 37.00 | 0.00 | RSS-034050-150 |
| 50.00 | 35.00 | 9.00 | 10.00 | 0.00 | 0.00 | RSS-035050-100 |
| 50.00 | 35.00 | 10.00 | 11.00 | 0.00 | 0.00 | CPI-035050-110 |
| 50.00 | 35.00 | 10.00 | 11.00 | 0.00 | 0.00 | TSL-035050-110 |
| 50.00 | 35.00 | 10.00 | 11.00 | 0.00 | 0.00 | CP-035050-110 |
| 50.00 | 35.00 | 10.00 | 11.00 | 39.00 | 0.00 | RSS-035050-110 |
| 50.00 | 35.00 | 11.00 | 11.50 | 0.00 | 0.00 | CPI-035050-115 |
| 50.00 | 38.00 | 5.50 | 6.50 | 0.00 | 0.00 | RSS-038050-065 |
| 50.00 | 38.00 | 8.50 | 9.50 | 0.00 | 0.00 | TSL-038050-095 |
| 50.00 | 38.00 | 9.00 | 10.00 | 41.00 | 0.00 | RSS-038050-100 |
| 50.00 | 38.00 | 10.00 | 11.00 | 0.00 | 0.00 | RS-038050-110 |
| 50.00 | 40.00 | 0.00 | 0.00 | 0.00 | 0.00 | RSS-040050-055 |
| 50.00 | 40.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-040050-030 |
| 50.00 | 40.00 | 5.80 | 6.30 | 0.00 | 0.00 | TSL-040050-063 |
| 50.00 | 40.00 | 6.00 | 7.00 | 0.00 | 0.00 | RSS-040050-070 |
| 50.00 | 40.00 | 6.00 | 7.00 | 0.00 | 0.00 | RS-040050-070 |
| 50.00 | 40.00 | 6.50 | 7.50 | 43.00 | 0.00 | RSS-040050-075 |
| 50.00 | 40.00 | 7.00 | 8.00 | 0.00 | 0.00 | TSL-040050-080 |
| 50.00 | 40.00 | 7.00 | 8.00 | 0.00 | 0.00 | RSS-040050-080 |
| 50.00 | 40.00 | 7.30 | 8.00 | 0.00 | 0.00 | TSLA-040050-080 |
| 50.00 | 40.00 | 7.50 | 8.00 | 0.00 | 0.00 | CPI-040050-080 |
| 50.00 | 40.00 | 8.00 | 9.00 | 43.00 | 0.00 | RSS-040050-090 |
| 50.00 | 40.00 | 9.00 | 0.00 | 0.00 | 0.00 | RSS-040050-100 |
| 50.00 | 40.00 | 10.00 | 10.50 | 0.00 | 0.00 | CPI-040050-105 |
| 50.00 | 40.00 | 10.00 | 11.00 | 0.00 | 0.00 | TSL-040050-110 |
| 50.00 | 40.00 | 10.00 | 11.00 | 43.00 | 0.00 | RSS-040050-110 |
| 50.00 | 40.00 | 12.50 | 13.50 | 0.00 | 0.00 | RS-040050-135 |
| 50.00 | 42.00 | 5.00 | 0.00 | 0.00 | 0.00 | RSS-042050-055 |
| 50.00 | 42.00 | 6.00 | 7.00 | 0.00 | 0.00 | RSS-042050-070 |



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| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
|-------|-------|-------|-------|-------|-----------|-----------------|
| 50.00 | 42.00 | 8.00 | 9.00 | 44.00 | 0.00 | RSS-042050-090 |
| 50.00 | 42.00 | 11.50 | 12.50 | 0.00 | 0.00 | RSL-042050-125 |
| 50.50 | 35.50 | 10.00 | 11.00 | 0.00 | 0.00 | RSS-035050-110A |
| 51.00 | 36.00 | 10.00 | 11.00 | 0.00 | 0.00 | RS-036051-110 |
| 51.00 | 36.00 | 10.50 | 11.00 | 0.00 | 0.00 | CP-036051-110 |
| 51.00 | 36.00 | 11.50 | 12.50 | 0.00 | 0.00 | RS-036051-125 |
| 51.00 | 42.00 | 10.00 | 11.00 | 0.00 | 0.00 | RSLA-042051-110 |
| 52.00 | 40.00 | 8.00 | 9.00 | 0.00 | 0.00 | RS-040052-090 |
| 52.00 | 40.00 | 9.00 | 10.00 | 0.00 | 0.00 | RSS-040052-100 |
| 52.00 | 40.00 | 10.00 | 0.00 | 0.00 | 0.00 | TSL-040052-110 |
| 52.00 | 40.00 | 10.00 | 11.00 | 0.00 | 0.00 | TSLA-040052-110 |
| 52.00 | 42.00 | 6.00 | 7.00 | 0.00 | 0.00 | RSS-042052-070 |
| 52.00 | 42.00 | 8.00 | 9.00 | 0.00 | 0.00 | TSL-042052-090 |
| 52.00 | 42.00 | 9.00 | 10.00 | 45.00 | 0.00 | RSS-042052-100 |
| 52.00 | 45.00 | 13.00 | 14.00 | 0.00 | 0.00 | RSLA-045052-140 |
| 52.50 | 45.00 | 9.00 | 10.00 | 0.00 | 0.00 | TSL-045052-100 |
| 53.00 | 38.00 | 10.00 | 11.00 | 0.00 | 0.00 | RSL-038053-110 |
| 53.00 | 42.00 | 9.00 | 10.00 | 0.00 | 0.00 | RSL-042053-100 |
| 53.00 | 45.00 | 5.80 | 6.30 | 0.00 | 0.00 | TSL-045053-063 |
| 53.00 | 45.00 | 6.00 | 7.00 | 0.00 | 0.00 | TS-045053-070 |
| 53.00 | 45.00 | 6.50 | 7.50 | 0.00 | 45,053.00 | RSS-045053-075 |
| 53.00 | 45.00 | 8.00 | 9.00 | 0.00 | 0.00 | TSL-045053-090 |
| 53.00 | 45.00 | 10.00 | 0.00 | 0.00 | 0.00 | TSL-045053-110 |
| 53.00 | 45.00 | 12.00 | 13.00 | 0.00 | 0.00 | RS-045053-130 |
| 54.00 | 46.00 | 8.00 | 9.00 | 0.00 | 0.00 | TSL-046054-090 |
| 55.00 | 35.00 | 10.00 | 11.00 | 39.00 | 0.00 | RSS-035055-110 |
| 55.00 | 35.00 | 12.00 | 13.00 | 0.00 | 0.00 | RS-035055-130 |
| 55.00 | 35.00 | 12.00 | 13.00 | 39.00 | 0.00 | RSS-035055-130 |
| 55.00 | 38.00 | 10.00 | 11.00 | 41.00 | 0.00 | RSS-038055-110 |
| 55.00 | 40.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-040055-030 |
| 55.00 | 40.00 | 7.50 | 8.00 | 0.00 | 0.00 | CPI-040055-080 |



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| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
|-------|-------|-------|-------|-------|-----------|-----------------|
| 55.00 | 40.00 | 7.50 | 8.50 | 0.00 | 0.00 | TSLA-040055-085 |
| 55.00 | 40.00 | 9.00 | 10.00 | 0.00 | 0.00 | RS-040055-100 |
| 55.00 | 40.00 | 9.50 | 10.50 | 0.00 | 0.00 | CPI-040055-105 |
| 55.00 | 40.00 | 10.00 | 11.00 | 0.00 | 0.00 | TSLA-040055-110 |
| 55.00 | 40.00 | 10.00 | 11.00 | 0.00 | 0.00 | RS-040055-110 |
| 55.00 | 40.00 | 10.00 | 11.00 | 44.00 | 0.00 | RSS-040055-110 |
| 55.00 | 40.00 | 11.50 | 12.50 | 0.00 | 0.00 | TSLA-040055-125 |
| 55.00 | 40.00 | 11.50 | 12.50 | 0.00 | 0.00 | RS-040055-125 |
| 55.00 | 43.00 | 6.00 | 7.00 | 0.00 | 0.00 | RSS-043055-070 |
| 55.00 | 45.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-045055-030 |
| 55.00 | 45.00 | 5.80 | 6.30 | 0.00 | 0.00 | TSL-045055-063 |
| 55.00 | 45.00 | 6.00 | 7.00 | 0.00 | 0.00 | RSS-045055-070 |
| 55.00 | 45.00 | 6.00 | 7.00 | 0.00 | 0.00 | RS-045055-070 |
| 55.00 | 45.00 | 6.50 | 7.50 | 48.00 | 0.00 | RSS-045055-075 |
| 55.00 | 45.00 | 7.00 | 8.00 | 0.00 | 0.00 | TSL-045055-080 |
| 55.00 | 45.00 | 7.50 | 8.00 | 0.00 | 0.00 | CPI-045055-080 |
| 55.00 | 45.00 | 7.50 | 8.00 | 0.00 | 0.00 | CP-045055-080 |
| 55.00 | 45.00 | 8.00 | 0.00 | 0.00 | 0.00 | RSS-045055-090 |
| 55.00 | 45.00 | 8.00 | 9.00 | 0.00 | 0.00 | RS-045055-090 |
| 55.00 | 45.00 | 10.00 | 0.00 | 0.00 | 0.00 | TSL-045055-110 |
| 55.00 | 45.00 | 10.00 | 11.00 | 0.00 | 0.00 | TSLA-045055-110 |
| 55.00 | 45.00 | 10.00 | 11.00 | 0.00 | 0.00 | CPI-045055-110 |
| 55.00 | 45.00 | 10.00 | 11.00 | 48.00 | 0.00 | RSS-045055-110 |
| 55.00 | 45.00 | 11.50 | 12.50 | 0.00 | 0.00 | RSL-045055-125 |
| 56.00 | 40.00 | 8.00 | 0.00 | 0.00 | 0.00 | RSS-040056-090 |
| 56.00 | 40.00 | 10.00 | 11.00 | 44.00 | 0.00 | RSS-040056-110 |
| 56.00 | 45.00 | 7.00 | 8.00 | 0.00 | 0.00 | RSS-045056-080 |
| 56.00 | 46.00 | 7.00 | 8.00 | 0.00 | 0.00 | RS-046056-080 |
| 56.00 | 48.00 | 11.50 | 12.50 | 0.00 | 0.00 | RSL-048056-125 |
| 56.00 | 48.00 | 12.00 | 13.00 | 0.00 | 0.00 | RSL-048056-130 |
| 57.00 | 36.00 | 5.00 | 6.00 | 0.00 | 36,057.00 | TSAI-036057-060 |



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| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
|-------|-------|-------|-------|-------|------|-----------------|
| 57.00 | 45.00 | 6.00 | 6.50 | 0.00 | 0.00 | RSS-045057-065 |
| 57.00 | 50.00 | 10.00 | 11.00 | 0.00 | 0.00 | RSL-050057-110 |
| 58.00 | 38.00 | 10.00 | 11.00 | 42.00 | 0.00 | RSS-038058-110 |
| 58.00 | 45.00 | 9.00 | 10.00 | 0.00 | 0.00 | RS-045058-100 |
| 58.00 | 45.00 | 10.00 | 0.00 | 0.00 | 0.00 | RSS-045058-110 |
| 58.00 | 48.00 | 6.50 | 0.00 | 0.00 | 0.00 | RSS-048058-075 |
| 58.00 | 48.00 | 10.00 | 11.00 | 51.00 | 0.00 | RSS-048058-110 |
| 58.00 | 50.00 | 8.00 | 0.00 | 0.00 | 0.00 | RSS-050058-090 |
| 58.00 | 50.00 | 8.00 | 9.00 | 0.00 | 0.00 | TSL-050058-090 |
| 60.00 | 40.00 | 10.00 | 11.00 | 45.00 | 0.00 | RSS-040060-110 |
| 60.00 | 40.00 | 12.00 | 0.00 | 0.00 | 0.00 | RSS-040060-130 |
| 60.00 | 40.00 | 12.00 | 13.00 | 0.00 | 0.00 | RS-040060-130 |
| 60.00 | 40.00 | 13.00 | 14.00 | 45.00 | 0.00 | RSS-040060-140 |
| 60.00 | 40.00 | 14.00 | 14.50 | 0.00 | 0.00 | CPI-040060-145 |
| 60.00 | 40.00 | 14.00 | 14.50 | 0.00 | 0.00 | CP-040060-145 |
| 60.00 | 40.00 | 18.00 | 19.00 | 45.00 | 0.00 | RSS-040060-190 |
| 60.00 | 44.00 | 12.00 | 13.00 | 0.00 | 0.00 | RSS-044060-130 |
| 60.00 | 45.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-045060-030 |
| 60.00 | 45.00 | 9.00 | 10.00 | 0.00 | 0.00 | RS-045060-100 |
| 60.00 | 45.00 | 10.00 | 0.00 | 0.00 | 0.00 | RS-045060-110 |
| 60.00 | 45.00 | 10.00 | 11.00 | 0.00 | 0.00 | TSLA-045060-110 |
| 60.00 | 45.00 | 10.00 | 11.00 | 49.00 | 0.00 | RSS-045060-110 |
| 60.00 | 45.00 | 10.50 | 11.50 | 0.00 | 0.00 | CPI-045060-115 |
| 60.00 | 45.00 | 11.00 | 11.50 | 0.00 | 0.00 | CP-045060-115 |
| 60.00 | 48.00 | 6.00 | 7.00 | 0.00 | 0.00 | TSL-048060-070 |
| 60.00 | 48.00 | 9.00 | 10.00 | 0.00 | 0.00 | RSS-048060-100 |
| 60.00 | 50.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-050060-030 |
| 60.00 | 50.00 | 5.00 | 5.50 | 0.00 | 0.00 | RSS-050060-055 |
| 60.00 | 50.00 | 6.00 | 7.00 | 0.00 | 0.00 | RSS-050060-070 |
| 60.00 | 50.00 | 6.00 | 7.00 | 0.00 | 0.00 | RS-050060-070 |
| 60.00 | 50.00 | 7.00 | 0.00 | 0.00 | 0.00 | RSS-050060-080 |



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| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
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| 60.00 | 50.00 | 7.00 | 8.00 | 0.00 | 0.00 | TSL-050060-080 |
| 60.00 | 50.00 | 7.20 | 8.00 | 0.00 | 0.00 | RSLA-050060-080 |
| 60.00 | 50.00 | 7.50 | 0.00 | 0.00 | 0.00 | CPI-050060-080 |
| 60.00 | 50.00 | 8.00 | 9.00 | 0.00 | 0.00 | RS-050060-090 |
| 60.00 | 50.00 | 9.00 | 10.00 | 0.00 | 0.00 | TSL-050060-100 |
| 60.00 | 50.00 | 9.50 | 10.00 | 0.00 | 0.00 | CPI-050060-100 |
| 60.00 | 50.00 | 10.00 | 0.00 | 0.00 | 0.00 | TSL-050060-110 |
| 60.00 | 50.00 | 10.00 | 11.00 | 0.00 | 0.00 | TSLA-050060-110 |
| 60.00 | 50.00 | 10.00 | 11.00 | 53.00 | 0.00 | RSS-050060-110 |
| 60.00 | 50.00 | 12.00 | 13.00 | 0.00 | 0.00 | RS-050060-130 |
| 62.00 | 40.00 | 15.00 | 16.00 | 0.00 | 0.00 | RSS-040062-160 |
| 62.00 | 42.00 | 10.00 | 11.00 | 0.00 | 0.00 | RS-042062-110 |
| 62.00 | 42.00 | 12.00 | 13.00 | 0.00 | 0.00 | RS-042062-130 |
| 62.00 | 42.00 | 12.00 | 13.00 | 47.00 | 0.00 | RSS-042062-130 |
| 62.00 | 50.00 | 8.70 | 9.60 | 0.00 | 0.00 | TSLA-050062-096 |
| 62.00 | 50.00 | 9.00 | 10.00 | 53.00 | 0.00 | RSS-050062-100 |
| 62.00 | 50.00 | 10.00 | 11.00 | 0.00 | 0.00 | TSL-050062-110 |
| 62.00 | 52.00 | 10.00 | 11.00 | 0.00 | 0.00 | RS-052062-110 |
| 62.00 | 52.00 | 12.00 | 13.00 | 55.00 | 0.00 | RSS-052062-130 |
| 62.50 | 55.00 | 9.00 | 10.00 | 0.00 | 0.00 | RSL-055062-100 |
| 62.70 | 50.00 | 9.50 | 10.50 | 0.00 | 0.00 | RSL-050062-105 |
| 63.00 | 45.00 | 10.00 | 11.00 | 49.00 | 0.00 | RSS-045063-110 |
| 63.00 | 48.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-048063-030 |
| 63.00 | 48.00 | 10.00 | 11.00 | 0.00 | 0.00 | RSS-048063-110 |
| 63.00 | 50.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-050063-030 |
| 63.00 | 50.00 | 6.00 | 7.00 | 54.00 | 0.00 | RSS-050063-070 |
| 63.00 | 50.00 | 8.00 | 9.00 | 0.00 | 0.00 | RS-050063-090 |
| 63.00 | 50.00 | 10.00 | 0.00 | 0.00 | 0.00 | RSS-050063-110 |
| 63.00 | 53.00 | 5.00 | 5.50 | 0.00 | 0.00 | RSS-053063-055 |
| 63.00 | 53.00 | 6.00 | 7.00 | 0.00 | 0.00 | RSS-053063-070 |
| 63.00 | 53.00 | 6.50 | 7.50 | 56.00 | 0.00 | RSS-053063-075 |



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| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
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| 63.00 | 55.00 | 8.00 | 9.00 | 0.00 | 0.00 | TSL-055063-090 |
| 63.00 | 55.00 | 11.50 | 12.50 | 0.00 | 0.00 | RSL-055063-125 |
| 64.00 | 56.00 | 8.00 | 9.00 | 0.00 | 0.00 | TSL-056064-090 |
| 65.00 | 40.00 | 12.00 | 13.00 | 45.00 | 0.00 | RSS-040065-130 |
| 65.00 | 45.00 | 10.00 | 11.00 | 50.00 | 0.00 | RSS-045065-110 |
| 65.00 | 45.00 | 12.00 | 13.00 | 50.00 | 0.00 | RSS-045065-130 |
| 65.00 | 45.00 | 14.00 | 14.50 | 0.00 | 0.00 | CPI-045065-145 |
| 65.00 | 50.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-050065-030 |
| 65.00 | 50.00 | 9.00 | 10.00 | 0.00 | 0.00 | RS-050065-100 |
| 65.00 | 50.00 | 10.00 | 0.00 | 0.00 | 0.00 | 19M-050065-100 |
| 65.00 | 50.00 | 10.00 | 11.00 | 0.00 | 0.00 | TSLA-050065-110 |
| 65.00 | 50.00 | 10.00 | 11.00 | 0.00 | 0.00 | TSL-050065-110 |
| 65.00 | 50.00 | 10.00 | 11.00 | 54.00 | 0.00 | RSS-050065-110 |
| 65.00 | 50.00 | 10.50 | 11.00 | 0.00 | 0.00 | CP-050065-110 |
| 65.00 | 50.00 | 11.00 | 12.00 | 0.00 | 0.00 | RSL-050065-120 |
| 65.00 | 50.00 | 11.50 | 12.50 | 0.00 | 0.00 | TSLA-050065-125 |
| 65.00 | 50.00 | 12.00 | 0.00 | 0.00 | 0.00 | RSS-050065-130 |
| 65.00 | 50.00 | 15.50 | 16.50 | 0.00 | 0.00 | RSL-050065-165 |
| 65.00 | 52.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-052065-030 |
| 65.00 | 55.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-055065-030 |
| 65.00 | 55.00 | 6.00 | 7.00 | 0.00 | 0.00 | RSS-055065-070 |
| 65.00 | 55.00 | 7.00 | 8.00 | 0.00 | 0.00 | TSL-055065-080 |
| 65.00 | 55.00 | 7.50 | 8.00 | 0.00 | 0.00 | CPI-055065-080 |
| 65.00 | 55.00 | 8.00 | 9.00 | 0.00 | 0.00 | RS-055065-090 |
| 65.00 | 55.00 | 8.50 | 9.50 | 0.00 | 0.00 | RSL-055065-095 |
| 65.00 | 55.00 | 10.00 | 0.00 | 0.00 | 0.00 | TSL-055065-110 |
| 65.00 | 55.00 | 10.00 | 11.00 | 0.00 | 0.00 | CPI-055065-110 |
| 65.00 | 55.00 | 10.00 | 11.00 | 58.00 | 0.00 | RSS-055065-110 |
| 65.00 | 55.00 | 12.00 | 13.00 | 0.00 | 0.00 | TSL-055065-130 |
| 65.00 | 55.00 | 12.00 | 13.00 | 58.00 | 0.00 | RSS-055065-130 |
| 65.30 | 49.50 | 10.00 | 11.00 | 0.00 | 0.00 | TSL-049065-110 |



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| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
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| 66.00 | 50.00 | 12.00 | 13.00 | 0.00 | 0.00 | RS-050066-130 |
| 66.00 | 54.00 | 9.00 | 9.50 | 0.00 | 0.00 | CPI-054066-095 |
| 66.00 | 56.00 | 6.00 | 7.00 | 0.00 | 0.00 | RSS-056066-070 |
| 66.00 | 56.00 | 6.50 | 7.50 | 0.00 | 0.00 | TSL-056066-075 |
| 66.00 | 56.00 | 10.00 | 11.00 | 0.00 | 0.00 | TSL-056066-110 |
| 66.00 | 60.00 | 5.00 | 6.00 | 0.00 | 0.00 | TS-060066-060 |
| 67.00 | 55.00 | 10.00 | 11.00 | 0.00 | 0.00 | RS-055067-110 |
| 67.00 | 59.50 | 9.00 | 10.00 | 0.00 | 0.00 | TSL-059067-100 |
| 68.00 | 50.00 | 9.00 | 10.00 | 0.00 | 0.00 | RS-050068-100 |
| 68.00 | 55.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-055068-030 |
| 68.00 | 55.00 | 10.00 | 11.00 | 0.00 | 0.00 | RS-055068-110 |
| 68.00 | 58.00 | 6.00 | 7.00 | 0.00 | 0.00 | RSS-058068-070 |
| 68.00 | 58.00 | 11.50 | 12.50 | 0.00 | 0.00 | RSL-058068-125 |
| 68.00 | 60.00 | 8.00 | 9.00 | 0.00 | 0.00 | TSL-060068-090 |
| 68.00 | 60.00 | 11.50 | 12.50 | 0.00 | 0.00 | TSL-060068-125 |
| 68.00 | 60.00 | 13.00 | 14.00 | 0.00 | 0.00 | RSLA-060068-140 |
| 69.00 | 60.00 | 10.00 | 11.00 | 0.00 | 0.00 | RSLA-060069-110 |
| 69.00 | 61.00 | 7.50 | 9.00 | 0.00 | 0.00 | TSL-061069-090 |
| 69.00 | 61.00 | 8.00 | 8.50 | 0.00 | 0.00 | CP-061069-085 |
| 69.70 | 61.00 | 8.00 | 9.00 | 0.00 | 0.00 | TSL-061697-090 |
| 70.00 | 36.00 | 10.00 | 11.00 | 39.00 | 0.00 | RSS-036070-110 |
| 70.00 | 50.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-050070-030 |
| 70.00 | 50.00 | 10.00 | 11.00 | 0.00 | 0.00 | RS-050070-110 |
| 70.00 | 50.00 | 10.00 | 11.00 | 55.00 | 0.00 | RSS-050070-110 |
| 70.00 | 50.00 | 12.00 | 13.00 | 0.00 | 0.00 | RS-050070-130 |
| 70.00 | 50.00 | 12.00 | 13.00 | 55.00 | 0.00 | RSS-050070-130 |
| 70.00 | 50.00 | 13.50 | 14.50 | 0.00 | 0.00 | TSL-050070-145 |
| 70.00 | 50.00 | 13.50 | 14.50 | 0.00 | 0.00 | RS-050070-145 |
| 70.00 | 50.00 | 14.00 | 0.00 | 0.00 | 0.00 | CP-050070-145 |
| 70.00 | 50.00 | 14.00 | 14.50 | 0.00 | 0.00 | CPI-050070-145 |
| 70.00 | 50.00 | 14.00 | 15.00 | 0.00 | 0.00 | RSL-050070-150 |



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| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
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| 70.00 | 50.00 | 18.00 | 19.00 | 55.00 | 0.00 | RSS-050070-190 |
| 70.00 | 54.00 | 12.00 | 13.00 | 0.00 | 0.00 | RSS-054070-130 |
| 70.00 | 55.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-055070-030 |
| 70.00 | 55.00 | 7.50 | 0.00 | 0.00 | 0.00 | RSS-055070-085 |
| 70.00 | 55.00 | 9.50 | 10.00 | 0.00 | 0.00 | RS-055070-100 |
| 70.00 | 55.00 | 9.50 | 10.50 | 0.00 | 0.00 | TSL-055070-105 |
| 70.00 | 55.00 | 10.00 | 10.50 | 0.00 | 0.00 | CPI-055070-105 |
| 70.00 | 55.00 | 10.00 | 11.00 | 0.00 | 55,070.00 | RSS-055070-110 |
| 70.00 | 55.00 | 12.00 | 13.00 | 0.00 | 0.00 | RS-055070-130 |
| 70.00 | 55.00 | 12.00 | 13.00 | 59.00 | 0.00 | RSS-055070-130 |
| 70.00 | 60.00 | 0.00 | 0.00 | 0.00 | 0.00 | 19M-060070-025 |
| 70.00 | 60.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-060070-030 |
| 70.00 | 60.00 | 5.00 | 5.50 | 0.00 | 0.00 | RSS-060070-055 |
| 70.00 | 60.00 | 6.00 | 7.00 | 0.00 | 0.00 | RSS-060070-070 |
| 70.00 | 60.00 | 6.00 | 7.00 | 0.00 | 0.00 | RS-060070-070 |
| 70.00 | 60.00 | 7.00 | 0.00 | 0.00 | 0.00 | RSS-060070-080 |
| 70.00 | 60.00 | 7.00 | 8.00 | 0.00 | 0.00 | TSL-060070-080 |
| 70.00 | 60.00 | 7.50 | 8.00 | 0.00 | 0.00 | CPI-060070-080 |
| 70.00 | 60.00 | 7.50 | 8.00 | 0.00 | 0.00 | CP-060070-080 |
| 70.00 | 60.00 | 8.00 | 9.00 | 63.00 | 0.00 | RSS-060070-090 |
| 70.00 | 60.00 | 9.00 | 0.00 | 0.00 | 0.00 | RS-060070-100 |
| 70.00 | 60.00 | 10.00 | 11.00 | 0.00 | 0.00 | TSL-060070-110 |
| 70.00 | 60.00 | 10.00 | 11.00 | 63.00 | 0.00 | RSS-060070-110 |
| 70.00 | 60.00 | 11.50 | 12.50 | 0.00 | 0.00 | TSL-060070-125 |
| 70.00 | 60.00 | 12.00 | 0.00 | 0.00 | 0.00 | TSL-060070-130 |
| 70.00 | 60.00 | 12.00 | 13.00 | 0.00 | 60,070.00 | TSAI-060070-130 |
| 70.00 | 60.00 | 12.00 | 13.00 | 63.00 | 0.00 | RSS-060070-130 |
| 70.00 | 60.00 | 12.50 | 13.00 | 0.00 | 0.00 | CPI-060070-130 |
| 70.00 | 60.00 | 14.00 | 15.00 | 0.00 | 0.00 | RSL-060070-150 |
| 71.00 | 55.00 | 10.00 | 11.00 | 0.00 | 0.00 | RS-055071-110 |
| 71.00 | 55.00 | 12.00 | 13.00 | 0.00 | 0.00 | RS-055071-130 |



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| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
|-------|-------|-------|-------|-------|------|-----------------|
| 71.00 | 56.00 | 10.00 | 11.00 | 0.00 | 0.00 | RS-056071-110 |
| 71.00 | 56.00 | 11.50 | 12.50 | 0.00 | 0.00 | TSLA-056071-125 |
| 71.00 | 56.00 | 11.50 | 12.50 | 0.00 | 0.00 | TSL-056071-125 |
| 71.00 | 60.00 | 7.00 | 0.00 | 0.00 | 0.00 | TSL-060071-080 |
| 71.00 | 60.00 | 7.00 | 8.00 | 0.00 | 0.00 | RSS-060071-080 |
| 71.00 | 63.00 | 8.00 | 0.00 | 0.00 | 0.00 | 4316500 |
| 71.00 | 63.00 | 8.00 | 9.00 | 0.00 | 0.00 | TSL-063071-090 |
| 72.00 | 60.00 | 9.00 | 10.00 | 0.00 | 0.00 | TSL-060072-100 |
| 73.00 | 53.00 | 12.00 | 13.00 | 0.00 | 0.00 | RSS-053073-130 |
| 73.00 | 60.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-060073-030 |
| 73.00 | 60.00 | 10.00 | 11.00 | 0.00 | 0.00 | RS-060073-110 |
| 73.00 | 63.00 | 6.00 | 7.00 | 0.00 | 0.00 | RSS-063073-070 |
| 73.00 | 63.00 | 6.00 | 7.00 | 0.00 | 0.00 | RS-063073-070 |
| 73.00 | 63.00 | 7.00 | 8.00 | 0.00 | 0.00 | RSS-063073-080 |
| 73.00 | 63.00 | 10.00 | 11.00 | 0.00 | 0.00 | TSL-063073-110 |
| 73.00 | 63.00 | 12.00 | 0.00 | 0.00 | 0.00 | TSL-063073-130 |
| 73.00 | 65.00 | 8.00 | 9.00 | 0.00 | 0.00 | TSL-065073-090 |
| 73.00 | 65.00 | 8.00 | 9.00 | 0.00 | 0.00 | RS-065073-090 |
| 73.00 | 65.00 | 11.50 | 12.50 | 0.00 | 0.00 | RSL-065073-125 |
| 74.00 | 34.00 | 10.00 | 11.00 | 44.00 | 0.00 | RSS-034074-110 |
| 74.00 | 62.00 | 13.00 | 14.00 | 0.00 | 0.00 | RS-062074-140 |
| 75.00 | 55.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-055075-030 |
| 75.00 | 55.00 | 12.00 | 13.00 | 0.00 | 0.00 | RS-055075-130 |
| 75.00 | 55.00 | 12.00 | 13.00 | 60.00 | 0.00 | RSS-055075-130 |
| 75.00 | 55.00 | 13.50 | 14.50 | 0.00 | 0.00 | RS-055075-145 |
| 75.00 | 55.00 | 14.00 | 14.50 | 0.00 | 0.00 | CPI-055075-145 |
| 75.00 | 60.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-060075-030 |
| 75.00 | 60.00 | 9.00 | 10.00 | 0.00 | 0.00 | RS-060075-100 |
| 75.00 | 60.00 | 10.00 | 11.00 | 0.00 | 0.00 | TSL-060075-110 |
| 75.00 | 60.00 | 10.00 | 11.00 | 64.00 | 0.00 | RSS-060075-110 |
| 75.00 | 60.00 | 11.50 | 12.50 | 0.00 | 0.00 | TSLA-060075-125 |



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| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
|-------|-------|-------|-------|-------|------|-----------------|
| 75.00 | 60.00 | 12.00 | 0.00 | 0.00 | 0.00 | TSL-060075-130 |
| 75.00 | 60.00 | 12.00 | 13.00 | 0.00 | 0.00 | TSLA-060075-130 |
| 75.00 | 60.00 | 12.00 | 13.00 | 0.00 | 0.00 | RS-060075-130 |
| 75.00 | 60.00 | 12.00 | 13.00 | 64.00 | 0.00 | RSS-060075-130 |
| 75.00 | 60.00 | 15.50 | 16.50 | 0.00 | 0.00 | RSL-060075-165 |
| 75.00 | 63.00 | 8.70 | 0.00 | 0.00 | 0.00 | TSLA-063075-095 |
| 75.00 | 63.00 | 9.00 | 9.60 | 0.00 | 0.00 | CP-063075-096 |
| 75.00 | 63.00 | 10.00 | 11.00 | 0.00 | 0.00 | TSL-063075-110 |
| 75.00 | 63.00 | 10.00 | 11.00 | 0.00 | 0.00 | CPI-063075-110 |
| 75.00 | 63.00 | 10.00 | 11.00 | 66.00 | 0.00 | RSS-063075-110 |
| 75.00 | 65.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-065075-030 |
| 75.00 | 65.00 | 6.00 | 7.00 | 0.00 | 0.00 | RSS-065075-070 |
| 75.00 | 65.00 | 7.70 | 9.00 | 0.00 | 0.00 | RSL-065075-090 |
| 75.00 | 65.00 | 9.00 | 10.00 | 0.00 | 0.00 | RSS-065075-100 |
| 75.00 | 65.00 | 10.00 | 0.00 | 0.00 | 0.00 | RSS-065075-110 |
| 75.00 | 65.00 | 10.00 | 11.00 | 0.00 | 0.00 | RSL-065075-110 |
| 75.00 | 65.00 | 12.00 | 13.00 | 0.00 | 0.00 | TSLA-065075-130 |
| 75.00 | 65.00 | 12.00 | 13.00 | 0.00 | 0.00 | TSL-065075-130 |
| 75.00 | 65.00 | 12.00 | 13.00 | 68.00 | 0.00 | RSS-065075-130 |
| 75.00 | 65.00 | 12.50 | 13.50 | 0.00 | 0.00 | TSL-065075-135 |
| 75.00 | 65.00 | 13.00 | 13.50 | 0.00 | 0.00 | CPI-065075-135 |
| 75.00 | 65.00 | 13.50 | 14.50 | 0.00 | 0.00 | RS-065075-145 |
| 76.00 | 56.00 | 12.00 | 13.00 | 0.00 | 0.00 | RS-056076-130 |
| 76.00 | 56.00 | 13.50 | 14.50 | 0.00 | 0.00 | RS-056076-145 |
| 76.00 | 56.00 | 14.00 | 14.50 | 0.00 | 0.00 | CPI-056076-145 |
| 76.00 | 56.00 | 15.00 | 16.00 | 0.00 | 0.00 | RS-056076-160 |
| 76.00 | 60.00 | 12.00 | 13.00 | 0.00 | 0.00 | RS-060076-130 |
| 76.00 | 66.00 | 8.00 | 9.00 | 69.00 | 0.00 | RSS-066076-090 |
| 76.00 | 68.00 | 8.00 | 9.00 | 0.00 | 0.00 | TSL-068076-090 |
| 76.00 | 70.00 | 5.50 | 6.00 | 0.00 | 0.00 | CP-070076-060 |
| 77.00 | 65.00 | 8.50 | 9.50 | 0.00 | 0.00 | TSL-065077-095 |



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| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
|-------|-------|-------|-------|-------|------|-----------------|
| 77.00 | 65.00 | 9.00 | 9.60 | 0.00 | 0.00 | CP-065077-096 |
| 77.00 | 65.00 | 9.00 | 10.00 | 0.00 | 0.00 | RS-065077-100 |
| 77.00 | 67.00 | 6.00 | 7.00 | 0.00 | 0.00 | RSS-067077-070 |
| 77.00 | 67.00 | 10.00 | 11.00 | 70.00 | 0.00 | RSS-067077-110 |
| 77.00 | 67.00 | 12.00 | 13.00 | 70.00 | 0.00 | RSS-067077-130 |
| 77.50 | 70.00 | 9.00 | 10.00 | 0.00 | 0.00 | RSL-070077-100 |
| 77.70 | 65.00 | 9.50 | 10.50 | 0.00 | 0.00 | RSL-065077-105 |
| 78.00 | 62.00 | 10.00 | 11.00 | 0.00 | 0.00 | RSS-062078-110 |
| 78.00 | 63.00 | 10.00 | 11.00 | 0.00 | 0.00 | RS-063078-110 |
| 78.00 | 63.00 | 10.00 | 11.00 | 67.00 | 0.00 | RSS-063078-110 |
| 78.00 | 63.00 | 11.50 | 12.50 | 0.00 | 0.00 | TSLA-063078-125 |
| 78.00 | 63.00 | 11.50 | 12.50 | 0.00 | 0.00 | TSL-063078-125 |
| 78.00 | 65.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-065078-030 |
| 78.00 | 65.00 | 10.00 | 11.00 | 0.00 | 0.00 | RS-065078-110 |
| 78.00 | 70.00 | 8.00 | 9.00 | 0.00 | 0.00 | TSL-070078-090 |
| 78.00 | 70.00 | 11.50 | 12.50 | 0.00 | 0.00 | RSL-070078-125 |
| 78.00 | 72.00 | 6.00 | 7.00 | 0.00 | 0.00 | TS-072078-070 |
| 79.00 | 70.00 | 13.00 | 14.00 | 0.00 | 0.00 | RSL-070079-140 |
| 79.20 | 65.00 | 11.50 | 12.50 | 0.00 | 0.00 | TSL-065079-125 |
| 80.00 | 55.00 | 12.00 | 13.00 | 60.00 | 0.00 | RSS-055080-130 |
| 80.00 | 55.00 | 15.00 | 17.00 | 60.00 | 0.00 | RSS-055080-170 |
| 80.00 | 60.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-060080-030 |
| 80.00 | 60.00 | 10.00 | 11.00 | 65.00 | 0.00 | RSS-060080-110 |
| 80.00 | 60.00 | 12.00 | 13.00 | 0.00 | 0.00 | TSLA-060080-130 |
| 80.00 | 60.00 | 12.00 | 13.00 | 65.00 | 0.00 | RSS-060080-130 |
| 80.00 | 60.00 | 14.00 | 14.50 | 0.00 | 0.00 | CPI-060080-145 |
| 80.00 | 60.00 | 18.00 | 19.00 | 65.00 | 0.00 | RSS-060080-190 |
| 80.00 | 65.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-065080-030 |
| 80.00 | 65.00 | 9.00 | 10.00 | 0.00 | 0.00 | RS-065080-100 |
| 80.00 | 65.00 | 10.00 | 0.00 | 0.00 | 0.00 | RSS-065080-110 |
| 80.00 | 65.00 | 10.00 | 11.00 | 0.00 | 0.00 | RS-065080-110 |



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| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
|-------|-------|-------|-------|-------|------|-----------------|
| 80.00 | 65.00 | 11.00 | 11.50 | 0.00 | 0.00 | CPI-065080-115 |
| 80.00 | 65.00 | 11.00 | 12.00 | 66.00 | 0.00 | RSS-065080-120 |
| 80.00 | 65.00 | 11.50 | 12.50 | 0.00 | 0.00 | TSLA-065080-125 |
| 80.00 | 65.00 | 12.00 | 13.00 | 0.00 | 0.00 | RS-065080-130 |
| 80.00 | 65.00 | 12.00 | 13.00 | 69.00 | 0.00 | RSS-065080-130 |
| 80.00 | 66.00 | 10.00 | 11.00 | 0.00 | 0.00 | RSL-066080-110 |
| 80.00 | 66.00 | 10.00 | 11.00 | 69.00 | 0.00 | RSS-066080-110 |
| 80.00 | 66.00 | 13.00 | 14.00 | 69.00 | 0.00 | RSS-066080-140 |
| 80.00 | 68.00 | 9.00 | 10.00 | 0.00 | 0.00 | RSS-068080-100 |
| 80.00 | 70.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-070080-030 |
| 80.00 | 70.00 | 5.00 | 6.00 | 73.00 | 0.00 | RSS-070080-060 |
| 80.00 | 70.00 | 6.00 | 7.00 | 0.00 | 0.00 | RSS-070080-070 |
| 80.00 | 70.00 | 6.50 | 0.00 | 0.00 | 0.00 | TSL-070080-075 |
| 80.00 | 70.00 | 7.00 | 8.00 | 0.00 | 0.00 | CPI-070080-080 |
| 80.00 | 70.00 | 8.00 | 9.00 | 73.00 | 0.00 | RSS-070080-090 |
| 80.00 | 70.00 | 10.00 | 11.00 | 0.00 | 0.00 | TSL-070080-110 |
| 80.00 | 70.00 | 10.00 | 11.00 | 73.00 | 0.00 | RSS-070080-110 |
| 80.00 | 70.00 | 11.50 | 0.00 | 0.00 | 0.00 | TSL-070080-125 |
| 80.00 | 70.00 | 12.00 | 0.00 | 0.00 | 0.00 | TSL-070080-130 |
| 80.00 | 70.00 | 12.00 | 13.00 | 0.00 | 0.00 | TSAI-070080-130 |
| 80.00 | 70.00 | 12.00 | 13.00 | 73.00 | 0.00 | RSS-070080-130 |
| 80.00 | 70.00 | 12.50 | 13.00 | 0.00 | 0.00 | CPI-070080-130 |
| 80.00 | 71.00 | 6.00 | 7.00 | 0.00 | 0.00 | RSS-071080-070 |
| 81.00 | 71.00 | 6.00 | 7.00 | 0.00 | 0.00 | RS-071081-070 |
| 82.00 | 66.00 | 12.00 | 13.00 | 0.00 | 0.00 | RSS-066082-130 |
| 82.00 | 70.00 | 9.00 | 10.00 | 0.00 | 0.00 | TSL-070082-100 |
| 82.00 | 74.50 | 9.00 | 10.00 | 0.00 | 0.00 | TSL-074082-100 |
| 83.00 | 63.00 | 12.00 | 0.00 | 0.00 | 0.00 | TSL-063083-130 |
| 83.00 | 63.00 | 12.00 | 13.00 | 0.00 | 0.00 | TSLA-063083-130 |
| 83.00 | 63.00 | 13.50 | 14.00 | 0.00 | 0.00 | CP-063083-140 |
| 83.00 | 63.00 | 13.50 | 14.50 | 0.00 | 0.00 | CPI-063083-145 |



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| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
|-------|-------|-------|-------|-------|------|------------------|
| 83.00 | 70.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-070083-030 |
| 83.00 | 70.00 | 10.00 | 0.00 | 0.00 | 0.00 | TSLA-070083-110 |
| 83.00 | 70.00 | 10.00 | 11.00 | 0.00 | 0.00 | RS-070083-110 |
| 83.00 | 75.00 | 8.00 | 9.00 | 0.00 | 0.00 | TSL-075083-090 |
| 83.00 | 75.00 | 11.50 | 12.50 | 0.00 | 0.00 | RSL-075083-125 |
| 84.00 | 70.00 | 10.00 | 11.00 | 0.00 | 0.00 | RSS-070084-110 |
| 84.00 | 76.00 | 7.50 | 9.00 | 0.00 | 0.00 | TSL-076084-090 |
| 85.00 | 60.00 | 12.50 | 13.50 | 65.00 | 0.00 | RSS-060085-135 |
| 85.00 | 65.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-065085-030 |
| 85.00 | 65.00 | 10.00 | 11.00 | 0.00 | 0.00 | RS-065085-110 |
| 85.00 | 65.00 | 10.00 | 11.00 | 70.00 | 0.00 | RSS-065085-110 |
| 85.00 | 65.00 | 11.50 | 12.50 | 0.00 | 0.00 | RSL-065085-125 |
| 85.00 | 65.00 | 12.00 | 13.00 | 0.00 | 0.00 | RS-065085-130 |
| 85.00 | 65.00 | 12.00 | 13.00 | 70.00 | 0.00 | RSS-065085-130 |
| 85.00 | 65.00 | 13.50 | 14.50 | 0.00 | 0.00 | RS-065085-145 |
| 85.00 | 70.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-070085-030 |
| 85.00 | 70.00 | 9.00 | 10.00 | 0.00 | 0.00 | RS-070085-100 |
| 85.00 | 70.00 | 10.00 | 0.00 | 0.00 | 0.00 | TSL-070085-110 |
| 85.00 | 70.00 | 10.00 | 11.00 | 0.00 | 0.00 | RSS-070085-110 |
| 85.00 | 70.00 | 10.00 | 11.00 | 0.00 | 0.00 | RS-070085-110 |
| 85.00 | 70.00 | 11.50 | 12.50 | 0.00 | 0.00 | TSLA-070085-125H |
| 85.00 | 70.00 | 11.50 | 12.50 | 0.00 | 0.00 | TSLA-070085-125 |
| 85.00 | 70.00 | 11.50 | 12.50 | 0.00 | 0.00 | TSL-070085-125 |
| 85.00 | 70.00 | 12.00 | 13.00 | 0.00 | 0.00 | TSLA-070085-130 |
| 85.00 | 70.00 | 12.00 | 13.00 | 74.00 | 0.00 | RSS-070085-130 |
| 85.00 | 75.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-075085-030 |
| 85.00 | 75.00 | 6.00 | 7.00 | 0.00 | 0.00 | RSS-075085-070 |
| 85.00 | 75.00 | 6.00 | 7.00 | 0.00 | 0.00 | RS-075085-070 |
| 85.00 | 75.00 | 7.00 | 0.00 | 0.00 | 0.00 | RSS-075085-080 |
| 85.00 | 75.00 | 10.00 | 11.00 | 0.00 | 0.00 | RSS-075085-110 |
| 85.00 | 75.00 | 10.00 | 11.00 | 0.00 | 0.00 | CPI-075085-110 |



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| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
|-------|-------|-------|-------|-------|------|-----------------|
| 85.00 | 75.00 | 11.50 | 12.50 | 0.00 | 0.00 | RSL-075085-125 |
| 85.00 | 75.00 | 12.00 | 13.00 | 0.00 | 0.00 | TSLA-075085-130 |
| 85.00 | 75.00 | 12.00 | 13.00 | 78.00 | 0.00 | RSS-075085-130 |
| 86.00 | 77.00 | 14.00 | 15.00 | 0.00 | 0.00 | RSL-077086-150 |
| 86.00 | 78.00 | 11.50 | 12.50 | 0.00 | 0.00 | RSL-078086-125 |
| 86.00 | 78.00 | 13.00 | 14.00 | 0.00 | 0.00 | RSLA-078086-140 |
| 86.00 | 78.00 | 13.50 | 14.50 | 0.00 | 0.00 | RSL-078086-145 |
| 87.00 | 67.00 | 12.00 | 13.00 | 0.00 | 0.00 | RSS-067087-130 |
| 87.00 | 72.00 | 9.00 | 10.00 | 0.00 | 0.00 | RS-072087-100 |
| 87.00 | 77.00 | 12.00 | 13.00 | 0.00 | 0.00 | RSL-077087-130 |
| 87.70 | 79.00 | 8.00 | 9.00 | 0.00 | 0.00 | TSL-079087-090 |
| 88.00 | 75.00 | 0.00 | 13.00 | 0.00 | 0.00 | TSLA-075088-140 |
| 88.00 | 75.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-075088-030 |
| 88.00 | 75.00 | 10.00 | 0.00 | 0.00 | 0.00 | TSLA-075088-110 |
| 88.00 | 75.00 | 10.00 | 11.00 | 0.00 | 0.00 | RS-075088-110 |
| 88.00 | 76.00 | 6.00 | 7.00 | 0.00 | 0.00 | RS-076088-070 |
| 88.00 | 78.00 | 14.30 | 15.00 | 0.00 | 0.00 | RSL-078088-150 |
| 88.00 | 80.00 | 8.00 | 9.00 | 0.00 | 0.00 | TSL-080088-090 |
| 88.00 | 80.00 | 9.00 | 10.00 | 0.00 | 0.00 | TSLA-080088-100 |
| 88.00 | 80.00 | 11.50 | 12.50 | 0.00 | 0.00 | TSL-080088-125 |
| 89.00 | 80.00 | 10.00 | 11.00 | 0.00 | 0.00 | TSL-080089-110 |
| 90.00 | 60.00 | 15.00 | 16.00 | 65.00 | 0.00 | RSS-060090-160 |
| 90.00 | 65.00 | 19.00 | 20.00 | 0.00 | 0.00 | RSS-065090-200 |
| 90.00 | 70.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-070090-030 |
| 90.00 | 70.00 | 10.00 | 11.00 | 0.00 | 0.00 | RSS-070090-110 |
| 90.00 | 70.00 | 12.00 | 13.00 | 0.00 | 0.00 | RS-070090-130 |
| 90.00 | 70.00 | 12.00 | 13.00 | 75.00 | 0.00 | RSS-070090-130 |
| 90.00 | 70.00 | 14.00 | 14.50 | 0.00 | 0.00 | CPI-070090-145 |
| 90.00 | 70.00 | 14.00 | 14.50 | 0.00 | 0.00 | CP-070090-145 |
| 90.00 | 70.00 | 15.00 | 16.00 | 0.00 | 0.00 | RS-070090-160 |
| 90.00 | 70.00 | 18.00 | 19.00 | 75.00 | 0.00 | RSS-070090-190 |



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| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
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| 90.00 | 75.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-075090-030 |
| 90.00 | 75.00 | 7.00 | 8.00 | 0.00 | 0.00 | RSS-075090-080 |
| 90.00 | 75.00 | 7.50 | 8.50 | 79.00 | 0.00 | RSS-075090-085 |
| 90.00 | 75.00 | 9.00 | 0.00 | 0.00 | 0.00 | TSL-075090-100 |
| 90.00 | 75.00 | 9.00 | 10.00 | 0.00 | 0.00 | RS-075090-100 |
| 90.00 | 75.00 | 10.00 | 11.00 | 0.00 | 0.00 | RS-075090-110 |
| 90.00 | 75.00 | 10.00 | 11.00 | 79.00 | 0.00 | RSS-075090-110 |
| 90.00 | 75.00 | 11.00 | 11.50 | 0.00 | 0.00 | CPI-075090-115 |
| 90.00 | 75.00 | 11.40 | 12.50 | 0.00 | 0.00 | TSLA-075090-125 |
| 90.00 | 75.00 | 12.00 | 13.00 | 0.00 | 0.00 | TSLA-075090-130 |
| 90.00 | 75.00 | 12.00 | 13.00 | 79.00 | 0.00 | RSS-075090-130 |
| 90.00 | 80.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-080090-030 |
| 90.00 | 80.00 | 4.50 | 5.50 | 0.00 | 0.00 | RSS-080090-055 |
| 90.00 | 80.00 | 6.00 | 7.00 | 0.00 | 0.00 | RSS-080090-070 |
| 90.00 | 80.00 | 6.00 | 7.00 | 0.00 | 0.00 | RS-080090-070 |
| 90.00 | 80.00 | 7.50 | 8.00 | 0.00 | 0.00 | CP-080090-080 |
| 90.00 | 80.00 | 8.00 | 9.00 | 0.00 | 0.00 | RSS-080090-090 |
| 90.00 | 80.00 | 10.00 | 11.00 | 0.00 | 0.00 | RS-080090-110 |
| 90.00 | 80.00 | 10.00 | 11.00 | 83.00 | 0.00 | RSS-080090-110 |
| 90.00 | 80.00 | 12.00 | 13.00 | 0.00 | 0.00 | TSL-080090-130 |
| 90.00 | 80.00 | 12.00 | 13.00 | 83.00 | 0.00 | RSS-080090-130 |
| 90.00 | 80.00 | 14.00 | 15.00 | 0.00 | 0.00 | TS-080090-150 |
| 92.00 | 76.00 | 12.00 | 13.00 | 0.00 | 0.00 | RSS-076092-130 |
| 92.00 | 77.00 | 9.00 | 10.00 | 0.00 | 0.00 | RS-077092-100 |
| 92.00 | 80.00 | 9.00 | 9.60 | 0.00 | 0.00 | TSL-080092-096 |
| 92.00 | 82.00 | 10.00 | 11.00 | 85.00 | 0.00 | RSS-082092-110 |
| 92.00 | 84.00 | 5.00 | 6.00 | 0.00 | 0.00 | CP-084092-060 |
| 92.00 | 86.00 | 6.00 | 7.00 | 0.00 | 0.00 | TS-086092-070 |
| 92.50 | 85.00 | 9.00 | 10.00 | 0.00 | 0.00 | RSL-085092-100 |
| 93.00 | 78.00 | 10.50 | 11.50 | 0.00 | 0.00 | TS-078093-115 |
| 93.00 | 78.00 | 10.50 | 11.50 | 82.00 | 0.00 | RSS-078093-115 |



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| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
|-------|-------|-------|-------|-------|-----------|-----------------|
| 93.00 | 80.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-080093-030 |
| 93.00 | 80.00 | 10.00 | 11.00 | 0.00 | 0.00 | RS-080093-110 |
| 93.00 | 85.00 | 6.50 | 7.50 | 0.00 | 0.00 | RS-085093-075 |
| 93.00 | 85.00 | 8.00 | 9.00 | 0.00 | 0.00 | TS-085093-090 |
| 93.00 | 85.00 | 8.00 | 9.00 | 0.00 | 0.00 | TSL-085093-090 |
| 93.00 | 85.00 | 10.00 | 11.00 | 0.00 | 0.00 | RSL-085093-110 |
| 94.00 | 84.50 | 8.00 | 8.80 | 89.50 | 0.00 | RSS-084094-088 |
| 95.00 | 69.00 | 10.00 | 0.00 | 0.00 | 0.00 | 19M-069095-100 |
| 95.00 | 70.00 | 12.00 | 13.00 | 75.00 | 0.00 | RSS-070095-130 |
| 95.00 | 75.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-075095-030 |
| 95.00 | 75.00 | 12.00 | 13.00 | 0.00 | 0.00 | RS-075095-130 |
| 95.00 | 75.00 | 12.00 | 13.00 | 80.00 | 0.00 | RSS-075095-130 |
| 95.00 | 75.00 | 13.50 | 14.50 | 0.00 | 75,095.00 | RSS-075095-145 |
| 95.00 | 75.00 | 14.00 | 14.50 | 0.00 | 0.00 | CPI-075095-145 |
| 95.00 | 80.00 | 0.00 | 0.00 | 0.00 | 0.00 | TSLA-080095-100 |
| 95.00 | 80.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-080095-030 |
| 95.00 | 80.00 | 8.00 | 0.00 | 0.00 | 0.00 | RSS-080095-090 |
| 95.00 | 80.00 | 9.00 | 10.00 | 0.00 | 0.00 | RS-080095-100 |
| 95.00 | 80.00 | 10.00 | 11.00 | 0.00 | 0.00 | RS-080095-110 |
| 95.00 | 80.00 | 11.40 | 0.00 | 0.00 | 0.00 | TSL-080095-125 |
| 95.00 | 80.00 | 11.50 | 12.50 | 0.00 | 0.00 | TSLA-080095-125 |
| 95.00 | 80.00 | 11.50 | 12.50 | 0.00 | 0.00 | RS-080095-125 |
| 95.00 | 80.00 | 11.70 | 13.00 | 0.00 | 0.00 | TSL-080095-130 |
| 95.00 | 80.00 | 12.00 | 12.50 | 0.00 | 0.00 | CPI-080095-125 |
| 95.00 | 80.00 | 12.00 | 13.00 | 84.00 | 0.00 | RSS-080095-130 |
| 95.00 | 85.00 | 5.00 | 0.00 | 0.00 | 0.00 | RSS-085095-055 |
| 95.00 | 85.00 | 7.00 | 8.00 | 0.00 | 0.00 | TSL-085095-080 |
| 95.00 | 85.00 | 7.50 | 8.00 | 0.00 | 0.00 | CPI-085095-080 |
| 95.00 | 85.00 | 7.50 | 8.00 | 0.00 | 0.00 | CP-085095-080 |
| 95.00 | 85.00 | 8.50 | 9.50 | 88.00 | 0.00 | RSS-085095-095 |
| 95.00 | 85.00 | 12.00 | 13.00 | 0.00 | 0.00 | TSL-085095-130 |





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| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
|--------|-------|-------|-------|-------|-----------|-----------------|
| 95.00 | 85.00 | 12.00 | 13.00 | 88.00 | 0.00 | RSS-085095-130 |
| 96.00 | 80.00 | 9.50 | 10.50 | 0.00 | 0.00 | TSLA-080096-105 |
| 96.00 | 80.00 | 9.50 | 10.50 | 0.00 | 0.00 | TSL-080096-105 |
| 96.00 | 88.00 | 7.50 | 8.50 | 0.00 | 0.00 | TSL-088096-085 |
| 96.00 | 88.00 | 8.00 | 9.00 | 0.00 | 0.00 | TS-088096-090 |
| 96.00 | 90.00 | 4.80 | 5.50 | 0.00 | 0.00 | TS-090096-055 |
| 96.50 | 76.50 | 12.00 | 13.00 | 0.00 | 76,096.00 | RSS-076096-130 |
| 96.50 | 88.50 | 11.50 | 12.50 | 0.00 | 0.00 | RSL-088096-125 |
| 97.00 | 85.00 | 8.50 | 9.50 | 0.00 | 0.00 | TSL-085097-095 |
| 97.00 | 89.50 | 9.00 | 10.00 | 0.00 | 0.00 | TSL-089097-100 |
| 97.50 | 82.50 | 12.00 | 13.00 | 0.00 | 0.00 | TSL-082097-130 |
| 98.00 | 90.00 | 8.00 | 9.00 | 0.00 | 0.00 | TSL-090098-090 |
| 98.00 | 90.00 | 11.50 | 12.50 | 0.00 | 0.00 | RSL-090098-125 |
| 99.00 | 91.00 | 7.50 | 9.00 | 0.00 | 0.00 | TSL-091099-090 |
| 100.00 | 80.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-080100-030 |
| 100.00 | 80.00 | 9.50 | 10.50 | 0.00 | 80,100.00 | RSS-080100-105 |
| 100.00 | 80.00 | 10.00 | 0.00 | 0.00 | 0.00 | RSS-080100-110 |
| 100.00 | 80.00 | 11.50 | 12.50 | 0.00 | 0.00 | TSLA-080100-125 |
| 100.00 | 80.00 | 12.00 | 13.00 | 0.00 | 0.00 | RS-080100-130 |
| 100.00 | 80.00 | 12.00 | 13.00 | 85.00 | 0.00 | RSS-080100-130 |
| 100.00 | 80.00 | 13.50 | 14.50 | 0.00 | 0.00 | TSLA-080100-145 |
| 100.00 | 80.00 | 14.00 | 14.50 | 0.00 | 0.00 | CPI-080100-145 |
| 100.00 | 85.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-085100-030 |
| 100.00 | 85.00 | 9.00 | 10.00 | 0.00 | 0.00 | RS-085100-100 |
| 100.00 | 85.00 | 9.00 | 10.00 | 89.00 | 0.00 | RSS-085100-100 |
| 100.00 | 85.00 | 10.00 | 11.00 | 0.00 | 0.00 | RS-085100-110 |
| 100.00 | 85.00 | 11.40 | 12.50 | 0.00 | 0.00 | TSLA-085100-125 |
| 100.00 | 85.00 | 11.50 | 12.00 | 0.00 | 0.00 | CPI-085100-120 |
| 100.00 | 85.00 | 12.00 | 13.00 | 0.00 | 0.00 | RS-085100-130 |
| 100.00 | 85.00 | 12.00 | 13.00 | 89.00 | 0.00 | RSS-085100-130 |
| 100.00 | 88.00 | 9.00 | 10.00 | 0.00 | 0.00 | RSS-088100-100 |



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| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
|--------|-------|-------|-------|-------|------|-----------------|
| 100.00 | 90.00 | 6.50 | 7.50 | 0.00 | 0.00 | TSL-090100-075 |
| 100.00 | 90.00 | 7.00 | 8.00 | 93.00 | 0.00 | RSS-090100-080 |
| 100.00 | 90.00 | 8.00 | 9.00 | 93.00 | 0.00 | RSS-090100-090 |
| 100.00 | 90.00 | 9.00 | 10.00 | 0.00 | 0.00 | RSL-090100-100 |
| 100.00 | 90.00 | 10.00 | 11.00 | 0.00 | 0.00 | CPI-090100-110 |
| 100.00 | 90.00 | 11.50 | 12.50 | 0.00 | 0.00 | RSL-090100-125 |
| 100.00 | 90.00 | 12.00 | 13.00 | 93.00 | 0.00 | RSS-090100-130 |
| 101.00 | 86.00 | 12.00 | 13.00 | 0.00 | 0.00 | TSL-086101-130 |
| 101.00 | 93.00 | 11.50 | 12.50 | 0.00 | 0.00 | RSL-093101-125 |
| 102.00 | 90.00 | 9.00 | 10.00 | 0.00 | 0.00 | TSL-090102-100 |
| 103.00 | 95.00 | 8.00 | 9.00 | 0.00 | 0.00 | TSL-095103-090 |
| 103.00 | 95.00 | 11.50 | 12.50 | 0.00 | 0.00 | RSL-095103-125 |
| 104.00 | 93.00 | 10.00 | 11.00 | 0.00 | 0.00 | RS-093104-110 |
| 104.00 | 95.00 | 10.00 | 11.00 | 0.00 | 0.00 | TSL-095104-110 |
| 105.00 | 80.00 | 12.00 | 13.00 | 0.00 | 0.00 | RSS-080105-130 |
| 105.00 | 80.00 | 15.00 | 16.00 | 0.00 | 0.00 | RSS-080105-160 |
| 105.00 | 85.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-085105-030 |
| 105.00 | 85.00 | 12.00 | 13.00 | 0.00 | 0.00 | TSLA-085105-130 |
| 105.00 | 85.00 | 12.00 | 13.00 | 0.00 | 0.00 | RS-085105-130 |
| 105.00 | 85.00 | 12.00 | 13.00 | 90.00 | 0.00 | RSS-085105-130 |
| 105.00 | 85.00 | 13.50 | 14.50 | 0.00 | 0.00 | TSLA-085105-145 |
| 105.00 | 85.00 | 13.50 | 14.50 | 0.00 | 0.00 | CPI-085105-145 |
| 105.00 | 90.00 | 2.00 | 0.00 | 0.00 | 0.00 | 19M-090105-020 |
| 105.00 | 90.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-090105-030 |
| 105.00 | 90.00 | 8.50 | 9.50 | 0.00 | 0.00 | CP-090105-095 |
| 105.00 | 90.00 | 8.50 | 9.50 | 0.00 | 0.00 | TSLA-090105-095 |
| 105.00 | 90.00 | 8.50 | 9.50 | 0.00 | 0.00 | CPI-090105-095 |
| 105.00 | 90.00 | 9.00 | 9.50 | 0.00 | 0.00 | CP-090105-095 |
| 105.00 | 90.00 | 9.00 | 10.00 | 0.00 | 0.00 | RSS-090105-100 |
| 105.00 | 90.00 | 9.00 | 10.00 | 0.00 | 0.00 | RS-090105-100 |
| 105.00 | 90.00 | 11.50 | 0.00 | 0.00 | 0.00 | TSL-090105-125 |



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| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
|--------|--------|-------|-------|-------|------|-----------------|
| 105.00 | 90.00 | 11.50 | 12.50 | 0.00 | 0.00 | TSLA-090105-125 |
| 105.00 | 90.00 | 12.00 | 13.00 | 0.00 | 0.00 | TSLA-090105-130 |
| 105.00 | 90.00 | 12.00 | 13.00 | 94.00 | 0.00 | RSS-090105-130 |
| 105.00 | 95.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-095105-030 |
| 105.00 | 95.00 | 8.70 | 9.50 | 0.00 | 0.00 | RSL-095105-095 |
| 105.00 | 95.00 | 10.00 | 11.00 | 0.00 | 0.00 | RS-095105-110 |
| 105.00 | 97.00 | 11.50 | 12.50 | 0.00 | 0.00 | RSL-097105-125 |
| 105.00 | 97.00 | 13.00 | 14.00 | 0.00 | 0.00 | RSLA-097105-140 |
| 105.00 | 97.00 | 13.50 | 14.50 | 0.00 | 0.00 | RSL-097105-145 |
| 105.00 | 125.00 | 15.00 | 16.00 | 0.00 | 0.00 | RS-105125-160 |
| 106.00 | 97.00 | 14.00 | 15.00 | 0.00 | 0.00 | RSL-097106-150 |
| 108.00 | 100.00 | 11.50 | 12.50 | 0.00 | 0.00 | TSL-100108-125 |
| 109.00 | 99.00 | 12.00 | 13.00 | 0.00 | 0.00 | RSL-099109-130 |
| 109.00 | 99.00 | 14.30 | 15.00 | 0.00 | 0.00 | RSL-099109-150 |
| 110.00 | 90.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-090110-030 |
| 110.00 | 90.00 | 10.00 | 11.00 | 0.00 | 0.00 | RSS-090110-110 |
| 110.00 | 90.00 | 11.50 | 12.50 | 0.00 | 0.00 | CPI-090110-125 |
| 110.00 | 90.00 | 12.00 | 13.00 | 0.00 | 0.00 | TSLA-090110-130 |
| 110.00 | 90.00 | 12.00 | 13.00 | 0.00 | 0.00 | RS-090110-130 |
| 110.00 | 90.00 | 12.00 | 13.00 | 95.00 | 0.00 | RSS-090110-130 |
| 110.00 | 90.00 | 13.00 | 14.00 | 0.00 | 0.00 | RS-090110-140 |
| 110.00 | 90.00 | 14.00 | 15.00 | 0.00 | 0.00 | TSL-090110-150 |
| 110.00 | 90.00 | 15.00 | 0.00 | 0.00 | 0.00 | RSS-090110-160 |
| 110.00 | 90.00 | 15.00 | 16.00 | 0.00 | 0.00 | RSLA-090110-160 |
| 110.00 | 90.00 | 15.00 | 16.00 | 0.00 | 0.00 | RS-090110-160 |
| 110.00 | 90.00 | 18.00 | 19.00 | 95.00 | 0.00 | RSS-090110-190 |
| 110.00 | 95.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-095110-030 |
| 110.00 | 95.00 | 9.00 | 10.00 | 0.00 | 0.00 | RSS-095110-100 |
| 110.00 | 95.00 | 9.00 | 10.00 | 0.00 | 0.00 | RS-095110-100 |
| 110.00 | 95.00 | 10.00 | 11.00 | 0.00 | 0.00 | RS-095110-110 |
| 110.00 | 95.00 | 11.40 | 12.50 | 0.00 | 0.00 | TSLA-095110-125 |



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| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
|--------|--------|-------|-------|--------|------|-----------------|
| 110.00 | 95.00 | 12.00 | 13.00 | 99.00 | 0.00 | RSS-095110-130 |
| 110.00 | 95.00 | 15.00 | 16.00 | 99.00 | 0.00 | RSS-095110-160 |
| 110.00 | 100.00 | 6.00 | 7.00 | 0.00 | 0.00 | RSS-100110-070 |
| 110.00 | 100.00 | 8.00 | 9.00 | 0.00 | 0.00 | RSS-100110-090 |
| 110.00 | 100.00 | 10.00 | 11.00 | 0.00 | 0.00 | RSL-100110-110 |
| 110.00 | 100.00 | 11.50 | 12.50 | 0.00 | 0.00 | RSL-100110-125 |
| 110.00 | 100.00 | 12.50 | 13.50 | 0.00 | 0.00 | TSLA-100110-135 |
| 110.00 | 100.00 | 14.00 | 15.00 | 0.00 | 0.00 | RS-100110-150 |
| 110.00 | 102.00 | 8.00 | 9.00 | 0.00 | 0.00 | TSL-102110-090 |
| 111.00 | 101.00 | 6.50 | 7.00 | 0.00 | 0.00 | CP-101111-070 |
| 112.00 | 95.00 | 11.00 | 12.00 | 0.00 | 0.00 | TSL-095112-120 |
| 112.00 | 95.00 | 11.00 | 12.00 | 99.00 | 0.00 | RSS-095112-120 |
| 112.00 | 95.00 | 11.50 | 12.50 | 0.00 | 0.00 | TS-095112-125 |
| 112.00 | 97.00 | 9.00 | 10.00 | 0.00 | 0.00 | RS-097112-100 |
| 112.00 | 98.00 | 9.00 | 10.00 | 0.00 | 0.00 | RSS-098112-100 |
| 112.00 | 104.50 | 9.00 | 10.00 | 0.00 | 0.00 | TSL-104112-100 |
| 113.00 | 98.00 | 9.00 | 10.00 | 0.00 | 0.00 | RS-098113-100 |
| 113.00 | 105.00 | 8.00 | 9.00 | 0.00 | 0.00 | TSL-105113-090 |
| 113.00 | 105.00 | 10.00 | 11.00 | 0.00 | 0.00 | RSL-105113-110 |
| 113.00 | 105.00 | 11.50 | 12.50 | 0.00 | 0.00 | RSL-105113-125 |
| 113.00 | 105.00 | 13.50 | 14.50 | 0.00 | 0.00 | RSL-105113-145 |
| 115.00 | 90.00 | 15.00 | 16.00 | 95.00 | 0.00 | RSS-090115-160 |
| 115.00 | 95.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-095115-030 |
| 115.00 | 95.00 | 12.00 | 13.00 | 0.00 | 0.00 | RS-095115-130 |
| 115.00 | 95.00 | 12.00 | 13.00 | 104.00 | 0.00 | RSS-095115-130 |
| 115.00 | 95.00 | 13.50 | 14.50 | 0.00 | 0.00 | TSLA-095115-145 |
| 115.00 | 95.00 | 18.00 | 19.00 | 100.00 | 0.00 | RSS-095115-190 |
| 115.00 | 100.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-100115-030 |
| 115.00 | 100.00 | 7.00 | 8.00 | 0.00 | 0.00 | RSS-100115-080 |
| 115.00 | 100.00 | 9.00 | 10.00 | 0.00 | 0.00 | RSS-100115-100 |
| 115.00 | 100.00 | 9.00 | 10.00 | 0.00 | 0.00 | RS-100115-100 |



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| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
|--------|--------|-------|-------|--------|------|-----------------|
| 115.00 | 100.00 | 10.00 | 11.00 | 0.00 | 0.00 | RS-100115-110 |
| 115.00 | 100.00 | 11.00 | 11.50 | 0.00 | 0.00 | CPI-100115-115 |
| 115.00 | 100.00 | 11.40 | 12.50 | 0.00 | 0.00 | TSLA-100115-125 |
| 115.00 | 100.00 | 11.50 | 12.50 | 0.00 | 0.00 | TSL-100115-125 |
| 115.00 | 100.00 | 12.00 | 0.00 | 0.00 | 0.00 | TSL-100115-130 |
| 115.00 | 100.00 | 12.00 | 13.00 | 105.00 | 0.00 | RSS-100115-130 |
| 115.00 | 100.00 | 14.30 | 16.00 | 0.00 | 0.00 | TSLA-100115-160 |
| 115.00 | 105.00 | 10.00 | 11.00 | 0.00 | 0.00 | RS-105115-110 |
| 115.00 | 105.00 | 10.50 | 11.00 | 0.00 | 0.00 | CPI-105115-110 |
| 115.00 | 105.00 | 11.50 | 12.50 | 0.00 | 0.00 | RSL-105115-125 |
| 115.00 | 105.00 | 13.50 | 14.50 | 0.00 | 0.00 | RS-105115-145 |
| 115.00 | 107.00 | 7.50 | 9.00 | 0.00 | 0.00 | TSL-107115-090 |
| 116.00 | 108.00 | 8.00 | 9.00 | 0.00 | 0.00 | TSL-108116-090 |
| 118.00 | 98.00 | 10.00 | 11.00 | 0.00 | 0.00 | RS-098118-110 |
| 118.00 | 110.00 | 11.50 | 12.50 | 0.00 | 0.00 | RSL-110118-125 |
| 119.00 | 110.00 | 10.00 | 11.00 | 0.00 | 0.00 | TSL-110119-110 |
| 120.00 | 100.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-100120-030 |
| 120.00 | 100.00 | 10.00 | 11.00 | 0.00 | 0.00 | RSS-100120-110 |
| 120.00 | 100.00 | 12.00 | 13.00 | 0.00 | 0.00 | RS-100120-130 |
| 120.00 | 100.00 | 12.00 | 13.00 | 105.00 | 0.00 | RSS-100120-130 |
| 120.00 | 100.00 | 13.50 | 14.50 | 0.00 | 0.00 | TSLA-100120-145 |
| 120.00 | 100.00 | 14.50 | 16.00 | 0.00 | 0.00 | TSLA-100120-160 |
| 120.00 | 100.00 | 15.00 | 16.00 | 0.00 | 0.00 | RS-100120-160 |
| 120.00 | 105.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-105120-030 |
| 120.00 | 105.00 | 8.00 | 9.00 | 109.00 | 0.00 | RSS-105120-090 |
| 120.00 | 105.00 | 9.00 | 10.00 | 0.00 | 0.00 | RS-105120-100 |
| 120.00 | 105.00 | 10.00 | 11.00 | 0.00 | 0.00 | RS-105120-110 |
| 120.00 | 105.00 | 11.50 | 12.00 | 0.00 | 0.00 | CP-105120-120 |
| 120.00 | 105.00 | 11.50 | 12.50 | 0.00 | 0.00 | CP-105120-125 |
| 120.00 | 105.00 | 12.00 | 0.00 | 0.00 | 0.00 | TSLA-105120-130 |
| 120.00 | 105.00 | 12.00 | 13.00 | 0.00 | 0.00 | EUS-105120-130 |



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| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
|--------|--------|-------|-------|--------|------------|-----------------|
| 120.00 | 105.00 | 15.00 | 16.00 | 109.00 | 0.00 | RSS-105120-160 |
| 120.00 | 106.00 | 8.50 | 9.50 | 111.00 | 0.00 | RSS-106120-095 |
| 120.00 | 110.00 | 13.50 | 14.50 | 0.00 | 0.00 | TSLA-110120-145 |
| 121.00 | 111.00 | 5.50 | 6.50 | 0.00 | 0.00 | RSS-111121-065 |
| 122.00 | 112.00 | 10.00 | 11.00 | 0.00 | 0.00 | RSL-112122-110 |
| 123.00 | 108.00 | 12.00 | 13.00 | 0.00 | 0.00 | CPI-108123-130 |
| 123.00 | 113.00 | 8.70 | 9.50 | 0.00 | 0.00 | RSL-113123-095 |
| 123.00 | 115.00 | 8.00 | 9.00 | 0.00 | 0.00 | TSL-115123-090 |
| 124.70 | 116.00 | 8.00 | 9.00 | 0.00 | 0.00 | TSL-116124-090 |
| 125.00 | 100.00 | 12.00 | 13.00 | 105.00 | 0.00 | RSS-100125-130 |
| 125.00 | 100.00 | 15.00 | 16.00 | 105.00 | 0.00 | RSS-100125-160 |
| 125.00 | 100.00 | 19.00 | 20.00 | 0.00 | 0.00 | RS-100125-200 |
| 125.00 | 100.00 | 19.00 | 20.00 | 0.00 | 100,125.00 | CP-100125-200 |
| 125.00 | 105.00 | 11.50 | 12.50 | 0.00 | 0.00 | CPI-105125-125 |
| 125.00 | 105.00 | 12.00 | 13.00 | 0.00 | 0.00 | TSLA-105125-130 |
| 125.00 | 105.00 | 12.00 | 13.00 | 0.00 | 0.00 | RS-105125-130 |
| 125.00 | 105.00 | 12.00 | 13.00 | 114.00 | 0.00 | RSS-105125-130 |
| 125.00 | 105.00 | 14.50 | 16.00 | 0.00 | 0.00 | RSLA-105125-160 |
| 125.00 | 105.00 | 15.00 | 16.00 | 110.00 | 0.00 | RSS-105125-160 |
| 125.00 | 110.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-110125-030 |
| 125.00 | 110.00 | 9.00 | 10.00 | 0.00 | 0.00 | RSS-110125-100 |
| 125.00 | 110.00 | 9.00 | 10.00 | 0.00 | 0.00 | RS-110125-100 |
| 125.00 | 110.00 | 10.00 | 11.00 | 0.00 | 0.00 | RS-110125-110 |
| 125.00 | 110.00 | 11.30 | 12.00 | 0.00 | 0.00 | TSL-110125-120 |
| 125.00 | 110.00 | 11.50 | 12.00 | 0.00 | 0.00 | CPI-110125-120 |
| 125.00 | 110.00 | 12.00 | 13.00 | 0.00 | 0.00 | TSLA-110125-130 |
| 125.00 | 110.00 | 12.00 | 13.00 | 114.00 | 0.00 | RSS-110125-130 |
| 125.00 | 110.00 | 15.00 | 16.00 | 0.00 | 0.00 | RS-110125-160 |
| 125.00 | 110.00 | 15.00 | 16.00 | 110.00 | 0.00 | RSS-110125-160 |
| 125.00 | 112.00 | 9.00 | 10.00 | 0.00 | 0.00 | RSS-112125-100 |
| 125.00 | 112.00 | 9.00 | 10.00 | 0.00 | 0.00 | RS-112125-100 |



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| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
|--------|--------|-------|-------|--------|------|-----------------|
| 125.00 | 113.00 | 9.50 | 10.50 | 116.00 | 0.00 | RSS-113125-105 |
| 125.00 | 115.00 | 8.00 | 9.00 | 0.00 | 0.00 | RSS-115125-090 |
| 125.00 | 115.00 | 12.00 | 13.00 | 0.00 | 0.00 | RSL-115125-130 |
| 125.00 | 115.00 | 14.00 | 15.00 | 0.00 | 0.00 | RSL-115125-150 |
| 126.00 | 106.00 | 16.00 | 17.00 | 0.00 | 0.00 | RSS-106126-170 |
| 126.00 | 115.00 | 15.00 | 16.00 | 118.00 | 0.00 | RSS-115126-160 |
| 126.00 | 117.00 | 14.00 | 15.00 | 0.00 | 0.00 | RSL-117126-150 |
| 126.00 | 118.00 | 11.50 | 12.50 | 0.00 | 0.00 | RSL-118126-125 |
| 126.00 | 118.00 | 13.00 | 14.00 | 0.00 | 0.00 | RSLA-118126-140 |
| 126.00 | 118.00 | 13.50 | 14.50 | 0.00 | 0.00 | RSL-118126-145 |
| 127.00 | 119.50 | 9.00 | 10.00 | 0.00 | 0.00 | TSL-119127-100 |
| 128.00 | 120.00 | 11.50 | 12.50 | 0.00 | 0.00 | TSL-120128-125 |
| 130.00 | 104.00 | 19.00 | 19.50 | 0.00 | 0.00 | CP-104130-195 |
| 130.00 | 110.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-110130-030 |
| 130.00 | 110.00 | 10.00 | 11.00 | 0.00 | 0.00 | RS-110130-110 |
| 130.00 | 110.00 | 11.50 | 12.50 | 0.00 | 0.00 | TSLA-110130-125 |
| 130.00 | 110.00 | 12.00 | 13.00 | 0.00 | 0.00 | RSS-110130-130 |
| 130.00 | 110.00 | 12.00 | 13.00 | 0.00 | 0.00 | TSLA-110130-130 |
| 130.00 | 110.00 | 12.00 | 13.00 | 0.00 | 0.00 | RS-110130-130 |
| 130.00 | 110.00 | 13.00 | 14.00 | 0.00 | 0.00 | TSLA-110130-140 |
| 130.00 | 110.00 | 13.00 | 14.00 | 0.00 | 0.00 | RS-110130-140 |
| 130.00 | 110.00 | 14.50 | 16.00 | 0.00 | 0.00 | TSLA-110130-160 |
| 130.00 | 110.00 | 15.00 | 16.00 | 0.00 | 0.00 | RS-110130-160 |
| 130.00 | 110.00 | 16.00 | 17.00 | 0.00 | 0.00 | RS-110130-170 |
| 130.00 | 110.00 | 18.00 | 19.00 | 115.00 | 0.00 | RSS-110130-190 |
| 130.00 | 115.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-115130-030 |
| 130.00 | 115.00 | 9.00 | 10.00 | 0.00 | 0.00 | RS-115130-100 |
| 130.00 | 115.00 | 10.00 | 11.00 | 0.00 | 0.00 | RSL-115130-110 |
| 130.00 | 115.00 | 11.00 | 12.00 | 0.00 | 0.00 | RS-115130-120 |
| 130.00 | 115.00 | 11.00 | 12.00 | 0.00 | 0.00 | RSS-115130-120 |
| 130.00 | 115.00 | 14.50 | 16.00 | 0.00 | 0.00 | TSLA-115130-160 |



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| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
|--------|--------|-------|-------|--------|------|-----------------|
| 130.00 | 115.00 | 14.50 | 16.00 | 0.00 | 0.00 | RSL-115130-160 |
| 130.00 | 115.00 | 16.00 | 17.00 | 0.00 | 0.00 | TSLA-115130-170 |
| 130.00 | 118.00 | 12.00 | 12.50 | 0.00 | 0.00 | CP-118130-125 |
| 130.00 | 120.00 | 7.20 | 8.00 | 0.00 | 0.00 | TSL-120130-080 |
| 130.00 | 120.00 | 7.50 | 8.00 | 0.00 | 0.00 | CP-120130-080 |
| 130.00 | 120.00 | 11.50 | 12.50 | 0.00 | 0.00 | RSL-120130-125 |
| 130.00 | 120.00 | 12.00 | 13.00 | 0.00 | 0.00 | RSL-120130-130 |
| 130.00 | 120.00 | 14.00 | 15.00 | 123.00 | 0.00 | RSS-120130-150 |
| 130.00 | 120.00 | 14.30 | 15.00 | 0.00 | 0.00 | RSL-120130-150 |
| 132.00 | 112.00 | 15.00 | 16.00 | 0.00 | 0.00 | RS-112132-160 |
| 132.00 | 112.00 | 16.00 | 17.00 | 0.00 | 0.00 | RSS-112132-170 |
| 132.00 | 120.00 | 10.00 | 11.00 | 0.00 | 0.00 | RS-120132-110 |
| 133.00 | 118.00 | 9.00 | 10.00 | 0.00 | 0.00 | RS-118133-100 |
| 133.00 | 121.00 | 7.50 | 8.00 | 0.00 | 0.00 | CP-121133-080 |
| 133.00 | 125.00 | 8.00 | 9.00 | 0.00 | 0.00 | TSL-125133-090 |
| 133.00 | 125.00 | 11.50 | 12.50 | 0.00 | 0.00 | RSL-125133-125 |
| 134.00 | 126.00 | 7.50 | 8.00 | 0.00 | 0.00 | CP-126134-080 |
| 134.00 | 126.00 | 8.00 | 9.00 | 0.00 | 0.00 | TSL-126134-090 |
| 135.00 | 110.00 | 14.50 | 16.00 | 0.00 | 0.00 | RSL-110135-160 |
| 135.00 | 110.00 | 15.00 | 15.50 | 0.00 | 0.00 | CPI-110135-155 |
| 135.00 | 110.00 | 18.00 | 19.00 | 0.00 | 0.00 | RSS-110135-190 |
| 135.00 | 110.00 | 19.00 | 20.00 | 0.00 | 0.00 | RS-110135-200 |
| 135.00 | 115.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-115135-030 |
| 135.00 | 115.00 | 12.00 | 13.00 | 0.00 | 0.00 | RS-115135-130 |
| 135.00 | 115.00 | 13.50 | 14.50 | 0.00 | 0.00 | RSS-115135-145 |
| 135.00 | 115.00 | 15.00 | 16.00 | 118.00 | 0.00 | RSS-115135-160 |
| 135.00 | 120.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-120135-030 |
| 135.00 | 120.00 | 9.00 | 10.00 | 0.00 | 0.00 | RSS-120135-100 |
| 135.00 | 120.00 | 9.00 | 10.00 | 0.00 | 0.00 | RS-120135-100 |
| 135.00 | 120.00 | 10.00 | 11.00 | 0.00 | 0.00 | RS-120135-110 |
| 135.00 | 120.00 | 11.50 | 12.50 | 0.00 | 0.00 | RS-120135-125 |



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| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
|--------|--------|-------|-------|--------|------|-----------------|
| 135.00 | 120.00 | 12.00 | 12.50 | 0.00 | 0.00 | CPI-120135-125 |
| 135.00 | 120.00 | 12.20 | 13.00 | 0.00 | 0.00 | CPI-120135-130 |
| 135.00 | 120.00 | 15.00 | 16.00 | 0.00 | 0.00 | TS-120135-160 |
| 135.00 | 120.00 | 15.00 | 16.00 | 124.00 | 0.00 | RSS-120135-160 |
| 135.00 | 121.00 | 9.00 | 10.00 | 0.00 | 0.00 | RSL-121135-100 |
| 135.00 | 125.00 | 10.00 | 11.00 | 0.00 | 0.00 | RSL-125135-110 |
| 135.00 | 125.00 | 13.50 | 14.50 | 0.00 | 0.00 | RS-125135-145 |
| 136.00 | 128.00 | 11.50 | 12.50 | 0.00 | 0.00 | RSL-128136-125 |
| 138.00 | 130.00 | 11.50 | 12.50 | 0.00 | 0.00 | RSL-130138-125 |
| 139.70 | 127.00 | 9.20 | 10.00 | 0.00 | 0.00 | RS-127139-100 |
| 140.00 | 110.00 | 15.00 | 0.00 | 0.00 | 0.00 | RSS-110140-160 |
| 140.00 | 115.00 | 15.00 | 16.00 | 120.00 | 0.00 | RSS-115140-160 |
| 140.00 | 115.00 | 22.00 | 23.00 | 120.00 | 0.00 | RSS-115140-230 |
| 140.00 | 120.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-120140-030 |
| 140.00 | 120.00 | 10.00 | 11.00 | 0.00 | 0.00 | RSS-120140-110 |
| 140.00 | 120.00 | 11.50 | 12.50 | 0.00 | 0.00 | TSLA-120140-125 |
| 140.00 | 120.00 | 12.00 | 0.00 | 0.00 | 0.00 | TSL-120140-130 |
| 140.00 | 120.00 | 12.00 | 12.50 | 0.00 | 0.00 | CP-120140-125 |
| 140.00 | 120.00 | 12.00 | 13.00 | 0.00 | 0.00 | RSS-120140-130 |
| 140.00 | 120.00 | 12.00 | 13.00 | 0.00 | 0.00 | RSLA-120140-130 |
| 140.00 | 120.00 | 13.00 | 14.00 | 0.00 | 0.00 | RS-120140-140 |
| 140.00 | 120.00 | 14.60 | 0.00 | 0.00 | 0.00 | TSLA-120140-160 |
| 140.00 | 120.00 | 15.00 | 16.00 | 125.00 | 0.00 | RSS-120140-160 |
| 140.00 | 120.00 | 16.00 | 17.00 | 0.00 | 0.00 | RS-120140-170 |
| 140.00 | 125.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-125140-030 |
| 140.00 | 125.00 | 9.00 | 10.00 | 0.00 | 0.00 | RSS-125140-100 |
| 140.00 | 125.00 | 9.00 | 10.00 | 0.00 | 0.00 | RS-125140-100 |
| 140.00 | 125.00 | 11.00 | 12.00 | 129.00 | 0.00 | RSS-125140-120 |
| 140.00 | 125.00 | 11.50 | 12.00 | 0.00 | 0.00 | CP-125140-120 |
| 140.00 | 125.00 | 14.50 | 16.00 | 0.00 | 0.00 | TSLA-125140-160 |
| 140.00 | 125.00 | 15.00 | 16.00 | 130.00 | 0.00 | RSS-125140-160 |



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| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
|--------|--------|-------|-------|--------|------|-----------------|
| 140.00 | 127.00 | 11.50 | 12.50 | 0.00 | 0.00 | RSL-127140-125 |
| 140.00 | 127.00 | 12.50 | 13.50 | 0.00 | 0.00 | TSLA-127140-135 |
| 142.00 | 132.00 | 8.70 | 9.50 | 0.00 | 0.00 | RSL-132142-095 |
| 142.00 | 134.50 | 9.00 | 10.00 | 0.00 | 0.00 | TSL-134142-100 |
| 143.00 | 135.00 | 8.00 | 9.00 | 0.00 | 0.00 | TSL-135143-090 |
| 143.00 | 135.00 | 11.50 | 12.50 | 0.00 | 0.00 | RSL-135143-125 |
| 143.70 | 135.00 | 8.00 | 9.00 | 0.00 | 0.00 | TSL-135143-090A |
| 145.00 | 125.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-125145-030 |
| 145.00 | 125.00 | 11.50 | 12.50 | 0.00 | 0.00 | RSS-125145-125 |
| 145.00 | 125.00 | 12.00 | 13.00 | 0.00 | 0.00 | RSLA-125145-130 |
| 145.00 | 125.00 | 12.00 | 13.00 | 0.00 | 0.00 | RS-125145-130 |
| 145.00 | 125.00 | 14.50 | 16.00 | 0.00 | 0.00 | RSL-125145-160 |
| 145.00 | 125.00 | 14.60 | 16.00 | 0.00 | 0.00 | TSLA-125145-160 |
| 145.00 | 125.00 | 14.60 | 16.00 | 0.00 | 0.00 | RS-125145-160 |
| 145.00 | 125.00 | 15.00 | 16.00 | 130.00 | 0.00 | RSS-125145-160 |
| 145.00 | 125.00 | 18.00 | 19.00 | 130.00 | 0.00 | RSS-125145-190 |
| 145.00 | 130.00 | 2.00 | 0.00 | 0.00 | 0.00 | 19M-130145-020 |
| 145.00 | 130.00 | 9.00 | 10.00 | 0.00 | 0.00 | RSS-130145-100 |
| 145.00 | 130.00 | 9.00 | 10.00 | 0.00 | 0.00 | RS-130145-100 |
| 145.00 | 130.00 | 9.00 | 10.00 | 0.00 | 0.00 | CPI-130145-100 |
| 145.00 | 130.00 | 10.00 | 11.00 | 0.00 | 0.00 | RS-130145-110 |
| 145.00 | 130.00 | 12.00 | 13.00 | 0.00 | 0.00 | TSLA-130145-130 |
| 145.00 | 130.00 | 12.00 | 13.00 | 0.00 | 0.00 | RS-130145-130 |
| 145.00 | 130.00 | 14.00 | 15.00 | 0.00 | 0.00 | RS-130145-150 |
| 145.00 | 130.00 | 15.00 | 16.00 | 0.00 | 0.00 | TSL-130145-160 |
| 146.00 | 137.00 | 14.00 | 15.00 | 0.00 | 0.00 | RSL-137146-150 |
| 148.00 | 140.00 | 7.00 | 8.00 | 0.00 | 0.00 | TSL-140148-080 |
| 148.00 | 140.00 | 11.50 | 12.50 | 0.00 | 0.00 | RSL-140148-125 |
| 150.00 | 125.00 | 13.00 | 14.00 | 0.00 | 0.00 | RS-125150-140 |
| 150.00 | 125.00 | 14.00 | 14.50 | 0.00 | 0.00 | CPI-125150-145 |
| 150.00 | 125.00 | 14.00 | 16.00 | 0.00 | 0.00 | RS-125150-160 |



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| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
|--------|--------|-------|-------|--------|------|-----------------|
| 150.00 | 125.00 | 18.00 | 20.00 | 0.00 | 0.00 | RSS-125150-200 |
| 150.00 | 129.00 | 2.30 | 0.00 | 0.00 | 0.00 | 19M-129150-023 |
| 150.00 | 130.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-130150-030 |
| 150.00 | 130.00 | 12.00 | 0.00 | 0.00 | 0.00 | RSS-130150-130 |
| 150.00 | 130.00 | 12.00 | 13.00 | 0.00 | 0.00 | TSL-130150-130 |
| 150.00 | 130.00 | 14.60 | 0.00 | 0.00 | 0.00 | TSLA-130150-160 |
| 150.00 | 130.00 | 15.00 | 16.00 | 0.00 | 0.00 | RS-130150-160 |
| 150.00 | 130.00 | 15.00 | 16.00 | 135.00 | 0.00 | RSS-130150-160 |
| 150.00 | 130.00 | 16.00 | 17.00 | 0.00 | 0.00 | RS-130150-170 |
| 150.00 | 131.00 | 13.00 | 14.00 | 0.00 | 0.00 | RSL-131150-140 |
| 150.00 | 135.00 | 11.00 | 12.00 | 0.00 | 0.00 | RSS-135150-120 |
| 150.00 | 135.00 | 11.50 | 12.50 | 0.00 | 0.00 | TSL-135150-125 |
| 150.00 | 135.00 | 15.00 | 16.00 | 0.00 | 0.00 | RSL-135150-160 |
| 150.00 | 135.00 | 15.00 | 16.00 | 140.00 | 0.00 | RSS-135150-160 |
| 150.00 | 136.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-136150-030 |
| 150.00 | 136.00 | 9.00 | 10.00 | 0.00 | 0.00 | RSS-136150-100 |
| 150.00 | 140.00 | 11.00 | 12.00 | 0.00 | 0.00 | RSL-140150-120 |
| 150.00 | 140.00 | 11.00 | 12.50 | 0.00 | 0.00 | RSL-140150-125 |
| 151.00 | 141.00 | 12.00 | 13.00 | 0.00 | 0.00 | RSL-141151-130 |
| 151.00 | 141.00 | 14.30 | 15.00 | 0.00 | 0.00 | RSL-141151-150 |
| 151.00 | 143.00 | 11.50 | 12.50 | 0.00 | 0.00 | RSL-143151-125 |
| 151.00 | 143.00 | 13.00 | 14.00 | 0.00 | 0.00 | RSLA-143151-140 |
| 151.00 | 143.00 | 13.50 | 14.50 | 0.00 | 0.00 | RSL-143151-145 |
| 152.00 | 130.00 | 0.00 | 0.00 | 0.00 | 0.00 | TSL-135152-130 |
| 153.00 | 145.00 | 7.50 | 8.50 | 0.00 | 0.00 | TSL-145153-085 |
| 153.00 | 145.00 | 8.00 | 9.00 | 0.00 | 0.00 | TS-145153-090 |
| 155.00 | 125.00 | 15.00 | 16.00 | 130.00 | 0.00 | RSS-125155-160 |
| 155.00 | 125.00 | 18.00 | 19.00 | 0.00 | 0.00 | RS-125155-190 |
| 155.00 | 130.00 | 15.00 | 16.00 | 0.00 | 0.00 | TSL-130155-160 |
| 155.00 | 135.00 | 15.00 | 16.00 | 140.00 | 0.00 | RSS-135155-160 |
| 155.00 | 140.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-140155-030 |



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| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
|--------|--------|-------|-------|--------|------|-----------------|
| 155.00 | 140.00 | 9.00 | 10.00 | 0.00 | 0.00 | RSS-140155-100 |
| 155.00 | 140.00 | 9.00 | 10.00 | 0.00 | 0.00 | RS-140155-100 |
| 155.00 | 140.00 | 12.00 | 13.00 | 0.00 | 0.00 | TSLA-140155-130 |
| 155.00 | 140.00 | 12.00 | 13.00 | 0.00 | 0.00 | RS-140155-130 |
| 155.00 | 140.00 | 15.00 | 16.00 | 144.00 | 0.00 | RSS-140155-160 |
| 155.00 | 145.00 | 12.00 | 13.00 | 0.00 | 0.00 | RSL-145155-130 |
| 155.00 | 147.00 | 10.00 | 11.00 | 0.00 | 0.00 | TS-147155-110 |
| 155.50 | 140.00 | 5.80 | 6.30 | 0.00 | 0.00 | TS-140155-063 |
| 156.00 | 146.00 | 10.00 | 11.00 | 0.00 | 0.00 | TSL-146156-110 |
| 157.00 | 149.50 | 9.00 | 10.00 | 0.00 | 0.00 | TSL-149157-100 |
| 157.70 | 145.00 | 9.00 | 10.00 | 0.00 | 0.00 | RS-145157-100 |
| 158.00 | 146.00 | 7.50 | 8.00 | 0.00 | 0.00 | CP-146158-080 |
| 160.00 | 135.00 | 15.00 | 16.00 | 140.00 | 0.00 | RSS-135160-160 |
| 160.00 | 135.00 | 32.00 | 33.00 | 0.00 | 0.00 | RSS-135160-330 |
| 160.00 | 140.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-140160-030 |
| 160.00 | 140.00 | 12.00 | 12.50 | 0.00 | 0.00 | CPI-140160-125 |
| 160.00 | 140.00 | 12.00 | 13.00 | 0.00 | 0.00 | RS-140160-130 |
| 160.00 | 140.00 | 14.00 | 14.50 | 0.00 | 0.00 | CPI-140160-145 |
| 160.00 | 140.00 | 14.00 | 15.00 | 0.00 | 0.00 | TSLA-140160-150 |
| 160.00 | 140.00 | 14.50 | 16.00 | 0.00 | 0.00 | TSLA-140160-160 |
| 160.00 | 140.00 | 15.00 | 16.00 | 145.00 | 0.00 | RSS-140160-160 |
| 160.00 | 145.00 | 2.00 | 0.00 | 0.00 | 0.00 | 19M-145160-020 |
| 160.00 | 145.00 | 9.00 | 10.00 | 0.00 | 0.00 | RSS-145160-100 |
| 160.00 | 145.00 | 9.00 | 10.00 | 0.00 | 0.00 | RS-145160-100 |
| 160.00 | 145.00 | 12.00 | 13.00 | 0.00 | 0.00 | RSL-145160-130 |
| 160.00 | 147.00 | 12.00 | 13.00 | 0.00 | 0.00 | RS-147160-130 |
| 160.00 | 148.00 | 12.00 | 13.00 | 0.00 | 0.00 | RSL-148160-130 |
| 160.00 | 152.00 | 11.50 | 12.50 | 0.00 | 0.00 | RSL-152160-125 |
| 162.00 | 152.00 | 10.00 | 11.00 | 0.00 | 0.00 | RSL-152162-110 |
| 162.70 | 154.00 | 8.00 | 9.00 | 0.00 | 0.00 | TSL-154162-090 |
| 163.00 | 155.00 | 11.50 | 12.50 | 0.00 | 0.00 | RSL-155163-125 |



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| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
|--------|--------|-------|-------|--------|------|-----------------|
| 165.00 | 140.00 | 18.00 | 19.00 | 0.00 | 0.00 | TSLA-140165-190 |
| 165.00 | 140.00 | 19.00 | 20.00 | 0.00 | 0.00 | RS-140165-200 |
| 165.00 | 140.00 | 19.00 | 20.00 | 0.00 | 0.00 | RSS-140165-200 |
| 165.00 | 145.00 | 15.00 | 16.00 | 150.00 | 0.00 | RSS-145165-160 |
| 165.00 | 150.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-150165-030 |
| 165.00 | 150.00 | 9.00 | 10.00 | 0.00 | 0.00 | RSS-150165-100 |
| 165.00 | 150.00 | 9.00 | 10.00 | 0.00 | 0.00 | RS-150165-100 |
| 168.00 | 153.00 | 11.50 | 12.00 | 0.00 | 0.00 | CPI-153168-120 |
| 168.00 | 160.00 | 11.50 | 12.50 | 0.00 | 0.00 | RSL-160168-125 |
| 170.00 | 140.00 | 18.00 | 20.00 | 0.00 | 0.00 | RSS-140170-200 |
| 170.00 | 150.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-150170-030 |
| 170.00 | 150.00 | 4.00 | 0.00 | 0.00 | 0.00 | 19M-150170-040 |
| 170.00 | 150.00 | 10.00 | 0.00 | 0.00 | 0.00 | RSS-150170-110 |
| 170.00 | 150.00 | 12.00 | 13.00 | 0.00 | 0.00 | TSL-150170-130 |
| 170.00 | 150.00 | 13.50 | 14.50 | 0.00 | 0.00 | TSLA-150170-145 |
| 170.00 | 150.00 | 13.50 | 14.50 | 0.00 | 0.00 | RS-150170-145 |
| 170.00 | 150.00 | 14.00 | 14.50 | 0.00 | 0.00 | CPI-150170-145 |
| 170.00 | 150.00 | 14.60 | 0.00 | 0.00 | 0.00 | TSLA-150170-160 |
| 170.00 | 150.00 | 15.00 | 16.00 | 155.00 | 0.00 | RSS-150170-160 |
| 170.00 | 150.00 | 18.00 | 19.00 | 155.00 | 0.00 | RSS-150170-190 |
| 170.00 | 155.00 | 2.00 | 0.00 | 0.00 | 0.00 | 19M-155170-020 |
| 170.00 | 155.00 | 9.00 | 10.00 | 0.00 | 0.00 | RSS-155170-100 |
| 170.00 | 155.00 | 9.00 | 10.00 | 0.00 | 0.00 | RS-155170-100 |
| 170.00 | 155.00 | 10.00 | 0.00 | 0.00 | 0.00 | RSS-155170-110 |
| 170.00 | 155.00 | 11.00 | 12.00 | 0.00 | 0.00 | RSS-155170-120 |
| 170.00 | 155.00 | 14.50 | 16.00 | 0.00 | 0.00 | RSL-155170-160 |
| 170.00 | 160.00 | 11.50 | 12.50 | 0.00 | 0.00 | RSL-160170-125 |
| 171.00 | 152.00 | 11.50 | 12.50 | 0.00 | 0.00 | RSL-152171-125 |
| 172.00 | 162.00 | 12.00 | 13.00 | 0.00 | 0.00 | RSL-162172-130 |
| 172.00 | 162.00 | 14.30 | 15.00 | 0.00 | 0.00 | RSL-162172-150 |
| 173.00 | 165.50 | 9.00 | 10.00 | 0.00 | 0.00 | TSL-165173-100 |



RS



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| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
|--------|--------|-------|-------|--------|------|-----------------|
| 175.00 | 160.00 | 9.00 | 10.00 | 0.00 | 0.00 | RSS-160175-100 |
| 175.00 | 160.00 | 9.00 | 10.00 | 0.00 | 0.00 | RS-160175-100 |
| 175.00 | 160.00 | 15.00 | 16.00 | 0.00 | 0.00 | TSL-160175-160 |
| 175.00 | 160.00 | 15.00 | 16.00 | 0.00 | 0.00 | CPI-160175-160 |
| 178.00 | 163.00 | 12.00 | 13.00 | 0.00 | 0.00 | TSL-163178-130 |
| 178.00 | 170.00 | 11.50 | 12.50 | 0.00 | 0.00 | RSL-170178-125 |
| 179.00 | 171.00 | 11.50 | 12.50 | 0.00 | 0.00 | RSL-171179-125 |
| 179.00 | 171.00 | 13.00 | 14.00 | 0.00 | 0.00 | RSLA-171179-140 |
| 180.00 | 160.00 | 4.00 | 0.00 | 0.00 | 0.00 | 19M-160180-040 |
| 180.00 | 160.00 | 12.00 | 13.00 | 0.00 | 0.00 | RS-160180-130 |
| 180.00 | 160.00 | 13.50 | 14.50 | 0.00 | 0.00 | CPI-160180-145 |
| 180.00 | 160.00 | 14.60 | 0.00 | 0.00 | 0.00 | TSLA-160180-160 |
| 180.00 | 160.00 | 15.00 | 16.00 | 0.00 | 0.00 | RS-160180-160 |
| 180.00 | 160.00 | 15.00 | 16.00 | 165.00 | 0.00 | RSS-160180-160 |
| 180.00 | 165.00 | 0.00 | 0.00 | 0.00 | 0.00 | 19M-165180-030 |
| 180.00 | 165.00 | 9.00 | 10.00 | 0.00 | 0.00 | RSS-165180-100 |
| 180.00 | 165.00 | 9.00 | 10.00 | 0.00 | 0.00 | RS-165180-100 |
| 180.00 | 170.00 | 10.00 | 11.00 | 0.00 | 0.00 | TSL-170180-110 |
| 180.00 | 170.00 | 12.00 | 13.00 | 0.00 | 0.00 | RSL-170180-130 |
| 182.70 | 170.00 | 9.50 | 10.00 | 0.00 | 0.00 | CP-170182-100 |
| 182.70 | 174.00 | 8.00 | 9.00 | 0.00 | 0.00 | TSL-174182-090 |
| 183.00 | 171.00 | 7.50 | 8.00 | 0.00 | 0.00 | CP-171183-080 |
| 184.00 | 165.00 | 13.00 | 14.00 | 0.00 | 0.00 | RSL-165184-140 |
| 185.00 | 160.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-160185-030 |
| 185.00 | 160.00 | 12.00 | 13.00 | 0.00 | 0.00 | RSS-160185-130 |
| 185.00 | 160.00 | 15.00 | 0.00 | 0.00 | 0.00 | RSS-160185-160 |
| 185.00 | 160.00 | 15.00 | 16.00 | 0.00 | 0.00 | RS-160185-160 |
| 185.00 | 160.00 | 18.00 | 19.00 | 0.00 | 0.00 | TSLA-160185-190 |
| 185.00 | 160.00 | 19.00 | 20.00 | 0.00 | 0.00 | RS-160185-200 |
| 185.00 | 165.00 | 15.00 | 0.00 | 0.00 | 0.00 | RSS-165185-160 |
| 185.00 | 170.00 | 9.00 | 10.00 | 0.00 | 0.00 | RS-170185-100 |



RS



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| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
|--------|--------|-------|-------|--------|------------|-----------------|
| 185.00 | 170.00 | 14.50 | 16.00 | 0.00 | 0.00 | TSLA-170185-160 |
| 185.00 | 175.00 | 12.00 | 13.00 | 0.00 | 0.00 | RSL-175185-130 |
| 188.00 | 180.00 | 13.50 | 14.50 | 0.00 | 0.00 | RSL-180188-145 |
| 190.00 | 170.00 | 4.00 | 0.00 | 0.00 | 0.00 | 19M-170190-040 |
| 190.00 | 170.00 | 12.00 | 13.00 | 0.00 | 0.00 | RS-170190-130 |
| 190.00 | 170.00 | 15.00 | 16.00 | 0.00 | 0.00 | RS-170190-160 |
| 190.00 | 170.00 | 15.00 | 16.00 | 175.00 | 0.00 | RSS-170190-160 |
| 190.00 | 175.00 | 2.00 | 0.00 | 0.00 | 0.00 | 19M-175190-020 |
| 190.00 | 175.00 | 9.00 | 10.00 | 0.00 | 0.00 | RSS-175190-100 |
| 190.00 | 180.00 | 10.00 | 11.00 | 0.00 | 0.00 | RSL-180190-110 |
| 190.00 | 180.00 | 12.50 | 13.50 | 0.00 | 0.00 | TSL-180190-135 |
| 190.50 | 183.00 | 9.00 | 10.00 | 0.00 | 0.00 | TSL-183190-100 |
| 193.00 | 185.00 | 11.50 | 12.50 | 0.00 | 0.00 | RSL-185193-125 |
| 195.00 | 165.00 | 20.00 | 21.00 | 0.00 | 0.00 | RS-165195-210 |
| 195.00 | 170.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-170195-030 |
| 195.00 | 170.00 | 15.00 | 17.00 | 0.00 | 0.00 | RSS-170195-170 |
| 195.00 | 180.00 | 11.50 | 12.50 | 0.00 | 0.00 | CPI-180195-125 |
| 195.00 | 180.00 | 12.50 | 13.50 | 0.00 | 0.00 | RSL-180195-135 |
| 200.00 | 170.00 | 18.00 | 19.00 | 175.00 | 0.00 | RSS-170200-190 |
| 200.00 | 175.00 | 4.00 | 0.00 | 0.00 | 0.00 | 19M-175200-040 |
| 200.00 | 175.00 | 14.00 | 14.50 | 0.00 | 0.00 | CP-175200-145 |
| 200.00 | 175.00 | 15.00 | 16.00 | 180.00 | 0.00 | RSS-175200-160 |
| 200.00 | 180.00 | 4.00 | 0.00 | 0.00 | 0.00 | 19M-180200-040 |
| 200.00 | 180.00 | 11.80 | 13.00 | 0.00 | 0.00 | RSL-180200-130 |
| 200.00 | 180.00 | 12.00 | 13.00 | 0.00 | 0.00 | RSS-180200-130 |
| 200.00 | 180.00 | 15.00 | 16.00 | 0.00 | 0.00 | RS-180200-160 |
| 200.00 | 180.00 | 15.00 | 16.00 | 185.00 | 0.00 | RSS-180200-160 |
| 200.00 | 180.00 | 19.00 | 20.00 | 0.00 | 0.00 | RS-180200-200 |
| 204.70 | 196.00 | 8.00 | 9.00 | 0.00 | 0.00 | TSL-196204-090 |
| 205.00 | 177.00 | 19.00 | 20.00 | 0.00 | 0.00 | RSL-177205-200 |
| 205.00 | 180.00 | 15.00 | 16.00 | 0.00 | 180,205.00 | RSS-180205-160 |



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| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
|--------|--------|-------|-------|------|------------|-----------------|
| 205.00 | 180.00 | 18.50 | 0.00 | 0.00 | 0.00 | TSLA-180205-200 |
| 205.00 | 185.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-185205-030 |
| 207.60 | 198.00 | 6.50 | 7.50 | 0.00 | 0.00 | RS-198207-075 |
| 208.00 | 200.00 | 11.50 | 12.50 | 0.00 | 0.00 | RSL-200208-125 |
| 209.00 | 197.00 | 7.50 | 8.00 | 0.00 | 0.00 | CP-197209-080 |
| 209.00 | 197.00 | 12.00 | 13.00 | 0.00 | 0.00 | TSL-197209-130 |
| 209.00 | 201.50 | 9.00 | 10.00 | 0.00 | 0.00 | TSL-201209-100 |
| 210.00 | 180.00 | 19.50 | 20.50 | 0.00 | 0.00 | CPI-180210-205 |
| 210.00 | 190.00 | 4.00 | 0.00 | 0.00 | 0.00 | 19M-190210-040 |
| 210.00 | 190.00 | 12.00 | 13.00 | 0.00 | 0.00 | RS-190210-130 |
| 210.00 | 190.00 | 12.00 | 13.00 | 0.00 | 190,210.00 | RSS-190210-130 |
| 210.00 | 190.00 | 13.50 | 14.50 | 0.00 | 0.00 | TSL-190210-145 |
| 210.00 | 190.00 | 14.00 | 14.50 | 0.00 | 0.00 | CPI-190210-145 |
| 210.00 | 190.00 | 15.00 | 16.00 | 0.00 | 0.00 | RSL-190210-160 |
| 210.00 | 190.00 | 15.00 | 16.00 | 0.00 | 0.00 | RS-190210-160 |
| 210.00 | 190.00 | 15.00 | 16.00 | 0.00 | 0.00 | RSS-190210-160 |
| 210.00 | 195.00 | 2.50 | 0.00 | 0.00 | 0.00 | 19M-195210-025 |
| 210.00 | 195.00 | 9.00 | 10.00 | 0.00 | 0.00 | RSS-195210-100 |
| 212.00 | 200.00 | 15.00 | 16.00 | 0.00 | 0.00 | RS-200212-160 |
| 215.00 | 190.00 | 4.00 | 0.00 | 0.00 | 0.00 | 19M-190215-040 |
| 215.00 | 190.00 | 12.00 | 13.00 | 0.00 | 0.00 | RSS-190215-130 |
| 215.00 | 190.00 | 15.00 | 16.00 | 0.00 | 190,215.00 | RSS-190215-160 |
| 215.00 | 190.00 | 19.00 | 20.00 | 0.00 | 0.00 | RSS-190215-200 |
| 217.00 | 207.00 | 14.30 | 15.00 | 0.00 | 0.00 | RSL-207217-150 |
| 220.00 | 200.00 | 12.00 | 13.00 | 0.00 | 0.00 | RSS-200220-130 |
| 220.00 | 200.00 | 12.00 | 13.00 | 0.00 | 0.00 | RS-200220-130 |
| 220.00 | 200.00 | 14.50 | 16.00 | 0.00 | 0.00 | RSL-200220-160 |
| 220.00 | 200.00 | 14.50 | 16.00 | 0.00 | 0.00 | 38M-200220-160 |
| 220.00 | 200.00 | 15.00 | 16.00 | 0.00 | 0.00 | RSS-200220-160 |
| 220.00 | 205.00 | 12.50 | 13.50 | 0.00 | 0.00 | RSL-205220-135 |
| 220.00 | 212.00 | 13.50 | 14.50 | 0.00 | 0.00 | RSL-212220-145 |



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| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
|--------|--------|-------|-------|--------|------------|-----------------|
| 225.00 | 200.00 | 15.00 | 17.00 | 0.00 | 0.00 | RSS-200225-170 |
| 225.00 | 200.00 | 16.00 | 17.00 | 0.00 | 0.00 | RS-200225-170 |
| 225.00 | 200.00 | 18.00 | 19.00 | 206.00 | 0.00 | RSS-200225-190 |
| 225.00 | 200.00 | 19.00 | 20.00 | 0.00 | 0.00 | RS-200225-200 |
| 228.00 | 209.00 | 13.00 | 14.00 | 0.00 | 0.00 | RSL-209228-140 |
| 228.50 | 221.00 | 9.00 | 10.00 | 0.00 | 0.00 | TSL-221228-100 |
| 230.00 | 210.00 | 4.00 | 0.00 | 0.00 | 0.00 | 19M-210230-040 |
| 230.00 | 210.00 | 12.00 | 13.00 | 0.00 | 0.00 | RS-210230-130 |
| 230.00 | 210.00 | 14.50 | 16.00 | 0.00 | 0.00 | TSLA-210230-160 |
| 230.00 | 210.00 | 16.00 | 17.00 | 0.00 | 0.00 | RS-210230-170 |
| 230.20 | 221.50 | 12.00 | 13.00 | 0.00 | 0.00 | TSL-221230-130 |
| 235.00 | 210.00 | 18.20 | 20.00 | 0.00 | 0.00 | TSLA-210235-200 |
| 235.00 | 210.00 | 19.00 | 20.00 | 0.00 | 0.00 | RSS-210235-200 |
| 235.00 | 210.00 | 24.50 | 26.00 | 0.00 | 0.00 | RS-210235-260 |
| 235.00 | 223.00 | 7.50 | 8.00 | 0.00 | 0.00 | CP-223235-080 |
| 237.00 | 218.00 | 16.00 | 17.00 | 0.00 | 0.00 | TSL-218237-170 |
| 240.00 | 220.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-220240-030 |
| 240.00 | 220.00 | 12.00 | 13.00 | 0.00 | 0.00 | RSS-220240-130 |
| 240.00 | 220.00 | 12.00 | 13.00 | 0.00 | 0.00 | RS-220240-130 |
| 240.00 | 220.00 | 15.00 | 16.00 | 0.00 | 0.00 | RS-220240-160 |
| 240.00 | 228.00 | 12.00 | 13.00 | 0.00 | 0.00 | TSL-228240-130 |
| 241.00 | 231.00 | 14.30 | 15.00 | 0.00 | 0.00 | RSL-231241-150 |
| 241.50 | 225.00 | 12.50 | 13.00 | 0.00 | 225,241.00 | EUS-225241-130 |
| 245.00 | 220.00 | 0.00 | 0.00 | 0.00 | 0.00 | 19M-220245-040 |
| 245.00 | 220.00 | 16.00 | 0.00 | 0.00 | 0.00 | RS-220245-170 |
| 245.00 | 225.00 | 15.00 | 16.00 | 230.00 | 0.00 | RSS-225245-160 |
| 246.00 | 230.00 | 12.00 | 13.00 | 0.00 | 230,246.00 | EUS-230246-130 |
| 246.00 | 232.00 | 12.00 | 13.00 | 0.00 | 0.00 | RSL-232246-130 |
| 247.00 | 235.00 | 10.00 | 11.00 | 0.00 | 0.00 | RSS-235247-110 |
| 249.50 | 242.00 | 9.00 | 10.00 | 0.00 | 0.00 | TSL-242249-100 |
| 250.00 | 220.00 | 18.00 | 19.00 | 0.00 | 0.00 | RS-220250-190 |



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| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
|--------|--------|-------|-------|--------|------|----------------|
| 250.00 | 220.00 | 18.00 | 19.00 | 225.00 | 0.00 | RSS-220250-190 |
| 250.00 | 220.00 | 19.50 | 20.50 | 0.00 | 0.00 | TSL-220250-205 |
| 250.00 | 220.00 | 19.50 | 20.50 | 0.00 | 0.00 | CPI-220250-205 |
| 250.00 | 225.00 | 16.00 | 17.00 | 0.00 | 0.00 | RS-225250-170 |
| 250.00 | 225.00 | 19.00 | 20.00 | 0.00 | 0.00 | RSS-225250-200 |
| 250.00 | 230.00 | 12.00 | 13.00 | 0.00 | 0.00 | RS-230250-130 |
| 250.00 | 230.00 | 15.00 | 16.00 | 0.00 | 0.00 | RSS-230250-160 |
| 250.00 | 230.00 | 16.00 | 17.00 | 0.00 | 0.00 | RS-230250-170 |
| 255.00 | 230.00 | 19.00 | 20.00 | 0.00 | 0.00 | RS-230255-200 |
| 255.00 | 240.00 | 12.00 | 13.00 | 0.00 | 0.00 | CP-240255-130 |
| 257.70 | 249.00 | 12.00 | 13.00 | 0.00 | 0.00 | TSL-249257-130 |
| 260.00 | 230.00 | 23.65 | 25.00 | 0.00 | 0.00 | RS-230260-250 |
| 260.00 | 240.00 | 4.00 | 0.00 | 0.00 | 0.00 | 19M-240260-040 |
| 260.00 | 240.00 | 12.00 | 13.00 | 0.00 | 0.00 | RS-240260-130 |
| 260.00 | 240.00 | 15.00 | 16.00 | 0.00 | 0.00 | RS-240260-160 |
| 260.00 | 240.00 | 16.00 | 17.00 | 0.00 | 0.00 | RS-240260-170 |
| 261.00 | 249.00 | 7.00 | 8.00 | 0.00 | 0.00 | CP-249261-080 |
| 265.00 | 240.00 | 16.00 | 17.00 | 0.00 | 0.00 | RS-240265-170 |
| 270.00 | 240.00 | 18.00 | 19.00 | 0.00 | 0.00 | RS-240270-190 |
| 270.00 | 240.00 | 22.00 | 23.00 | 0.00 | 0.00 | RSS-240270-230 |
| 270.00 | 245.00 | 15.00 | 16.00 | 250.00 | 0.00 | RSS-245270-160 |
| 270.00 | 250.00 | 4.00 | 0.00 | 0.00 | 0.00 | 19M-250270-040 |
| 270.00 | 250.00 | 12.00 | 13.00 | 0.00 | 0.00 | RS-250270-130 |
| 270.00 | 250.00 | 15.00 | 16.00 | 0.00 | 0.00 | RS-250270-160 |
| 270.00 | 250.00 | 15.00 | 16.00 | 0.00 | 0.00 | RSS-250270-160 |
| 270.00 | 250.00 | 16.00 | 17.00 | 0.00 | 0.00 | RS-250270-170 |
| 280.00 | 250.00 | 22.00 | 23.00 | 0.00 | 0.00 | RS-250280-230 |
| 280.00 | 260.00 | 15.00 | 16.00 | 0.00 | 0.00 | RS-260280-160 |
| 280.00 | 260.00 | 15.00 | 16.00 | 0.00 | 0.00 | RSS-260280-160 |
| 285.00 | 260.00 | 19.00 | 20.00 | 0.00 | 0.00 | RS-260285-200 |
| 287.70 | 279.00 | 12.00 | 13.00 | 0.00 | 0.00 | TSL-279287-130 |



RS



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| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
|--------|--------|-------|-------|--------|------|----------------|
| 290.00 | 260.00 | 4.00 | 0.00 | 0.00 | 0.00 | 19M-260290-040 |
| 290.00 | 260.00 | 19.00 | 20.00 | 0.00 | 0.00 | RS-260290-200 |
| 290.00 | 265.00 | 12.00 | 13.00 | 0.00 | 0.00 | RSS-265290-130 |
| 290.00 | 265.00 | 17.00 | 18.00 | 270.00 | 0.00 | RSS-265290-180 |
| 290.00 | 270.00 | 17.00 | 18.00 | 275.00 | 0.00 | RSS-270290-180 |
| 295.00 | 270.00 | 16.00 | 17.00 | 0.00 | 0.00 | RS-270295-170 |
| 300.00 | 270.00 | 15.00 | 16.00 | 275.00 | 0.00 | RSS-270300-160 |
| 300.00 | 270.00 | 18.00 | 19.00 | 0.00 | 0.00 | RS-270300-190 |
| 300.00 | 270.00 | 18.00 | 20.00 | 0.00 | 0.00 | RSS-270300-200 |
| 300.00 | 280.00 | 15.00 | 16.00 | 285.00 | 0.00 | RSS-280300-160 |
| 305.00 | 280.00 | 12.00 | 13.00 | 0.00 | 0.00 | RSS-280305-130 |
| 305.00 | 280.00 | 15.00 | 16.00 | 0.00 | 0.00 | RS-280305-160 |
| 305.00 | 280.00 | 19.00 | 20.00 | 0.00 | 0.00 | RSS-280305-200 |
| 310.00 | 280.00 | 24.00 | 25.00 | 0.00 | 0.00 | RS-280310-250 |
| 310.00 | 290.00 | 15.00 | 16.00 | 0.00 | 0.00 | RSS-290310-160 |
| 320.00 | 290.00 | 18.00 | 20.00 | 0.00 | 0.00 | RSS-290320-200 |
| 320.00 | 295.00 | 19.00 | 20.00 | 0.00 | 0.00 | RSS-295320-200 |
| 320.00 | 300.00 | 15.00 | 16.00 | 0.00 | 0.00 | RSS-300320-160 |
| 320.00 | 305.00 | 17.00 | 18.00 | 310.00 | 0.00 | RSS-305320-180 |
| 325.00 | 300.00 | 24.00 | 25.00 | 0.00 | 0.00 | TSL-300325-250 |
| 330.00 | 300.00 | 18.00 | 19.00 | 0.00 | 0.00 | RS-300330-190 |
| 330.00 | 300.00 | 18.00 | 20.00 | 0.00 | 0.00 | RSS-300330-200 |
| 340.00 | 320.00 | 15.00 | 16.00 | 0.00 | 0.00 | RSS-320340-160 |
| 350.00 | 320.00 | 22.00 | 23.00 | 0.00 | 0.00 | RSS-320350-230 |
| 350.00 | 325.00 | 19.00 | 20.00 | 0.00 | 0.00 | RSS-325350-200 |
| 360.00 | 340.00 | 15.00 | 16.00 | 0.00 | 0.00 | RSS-340360-160 |
| 370.00 | 340.00 | 20.00 | 21.00 | 0.00 | 0.00 | RS-340370-210 |
| 370.00 | 350.00 | 15.00 | 16.00 | 0.00 | 0.00 | RSS-350370-160 |
| 375.00 | 345.00 | 20.00 | 21.00 | 0.00 | 0.00 | RS-345375-210 |
| 380.00 | 340.00 | 21.00 | 22.00 | 0.00 | 0.00 | RSS-340380-220 |
| 380.00 | 360.00 | 15.00 | 16.00 | 0.00 | 0.00 | RSS-360380-160 |



RS



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| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
|--------|--------|-------|-------|--------|------|----------------|
| 385.00 | 350.00 | 24.40 | 25.40 | 0.00 | 0.00 | CP-350385-254 |
| 390.00 | 360.00 | 22.00 | 23.00 | 365.00 | 0.00 | RSS-360390-230 |
| 390.00 | 370.00 | 15.00 | 16.00 | 0.00 | 0.00 | RSS-370390-160 |
| 400.00 | 380.00 | 15.00 | 16.00 | 0.00 | 0.00 | RSS-380400-160 |
| 410.00 | 385.00 | 12.00 | 13.00 | 0.00 | 0.00 | RSS-385410-130 |



GR2

Glide & Buffer Rings

Design

GR2 are designed as high pressure, low friction double acting rod seals for use in heavy duty hydraulic applications. They consist of an outer NBR o-ring energiser and an inner ring of Bronze filled PTFE. This design, often found in rotary couplings, is usually supplied in GR3 standard housing sizes. Through the use of different energising materials a low cost high temperature seal can be created. Due to the properties of Bronze PTFE speeds up to 15 m/s can be accommodated.

Operating Conditions

Pressure

400 Bar
6,000 Psi



Temperature

-40° to 110°C
-40° to 230°F



Speed

4.0m/sec
12.0'/sec



Surface Finish μmRa

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|-----------------|-----------------|-----|
| $\varnothing d$ | $\varnothing D$ | L |
| 0.1 - 0.25 | ≤ 0.8 | 1.0 |

Tolerances

| | | |
|-----------------|-----------------|-------------|
| $\varnothing d$ | $\varnothing D$ | L |
| f8 | H9 | - 0.0 + 0.2 |

Chamfer Radii

| | | | | | | |
|-----|-----|------|------|------|------|-------|
| c/s | 2.5 | 3.75 | 5.50 | 7.75 | 10.5 | 12.25 |
| C | 1.5 | 2.0 | 2.5 | 5.0 | 7.5 | 10.0 |
| r | 0.3 | 0.5 | 0.8 | 1.2 | 1.5 | 1.5 |

Extrusion Gap

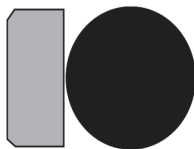
| | | | | | |
|----------|-----|------|------|------|------|
| Pressure | Bar | 100 | 200 | 300 | 400 |
| | G | 0.80 | 0.65 | 0.50 | 0.35 |

Typical Examples

Reciprocating Rotary Oscillating Helix



Rod seals



Key Features

Medium to heavy duty

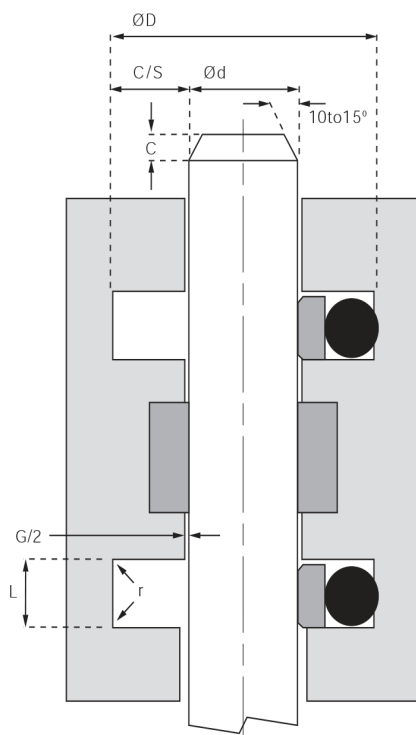
Rod seal only

Higher pressures

High speed capability

Compact housing

Easy to fit

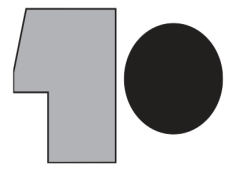




GR3

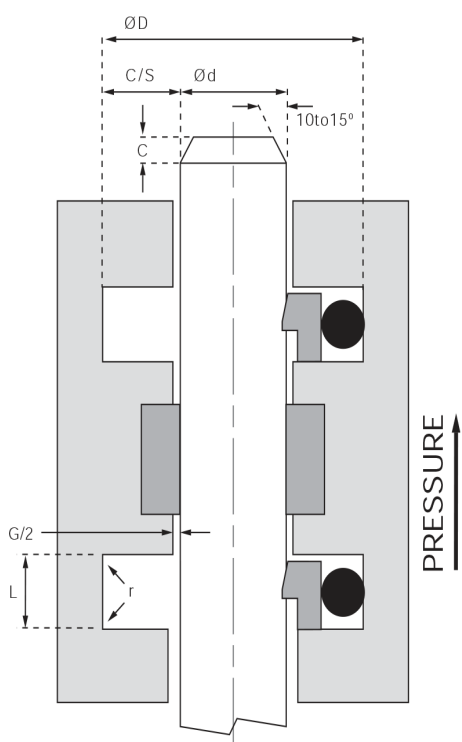
Glide & Buffer Rings

Rod seals



Key Features

- Medium to heavy duty
- Rod seal only
- Higher pressures
- High speed capability
- Compact housing
- Easy to fit



Design

GR3 are designed as high pressure, low friction single acting rod seals for use in heavy duty hydraulic and pneumatic applications. They consist of an outer NBR o-ring energiser and an inner ring of Bronze filled PTFE. This inner ring has a step machined into approximately the middle. This step reduces the area which the energiser loads, creating a dry rod seal. The step faces the direction of the pressure. Through the use of different energising materials a low cost high temperature seal can be created. Due to the properties of Bronze PTFE speeds up to 15 m/s can be accommodated.

Operating Conditions

| Pressure | |
|-----------|--|
| 350 Bar | |
| 5,000 Psi | |

| Temperature | |
|---------------|--|
| -40° to 110°C | |
| -40° to 230°F | |

| Speed | |
|-----------|--|
| 4.0m/sec | |
| 12.0'/sec | |

| Surface Finish µmRa | | |
|---------------------|------|-----|
| Ød | ØD | L |
| 0.1 - 0.25 | ≤0.8 | 1.0 |

| Tolerances | | |
|------------|----|-------------|
| Ød | ØD | L |
| f8 | H9 | - 0.0 + 0.2 |

| Chamfer Radii | | | | | | |
|---------------|-----|------|------|------|------|-------|
| C/S | 2.5 | 3.75 | 5.50 | 7.75 | 10.5 | 12.25 |
| C | 1.5 | 2.0 | 2.5 | 5.0 | 7.5 | 10.0 |
| r | 0.3 | 0.5 | 0.8 | 1.2 | 1.5 | 1.5 |

| Extrusion Gap | | | | | |
|---------------|-----|------|------|------|------|
| Pressure | Bar | 100 | 200 | 300 | 400 |
| | G | 0.80 | 0.65 | 0.50 | 0.35 |

Typical Examples

- Reciprocating Rotary Oscillating Helix





GR5

Glide & Buffer Rings

Design

GR5 are designed as high pressure low friction single acting rod seals for use in heavy duty hydraulic and pneumatic applications. They consist of an outer Viton o-ring energiser and an inner ring of Bronze filled or virgin PTFE. This inner ring has a step machined into approximately the middle. This step reduces the area which the energiser loads, creating a dry rod seal. The step faces the direction of the pressure. Due to the properties of Bronze PTFE speeds up to 15 m/s can be accommodated.

Operating Conditions

| | |
|-----------------|--|
| Pressure | |
| 350 Bar | |
| 5,000 Psi | |

| | |
|--------------------|--|
| Temperature | |
| -20° to 200°C | |
| -4° to 392°F | |

| | |
|--------------|--|
| Speed | |
| 4.0m/sec | |
| 12.0'/sec | |

| | | |
|--|-----------------|-----|
| Surface Finish μmRa | | |
| $\varnothing d$ | $\varnothing D$ | L |
| 0.1 - 0.25 | ≤ 0.8 | 1.0 |

| | | |
|-------------------|-----------------|-------------|
| Tolerances | | |
| $\varnothing d$ | $\varnothing D$ | L |
| f8 | H9 | - 0.0 + 0.2 |

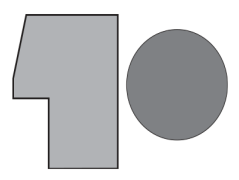
| | | | | | | |
|----------------------|-----|------|------|------|------|-------|
| Chamfer Radii | | | | | | |
| C/S | 2.5 | 3.75 | 5.50 | 7.75 | 10.5 | 12.25 |
| C | 1.5 | 2.0 | 2.5 | 5.0 | 7.5 | 10.0 |
| r | 0.3 | 0.5 | 0.8 | 1.2 | 1.5 | 1.5 |

| | | | | |
|----------------------|------|------|------|------|
| Extrusion Gap | | | | |
| Pressure Bar | 100 | 200 | 300 | 400 |
| G | 0.80 | 0.65 | 0.50 | 0.35 |

Typical Examples
 Reciprocating Rotary Oscillating Helix

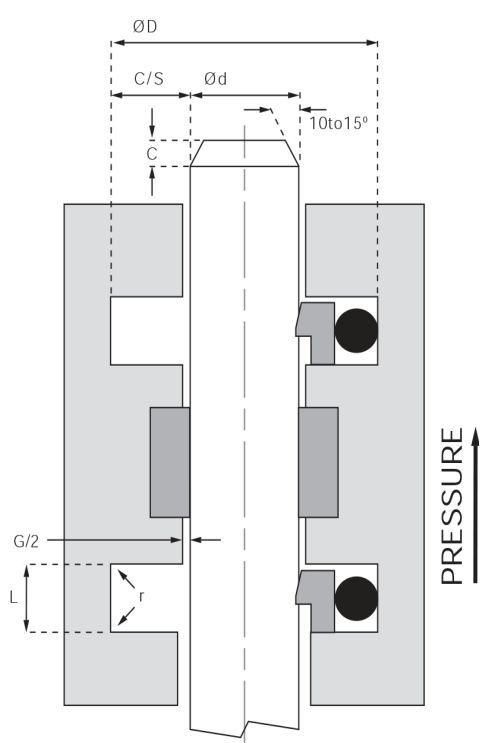


Rod seals



Key Features

- Medium to heavy duty
- Rod seal only
- Higher pressures
- High speed capability
- Higher temperature capability
- Easy to fit





GRU

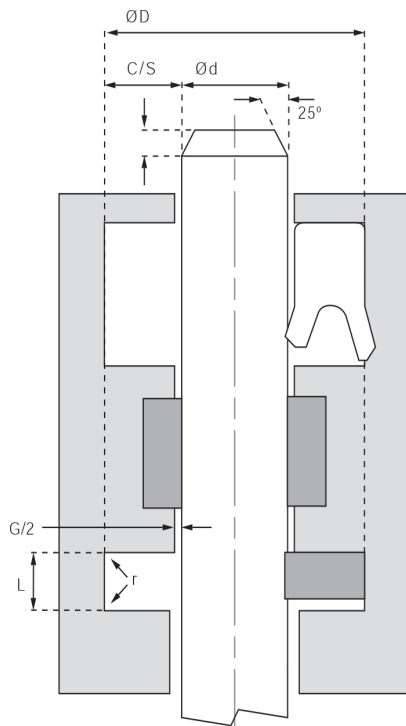
Glide & Buffer Rings

Rod seals



Key Features

- Medium to heavy duty
- Rod seal only
- Higher pressures
- High speed capability
- Compact housing
- Easy to fit



Design

GRU are a symmetrical buffer type single acting seal. They are a straight cut polyurethane ring usually with a groove or slot, which faces the pressure, to enable oil to flow to the secondary seal to maintain lubrication and a dry rod. The buffer seal is designed to absorb pressure fluctuations under high load conditions, thus increasing the life of the tandem seal. This type of arrangement is used where both low friction and low leakage are required. The seals high pressure resistance makes it suitable for use in heavy duty applications where shock loads and pressure spikes occur, as found in mobile plant equipment.

Operating Conditions

Pressure

350 Bar
5,000 Psi



Temperature

-40° to 105°C
-40° to 221°F



Speed

0.8m/sec
2.5'/sec



Surface Finish μmRa

| $\varnothing d$ | $\varnothing D$ | L |
|-----------------|-----------------|-----|
| 0.1 - 0.25 | ≤ 0.8 | 2.0 |

Tolerances

| $\varnothing d$ | $\varnothing D$ | L |
|-----------------|-----------------|-------------|
| f9 | H11 | - 0.0 + 0.2 |

Chamfer Radii

| Radii | r | 0.2 |
|-------|---|-----|
|-------|---|-----|

Extrusion Gap

| Pressure | Bar | | | |
|----------|------|------|------|------|
| | 100 | 200 | 300 | 400 |
| G | 0.80 | 0.65 | 0.50 | 0.35 |

Typical Examples

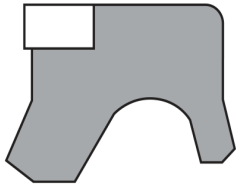
Reciprocating Rotary Oscillating Helix



HBY

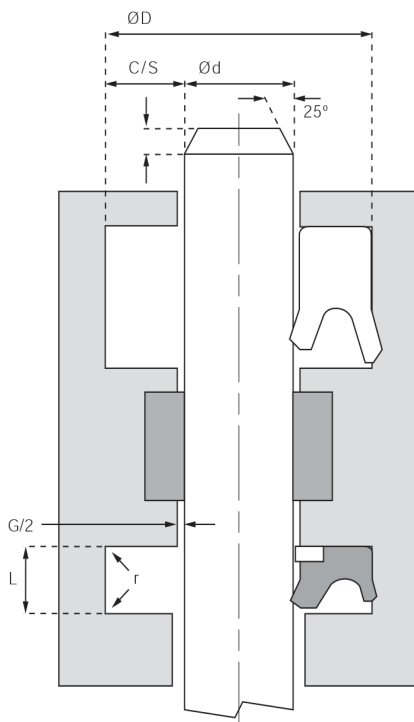
Glide & Buffer Rings

Rod seals



Key Features

- Medium to heavy duty
- Rod seal only
- Higher pressures
- High speed capability
- Compact housing
- Easy to fit



Design

HBY is a single acting buffer seal for gland applications using the same housing design as GR3. The sealing element is manufactured in Polyurethane, with a Polyacetyl anti-extrusion ring. Designed as a high pressure low friction seal for use in second generation tandem sealing arrangements. The HBY seal is used on the pressure side and a low leak but higher friction seal on the non pressure side to collect oil film during the positive stroke. This type of arrangement is used where both low friction and low leakage are required. The seals high pressure resistance makes it suitable for use in heavy duty applications where shock loads and pressure spikes occur, as found in mobile plant equipment.

Operating Conditions

Pressure

500 Bar
7,000 Psi



Temperature

-40° to 105°C
-40° to 221°F



Speed

0.8m/sec
2.5'/sec



Surface Finish μmRa

| | | |
|-------------|-------------|-----|
| Ød | ØD | L |
| 0.1 - 0.25 | ≤ 0.8 | 2.0 |

Tolerances

| | | |
|-------------|-------------|-------------|
| Ød | ØD | L |
| f9 | H11 | - 0.0 + 0.2 |

Chamfer Radii

| | |
|-----|------|
| C/S | 7.75 |
| C | 4.0 |
| r | 0.8 |

Extrusion Gap

| | | | | | |
|----------|-----|------|------|------|------|
| Pressure | Bar | 100 | 200 | 300 | 400 |
| | G | 0.80 | 0.65 | 0.50 | 0.35 |

Typical Examples

Reciprocating Rotary Oscillating Helix





GR2



GR3



GR5



GRU



HBY

| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
|-------|-------|------|------|------|------|-----------------|
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | R110-060071-042 |
| 11.00 | 6.00 | 2.20 | 0.00 | 0.00 | 0.00 | GR3-006010-022 |
| 13.00 | 8.00 | 2.20 | 0.00 | 0.00 | 0.00 | GR5-008013-022 |
| 13.00 | 8.00 | 2.20 | 0.00 | 0.00 | 0.00 | GR3-008013-022 |
| 14.90 | 10.00 | 1.90 | 2.20 | 0.00 | 0.00 | GR5-010015-022 |
| 15.00 | 10.00 | 1.90 | 2.20 | 0.00 | 0.00 | GR3-010015-022 |
| 17.00 | 12.00 | 1.90 | 2.20 | 0.00 | 0.00 | GR3-012017-022 |
| 19.00 | 14.00 | 1.90 | 2.20 | 0.00 | 0.00 | GR3-014019-022 |
| 19.30 | 12.00 | 2.80 | 3.20 | 0.00 | 0.00 | GR5-012019-032 |
| 19.50 | 12.00 | 2.80 | 3.20 | 0.00 | 0.00 | GR3-012019-032 |
| 21.00 | 16.00 | 1.90 | 2.20 | 0.00 | 0.00 | GR3-016021-022 |
| 21.30 | 14.00 | 2.80 | 3.20 | 0.00 | 0.00 | GR5-014021-032 |
| 21.50 | 14.00 | 2.80 | 3.20 | 0.00 | 0.00 | GR3-014021-032 |
| 22.30 | 15.00 | 2.80 | 3.20 | 0.00 | 0.00 | GR5-015022-032 |
| 22.50 | 15.00 | 2.80 | 3.20 | 0.00 | 0.00 | GR3-015022-032 |
| 23.30 | 16.00 | 2.80 | 3.20 | 0.00 | 0.00 | GR5-016023-032 |
| 23.50 | 16.00 | 2.80 | 3.20 | 0.00 | 0.00 | GR3-016023-032 |
| 23.80 | 18.00 | 2.70 | 3.20 | 0.00 | 0.00 | GR2-018023-027 |
| 25.30 | 18.00 | 2.80 | 3.20 | 0.00 | 0.00 | GR5-018025-032 |
| 25.50 | 18.00 | 2.80 | 3.20 | 0.00 | 0.00 | GR3-018025-032 |
| 27.50 | 20.00 | 2.80 | 3.20 | 0.00 | 0.00 | GR3-020027-032 |
| 27.50 | 20.00 | 2.90 | 3.20 | 0.00 | 0.00 | GR5-020027-032 |
| 29.50 | 22.00 | 2.80 | 3.20 | 0.00 | 0.00 | GR3-022029-032 |
| 29.50 | 22.00 | 3.20 | 0.00 | 0.00 | 0.00 | GR5-022029-032 |
| 30.70 | 20.00 | 3.80 | 4.20 | 0.00 | 0.00 | GR5-020031-042 |
| 31.00 | 20.00 | 0.00 | 0.00 | 0.00 | 0.00 | 616-020031-042 |
| 31.00 | 20.00 | 3.80 | 4.20 | 0.00 | 0.00 | GR3-020031-042 |
| 32.30 | 25.00 | 2.80 | 3.20 | 0.00 | 0.00 | GR5-025032-032 |
| 32.50 | 25.00 | 2.80 | 3.20 | 0.00 | 0.00 | GR3-025032-032 |
| 32.70 | 22.00 | 3.80 | 4.20 | 0.00 | 0.00 | GR5-022033-042 |
| 33.00 | 22.00 | 3.80 | 4.20 | 0.00 | 0.00 | GR3-022033-042 |



GR2



GR3



GR5



GRU



HBY

| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
|-------|-------|------|------|------|-----------|-----------------|
| 33.10 | 22.40 | 3.80 | 4.20 | 0.00 | 0.00 | GR5-022033-042A |
| 33.40 | 22.40 | 3.80 | 4.20 | 0.00 | 0.00 | GR3-022033-042A |
| 35.00 | 25.00 | 5.00 | 4.70 | 0.00 | 0.00 | GR3-025035-050 |
| 35.50 | 28.00 | 2.80 | 3.20 | 0.00 | 0.00 | GR3-028035-032 |
| 35.70 | 25.00 | 3.80 | 4.20 | 0.00 | 0.00 | GR5-025036-042 |
| 36.00 | 25.00 | 3.80 | 4.20 | 0.00 | 0.00 | GR3-025036-042 |
| 37.50 | 30.00 | 2.80 | 3.20 | 0.00 | 0.00 | GR3-030037-032 |
| 38.70 | 28.00 | 3.80 | 4.20 | 0.00 | 0.00 | GR5-028039-042 |
| 39.00 | 28.00 | 3.80 | 4.20 | 0.00 | 0.00 | GR3-028039-042 |
| 39.30 | 32.00 | 2.80 | 3.20 | 0.00 | 0.00 | GR5-032039-032 |
| 39.50 | 32.00 | 2.80 | 3.20 | 0.00 | 0.00 | GR3-032039-032 |
| 40.70 | 30.00 | 3.80 | 4.20 | 0.00 | 0.00 | GR5-030041-042 |
| 41.00 | 30.00 | 3.00 | 3.20 | 0.00 | 30,041.00 | GRU-030041-032 |
| 41.00 | 30.00 | 3.80 | 4.20 | 0.00 | 0.00 | GR3-030041-042 |
| 42.30 | 35.00 | 2.80 | 3.20 | 0.00 | 0.00 | GR5-035042-032 |
| 42.50 | 35.00 | 2.80 | 3.20 | 0.00 | 0.00 | GR3-035042-032 |
| 42.70 | 32.00 | 3.80 | 4.20 | 0.00 | 0.00 | GR5-032043-042 |
| 43.00 | 32.00 | 3.80 | 4.20 | 0.00 | 0.00 | GR3-032043-042 |
| 44.50 | 36.00 | 2.80 | 3.20 | 0.00 | 0.00 | GR5-036044-032 |
| 44.50 | 36.00 | 2.80 | 3.20 | 0.00 | 0.00 | GR3-036044-032 |
| 45.50 | 38.00 | 2.80 | 3.20 | 0.00 | 0.00 | GR3-038045-032 |
| 45.70 | 35.00 | 3.80 | 4.20 | 0.00 | 0.00 | GR5-035046-042 |
| 46.00 | 35.00 | 3.00 | 3.20 | 0.00 | 35,046.00 | GRU-035046-032 |
| 46.00 | 35.00 | 3.80 | 4.20 | 0.00 | 0.00 | GR3-035046-042 |
| 46.70 | 36.00 | 3.80 | 4.20 | 0.00 | 0.00 | GR5-036047-042 |
| 47.00 | 36.00 | 3.80 | 4.20 | 0.00 | 0.00 | GR3-036047-042 |
| 47.10 | 32.00 | 5.90 | 6.30 | 0.00 | 0.00 | GR5-032047-063 |
| 47.50 | 32.00 | 5.90 | 6.30 | 0.00 | 0.00 | GR3-032047-063 |
| 48.00 | 35.00 | 3.00 | 3.20 | 0.00 | 35,048.00 | GRU-035048-032 |
| 48.00 | 40.00 | 3.00 | 3.20 | 0.00 | 0.00 | GRU-040048-032 |
| 50.70 | 40.00 | 3.80 | 4.20 | 0.00 | 0.00 | GR5-040051-042 |



GR2



GR3



GR5



GRU



HBY

| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
|-------|-------|------|------|------|-----------|----------------|
| 51.00 | 40.00 | 3.80 | 4.20 | 0.00 | 0.00 | GR3-040051-042 |
| 55.50 | 40.00 | 5.90 | 6.30 | 0.00 | 0.00 | GR5-040055-063 |
| 55.50 | 40.00 | 5.90 | 6.30 | 0.00 | 0.00 | GR3-040055-063 |
| 55.50 | 40.00 | 5.90 | 6.30 | 0.00 | 40,055.00 | HBY-040055-063 |
| 55.70 | 45.00 | 3.80 | 4.20 | 0.00 | 0.00 | GR5-045056-042 |
| 56.00 | 45.00 | 3.20 | 3.50 | 0.00 | 0.00 | GRU-045 |
| 56.00 | 45.00 | 3.80 | 4.20 | 0.00 | 0.00 | GR3-045056-042 |
| 57.50 | 42.00 | 5.90 | 6.30 | 0.00 | 0.00 | GR3-042057-063 |
| 58.00 | 50.00 | 3.00 | 3.20 | 0.00 | 0.00 | GRU-050058-032 |
| 60.10 | 45.00 | 5.90 | 6.30 | 0.00 | 0.00 | GR5-045060-063 |
| 60.50 | 45.00 | 5.90 | 6.30 | 0.00 | 0.00 | HBY-045060-063 |
| 60.50 | 45.00 | 5.90 | 6.30 | 0.00 | 0.00 | GR3-045060-063 |
| 60.70 | 50.00 | 3.80 | 4.20 | 0.00 | 0.00 | GR5-050061-042 |
| 61.00 | 50.00 | 3.80 | 4.20 | 0.00 | 0.00 | GR3-050061-042 |
| 61.00 | 50.00 | 3.90 | 4.20 | 0.00 | 0.00 | GR2-050061-042 |
| 62.00 | 50.00 | 3.00 | 3.20 | 0.00 | 0.00 | GRU-050062-032 |
| 62.70 | 50.00 | 3.80 | 4.30 | 0.00 | 0.00 | GRU-050062-043 |
| 65.10 | 50.00 | 5.90 | 6.30 | 0.00 | 0.00 | GR5-050065-063 |
| 65.50 | 50.00 | 5.90 | 6.30 | 0.00 | 0.00 | HBY-050065-063 |
| 65.50 | 50.00 | 5.90 | 6.30 | 0.00 | 0.00 | GR3-050065-063 |
| 66.70 | 56.00 | 3.80 | 4.20 | 0.00 | 0.00 | GR5-056067-042 |
| 67.00 | 56.00 | 3.80 | 4.20 | 0.00 | 0.00 | GR3-056067-042 |
| 68.00 | 55.00 | 4.00 | 0.00 | 0.00 | 0.00 | GRU-055068-042 |
| 68.00 | 56.00 | 3.80 | 4.30 | 0.00 | 56,068.00 | GRU-056068-043 |
| 70.10 | 55.00 | 5.90 | 6.30 | 0.00 | 0.00 | GR5-055070-063 |
| 70.50 | 55.00 | 5.90 | 6.30 | 0.00 | 0.00 | HBY-055070-063 |
| 70.50 | 55.00 | 5.90 | 6.30 | 0.00 | 0.00 | GR3-055070-063 |
| 71.00 | 60.00 | 3.20 | 3.50 | 0.00 | 0.00 | GRU-060 |
| 71.00 | 60.00 | 3.80 | 4.20 | 0.00 | 0.00 | GR3-060071-042 |
| 71.00 | 60.00 | 3.80 | 4.20 | 0.00 | 0.00 | GR2-060071-042 |
| 71.10 | 56.00 | 5.90 | 6.30 | 0.00 | 0.00 | GR5-056071-063 |



GR2



GR3



GR5



GRU



HBY

| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
|-------|-------|------|------|------|-----------|----------------|
| 71.50 | 56.00 | 5.90 | 6.30 | 0.00 | 0.00 | GR3-056071-063 |
| 73.00 | 56.00 | 4.80 | 5.20 | 0.00 | 56,073.00 | GRU-056073-052 |
| 74.00 | 63.00 | 3.80 | 4.20 | 0.00 | 0.00 | GR3-063074-042 |
| 75.10 | 60.00 | 5.90 | 6.30 | 0.00 | 0.00 | GR5-060075-063 |
| 75.50 | 60.00 | 5.90 | 6.30 | 0.00 | 0.00 | HBY-060075-063 |
| 75.50 | 60.00 | 5.90 | 6.30 | 0.00 | 0.00 | GR3-060075-063 |
| 76.00 | 65.00 | 3.80 | 4.20 | 0.00 | 0.00 | GR3-065076-042 |
| 77.00 | 63.00 | 2.80 | 3.00 | 0.00 | 0.00 | GRU-063077-030 |
| 77.00 | 65.00 | 3.20 | 3.50 | 0.00 | 0.00 | GRU-065 |
| 78.00 | 65.00 | 3.80 | 4.30 | 0.00 | 65,078.00 | GRU-065078-043 |
| 78.10 | 63.00 | 5.90 | 6.30 | 0.00 | 0.00 | GR5-063078-063 |
| 78.50 | 63.00 | 5.90 | 6.30 | 0.00 | 0.00 | HBY-063078-063 |
| 78.50 | 63.00 | 5.90 | 6.30 | 0.00 | 0.00 | GR3-063078-063 |
| 80.50 | 65.00 | 5.90 | 6.30 | 0.00 | 0.00 | GR5-065080-063 |
| 80.50 | 65.00 | 5.90 | 6.30 | 0.00 | 0.00 | GR3-065080-063 |
| 80.50 | 65.00 | 5.90 | 6.30 | 0.00 | 65,080.00 | HBY-065080-063 |
| 83.00 | 70.00 | 3.80 | 4.30 | 0.00 | 70,083.00 | GRU-070083-043 |
| 83.50 | 70.00 | 3.00 | 3.20 | 0.00 | 70,083.00 | GRU-070083-032 |
| 84.00 | 70.00 | 3.00 | 3.20 | 0.00 | 0.00 | GRU-070084-032 |
| 85.10 | 70.00 | 5.90 | 6.30 | 0.00 | 0.00 | GR5-070085-063 |
| 85.50 | 70.00 | 5.80 | 6.30 | 0.00 | 0.00 | GR2-070085-063 |
| 85.50 | 70.00 | 5.90 | 6.30 | 0.00 | 0.00 | HBY-070085-063 |
| 85.50 | 70.00 | 5.90 | 6.30 | 0.00 | 0.00 | GR3-070085-063 |
| 88.00 | 75.00 | 3.80 | 4.30 | 0.00 | 75,088.00 | GRU-075088-043 |
| 88.50 | 73.00 | 5.90 | 6.30 | 0.00 | 0.00 | GR3-073088-063 |
| 90.10 | 75.00 | 5.90 | 6.30 | 0.00 | 0.00 | GR5-075090-063 |
| 90.50 | 75.00 | 5.90 | 6.30 | 0.00 | 0.00 | HBY-075090-063 |
| 90.50 | 75.00 | 5.90 | 6.30 | 0.00 | 0.00 | GR3-075090-063 |
| 91.00 | 80.00 | 3.90 | 4.20 | 0.00 | 0.00 | GR2-080091-042 |
| 93.00 | 80.00 | 3.80 | 4.30 | 0.00 | 80,093.00 | GRU-080093-043 |
| 95.10 | 80.00 | 5.90 | 6.30 | 0.00 | 0.00 | GR5-080095-063 |





GR2



GR3



GR5



GRU



HBY

| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
|--------|--------|------|------|------|------------|----------------|
| 95.50 | 80.00 | 5.90 | 6.30 | 0.00 | 0.00 | HBY-080095-063 |
| 95.50 | 80.00 | 5.90 | 6.30 | 0.00 | 0.00 | GR3-080095-063 |
| 95.50 | 80.00 | 5.90 | 6.30 | 0.00 | 0.00 | GR2-080095-063 |
| 100.10 | 85.00 | 5.90 | 6.30 | 0.00 | 0.00 | GR5-085100-063 |
| 100.50 | 85.00 | 5.90 | 6.30 | 0.00 | 0.00 | HBY-085100-063 |
| 100.50 | 85.00 | 5.90 | 6.30 | 0.00 | 0.00 | GR3-085100-063 |
| 104.00 | 90.00 | 3.80 | 4.30 | 0.00 | 90,104.00 | GRU-090104-043 |
| 105.10 | 90.00 | 5.90 | 6.30 | 0.00 | 0.00 | GR5-090105-063 |
| 105.50 | 90.00 | 5.90 | 6.30 | 0.00 | 0.00 | GR3-090105-063 |
| 105.50 | 90.00 | 5.90 | 6.30 | 0.00 | 90,105.00 | HBY-090105-063 |
| 110.10 | 95.00 | 5.90 | 6.30 | 0.00 | 0.00 | GR5-095110-063 |
| 110.50 | 95.00 | 5.90 | 6.30 | 0.00 | 0.00 | GR3-095110-063 |
| 110.50 | 95.00 | 5.90 | 6.30 | 0.00 | 95,110.00 | HBY-095110-063 |
| 113.00 | 100.00 | 3.80 | 4.30 | 0.00 | 100,113.00 | GRU-100113-043 |
| 115.10 | 100.00 | 5.90 | 6.30 | 0.00 | 0.00 | GR5-100115-063 |
| 115.50 | 100.00 | 5.90 | 6.30 | 0.00 | 0.00 | HBY-100115-063 |
| 115.50 | 100.00 | 5.90 | 6.30 | 0.00 | 0.00 | GR3-100115-063 |
| 120.10 | 105.00 | 5.90 | 6.30 | 0.00 | 0.00 | GR5-105120-063 |
| 120.50 | 105.00 | 5.90 | 6.30 | 0.00 | 0.00 | GR3-105120-063 |
| 120.50 | 105.00 | 5.90 | 6.30 | 0.00 | 105,120.00 | HBY-105120-063 |
| 125.10 | 110.00 | 5.90 | 6.30 | 0.00 | 0.00 | GR5-110125-063 |
| 125.50 | 110.00 | 5.90 | 6.30 | 0.00 | 0.00 | GR3-110125-063 |
| 125.50 | 110.00 | 5.90 | 6.30 | 0.00 | 110,125.00 | HBY-110125-063 |
| 130.10 | 115.00 | 5.90 | 6.30 | 0.00 | 0.00 | GR5-115130-063 |
| 130.50 | 115.00 | 5.90 | 6.30 | 0.00 | 0.00 | HBY-115130-063 |
| 130.50 | 115.00 | 5.90 | 6.30 | 0.00 | 0.00 | GR3-115130-063 |
| 131.00 | 110.00 | 7.80 | 8.10 | 0.00 | 0.00 | GR3-110131-081 |
| 135.10 | 120.00 | 5.90 | 6.30 | 0.00 | 0.00 | GR5-120135-063 |
| 135.50 | 120.00 | 5.90 | 6.30 | 0.00 | 0.00 | HBY-120135-063 |
| 135.50 | 120.00 | 5.90 | 6.30 | 0.00 | 0.00 | GR3-120135-063 |
| 140.10 | 125.00 | 5.90 | 6.30 | 0.00 | 0.00 | GR5-125140-063 |



GR2



GR3



GR5



GRU



HBY

| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
|--------|--------|------|------|------|------------|----------------|
| 140.50 | 125.00 | 5.90 | 6.30 | 0.00 | 0.00 | HBY-125140-063 |
| 140.50 | 125.00 | 5.90 | 6.30 | 0.00 | 0.00 | GR3-125140-063 |
| 145.10 | 130.00 | 5.90 | 6.30 | 0.00 | 0.00 | GR5-130145-063 |
| 145.50 | 130.00 | 5.90 | 6.30 | 0.00 | 0.00 | HBY-130145-063 |
| 145.50 | 130.00 | 5.90 | 6.30 | 0.00 | 0.00 | GR3-130145-063 |
| 150.10 | 135.00 | 5.90 | 6.30 | 0.00 | 0.00 | GR5-135150-063 |
| 155.10 | 140.00 | 5.90 | 6.30 | 0.00 | 0.00 | GR5-140155-063 |
| 155.50 | 140.00 | 5.90 | 6.30 | 0.00 | 0.00 | GR3-140155-063 |
| 155.50 | 140.00 | 5.90 | 6.30 | 0.00 | 0.00 | GR2-140155-063 |
| 155.50 | 140.00 | 5.90 | 6.30 | 0.00 | 140,155.00 | HBY-140155-063 |
| 160.10 | 145.00 | 5.90 | 6.30 | 0.00 | 0.00 | GR5-145160-063 |
| 160.50 | 145.00 | 5.90 | 6.30 | 0.00 | 0.00 | GR3-145160-063 |
| 161.00 | 150.00 | 3.80 | 4.20 | 0.00 | 0.00 | GR3-150161-042 |
| 165.10 | 150.00 | 5.90 | 6.30 | 0.00 | 0.00 | GR5-150165-063 |
| 165.10 | 150.00 | 5.90 | 6.30 | 0.00 | 0.00 | GR2-150165-063 |
| 165.50 | 150.00 | 5.90 | 6.30 | 0.00 | 0.00 | GR3-150165-063 |
| 170.10 | 155.00 | 5.90 | 6.30 | 0.00 | 0.00 | GR5-155170-063 |
| 170.50 | 155.00 | 5.90 | 6.30 | 0.00 | 0.00 | GR3-155170-063 |
| 171.00 | 150.00 | 7.70 | 8.10 | 0.00 | 0.00 | GR3-150171-081 |
| 175.10 | 160.00 | 5.90 | 6.30 | 0.00 | 0.00 | GR5-160175-063 |
| 175.50 | 160.00 | 0.00 | 0.00 | 0.00 | 0.00 | HBY-160175-063 |
| 175.50 | 160.00 | 5.90 | 6.30 | 0.00 | 0.00 | GR3-160175-063 |
| 180.50 | 165.00 | 5.80 | 6.30 | 0.00 | 0.00 | GR2-165180-063 |
| 185.10 | 170.00 | 5.90 | 6.30 | 0.00 | 0.00 | GR5-170185-063 |
| 185.50 | 170.00 | 5.90 | 6.30 | 0.00 | 0.00 | GR3-170185-063 |
| 190.50 | 170.00 | 7.70 | 8.10 | 0.00 | 0.00 | GR3-170191-081 |
| 195.10 | 180.00 | 5.90 | 6.30 | 0.00 | 0.00 | GR5-180195-063 |
| 195.50 | 180.00 | 5.90 | 6.30 | 0.00 | 0.00 | GR3-180195-063 |
| 195.50 | 180.00 | 5.90 | 6.30 | 0.00 | 180,195.00 | HBY-180195-063 |
| 201.00 | 180.00 | 7.70 | 8.10 | 0.00 | 0.00 | GR3-180201-081 |
| 205.10 | 190.00 | 5.90 | 6.30 | 0.00 | 0.00 | GR5-190205-063 |



GR2



GR3



GR5



GRU



HBY

| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
|--------|--------|------|------|------|------|----------------|
| 205.50 | 190.00 | 5.90 | 6.30 | 0.00 | 0.00 | GR3-190205-063 |
| 220.50 | 200.00 | 7.70 | 8.10 | 0.00 | 0.00 | GR5-200221-081 |
| 221.00 | 200.00 | 7.70 | 8.10 | 0.00 | 0.00 | GR3-200221-081 |
| 230.50 | 210.00 | 7.70 | 8.10 | 0.00 | 0.00 | GR5-210231-081 |
| 240.50 | 220.00 | 7.70 | 8.10 | 0.00 | 0.00 | GR5-220241-081 |
| 241.00 | 220.00 | 7.70 | 8.10 | 0.00 | 0.00 | GR3-220241-081 |
| 250.50 | 230.00 | 7.70 | 8.10 | 0.00 | 0.00 | GR5-230251-081 |
| 251.00 | 230.00 | 7.70 | 8.10 | 0.00 | 0.00 | GR3-230251-081 |
| 260.50 | 240.00 | 7.70 | 8.10 | 0.00 | 0.00 | GR5-240261-081 |
| 261.00 | 240.00 | 7.70 | 8.10 | 0.00 | 0.00 | GR3-240261-081 |
| 270.50 | 250.00 | 7.70 | 8.10 | 0.00 | 0.00 | GR5-250271-081 |
| 271.00 | 250.00 | 7.70 | 8.10 | 0.00 | 0.00 | GR3-250271-081 |
| 288.00 | 260.00 | 8.60 | 9.00 | 0.00 | 0.00 | GR3-260288-090 |
| 290.50 | 270.00 | 7.80 | 8.10 | 0.00 | 0.00 | GR3-270290-081 |
| 294.00 | 270.00 | 7.70 | 8.10 | 0.00 | 0.00 | GR5-270294-081 |
| 294.50 | 270.00 | 7.70 | 8.10 | 0.00 | 0.00 | GR3-270294-081 |
| 304.00 | 280.00 | 7.70 | 8.10 | 0.00 | 0.00 | GR5-280304-081 |
| 304.50 | 280.00 | 7.70 | 8.10 | 0.00 | 0.00 | GR3-280304-081 |
| 324.00 | 300.00 | 7.70 | 8.10 | 0.00 | 0.00 | GR5-300324-081 |
| 324.50 | 300.00 | 7.70 | 8.10 | 0.00 | 0.00 | GR3-300324-081 |
| 344.00 | 320.00 | 7.70 | 8.10 | 0.00 | 0.00 | GR5-320344-081 |
| 344.50 | 320.00 | 7.70 | 8.10 | 0.00 | 0.00 | GR3-320344-081 |
| 384.00 | 360.00 | 7.70 | 8.10 | 0.00 | 0.00 | GR5-360384-081 |
| 384.50 | 360.00 | 7.70 | 8.10 | 0.00 | 0.00 | GR3-360384-081 |





VS1

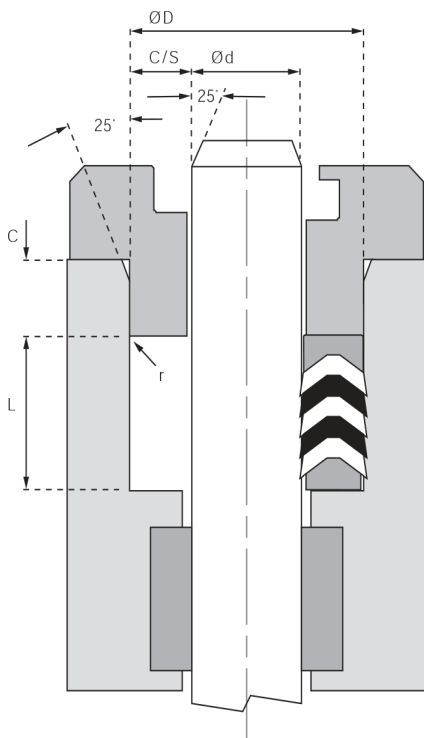
V Pack Sets

Rod seals



Key Features

- Medium to heavy duty
- Piston or rod
- Wide size range
- Handles some misalignment
- Hard wearing



Design

VS1 are a single acting rod or piston seal for medium to heavy duty applications. The assembly consists of a male and female adaptor with a series of 'V' shaped rings. The number of 'V' rings may be varied to alter the assembled height. The material is generally fabric reinforced NBR, although some sets incorporate NBR only 'V' rings to assist low pressure sealing. This is a non preferred design but it still has a place in applications where difficult conditions prevail such as pressure surges and misalignment.

Operating Conditions

Pressure

700 Bar
10,000 Psi



Temperature

-30° to 100°C
-22° to 212°F



Speed

0.5m/sec
1.5'/sec



Surface Finish μmRa

| $\varnothing d$ | $\varnothing D$ | L |
|-----------------|-----------------|-----|
| 0.1 - 0.25 | ≤ 0.8 | 2.0 |

Tolerances

| $\varnothing d$ | $\varnothing D$ | L |
|-----------------|-----------------|----------|
| f9 | H11 | -0 + 0.2 |

Chamfer Radii

| | 5.0 | 7.5 | 10.0 |
|-----|-----|-----|------|
| C/S | 5.0 | 7.5 | 10.0 |
| C | 2.5 | 4.0 | 5.0 |
| r | 0.3 | 0.4 | 0.6 |

Typical Examples

Reciprocating Rotary Oscillating Helix



Similar Styles



SM1

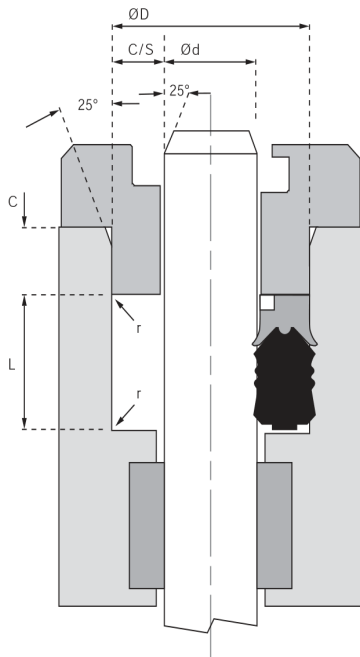
V Pack Sets

Rod seals



Key Features

- Heavy duty
- Higher pressure
- Will handle some mis-alignment
- Anti-extrusion ring
- Vee set replacement
- Nil adjustment required
- Hardy construction



Design

SM1 is a three piece rod seal consisting of an NBR sealing element which is backed up by a tough thermoplastic elastomer adaptor with a Polyacetal anti-extrusion ring on the inside diameter heal. The complete assembly forms a highly robust sealing unit for use in high pressure applications where shock loads and pressure spikes are present. The corrugations hold grease/oil and help to reduce friction and increase service life. This design is a modern and common replacement for veepac seals with the main difference that type SM1 does not require preload as this is already built into the rubber element.

Operating Conditions

Pressure

700 Bar
10,000 Psi



Temperature

-40° to 130°C
-40° to 266°F



Speed

0.5m/sec
1.5'/sec



Surface Finish μmRa

| $\text{\O}d$ | $\text{\O}D$ | L |
|--------------|--------------|-----|
| 0.1 - 0.25 | ≤ 0.8 | 2.0 |

Tolerances

| $\text{\O}d$ | $\text{\O}D$ | L |
|--------------|--------------|--------------|
| f8 | Js11 | -0.0 +0.2 |

Chamfer Radii

| | 8.0 | 10.0 | 12.5 |
|-----|-----|------|------|
| C/S | | | |
| C | 5.0 | 5.0 | 6.5 |
| r | 0.4 | 0.4 | 0.4 |

Typical Examples

Reciprocating Rotary Oscillating Helix



Similar Styles





VS1



SM1

| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
|-------|-------|-------|-------|------|-----------|----------------|
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | SM1-140160-300 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | SM1-130150-300 |
| 26.00 | 16.00 | 18.50 | 0.00 | 0.00 | 0.00 | VS1-016026-185 |
| 27.00 | 15.00 | 19.00 | 20.00 | 0.00 | 0.00 | SM1-015027-200 |
| 28.00 | 18.00 | 18.50 | 0.00 | 0.00 | 0.00 | VS1-018028-185 |
| 30.00 | 20.00 | 18.50 | 0.00 | 0.00 | 0.00 | VS1-020030-185 |
| 31.50 | 20.00 | 17.30 | 0.00 | 0.00 | 0.00 | VS1-020031-175 |
| 32.00 | 18.00 | 23.50 | 0.00 | 0.00 | 0.00 | VS1-018032-235 |
| 32.00 | 20.00 | 22.50 | 0.00 | 0.00 | 0.00 | VS1-020032-225 |
| 32.00 | 22.00 | 0.00 | 0.00 | 0.00 | 0.00 | VS1-022032-181 |
| 32.00 | 22.00 | 17.90 | 0.00 | 0.00 | 0.00 | VS1-022032-185 |
| 33.00 | 20.00 | 18.00 | 20.00 | 0.00 | 0.00 | SM1-020033-200 |
| 35.00 | 22.00 | 19.00 | 20.00 | 0.00 | 0.00 | SM1-022035-200 |
| 35.00 | 25.00 | 17.10 | 0.00 | 0.00 | 0.00 | VS1-025035-173 |
| 37.00 | 25.00 | 22.50 | 0.00 | 0.00 | 0.00 | VS1-025037-225 |
| 38.00 | 25.00 | 19.00 | 20.00 | 0.00 | 0.00 | SM1-025038-200 |
| 40.00 | 25.00 | 22.50 | 0.00 | 0.00 | 0.00 | VS1-025040-225 |
| 40.00 | 28.00 | 22.50 | 0.00 | 0.00 | 0.00 | VS1-028040-225 |
| 40.00 | 30.00 | 18.50 | 0.00 | 0.00 | 0.00 | VS1-030040-185 |
| 41.00 | 28.00 | 19.00 | 20.00 | 0.00 | 0.00 | SM1-028041-200 |
| 42.00 | 27.00 | 11.00 | 0.00 | 0.00 | 0.00 | VS1-027042-110 |
| 42.00 | 30.00 | 22.50 | 0.00 | 0.00 | 0.00 | VS1-030042-225 |
| 43.00 | 30.00 | 19.00 | 20.00 | 0.00 | 0.00 | SM1-030043-200 |
| 44.00 | 32.00 | 22.50 | 0.00 | 0.00 | 0.00 | VS1-032044-225 |
| 45.00 | 30.00 | 0.00 | 0.00 | 0.00 | 0.00 | VS1-030045-185 |
| 45.00 | 30.00 | 22.50 | 0.00 | 0.00 | 0.00 | VS1-030045-225 |
| 45.00 | 35.00 | 24.00 | 25.60 | 0.00 | 35,045.00 | SM1-035045-256 |
| 47.00 | 32.00 | 21.00 | 22.50 | 0.00 | 0.00 | SM1-032047-225 |
| 47.00 | 32.00 | 22.50 | 0.00 | 0.00 | 0.00 | VS1-032047-225 |
| 47.00 | 35.00 | 21.00 | 22.50 | 0.00 | 35,047.00 | SM1-035047-225 |
| 47.00 | 35.00 | 22.50 | 0.00 | 0.00 | 0.00 | VS1-035047-225 |



VS1



SM1

| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
|-------|-------|-------|-------|------|-----------|----------------|
| 48.00 | 36.00 | 22.50 | 0.00 | 0.00 | 0.00 | VS1-036048-225 |
| 50.00 | 35.00 | 11.50 | 0.00 | 0.00 | 0.00 | VS1-035050-115 |
| 50.00 | 35.00 | 21.00 | 22.50 | 0.00 | 0.00 | SM1-035050-225 |
| 50.00 | 35.00 | 22.50 | 0.00 | 0.00 | 0.00 | VS1-035050-225 |
| 50.00 | 40.00 | 23.00 | 0.00 | 0.00 | 0.00 | VS1-040050-230 |
| 51.00 | 36.00 | 21.00 | 22.50 | 0.00 | 0.00 | SM1-036051-225 |
| 52.00 | 40.00 | 21.00 | 22.50 | 0.00 | 0.00 | SM1-040052-225 |
| 54.00 | 42.00 | 22.50 | 0.00 | 0.00 | 0.00 | VS1-042054-225 |
| 55.00 | 40.00 | 21.00 | 22.50 | 0.00 | 0.00 | SM1-040055-225 |
| 55.00 | 40.00 | 22.50 | 0.00 | 0.00 | 0.00 | VS1-040055-225 |
| 60.00 | 40.00 | 28.50 | 30.00 | 0.00 | 0.00 | SM1-040060-300 |
| 60.00 | 40.00 | 30.00 | 0.00 | 0.00 | 0.00 | VS1-040060-300 |
| 60.00 | 45.00 | 21.00 | 22.50 | 0.00 | 0.00 | SM1-045060-225 |
| 60.00 | 45.00 | 22.50 | 0.00 | 0.00 | 0.00 | VS1-045060-225 |
| 63.00 | 48.00 | 13.00 | 0.00 | 0.00 | 0.00 | VS1-048063-130 |
| 63.00 | 50.00 | 19.00 | 20.00 | 0.00 | 0.00 | SM1-050063-200 |
| 65.00 | 45.00 | 26.50 | 28.00 | 0.00 | 0.00 | SM1-045065-280 |
| 65.00 | 45.00 | 27.50 | 0.00 | 0.00 | 0.00 | VS1-045065-275 |
| 65.00 | 50.00 | 21.00 | 22.50 | 0.00 | 0.00 | SM1-050065-225 |
| 65.00 | 50.00 | 22.50 | 0.00 | 0.00 | 0.00 | VS1-050065-225 |
| 70.00 | 50.00 | 28.50 | 30.00 | 0.00 | 0.00 | SM1-050070-300 |
| 70.00 | 50.00 | 30.00 | 0.00 | 0.00 | 0.00 | VS1-050070-300 |
| 70.00 | 55.00 | 21.00 | 22.50 | 0.00 | 0.00 | SM1-055070-225 |
| 70.00 | 55.00 | 22.50 | 0.00 | 0.00 | 0.00 | VS1-055070-225 |
| 70.00 | 55.00 | 26.50 | 0.00 | 0.00 | 0.00 | VS1-055070-265 |
| 71.00 | 56.00 | 22.50 | 0.00 | 0.00 | 0.00 | VS1-056071-225 |
| 71.00 | 56.00 | 23.50 | 25.00 | 0.00 | 0.00 | SM1-056071-250 |
| 75.00 | 55.00 | 26.00 | 0.00 | 0.00 | 55,075.00 | VS1-055075-260 |
| 75.00 | 55.00 | 28.50 | 30.00 | 0.00 | 0.00 | SM1-055075-300 |
| 75.00 | 55.00 | 30.00 | 0.00 | 0.00 | 0.00 | VS1-055075-300 |
| 75.00 | 60.00 | 21.00 | 22.50 | 0.00 | 0.00 | SM1-060075-225 |



VS1



SM1

| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
|-------|-------|-------|-------|------|-----------|-----------------|
| 75.00 | 60.00 | 22.50 | 0.00 | 0.00 | 0.00 | VS1-060075-225A |
| 75.00 | 60.00 | 22.50 | 0.00 | 0.00 | 0.00 | VS1-060075-225 |
| 76.00 | 56.00 | 26.50 | 28.00 | 0.00 | 0.00 | SM1-056076-280 |
| 77.00 | 60.00 | 25.50 | 27.00 | 0.00 | 0.00 | SM1-060077-270 |
| 78.00 | 63.00 | 22.50 | 0.00 | 0.00 | 0.00 | VS1-063078-225 |
| 80.00 | 60.00 | 15.20 | 0.00 | 0.00 | 0.00 | VS1-060080-152 |
| 80.00 | 60.00 | 26.00 | 0.00 | 0.00 | 0.00 | VS1-060080-260 |
| 80.00 | 60.00 | 28.50 | 30.00 | 0.00 | 0.00 | SM1-060080-300 |
| 80.00 | 60.00 | 30.50 | 32.00 | 0.00 | 0.00 | SM1-060080-320 |
| 80.00 | 60.00 | 37.00 | 0.00 | 0.00 | 0.00 | VS1-060080-370 |
| 80.00 | 65.00 | 22.50 | 0.00 | 0.00 | 0.00 | VS1-065080-225 |
| 83.00 | 63.00 | 25.50 | 27.00 | 0.00 | 0.00 | SM1-063083-270 |
| 83.00 | 63.00 | 27.50 | 29.00 | 0.00 | 0.00 | SM1-063083-290 |
| 83.00 | 63.00 | 37.00 | 0.00 | 0.00 | 0.00 | VS1-063083-370 |
| 83.00 | 70.00 | 23.50 | 25.00 | 0.00 | 0.00 | SM1-070083-250 |
| 85.00 | 65.00 | 27.50 | 29.00 | 0.00 | 0.00 | SM1-065085-290 |
| 85.00 | 65.00 | 30.00 | 0.00 | 0.00 | 0.00 | VS1-065085-300 |
| 85.00 | 65.00 | 40.00 | 0.00 | 0.00 | 0.00 | VS1-065085-400 |
| 85.00 | 70.00 | 21.00 | 22.50 | 0.00 | 0.00 | SM1-070085-225 |
| 85.00 | 70.00 | 22.50 | 0.00 | 0.00 | 70,085.00 | VS1-070085-225 |
| 85.00 | 70.00 | 23.50 | 25.00 | 0.00 | 0.00 | SM1-070085-250 |
| 90.00 | 70.00 | 21.20 | 0.00 | 0.00 | 0.00 | VS1-070090-212 |
| 90.00 | 70.00 | 28.50 | 30.00 | 0.00 | 0.00 | SM1-070090-300 |
| 90.00 | 70.00 | 30.00 | 0.00 | 0.00 | 0.00 | VS1-070090-300 |
| 90.00 | 70.00 | 30.50 | 31.90 | 0.00 | 0.00 | SM1-070090-320 |
| 90.00 | 70.00 | 40.00 | 0.00 | 0.00 | 0.00 | VS1-070090-400 |
| 90.00 | 75.00 | 22.50 | 0.00 | 0.00 | 0.00 | VS1-075090-225 |
| 95.00 | 75.00 | 28.50 | 30.00 | 0.00 | 0.00 | SM1-075095-300 |
| 95.00 | 75.00 | 30.00 | 0.00 | 0.00 | 0.00 | VS1-075095-300 |
| 95.00 | 75.00 | 40.00 | 0.00 | 0.00 | 0.00 | VS1-075095-400 |
| 95.00 | 80.00 | 22.50 | 0.00 | 0.00 | 0.00 | VS1-080095-225 |



VS1



SM1

| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
|--------|--------|-------|-------|------|------|-----------------|
| 96.50 | 76.50 | 31.00 | 32.50 | 0.00 | 0.00 | SM1-076096-325 |
| 98.00 | 85.00 | 23.50 | 25.00 | 0.00 | 0.00 | SM1-085098-250 |
| 100.00 | 80.00 | 28.50 | 30.00 | 0.00 | 0.00 | SM1-080100-300 |
| 100.00 | 80.00 | 40.00 | 0.00 | 0.00 | 0.00 | VS1-080100-400 |
| 100.00 | 85.00 | 22.50 | 0.00 | 0.00 | 0.00 | VS1-085100-225 |
| 105.00 | 85.00 | 28.50 | 30.00 | 0.00 | 0.00 | SM1-085105-300 |
| 105.00 | 85.00 | 40.00 | 0.00 | 0.00 | 0.00 | VS1-085105-400 |
| 105.00 | 90.00 | 22.50 | 0.00 | 0.00 | 0.00 | VS1-090105-225 |
| 105.00 | 90.00 | 23.50 | 25.00 | 0.00 | 0.00 | SM1-090105-250 |
| 105.00 | 90.00 | 31.50 | 35.00 | 0.00 | 0.00 | SM1-090105-350 |
| 110.00 | 90.00 | 28.50 | 30.00 | 0.00 | 0.00 | SM1-090110-300 |
| 110.00 | 90.00 | 40.00 | 0.00 | 0.00 | 0.00 | VS1-090110-400 |
| 110.00 | 95.00 | 24.00 | 0.00 | 0.00 | 0.00 | VS1-095110-240 |
| 115.00 | 90.00 | 27.41 | 0.00 | 0.00 | 0.00 | VS1-090115-274 |
| 115.00 | 95.00 | 26.50 | 28.00 | 0.00 | 0.00 | SM1-095115-280 |
| 115.00 | 100.00 | 30.00 | 0.00 | 0.00 | 0.00 | VS1-100115-300 |
| 118.00 | 105.00 | 23.50 | 25.00 | 0.00 | 0.00 | SM1-105118-250 |
| 120.00 | 100.00 | 28.50 | 30.00 | 0.00 | 0.00 | SM1-100120-300 |
| 120.00 | 100.00 | 30.00 | 0.00 | 0.00 | 0.00 | VS1-100120-300 |
| 120.00 | 100.00 | 40.00 | 0.00 | 0.00 | 0.00 | VS1-100120-400 |
| 120.00 | 105.00 | 32.50 | 34.00 | 0.00 | 0.00 | SM1-105120-340 |
| 125.00 | 105.00 | 40.00 | 0.00 | 0.00 | 0.00 | VS1-105125-400 |
| 125.00 | 110.00 | 30.00 | 0.00 | 0.00 | 0.00 | VS1-110125-300 |
| 130.00 | 110.00 | 31.00 | 32.50 | 0.00 | 0.00 | SM1-110130-325 |
| 130.00 | 110.00 | 40.00 | 0.00 | 0.00 | 0.00 | VS1-110130-400 |
| 130.00 | 115.00 | 28.50 | 30.00 | 0.00 | 0.00 | SM1-115130-300 |
| 135.00 | 110.00 | 40.00 | 0.00 | 0.00 | 0.00 | VS1-110135-400A |
| 135.00 | 110.00 | 40.00 | 0.00 | 0.00 | 0.00 | VS1-110135-400 |
| 140.00 | 110.00 | 60.00 | 0.00 | 0.00 | 0.00 | VS1-110140-600 |
| 140.00 | 115.00 | 25.80 | 0.00 | 0.00 | 0.00 | VS1-115140-258 |
| 140.00 | 115.00 | 46.00 | 0.00 | 0.00 | 0.00 | VS1-115140-460 |



VS1



SM1

| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
|--------|--------|-------|-------|------|------|-----------------|
| 140.00 | 120.00 | 28.50 | 30.00 | 0.00 | 0.00 | SM1-120140-300 |
| 140.00 | 120.00 | 30.00 | 0.00 | 0.00 | 0.00 | VS1-120140-300 |
| 140.00 | 125.00 | 34.00 | 0.00 | 0.00 | 0.00 | VS1-125140-340 |
| 145.00 | 125.00 | 28.50 | 30.00 | 0.00 | 0.00 | SM1-125145-300 |
| 145.00 | 125.00 | 29.60 | 0.00 | 0.00 | 0.00 | VS1-125145-296 |
| 145.00 | 125.00 | 32.00 | 0.00 | 0.00 | 0.00 | VS1-125145-320 |
| 150.00 | 120.00 | 29.00 | 0.00 | 0.00 | 0.00 | VS1-120150-290 |
| 150.00 | 120.00 | 44.00 | 0.00 | 0.00 | 0.00 | VS1-120150-440 |
| 150.00 | 125.00 | 27.20 | 0.00 | 0.00 | 0.00 | VS1-125150-274 |
| 150.00 | 125.00 | 46.00 | 0.00 | 0.00 | 0.00 | VS1-125150-460 |
| 150.00 | 130.00 | 26.50 | 28.00 | 0.00 | 0.00 | SM1-130150-280 |
| 150.00 | 130.00 | 29.56 | 0.00 | 0.00 | 0.00 | VS1-130150-297 |
| 150.00 | 130.00 | 39.68 | 0.00 | 0.00 | 0.00 | VS1-130150-396 |
| 155.00 | 125.00 | 36.00 | 0.00 | 0.00 | 0.00 | VS1-125155-410 |
| 155.00 | 135.00 | 26.50 | 28.00 | 0.00 | 0.00 | SM1-135155-280 |
| 155.00 | 140.00 | 34.00 | 0.00 | 0.00 | 0.00 | VS1-140155-340 |
| 160.00 | 130.00 | 29.00 | 0.00 | 0.00 | 0.00 | VS1-130160-290M |
| 160.00 | 130.00 | 29.00 | 0.00 | 0.00 | 0.00 | VS1-130160-290A |
| 160.00 | 130.00 | 29.00 | 0.00 | 0.00 | 0.00 | VS1-130160-290 |
| 160.00 | 130.00 | 41.50 | 0.00 | 0.00 | 0.00 | VS1-130160-415 |
| 160.00 | 140.00 | 26.50 | 28.00 | 0.00 | 0.00 | SM1-140160-280 |
| 165.00 | 140.00 | 40.00 | 0.00 | 0.00 | 0.00 | VS1-140165-400 |
| 165.00 | 140.00 | 46.00 | 0.00 | 0.00 | 0.00 | VS1-140165-460 |
| 165.00 | 145.00 | 21.00 | 22.50 | 0.00 | 0.00 | SM1-145165-225 |
| 165.00 | 145.00 | 26.50 | 28.00 | 0.00 | 0.00 | SM1-145165-280 |
| 170.00 | 140.00 | 59.00 | 0.00 | 0.00 | 0.00 | VS1-140170-590 |
| 170.00 | 150.00 | 26.50 | 28.00 | 0.00 | 0.00 | SM1-150170-280 |
| 170.00 | 150.00 | 40.00 | 0.00 | 0.00 | 0.00 | VS1-150170-400 |
| 175.00 | 155.00 | 26.50 | 28.00 | 0.00 | 0.00 | SM1-155175-280 |
| 180.00 | 150.00 | 60.00 | 0.00 | 0.00 | 0.00 | VS1-150180-600 |
| 180.00 | 160.00 | 26.50 | 28.00 | 0.00 | 0.00 | SM1-160180-280 |



VS1



SM1

| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
|--------|--------|-------|-------|------|------|----------------|
| 180.00 | 160.00 | 40.00 | 0.00 | 0.00 | 0.00 | VS1-160180-400 |
| 185.00 | 165.00 | 28.50 | 30.00 | 0.00 | 0.00 | SM1-165185-300 |
| 190.00 | 160.00 | 0.00 | 0.00 | 0.00 | 0.00 | VS1-160190-600 |
| 190.00 | 160.00 | 33.00 | 0.00 | 0.00 | 0.00 | VS1-160190-330 |
| 190.00 | 170.00 | 51.00 | 0.00 | 0.00 | 0.00 | VS1-170190-510 |
| 195.00 | 170.00 | 33.50 | 35.00 | 0.00 | 0.00 | SM1-170195-350 |
| 195.00 | 170.00 | 37.50 | 0.00 | 0.00 | 0.00 | VS1-170195-375 |
| 200.00 | 170.00 | 32.50 | 0.00 | 0.00 | 0.00 | VS1-170200-335 |
| 200.00 | 180.00 | 40.00 | 0.00 | 0.00 | 0.00 | VS1-180200-400 |
| 205.00 | 180.00 | 33.50 | 35.00 | 0.00 | 0.00 | SM1-180205-350 |
| 210.00 | 180.00 | 60.00 | 0.00 | 0.00 | 0.00 | VS1-180210-600 |
| 210.00 | 185.00 | 33.50 | 35.00 | 0.00 | 0.00 | SM1-185210-350 |
| 215.00 | 190.00 | 33.50 | 35.00 | 0.00 | 0.00 | SM1-190215-350 |
| 220.00 | 190.00 | 60.00 | 0.00 | 0.00 | 0.00 | VS1-190220-600 |
| 220.00 | 200.00 | 40.00 | 0.00 | 0.00 | 0.00 | VS1-200220-400 |
| 225.00 | 195.00 | 33.50 | 0.00 | 0.00 | 0.00 | VS1-195225-335 |
| 230.00 | 200.00 | 0.00 | 0.00 | 0.00 | 0.00 | VS1-200230-850 |
| 230.00 | 200.00 | 32.97 | 0.00 | 0.00 | 0.00 | VS1-200230-330 |
| 230.00 | 200.00 | 60.00 | 0.00 | 0.00 | 0.00 | VS1-200230-600 |
| 237.00 | 212.00 | 32.00 | 0.00 | 0.00 | 0.00 | VS1-212237-320 |
| 240.00 | 215.00 | 33.50 | 35.00 | 0.00 | 0.00 | SM1-215240-350 |
| 245.00 | 220.00 | 33.50 | 35.00 | 0.00 | 0.00 | SM1-220245-350 |
| 250.00 | 220.00 | 32.50 | 0.00 | 0.00 | 0.00 | VS1-220250-335 |
| 250.00 | 220.00 | 52.00 | 0.00 | 0.00 | 0.00 | VS1-220250-520 |
| 250.00 | 220.00 | 62.50 | 0.00 | 0.00 | 0.00 | VS1-220250-625 |
| 250.00 | 225.00 | 33.50 | 35.00 | 0.00 | 0.00 | SM1-225250-350 |
| 265.00 | 240.00 | 33.50 | 35.00 | 0.00 | 0.00 | SM1-240265-350 |
| 270.00 | 240.00 | 45.00 | 0.00 | 0.00 | 0.00 | VS1-240270-450 |
| 270.00 | 250.00 | 32.00 | 0.00 | 0.00 | 0.00 | VS1-250270-320 |
| 275.00 | 245.00 | 33.50 | 0.00 | 0.00 | 0.00 | VS1-245275-335 |
| 275.00 | 250.00 | 33.50 | 35.00 | 0.00 | 0.00 | SM1-250275-350 |



VS1



SM1

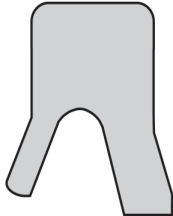
| OD | ID | L1 | L2 | OD2 | OD3 | Product Name |
|--------|--------|--------|-------|------|------|----------------|
| 280.00 | 250.00 | 33.00 | 0.00 | 0.00 | 0.00 | VS1-250280-330 |
| 290.00 | 265.00 | 33.50 | 35.00 | 0.00 | 0.00 | SM1-265290-350 |
| 305.00 | 280.00 | 33.50 | 35.00 | 0.00 | 0.00 | SM1-280305-350 |
| 315.00 | 280.00 | 38.45 | 0.00 | 0.00 | 0.00 | VS1-280315-384 |
| 320.00 | 290.00 | 50.80 | 0.00 | 0.00 | 0.00 | VS1-290320-508 |
| 320.00 | 300.00 | 32.00 | 0.00 | 0.00 | 0.00 | VS1-300320-320 |
| 330.00 | 300.00 | 52.00 | 0.00 | 0.00 | 0.00 | VS1-300330-520 |
| 330.00 | 310.00 | 30.00 | 0.00 | 0.00 | 0.00 | VS1-310330-300 |
| 350.00 | 315.00 | 38.45 | 0.00 | 0.00 | 0.00 | VS1-315350-384 |
| 350.00 | 320.00 | 0.00 | 0.00 | 0.00 | 0.00 | VS1-320350-762 |
| 350.00 | 320.00 | 84.00 | 0.00 | 0.00 | 0.00 | VS1-320350-840 |
| 365.00 | 320.00 | 55.00 | 0.00 | 0.00 | 0.00 | VS1-320365-550 |
| 380.00 | 340.00 | 58.00 | 0.00 | 0.00 | 0.00 | VS1-340380-580 |
| 380.00 | 340.00 | 60.00 | 0.00 | 0.00 | 0.00 | VS1-340380-600 |
| 390.00 | 360.00 | 60.00 | 0.00 | 0.00 | 0.00 | VS1-360390-600 |
| 440.00 | 400.00 | 0.00 | 0.00 | 0.00 | 0.00 | VS1-400440-810 |
| 460.00 | 420.00 | 72.50 | 0.00 | 0.00 | 0.00 | VS1-420460-725 |
| 600.00 | 550.00 | 102.00 | 0.00 | 0.00 | 0.00 | VS1-550600-102 |
| 758.00 | 720.00 | 68.00 | 0.00 | 0.00 | 0.00 | VS1-720758-680 |



GSP

Pneumatic

Rod seals



Key Features

- Dry or lubricated air media
- Rod only
- Low pressure capability
- Dynamic lip reaction
- Low friction
- Excellent wear resistance

Design

GSP pneumatic Polyurethane 90 shore A rod seal, has been redesigned with respect to traditional u-profile use in pneumatics to give significant improvements. The dynamic lip has no sharp edges to reduce friction, along with increased depth of the u-profile to increase flexibility. The use of urethane instead of rubber increases seal life and facilitates the use of **non-lubricated** air.

Operating Conditions

Pressure

16 Bar
230 Psi



Temperature

-30° to 80°C
-22° to 176°F



Speed

1.0m/sec
3.0'/sec



Surface Finish μmRa

| $\varnothing d$ | $\varnothing D$ | L |
|-----------------|-----------------|-----|
| 0.1 - 0.25 | ≤ 0.8 | 2.0 |

Tolerances

| $\varnothing d$ | $\varnothing D$ | L | G |
|-----------------|-----------------|----------|------|
| f7 | H9 | -0 + 0.5 | 0.25 |

Chamfer Radii

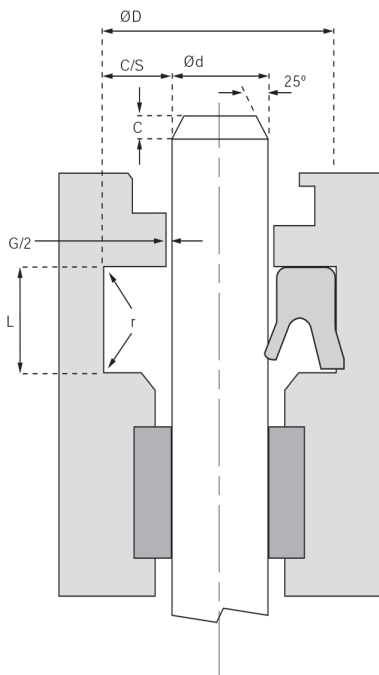
r
0.20

Typical Examples

Reciprocating Rotary Oscillating Helix



Similar Styles





DI

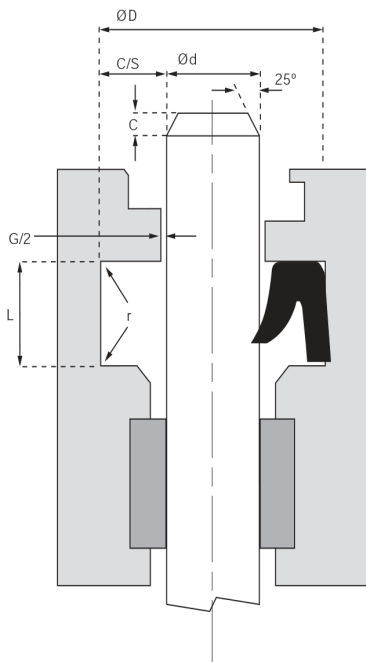
Pneumatic

Rod seals



Key Features

- Light duty
- Rod only
- Low pressure capability
- Dynamic lip reaction
- Low friction
- Easy to fit



Design

DI are designed as an easy to fit low pressure seal and are manufactured from NBR 90 Shore A. Type DI have a thicker and longer static sealing lip to form a buffer against axial movement. To ensure that type DI seals are fitted snugly in the grooves, they are moulded slightly larger on the heel outside diameter than the groove size to ensure positive sealing on the static face whilst maintaining dynamic sealing lip interference.

Operating Conditions

Pressure



Temperature



Speed



Surface Finish μmRa

| $\text{\O}d$ | $\text{\O}D$ | L |
|--------------|--------------|-----|
| 0.1 - 0.25 | ≤ 0.8 | 2.0 |

Tolerances

| $\text{\O}d$ | $\text{\O}D$ | L | G |
|--------------|--------------|----------|------|
| f7 | H8 | -0 + 0.2 | 0.25 |

Chamfer Radii

| | 1.5 | 3.0 | 5.0 | 7.5 | 10 |
|-----|-----|-----|-----|-----|-----|
| C/S | 1.5 | 3.0 | 5.0 | 7.5 | 10 |
| C | 1.0 | 2.0 | 2.5 | 3.0 | 3.0 |
| r | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 |

Typical Examples

Reciprocating Rotary Oscillating Helix



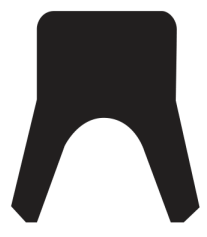
Similar Styles



U-70

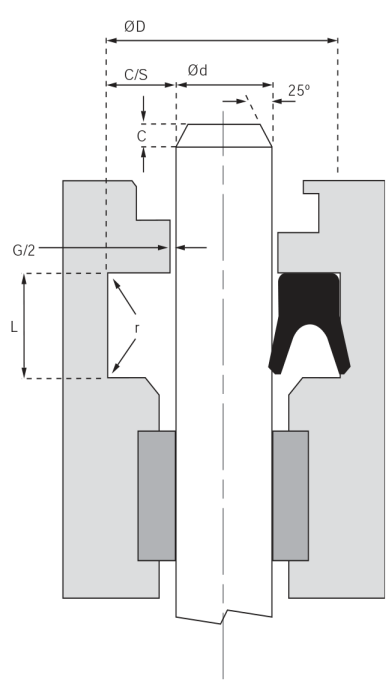
Pneumatic

Rod seals



Key Features

- Light duty
- Piston or rod
- Low pressure capability
- Dynamic lip reaction
- Low friction
- Easy to fit



Design

U-70 type rubber single acting seals are designed for rods or pistons. Manufactured in NBR 70 Shore A, this type can handle low pressure applications although predominately used in pneumatic cylinders, low pressure hydraulic cylinders can be accommodated. These precision moulded seals have equally distributed heel clearance and lip to housing interference. In double acting applications the two seals should always be in separate grooves and facing away from one another to avoid a pressure trap.

Operating Conditions

Pressure



Temperature



Speed



Surface Finish μmRa

| | | |
|--------------|--------------|-----|
| $\text{\O}d$ | $\text{\O}D$ | L |
| 0.1 - 0.25 | ≤ 0.8 | 2.0 |

Tolerances

| | | | |
|--------------|--------------|----------|------|
| $\text{\O}d$ | $\text{\O}D$ | L | G |
| f9 | Js11 | -0 + 0.2 | 0.25 |

Chamfer Radii

| | | | |
|-----|-----|-----|-----|
| C/S | 5.0 | 7.5 | 10 |
| C | 2.5 | 4.0 | 5.0 |
| r | 0.2 | 0.4 | 0.4 |

Typical Examples

Reciprocating Rotary Oscillating Helix



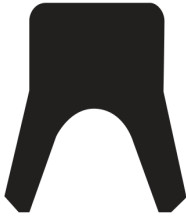
Similar Styles



U-90

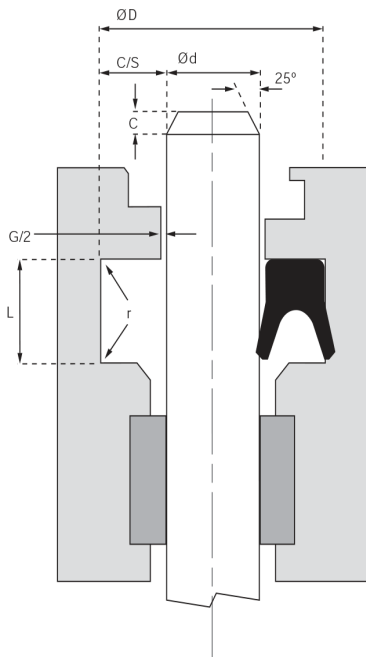
Pneumatic

Rod seals



Key Features

- Light to medium duty
- Piston or rod
- Dynamic lip reaction
- Low friction
- Easy to fit



Design

U-90 type rubber single acting seals are designed for rods or pistons. Manufactured in NBR 90 Shore A, this type can handle low to medium pressure applications although predominately used in pneumatic cylinders, low to medium pressure hydraulic cylinders can be accommodated. These precision moulded seals have equally distributed heel clearance and lip to housing interference. In double acting applications the two seals should always be in separate grooves and facing away from one another to avoid a pressure trap.

Operating Conditions

Pressure



Temperature



Speed



Surface Finish µmRa

| ØD | Ød | L |
|------------|------|-----|
| 0.1 - 0.25 | ≤0.8 | 2.0 |

Tolerances

| ØD | Ød | L | G |
|----|------|----------|------|
| f9 | Js11 | -0 + 0.2 | 0.25 |

Chamfer Radii

| | 5.0 | 7.5 | 10.0 |
|-----|-----|-----|------|
| C/S | 5.0 | 7.5 | 10.0 |
| C | 2.5 | 4.0 | 5.0 |
| r | 0.2 | 0.4 | 0.4 |

Typical Examples

Reciprocating Rotary Oscillating Helix



Similar Styles



GSP



DI



U70



U90



19M

| ID | OD | L1 | L2 | OD2 | OD3 | Product Name |
|-------|-------|------|------|------|------|----------------|
| 0.19 | 0.44 | 0.16 | 0.22 | 0.00 | 0.00 | DI-018 |
| 3.00 | 6.00 | 2.50 | 3.00 | 0.00 | 0.00 | GSP-003006-030 |
| 4.00 | 8.00 | 3.00 | 3.50 | 0.00 | 0.00 | GSP-004008-035 |
| 5.00 | 9.00 | 2.50 | 3.00 | 0.00 | 0.00 | GSP-005009-030 |
| 6.00 | 10.00 | 3.00 | 3.50 | 0.00 | 0.00 | GSP-006010-035 |
| 6.00 | 11.00 | 3.00 | 3.50 | 0.00 | 0.00 | GSP-006011-035 |
| 6.00 | 12.00 | 4.00 | 4.50 | 0.00 | 0.00 | GSP-006012-045 |
| 7.00 | 13.00 | 4.00 | 4.50 | 0.00 | 0.00 | GSP-007013-045 |
| 8.00 | 14.00 | 2.55 | 3.00 | 0.00 | 0.00 | GSP-008014-030 |
| 8.00 | 14.00 | 4.00 | 4.50 | 0.00 | 0.00 | GSP-008014-045 |
| 8.00 | 14.00 | 4.50 | 5.00 | 0.00 | 0.00 | GSP-008014-050 |
| 8.00 | 16.00 | 5.50 | 7.00 | 0.00 | 0.00 | DI-008016-070 |
| 10.00 | 16.00 | 2.55 | 3.00 | 0.00 | 0.00 | GSP-010016-030 |
| 10.00 | 16.00 | 4.50 | 5.00 | 0.00 | 0.00 | GSP-010016-050 |
| 10.00 | 16.00 | 4.50 | 5.50 | 0.00 | 0.00 | DI-010016-055 |
| 8.00 | 18.00 | 2.00 | 0.00 | 0.00 | 0.00 | 19M-008018-020 |
| 10.00 | 18.00 | 5.50 | 6.00 | 0.00 | 0.00 | GSP-010018-060 |
| 10.00 | 18.00 | 5.50 | 7.00 | 0.00 | 0.00 | DI-010018-070 |
| 12.00 | 18.00 | 2.55 | 3.00 | 0.00 | 0.00 | GSP-012018-030 |
| 12.00 | 20.00 | 5.50 | 6.00 | 0.00 | 0.00 | GSP-012020-060 |
| 12.00 | 20.00 | 5.50 | 7.00 | 0.00 | 0.00 | DI-012020-070 |
| 14.00 | 22.00 | 5.50 | 6.00 | 0.00 | 0.00 | GSP-014022-060 |
| 16.00 | 22.00 | 2.50 | 3.00 | 0.00 | 0.00 | GSP-016022-030 |
| 12.00 | 24.00 | 6.00 | 6.50 | 0.00 | 0.00 | GSP-012024-065 |
| 16.00 | 24.00 | 5.50 | 6.00 | 0.00 | 0.00 | GSP-016024-060 |
| 16.00 | 24.00 | 5.50 | 7.00 | 0.00 | 0.00 | DI-016024-070 |
| 17.00 | 24.00 | 2.55 | 3.00 | 0.00 | 0.00 | GSP-017024-030 |
| 18.00 | 25.00 | 4.50 | 6.00 | 0.00 | 0.00 | DI-018025-060 |
| 19.00 | 25.00 | 5.20 | 6.30 | 0.00 | 0.00 | DI-019025-063 |
| 18.00 | 26.00 | 5.50 | 6.00 | 0.00 | 0.00 | GSP-018026-060 |
| 18.00 | 26.00 | 5.50 | 6.00 | 0.00 | 0.00 | DI-018026-060 |



GSP



DI



U70



U90



19M

| ID | OD | L1 | L2 | OD2 | OD3 | Product Name |
|-------|-------|-------|-------|------|------|----------------|
| 20.00 | 28.00 | 5.50 | 6.00 | 0.00 | 0.00 | GSP-020028-060 |
| 20.00 | 28.00 | 5.50 | 7.00 | 0.00 | 0.00 | DI-020028-070 |
| 22.00 | 28.00 | 4.30 | 5.00 | 0.00 | 0.00 | GSP-022028-050 |
| 22.00 | 30.00 | 5.50 | 6.00 | 0.00 | 0.00 | GSP-022030-060 |
| 22.00 | 30.00 | 5.50 | 6.00 | 0.00 | 0.00 | DI-022030-060 |
| 25.00 | 33.00 | 5.50 | 6.00 | 0.00 | 0.00 | GSP-025033-060 |
| 25.00 | 35.00 | 7.00 | 8.50 | 0.00 | 0.00 | DI-025035-085 |
| 28.00 | 35.50 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-028035-030 |
| 28.00 | 36.00 | 5.50 | 6.00 | 0.00 | 0.00 | GSP-028036-060 |
| 30.00 | 38.00 | 5.50 | 6.00 | 0.00 | 0.00 | GSP-030038-060 |
| 30.00 | 40.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-030040-030 |
| 30.00 | 40.00 | 7.00 | 7.50 | 0.00 | 0.00 | GSP-030040-075 |
| 32.00 | 40.00 | 5.50 | 6.00 | 0.00 | 0.00 | GSP-032040-060 |
| 32.00 | 42.00 | 7.00 | 8.50 | 0.00 | 0.00 | DI-032042-085 |
| 30.00 | 43.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-030043-030 |
| 35.00 | 43.00 | 8.00 | 8.50 | 0.00 | 0.00 | GSP-035043-085 |
| 35.00 | 45.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-035045-030 |
| 35.00 | 45.00 | 7.00 | 7.50 | 0.00 | 0.00 | GSP-035045-075 |
| 36.00 | 46.00 | 7.00 | 7.50 | 0.00 | 0.00 | GSP-036046-075 |
| 32.00 | 48.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-032048-030 |
| 40.00 | 48.00 | 5.50 | 6.00 | 0.00 | 0.00 | GSP-040048-060 |
| 40.00 | 50.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-040050-030 |
| 40.00 | 50.00 | 7.00 | 7.50 | 0.00 | 0.00 | GSP-040050-075 |
| 38.00 | 55.00 | 10.00 | 11.50 | 0.00 | 0.00 | DI-038055-115 |
| 40.00 | 55.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-040055-030 |
| 45.00 | 55.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-045055-030 |
| 45.00 | 55.00 | 7.00 | 7.50 | 0.00 | 0.00 | GSP-045055-075 |
| 45.00 | 55.00 | 7.00 | 7.50 | 0.00 | 0.00 | DI-045055-075 |
| 45.00 | 60.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-045060-030 |
| 50.00 | 60.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-050060-030 |
| 50.00 | 60.00 | 7.00 | 7.50 | 0.00 | 0.00 | GSP-050060-075 |



GSP



DI



U70



U90



19M

| ID | OD | L1 | L2 | OD2 | OD3 | Product Name |
|-------|-------|-------|-------|------|------|----------------|
| 50.00 | 60.00 | 7.00 | 7.50 | 0.00 | 0.00 | DI-050060-075 |
| 48.00 | 63.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-048063-030 |
| 50.00 | 63.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-050063-030 |
| 50.00 | 65.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-050065-030 |
| 50.00 | 65.00 | 10.00 | 0.00 | 0.00 | 0.00 | 19M-050065-100 |
| 52.00 | 65.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-052065-030 |
| 55.00 | 65.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-055065-030 |
| 55.00 | 65.00 | 7.00 | 7.50 | 0.00 | 0.00 | GSP-055065-075 |
| 56.00 | 66.00 | 7.00 | 7.50 | 0.00 | 0.00 | GSP-056066-075 |
| 55.00 | 68.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-055068-030 |
| 50.00 | 70.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-050070-030 |
| 55.00 | 70.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-055070-030 |
| 60.00 | 70.00 | 0.00 | 0.00 | 0.00 | 0.00 | 19M-060070-025 |
| 60.00 | 70.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-060070-030 |
| 60.00 | 72.00 | 8.50 | 9.50 | 0.00 | 0.00 | GSP-060072-095 |
| 60.00 | 73.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-060073-030 |
| 63.00 | 73.00 | 7.00 | 7.50 | 0.00 | 0.00 | GSP-063073-075 |
| 55.00 | 75.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-055075-030 |
| 60.00 | 75.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-060075-030 |
| 63.00 | 75.00 | 8.50 | 9.50 | 0.00 | 0.00 | GSP-063075-095 |
| 63.00 | 75.00 | 8.50 | 10.00 | 0.00 | 0.00 | DI-063075-100 |
| 65.00 | 75.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-065075-030 |
| 65.00 | 77.00 | 8.50 | 9.50 | 0.00 | 0.00 | GSP-065077-095 |
| 65.00 | 78.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-065078-030 |
| 60.00 | 80.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-060080-030 |
| 65.00 | 80.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-065080-030 |
| 70.00 | 80.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-070080-030 |
| 70.00 | 82.00 | 8.50 | 9.50 | 0.00 | 0.00 | GSP-070082-095 |
| 70.00 | 83.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-070083-030 |
| 65.00 | 85.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-065085-030 |
| 70.00 | 85.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-070085-030 |



GSP



DI



U70



U90



19M

| ID | OD | L1 | L2 | OD2 | OD3 | Product Name |
|--------|--------|-------|-------|------|------|----------------|
| 75.00 | 85.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-075085-030 |
| 75.00 | 88.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-075088-030 |
| 70.00 | 90.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-070090-030 |
| 75.00 | 90.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-075090-030 |
| 80.00 | 90.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-080090-030 |
| 80.00 | 92.00 | 8.50 | 9.50 | 0.00 | 0.00 | GSP-080092-095 |
| 80.00 | 92.00 | 8.50 | 9.50 | 0.00 | 0.00 | DI-080092-095 |
| 80.00 | 93.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-080093-030 |
| 69.00 | 95.00 | 10.00 | 0.00 | 0.00 | 0.00 | 19M-069095-100 |
| 75.00 | 95.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-075095-030 |
| 80.00 | 95.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-080095-030 |
| 85.00 | 97.00 | 8.50 | 9.50 | 0.00 | 0.00 | GSP-085097-095 |
| 80.00 | 100.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-080100-030 |
| 85.00 | 100.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-085100-030 |
| 90.00 | 102.00 | 8.50 | 9.50 | 0.00 | 0.00 | GSP-090102-095 |
| 90.00 | 102.00 | 8.50 | 9.50 | 0.00 | 0.00 | DI-090102-095 |
| 85.00 | 105.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-085105-030 |
| 90.00 | 105.00 | 2.00 | 0.00 | 0.00 | 0.00 | 19M-090105-020 |
| 90.00 | 105.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-090105-030 |
| 95.00 | 105.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-095105-030 |
| 90.00 | 110.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-090110-030 |
| 95.00 | 110.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-095110-030 |
| 95.00 | 115.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-095115-030 |
| 100.00 | 115.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-100115-030 |
| 100.00 | 115.00 | 10.00 | 11.00 | 0.00 | 0.00 | GSP-100115-110 |
| 100.00 | 115.00 | 10.00 | 11.50 | 0.00 | 0.00 | DI-100115-115 |
| 100.00 | 120.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-100120-030 |
| 105.00 | 120.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-105120-030 |
| 110.00 | 125.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-110125-030 |
| 110.00 | 125.00 | 10.00 | 11.00 | 0.00 | 0.00 | DI-110125-110 |
| 110.00 | 130.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-110130-030 |



GSP



DI



U70



U90



19M

| ID | OD | L1 | L2 | OD2 | OD3 | Product Name |
|--------|--------|-------|-------|------|------|----------------|
| 110.00 | 130.00 | 14.00 | 15.50 | 0.00 | 0.00 | DI-110130-155 |
| 115.00 | 130.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-115130-030 |
| 115.00 | 135.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-115135-030 |
| 120.00 | 135.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-120135-030 |
| 120.00 | 140.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-120140-030 |
| 125.00 | 140.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-125140-030 |
| 125.00 | 145.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-125145-030 |
| 130.00 | 145.00 | 2.00 | 0.00 | 0.00 | 0.00 | 19M-130145-020 |
| 129.00 | 150.00 | 2.30 | 0.00 | 0.00 | 0.00 | 19M-129150-023 |
| 130.00 | 150.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-130150-030 |
| 136.00 | 150.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-136150-030 |
| 140.00 | 155.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-140155-030 |
| 140.00 | 160.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-140160-030 |
| 145.00 | 160.00 | 2.00 | 0.00 | 0.00 | 0.00 | 19M-145160-020 |
| 150.00 | 165.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-150165-030 |
| 150.00 | 170.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-150170-030 |
| 150.00 | 170.00 | 4.00 | 0.00 | 0.00 | 0.00 | 19M-150170-040 |
| 155.00 | 170.00 | 2.00 | 0.00 | 0.00 | 0.00 | 19M-155170-020 |
| 160.00 | 175.00 | 10.00 | 11.00 | 0.00 | 0.00 | GSP-160175-110 |
| 160.00 | 180.00 | 4.00 | 0.00 | 0.00 | 0.00 | 19M-160180-040 |
| 165.00 | 180.00 | 0.00 | 0.00 | 0.00 | 0.00 | 19M-165180-030 |
| 160.00 | 185.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-160185-030 |
| 170.00 | 190.00 | 4.00 | 0.00 | 0.00 | 0.00 | 19M-170190-040 |
| 175.00 | 190.00 | 2.00 | 0.00 | 0.00 | 0.00 | 19M-175190-020 |
| 170.00 | 195.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-170195-030 |
| 175.00 | 200.00 | 4.00 | 0.00 | 0.00 | 0.00 | 19M-175200-040 |
| 180.00 | 200.00 | 4.00 | 0.00 | 0.00 | 0.00 | 19M-180200-040 |
| 185.00 | 205.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-185205-030 |
| 190.00 | 210.00 | 4.00 | 0.00 | 0.00 | 0.00 | 19M-190210-040 |
| 195.00 | 210.00 | 2.50 | 0.00 | 0.00 | 0.00 | 19M-195210-025 |
| 190.00 | 215.00 | 4.00 | 0.00 | 0.00 | 0.00 | 19M-190215-040 |



GSP



DI



U70



U90



19M

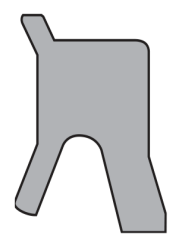
| ID | OD | L1 | L2 | OD2 | OD3 | Product Name |
|--------|--------|------|------|------|------|----------------|
| 210.00 | 230.00 | 4.00 | 0.00 | 0.00 | 0.00 | 19M-210230-040 |
| 220.00 | 240.00 | 3.00 | 0.00 | 0.00 | 0.00 | 19M-220240-030 |
| 220.00 | 245.00 | 0.00 | 0.00 | 0.00 | 0.00 | 19M-220245-040 |
| 240.00 | 260.00 | 4.00 | 0.00 | 0.00 | 0.00 | 19M-240260-040 |
| 250.00 | 270.00 | 4.00 | 0.00 | 0.00 | 0.00 | 19M-250270-040 |
| 260.00 | 290.00 | 4.00 | 0.00 | 0.00 | 0.00 | 19M-260290-040 |



RBP

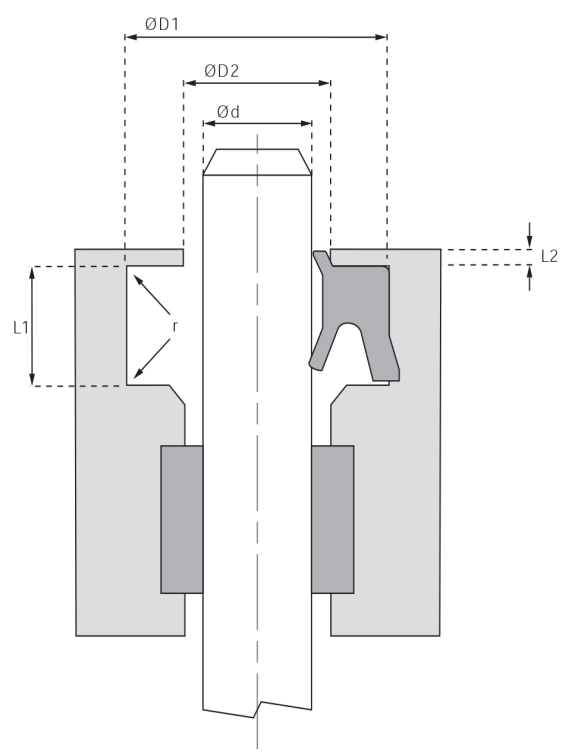
Wiper Combo

Rod seals



Key Features


- Lower pressures
- Simple housing design
- Easy to replace
- Excellent wear resistance
- Cost effective

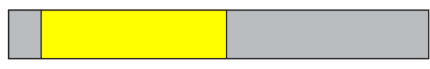



Design

RBP are a pneumatic seal-wiper, designed as a combination asymmetric lip seal with an integral wiper element, and as such, only requires a single groove and not two grooves as in the traditional system. The reduction of the overall dimensions and the execution of a single groove together with a single polyurethane seal give's considerable economic advantages.

Operating Conditions

| | |
|-------------------|--|
| Pressure | |
| 16 Bar 230 Psi |  |

| | |
|-------------------------------|--|
| Temperature | |
| -30° to 80°C -22° to 176°F |  |

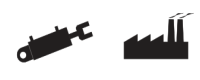
| | |
|----------------------|--|
| Speed | |
| 1.0m/sec 3.0'/sec |  |

| | | | |
|--|------------------|------------------|-----|
| Surface Finish μmRa | | | |
| $\varnothing d$ | $\varnothing D1$ | $\varnothing D2$ | L1 |
| 0.1 - 0.25 | ≤ 0.8 | ≤ 0.8 | 2.0 |

| | | | | |
|-------------------|------------------|------------------|-----------|--------------|
| Tolerances | | | | |
| $\varnothing d$ | $\varnothing D1$ | $\varnothing D2$ | L1 | L2 |
| f7 | H10 | H11 | -0 + 0.15 | -0.00 + 0.10 |

| | |
|----------------------|-----|
| Chamfer Radii | |
| r | 0.2 |

Typical Examples
 Reciprocating Rotary Oscillating Helix

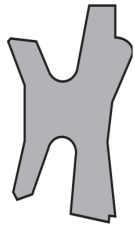




RCA

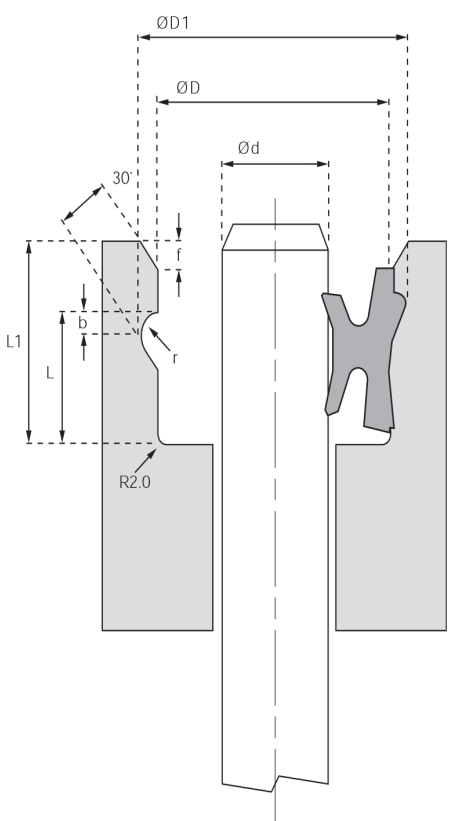
Wiper Combo

Rod seals



Key Features

- Lower pressures
- Simple housing design
- Easy to replace
- Complete solution
- Cost effective



Design

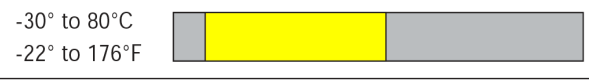
RCA are a self locating pneumatic rod wiper/seal combining three functions. Keeping contaminants from the system, maintaining system pressure and self location. RCA may be used for dry air and air free from oil, after initial lubrication on assembly. With slight modification to the housing this style can be replaced without removal of the rod. With favourable friction values due to the polyurethane material and lip design, RCA is a simple, complete pneumatic rod solution.

Operating Conditions

Pressure



Temperature



Speed



Surface Finish µmRa

| ØD | Ød | L1 |
|------------|------|-----|
| 0.1 - 0.25 | ≤0.8 | 2.0 |

Tolerances

| Ød | ØD | ØD1 | L1 | L |
|----|-----|-----|-----------------|-----------------|
| e9 | H10 | H10 | + 0.15 -0.00 | + 0.25 -0.00 |

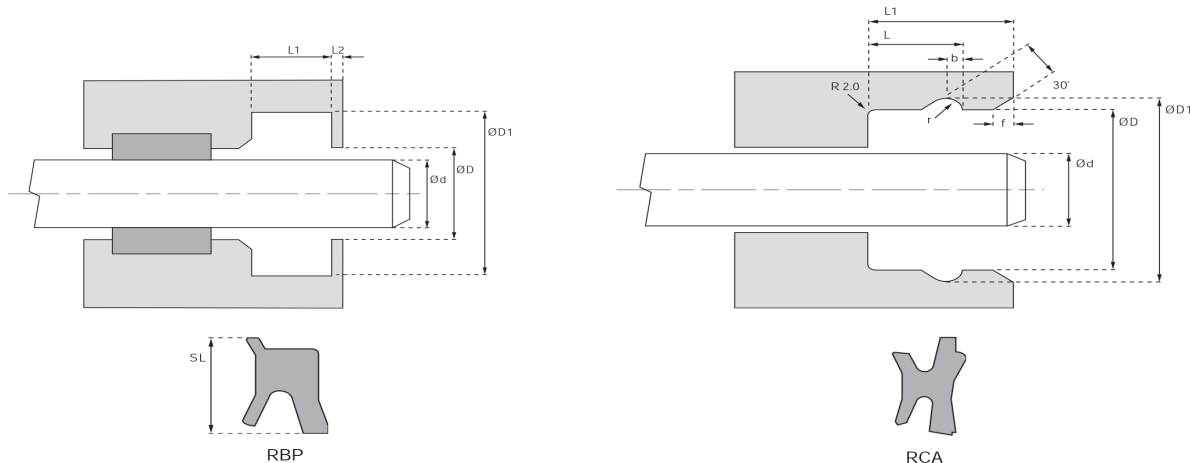
Chamfer Radii

as noted in data table

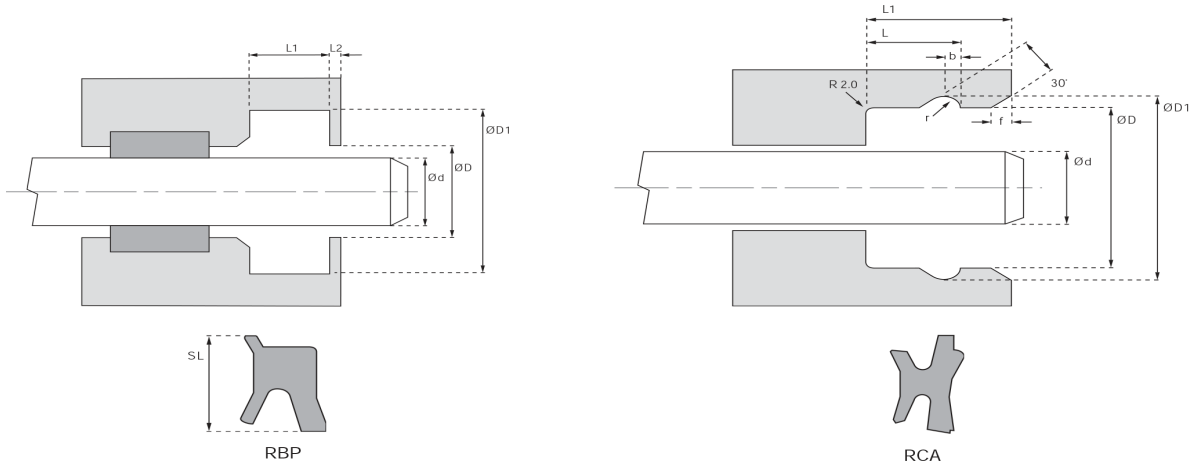
Typical Examples

- Reciprocating Rotary Oscillating Helix

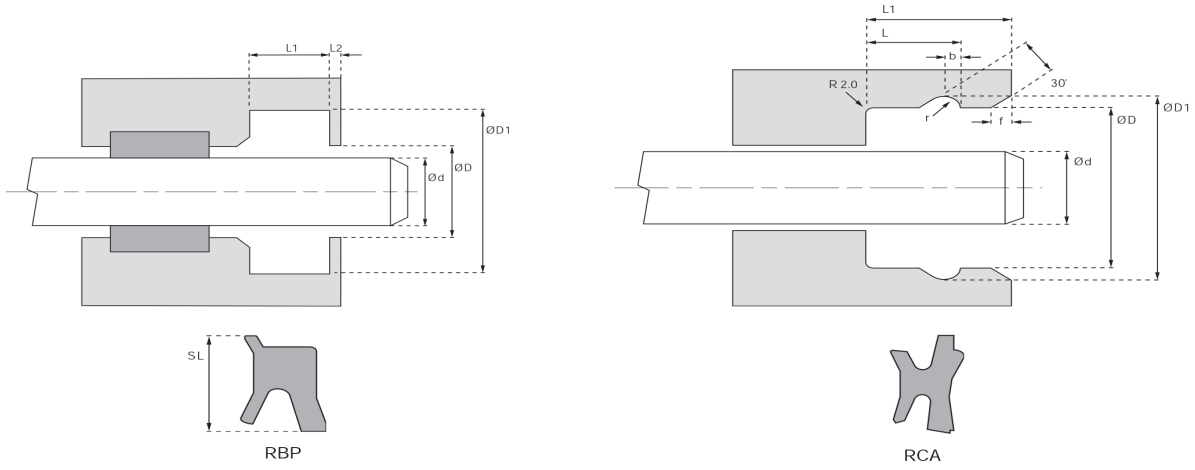




| ID | OD | L1 | L2 | OD2 | OD3 | Product Name |
|-------|-------|-------|-------|-------|------|----------------|
| 4.00 | 7.00 | 2.70 | 2.80 | 5.40 | 1.00 | RBP-004007-027 |
| 5.00 | 8.00 | 2.30 | 2.80 | 6.20 | 1.00 | RBP-005008-027 |
| 3.00 | 8.80 | 4.50 | 5.20 | 5.00 | 1.20 | RBP-003008-045 |
| 4.00 | 8.80 | 4.50 | 5.20 | 6.00 | 1.20 | RBP-004008-045 |
| 6.00 | 9.00 | 2.30 | 2.80 | 7.20 | 1.00 | RBP-006009-027 |
| 6.00 | 10.80 | 4.50 | 5.20 | 8.00 | 1.20 | RBP-006010-045 |
| 8.00 | 12.80 | 4.50 | 5.20 | 10.00 | 1.20 | RBP-008012-045 |
| 8.00 | 14.00 | 4.50 | 5.20 | 11.00 | 1.20 | RBP-008014-045 |
| 10.00 | 14.00 | 3.20 | 3.70 | 11.40 | 1.00 | RBP-010014-032 |
| 12.00 | 16.50 | 3.70 | 4.00 | 13.70 | 1.20 | RBP-012016-037 |
| 10.00 | 18.00 | 5.00 | 6.00 | 14.00 | 1.60 | RBP-010018-050 |
| 12.00 | 18.00 | 4.00 | 4.80 | 14.50 | 1.20 | RBP-012018-040 |
| 14.00 | 18.50 | 3.70 | 4.00 | 15.70 | 1.20 | RBP-014018-037 |
| 12.00 | 20.00 | 5.00 | 6.00 | 16.00 | 1.60 | RBP-012020-050 |
| 12.00 | 20.00 | 5.50 | 6.50 | 16.00 | 1.60 | RBP-012020-055 |
| 12.00 | 20.00 | 10.50 | 11.00 | 22.00 | 0.00 | RCA-012020-110 |
| 14.00 | 20.00 | 4.00 | 4.80 | 16.50 | 1.20 | RBP-014020-040 |
| 16.00 | 20.50 | 3.70 | 4.00 | 18.50 | 0.00 | RBP-016020-037 |
| 12.00 | 22.00 | 6.00 | 6.50 | 0.00 | 0.00 | RBP-012022-060 |
| 12.00 | 22.00 | 7.00 | 9.50 | 0.00 | 0.00 | KPS-012 |
| 12.00 | 22.00 | 11.00 | 10.50 | 0.00 | 0.00 | RCA-012022-110 |
| 16.00 | 22.00 | 4.00 | 5.00 | 18.50 | 0.00 | RBP-016022-040 |
| 14.00 | 24.00 | 6.00 | 6.50 | 0.00 | 0.00 | RBP-014024-060 |
| 16.00 | 24.00 | 5.00 | 6.00 | 0.00 | 0.00 | RBP-016024-050 |
| 20.00 | 25.00 | 4.00 | 4.60 | 0.00 | 0.00 | RBP-020025-040 |
| 16.00 | 26.00 | 6.00 | 6.50 | 0.00 | 0.00 | RBP-016026-060 |
| 16.00 | 26.00 | 7.00 | 9.50 | 0.00 | 0.00 | KPS-016V |
| 16.00 | 26.00 | 10.50 | 11.00 | 0.00 | 0.00 | RCA-016026-110 |
| 18.00 | 26.00 | 5.00 | 6.00 | 0.00 | 0.00 | RBP-018026-050 |
| 18.00 | 26.00 | 10.50 | 11.00 | 0.00 | 0.00 | RCA-018026-110 |
| 20.00 | 26.00 | 4.00 | 4.80 | 0.00 | 0.00 | RBP-020026-040 |



| ID | OD | L1 | L2 | OD2 | OD3 | Product Name |
|-------|-------|-------|-------|-------|------|----------------|
| 22.00 | 27.00 | 4.00 | 4.60 | 0.00 | 0.00 | RBP-022027-040 |
| 18.00 | 28.00 | 6.00 | 6.50 | 0.00 | 0.00 | RBP-018028-060 |
| 18.00 | 28.00 | 10.50 | 11.00 | 0.00 | 0.00 | RCA-018028-110 |
| 22.00 | 28.00 | 4.00 | 5.00 | 0.00 | 0.00 | RBP-022028-040 |
| 20.00 | 28.60 | 5.30 | 7.50 | 23.00 | 0.00 | RBP-020028-053 |
| 20.00 | 30.00 | 7.00 | 7.50 | 0.00 | 0.00 | RBP-020030-070 |
| 20.00 | 30.00 | 7.50 | 9.50 | 0.00 | 0.00 | KPS-020 |
| 20.00 | 30.00 | 10.50 | 11.00 | 0.00 | 0.00 | RCA-020030-110 |
| 25.00 | 30.00 | 4.00 | 4.60 | 0.00 | 0.00 | RBP-025030-040 |
| 25.00 | 31.00 | 4.00 | 4.80 | 0.00 | 0.00 | RBP-025031-040 |
| 22.00 | 32.00 | 7.00 | 7.50 | 0.00 | 0.00 | RBP-022032-070 |
| 22.00 | 32.00 | 11.00 | 11.50 | 0.00 | 0.00 | RCA-022032-115 |
| 25.00 | 33.60 | 5.30 | 6.20 | 0.00 | 0.00 | RBP-025033-053 |
| 25.00 | 35.00 | 7.00 | 7.50 | 0.00 | 0.00 | RBP-025035-070 |
| 25.00 | 35.00 | 7.00 | 9.50 | 0.00 | 0.00 | KPS-025 |
| 25.00 | 35.00 | 11.00 | 11.50 | 0.00 | 0.00 | RCA-025035-115 |
| 32.00 | 37.50 | 4.55 | 5.00 | 0.00 | 0.00 | RBP-032037-045 |
| 28.00 | 38.00 | 7.00 | 7.50 | 0.00 | 0.00 | RBP-028038-070 |
| 30.00 | 40.00 | 7.00 | 7.50 | 0.00 | 0.00 | RBP-030040-070 |
| 30.00 | 40.00 | 7.00 | 10.00 | 0.00 | 0.00 | KPS-030 |
| 30.00 | 40.00 | 11.00 | 11.50 | 0.00 | 0.00 | RCA-030040-115 |
| 32.00 | 40.00 | 5.00 | 5.80 | 0.00 | 0.00 | RBP-032040-050 |
| 32.00 | 42.00 | 7.00 | 7.50 | 0.00 | 0.00 | RBP-032042-070 |
| 32.00 | 42.00 | 11.00 | 11.50 | 0.00 | 0.00 | RCA-032042-115 |
| 35.00 | 45.00 | 6.00 | 7.50 | 0.00 | 0.00 | RBP-035045-070 |
| 36.00 | 46.00 | 7.00 | 7.50 | 0.00 | 0.00 | RBP-036046-070 |
| 40.00 | 50.00 | 7.00 | 7.50 | 0.00 | 0.00 | RBP-040050-070 |
| 40.00 | 50.00 | 11.00 | 11.50 | 0.00 | 0.00 | RCA-040050-115 |
| 45.00 | 55.00 | 7.00 | 7.50 | 0.00 | 0.00 | RBP-045055-070 |
| 45.00 | 55.00 | 12.00 | 12.50 | 0.00 | 0.00 | RCA-045055-125 |
| 50.00 | 60.00 | 12.20 | 12.50 | 0.00 | 0.00 | RCA-050060-125 |



| ID | OD | L1 | L2 | OD2 | OD3 | Product Name |
|-------|-------|-------|-------|------|------|----------------|
| 50.00 | 62.00 | 8.50 | 9.00 | 0.00 | 0.00 | RBP-050062-085 |
| 63.00 | 75.00 | 12.50 | 13.00 | 0.00 | 0.00 | RCA-063075-130 |

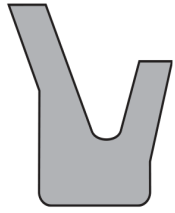




CSW

Rod Wipers

Rod wipers



Key Features

- Heavy duty scraper
- Simple snap-in fit
- Good abrasion resistance

Design

CSW rod wiper is designed to remove more tenacious mud and ice from reciprocating rods during the negative stroke. Classed as a heavy duty scraper, moulded in Nylon (PA) with a MOS2 filler to improve friction and wear characteristics. The materials high modulus allow it to aggressively scrape larger debris from the rod. The sealing lip on the outside diameter provides positive sealing preventing contamination entering the cylinder.

Operating Conditions

| Temperature | |
|---------------|--|
| -40° to 100°C | |
| -40° to 212°F | |

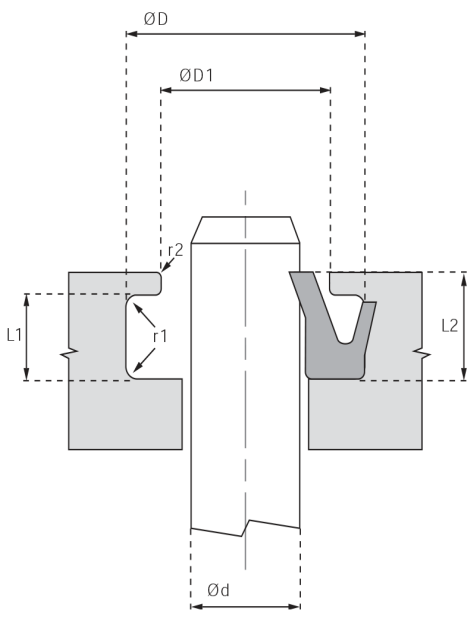
| Speed | |
|-----------|--|
| 5.0m/sec | |
| 15.0'/sec | |

| Surface Finish μmRa | | |
|--------------------------------|------------------------------------|--------------------------|
| $\varnothing d$ | $\varnothing D$ & $\varnothing D1$ | L1 |
| 0.1 - 0.25 μmRa | $\leq 0.8 \mu\text{mRa}$ | $\leq 3.2 \mu\text{mRa}$ |

| Tolerances | | | |
|------------------|-----------------|------------------|--------|
| $\varnothing d$ | $\varnothing D$ | $\varnothing D1$ | L1 |
| Refer seal | + 0.20 | + 0.20 | + 0.20 |
| specs' for d Dia | - 0.00 | - 0.00 | - 0.00 |

| Chamfer Radii | |
|---------------|---------|
| r1 | 0.04 mm |
| r2 | 1.50 mm |

| Typical Examples | |
|------------------|-------------------------------------|
| Reciprocating | <input checked="" type="checkbox"/> |
| Rotary | <input type="checkbox"/> |
| Oscillating | <input type="checkbox"/> |
| Helix | <input type="checkbox"/> |





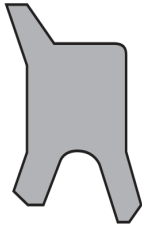
DH

Rod Wipers

Design

DH rod wiper is designed to preclude the ingress of contaminants into the cylinder as well as assist in sealing the rod. Manufactured from Polyurethane DH are designed for closed housings with pre-load on the static diameter providing stability and sealing.

Rod wipers



Key Features

Sealing lip ensures a drier rod

Flexible design

Easy installation

Operating Conditions

Temperature

-30° to 100°C
-22° to 212°F



Speed

3.0m/sec
9.0'/sec



Surface Finish μmRa

| Ød | $\text{ØD} \ \& \ \text{ØD1}$ | L1 |
|----------------------------|-------------------------------|----------------------------|
| 0.1 - 0.25 μmRa | $\leq 0.8 \ \mu\text{mRa}$ | $\leq 3.2 \ \mu\text{mRa}$ |

Tolerances

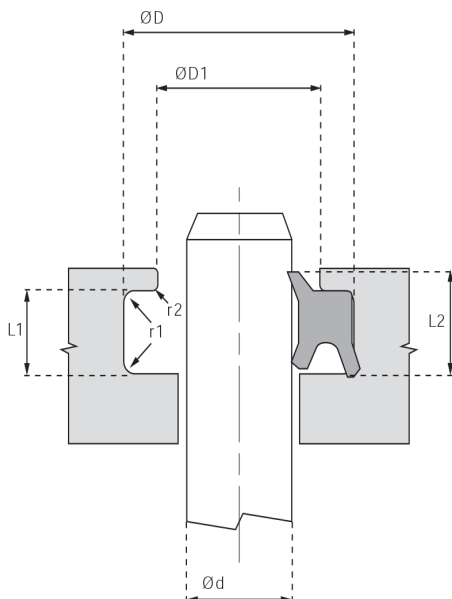
| Ød | ØD | ØD1 | L1 |
|-----------------------------|-------------|--------------|--------|
| Refer seal specs' for d Dia | + 0.20 | ± 0.1 | + 0.30 |
| | - 0.00 | | - 0.00 |

Chamfer Radii

| r1 | r2 |
|-----|-----|
| 0.3 | 0.4 |

Typical Examples

Reciprocating Rotary Oscillating Helix

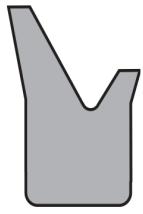




DSI

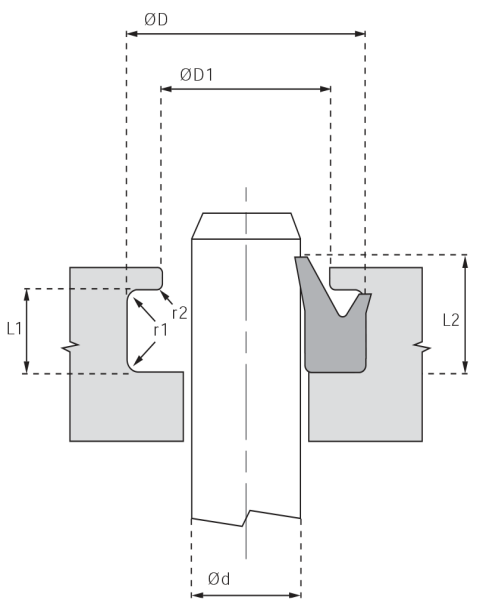
Rod Wipers

Rod wipers



Key Features


- Medium to heavy duty
- Tough polyurethane material
- Easy installation



Design

DSI rod wiper is a medium to heavy duty type, manufactured from Polyurethane. This type is proportioned to help remove tenacious contaminants such as ice and dried mud, from intruding past either the inside or outside diameters. DSI also offers very good abrasion resistance and withstands some sideloads, without detrimental wiping loss.

Operating Conditions

| Temperature | |
|---------------|--|
| -30° to 100°C |  |
| -22° to 212°F | |

| Speed | |
|----------|--|
| 1.0m/sec |  |
| 3.0'/sec | |

| Surface Finish μmRa | | |
|--------------------------------|-------------------------------|----------------------------|
| Ød | $\text{ØD} \ \& \ \text{ØD1}$ | L1 |
| 0.1 - 0.25 μmRa | $\leq 0.8 \ \mu\text{mRa}$ | $\leq 3.2 \ \mu\text{mRa}$ |

| Tolerances | | | |
|------------------|-------------|--------------|-------|
| Ød | ØD | ØD1 | L1 |
| Refer seal | + 0.14 | ± 0.1 | + 0.3 |
| specs' for d Dia | - 0.00 | | - 0.0 |

| Chamfer Radii | |
|---------------|-----|
| r1 | r2 |
| 0.3 | 0.4 |

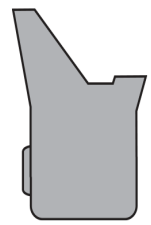
| Typical Examples | | | |
|------------------|-------------------------------------|--------|--------------------------|
| Reciprocating | <input checked="" type="checkbox"/> | Rotary | <input type="checkbox"/> |
| Oscillating | <input type="checkbox"/> | Helix | <input type="checkbox"/> |



PW

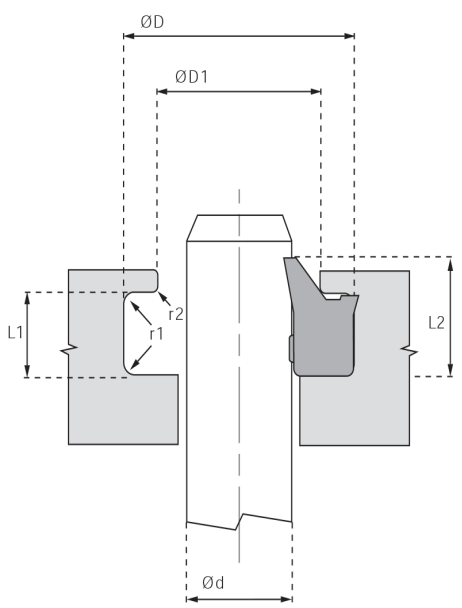
Rod Wipers

Rod wipers



Key Features

- Medium duty
- Tough polyurethane material
- Easy installation
- Popular European sizes



Design

PW rod wiper is designed to prevent contaminants entering the system, extending the cylinder service life. The sealing bead on the outside diameter provides positive sealing preventing contamination entering the cylinder. Most sizes also have a ribbed inside diameter heel to prevent the possibility of blow-out due to pressure trapping of the main seal.

Operating Conditions

Temperature



Speed



Surface Finish µmRa

| | | |
|-----------------|------------|------------|
| Ød | ØD & ØD1 | L1 |
| 0.1 - 0.25 µmRa | ≤ 0.8 µmRa | ≤ 3.2 µmRa |

Tolerances

| | | | |
|------------------|--------|--------|--------|
| Ød | ØD | ØD1 | L1 |
| Refer seal | + 0.20 | + 0.20 | + 0.10 |
| specs' for d Dia | - 0.00 | - 0.00 | - 0.00 |

Chamfer Radii

| | |
|-----|-----|
| r1 | r2 |
| 0.3 | 0.4 |

Typical Examples

- Reciprocating Rotary Oscillating Helix



PWF

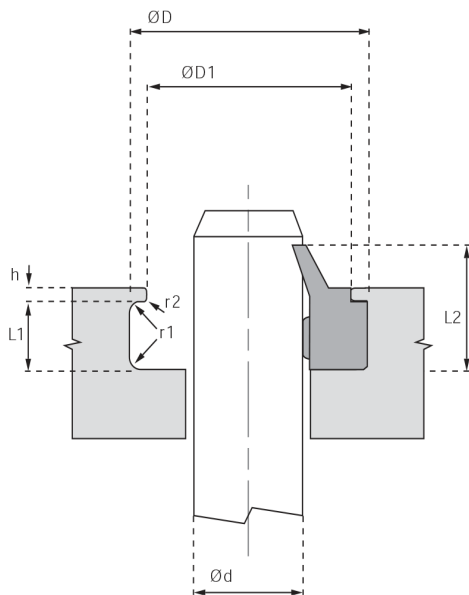
Rod Wipers

Rod wipers



Key Features

- Compact design
- Easy installation
- Pre-loaded fit for effective sealing



Design

PWF rod wiper is designed to prevent contaminants entering the cylinder extending the service life. Moulded from Polyurethane the outside step is carefully calculated to provide assembly pre-load creating perfect protection against water and other impurities entering the cylinder. Most sizes also have a ribbed inside diameter heel to prevent the possibility of blow-out due to pressure trapping of the main seal.

Operating Conditions

Temperature

-40° to 105°C
-40° to 221°F



Speed

0.8m/sec
2.5'/sec



Surface Finish μmRa

| | | |
|----------------------------|-------------------------------|----------------------------|
| Ød | $\text{ØD} \ \& \ \text{ØD1}$ | L1 |
| 0.1 - 0.25 μmRa | $\leq 0.8 \ \mu\text{mRa}$ | $\leq 3.2 \ \mu\text{mRa}$ |

Tolerances

| | | | |
|------------------|-------------|--------------|----------|
| Ød | ØD | ØD1 | L1 |
| Refer seal | ± 0.10 | ± 0.10 | $+ 0.10$ |
| specs' for d Dia | | | $- 0.00$ |

Chamfer Radii

| | |
|-----|-----|
| r1 | r2 |
| 0.4 | 0.2 |

Typical Examples

Reciprocating Rotary Oscillating Helix



PWM

Rod Wipers

Rod wipers



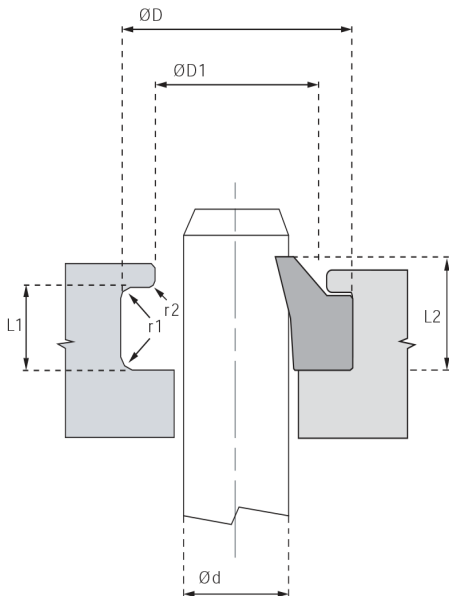
Key Features

Key features

Light to medium duty

Easy installation

Flexible design



Design

PWM rod wiper is a light-medium duty wiper manufactured from a hard Nitrile rubber. The wiper is proportioned to prevent mud and moisture from entering the system.

Operating Conditions

Temperature

-30° to 100°C
-22° to 212°F



Speed

3.0m/sec
9.0'/sec



Surface Finish µmRa

| Ød | ØD | ØD1 | L1 |
|----------|-------|-----|-----|
| 0.1-0.25 | ≤ 0.8 | 1.0 | 2.0 |

Tolerances

| Ød | ØD | ØD1 | L1 |
|------------------|-------|-------|-------|
| Refer seal | + 0.2 | + 0.2 | + 0.2 |
| specs' for d Dia | - 0.0 | - 0.0 | - 0.0 |

Chamfer Radii

| r1 | r2 |
|-----|-----|
| 0.4 | 0.2 |

Typical Examples

Reciprocating Rotary Oscillating Helix



PWS

Rod Wipers

Rod wipers

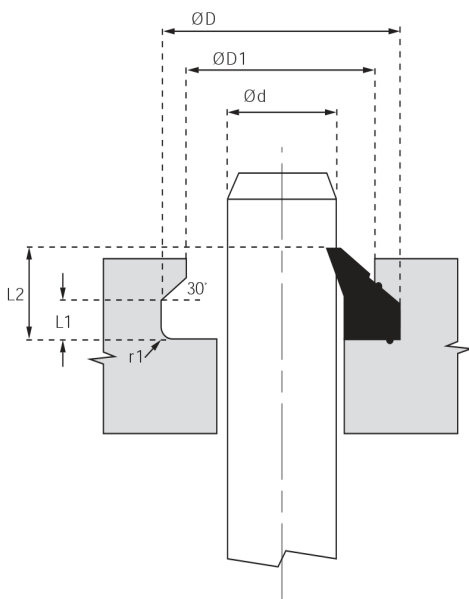


Key Features

Easy installation

Sealing beads ensures a drier rod

Flexible design



Design

PWS rod wiper is designed to prevent contaminants entering the cylinder extending the service life. A medium duty wiper moulded from NBR 90 Shore A. The wiper is machine trimmed to provide a precise wiping lip. The sealing beads on the outside diameter & heel provide positive sealing preventing contamination entering the cylinder.

Operating Conditions

Temperature

-30° to 100°C
-22° to 212°F



Speed

3.0m/sec
9.0'/sec



Surface Finish μmRa

| $\text{\O}d$ | $\text{\O}D$ & $\text{\O}D1$ | L1 |
|----------------------------|------------------------------|--------------------------|
| 0.1 - 0.25 μmRa | $\leq 0.8 \mu\text{mRa}$ | $\leq 2.0 \mu\text{mRa}$ |

Tolerances

| $\text{\O}d$ | $\text{\O}D$ | $\text{\O}D1$ | L1 |
|------------------|--------------|---------------|-------|
| Refer seal | + 0.2 | + 0.2 | + 0.2 |
| specs' for d Dia | - 0.0 | - 0.0 | - 0.0 |

Chamfer Radii

r1
0.2

Typical Examples

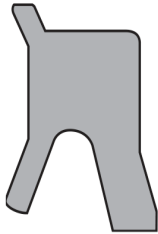
Reciprocating Rotary Oscillating Helix



RBP

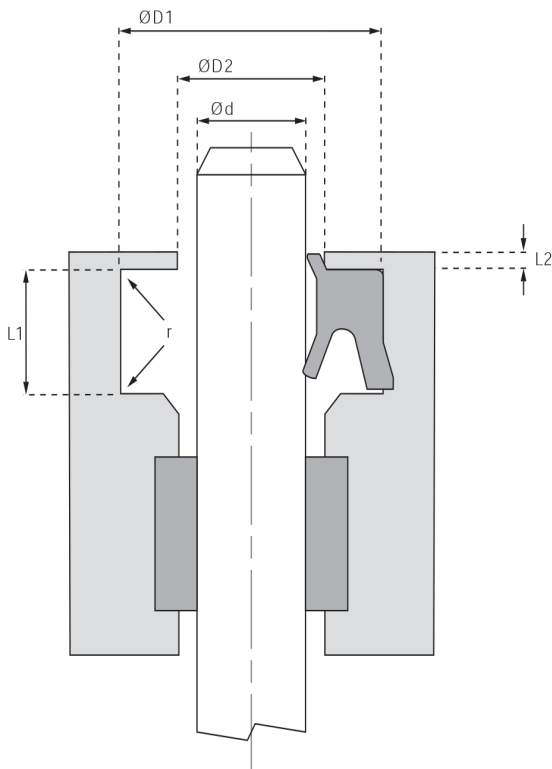
Rod Wipers

Rod seals



Key Features

- Lower pressures
- Simple housing design
- Easy to replace
- Excellent wear resistance
- Cost effective



Design

RBP are a pneumatic seal-wiper, designed as a combination asymmetric lip seal with an integral wiper element, and as such, only requires a single groove and not two grooves as in the traditional system. The reduction of the overall dimensions and the execution of a single groove together with a single polyurethane seal give's considerable economic advantages.

Operating Conditions

Pressure

16 Bar
230 Psi



Temperature

-30° to 80°C
-22° to 176°F



Speed

1.0m/sec
3.0'/sec



Surface Finish μmRa

| Ød | ØD1 | ØD2 | L1 |
|-------------|--------------|--------------|-----|
| 0.1 - 0.25 | ≤ 0.8 | ≤ 0.8 | 2.0 |

Tolerances

| Ød | ØD1 | ØD2 | L1 | L2 |
|-------------|--------------|--------------|-----------|--------------|
| f7 | H10 | H11 | -0 + 0.15 | -0.00 + 0.10 |

Chamfer Radii

r
0.2

Typical Examples

Reciprocating Rotary Oscillating Helix





RCA

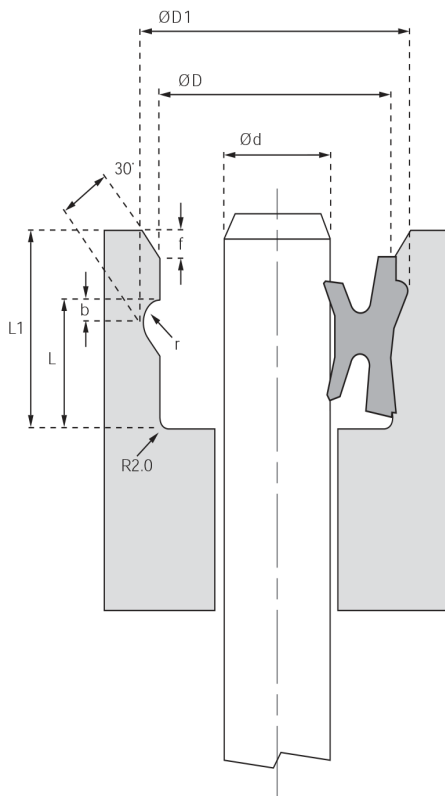
Rod Wipers

Rod seals



Key Features

- Lower pressures
- Simple housing design
- Easy to replace
- Complete solution
- Cost effective



Design

RCA are a self locating pneumatic rod wiper/seal combining three functions. Keeping contaminants from the system, maintaining system pressure and self location. RCA may be used for dry air and air free from oil, after initial lubrication on assembly. With slight modification to the housing this style can be replaced without removal of the rod. With favourable friction values due to the polyurethane material and lip design, RCA is a simple, complete pneumatic rod solution.

Operating Conditions

Pressure

16 Bar
230 Psi



Temperature

-30° to 80°C
-22° to 176°F



Speed

1.0m/sec
3.0"/sec



Surface Finish µmRa

| ØD | Ød | L1 |
|------------|------|-----|
| 0.1 - 0.25 | ≤0.8 | 2.0 |

Tolerances

| Ød | ØD | ØD1 | L1 | L |
|----|-----|-----|-----------------|-----------------|
| e9 | H10 | H10 | + 0.15 -0.00 | + 0.25 -0.00 |

Chamfer Radii

as noted in data table

Typical Examples

Reciprocating Rotary Oscillating Helix

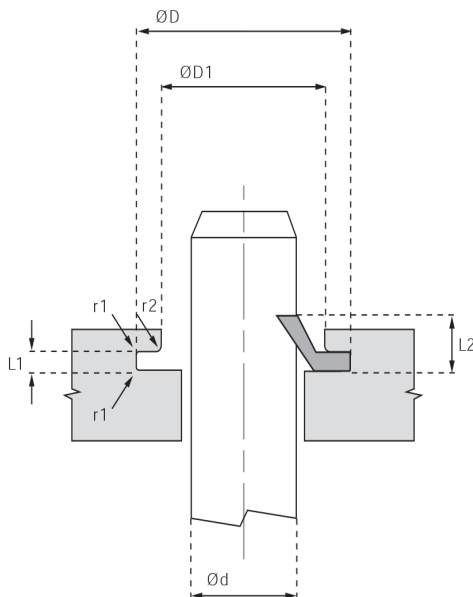
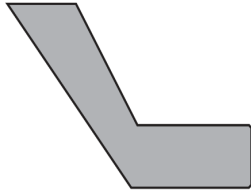




SDK

Rod Wipers

Rod wipers



Design

SDK rod wiper is designed to prevent contaminants entering the cylinder extending the service life.
Retro fit only. Very popular in cylinders on truck mounted cranes.

Operating Conditions

Temperature

-30° to 100°C
-22° to 212°F



Speed

1.0m/sec
3.0'/sec



Surface Finish μmRa

| $\varnothing d$ | $\varnothing D$ | $\varnothing D1$ | L1 |
|----------------------------|-----------------|------------------|---------------------|
| 0.1 - 0.25 μmRa | 1.6 | 2.0 | 3.2 μmRa |

Tolerances

| $\varnothing d$ | $\varnothing D$ | $\varnothing D1$ | L1 |
|-----------------------------|-----------------|------------------|-----|
| Refer seal specs' for d Dia | H11 | H11 | 0.1 |

Chamfer Radii

| r1 | r2 |
|-----|-----|
| 0.5 | 0.3 |

Typical Examples

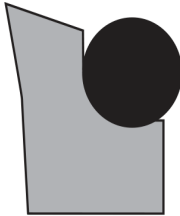
Reciprocating Rotary Oscillating Helix



WTN

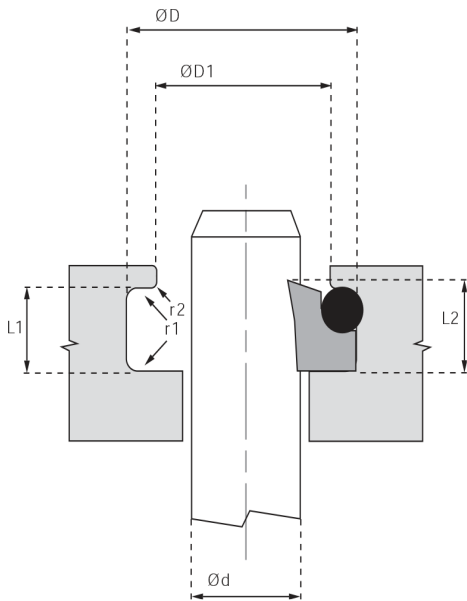
Rod Wipers

Rod wipers



Key features

- Very abrasion resistant
- No stick - slip effect
- Small installation space
- Higher speed capability



Design

WTN rod wiper is designed to prevent contaminants entering the cylinder extending the service life. Standard construction is Virgin PTFE and NBR 70 Shore A o-ring. WTN type offers high speed capability up to 15m/s. Due to the low co-efficiency of friction there's no stick, slip effect. Simply by changing the o-ring material a high temperature wiper is achieved.

Operating Conditions

Temperature

-30° to 120°C
-22° to 250°F



Speed

15.0m/sec
50.0'/sec



Surface Finish µmRa

| Ød | ØD & ØD1 | L1 |
|-----------------|------------|------------|
| 0.1 - 0.25 µmRa | ≤ 0.8 µmRa | ≤ 3.2 µmRa |

Tolerances

| Ød | ØD | ØD1 | L1 |
|-----------------------------|----|------------------|------------------|
| Refer seal specs' for d Dia | H9 | + 0.20 - 0.00 | + 0.20 - 0.00 |

Chamfer Radii

| r1 | r2 |
|-----|-----|
| 0.5 | 0.3 |

Typical Examples

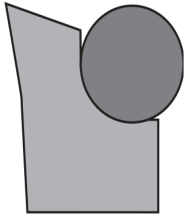
Reciprocating ✓ Rotary ✗ Oscillating ✓ Helix ✓



WTV

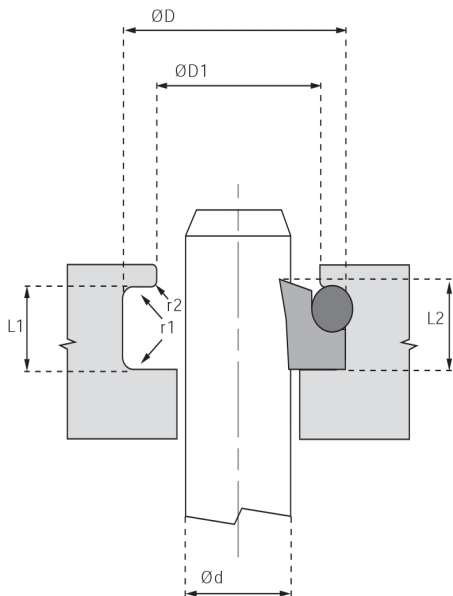
Rod Wipers

Rod wipers



Key Features

- Very abrasion resistant
- No stick - slip effect
- Higher speed capability
- Higher temperatures



Design

WTV rod wiper is designed to prevent contaminants entering the cylinder extending the service life. Standard construction is Virgin PTFE and Viton 70 Shore A o-ring. WTV offers high speed capability up to 15m/s without the effects of stick slip, due to the materials low co-efficient of friction.

Operating Conditions

Temperature

-20° to 200°C
-4° to 392°C



Speed

15.0m/sec
50.0'/sec



Surface Finish µmRa

| | | |
|-----------------|------------|------------|
| Ød | ØD & ØD1 | L1 |
| 0.1 - 0.25 µmRa | ≤ 0.8 µmRa | ≤ 2.0 µmRa |

Tolerances

| | | | |
|-----------------------------|----|----------------|----------------|
| Ød | ØD | ØD1 | L1 |
| Refer seal specs' for d Dia | H9 | + 0.2 - 0.0 | + 0.2 - 0.0 |

Chamfer Radii

| | |
|-----|-----|
| r1 | r2 |
| 0.5 | 0.3 |

Typical Examples

Reciprocating ✓ Rotary ✗ Oscillating ✓ Helix ✓



DKB

Rod Wipers

Design

DKB rod wiper is designed to prevent contaminants entering the cylinder extending the service life. A rust inhibitor coated metal cased wiper designed to press-fit into an open housing, the wiper and sealing lips are moulded in NBR 80 Shore A with precision trimmed lips bonded to the metal case. The sealing lip assists sealing by collecting the fluid film on the positive stroke.

Rod wipers



Key Features

Simple housing design

Medium duty

Asian sizes

Operating Conditions

Temperature

-30° to 105°C
-22° to 220°F



Speed

3.0m/sec
9.0'/sec



Surface Finish μmRa

| $\text{\O}d$ | $\text{\O}D$ | L1 |
|----------------------------|--------------|--------------------------|
| 0.1 - 0.25 μmRa | ≤ 12.5 | $\leq 3.2 \mu\text{mRa}$ |

Tolerances

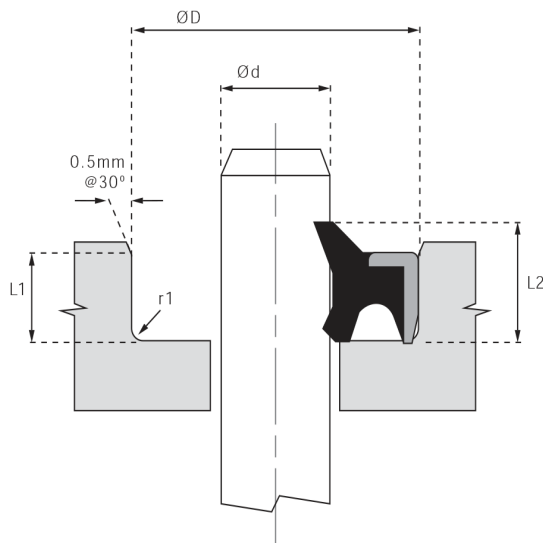
| $\text{\O}d$ | $\text{\O}D$ | L1 |
|-----------------------------|--------------|-----------|
| Refer seal specs' for d Dia | H8 | + 0.3 - 0 |

Chamfer Radii

| r1 | C |
|-----|-----------|
| 0.3 | 0.5 @ 30° |

Typical Examples

Reciprocating Rotary Oscillating Helix

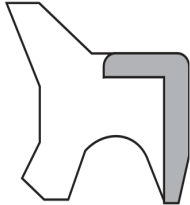




DKBI

Rod Wipers

Rod wipers

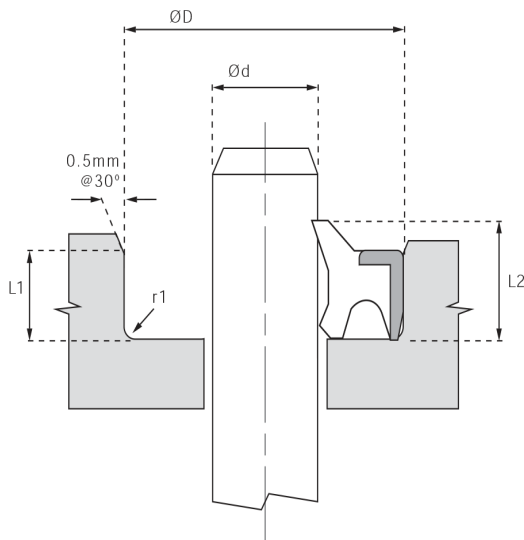


Key Features

Simple housing design

Medium duty

Asian sizes



Design

DKBI rod wiper is designed to prevent contaminants entering the cylinder, extending the service life. A rust inhibitor coated metal cased wiper designed to press-fit into an open housing, the wiper and sealing lips are moulded from a tough Polyurethane with precision trimmed lips bonded to the metal case. The sealing lip assists sealing by collecting the fluid film on the positive stroke.

Operating Conditions

Temperature

-30° to 105°C
-22° to 220°F



Speed

3.0m/sec
9.0'/sec



Surface Finish µmRa

| | | |
|-----------------|--------|------------|
| Ød | ØD | L1 |
| 0.1 - 0.25 µmRa | ≤ 12.5 | ≤ 3.2 µmRa |

Tolerances

| | | |
|-----------------------------|----|----------------|
| Ød | ØD | L1 |
| Refer seal specs' for d Dia | H8 | + 0.2 - 0.0 |

Chamfer Radii

| | |
|-----|-----------|
| r1 | C |
| 0.3 | 0.5 @ 30° |

Typical Examples

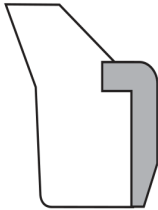
Reciprocating Rotary Oscillating Helix



DKI

Rod Wipers

Rod wipers

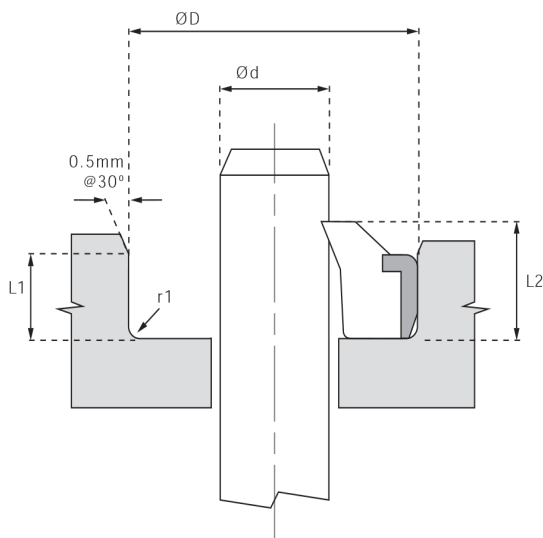


Key Features

Simple housing design

Medium duty

Asian sizes



Design

DKI rod wiper is designed to prevent contaminants entering the cylinder extending the service life. A rust inhibitor coated metal cased wiper designed to press-fit into an open housing, the wiper is moulded from a tough Polyurethane with precision trimmed wiping lip bonded to the metal case.

Operating Conditions

Temperature

-30° to 105°C
-22° to 220°F



Speed

3.0m/sec
9.0'/sec



Surface Finish µmRa

| Ød | ØD | L1 |
|-----------------|--------|------------|
| 0.1 - 0.25 µmRa | ≤ 12.5 | ≤ 3.2 µmRa |

Tolerances

| Ød | ØD | L1 |
|------------------|----|-------|
| Refer seal | H8 | + 0.2 |
| specs' for d Dia | | - 0.0 |

Chamfer Radii

| r1 | C |
|-----|-----------|
| 0.3 | 0.5 @ 30° |

Typical Examples

Reciprocating Rotary Oscillating Helix



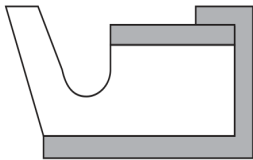
DKIY

Rod Wipers

Design

DKIY rod wiper is designed to prevent contaminants entering the cylinder extending the service life. A rust inhibitor coated metal cased wiper designed to press-fit into an open housing, the wiper is moulded from a tough Polyurethane with precision trimmed wiping lip bonded to the metal case. The wiper is also suitable for the retention of grease when fitted to pivot pins.

Rod wipers



Key Features

Simple housing design

Medium duty

Asian & European sizes

Temperature

-30° to 105°C
-22° to 220°F



Speed

3.0m/sec
9.0'/sec



Surface Finish μmRa

| $\text{\O}d$ | $\text{\O}D$ | L1 |
|----------------------------|--------------|--------------------------|
| 0.1 - 0.25 μmRa | ≤ 12.5 | $\leq 3.2 \mu\text{mRa}$ |

Tolerances

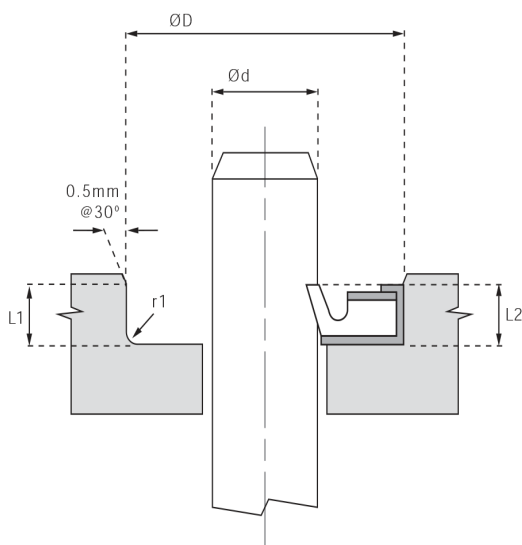
| $\text{\O}d$ | $\text{\O}D$ | L1 |
|------------------|--------------|-------|
| Refer seal | H8 | + 0.2 |
| specs' for d Dia | | - 0.0 |

Chamfer Radii

| r1 | C |
|-----|-----------|
| 0.3 | 0.5 @ 30° |

Typical Examples

Reciprocating Rotary Oscillating Helix





MCR

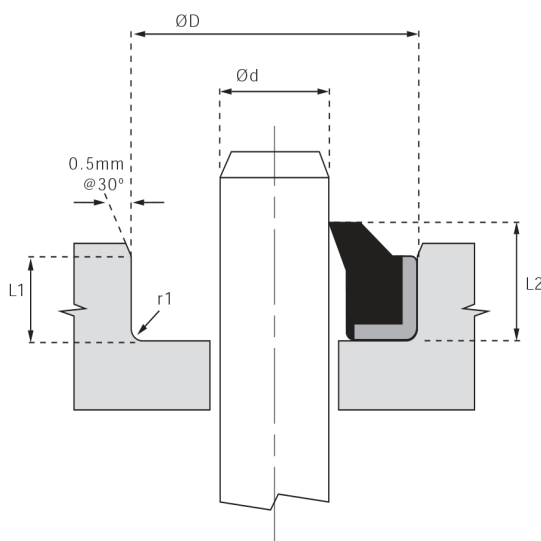
Rod Wipers

Rod wipers



Key Features

- Simple housing design
- Medium duty
- European sizes



Design

MCR rod wiper is designed to prevent contaminants entering the cylinder extending the service life. A metal cased wiper designed to press-fit into an open housing, the wiper is moulded in NBR 85 Shore A with precision trimmed wiping lip bonded to the metal case.

Operating Conditions

Temperature

-30° to 105°C
-22° to 220°F



Speed

3.0m/sec
9.0'/sec



Surface Finish µmRa

| Ød | ØD | L1 |
|-----------------|--------|------------|
| 0.1 - 0.25 µmRa | ≤ 12.5 | ≤ 3.2 µmRa |

Tolerances

| Ød | ØD | L1 |
|------------------|----|-------|
| Refer seal | H8 | + 0.2 |
| specs' for d Dia | | - 0.0 |

Chamfer Radii

| r1 | C |
|-----|-----------|
| 0.3 | 0.5 @ 30° |

Typical Examples

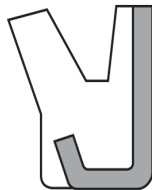
Reciprocating Rotary Oscillating Helix



MCU

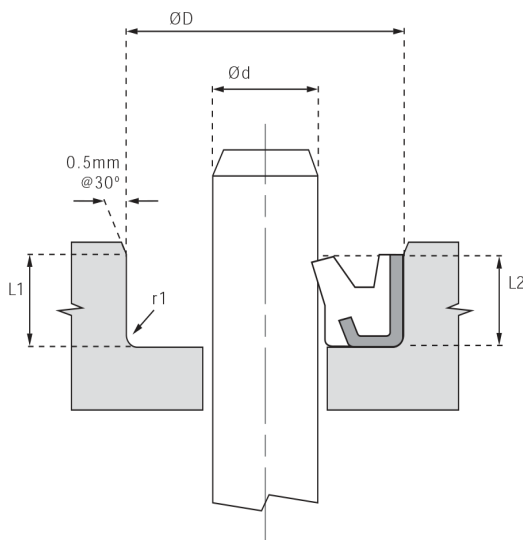
Rod Wipers

Rod wipers



Key Features

- Simple housing design
- Medium duty
- Asian & European sizes



Design

MCU rod wiper is designed to prevent contaminants entering the cylinder extending the service life. A rust inhibitor coated metal cased wiper designed to press-fit into an open housing, the wiper is moulded from a tough Polyurethane with precision trimmed wiping lip bonded to the metal case.

Operating Conditions

Temperature

-30° to 105°C
-22° to 220°F



Speed

3.0m/sec
9.0'/sec



Surface Finish µmRa

| | | |
|-----------------|--------|------------|
| Ød | ØD | L1 |
| 0.1 - 0.25 µmRa | ≤ 12.5 | ≤ 3.2 µmRa |

Tolerances

| | | |
|------------------|----|-------|
| Ød | ØD | L1 |
| Refer seal | H8 | + 0.2 |
| specs' for d Dia | | - 0.0 |

Chamfer Radii

| | |
|-----|-----------|
| r1 | C |
| 0.3 | 0.5 @ 30° |

Typical Examples

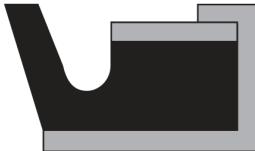
Reciprocating ✓ Rotary ✓ Oscillating ✗ Helix ✗



MPW

Rod Wipers

Rod wipers



Key Features

Compact design

Ideal pin grease seal

Asian sizes

Design

MPW rod wiper is designed to prevent contaminants entering the cylinder extending the service life. A metal cased wiper designed to press-fit into an open housing, the wiper is moulded in NBR 80 shore A with precision trimmed wiping lip bonded to the metal case.

These wipers are sized to suit cylinder pin eye housings.

Operating Conditions

Temperature

-30° to 105°C

-22° to 220°F



Speed

3.0m/sec

9.0'/sec



Surface Finish μmRa

| $\text{\O}d$ | $\text{\O}D$ | L1 |
|----------------------------|--------------|--------------------------|
| 0.1 - 0.25 μmRa | ≤ 12.5 | $\leq 3.2 \mu\text{mRa}$ |

Tolerances

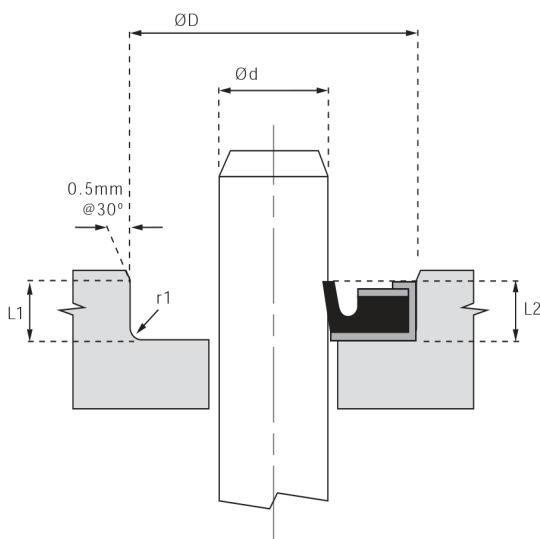
| $\text{\O}d$ | $\text{\O}D$ | L1 |
|------------------|--------------|-------|
| Refer seal | H8 | + 0.2 |
| specs' for d Dia | | - 0.0 |

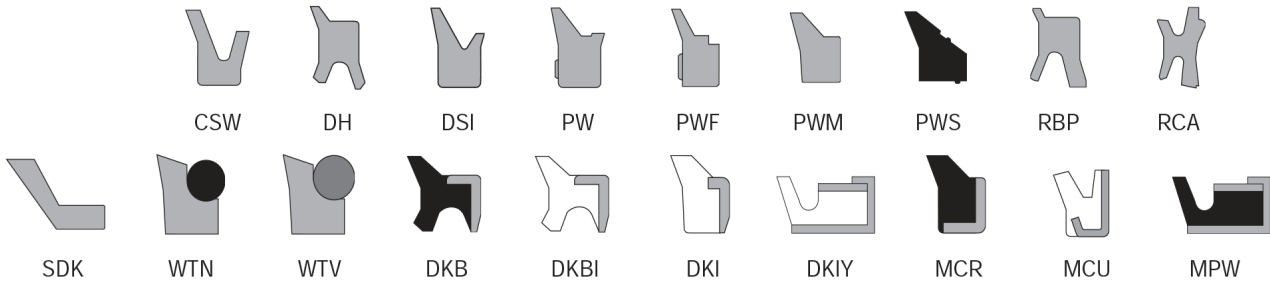
Chamfer Radii

| r1 | C |
|-----|-----------|
| 0.3 | 0.5 @ 30° |

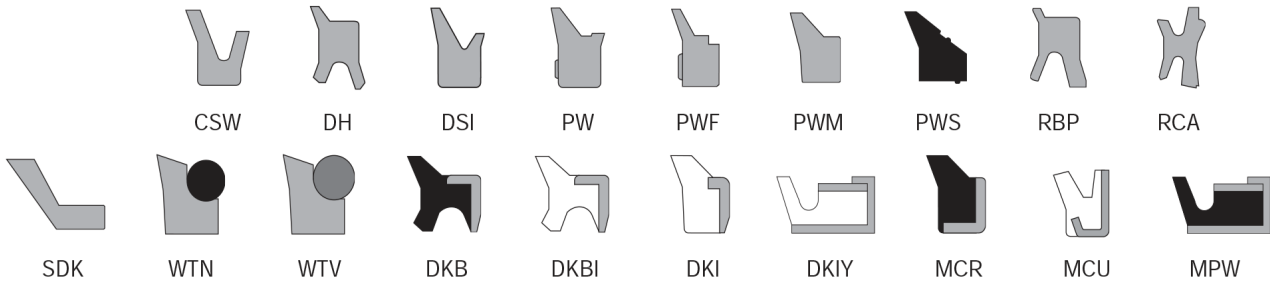
Typical Examples

Reciprocating Rotary Oscillating Helix

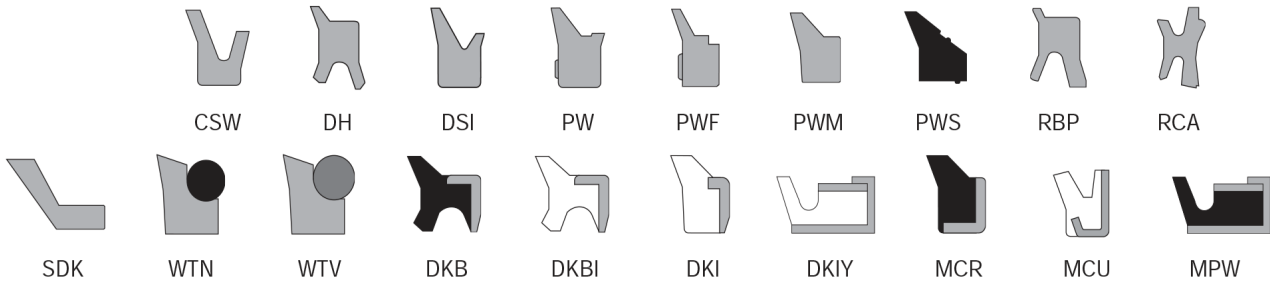




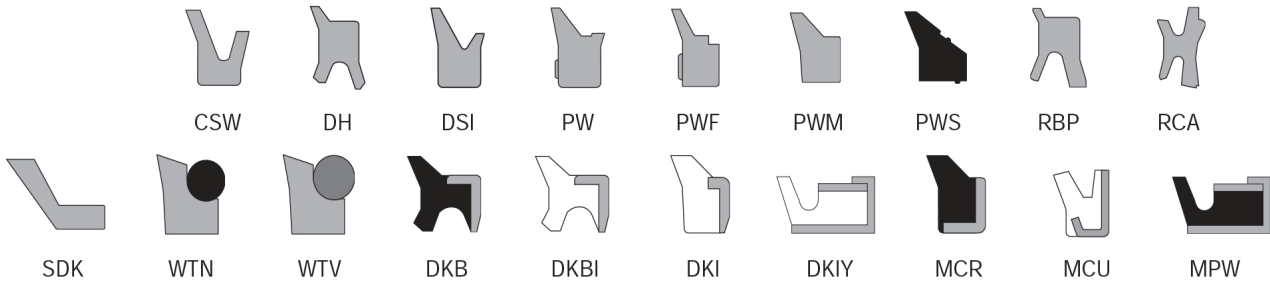
| ID | OD | L1 | L2 | OD2 | OD3 | Product Name |
|-------|-------|------|------|-------|------|----------------|
| 3.00 | 8.80 | 4.50 | 5.20 | 5.00 | 1.20 | RBP-003008-045 |
| 4.00 | 7.00 | 2.70 | 2.80 | 5.40 | 1.00 | RBP-004007-027 |
| 4.00 | 8.80 | 4.50 | 5.20 | 6.00 | 1.20 | RBP-004008-045 |
| 4.00 | 12.00 | 3.00 | 5.00 | 9.00 | 0.00 | PW-004012-030 |
| 4.00 | 12.00 | 4.00 | 7.00 | 10.00 | 1.00 | PWF-004012-040 |
| 5.00 | 8.00 | 2.30 | 2.80 | 6.20 | 1.00 | RBP-005008-027 |
| 5.00 | 12.00 | 2.80 | 5.00 | 9.00 | 0.00 | PW-005012-028 |
| 6.00 | 9.00 | 2.30 | 2.80 | 7.20 | 1.00 | RBP-006009-027 |
| 6.00 | 10.80 | 4.50 | 5.20 | 8.00 | 1.20 | RBP-006010-045 |
| 6.00 | 12.00 | 3.00 | 5.00 | 9.00 | 0.00 | PW-006012-030 |
| 6.00 | 13.00 | 3.00 | 4.50 | 0.00 | 0.00 | MCR-006013-030 |
| 6.30 | 16.00 | 5.00 | 7.00 | 0.00 | 0.00 | MCR-006016-050 |
| 8.00 | 12.80 | 3.70 | 3.70 | 9.50 | 0.00 | WTN-008012-037 |
| 8.00 | 12.80 | 4.50 | 5.20 | 10.00 | 1.20 | RBP-008012-045 |
| 8.00 | 14.00 | 3.50 | 5.00 | 0.00 | 0.00 | MCR-008014-035 |
| 8.00 | 14.00 | 4.50 | 5.20 | 11.00 | 1.20 | RBP-008014-045 |
| 8.00 | 14.60 | 3.80 | 5.00 | 11.00 | 0.00 | PW-008014-038 |
| 8.00 | 16.00 | 4.00 | 7.00 | 14.00 | 1.00 | PWF-008016-040 |
| 8.00 | 22.00 | 3.00 | 4.50 | 0.00 | 0.00 | MCR-008022-030 |
| 9.00 | 13.00 | 2.50 | 4.50 | 12.00 | 0.00 | PW-009013-025 |
| 10.00 | 14.00 | 3.20 | 3.70 | 11.40 | 1.00 | RBP-010014-032 |
| 10.00 | 14.80 | 3.70 | 3.70 | 11.50 | 0.00 | WTN-010014-037 |
| 10.00 | 15.00 | 1.00 | 3.00 | 13.00 | 0.00 | PW-010015-010 |
| 10.00 | 16.00 | 3.00 | 4.50 | 0.00 | 0.00 | MCR-010016-030 |
| 10.00 | 16.60 | 3.80 | 5.00 | 13.00 | 0.00 | PW-010016-038 |
| 10.00 | 18.00 | 4.00 | 7.00 | 16.00 | 1.00 | PWF-010018-040 |
| 10.00 | 18.00 | 5.00 | 6.00 | 14.00 | 1.60 | RBP-010018-050 |
| 10.00 | 20.00 | 5.00 | 7.00 | 0.00 | 0.00 | DKI-010020-050 |
| 10.00 | 20.00 | 5.00 | 8.00 | 0.00 | 0.00 | MCR-010020-050 |
| 11.20 | 19.20 | 4.00 | 5.00 | 15.50 | 0.00 | DH-011019-050 |
| 12.00 | 16.50 | 3.70 | 4.00 | 13.70 | 1.20 | RBP-012016-037 |



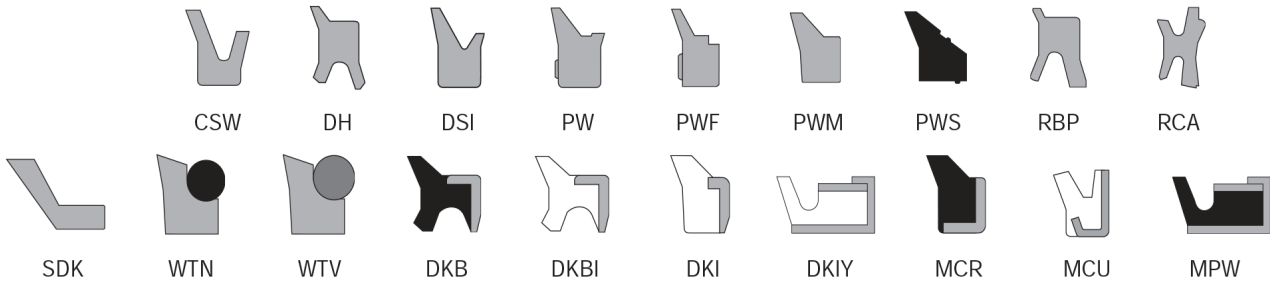
| ID | OD | L1 | L2 | OD2 | OD3 | Product Name |
|-------|-------|-------|-------|-------|------|----------------|
| 12.00 | 18.00 | 3.50 | 0.00 | 0.00 | 0.00 | MCR-012018-035 |
| 12.00 | 18.00 | 4.00 | 4.80 | 14.50 | 1.20 | RBP-012018-040 |
| 12.00 | 18.60 | 3.80 | 5.00 | 15.00 | 0.00 | PW-012018-038 |
| 12.00 | 18.80 | 5.00 | 5.00 | 13.50 | 0.00 | WTN-012018-050 |
| 12.00 | 20.00 | 4.00 | 6.00 | 0.00 | 0.00 | MCR-012020-040 |
| 12.00 | 20.00 | 4.00 | 7.00 | 18.00 | 1.00 | PWF-012020-040 |
| 12.00 | 20.00 | 5.00 | 6.00 | 16.00 | 1.60 | RBP-012020-050 |
| 12.00 | 20.00 | 5.50 | 6.50 | 16.00 | 1.60 | RBP-012020-055 |
| 12.00 | 20.00 | 10.50 | 11.00 | 22.00 | 0.00 | RCA-012020-110 |
| 12.00 | 22.00 | 5.00 | 8.00 | 0.00 | 0.00 | MCR-012022-050 |
| 12.00 | 22.00 | 6.00 | 6.50 | 0.00 | 0.00 | RBP-012022-060 |
| 12.00 | 22.00 | 7.00 | 9.50 | 0.00 | 0.00 | KPS-012 |
| 12.00 | 22.00 | 11.00 | 10.50 | 0.00 | 0.00 | RCA-012022-110 |
| 12.50 | 23.00 | 5.00 | 7.00 | 0.00 | 0.00 | DKI-012023-050 |
| 13.00 | 19.60 | 3.80 | 6.00 | 0.00 | 0.00 | PWM-013019-038 |
| 14.00 | 18.50 | 3.70 | 4.00 | 15.70 | 1.20 | RBP-014018-037 |
| 14.00 | 20.00 | 3.50 | 4.00 | 18.50 | 0.00 | DH-014020-040 |
| 14.00 | 20.00 | 3.50 | 6.00 | 0.00 | 0.00 | MCR-014020-035 |
| 14.00 | 20.00 | 4.00 | 4.80 | 16.50 | 1.20 | RBP-014020-040 |
| 14.00 | 20.60 | 3.80 | 5.00 | 0.00 | 0.00 | PW-014020-038 |
| 14.00 | 20.80 | 5.00 | 5.00 | 0.00 | 0.00 | WTN-014020-050 |
| 14.00 | 22.00 | 3.00 | 4.00 | 0.00 | 0.00 | MCR-014022-030 |
| 14.00 | 22.00 | 4.00 | 6.00 | 0.00 | 0.00 | DH-014022-050 |
| 14.00 | 22.00 | 4.00 | 7.00 | 0.00 | 0.00 | PWF-014022-040 |
| 14.00 | 24.00 | 5.00 | 7.00 | 0.00 | 0.00 | DKB-014024-050 |
| 14.00 | 24.00 | 6.00 | 6.50 | 0.00 | 0.00 | RBP-014024-060 |
| 14.00 | 25.00 | 5.00 | 7.00 | 0.00 | 0.00 | MCU-014025-050 |
| 15.00 | 21.60 | 3.80 | 5.00 | 0.00 | 0.00 | PW-015021-038 |
| 15.00 | 21.80 | 5.00 | 5.00 | 0.00 | 0.00 | WTN-015021-050 |
| 15.00 | 23.00 | 4.00 | 7.00 | 0.00 | 0.00 | PWF-015023-040 |
| 15.00 | 25.00 | 5.00 | 8.00 | 0.00 | 0.00 | MCR-015025-050 |



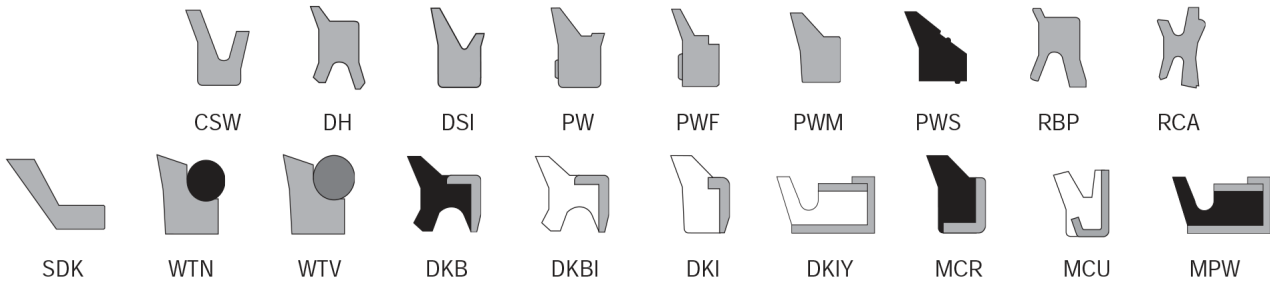
| ID | OD | L1 | L2 | OD2 | OD3 | Product Name |
|-------|-------|-------|-------|-------|------|----------------|
| 15.00 | 27.00 | 5.00 | 7.00 | 0.00 | 0.00 | PW-015027-050 |
| 16.00 | 20.50 | 3.70 | 4.00 | 18.50 | 0.00 | RBP-016020-037 |
| 16.00 | 22.00 | 3.00 | 4.00 | 0.00 | 0.00 | MCR-016022-030 |
| 16.00 | 22.00 | 4.00 | 5.00 | 18.50 | 0.00 | RBP-016022-040 |
| 16.00 | 22.50 | 3.00 | 5.00 | 0.00 | 0.00 | PW-016022-030 |
| 16.00 | 22.60 | 3.80 | 5.00 | 0.00 | 0.00 | PW-016022-038 |
| 16.00 | 22.80 | 5.00 | 5.00 | 0.00 | 0.00 | WTN-016022-050 |
| 16.00 | 24.00 | 4.00 | 6.00 | 0.00 | 0.00 | DH-016024-050V |
| 16.00 | 24.00 | 4.00 | 6.00 | 0.00 | 0.00 | DH-016024-050 |
| 16.00 | 24.00 | 4.00 | 7.00 | 0.00 | 0.00 | PWF-016024-040 |
| 16.00 | 24.00 | 5.00 | 0.00 | 0.00 | 0.00 | MCR-016024-035 |
| 16.00 | 24.00 | 5.00 | 6.00 | 0.00 | 0.00 | RBP-016024-050 |
| 16.00 | 24.60 | 5.30 | 7.00 | 0.00 | 0.00 | PW-016024-053 |
| 16.00 | 26.00 | 4.50 | 6.50 | 0.00 | 0.00 | CSW-016026-045 |
| 16.00 | 26.00 | 5.00 | 8.00 | 0.00 | 0.00 | MCR-016026-050 |
| 16.00 | 26.00 | 6.00 | 6.50 | 0.00 | 0.00 | RBP-016026-060 |
| 16.00 | 26.00 | 7.00 | 9.50 | 0.00 | 0.00 | KPS-016V |
| 16.00 | 26.00 | 10.50 | 11.00 | 0.00 | 0.00 | RCA-016026-110 |
| 17.00 | 23.60 | 3.80 | 5.00 | 0.00 | 0.00 | PW-017023-038 |
| 17.00 | 25.00 | 4.00 | 7.00 | 0.00 | 0.00 | PWF-017025-040 |
| 18.00 | 24.00 | 3.60 | 7.00 | 0.00 | 0.00 | DH-018024-040 |
| 18.00 | 24.00 | 4.50 | 7.00 | 0.00 | 0.00 | MCR-018024-045 |
| 18.00 | 24.60 | 3.80 | 5.00 | 0.00 | 0.00 | PW-018024-038 |
| 18.00 | 24.80 | 5.00 | 5.00 | 0.00 | 0.00 | WTN-018024-050 |
| 18.00 | 26.00 | 4.00 | 6.50 | 0.00 | 0.00 | DH-018026-050 |
| 18.00 | 26.00 | 4.00 | 7.00 | 0.00 | 0.00 | PWF-018026-040 |
| 18.00 | 26.00 | 5.00 | 6.00 | 0.00 | 0.00 | RBP-018026-050 |
| 18.00 | 26.00 | 10.50 | 11.00 | 0.00 | 0.00 | RCA-018026-110 |
| 18.00 | 26.60 | 5.30 | 7.00 | 0.00 | 0.00 | PW-018026-053 |
| 18.00 | 28.00 | 4.50 | 7.00 | 0.00 | 0.00 | DH-018028-055 |
| 18.00 | 28.00 | 5.00 | 7.00 | 0.00 | 0.00 | MCR-018028-050 |



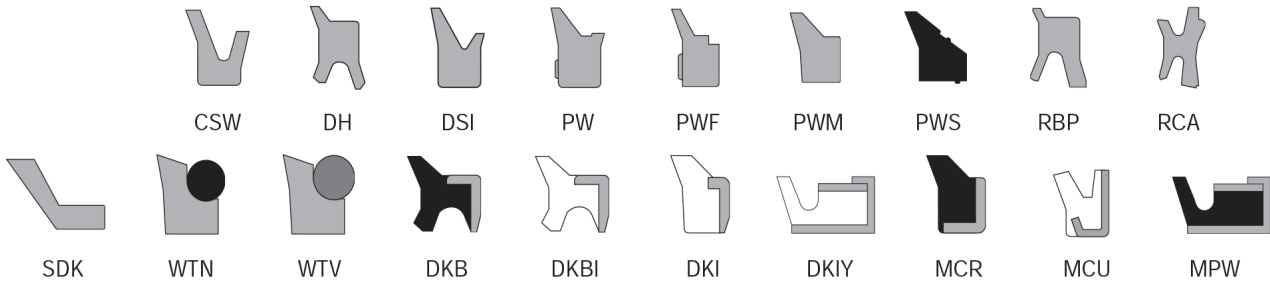
| ID | OD | L1 | L2 | OD2 | OD3 | Product Name |
|-------|-------|-------|-------|-------|------|-----------------|
| 18.00 | 28.00 | 6.00 | 6.50 | 0.00 | 0.00 | RBP-018028-060 |
| 18.00 | 28.00 | 7.00 | 10.00 | 0.00 | 0.00 | MCR-018028-070 |
| 18.00 | 28.00 | 10.50 | 11.00 | 0.00 | 0.00 | RCA-018028-110 |
| 18.00 | 30.00 | 6.00 | 9.00 | 0.00 | 0.00 | DKBI-018030-060 |
| 19.00 | 28.60 | 5.30 | 7.00 | 0.00 | 0.00 | PW-019028-053 |
| 20.00 | 25.00 | 4.00 | 4.60 | 0.00 | 0.00 | RBP-020025-040 |
| 20.00 | 26.00 | 3.60 | 4.80 | 0.00 | 0.00 | DH-020026-040 |
| 20.00 | 26.00 | 4.00 | 4.00 | 0.00 | 0.00 | MCR-020026-040 |
| 20.00 | 26.00 | 4.00 | 4.80 | 0.00 | 0.00 | RBP-020026-040 |
| 20.00 | 26.80 | 5.00 | 5.00 | 0.00 | 0.00 | WTN-020026-050 |
| 20.00 | 28.00 | 3.50 | 5.00 | 0.00 | 0.00 | MCR-020028-035 |
| 20.00 | 28.00 | 4.00 | 6.00 | 0.00 | 0.00 | DH-020028-050 |
| 20.00 | 28.00 | 4.00 | 7.00 | 0.00 | 0.00 | PWF-020028-040 |
| 20.00 | 28.00 | 7.00 | 9.00 | 0.00 | 0.00 | MCR-020028-070 |
| 20.00 | 28.00 | 8.00 | 0.00 | 0.00 | 0.00 | MCR-020028-050 |
| 20.00 | 28.60 | 5.30 | 7.00 | 0.00 | 0.00 | PW-020028-053 |
| 20.00 | 28.60 | 5.30 | 7.50 | 23.00 | 0.00 | RBP-020028-053 |
| 20.00 | 30.00 | 4.00 | 6.00 | 0.00 | 0.00 | MCR-020030-040 |
| 20.00 | 30.00 | 5.00 | 8.00 | 0.00 | 0.00 | MCR-020030-050 |
| 20.00 | 30.00 | 5.40 | 7.00 | 0.00 | 0.00 | PW-020030-054 |
| 20.00 | 30.00 | 7.00 | 7.50 | 0.00 | 0.00 | RBP-020030-070 |
| 20.00 | 30.00 | 7.00 | 8.00 | 0.00 | 0.00 | DH-020030-070 |
| 20.00 | 30.00 | 7.00 | 10.00 | 0.00 | 0.00 | MCR-020030-070 |
| 20.00 | 30.00 | 7.50 | 9.50 | 0.00 | 0.00 | KPS-020 |
| 20.00 | 30.00 | 10.50 | 11.00 | 0.00 | 0.00 | RCA-020030-110 |
| 20.00 | 32.00 | 6.00 | 9.00 | 0.00 | 0.00 | DKBI-020032-060 |
| 20.00 | 33.00 | 6.00 | 8.50 | 0.00 | 0.00 | CSW-020033-060 |
| 20.00 | 35.00 | 7.00 | 10.00 | 0.00 | 0.00 | MCR-020035-070 |
| 22.00 | 27.00 | 4.00 | 4.60 | 0.00 | 0.00 | RBP-022027-040 |
| 22.00 | 28.00 | 3.50 | 7.00 | 0.00 | 0.00 | DH-022028-040 |
| 22.00 | 28.00 | 4.00 | 5.00 | 0.00 | 0.00 | RBP-022028-040 |



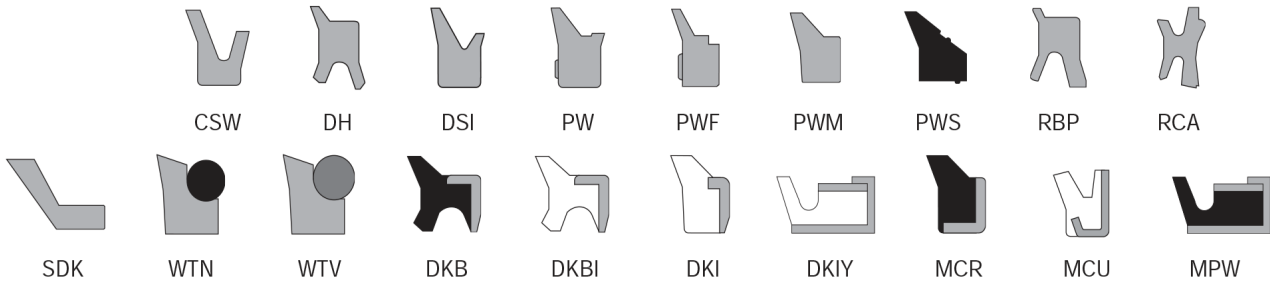
| ID | OD | L1 | L2 | OD2 | OD3 | Product Name |
|-------|-------|-------|-------|-------|------|-----------------|
| 22.00 | 28.00 | 5.00 | 9.00 | 0.00 | 0.00 | MCR-022028-050 |
| 22.00 | 28.80 | 5.00 | 5.00 | 0.00 | 0.00 | WTV-022028-050 |
| 22.00 | 28.80 | 5.00 | 5.00 | 0.00 | 0.00 | WTN-022028-050 |
| 22.00 | 30.00 | 4.00 | 6.00 | 0.00 | 0.00 | MCR-022030-040 |
| 22.00 | 30.00 | 4.00 | 6.00 | 26.30 | 0.00 | DH-022030-050A |
| 22.00 | 30.00 | 4.00 | 7.00 | 26.00 | 0.00 | PWF-022030-040 |
| 22.00 | 30.00 | 5.00 | 7.00 | 0.00 | 0.00 | PW-022030-050 |
| 22.00 | 30.60 | 2.20 | 4.00 | 0.00 | 0.00 | PW-022030-022 |
| 22.00 | 30.60 | 5.30 | 7.00 | 0.00 | 0.00 | PW-022030-053 |
| 22.00 | 32.00 | 5.00 | 7.00 | 0.00 | 0.00 | MCR-022032-050 |
| 22.00 | 32.00 | 6.00 | 9.00 | 0.00 | 0.00 | DKB-022032-060 |
| 22.00 | 32.00 | 7.00 | 7.50 | 0.00 | 0.00 | RBP-022032-070 |
| 22.00 | 32.00 | 7.00 | 10.00 | 0.00 | 0.00 | MCR-022032-070 |
| 22.00 | 32.00 | 11.00 | 11.50 | 0.00 | 0.00 | RCA-022032-115 |
| 22.00 | 34.00 | 6.00 | 9.00 | 0.00 | 0.00 | DKB-022034-060 |
| 22.00 | 35.00 | 5.00 | 8.00 | 0.00 | 0.00 | MCR-022035-050 |
| 22.40 | 34.40 | 6.00 | 9.00 | 0.00 | 0.00 | DKB-022034-060A |
| 23.00 | 31.00 | 4.00 | 7.00 | 0.00 | 0.00 | PWF-023031-040 |
| 23.50 | 31.50 | 4.00 | 6.00 | 0.00 | 0.00 | DH-023031-050 |
| 24.00 | 32.00 | 4.00 | 7.00 | 0.00 | 0.00 | PWF-024032-040 |
| 24.00 | 32.00 | 5.00 | 7.00 | 0.00 | 0.00 | MCR-024032-050 |
| 24.00 | 32.60 | 2.20 | 4.00 | 0.00 | 0.00 | PW-024032-022 |
| 24.00 | 32.60 | 5.30 | 7.00 | 0.00 | 0.00 | PW-024032-053 |
| 25.00 | 30.00 | 4.00 | 4.60 | 0.00 | 0.00 | RBP-025030-040 |
| 25.00 | 31.00 | 4.00 | 4.80 | 0.00 | 0.00 | RBP-025031-040 |
| 25.00 | 31.00 | 5.00 | 7.00 | 0.00 | 0.00 | MCR-025031-050 |
| 25.00 | 31.80 | 5.00 | 5.00 | 0.00 | 0.00 | WTN-025031-050 |
| 25.00 | 32.00 | 5.00 | 8.00 | 0.00 | 0.00 | MCR-025032-050 |
| 25.00 | 32.00 | 7.00 | 7.00 | 0.00 | 0.00 | MCU-025032-070 |
| 25.00 | 32.50 | 1.60 | 3.00 | 0.00 | 0.00 | SDK-025032-016 |
| 25.00 | 33.00 | 4.00 | 6.00 | 0.00 | 0.00 | DH-025033-050 |



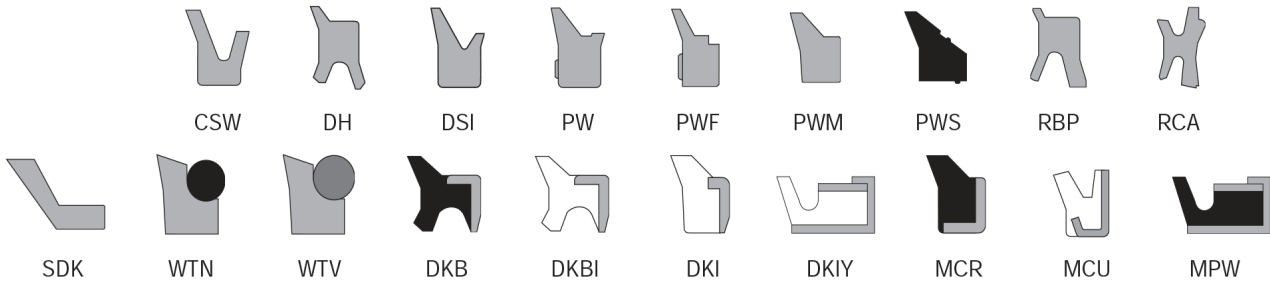
| ID | OD | L1 | L2 | OD2 | OD3 | Product Name |
|-------|-------|-------|-------|-------|------|-----------------|
| 25.00 | 33.00 | 4.00 | 6.00 | 29.00 | 0.00 | PWM-025033-040 |
| 25.00 | 33.00 | 4.00 | 7.00 | 0.00 | 0.00 | PWF-025033-040 |
| 25.00 | 33.60 | 5.30 | 6.20 | 0.00 | 0.00 | RBP-025033-053 |
| 25.00 | 33.60 | 5.30 | 7.00 | 0.00 | 0.00 | PW-025033-053 |
| 25.00 | 34.00 | 6.90 | 9.00 | 0.00 | 0.00 | MCR-025034-069 |
| 25.00 | 35.00 | 4.00 | 4.00 | 0.00 | 0.00 | MCU-025035-040 |
| 25.00 | 35.00 | 5.00 | 8.00 | 0.00 | 0.00 | MCR-025035-050 |
| 25.00 | 35.00 | 7.00 | 7.50 | 0.00 | 0.00 | RBP-025035-070 |
| 25.00 | 35.00 | 7.00 | 9.50 | 0.00 | 0.00 | KPS-025 |
| 25.00 | 35.00 | 7.00 | 10.00 | 0.00 | 0.00 | MCU-025035-070 |
| 25.00 | 35.00 | 7.00 | 10.00 | 0.00 | 0.00 | MCR-025035-070 |
| 25.00 | 35.00 | 11.00 | 11.50 | 0.00 | 0.00 | RCA-025035-115 |
| 25.00 | 37.00 | 6.00 | 9.00 | 0.00 | 0.00 | DKBI-025037-060 |
| 25.00 | 38.00 | 6.00 | 8.50 | 0.00 | 0.00 | CSW-025038-060 |
| 25.00 | 38.00 | 7.50 | 7.50 | 0.00 | 0.00 | MCU-025038-075 |
| 25.00 | 45.00 | 3.00 | 0.00 | 0.00 | 0.00 | SDK-025045-030 |
| 26.00 | 32.00 | 5.00 | 7.00 | 0.00 | 0.00 | MCR-026032-050 |
| 26.00 | 34.00 | 4.00 | 7.00 | 0.00 | 0.00 | PWF-026034-040 |
| 27.00 | 39.00 | 6.00 | 9.00 | 0.00 | 0.00 | DKI-027039-060 |
| 28.00 | 34.50 | 5.00 | 0.00 | 0.00 | 0.00 | WTV-028034-050 |
| 28.00 | 34.80 | 5.00 | 5.00 | 0.00 | 0.00 | WTN-028034-050 |
| 28.00 | 36.00 | 3.80 | 7.00 | 31.00 | 0.00 | PWM-028036-040 |
| 28.00 | 36.00 | 4.00 | 6.00 | 0.00 | 0.00 | DH-028036-050A |
| 28.00 | 36.00 | 4.00 | 6.00 | 0.00 | 0.00 | DH-028036-050 |
| 28.00 | 36.00 | 4.00 | 7.00 | 0.00 | 0.00 | PWF-028036-040 |
| 28.00 | 36.60 | 5.30 | 7.00 | 31.00 | 0.00 | PW-028036-053 |
| 28.00 | 38.00 | 5.00 | 8.00 | 0.00 | 0.00 | MCR-028038-050 |
| 28.00 | 38.00 | 7.00 | 7.50 | 0.00 | 0.00 | RBP-028038-070 |
| 28.00 | 38.00 | 7.00 | 10.00 | 0.00 | 0.00 | MCR-028038-070 |
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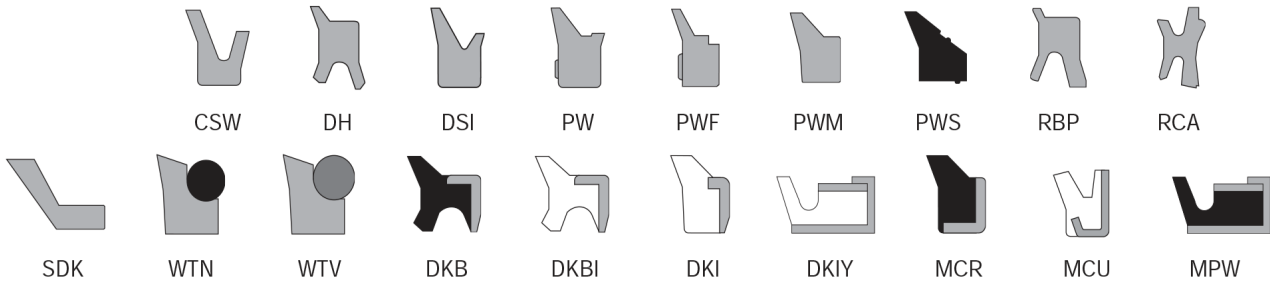
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| 28.00 | 41.00 | 6.00 | 8.50 | 0.00 | 0.00 | CSW-028041-060 |
| 28.00 | 42.00 | 7.00 | 7.00 | 0.00 | 0.00 | MCU-028042-070 |
| 30.00 | 36.80 | 5.00 | 0.00 | 0.00 | 0.00 | WTV-030036-050 |
| 30.00 | 36.80 | 5.00 | 5.00 | 0.00 | 0.00 | WTN-030036-050 |
| 30.00 | 37.50 | 1.60 | 3.00 | 32.90 | 0.00 | SDK-030037-016 |
| 30.00 | 38.00 | 4.00 | 7.00 | 0.00 | 0.00 | PWF-030038-040 |
| 30.00 | 38.00 | 5.00 | 6.50 | 0.00 | 0.00 | DH-030038-060 |
| 30.00 | 38.60 | 5.30 | 7.00 | 0.00 | 0.00 | PW-030038-053 |
| 30.00 | 40.00 | 3.00 | 5.00 | 0.00 | 0.00 | PW-030040-030 |
| 30.00 | 40.00 | 4.00 | 0.00 | 0.00 | 0.00 | MCU-030040-040 |
| 30.00 | 40.00 | 4.00 | 4.00 | 0.00 | 0.00 | MPW-030040-040 |
| 30.00 | 40.00 | 5.00 | 8.00 | 0.00 | 0.00 | MCR-030040-050 |
| 30.00 | 40.00 | 6.00 | 8.50 | 0.00 | 0.00 | DH-030040-070V |
| 30.00 | 40.00 | 7.00 | 7.50 | 0.00 | 0.00 | RBP-030040-070 |
| 30.00 | 40.00 | 7.00 | 10.00 | 0.00 | 0.00 | KPS-030 |
| 30.00 | 40.00 | 7.00 | 10.00 | 0.00 | 0.00 | MCR-030040-070 |
| 30.00 | 40.00 | 11.00 | 11.50 | 0.00 | 0.00 | RCA-030040-115 |
| 30.00 | 42.00 | 6.00 | 9.00 | 0.00 | 0.00 | PWM-030042-060 |
| 30.00 | 42.00 | 6.00 | 9.00 | 0.00 | 0.00 | DKBI-030042-060 |
| 30.00 | 43.00 | 6.00 | 8.50 | 0.00 | 0.00 | CSW-030043-060 |
| 30.00 | 45.00 | 5.00 | 8.00 | 0.00 | 0.00 | MCR-030045-050 |
| 30.00 | 45.00 | 6.00 | 9.00 | 0.00 | 0.00 | DKB-030045-060 |
| 30.00 | 47.00 | 7.00 | 10.00 | 0.00 | 0.00 | DKB-030047-070 |
| 31.00 | 39.60 | 5.30 | 7.00 | 0.00 | 0.00 | PW-031039-053 |
| 31.50 | 44.00 | 7.00 | 10.00 | 0.00 | 0.00 | DKI-031044-070 |
| 32.00 | 37.50 | 4.55 | 5.00 | 0.00 | 0.00 | RBP-032037-045 |
| 32.00 | 38.80 | 5.00 | 5.00 | 0.00 | 0.00 | WTN-032038-050 |
| 32.00 | 39.50 | 1.60 | 3.00 | 0.00 | 0.00 | SDK-032039-016 |
| 32.00 | 40.00 | 3.70 | 5.00 | 0.00 | 0.00 | PW-032040-037 |
| 32.00 | 40.00 | 4.00 | 7.00 | 0.00 | 0.00 | PWF-032040-040 |



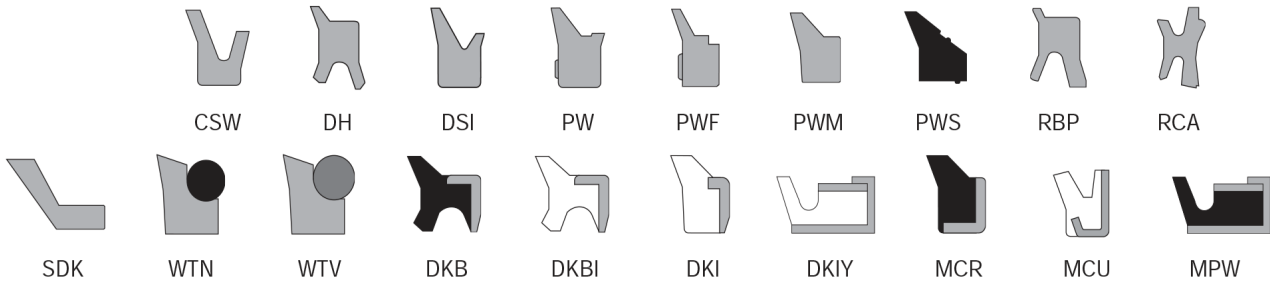
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| 32.00 | 40.00 | 5.00 | 6.50 | 36.00 | 0.00 | DH-032040-060 |
| 32.00 | 40.60 | 5.30 | 7.00 | 0.00 | 0.00 | PW-032040-053 |
| 32.00 | 42.00 | 5.00 | 7.00 | 0.00 | 0.00 | MCR-032042-050 |
| 32.00 | 42.00 | 7.00 | 7.50 | 0.00 | 0.00 | RBP-032042-070 |
| 32.00 | 42.00 | 7.00 | 10.00 | 0.00 | 0.00 | MCR-032042-070 |
| 32.00 | 42.00 | 11.00 | 11.50 | 0.00 | 0.00 | RCA-032042-115 |
| 32.00 | 44.00 | 7.00 | 10.00 | 0.00 | 0.00 | DKB-032044-070 |
| 32.00 | 45.00 | 4.00 | 8.00 | 0.00 | 0.00 | MCR-032045-040 |
| 32.00 | 45.00 | 5.00 | 7.00 | 0.00 | 0.00 | MCR-032045-050 |
| 32.00 | 45.00 | 6.00 | 8.50 | 0.00 | 0.00 | CSW-032045-060 |
| 32.00 | 45.00 | 7.00 | 10.00 | 0.00 | 0.00 | MCR-032045-070 |
| 32.00 | 48.00 | 7.00 | 10.00 | 0.00 | 0.00 | MCR-032048-070 |
| 32.00 | 52.00 | 8.00 | 11.00 | 0.00 | 0.00 | DKBI-032052-080 |
| 33.00 | 40.50 | 1.60 | 3.00 | 0.00 | 0.00 | SDK-033040-016 |
| 33.00 | 41.60 | 5.30 | 7.00 | 0.00 | 0.00 | PWM-033041-053 |
| 33.00 | 43.00 | 0.00 | 10.00 | 0.00 | 0.00 | MCU-033043-070 |
| 34.00 | 46.00 | 7.00 | 10.00 | 0.00 | 0.00 | DKI-034046-070 |
| 34.00 | 46.00 | 7.00 | 10.00 | 0.00 | 0.00 | DKB-034046-070 |
| 35.00 | 40.00 | 3.70 | 6.00 | 0.00 | 0.00 | PW-035040-037 |
| 35.00 | 41.80 | 5.00 | 5.00 | 0.00 | 0.00 | WTN-035041-050 |
| 35.00 | 42.50 | 1.60 | 3.00 | 0.00 | 0.00 | SDK-035042-016 |
| 35.00 | 43.00 | 4.00 | 7.00 | 0.00 | 0.00 | PWF-035043-040 |
| 35.00 | 43.00 | 5.00 | 6.50 | 0.00 | 0.00 | DH-035043-060 |
| 35.00 | 43.60 | 5.30 | 7.00 | 0.00 | 0.00 | PW-035043-053 |
| 35.00 | 45.00 | 4.00 | 4.00 | 0.00 | 0.00 | MPW-035045-040 |
| 35.00 | 45.00 | 4.00 | 6.00 | 0.00 | 0.00 | PW-035045-040 |
| 35.00 | 45.00 | 5.00 | 8.00 | 0.00 | 0.00 | MCR-035045-050 |
| 35.00 | 45.00 | 6.00 | 6.00 | 0.00 | 0.00 | DKIY-035045-060 |
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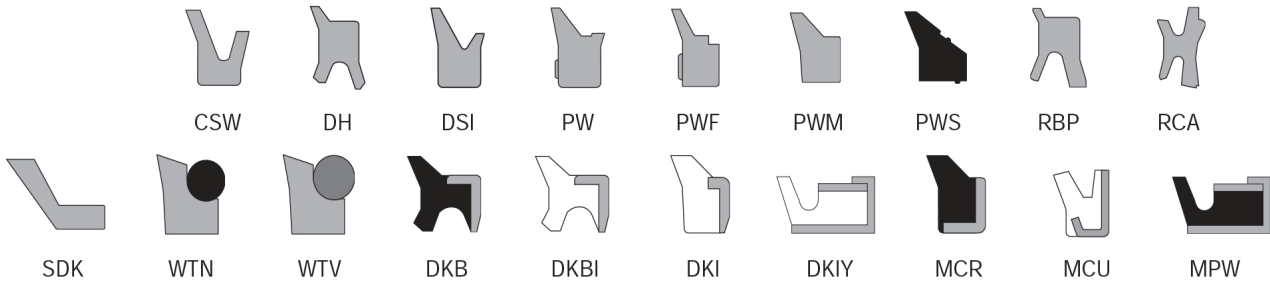
| ID | OD | L1 | L2 | OD2 | OD3 | Product Name |
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| 35.00 | 45.00 | 7.00 | 10.00 | 0.00 | 0.00 | MCR-035045-070 |
| 35.00 | 47.00 | 6.00 | 9.00 | 0.00 | 0.00 | PWM-035047-060 |
| 35.00 | 47.00 | 7.00 | 10.00 | 0.00 | 0.00 | DKBI-035047-070 |
| 36.00 | 42.80 | 5.00 | 5.00 | 0.00 | 0.00 | WTN-036042-050 |
| 36.00 | 44.00 | 4.00 | 7.00 | 0.00 | 0.00 | PWF-036044-040 |
| 36.00 | 44.60 | 4.00 | 8.00 | 0.00 | 0.00 | DH-036044-050 |
| 36.00 | 44.60 | 5.30 | 7.00 | 0.00 | 0.00 | PW-036044-053 |
| 36.00 | 45.00 | 7.00 | 10.00 | 0.00 | 0.00 | MCR-036045-070 |
| 36.00 | 46.00 | 5.00 | 8.00 | 0.00 | 0.00 | MCR-036046-050 |
| 36.00 | 46.00 | 7.00 | 7.00 | 0.00 | 0.00 | MCU-036046-070 |
| 36.00 | 46.00 | 7.00 | 7.50 | 0.00 | 0.00 | RBP-036046-070 |
| 36.00 | 48.00 | 6.00 | 0.00 | 0.00 | 0.00 | MCU-036048-060 |
| 36.00 | 48.00 | 7.00 | 10.00 | 0.00 | 0.00 | DKI-036048-070 |
| 36.00 | 49.00 | 6.00 | 8.50 | 0.00 | 0.00 | CSW-036049-060 |
| 37.00 | 45.00 | 4.00 | 7.00 | 0.00 | 0.00 | PWF-037045-040 |
| 37.00 | 47.00 | 5.00 | 8.00 | 0.00 | 0.00 | MCR-037047-050 |
| 38.00 | 44.80 | 5.00 | 0.00 | 41.50 | 0.00 | WTV-038044-050 |
| 38.00 | 46.00 | 4.00 | 7.00 | 0.00 | 0.00 | PWF-038046-040 |
| 38.00 | 46.00 | 5.00 | 6.50 | 0.00 | 0.00 | DH-038046-060 |
| 38.00 | 46.60 | 5.30 | 7.00 | 0.00 | 0.00 | PW-038046-053 |
| 38.00 | 48.00 | 7.00 | 10.00 | 0.00 | 0.00 | MCR-038048-070 |
| 38.00 | 50.00 | 7.50 | 7.50 | 0.00 | 0.00 | MCU-038050-075 |
| 40.00 | 46.00 | 10.00 | 12.00 | 0.00 | 0.00 | MCR-040046-080 |
| 40.00 | 46.80 | 5.00 | 5.00 | 0.00 | 0.00 | WTN-040046-050 |
| 40.00 | 47.50 | 1.60 | 3.00 | 0.00 | 0.00 | SDK-040047-016 |
| 40.00 | 48.00 | 4.00 | 4.00 | 0.00 | 0.00 | MCR-040048-040 |
| 40.00 | 48.00 | 4.00 | 7.00 | 0.00 | 0.00 | PWF-040048-040 |
| 40.00 | 48.00 | 5.00 | 6.50 | 0.00 | 0.00 | DH-040048-060 |
| 40.00 | 48.60 | 5.30 | 7.00 | 43.00 | 0.00 | PW-040048-053 |
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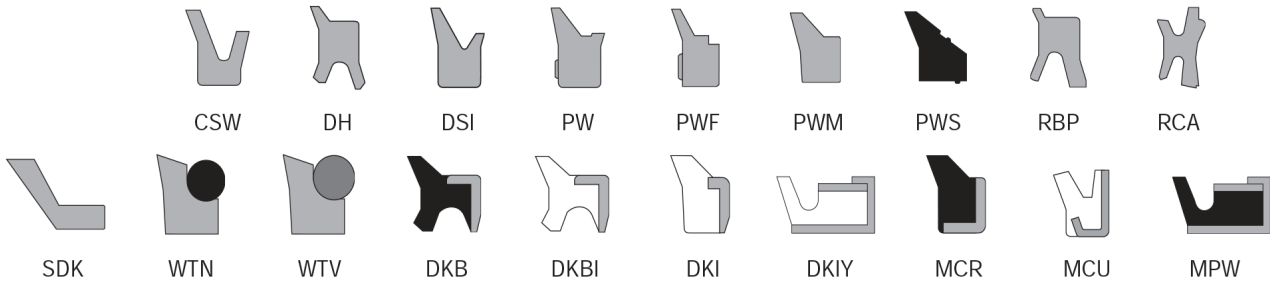
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| 40.00 | 50.00 | 5.50 | 8.00 | 45.00 | 0.00 | PW-040050-050 |
| 40.00 | 50.00 | 6.00 | 6.00 | 0.00 | 0.00 | DKIY-040050-060 |
| 40.00 | 50.00 | 7.00 | 7.50 | 0.00 | 0.00 | RBP-040050-070 |
| 40.00 | 50.00 | 7.00 | 10.00 | 0.00 | 0.00 | MCR-040050-070 |
| 40.00 | 50.00 | 7.10 | 12.00 | 0.00 | 0.00 | PW-040050-071 |
| 40.00 | 50.00 | 11.00 | 11.50 | 0.00 | 0.00 | RCA-040050-115 |
| 40.00 | 52.00 | 6.00 | 9.00 | 0.00 | 0.00 | PWM-040052-060 |
| 40.00 | 52.00 | 7.00 | 10.00 | 0.00 | 0.00 | DKBI-040052-070 |
| 40.00 | 53.00 | 6.00 | 8.50 | 0.00 | 0.00 | CSW-040053-060 |
| 40.00 | 55.00 | 5.00 | 5.00 | 0.00 | 0.00 | MCU-040055-050 |
| 40.00 | 62.00 | 8.00 | 11.00 | 0.00 | 0.00 | DKB-040062-080 |
| 42.00 | 50.00 | 4.00 | 7.00 | 0.00 | 0.00 | PWF-042050-040 |
| 42.00 | 50.60 | 5.30 | 7.00 | 0.00 | 0.00 | PW-042050-053 |
| 42.00 | 52.00 | 7.00 | 10.00 | 0.00 | 0.00 | MCR-042052-070 |
| 45.00 | 51.80 | 5.00 | 5.00 | 0.00 | 0.00 | WTN-045051-050 |
| 45.00 | 52.50 | 1.60 | 3.00 | 0.00 | 0.00 | SDK-045052-016 |
| 45.00 | 53.00 | 4.00 | 7.00 | 0.00 | 0.00 | PWF-045053-040 |
| 45.00 | 53.00 | 5.00 | 6.50 | 0.00 | 0.00 | DH-045053-060 |
| 45.00 | 53.60 | 5.30 | 7.00 | 0.00 | 0.00 | PW-045053-053 |
| 45.00 | 55.00 | 0.00 | 0.00 | 0.00 | 0.00 | MCU-045055-060 |
| 45.00 | 55.00 | 4.00 | 4.00 | 0.00 | 0.00 | MPW-045055-040 |
| 45.00 | 55.00 | 5.00 | 6.50 | 51.00 | 0.00 | DH-045055-060 |
| 45.00 | 55.00 | 5.00 | 7.00 | 0.00 | 0.00 | MCR-045055-050 |
| 45.00 | 55.00 | 6.00 | 6.00 | 0.00 | 0.00 | DKIY-045055-060 |
| 45.00 | 55.00 | 7.00 | 7.50 | 0.00 | 0.00 | RBP-045055-070 |
| 45.00 | 55.00 | 7.00 | 8.00 | 0.00 | 0.00 | DSI-045055-070 |
| 45.00 | 55.00 | 7.00 | 10.00 | 0.00 | 0.00 | MCR-045055-070 |
| 45.00 | 55.00 | 12.00 | 12.50 | 0.00 | 0.00 | RCA-045055-125 |
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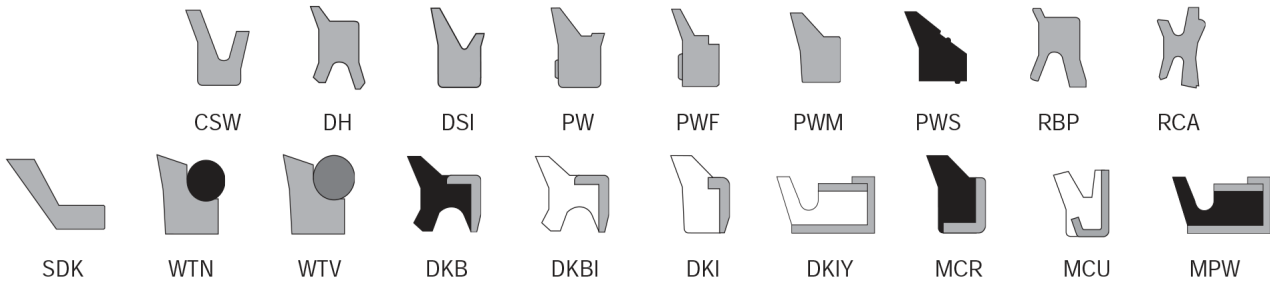
| ID | OD | L1 | L2 | OD2 | OD3 | Product Name |
|-------|-------|-------|-------|------|------|-----------------|
| 45.00 | 57.00 | 0.00 | 10.00 | 0.00 | 0.00 | DKBI-045057-070 |
| 45.00 | 57.00 | 6.00 | 9.00 | 0.00 | 0.00 | PWM-045057-060 |
| 45.00 | 58.00 | 6.00 | 8.50 | 0.00 | 0.00 | CSW-045058-060 |
| 45.00 | 60.00 | 4.20 | 7.00 | 0.00 | 0.00 | PW-045060-042 |
| 45.00 | 60.00 | 5.00 | 5.00 | 0.00 | 0.00 | MCU-045060-050 |
| 45.00 | 60.00 | 7.00 | 10.00 | 0.00 | 0.00 | MCR-045060-070 |
| 45.00 | 68.00 | 7.00 | 10.00 | 0.00 | 0.00 | DKB-045068-070 |
| 46.00 | 54.00 | 4.00 | 7.00 | 0.00 | 0.00 | PWF-046054-040 |
| 46.00 | 54.60 | 5.30 | 7.00 | 0.00 | 0.00 | PW-046054-053 |
| 47.00 | 55.00 | 4.00 | 7.00 | 0.00 | 0.00 | PWF-047055-040 |
| 47.00 | 59.00 | 7.00 | 10.00 | 0.00 | 0.00 | DKI-047059-070 |
| 48.00 | 56.60 | 5.30 | 7.00 | 0.00 | 0.00 | PWM-048056-053 |
| 48.00 | 60.00 | 7.00 | 10.00 | 0.00 | 0.00 | MCR-048060-070 |
| 50.00 | 56.00 | 5.00 | 8.00 | 0.00 | 0.00 | MCR-050056-050 |
| 50.00 | 56.80 | 5.00 | 5.00 | 0.00 | 0.00 | WTN-050056-050 |
| 50.00 | 56.80 | 5.00 | 7.00 | 0.00 | 0.00 | WTV-050056-050 |
| 50.00 | 58.00 | 4.00 | 4.00 | 0.00 | 0.00 | MCR-050058-040 |
| 50.00 | 58.00 | 4.00 | 7.00 | 0.00 | 0.00 | PWF-050058-040 |
| 50.00 | 58.00 | 5.00 | 6.50 | 0.00 | 0.00 | DH-050058-060 |
| 50.00 | 58.60 | 5.30 | 7.00 | 0.00 | 0.00 | PW-050058-053 |
| 50.00 | 58.80 | 6.00 | 6.00 | 0.00 | 0.00 | WTN-050058-060 |
| 50.00 | 60.00 | 2.15 | 4.00 | 0.00 | 0.00 | SDK-050060-021 |
| 50.00 | 60.00 | 2.90 | 4.00 | 0.00 | 0.00 | SDK-050060-029 |
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| 50.00 | 60.00 | 6.00 | 6.00 | 0.00 | 0.00 | DKYI-050060-060 |
| 50.00 | 60.00 | 7.00 | 8.00 | 0.00 | 0.00 | DSI-050060-070 |
| 50.00 | 60.00 | 7.00 | 10.00 | 0.00 | 0.00 | MCR-050060-070 |
| 50.00 | 60.00 | 7.10 | 12.00 | 0.00 | 0.00 | PW-050060-071 |
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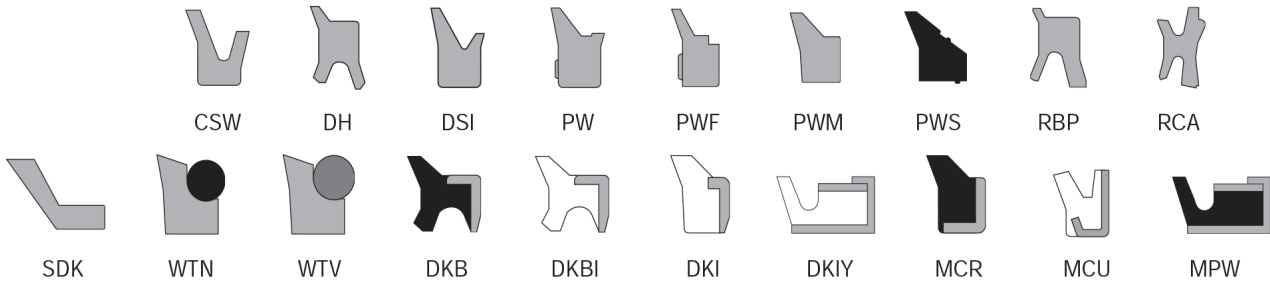
| ID | OD | L1 | L2 | OD2 | OD3 | Product Name |
|-------|-------|------|-------|-------|------|-----------------|
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| 50.00 | 62.00 | 6.60 | 0.00 | 0.00 | 0.00 | MCU-050062-066 |
| 50.00 | 62.00 | 7.00 | 10.50 | 0.00 | 0.00 | DKBI-050062-070 |
| 50.00 | 62.00 | 8.50 | 9.00 | 0.00 | 0.00 | RBP-050062-085 |
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| 50.00 | 63.00 | 4.00 | 0.00 | 0.00 | 0.00 | MCU-050063-040 |
| 50.00 | 63.00 | 6.00 | 8.50 | 0.00 | 0.00 | CSW-050063-060 |
| 50.00 | 63.00 | 7.00 | 9.50 | 0.00 | 0.00 | DSI-050063-080 |
| 50.00 | 64.00 | 8.00 | 8.00 | 0.00 | 0.00 | DKYI-050064-080 |
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| 50.00 | 65.00 | 5.00 | 8.00 | 0.00 | 0.00 | MCR-050065-050 |
| 50.00 | 65.00 | 6.00 | 6.00 | 0.00 | 0.00 | MPW-050065-060 |
| 50.00 | 65.00 | 6.00 | 6.00 | 0.00 | 0.00 | DKYI-050065-060 |
| 50.00 | 65.00 | 7.00 | 10.00 | 0.00 | 0.00 | MCR-050065-070 |
| 50.00 | 65.00 | 7.50 | 7.50 | 0.00 | 0.00 | MCU-050065-075 |
| 50.00 | 65.50 | 4.20 | 7.00 | 0.00 | 0.00 | PW-050065-042 |
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| 52.00 | 60.00 | 4.00 | 7.00 | 0.00 | 0.00 | PWF-052060-040 |
| 52.00 | 62.00 | 7.00 | 10.00 | 0.00 | 0.00 | MCR-052062-070 |
| 53.00 | 61.00 | 5.00 | 6.50 | 0.00 | 0.00 | DH-053061-060 |
| 53.00 | 61.60 | 5.30 | 7.00 | 0.00 | 0.00 | PW-053061-053 |
| 55.00 | 61.80 | 5.00 | 5.00 | 0.00 | 0.00 | WTN-055061-050 |
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| 55.00 | 65.00 | 4.00 | 0.00 | 0.00 | 0.00 | MCR-055065-040 |
| 55.00 | 65.00 | 5.00 | 5.00 | 0.00 | 0.00 | DKYI-055065-050 |
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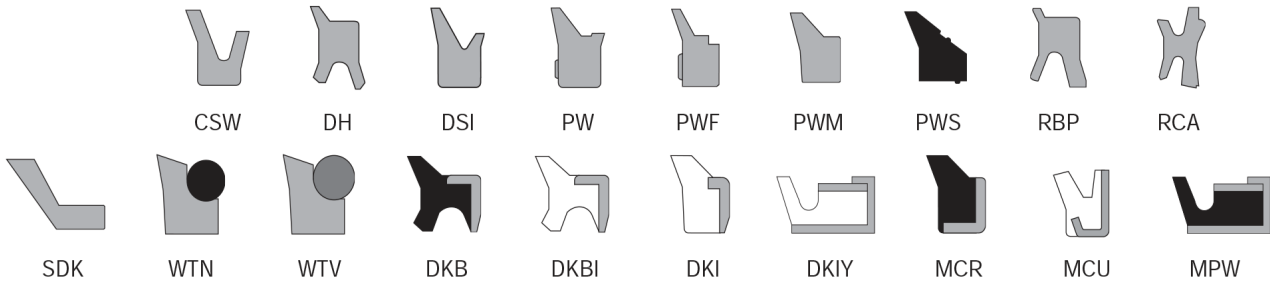
| ID | OD | L1 | L2 | OD2 | OD3 | Product Name |
|-------|-------|------|-------|-------|------|-----------------|
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| 55.00 | 65.00 | 7.00 | 8.50 | 0.00 | 0.00 | DSI-055065-070 |
| 55.00 | 65.00 | 7.00 | 10.00 | 0.00 | 0.00 | MCR-055065-070 |
| 55.00 | 65.60 | 5.30 | 7.00 | 0.00 | 0.00 | PW-055065-053 |
| 55.00 | 67.00 | 0.00 | 12.00 | 0.00 | 0.00 | PW-055067-070 |
| 55.00 | 68.00 | 4.00 | 0.00 | 0.00 | 0.00 | MPW-055068-040 |
| 55.00 | 68.00 | 6.00 | 8.50 | 0.00 | 0.00 | CSW-055068-060 |
| 55.00 | 69.00 | 8.00 | 0.00 | 0.00 | 0.00 | MCU-055069-080 |
| 55.00 | 69.00 | 8.00 | 11.00 | 0.00 | 0.00 | DKBI-055069-080 |
| 55.00 | 70.00 | 5.00 | 5.00 | 0.00 | 0.00 | MCU-055070-050 |
| 55.00 | 70.00 | 6.00 | 6.00 | 0.00 | 0.00 | MCU-055070-060 |
| 55.00 | 75.00 | 6.00 | 6.00 | 0.00 | 0.00 | DKYI-055075-060 |
| 56.00 | 62.80 | 5.00 | 5.00 | 0.00 | 0.00 | WTN-056062-050 |
| 56.00 | 64.00 | 4.00 | 7.00 | 0.00 | 0.00 | PWF-056064-040 |
| 56.00 | 64.00 | 5.00 | 6.50 | 60.00 | 0.00 | DH-056064-060 |
| 56.00 | 64.60 | 5.30 | 7.00 | 0.00 | 0.00 | PW-056064-053 |
| 56.00 | 65.00 | 7.00 | 10.00 | 0.00 | 0.00 | MCR-056065-070 |
| 56.00 | 66.00 | 5.00 | 7.00 | 0.00 | 0.00 | MCR-056066-050 |
| 56.00 | 66.00 | 6.30 | 9.00 | 0.00 | 0.00 | PW-056066-063 |
| 56.00 | 66.00 | 7.00 | 10.00 | 0.00 | 0.00 | MCR-056066-070 |
| 56.00 | 66.60 | 5.30 | 7.00 | 0.00 | 0.00 | PW-056066-053 |
| 56.00 | 68.00 | 6.00 | 9.00 | 0.00 | 0.00 | PWM-056068-060 |
| 56.00 | 69.00 | 6.00 | 8.50 | 0.00 | 0.00 | CSW-056069-060 |
| 56.00 | 70.00 | 7.50 | 0.00 | 0.00 | 0.00 | MCU-056070-075 |
| 58.00 | 66.00 | 4.00 | 7.00 | 0.00 | 0.00 | PWF-058066-040 |
| 59.50 | 68.00 | 5.10 | 7.00 | 0.00 | 0.00 | PW-059068-051 |
| 60.00 | 66.80 | 5.00 | 5.00 | 0.00 | 0.00 | WTN-060066-050 |
| 60.00 | 68.00 | 4.00 | 7.00 | 0.00 | 0.00 | PWF-060068-040 |
| 60.00 | 68.00 | 5.00 | 6.50 | 0.00 | 0.00 | DH-060068-060 |
| 60.00 | 68.60 | 5.30 | 7.00 | 0.00 | 0.00 | PW-060068-053 |
| 60.00 | 70.00 | 0.00 | 0.00 | 0.00 | 0.00 | MCU-060070-060 |



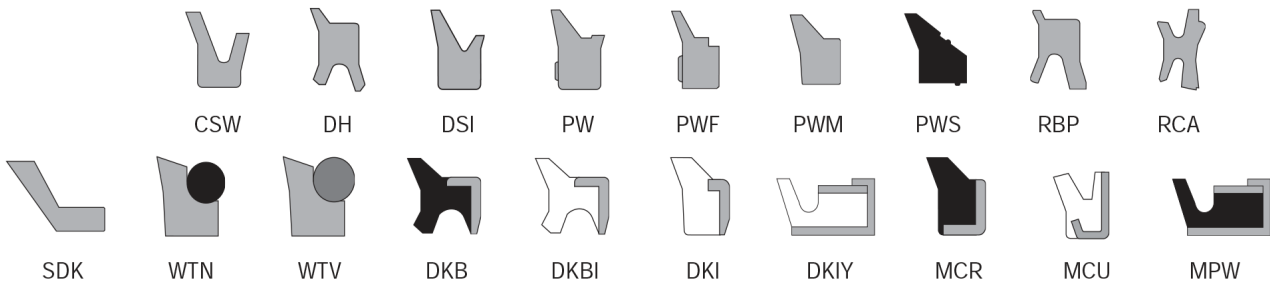
| ID | OD | L1 | L2 | OD2 | OD3 | Product Name |
|-------|-------|-------|-------|-------|------|-----------------|
| 60.00 | 70.00 | 0.00 | 0.00 | 0.00 | 0.00 | MCU-060070-070 |
| 60.00 | 70.00 | 5.00 | 5.00 | 0.00 | 0.00 | MCU-060070-050 |
| 60.00 | 70.00 | 5.00 | 7.00 | 0.00 | 0.00 | MCR-060070-050A |
| 60.00 | 70.00 | 5.00 | 7.00 | 65.00 | 0.00 | DH-060070-060 |
| 60.00 | 70.00 | 5.00 | 8.00 | 0.00 | 0.00 | MCR-060070-050 |
| 60.00 | 70.00 | 6.30 | 8.80 | 0.00 | 0.00 | PW-060070-063 |
| 60.00 | 70.00 | 7.00 | 10.00 | 0.00 | 0.00 | MCR-060070-070 |
| 60.00 | 70.00 | 7.10 | 12.00 | 65.00 | 0.00 | PW-060070-071 |
| 60.00 | 70.60 | 5.50 | 7.00 | 66.50 | 0.00 | PW-060070-055 |
| 60.00 | 72.00 | 4.00 | 0.00 | 0.00 | 0.00 | MPW-060072-040 |
| 60.00 | 72.70 | 5.30 | 9.00 | 0.00 | 0.00 | PWS-060072-053 |
| 60.00 | 73.00 | 6.00 | 8.50 | 0.00 | 0.00 | CSW-060073-060 |
| 60.00 | 73.00 | 8.00 | 9.50 | 0.00 | 0.00 | DSI-060073-080 |
| 60.00 | 74.00 | 8.00 | 11.00 | 0.00 | 0.00 | DKBI-060074-080 |
| 60.00 | 75.00 | 4.00 | 4.00 | 0.00 | 0.00 | MPW-060075-040 |
| 60.00 | 75.00 | 5.00 | 5.00 | 0.00 | 0.00 | MCU-060075-050 |
| 60.00 | 75.00 | 7.00 | 10.00 | 0.00 | 0.00 | MCR-060075-070 |
| 60.00 | 75.00 | 7.50 | 7.50 | 0.00 | 0.00 | MCU-060075-075 |
| 60.00 | 80.00 | 7.00 | 10.00 | 0.00 | 0.00 | MCR-060080-070 |
| 60.00 | 82.00 | 0.00 | 11.00 | 0.00 | 0.00 | DKB-060082-080 |
| 63.00 | 71.00 | 4.00 | 7.00 | 0.00 | 0.00 | PWF-063071-040 |
| 63.00 | 71.00 | 5.00 | 6.50 | 0.00 | 0.00 | DH-063071-060 |
| 63.00 | 71.60 | 5.30 | 7.00 | 0.00 | 0.00 | PW-063071-053 |
| 63.00 | 73.00 | 2.15 | 4.00 | 0.00 | 0.00 | SDK-063073-021 |
| 63.00 | 73.00 | 5.00 | 7.00 | 0.00 | 0.00 | MCR-063073-050 |
| 63.00 | 73.00 | 6.30 | 10.00 | 0.00 | 0.00 | PW-063073-063 |
| 63.00 | 73.60 | 5.30 | 7.00 | 0.00 | 0.00 | PW-063073-053 |
| 63.00 | 75.00 | 7.00 | 10.00 | 0.00 | 0.00 | MCR-063075-070 |
| 63.00 | 75.00 | 12.50 | 13.00 | 0.00 | 0.00 | RCA-063075-130 |
| 63.00 | 76.00 | 6.00 | 8.50 | 0.00 | 0.00 | CSW-063076-060 |
| 63.00 | 77.00 | 0.00 | 0.00 | 0.00 | 0.00 | MCU-063077-080 |



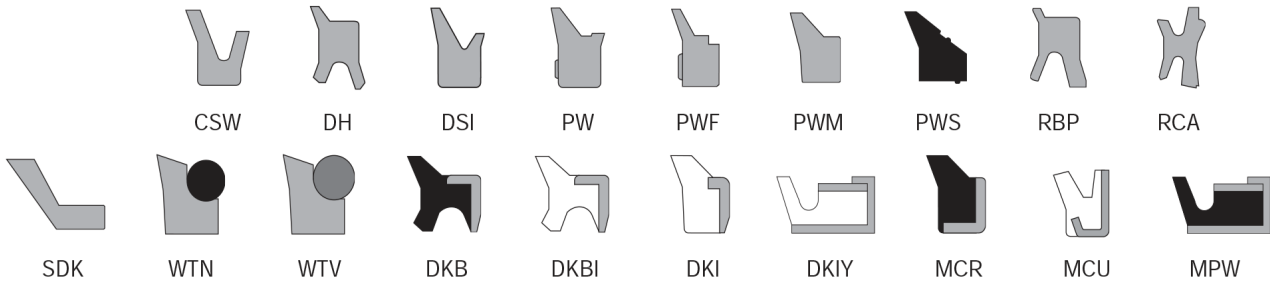
| ID | OD | L1 | L2 | OD2 | OD3 | Product Name |
|-------|-------|------|-------|-------|------|-----------------|
| 63.00 | 78.00 | 7.00 | 0.00 | 0.00 | 0.00 | DKI-063078-070 |
| 63.00 | 78.00 | 7.50 | 0.00 | 0.00 | 0.00 | MCU-063078-075 |
| 63.50 | 69.22 | 5.80 | 6.00 | 65.02 | 0.00 | WTN-063069-060 |
| 65.00 | 73.00 | 4.00 | 7.00 | 0.00 | 0.00 | PWF-065073-040 |
| 65.00 | 73.00 | 5.00 | 6.50 | 0.00 | 0.00 | DH-065073-060 |
| 65.00 | 73.60 | 5.30 | 7.00 | 0.00 | 0.00 | PW-065073-053 |
| 65.00 | 73.80 | 6.00 | 6.00 | 0.00 | 0.00 | WTN-065073-060 |
| 65.00 | 75.00 | 0.00 | 0.00 | 0.00 | 0.00 | MCU-065075-060 |
| 65.00 | 75.00 | 0.00 | 0.00 | 0.00 | 0.00 | MCU-065075-050 |
| 65.00 | 75.00 | 4.00 | 0.00 | 0.00 | 0.00 | MCU-065075-040 |
| 65.00 | 75.00 | 7.00 | 10.00 | 0.00 | 0.00 | MCR-065075-070 |
| 65.00 | 75.00 | 7.10 | 12.00 | 0.00 | 0.00 | PW-065075-071 |
| 65.00 | 75.60 | 5.30 | 7.00 | 0.00 | 0.00 | PW-065075-053 |
| 65.00 | 76.60 | 6.00 | 10.00 | 0.00 | 0.00 | PW-065076-060 |
| 65.00 | 77.00 | 6.00 | 9.00 | 0.00 | 0.00 | PWM-065077-060 |
| 65.00 | 77.70 | 5.30 | 9.00 | 0.00 | 0.00 | PWS-065077-053 |
| 65.00 | 78.00 | 8.00 | 9.50 | 0.00 | 0.00 | DSI-065078-080 |
| 65.00 | 79.00 | 8.00 | 11.00 | 0.00 | 0.00 | DKBI-065079-080 |
| 65.00 | 80.00 | 0.00 | 0.00 | 0.00 | 0.00 | MCU-065080-080 |
| 65.00 | 80.00 | 4.00 | 0.00 | 0.00 | 0.00 | MPW-065080-040 |
| 65.00 | 80.00 | 5.00 | 8.00 | 0.00 | 0.00 | MCU-065080-050 |
| 65.00 | 80.00 | 6.00 | 6.00 | 0.00 | 0.00 | DKIY-065080-060 |
| 65.00 | 85.00 | 5.00 | 5.00 | 0.00 | 0.00 | DKIY-065085-050 |
| 65.00 | 85.00 | 6.00 | 6.00 | 0.00 | 0.00 | DKIY-065085-060 |
| 67.00 | 75.00 | 5.00 | 6.50 | 0.00 | 0.00 | DH-067075-060 |
| 67.00 | 76.60 | 5.50 | 7.00 | 0.00 | 0.00 | PW-067076-055 |
| 67.00 | 81.00 | 8.00 | 11.00 | 0.00 | 0.00 | DKI-067081-080 |
| 68.50 | 78.00 | 4.80 | 8.00 | 0.00 | 0.00 | PWM-068078-048 |
| 70.00 | 76.00 | 4.30 | 6.00 | 0.00 | 0.00 | PWM-070076-043 |
| 70.00 | 78.00 | 4.00 | 7.00 | 0.00 | 0.00 | PWF-070078-040 |
| 70.00 | 78.60 | 5.30 | 7.00 | 0.00 | 0.00 | PW-070078-053 |



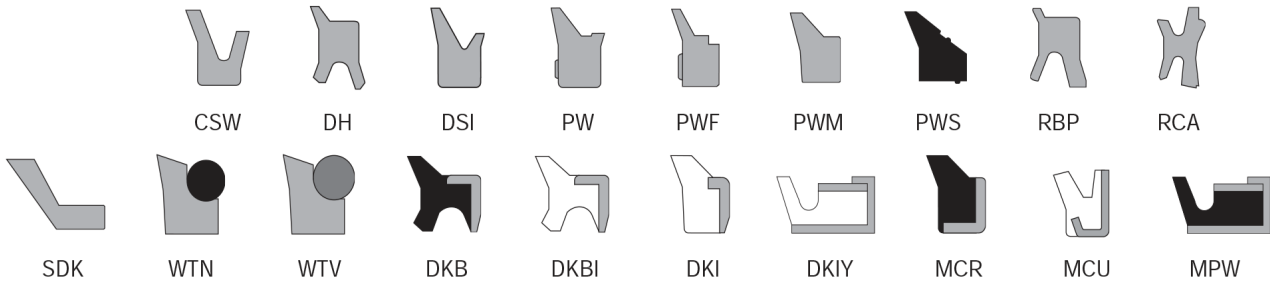
| ID | OD | L1 | L2 | OD2 | OD3 | Product Name |
|-------|-------|------|-------|-------|------|-----------------|
| 70.00 | 78.80 | 6.00 | 6.00 | 0.00 | 0.00 | WTN-070078-060 |
| 70.00 | 80.00 | 2.10 | 4.00 | 0.00 | 0.00 | SDK-070080-021 |
| 70.00 | 80.00 | 4.00 | 0.00 | 0.00 | 0.00 | MCU-070080-040 |
| 70.00 | 80.00 | 6.00 | 0.00 | 0.00 | 0.00 | MCU-070080-060 |
| 70.00 | 80.00 | 6.00 | 6.00 | 0.00 | 0.00 | DKIY-070080-060 |
| 70.00 | 80.00 | 6.00 | 8.00 | 75.00 | 0.00 | DH-070080-070 |
| 70.00 | 80.00 | 7.00 | 10.00 | 0.00 | 0.00 | PW-070080-070 |
| 70.00 | 80.00 | 7.00 | 10.00 | 0.00 | 0.00 | MCR-070080-070 |
| 70.00 | 80.60 | 5.30 | 7.00 | 73.00 | 0.00 | PW-070080-053 |
| 70.00 | 82.60 | 7.10 | 10.00 | 0.00 | 0.00 | PW-070082-071 |
| 70.00 | 83.00 | 6.00 | 8.50 | 0.00 | 0.00 | CSW-070083-060 |
| 70.00 | 83.00 | 7.00 | 8.00 | 0.00 | 0.00 | DSI-070083-080 |
| 70.00 | 83.00 | 8.00 | 8.00 | 0.00 | 0.00 | MCU-070083-080 |
| 70.00 | 84.00 | 8.00 | 11.00 | 0.00 | 0.00 | DKBI-070084-080 |
| 70.00 | 84.00 | 8.00 | 11.00 | 0.00 | 0.00 | DKB-070084-080 |
| 70.00 | 85.00 | 4.00 | 4.00 | 0.00 | 0.00 | MPW-070085-040 |
| 70.00 | 85.00 | 5.00 | 5.00 | 0.00 | 0.00 | MCU-070085-050 |
| 70.00 | 85.00 | 6.00 | 6.00 | 0.00 | 0.00 | DKIY-070085-060 |
| 70.00 | 85.00 | 8.00 | 8.00 | 0.00 | 0.00 | MCU-070085-080 |
| 70.00 | 90.00 | 5.00 | 5.00 | 0.00 | 0.00 | MCU-070090-050 |
| 70.00 | 90.00 | 7.00 | 10.00 | 0.00 | 0.00 | MCR-070090-070 |
| 70.00 | 90.00 | 9.50 | 9.50 | 0.00 | 0.00 | DKIY-070090-095 |
| 70.00 | 95.00 | 9.50 | 9.50 | 0.00 | 0.00 | DKIY-070095-095 |
| 71.00 | 81.00 | 6.00 | 8.00 | 0.00 | 0.00 | DH-071081-070 |
| 71.00 | 85.00 | 8.00 | 11.00 | 0.00 | 0.00 | DKI-071085-080 |
| 71.00 | 86.00 | 5.00 | 0.00 | 0.00 | 0.00 | MCU-071086-050 |
| 72.00 | 80.60 | 5.30 | 7.00 | 0.00 | 0.00 | PWM-072080-053 |
| 72.00 | 82.00 | 7.00 | 10.00 | 0.00 | 0.00 | MCR-072082-070 |
| 73.00 | 79.80 | 5.00 | 5.00 | 0.00 | 0.00 | WTN-073079-050 |
| 73.00 | 81.60 | 5.30 | 7.00 | 0.00 | 0.00 | PW-073081-053 |
| 73.00 | 83.60 | 7.30 | 10.00 | 0.00 | 0.00 | PW-073083-073 |



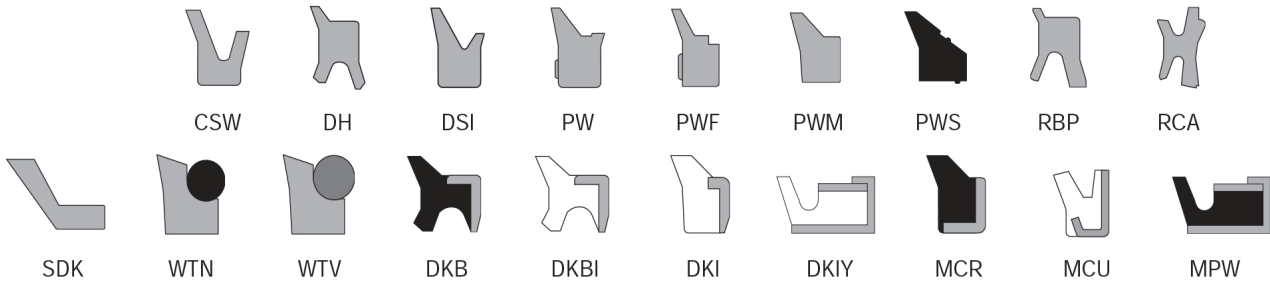
| ID | OD | L1 | L2 | OD2 | OD3 | Product Name |
|-------|-------|------|-------|-------|------|-----------------|
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| 75.00 | 83.00 | 4.00 | 7.00 | 0.00 | 0.00 | PWF-075083-040 |
| 75.00 | 83.00 | 7.00 | 10.00 | 0.00 | 0.00 | MCR-075083-070 |
| 75.00 | 83.60 | 5.30 | 7.00 | 0.00 | 0.00 | PW-075083-053 |
| 75.00 | 83.80 | 6.00 | 6.00 | 0.00 | 0.00 | WTN-075083-060 |
| 75.00 | 85.00 | 2.15 | 4.00 | 0.00 | 0.00 | SDK-075085-021 |
| 75.00 | 85.00 | 6.00 | 8.00 | 0.00 | 0.00 | DH-075085-070 |
| 75.00 | 85.00 | 6.30 | 10.00 | 0.00 | 0.00 | PW-075085-063 |
| 75.00 | 85.00 | 7.00 | 10.00 | 0.00 | 0.00 | MCR-075085-070 |
| 75.00 | 85.60 | 7.00 | 0.00 | 78.00 | 0.00 | PW-075085-053 |
| 75.00 | 87.00 | 5.00 | 7.00 | 0.00 | 0.00 | MCR-075087-050 |
| 75.00 | 87.20 | 7.10 | 10.00 | 0.00 | 0.00 | PW-075087-071 |
| 75.00 | 88.00 | 8.00 | 9.50 | 0.00 | 0.00 | DSI-075088-080 |
| 75.00 | 88.00 | 8.50 | 0.00 | 86.50 | 0.00 | CSW-075088-060 |
| 75.00 | 89.00 | 8.00 | 11.00 | 0.00 | 0.00 | DKBI-075089-080 |
| 75.00 | 90.00 | 0.00 | 0.00 | 0.00 | 0.00 | MCR-075090-050 |
| 75.00 | 90.00 | 4.00 | 4.00 | 0.00 | 0.00 | MPW-075090-040 |
| 75.00 | 90.00 | 8.00 | 8.00 | 0.00 | 0.00 | MCU-075090-080 |
| 77.00 | 85.60 | 5.30 | 7.00 | 0.00 | 0.00 | PW-077085-053 |
| 78.00 | 86.00 | 5.00 | 7.00 | 0.00 | 0.00 | PW-078086-050 |
| 78.00 | 88.00 | 2.15 | 4.00 | 0.00 | 0.00 | SDK-078088-021 |
| 78.00 | 88.00 | 7.00 | 10.00 | 0.00 | 0.00 | MCR-078088-070 |
| 78.00 | 88.60 | 5.50 | 7.00 | 0.00 | 0.00 | PW-078088-055 |
| 78.00 | 92.20 | 7.10 | 10.00 | 0.00 | 0.00 | PW-078092-071 |
| 80.00 | 88.00 | 4.00 | 7.00 | 0.00 | 0.00 | PWF-080088-040 |
| 80.00 | 88.00 | 7.00 | 10.00 | 0.00 | 0.00 | MCR-080088-070 |
| 80.00 | 88.60 | 5.30 | 7.00 | 0.00 | 0.00 | PW-080088-053 |
| 80.00 | 88.80 | 6.00 | 0.00 | 0.00 | 0.00 | WTV-080088-060 |
| 80.00 | 88.80 | 6.00 | 6.00 | 0.00 | 0.00 | WTN-080088-060 |
| 80.00 | 90.00 | 0.00 | 0.00 | 0.00 | 0.00 | MCU-080090-045 |
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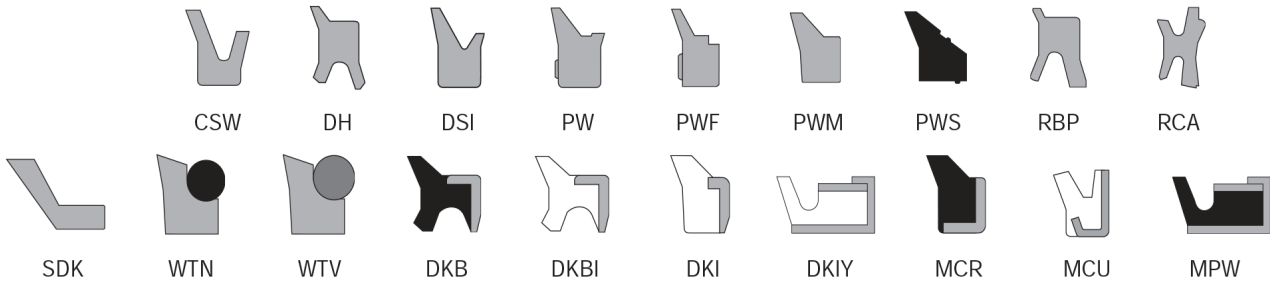
| ID | OD | L1 | L2 | OD2 | OD3 | Product Name |
|-------|--------|-------|-------|-------|------|-----------------|
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| 80.00 | 90.00 | 3.18 | 3.18 | 0.00 | 0.00 | MCU-080090-031 |
| 80.00 | 90.00 | 6.00 | 0.00 | 0.00 | 0.00 | DH-080090-070 |
| 80.00 | 90.00 | 7.00 | 0.00 | 0.00 | 0.00 | MCU-080090-070 |
| 80.00 | 90.00 | 7.00 | 10.00 | 0.00 | 0.00 | MCR-080090-070 |
| 80.00 | 90.00 | 10.00 | 0.00 | 87.00 | 0.00 | PW-080090-063 |
| 80.00 | 90.60 | 5.30 | 7.00 | 83.50 | 0.00 | PW-080090-053 |
| 80.00 | 92.60 | 7.10 | 10.00 | 86.00 | 0.00 | PW-080092-071 |
| 80.00 | 92.70 | 5.30 | 9.00 | 0.00 | 0.00 | PWS-080092-053 |
| 80.00 | 93.00 | 6.00 | 8.50 | 0.00 | 0.00 | CSW-080093-060 |
| 80.00 | 93.00 | 8.00 | 8.00 | 0.00 | 0.00 | MCU-080093-080 |
| 80.00 | 94.00 | 8.00 | 11.00 | 0.00 | 0.00 | DKB-080094-080 |
| 80.00 | 94.00 | 8.00 | 11.50 | 0.00 | 0.00 | DKBI-080094-080 |
| 80.00 | 95.00 | 0.00 | 0.00 | 0.00 | 0.00 | MCR-080095-070 |
| 80.00 | 95.00 | 4.00 | 4.00 | 0.00 | 0.00 | MPW-080095-040 |
| 80.00 | 95.00 | 5.00 | 5.00 | 0.00 | 0.00 | MCU-080095-050 |
| 80.00 | 95.00 | 6.00 | 6.00 | 0.00 | 0.00 | MPW-080095-060 |
| 80.00 | 95.00 | 8.00 | 8.00 | 0.00 | 0.00 | MCU-080095-080 |
| 80.00 | 96.00 | 8.80 | 12.00 | 0.00 | 0.00 | PWM-080096-080 |
| 80.00 | 100.00 | 6.00 | 6.00 | 0.00 | 0.00 | DKIY-080100-060 |
| 80.00 | 100.00 | 10.00 | 10.00 | 0.00 | 0.00 | MCU-080100-100 |
| 80.00 | 100.00 | 12.00 | 15.00 | 0.00 | 0.00 | DKI-080100-120 |
| 81.00 | 89.00 | 7.00 | 9.50 | 0.00 | 0.00 | PW-081089-070 |
| 84.00 | 92.00 | 5.30 | 7.00 | 0.00 | 0.00 | PWM-084092-053 |
| 85.00 | 93.00 | 4.00 | 7.00 | 0.00 | 0.00 | PWF-085093-040 |
| 85.00 | 93.60 | 5.30 | 7.00 | 0.00 | 0.00 | PW-085093-053 |
| 85.00 | 93.80 | 6.00 | 6.00 | 0.00 | 0.00 | WTN-085093-060 |
| 85.00 | 95.00 | 2.15 | 4.00 | 0.00 | 0.00 | SDK-085095-020 |
| 85.00 | 95.00 | 5.00 | 5.00 | 0.00 | 0.00 | MCU-085095-050 |
| 85.00 | 95.00 | 6.00 | 8.00 | 0.00 | 0.00 | DH-085095-070 |
| 85.00 | 97.20 | 7.10 | 10.00 | 0.00 | 0.00 | PW-085097-071 |



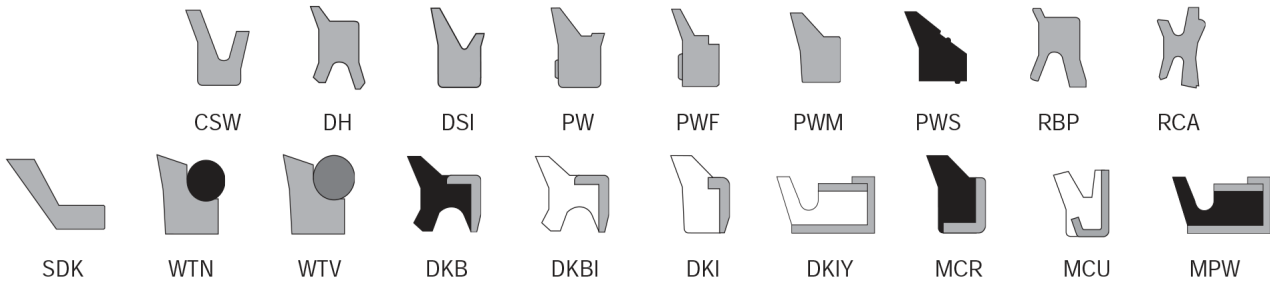
| ID | OD | L1 | L2 | OD2 | OD3 | Product Name |
|-------|--------|-------|-------|--------|------|-----------------|
| 85.00 | 98.00 | 8.00 | 9.50 | 0.00 | 0.00 | DSI-085098-080 |
| 85.00 | 98.00 | 8.50 | 0.00 | 96.50 | 0.00 | CSW-085098-060 |
| 85.00 | 99.00 | 8.00 | 8.00 | 0.00 | 0.00 | MCU-085099-080 |
| 85.00 | 99.00 | 8.00 | 11.00 | 0.00 | 0.00 | DKBI-085099-080 |
| 85.00 | 99.00 | 8.00 | 11.00 | 0.00 | 0.00 | DKB-085099-080 |
| 85.00 | 100.00 | 4.00 | 0.00 | 0.00 | 0.00 | MPW-085100-040 |
| 85.00 | 100.00 | 4.00 | 4.00 | 0.00 | 0.00 | DKIY-085100-040 |
| 85.00 | 100.00 | 6.00 | 6.00 | 0.00 | 0.00 | MCU-085100-060 |
| 85.00 | 100.00 | 8.00 | 0.00 | 0.00 | 0.00 | MCU-085100-080 |
| 85.00 | 100.00 | 10.00 | 0.00 | 0.00 | 0.00 | MCU-085100-100 |
| 85.00 | 100.00 | 10.00 | 10.00 | 0.00 | 0.00 | MCU-085105-100 |
| 86.00 | 94.00 | 4.00 | 7.00 | 0.00 | 0.00 | PWF-086094-040 |
| 88.50 | 96.50 | 4.00 | 7.00 | 0.00 | 0.00 | PWF-088096-040 |
| 89.50 | 98.50 | 5.10 | 7.00 | 0.00 | 0.00 | PW-089098-051 |
| 90.00 | 98.00 | 4.00 | 7.00 | 0.00 | 0.00 | PWF-090098-040A |
| 90.00 | 98.00 | 4.00 | 7.00 | 0.00 | 0.00 | PWF-090098-040 |
| 90.00 | 98.00 | 5.30 | 7.00 | 0.00 | 0.00 | PW-090098-053A |
| 90.00 | 98.60 | 5.30 | 7.00 | 0.00 | 0.00 | PW-090098-053 |
| 90.00 | 98.80 | 6.00 | 6.00 | 0.00 | 0.00 | WTN-090098-060 |
| 90.00 | 100.00 | 2.15 | 4.00 | 0.00 | 0.00 | SDK-090100-021 |
| 90.00 | 100.00 | 5.00 | 7.00 | 0.00 | 0.00 | MCR-090100-050 |
| 90.00 | 100.00 | 6.00 | 8.00 | 95.00 | 0.00 | DH-090100-070 |
| 90.00 | 100.00 | 6.30 | 10.00 | 0.00 | 0.00 | PW-090100-063 |
| 90.00 | 100.00 | 7.00 | 7.00 | 0.00 | 0.00 | MCU-090100-070 |
| 90.00 | 100.00 | 7.00 | 10.00 | 0.00 | 0.00 | MCR-090100-070 |
| 90.00 | 102.00 | 6.00 | 10.00 | 0.00 | 0.00 | PW-090102-060 |
| 90.00 | 102.20 | 7.10 | 10.00 | 0.00 | 0.00 | PW-090102-071 |
| 90.00 | 102.20 | 8.10 | 92.00 | 0.00 | 0.00 | WTN-090102-081 |
| 90.00 | 102.70 | 5.30 | 9.00 | 0.00 | 0.00 | PWS-090102-053 |
| 90.00 | 103.00 | 6.00 | 8.50 | 101.50 | 0.00 | CSW-090103-060 |
| 90.00 | 103.00 | 8.00 | 9.50 | 0.00 | 0.00 | DSI-090103-080 |



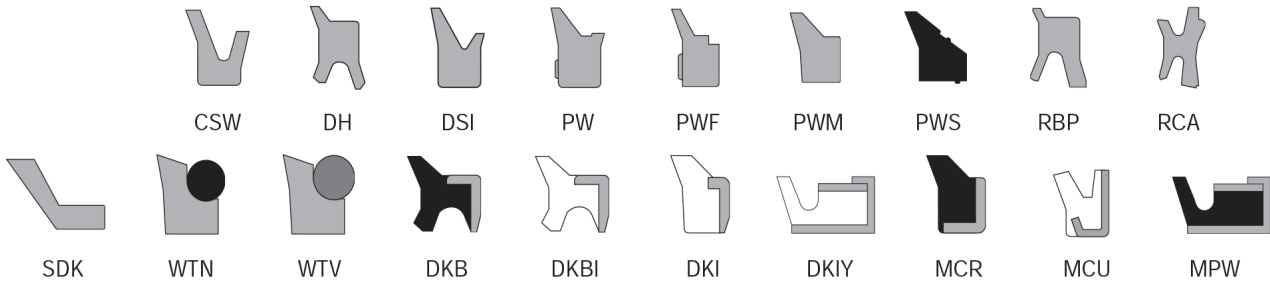
| ID | OD | L1 | L2 | OD2 | OD3 | Product Name |
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| 90.00 | 104.00 | 8.00 | 11.00 | 0.00 | 0.00 | DKB-090104-080 |
| 90.00 | 105.00 | 4.00 | 4.00 | 0.00 | 0.00 | MPW-090105-040 |
| 90.00 | 105.00 | 4.00 | 4.00 | 0.00 | 0.00 | DKIY-090105-040 |
| 90.00 | 105.00 | 5.00 | 5.00 | 0.00 | 0.00 | MCU-090105-050 |
| 90.00 | 105.00 | 6.00 | 6.00 | 0.00 | 0.00 | MCU-090105-060 |
| 90.00 | 105.00 | 6.00 | 6.00 | 0.00 | 0.00 | DKIY-090105-060 |
| 90.00 | 106.00 | 0.00 | 0.00 | 0.00 | 0.00 | MCU-090106-080 |
| 90.00 | 106.00 | 12.00 | 0.00 | 98.00 | 0.00 | PWM-090106-080 |
| 90.00 | 110.00 | 8.00 | 0.00 | 0.00 | 0.00 | DKIY-090110-080 |
| 90.00 | 110.00 | 8.00 | 11.00 | 0.00 | 0.00 | DKI-090110-080 |
| 90.00 | 110.00 | 9.50 | 9.50 | 0.00 | 0.00 | DKIY-090110-095 |
| 90.00 | 110.00 | 10.00 | 10.00 | 0.00 | 0.00 | MCU-090110-100 |
| 91.00 | 99.60 | 5.30 | 7.00 | 0.00 | 0.00 | PW-091099-053 |
| 92.00 | 103.60 | 5.50 | 8.00 | 0.00 | 0.00 | PW-092103-055 |
| 93.00 | 101.00 | 5.00 | 7.00 | 0.00 | 0.00 | PW-093101-050 |
| 93.00 | 123.00 | 5.00 | 7.00 | 0.00 | 0.00 | PW-093123-050 |
| 95.00 | 85.00 | 7.00 | 10.00 | 0.00 | 0.00 | MCR-085095-070 |
| 95.00 | 103.00 | 4.00 | 7.00 | 0.00 | 0.00 | PWF-095103-040 |
| 95.00 | 103.60 | 5.30 | 7.00 | 0.00 | 0.00 | PW-095103-053 |
| 95.00 | 103.80 | 6.00 | 6.00 | 0.00 | 0.00 | WTN-095103-060 |
| 95.00 | 105.00 | 2.15 | 4.00 | 0.00 | 0.00 | SDK-095105-020 |
| 95.00 | 105.00 | 6.00 | 8.00 | 0.00 | 0.00 | DH-095105-070 |
| 95.00 | 105.00 | 7.00 | 10.00 | 0.00 | 0.00 | MCR-095105-070 |
| 95.00 | 105.00 | 10.00 | 14.00 | 0.00 | 0.00 | PW-095105-100 |
| 95.00 | 107.20 | 7.10 | 10.00 | 0.00 | 0.00 | PW-095107-071 |
| 95.00 | 107.70 | 5.30 | 9.00 | 0.00 | 0.00 | PWS-095107-053 |
| 95.00 | 108.00 | 8.00 | 9.50 | 0.00 | 0.00 | DSI-095108-080 |
| 95.00 | 109.00 | 8.00 | 11.50 | 0.00 | 0.00 | DKBI-095109-080 |
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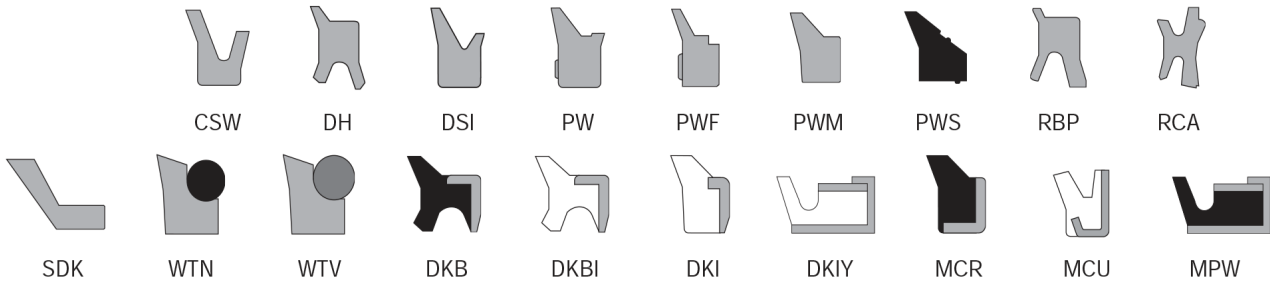
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| 95.00 | 115.00 | 9.50 | 9.50 | 0.00 | 0.00 | DKYI-095115-095 |
| 95.00 | 115.00 | 10.00 | 10.00 | 0.00 | 0.00 | MCU-095115-100 |
| 96.00 | 104.00 | 7.00 | 9.50 | 0.00 | 0.00 | PW-096104-070 |
| 97.00 | 105.00 | 5.00 | 7.00 | 0.00 | 0.00 | PW-097105-050 |
| 97.00 | 105.60 | 5.30 | 7.00 | 0.00 | 0.00 | PW-097105-053 |
| 98.00 | 108.00 | 4.50 | 6.50 | 0.00 | 0.00 | DH-098108-055 |
| 98.00 | 108.00 | 6.00 | 8.00 | 0.00 | 0.00 | DH-098108-070 |
| 99.00 | 109.60 | 5.50 | 7.00 | 0.00 | 0.00 | PW-099109-055 |
| 100.00 | 108.00 | 4.00 | 7.00 | 0.00 | 0.00 | PWF-100108-040 |
| 100.00 | 108.60 | 5.30 | 7.00 | 0.00 | 0.00 | PW-100108-053 |
| 100.00 | 108.80 | 6.00 | 6.00 | 0.00 | 0.00 | WTN-100108-060 |
| 100.00 | 110.00 | 2.15 | 4.00 | 0.00 | 0.00 | SDK-100110-020 |
| 100.00 | 110.00 | 6.00 | 8.00 | 105.00 | 0.00 | DH-100110-070 |
| 100.00 | 110.00 | 7.00 | 7.00 | 0.00 | 0.00 | MCU-100110-070 |
| 100.00 | 110.00 | 7.00 | 10.00 | 0.00 | 0.00 | MCR-100110-070 |
| 100.00 | 112.20 | 7.10 | 10.00 | 0.00 | 0.00 | PW-100112-071 |
| 100.00 | 112.20 | 7.20 | 12.00 | 0.00 | 0.00 | PW-100112-072 |
| 100.00 | 112.70 | 5.30 | 9.00 | 0.00 | 0.00 | PWS-100112-053 |
| 100.00 | 113.00 | 6.00 | 8.50 | 0.00 | 0.00 | CSW-100113-060 |
| 100.00 | 113.00 | 8.00 | 9.50 | 0.00 | 0.00 | DSI-100113-080 |
| 100.00 | 114.00 | 8.00 | 8.00 | 0.00 | 0.00 | MCU-100114-080 |
| 100.00 | 114.00 | 8.00 | 11.50 | 0.00 | 0.00 | DKBI-100114-080 |
| 100.00 | 115.00 | 4.00 | 4.00 | 0.00 | 0.00 | MCU-100115-040 |
| 100.00 | 115.00 | 4.00 | 4.00 | 0.00 | 0.00 | MPW-100115-040 |
| 100.00 | 115.00 | 4.00 | 4.00 | 0.00 | 0.00 | DKYI-100115-040 |
| 100.00 | 115.00 | 6.00 | 6.00 | 0.00 | 0.00 | MCU-100115-060 |
| 100.00 | 115.00 | 7.00 | 7.00 | 0.00 | 0.00 | MCU-100115-070 |
| 100.00 | 115.00 | 8.00 | 8.00 | 0.00 | 0.00 | DKYI-100115-080 |
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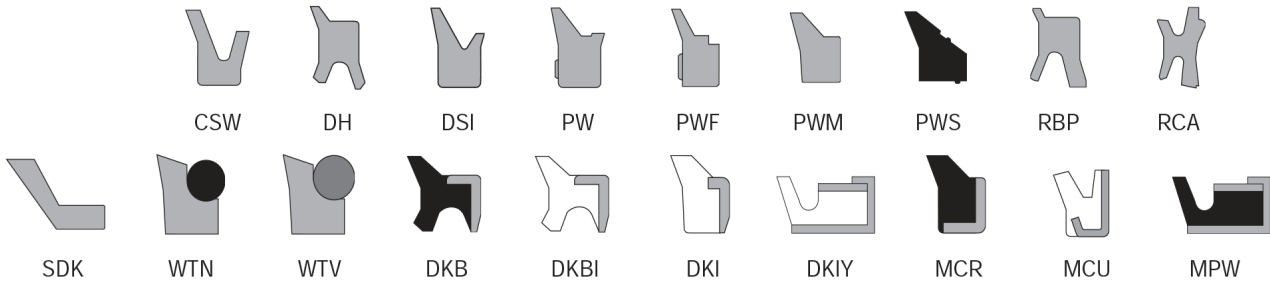
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|--------|--------|-------|-------|--------|------|-----------------|
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| 100.00 | 116.00 | 8.00 | 10.00 | 0.00 | 0.00 | PWM-100116-080 |
| 100.00 | 120.00 | 4.00 | 0.00 | 0.00 | 0.00 | MPW-100120-040 |
| 100.00 | 120.00 | 6.00 | 6.00 | 0.00 | 0.00 | DKIY-100120-060 |
| 100.00 | 120.00 | 8.00 | 8.00 | 0.00 | 0.00 | DKIY-100120-080 |
| 100.00 | 120.00 | 9.50 | 9.50 | 0.00 | 0.00 | DKIY-100120-095 |
| 100.00 | 120.00 | 10.00 | 0.00 | 0.00 | 0.00 | MCU-100120-100 |
| 100.00 | 125.00 | 4.00 | 4.00 | 0.00 | 0.00 | MCU-100125-040 |
| 100.00 | 130.00 | 8.00 | 8.00 | 0.00 | 0.00 | DKIY-100130-080 |
| 101.00 | 109.00 | 4.00 | 7.00 | 0.00 | 0.00 | PWF-101109-040 |
| 101.00 | 111.00 | 5.30 | 7.00 | 0.00 | 0.00 | PWM-101111-053 |
| 104.50 | 113.50 | 5.10 | 7.00 | 0.00 | 0.00 | PW-104113-051 |
| 105.00 | 113.60 | 5.30 | 7.00 | 0.00 | 0.00 | PW-105113-053 |
| 105.00 | 115.00 | 0.00 | 0.00 | 0.00 | 0.00 | MPW-105115-070 |
| 105.00 | 115.00 | 7.00 | 10.00 | 0.00 | 0.00 | MCR-105115-070 |
| 105.00 | 117.20 | 7.10 | 10.00 | 0.00 | 0.00 | PW-105117-071 |
| 105.00 | 120.00 | 0.00 | 0.00 | 0.00 | 0.00 | MCU-105120-080 |
| 105.00 | 120.00 | 4.00 | 0.00 | 0.00 | 0.00 | MCU-105120-040 |
| 105.00 | 120.00 | 7.50 | 7.50 | 0.00 | 0.00 | MCU-105120-075 |
| 105.00 | 121.00 | 9.00 | 0.00 | 0.00 | 0.00 | MCU-105121-090 |
| 105.00 | 121.00 | 9.00 | 12.50 | 0.00 | 0.00 | DKBI-105121-090 |
| 106.00 | 122.00 | 9.00 | 12.00 | 0.00 | 0.00 | DKI-106122-090 |
| 107.00 | 115.60 | 5.30 | 7.00 | 0.00 | 0.00 | PW-107115-053 |
| 108.00 | 116.60 | 5.30 | 7.00 | 0.00 | 0.00 | PW-108116-053 |
| 108.50 | 116.50 | 4.00 | 7.00 | 0.00 | 0.00 | PWF-108116-040 |
| 110.00 | 118.00 | 4.00 | 7.00 | 0.00 | 0.00 | PWF-110118-040 |
| 110.00 | 118.60 | 5.30 | 7.00 | 0.00 | 0.00 | PW-110118-053 |
| 110.00 | 118.80 | 6.00 | 6.00 | 0.00 | 0.00 | WTN-110118-060 |
| 110.00 | 120.00 | 6.00 | 8.00 | 115.00 | 0.00 | DH-110120-070 |
| 110.00 | 120.00 | 7.00 | 10.00 | 0.00 | 0.00 | MCR-110120-070 |
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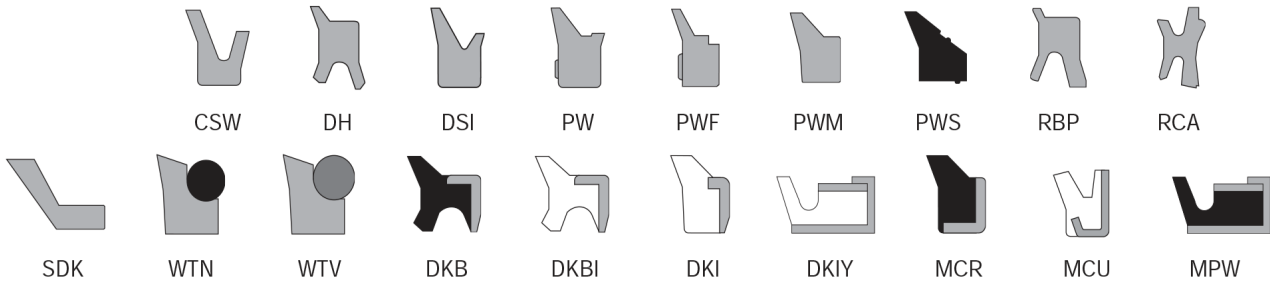
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| 110.00 | 122.20 | 7.10 | 12.00 | 0.00 | 0.00 | PW-110122-071A |
| 110.00 | 122.20 | 7.20 | 12.00 | 0.00 | 0.00 | PWM-110122-072 |
| 110.00 | 122.20 | 8.40 | 8.40 | 0.00 | 0.00 | WTN-110122-084 |
| 110.00 | 124.00 | 9.00 | 11.00 | 0.00 | 0.00 | MCR-110124-090 |
| 110.00 | 125.00 | 4.00 | 4.00 | 0.00 | 0.00 | MPW-110125-040 |
| 110.00 | 125.00 | 8.00 | 8.00 | 0.00 | 0.00 | DKYI-110125-080 |
| 110.00 | 125.00 | 8.50 | 14.00 | 0.00 | 0.00 | DH-110125-095 |
| 110.00 | 125.00 | 9.00 | 0.00 | 0.00 | 0.00 | MCU-110125-090 |
| 110.00 | 125.00 | 9.50 | 9.50 | 0.00 | 0.00 | MCU-110125-095 |
| 110.00 | 125.00 | 9.50 | 9.50 | 0.00 | 0.00 | DKYI-110125-095 |
| 110.00 | 125.00 | 9.50 | 14.00 | 120.00 | 0.00 | PW-110125-095 |
| 110.00 | 126.00 | 9.00 | 9.00 | 0.00 | 0.00 | MCU-110126-090 |
| 110.00 | 126.00 | 9.00 | 12.50 | 0.00 | 0.00 | DKBI-110126-090 |
| 110.00 | 130.00 | 8.00 | 8.00 | 0.00 | 0.00 | DKYI-110130-080 |
| 110.00 | 130.00 | 9.50 | 9.50 | 0.00 | 0.00 | DKYI-110130-095 |
| 110.00 | 130.00 | 10.00 | 10.00 | 0.00 | 0.00 | MCU-110130-100 |
| 110.00 | 135.00 | 8.00 | 8.00 | 0.00 | 0.00 | DKYI-110135-080 |
| 110.00 | 140.00 | 8.00 | 8.00 | 0.00 | 0.00 | DKYI-110140-080 |
| 112.00 | 122.00 | 6.00 | 8.00 | 0.00 | 0.00 | DH-112122-070 |
| 112.00 | 124.20 | 7.10 | 10.00 | 0.00 | 0.00 | PW-112124-071 |
| 112.00 | 128.00 | 9.00 | 12.00 | 0.00 | 0.00 | DKB-112128-090 |
| 113.00 | 123.00 | 2.15 | 4.00 | 0.00 | 0.00 | SDK-113123-021 |
| 115.00 | 123.20 | 5.30 | 7.00 | 0.00 | 0.00 | PW-115123-053 |
| 115.00 | 125.00 | 2.15 | 4.00 | 0.00 | 0.00 | SDK-115125-021 |
| 115.00 | 125.00 | 7.00 | 10.00 | 0.00 | 0.00 | MCR-115125-070 |
| 115.00 | 127.00 | 5.50 | 10.00 | 0.00 | 0.00 | PWF-115127-055 |
| 115.00 | 127.00 | 10.00 | 14.00 | 0.00 | 0.00 | PW-115127-100 |
| 115.00 | 127.20 | 7.10 | 10.00 | 0.00 | 0.00 | PW-115127-071 |
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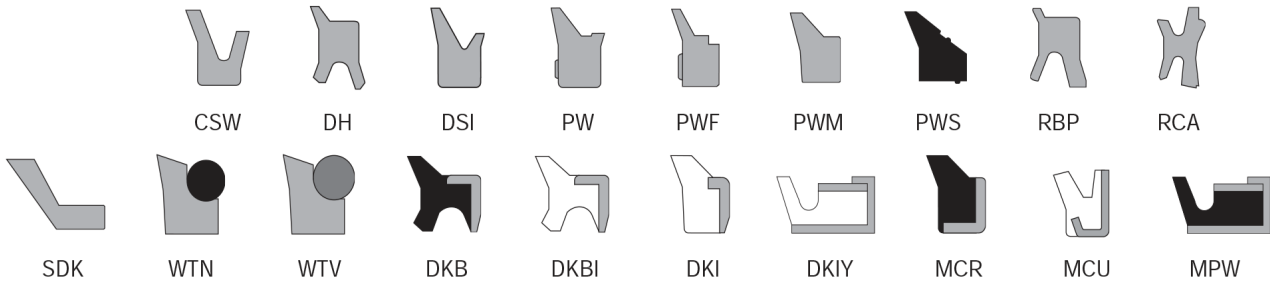
| ID | OD | L1 | L2 | OD2 | OD3 | Product Name |
|--------|--------|-------|-------|--------|------|-----------------|
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| 117.00 | 125.00 | 4.00 | 7.00 | 0.00 | 0.00 | PWF-117125-040 |
| 117.00 | 125.60 | 5.30 | 7.00 | 0.00 | 0.00 | PW-117125-053 |
| 117.00 | 127.00 | 5.50 | 7.50 | 0.00 | 0.00 | DH-117127-065 |
| 118.00 | 126.00 | 5.00 | 7.00 | 0.00 | 0.00 | PW-118126-050 |
| 118.00 | 134.00 | 9.00 | 12.00 | 0.00 | 0.00 | DKI-118134-090 |
| 119.50 | 128.50 | 5.10 | 7.00 | 0.00 | 0.00 | PW-119128-051 |
| 120.00 | 128.60 | 5.30 | 7.00 | 0.00 | 0.00 | PW-120128-053 |
| 120.00 | 128.80 | 6.00 | 6.00 | 0.00 | 0.00 | WTN-120128-060 |
| 120.00 | 130.00 | 7.00 | 7.00 | 0.00 | 0.00 | MCU-120130-070 |
| 120.00 | 130.00 | 7.00 | 9.00 | 0.00 | 0.00 | DH-120130-080 |
| 120.00 | 130.00 | 7.00 | 10.00 | 0.00 | 0.00 | MCR-120130-070 |
| 120.00 | 132.00 | 10.00 | 0.00 | 129.00 | 0.00 | PWF-120132-055 |
| 120.00 | 132.20 | 7.10 | 10.00 | 0.00 | 0.00 | PW-120132-071 |
| 120.00 | 133.00 | 6.00 | 8.50 | 0.00 | 0.00 | CSW-120133-060 |
| 120.00 | 134.00 | 8.00 | 12.00 | 0.00 | 0.00 | PW-120134-080 |
| 120.00 | 135.00 | 0.00 | 0.00 | 0.00 | 0.00 | MCU-120135-070 |
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| 120.00 | 135.00 | 4.00 | 4.00 | 0.00 | 0.00 | MPW-120135-040 |
| 120.00 | 135.00 | 7.00 | 10.00 | 0.00 | 0.00 | MCR-120135-070 |
| 120.00 | 135.00 | 8.00 | 0.00 | 0.00 | 0.00 | MCU-120135-080 |
| 120.00 | 135.00 | 8.00 | 8.00 | 0.00 | 0.00 | DKIY-120135-080 |
| 120.00 | 135.00 | 9.50 | 9.50 | 0.00 | 0.00 | DKIY-120135-095 |
| 120.00 | 136.00 | 9.00 | 12.00 | 0.00 | 0.00 | DKBI-120136-090 |
| 120.00 | 140.00 | 8.00 | 8.00 | 0.00 | 0.00 | DKIY-120140-080 |
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| 120.00 | 140.00 | 10.00 | 10.00 | 0.00 | 0.00 | MCU-120140-100 |
| 121.00 | 113.00 | 7.00 | 9.50 | 0.00 | 0.00 | PW-121133-070 |
| 121.00 | 131.00 | 5.30 | 7.00 | 0.00 | 0.00 | PWM-121131-053 |
| 125.00 | 133.60 | 5.30 | 7.00 | 0.00 | 0.00 | PW-125133-053 |
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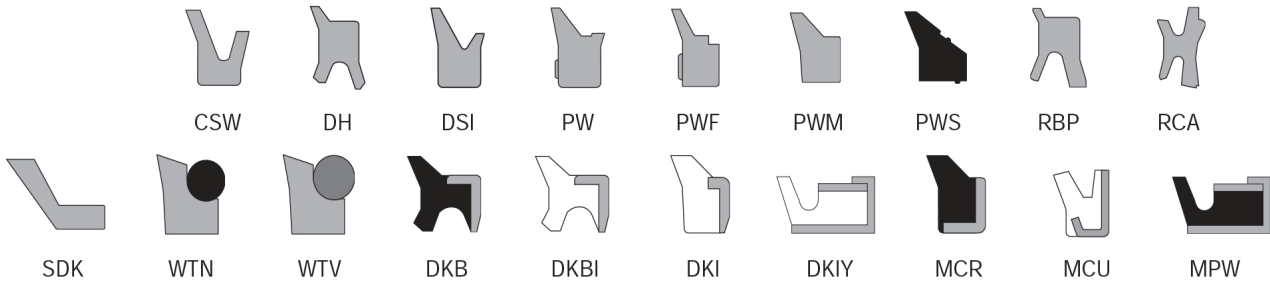
| ID | OD | L1 | L2 | OD2 | OD3 | Product Name |
|--------|--------|-------|-------|--------|------|-----------------|
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| 125.00 | 137.20 | 7.10 | 10.00 | 0.00 | 0.00 | PW-125137-071 |
| 125.00 | 138.00 | 7.00 | 9.50 | 0.00 | 0.00 | DH-125138-080 |
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| 125.00 | 140.00 | 4.00 | 4.00 | 0.00 | 0.00 | DKIY-125140-040 |
| 125.00 | 140.00 | 7.50 | 10.50 | 129.00 | 0.00 | DH-125140-085 |
| 125.00 | 140.00 | 9.00 | 12.00 | 0.00 | 0.00 | MCR-125140-090 |
| 125.00 | 140.00 | 9.50 | 14.00 | 0.00 | 0.00 | PW-125140-095 |
| 125.00 | 140.00 | 10.10 | 16.00 | 0.00 | 0.00 | PW-125140-101 |
| 125.00 | 141.00 | 9.00 | 12.00 | 0.00 | 0.00 | DKI-125141-090 |
| 125.00 | 141.00 | 9.00 | 12.00 | 0.00 | 0.00 | DKBI-125141-090 |
| 126.00 | 134.60 | 5.30 | 7.00 | 0.00 | 0.00 | PW-126134-053 |
| 127.00 | 140.00 | 5.30 | 7.00 | 0.00 | 0.00 | PW-127140-053 |
| 128.00 | 140.20 | 7.10 | 10.00 | 0.00 | 0.00 | PW-128140-071 |
| 128.50 | 136.50 | 4.00 | 7.00 | 0.00 | 0.00 | PWF-128136-040 |
| 130.00 | 138.80 | 6.00 | 6.00 | 0.00 | 0.00 | WTN-130138-060 |
| 130.00 | 140.00 | 7.00 | 10.00 | 0.00 | 0.00 | MCR-130140-070 |
| 130.00 | 142.00 | 5.50 | 10.00 | 135.00 | 0.00 | PWF-130142-055 |
| 130.00 | 142.20 | 7.10 | 10.00 | 0.00 | 0.00 | PW-130142-071 |
| 130.00 | 145.00 | 9.00 | 12.00 | 0.00 | 0.00 | MCR-130145-090 |
| 130.00 | 146.00 | 9.00 | 12.00 | 0.00 | 0.00 | MCU-130146-090 |
| 130.00 | 146.00 | 9.00 | 12.00 | 0.00 | 0.00 | DKBI-130146-090 |
| 131.00 | 141.00 | 7.00 | 9.50 | 0.00 | 0.00 | PW-131141-070 |
| 132.00 | 142.00 | 2.00 | 4.00 | 0.00 | 0.00 | SDK-132142-021 |
| 134.50 | 143.50 | 5.10 | 7.00 | 0.00 | 0.00 | PW-134143-051 |
| 135.00 | 145.00 | 7.00 | 10.00 | 0.00 | 0.00 | MCR-135145-070 |
| 135.00 | 147.20 | 7.10 | 10.00 | 0.00 | 0.00 | PW-135147-071 |
| 135.00 | 150.00 | 8.00 | 11.50 | 0.00 | 0.00 | DKBI-135150-080 |
| 135.00 | 150.00 | 9.00 | 12.00 | 0.00 | 0.00 | MCR-135150-090 |
| 135.00 | 155.00 | 10.00 | 14.00 | 0.00 | 0.00 | DKI-135155-100 |
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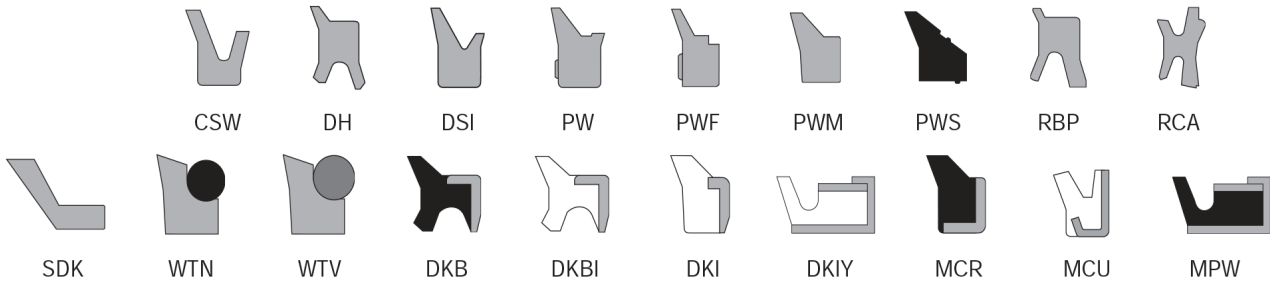
| ID | OD | L1 | L2 | OD2 | OD3 | Product Name |
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| 137.00 | 145.60 | 5.30 | 7.00 | 0.00 | 0.00 | PW-137145-053 |
| 137.20 | 125.00 | 7.70 | 12.00 | 0.00 | 0.00 | PW-125137-077 |
| 140.00 | 148.60 | 5.30 | 7.00 | 0.00 | 0.00 | PW-140148-053 |
| 140.00 | 148.60 | 6.00 | 8.00 | 0.00 | 0.00 | PW-140148-060 |
| 140.00 | 150.00 | 2.15 | 4.00 | 0.00 | 0.00 | SDK-140150-021 |
| 140.00 | 150.00 | 7.00 | 10.00 | 0.00 | 0.00 | MCR-140150-070 |
| 140.00 | 152.00 | 5.50 | 10.00 | 0.00 | 0.00 | PWF-140152-055 |
| 140.00 | 152.20 | 7.10 | 10.00 | 0.00 | 0.00 | PW-140152-071 |
| 140.00 | 153.00 | 7.00 | 9.50 | 0.00 | 0.00 | DH-140153-080 |
| 140.00 | 155.00 | 8.00 | 8.00 | 0.00 | 0.00 | DKIY-140155-080 |
| 140.00 | 155.00 | 8.00 | 9.50 | 0.00 | 0.00 | DSI-140155-080 |
| 140.00 | 155.00 | 9.00 | 12.00 | 0.00 | 0.00 | MCR-140155-090 |
| 140.00 | 155.00 | 9.00 | 13.00 | 0.00 | 0.00 | PW-140155-090 |
| 140.00 | 155.00 | 9.50 | 14.00 | 0.00 | 0.00 | PW-140155-095 |
| 140.00 | 155.00 | 10.20 | 16.00 | 147.50 | 0.00 | PW-140155-102 |
| 140.00 | 160.00 | 10.00 | 14.00 | 0.00 | 0.00 | MCU-140160-100 |
| 140.00 | 160.00 | 10.00 | 14.00 | 0.00 | 0.00 | DKBI-140160-100 |
| 141.00 | 151.60 | 5.50 | 7.00 | 0.00 | 0.00 | PW-141151-055 |
| 143.00 | 151.00 | 5.50 | 7.00 | 0.00 | 0.00 | PW-143151-055 |
| 145.00 | 157.20 | 7.10 | 10.00 | 0.00 | 0.00 | PW-145157-071 |
| 145.00 | 158.00 | 7.00 | 9.50 | 0.00 | 0.00 | DH-145158-080 |
| 145.00 | 160.00 | 8.00 | 11.00 | 0.00 | 0.00 | PW-145160-080 |
| 145.00 | 165.00 | 10.00 | 14.00 | 0.00 | 0.00 | DKI-145165-100 |
| 145.00 | 165.00 | 10.00 | 14.00 | 0.00 | 0.00 | DKB-145165-100 |
| 146.00 | 154.60 | 5.30 | 7.00 | 0.00 | 0.00 | PW-146154-053 |
| 146.00 | 158.00 | 6.30 | 8.00 | 0.00 | 0.00 | PWM-146158-063 |
| 148.00 | 160.00 | 7.00 | 10.00 | 0.00 | 0.00 | PW-148160-070 |
| 148.50 | 156.50 | 4.00 | 7.00 | 0.00 | 0.00 | PWF-148156-040 |
| 149.50 | 158.50 | 5.10 | 7.00 | 0.00 | 0.00 | PW-149158-051 |
| 150.00 | 158.00 | 5.30 | 7.00 | 0.00 | 0.00 | PW-150158-053 |



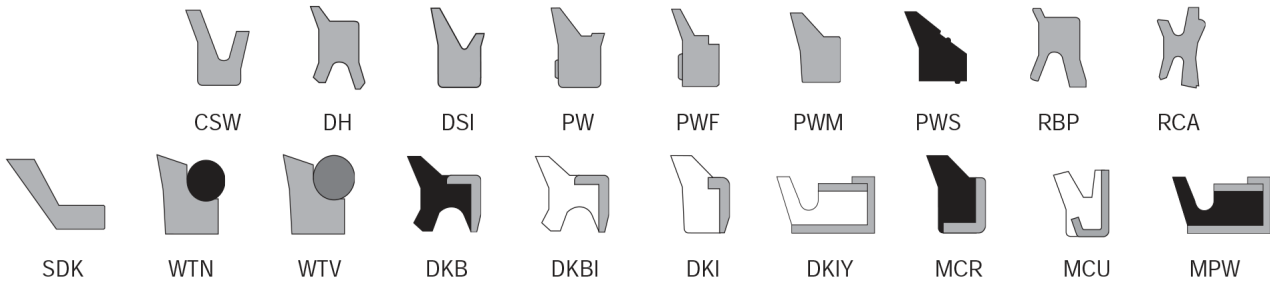
| ID | OD | L1 | L2 | OD2 | OD3 | Product Name |
|--------|--------|-------|-------|--------|------|-----------------|
| 150.00 | 162.00 | 5.50 | 10.00 | 0.00 | 0.00 | PWF-150162-055 |
| 150.00 | 162.20 | 7.10 | 10.00 | 0.00 | 0.00 | PW-150162-071 |
| 150.00 | 163.00 | 7.00 | 9.50 | 0.00 | 0.00 | DH-150163-080 |
| 150.00 | 165.00 | 7.50 | 10.00 | 0.00 | 0.00 | PW-150165-075 |
| 150.00 | 165.00 | 9.00 | 12.00 | 0.00 | 0.00 | MCR-150165-090 |
| 150.00 | 165.00 | 10.20 | 16.00 | 157.60 | 0.00 | PW-150165-102 |
| 150.00 | 166.00 | 8.00 | 12.00 | 0.00 | 0.00 | PW-150166-080 |
| 150.00 | 170.00 | 10.00 | 14.00 | 0.00 | 0.00 | DKI-150170-100 |
| 155.00 | 165.00 | 5.50 | 7.50 | 0.00 | 0.00 | DH-155165-065 |
| 155.00 | 175.00 | 10.00 | 14.00 | 0.00 | 0.00 | DKI-155175-100 |
| 155.00 | 175.00 | 10.00 | 14.00 | 0.00 | 0.00 | DKB-155175-100 |
| 160.00 | 168.60 | 5.30 | 7.00 | 0.00 | 0.00 | PW-160168-053 |
| 160.00 | 168.80 | 6.00 | 6.00 | 0.00 | 0.00 | WTN-160168-060 |
| 160.00 | 172.00 | 5.50 | 10.00 | 0.00 | 0.00 | PWF-160172-055 |
| 160.00 | 172.20 | 7.10 | 10.00 | 0.00 | 0.00 | PW-160172-071 |
| 160.00 | 173.00 | 7.00 | 9.50 | 0.00 | 0.00 | DH-160173-080 |
| 160.00 | 174.00 | 7.00 | 9.50 | 0.00 | 0.00 | DH-160174-080 |
| 160.00 | 175.00 | 9.00 | 9.00 | 0.00 | 0.00 | MCU-160175-090 |
| 160.00 | 175.00 | 14.00 | 0.00 | 170.00 | 0.00 | PW-160175-095 |
| 160.00 | 175.20 | 10.10 | 14.00 | 0.00 | 0.00 | PW-160175-101 |
| 160.00 | 180.00 | 9.50 | 9.50 | 0.00 | 0.00 | DKIY-160180-095 |
| 160.00 | 180.00 | 10.00 | 14.00 | 0.00 | 0.00 | DKBI-160180-100 |
| 160.00 | 180.00 | 10.00 | 14.00 | 0.00 | 0.00 | DKB-160180-100 |
| 162.00 | 152.00 | 7.00 | 9.50 | 0.00 | 0.00 | PW-152162-070 |
| 162.00 | 172.60 | 5.50 | 7.00 | 0.00 | 0.00 | PW-162172-055 |
| 163.00 | 175.00 | 7.00 | 10.00 | 0.00 | 0.00 | MCR-163175-070 |
| 163.00 | 175.20 | 7.10 | 10.00 | 0.00 | 0.00 | PW-163175-071 |
| 165.00 | 178.00 | 9.50 | 0.00 | 172.00 | 0.00 | DH-165178-080 |
| 165.00 | 179.00 | 7.00 | 9.50 | 0.00 | 0.00 | DH-165179-080 |
| 165.00 | 180.00 | 8.00 | 12.00 | 0.00 | 0.00 | MCR-165180-080 |
| 165.00 | 180.00 | 9.50 | 14.00 | 0.00 | 0.00 | PW-165180-095 |



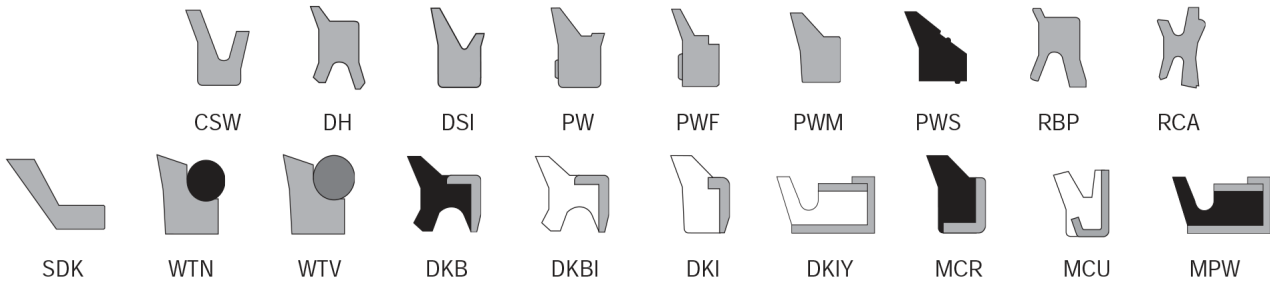
| ID | OD | L1 | L2 | OD2 | OD3 | Product Name |
|--------|--------|-------|-------|--------|------|-----------------|
| 165.00 | 185.00 | 10.00 | 14.00 | 0.00 | 0.00 | DKI-165185-100 |
| 165.00 | 185.00 | 10.00 | 14.50 | 0.00 | 0.00 | DKBI-165185-100 |
| 165.50 | 174.50 | 5.10 | 7.00 | 0.00 | 0.00 | PW-165174-051 |
| 170.00 | 178.60 | 5.30 | 7.00 | 0.00 | 0.00 | PW-170178-053 |
| 170.00 | 178.80 | 6.00 | 6.00 | 0.00 | 0.00 | WTN-170178-060 |
| 170.00 | 182.00 | 8.20 | 11.00 | 0.00 | 0.00 | PWF-170182-082 |
| 170.00 | 182.00 | 10.00 | 0.00 | 179.00 | 0.00 | PWF-170182-055 |
| 170.00 | 182.20 | 7.10 | 12.00 | 0.00 | 0.00 | PWM-170182-071 |
| 170.00 | 182.20 | 7.70 | 12.00 | 176.00 | 0.00 | PW-170182-077 |
| 170.00 | 185.00 | 9.00 | 12.00 | 0.00 | 0.00 | MCR-170185-090 |
| 170.00 | 185.20 | 10.10 | 14.00 | 0.00 | 0.00 | PW-170185-101 |
| 170.00 | 190.00 | 10.00 | 14.00 | 0.00 | 0.00 | DKBI-170190-100 |
| 171.00 | 183.00 | 6.30 | 8.00 | 0.00 | 0.00 | PWM-171183-063 |
| 171.50 | 179.50 | 4.20 | 7.00 | 0.00 | 0.00 | PWF-171179-040 |
| 175.00 | 189.20 | 7.10 | 10.00 | 182.00 | 0.00 | PWM-175189-071 |
| 175.00 | 195.00 | 10.00 | 14.00 | 0.00 | 0.00 | DKI-175195-100 |
| 175.00 | 195.00 | 10.00 | 14.00 | 0.00 | 0.00 | DKB-175195-100 |
| 176.00 | 186.00 | 5.50 | 7.50 | 0.00 | 0.00 | DH-176186-065 |
| 180.00 | 188.60 | 5.30 | 7.00 | 0.00 | 0.00 | PW-180188-053 |
| 180.00 | 188.80 | 6.00 | 6.00 | 0.00 | 0.00 | WTN-180188-060 |
| 180.00 | 194.00 | 7.00 | 9.50 | 0.00 | 0.00 | DH-180194-080 |
| 180.00 | 195.00 | 10.00 | 14.00 | 0.00 | 0.00 | MCR-180195-100 |
| 180.00 | 195.20 | 10.10 | 14.00 | 0.00 | 0.00 | PW-180195-101 |
| 180.00 | 200.00 | 7.00 | 10.00 | 0.00 | 0.00 | PW-180200-070 |
| 180.00 | 200.00 | 10.00 | 14.00 | 0.00 | 0.00 | DKB-180200-100 |
| 180.00 | 200.00 | 10.20 | 18.00 | 190.00 | 0.00 | PW-180200-102 |
| 180.00 | 205.00 | 12.00 | 16.00 | 0.00 | 0.00 | DKBI-180205-120 |
| 183.00 | 192.00 | 5.10 | 7.00 | 0.00 | 0.00 | PW-183192-051 |
| 183.00 | 193.60 | 5.50 | 7.00 | 0.00 | 0.00 | PW-183193-055 |
| 185.00 | 175.00 | 7.00 | 9.50 | 0.00 | 0.00 | PW-175185-070 |
| 185.00 | 193.60 | 5.30 | 7.00 | 0.00 | 0.00 | PW-185193-053 |



| ID | OD | L1 | L2 | OD2 | OD3 | Product Name |
|--------|--------|-------|-------|--------|------|-----------------|
| 190.00 | 202.00 | 5.50 | 10.00 | 0.00 | 0.00 | PWF-190202-055 |
| 190.00 | 205.00 | 9.00 | 12.00 | 0.00 | 0.00 | DKBI-190205-090 |
| 190.00 | 205.20 | 10.10 | 14.00 | 0.00 | 0.00 | PW-190205-101 |
| 190.00 | 210.00 | 10.00 | 10.00 | 0.00 | 0.00 | MCU-190210-100 |
| 190.00 | 210.00 | 15.00 | 14.00 | 200.00 | 0.00 | PW-190210-101 |
| 190.00 | 220.00 | 8.00 | 8.00 | 0.00 | 0.00 | DKYI-190220-080 |
| 194.50 | 202.50 | 4.20 | 7.00 | 0.00 | 0.00 | PWF-194202-040 |
| 196.00 | 210.20 | 7.10 | 10.00 | 0.00 | 0.00 | PWM-196210-071 |
| 197.00 | 205.60 | 5.30 | 7.00 | 0.00 | 0.00 | PW-197205-053 |
| 197.00 | 209.00 | 6.30 | 8.00 | 0.00 | 0.00 | PWM-197209-063 |
| 198.00 | 208.00 | 5.50 | 7.50 | 0.00 | 0.00 | DH-198208-065 |
| 200.00 | 208.80 | 6.00 | 6.00 | 0.00 | 0.00 | WTN-200208-060 |
| 200.00 | 212.00 | 5.50 | 8.00 | 0.00 | 0.00 | PWF-200212-055 |
| 200.00 | 214.00 | 7.00 | 9.50 | 207.00 | 0.00 | DH-200214-080 |
| 200.00 | 215.20 | 10.10 | 14.00 | 0.00 | 0.00 | PW-200215-101 |
| 200.00 | 216.00 | 8.00 | 11.50 | 0.00 | 0.00 | DKBI-200216-080 |
| 200.00 | 216.00 | 9.00 | 9.50 | 202.50 | 0.00 | WTV-200216-095 |
| 200.00 | 216.00 | 9.00 | 9.50 | 202.50 | 0.00 | WTN-200216-095 |
| 200.00 | 220.00 | 12.00 | 0.00 | 0.00 | 0.00 | MCR-200220-120 |
| 200.00 | 220.00 | 12.00 | 16.00 | 0.00 | 0.00 | PW-200220-120 |
| 200.00 | 224.00 | 12.00 | 17.00 | 0.00 | 0.00 | DKB-200224-120 |
| 200.00 | 225.00 | 12.00 | 17.00 | 0.00 | 0.00 | DKBI-200225-120 |
| 201.50 | 210.50 | 5.10 | 7.00 | 0.00 | 0.00 | PW-201210-051 |
| 204.00 | 218.00 | 7.00 | 9.50 | 0.00 | 0.00 | DH-204218-070 |
| 205.00 | 213.60 | 5.30 | 7.00 | 0.00 | 0.00 | PW-205213-053 |
| 207.00 | 217.60 | 5.50 | 7.00 | 0.00 | 0.00 | PW-207217-055 |
| 210.00 | 200.00 | 7.00 | 9.50 | 0.00 | 0.00 | PW-200210-070 |
| 210.00 | 220.00 | 10.20 | 18.00 | 210.00 | 0.00 | PW-200220-102 |
| 210.00 | 225.20 | 10.10 | 14.00 | 0.00 | 0.00 | PW-210225-101 |
| 210.00 | 230.00 | 12.00 | 16.00 | 0.00 | 0.00 | MCR-210230-120 |
| 210.00 | 230.00 | 12.00 | 16.00 | 0.00 | 0.00 | DKB-210230-120 |



| ID | OD | L1 | L2 | OD2 | OD3 | Product Name |
|--------|--------|-------|-------|--------|------|-----------------|
| 210.00 | 230.00 | 12.00 | 17.00 | 0.00 | 0.00 | DKBI-210230-120 |
| 210.00 | 235.00 | 12.00 | 17.00 | 0.00 | 0.00 | DKB-210235-120 |
| 212.00 | 224.00 | 7.00 | 12.00 | 0.00 | 0.00 | PW-212224-070 |
| 212.00 | 237.00 | 12.00 | 17.00 | 0.00 | 0.00 | DKI-212237-120 |
| 220.00 | 235.20 | 10.10 | 14.00 | 0.00 | 0.00 | PW-220235-101 |
| 220.00 | 240.00 | 10.10 | 14.00 | 0.00 | 0.00 | PW-220240-101 |
| 220.00 | 240.00 | 12.00 | 16.00 | 0.00 | 0.00 | MCR-220240-120 |
| 220.00 | 245.00 | 12.00 | 17.00 | 0.00 | 0.00 | DKI-220245-120 |
| 221.00 | 230.00 | 5.10 | 7.00 | 0.00 | 0.00 | PW-221230-051 |
| 223.00 | 235.00 | 6.30 | 8.00 | 0.00 | 0.00 | PWM-223235-063 |
| 225.00 | 240.00 | 6.20 | 13.00 | 236.00 | 0.00 | PWF-225240-064 |
| 225.00 | 245.00 | 12.50 | 18.00 | 0.00 | 0.00 | PW-225245-125 |
| 225.00 | 250.00 | 12.00 | 17.00 | 0.00 | 0.00 | DKB-225250-120 |
| 228.00 | 236.60 | 5.30 | 7.00 | 0.00 | 0.00 | PW-228236-053 |
| 230.00 | 244.00 | 7.00 | 9.50 | 0.00 | 0.00 | DH-230244-080 |
| 230.00 | 245.00 | 8.00 | 12.00 | 0.00 | 0.00 | MCR-230245-080 |
| 230.00 | 245.20 | 10.10 | 14.00 | 0.00 | 0.00 | PW-230245-101 |
| 230.00 | 246.00 | 7.50 | 12.00 | 0.00 | 0.00 | PW-230246-075 |
| 230.00 | 255.00 | 12.00 | 17.00 | 0.00 | 0.00 | DKBI-230255-120 |
| 231.00 | 241.60 | 5.50 | 7.00 | 0.00 | 0.00 | PW-231241-055 |
| 232.00 | 240.60 | 5.30 | 7.00 | 0.00 | 0.00 | PW-232240-053 |
| 240.00 | 255.20 | 10.10 | 14.00 | 0.00 | 0.00 | PW-240255-101 |
| 242.00 | 251.00 | 5.10 | 7.00 | 0.00 | 0.00 | PW-242251-051 |
| 249.00 | 261.00 | 6.30 | 8.00 | 0.00 | 0.00 | PWM-249261-063 |
| 250.00 | 265.20 | 14.00 | 0.00 | 0.00 | 0.00 | PW-250265-101 |
| 250.00 | 270.00 | 10.20 | 14.00 | 0.00 | 0.00 | PW-250270-102 |
| 250.00 | 270.00 | 10.20 | 14.00 | 260.00 | 0.00 | PWM-250270-102 |
| 250.00 | 275.00 | 12.00 | 17.00 | 0.00 | 0.00 | DKBI-250275-120 |
| 257.00 | 267.60 | 5.50 | 7.00 | 0.00 | 0.00 | PW-257267-055 |
| 260.00 | 285.00 | 12.00 | 17.00 | 0.00 | 0.00 | DKBI-260285-120 |
| 265.00 | 280.00 | 6.50 | 13.00 | 276.00 | 0.00 | PWF-265280-065 |



| ID | OD | L1 | L2 | OD2 | OD3 | Product Name |
|--------|--------|-------|-------|------|------|----------------|
| 265.00 | 290.00 | 12.00 | 17.00 | 0.00 | 0.00 | DKI-265290-120 |
| 274.00 | 250.00 | 12.00 | 16.00 | 0.00 | 0.00 | DKB-250275-120 |
| 280.00 | 295.70 | 10.20 | 14.00 | 0.00 | 0.00 | PW-280295-102 |
| 280.00 | 300.00 | 10.20 | 14.00 | 0.00 | 0.00 | PW-280300-102 |
| 280.00 | 300.00 | 12.00 | 16.00 | 0.00 | 0.00 | MCR-280300-120 |
| 280.00 | 310.00 | 16.00 | 22.00 | 0.00 | 0.00 | DKI-280310-160 |
| 290.00 | 305.70 | 10.20 | 14.00 | 0.00 | 0.00 | PW-290305-102 |
| 300.00 | 315.70 | 10.20 | 14.00 | 0.00 | 0.00 | PW-300315-102 |
| 300.00 | 330.00 | 16.00 | 22.00 | 0.00 | 0.00 | DKI-300330-160 |
| 345.00 | 369.00 | 10.00 | 14.00 | 0.00 | 0.00 | PW-345369-100 |





GT

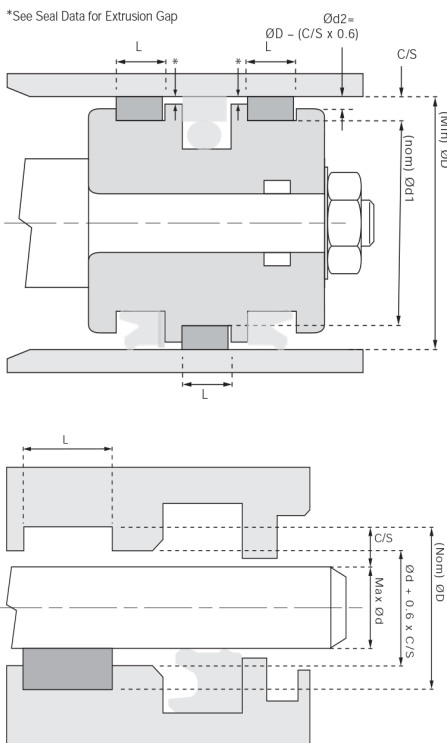
Bearings

Bearings



Key Features

- Excellent friction properties
- Excellent heat resistance
- Easy to fit
- Reduces particulate contamination
- Very flexible
- Infinite diameters possible

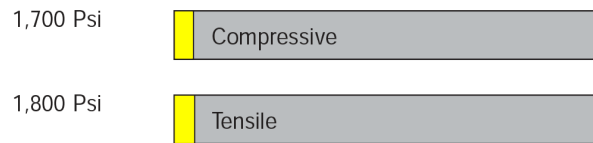


Design

GT strip is designed for use with glide ring type piston and rod seals. Made from Bronze filled PTFE, the strip allows contaminate particles to embed in the non working surface helping to keep the main seal and cylinder bore/rod free from scoring. Bearing strip is designed to allow pressure relief to the seal by use of an expansion gap. This avoids the possibility of a pressure lock between the seal and the bearing as well as eliminating the possibility of hydrodynamic pressure build up which will cause premature destruction of the seal. This relief also avoids the presence of excess pressure during the return stroke which can prevent the transfer of the fluid film back to the pressure side of the seal, so creating the effect of a leaking seal.

Operating Conditions

Strength



Dynamic Load



Temperature



Speed



Surface Finish µmRa

| | |
|---------|--------------------|
| Dynamic | 0.1 – 0.25 Optimum |
| Dynamic | 0.1 – 0.4 Range |
| Static | ≤2.6 |

Tolerances

| | | |
|--------|---------------------|-----|
| Piston | Ød = minØD – 2x c/s | H11 |
| Rod | ØD = maxØd + 2x c/s | f9 |
| L | -0.0 + 0.2 | |



B1

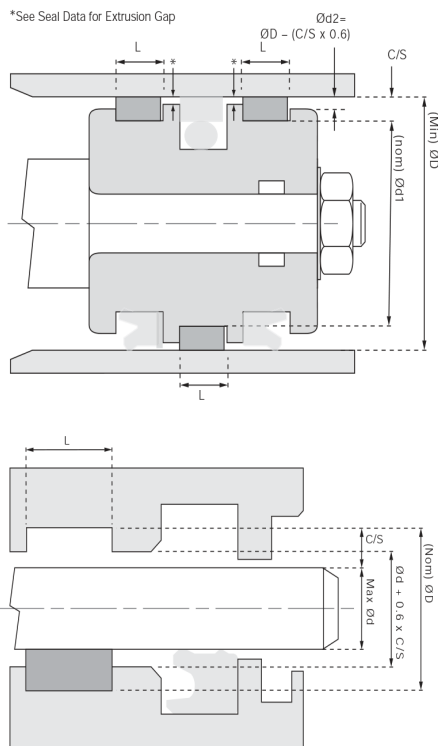
Bearings

Bearings



Key Features

- Can be cut down
- Allow steel pistons / glands
- Cheap to replace
- Easy to fit
- Provides improved alignment
- Longer seal life



Design

B1 non metallic bearing rings are designed for both piston and gland applications. They are made from heat stabilised glass reinforced type 66 Nylon possessing excellent impact resistance and compressive strength. The use of bearing rings will help provide better piston and rod alignment therefore avoiding metal to metal contact. This will result in longer lasting cylinder parts and extended seal life as contaminants will embed into the softer bearing ring. They are generally of relatively low cost.

Operating Conditions

Strength

35,000 Psi

Compressive

27,000 Psi

Tensile

Dynamic Load

45N/mm²

@ 25°C Max

Temperature

-40° to 120°C

-40° to 250°F

Speed

3.0m/sec

9.0'/sec

Surface Finish µmRa

Dynamic 0.1 - 0.25 Optimum

Dynamic 0.1 - 0.4 Range

Static ≤2.6

Tolerances

| | ØD | Ød | L |
|--------|----|--|-----------|
| Piston | H9 | ≤ 100mm +0 - 0.05 > 100mm +0 - 0.08 | -0 + 0.25 |
| Rod | f8 | ≤ 100mm -0 + 0.05 > 100mm -0 + 0.08 | -0 + 0.25 |



B6

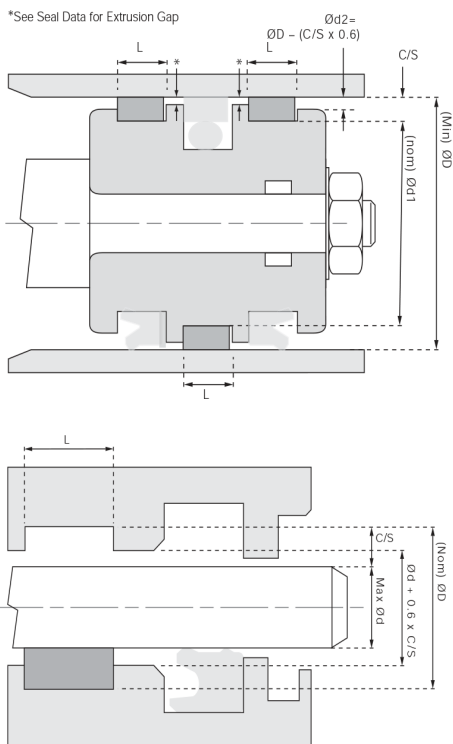
Bearings

Bearings



Key Features

- Can be cut down
- Allow steel pistons / glands
- Cheap to replace
- Easy to fit
- Provides improved alignment
- Longer seal life



Design

B6 non metallic bearing rings are designed for both piston and gland applications. They are made from glass filled Acetal to ensure high mechanical strength and resistance to heavy radial loads. They are particularly suitable for replacing traditional soft metal bearings as their low friction benefits enabling efficient operation with minimal lubrication. The use of bearing rings will help provide better piston and rod alignment therefore avoiding metal to metal contact. This will result in longer lasting cylinder parts and extended seal life as some contaminants will embed into the softer bearing ring. They are generally of relatively low cost.

Operating Conditions

Strength

35,000 Psi

Compressive

27,000 Psi

Tensile

Dynamic Load

40N/mm²

@ 25°C Max

Temperature

-40° to 110°C

-40° to 230°F

Speed

3.0m/sec

9.0'/sec

Surface Finish µmRa

Dynamic 0.1 - 0.25 Optimum

Dynamic 0.1 - 0.4 Range

Static ≤2.6

Tolerances

| | ØD | Ød | L |
|--------|----|-------------------|---|
| Piston | H8 | +0 -0.05 -0 +0.25 | |
| Rod | f7 | -0 +0.05 -0 +0.25 | |



B8

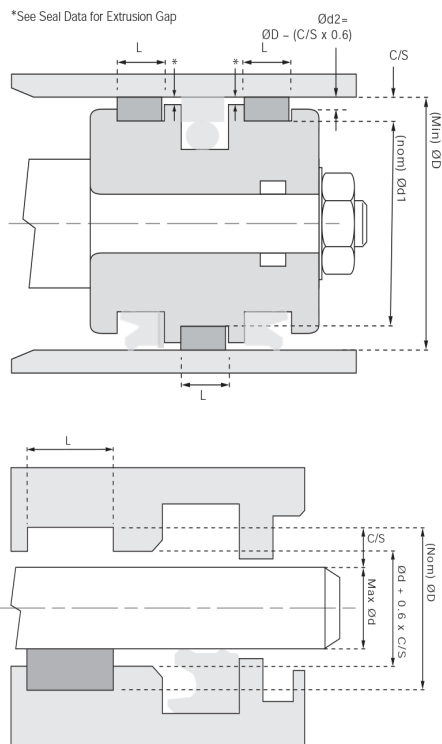
Bearings

Bearings



Key Features

- Can be cut down
- Allow steel pistons / glands
- High load / heavy duty
- Easy to fit
- Provides improved alignment
- Longer seal life



Design

B8 bearing rings are designed for use on pistons and or rods to align rod and piston and to prevent metal to metal contact. This bearing is precision machined from a reinforced grade of phenolic resin. The thermoset properties of this material allow for a high load capability even at higher temperatures. This will result in longer lasting cylinder parts and extended seal life as some contaminants will embed into the softer bearing ring.

Operating Conditions

Strength

34,000 Psi

Compressive

10,600 Psi

Tensile

Dynamic Load

50N/mm²

@ 25°C Max

Temperature

-40° to 120°C

-40° to 250°F

Speed

3.0m/sec

9.0'/sec

Surface Finish µmRa

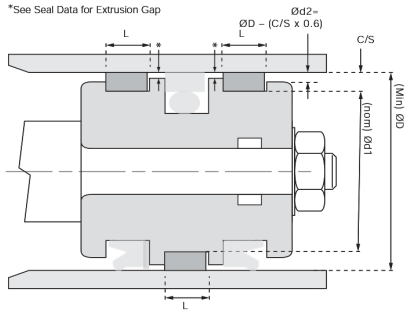
Dynamic 0.1 - 0.25 Optimum

Dynamic 0.1 - 0.4 Range

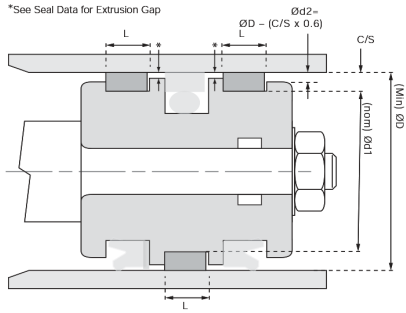
Static ≤2.6

Tolerances

| | ØD | Ød | L |
|--------|----|--|-------------|
| Piston | H9 | ≤ 100mm +0 - 0.05 > 100mm +0 - 0.08 | -0.00 +0.20 |
| Rod | f8 | ≤ 100mm -0 + 0.05 > 100mm -0 + 0.08 | -0.00 +0.20 |

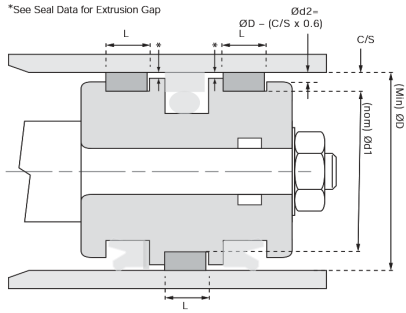


| OD | ID | L1 | C/S | Width | Product Name |
|------|------|-------|------|-------|--------------|
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | B8-40300 |
| 1.50 | 0.00 | 0.00 | 1.50 | 3.20 | GT-15032 |
| 1.50 | 0.00 | 0.00 | 0.00 | 5.60 | GT-15056 |
| 1.50 | 0.00 | 0.00 | 1.50 | 6.30 | GT-15063 |
| 1.55 | 0.00 | 0.00 | 1.55 | 4.00 | GT-15540 |
| 2.00 | 0.00 | 0.00 | 2.00 | 6.30 | GT-20063 |
| 2.00 | 0.00 | 0.00 | 2.00 | 8.10 | GT-20081 |
| 2.00 | 0.00 | 0.00 | 2.00 | 9.70 | GT-20097 |
| 2.00 | 0.00 | 0.00 | 2.00 | 15.00 | GT-20150 |
| 2.00 | 0.00 | 0.00 | 2.00 | 20.00 | GT-20200 |
| 2.00 | 0.00 | 0.00 | 2.00 | 25.00 | GT-20250 |
| 2.00 | 0.00 | 9.80 | 2.00 | 10.00 | B8-20100 |
| 2.50 | 0.00 | 0.00 | 0.00 | 0.00 | B8-25200 |
| 2.50 | 0.00 | 0.00 | 0.00 | 0.00 | B8-25097 |
| 2.50 | 0.00 | 0.00 | 0.00 | 0.00 | B8-25250 |
| 2.50 | 0.00 | 0.00 | 0.00 | 0.00 | B8-25130 |
| 2.50 | 0.00 | 0.00 | 2.50 | 5.60 | GT-25056 |
| 2.50 | 0.00 | 0.00 | 2.50 | 6.30 | GT-25063 |
| 2.50 | 0.00 | 0.00 | 2.50 | 8.10 | GT-25081 |
| 2.50 | 0.00 | 0.00 | 2.50 | 9.70 | GT-25097 |
| 2.50 | 0.00 | 0.00 | 2.50 | 12.80 | GT-25128 |
| 2.50 | 0.00 | 0.00 | 2.50 | 15.00 | GT-25150 |
| 2.50 | 0.00 | 0.00 | 2.50 | 20.00 | GT-25200 |
| 2.50 | 0.00 | 0.00 | 2.50 | 25.00 | GT-25250 |
| 2.50 | 0.00 | 0.00 | 2.50 | 30.00 | GT-25300 |
| 2.50 | 0.00 | 14.80 | 2.50 | 15.00 | B8-25150 |
| 3.00 | 0.00 | 0.00 | 3.00 | 9.60 | GT-30096 |
| 3.00 | 0.00 | 0.00 | 3.00 | 12.80 | GT-30128 |
| 3.00 | 0.00 | 0.00 | 3.00 | 15.00 | GT-30150 |
| 3.00 | 0.00 | 0.00 | 3.00 | 19.20 | GT-30192 |
| 3.00 | 0.00 | 0.00 | 3.00 | 20.00 | GT-30200 |



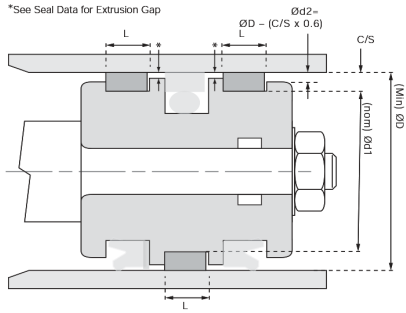
| OD | ID | L1 | C/S | Width | Product Name |
|-------|-------|-------|------|-------|----------------|
| 3.00 | 0.00 | 0.00 | 3.00 | 25.00 | GT-30250 |
| 3.00 | 0.00 | 0.00 | 3.00 | 30.00 | GT-30300 |
| 3.00 | 0.00 | 0.00 | 3.00 | 40.00 | GT-30400 |
| 3.00 | 0.00 | 9.70 | 0.00 | 0.00 | B8-30097 |
| 4.00 | 0.00 | 0.00 | 4.00 | 6.30 | GT-40063 |
| 4.00 | 0.00 | 0.00 | 4.00 | 8.10 | GT-40081 |
| 4.00 | 0.00 | 0.00 | 4.00 | 9.70 | GT-40097 |
| 4.00 | 0.00 | 0.00 | 4.00 | 12.00 | GT-40120 |
| 4.00 | 0.00 | 0.00 | 4.00 | 15.00 | GT-40150 |
| 4.00 | 0.00 | 0.00 | 4.00 | 20.00 | GT-40200 |
| 4.00 | 0.00 | 0.00 | 4.00 | 25.00 | GT-40250 |
| 4.00 | 0.00 | 0.00 | 4.00 | 30.00 | GT-40300 |
| 4.00 | 0.00 | 0.00 | 4.00 | 40.00 | GT-40400 |
| 4.00 | 0.00 | 9.70 | 0.00 | 0.00 | B8-40097 |
| 4.00 | 0.00 | 39.80 | 4.00 | 40.00 | B8-40400 |
| 6.50 | 6.25 | 0.38 | 0.00 | 0.00 | B1-0650625-037 |
| 8.50 | 8.25 | 1.25 | 0.00 | 0.00 | B1-0850825-125 |
| 11.50 | 11.25 | 1.25 | 0.00 | 0.00 | B1-1150112-125 |
| 24.00 | 20.00 | 9.60 | 0.00 | 0.00 | B6-024020-096 |
| 25.00 | 0.00 | 0.00 | 0.00 | 0.00 | B8-30250 |
| 25.00 | 21.00 | 9.60 | 0.00 | 0.00 | B6-025021-096 |
| 26.00 | 22.00 | 9.60 | 0.00 | 0.00 | B6-026022-096 |
| 29.00 | 25.00 | 9.60 | 0.00 | 0.00 | B6-029025-096 |
| 30.00 | 25.00 | 5.60 | 0.00 | 0.00 | B6-030025-056 |
| 30.00 | 25.00 | 9.70 | 0.00 | 0.00 | B6-030025-097 |
| 32.00 | 28.00 | 9.60 | 0.00 | 0.00 | B6-032028-096 |
| 34.00 | 30.00 | 9.60 | 0.00 | 0.00 | B6-034030-096 |
| 35.00 | 30.00 | 5.60 | 0.00 | 0.00 | B6-035030-056 |
| 35.00 | 30.00 | 9.70 | 0.00 | 0.00 | B6-035030-097 |
| 35.00 | 31.00 | 8.00 | 0.00 | 0.00 | B1-035031-081 |
| 35.00 | 32.00 | 15.00 | 0.00 | 0.00 | B1-035032-150 |





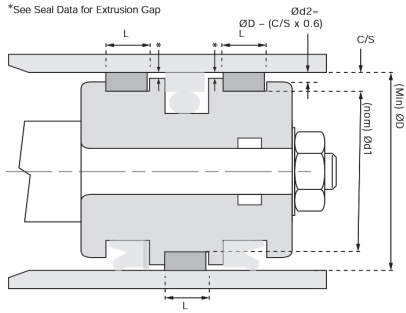
| OD | ID | L1 | C/S | Width | Product Name |
|-------|-------|-------|------|-------|---------------|
| 36.00 | 32.00 | 8.00 | 0.00 | 0.00 | B8-036032-080 |
| 36.00 | 32.00 | 9.60 | 0.00 | 0.00 | B6-036032-096 |
| 36.00 | 32.00 | 20.00 | 0.00 | 0.00 | B8-036032-200 |
| 38.00 | 32.00 | 10.00 | 0.00 | 0.00 | B6-038032-100 |
| 38.00 | 34.00 | 8.00 | 0.00 | 0.00 | B8-038034-080 |
| 39.00 | 35.00 | 9.60 | 0.00 | 0.00 | B6-039035-096 |
| 39.00 | 35.00 | 25.00 | 0.00 | 0.00 | B8-039035-250 |
| 40.00 | 34.00 | 9.60 | 0.00 | 0.00 | B6-040034-096 |
| 40.00 | 35.00 | 0.00 | 0.00 | 0.00 | B8-040035-097 |
| 40.00 | 35.00 | 0.00 | 0.00 | 0.00 | B1-040035-150 |
| 40.00 | 35.00 | 5.60 | 0.00 | 0.00 | B8-040035-056 |
| 40.00 | 35.00 | 5.60 | 0.00 | 0.00 | B6-040035-056 |
| 40.00 | 35.00 | 9.70 | 0.00 | 0.00 | B6-040035-097 |
| 40.00 | 36.00 | 9.60 | 0.00 | 0.00 | B6-040036-096 |
| 40.00 | 36.00 | 12.00 | 0.00 | 0.00 | B1-040036-120 |
| 40.00 | 37.00 | 3.00 | 0.00 | 0.00 | B8-040037-030 |
| 41.00 | 36.00 | 5.60 | 0.00 | 0.00 | B6-041036-056 |
| 42.00 | 36.00 | 9.50 | 0.00 | 9.70 | B6-042036-097 |
| 42.00 | 38.00 | 9.60 | 0.00 | 0.00 | B6-042038-096 |
| 44.00 | 40.00 | 9.60 | 0.00 | 0.00 | B6-044040-096 |
| 44.00 | 40.00 | 30.00 | 0.00 | 0.00 | B6-044040-300 |
| 44.00 | 40.00 | 40.00 | 0.00 | 0.00 | B8-044040-400 |
| 45.00 | 40.00 | 0.00 | 0.00 | 0.00 | B8-045040-100 |
| 45.00 | 40.00 | 5.60 | 0.00 | 0.00 | B6-045040-056 |
| 45.00 | 40.00 | 9.70 | 0.00 | 0.00 | B6-045040-097 |
| 45.00 | 40.00 | 20.00 | 0.00 | 0.00 | B8-045040-200 |
| 45.00 | 41.00 | 20.00 | 0.00 | 0.00 | B1-045041-200 |
| 46.00 | 40.00 | 9.60 | 0.00 | 0.00 | B6-046040-096 |
| 46.00 | 40.00 | 20.00 | 0.00 | 0.00 | B8-046040-200 |
| 48.00 | 45.00 | 22.50 | 0.00 | 0.00 | B1-048045-225 |
| 49.00 | 45.00 | 25.00 | 0.00 | 0.00 | B8-049045-250 |



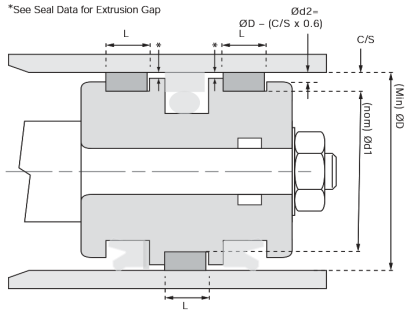


| OD | ID | L1 | C/S | Width | Product Name |
|-------|-------|-------|------|-------|---------------|
| 50.00 | 43.40 | 12.60 | 0.00 | 0.00 | B8-050043-126 |
| 50.00 | 44.00 | 5.00 | 0.00 | 0.00 | B1-050044-050 |
| 50.00 | 45.00 | 0.00 | 0.00 | 0.00 | B8-050045-130 |
| 50.00 | 45.00 | 5.60 | 0.00 | 0.00 | B6-050045-056 |
| 50.00 | 45.00 | 9.70 | 0.00 | 0.00 | B8-050045-097 |
| 50.00 | 45.00 | 9.70 | 0.00 | 0.00 | B6-050045-097 |
| 50.00 | 45.00 | 13.00 | 0.00 | 0.00 | B6-050045-130 |
| 50.00 | 45.00 | 15.00 | 0.00 | 0.00 | B8-050045-150 |
| 50.00 | 45.00 | 20.00 | 0.00 | 0.00 | B8-050045-200 |
| 50.00 | 46.00 | 0.00 | 0.00 | 0.00 | B1-050046-097 |
| 50.00 | 46.00 | 4.80 | 0.00 | 5.00 | B8-050046-050 |
| 50.00 | 46.00 | 14.50 | 0.00 | 0.00 | B8-050046-145 |
| 51.00 | 45.00 | 9.60 | 0.00 | 0.00 | B6-051045-096 |
| 55.00 | 49.00 | 10.50 | 0.00 | 0.00 | B1-055049-105 |
| 55.00 | 49.00 | 12.50 | 0.00 | 0.00 | B6-055049-125 |
| 55.00 | 49.00 | 15.50 | 0.00 | 0.00 | B8-055049-155 |
| 55.00 | 50.00 | 0.00 | 0.00 | 0.00 | B8-055050-056 |
| 55.00 | 50.00 | 0.00 | 0.00 | 0.00 | B8-055050-097 |
| 55.00 | 50.00 | 5.60 | 0.00 | 0.00 | B6-055050-056 |
| 55.00 | 50.00 | 9.70 | 0.00 | 0.00 | B6-055050-097 |
| 55.00 | 50.00 | 15.00 | 0.00 | 0.00 | B8-055050-150 |
| 55.00 | 50.00 | 20.00 | 0.00 | 0.00 | B1-055050-200 |
| 55.00 | 50.00 | 20.00 | 0.00 | 0.00 | B8-055050-200 |
| 55.00 | 50.00 | 25.00 | 0.00 | 2.50 | B8-055050-250 |
| 55.00 | 50.00 | 30.00 | 0.00 | 0.00 | B8-055050-300 |
| 56.00 | 50.00 | 9.60 | 0.00 | 0.00 | B6-056050-096 |
| 56.00 | 50.00 | 12.80 | 0.00 | 0.00 | B6-056050-128 |
| 56.00 | 50.00 | 25.00 | 0.00 | 0.00 | B8-056050-250 |
| 56.00 | 51.00 | 15.00 | 0.00 | 0.00 | B1-056051-150 |
| 58.00 | 50.00 | 30.00 | 0.00 | 0.00 | B8-058050-300 |
| 60.00 | 54.00 | 12.50 | 0.00 | 0.00 | B6-060054-125 |



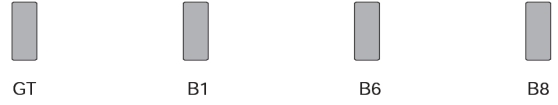
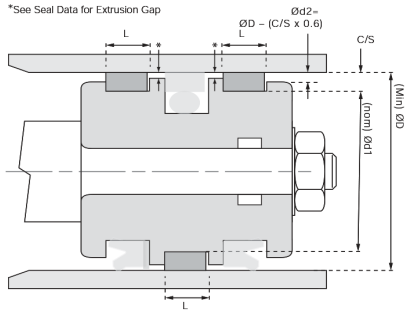


| OD | ID | L1 | C/S | Width | Product Name |
|-------|-------|-------|------|-------|---------------|
| 60.00 | 54.00 | 12.80 | 0.00 | 0.00 | B6-060054-128 |
| 60.00 | 55.00 | 0.00 | 0.00 | 0.00 | B8-060055-097 |
| 60.00 | 55.00 | 5.60 | 0.00 | 0.00 | B6-060055-056 |
| 60.00 | 55.00 | 6.00 | 0.00 | 0.00 | B8-060055-060 |
| 60.00 | 55.00 | 7.00 | 0.00 | 0.00 | B8-060055-070 |
| 60.00 | 55.00 | 7.30 | 0.00 | 0.00 | B8-060055-073 |
| 60.00 | 55.00 | 8.10 | 0.00 | 0.00 | B8-060055-081 |
| 60.00 | 55.00 | 9.70 | 0.00 | 0.00 | B6-060055-097 |
| 60.00 | 55.00 | 10.00 | 0.00 | 0.00 | B8-060055-100 |
| 60.00 | 55.00 | 14.50 | 0.00 | 0.00 | B8-060055-145 |
| 60.00 | 55.00 | 15.00 | 0.00 | 0.00 | B8-060055-150 |
| 60.00 | 55.00 | 20.00 | 0.00 | 0.00 | B8-060055-200 |
| 60.00 | 56.00 | 10.20 | 0.00 | 0.00 | B6-060056-102 |
| 61.00 | 55.00 | 9.60 | 0.00 | 0.00 | B6-061055-096 |
| 61.00 | 56.00 | 0.00 | 0.00 | 0.00 | B8-061056-097 |
| 61.00 | 57.00 | 25.00 | 0.00 | 0.00 | B8-061057-250 |
| 62.00 | 56.00 | 12.80 | 0.00 | 0.00 | B6-062056-128 |
| 63.00 | 56.80 | 5.00 | 0.00 | 0.00 | B1-063056-050 |
| 63.00 | 57.00 | 12.80 | 0.00 | 0.00 | B6-063057-128 |
| 63.00 | 58.00 | 0.00 | 0.00 | 0.00 | B8-063058-080 |
| 63.00 | 58.00 | 5.60 | 0.00 | 0.00 | B6-063058-056 |
| 63.00 | 58.00 | 9.50 | 0.00 | 9.70 | B8-063058-097 |
| 63.00 | 58.00 | 9.70 | 0.00 | 0.00 | B6-063058-097 |
| 63.00 | 58.00 | 20.00 | 0.00 | 0.00 | B1-063058-200 |
| 63.00 | 59.00 | 12.00 | 0.00 | 0.00 | B1-063059-120 |
| 65.00 | 59.00 | 12.80 | 0.00 | 0.00 | B6-065059-128 |
| 65.00 | 59.00 | 15.50 | 0.00 | 0.00 | B8-065059-155 |
| 65.00 | 60.00 | 5.60 | 0.00 | 0.00 | B6-065060-056 |
| 65.00 | 60.00 | 9.70 | 0.00 | 0.00 | B8-065060-097 |
| 65.00 | 60.00 | 9.70 | 0.00 | 0.00 | B6-065060-097 |
| 65.00 | 60.00 | 14.80 | 0.00 | 15.00 | B8-065060-150 |

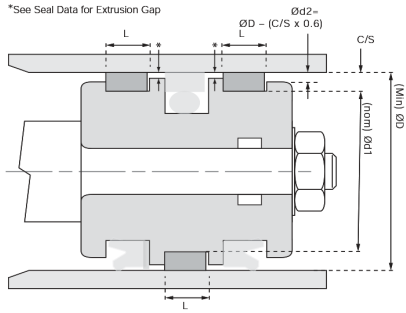


| OD | ID | L1 | C/S | Width | Product Name |
|-------|-------|-------|------|-------|---------------|
| 65.00 | 60.00 | 24.80 | 0.00 | 25.00 | B8-065060-250 |
| 65.00 | 60.00 | 32.00 | 0.00 | 0.00 | B8-065060-320 |
| 65.00 | 61.00 | 10.00 | 0.00 | 0.00 | B6-065061-100 |
| 66.00 | 60.00 | 12.80 | 0.00 | 0.00 | B6-066060-128 |
| 68.00 | 58.00 | 29.80 | 0.00 | 0.00 | B8-068058-300 |
| 68.00 | 63.00 | 15.00 | 0.00 | 0.00 | B8-068063-150 |
| 68.00 | 63.00 | 20.00 | 0.00 | 0.00 | B8-068063-200 |
| 68.00 | 63.00 | 30.00 | 0.00 | 0.00 | B8-068063-300 |
| 68.00 | 64.00 | 10.00 | 0.00 | 0.00 | B6-068064-100 |
| 69.00 | 63.00 | 12.80 | 0.00 | 0.00 | B6-069063-128 |
| 69.00 | 63.00 | 30.00 | 0.00 | 0.00 | B1-069063-300 |
| 69.00 | 63.00 | 31.50 | 0.00 | 0.00 | B8-069063-315 |
| 69.00 | 65.00 | 25.00 | 0.00 | 0.00 | B8-069065-250 |
| 70.00 | 62.16 | 10.00 | 0.00 | 0.00 | B8-070062-100 |
| 70.00 | 64.00 | 12.40 | 0.00 | 0.00 | B8-070064-124 |
| 70.00 | 64.00 | 12.80 | 0.00 | 0.00 | B6-070064-128 |
| 70.00 | 64.00 | 15.00 | 0.00 | 0.00 | B8-070064-150 |
| 70.00 | 64.00 | 19.50 | 0.00 | 0.00 | B8-070064-195 |
| 70.00 | 65.00 | 0.00 | 0.00 | 0.00 | B8-070065-056 |
| 70.00 | 65.00 | 0.00 | 0.00 | 0.00 | B1-070065-200 |
| 70.00 | 65.00 | 5.60 | 0.00 | 0.00 | B6-070065-056 |
| 70.00 | 65.00 | 7.00 | 0.00 | 0.00 | B8-070065-070 |
| 70.00 | 65.00 | 9.70 | 0.00 | 0.00 | B8-070065-097 |
| 70.00 | 65.00 | 9.70 | 0.00 | 0.00 | B6-070065-097 |
| 70.00 | 65.00 | 12.00 | 0.00 | 0.00 | B8-070065-120 |
| 70.00 | 65.00 | 15.00 | 0.00 | 0.00 | B8-070065-150 |
| 70.00 | 65.00 | 20.00 | 0.00 | 0.00 | B8-070065-200 |
| 70.00 | 65.00 | 20.50 | 0.00 | 0.00 | B6-070065-205 |
| 70.00 | 65.00 | 30.00 | 0.00 | 0.00 | B8-070065-300 |
| 70.00 | 66.00 | 10.00 | 0.00 | 0.00 | B8-070066-100 |
| 70.00 | 66.00 | 10.20 | 0.00 | 0.00 | B6-070066-102 |



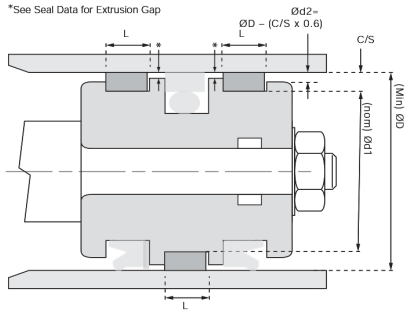


| OD | ID | L1 | C/S | Width | Product Name |
|-------|-------|-------|------|-------|----------------|
| 71.00 | 60.00 | 11.00 | 0.00 | 0.00 | B6-071060-050L |
| 71.00 | 65.00 | 12.80 | 0.00 | 0.00 | B6-071065-128 |
| 71.00 | 65.00 | 17.80 | 0.00 | 18.00 | B8-071065-180 |
| 71.00 | 66.00 | 5.50 | 0.00 | 0.00 | B6-071066-055 |
| 71.50 | 66.50 | 5.40 | 0.00 | 0.00 | B6-071066-054 |
| 75.00 | 69.00 | 19.60 | 0.00 | 0.00 | B8-075069-200 |
| 75.00 | 70.00 | 0.00 | 0.00 | 0.00 | B8-075070-097 |
| 75.00 | 70.00 | 0.00 | 0.00 | 0.00 | B8-075070-200 |
| 75.00 | 70.00 | 5.60 | 0.00 | 0.00 | B6-075070-056 |
| 75.00 | 70.00 | 9.70 | 0.00 | 0.00 | B6-075070-097 |
| 75.00 | 70.00 | 15.00 | 0.00 | 0.00 | B8-075070-150 |
| 75.00 | 70.00 | 30.00 | 0.00 | 0.00 | B8-075070-300 |
| 75.00 | 70.00 | 50.00 | 0.00 | 0.00 | B8-075070-500 |
| 75.00 | 71.00 | 10.00 | 0.00 | 0.00 | B1-075071-100 |
| 75.00 | 71.00 | 15.00 | 0.00 | 0.00 | B1-075071-150 |
| 76.00 | 70.00 | 12.80 | 0.00 | 0.00 | B6-076070-128 |
| 76.00 | 70.00 | 35.00 | 0.00 | 0.00 | B8-076070-350 |
| 76.00 | 70.00 | 63.50 | 0.00 | 0.00 | B8-076070-635 |
| 80.00 | 74.00 | 0.00 | 0.00 | 0.00 | B8-080074-200 |
| 80.00 | 74.00 | 4.00 | 0.00 | 0.00 | B1-080074-040 |
| 80.00 | 74.00 | 9.70 | 0.00 | 0.00 | B6-080074-097 |
| 80.00 | 74.00 | 12.50 | 0.00 | 0.00 | B6-080074-125 |
| 80.00 | 74.00 | 12.80 | 0.00 | 0.00 | B6-080074-128 |
| 80.00 | 74.00 | 15.50 | 0.00 | 0.00 | B8-080074-155 |
| 80.00 | 74.00 | 16.00 | 0.00 | 0.00 | B8-080074-160 |
| 80.00 | 74.00 | 19.50 | 0.00 | 0.00 | B1-080074-195 |
| 80.00 | 74.00 | 25.00 | 0.00 | 0.00 | B8-080074-250 |
| 80.00 | 74.00 | 30.00 | 0.00 | 0.00 | B8-080074-300 |
| 80.00 | 75.00 | 0.00 | 0.00 | 0.00 | B8-080075-056 |
| 80.00 | 75.00 | 0.00 | 0.00 | 0.00 | B8-080075-097 |
| 80.00 | 75.00 | 9.70 | 0.00 | 0.00 | B6-080075-097 |

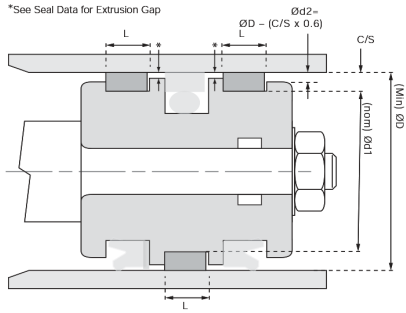


| OD | ID | L1 | C/S | Width | Product Name |
|-------|-------|-------|------|-------|----------------|
| 80.00 | 75.00 | 13.00 | 0.00 | 0.00 | B1-080075-130 |
| 80.00 | 75.00 | 15.00 | 0.00 | 0.00 | B8-080075-150 |
| 80.00 | 75.00 | 20.00 | 0.00 | 0.00 | B8-080075-200 |
| 80.00 | 76.00 | 10.00 | 0.00 | 0.00 | B6-080076-100 |
| 81.00 | 75.00 | 12.80 | 0.00 | 0.00 | B6-081075-128 |
| 84.00 | 80.00 | 15.00 | 0.00 | 0.00 | B8-084080-150 |
| 85.00 | 79.00 | 0.00 | 0.00 | 0.00 | B8-085079-125 |
| 85.00 | 79.00 | 20.00 | 0.00 | 0.00 | B8-085079-200 |
| 85.00 | 79.00 | 25.00 | 0.00 | 0.00 | B8-085079-250 |
| 85.00 | 80.00 | 0.00 | 0.00 | 0.00 | B8-085080-056 |
| 85.00 | 80.00 | 0.00 | 0.00 | 0.00 | B1-085080-150 |
| 85.00 | 80.00 | 5.60 | 0.00 | 0.00 | B6-085080-056 |
| 85.00 | 80.00 | 9.70 | 0.00 | 0.00 | B8-085080-097 |
| 85.00 | 80.00 | 9.70 | 0.00 | 0.00 | B6-085080-097 |
| 85.00 | 80.00 | 15.00 | 0.00 | 0.00 | B8-085080-150 |
| 85.00 | 80.00 | 20.00 | 0.00 | 0.00 | B8-085080-200 |
| 85.00 | 80.00 | 25.00 | 0.00 | 0.00 | B8-085080-250 |
| 85.00 | 80.00 | 35.00 | 0.00 | 0.00 | B8-085080-350 |
| 85.00 | 80.00 | 50.00 | 0.00 | 0.00 | B8-085080-500 |
| 85.00 | 81.00 | 10.00 | 0.00 | 0.00 | B6-085081-100 |
| 86.00 | 80.00 | 12.80 | 0.00 | 0.00 | B6-086080-128 |
| 86.00 | 80.00 | 25.00 | 0.00 | 0.00 | B1-086080-250 |
| 86.00 | 80.00 | 40.00 | 0.00 | 0.00 | B8-086080-400 |
| 86.00 | 80.00 | 50.00 | 0.00 | 0.00 | B1-086080-500 |
| 89.00 | 78.00 | 5.00 | 0.00 | 0.00 | B6-089078-050L |
| 90.00 | 81.00 | 12.50 | 0.00 | 0.00 | B8-090081-125 |
| 90.00 | 82.00 | 6.00 | 0.00 | 0.00 | B8-090082-060 |
| 90.00 | 82.00 | 25.00 | 0.00 | 0.00 | B8-090082-250 |
| 90.00 | 84.00 | 10.00 | 0.00 | 0.00 | B8-090084-100 |
| 90.00 | 84.00 | 12.50 | 0.00 | 0.00 | B8-090084-125 |
| 90.00 | 84.00 | 12.80 | 0.00 | 0.00 | B6-090084-128 |

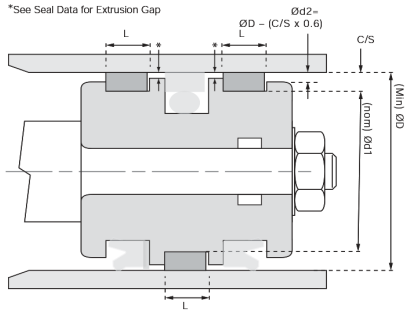




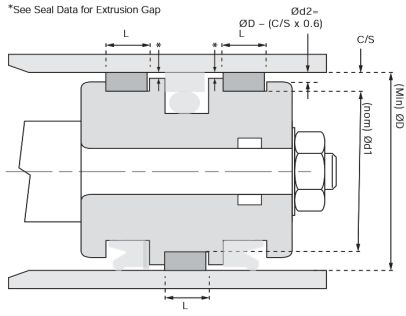
| OD | ID | L1 | C/S | Width | Product Name |
|--------|-------|-------|------|-------|---------------|
| 90.00 | 84.00 | 15.00 | 0.00 | 0.00 | B8-090084-150 |
| 90.00 | 84.00 | 15.00 | 0.00 | 0.00 | B1-090084-150 |
| 90.00 | 84.00 | 20.00 | 0.00 | 0.00 | B8-090084-200 |
| 90.00 | 84.00 | 25.00 | 0.00 | 0.00 | B8-090084-250 |
| 90.00 | 84.00 | 30.00 | 0.00 | 0.00 | B8-090084-300 |
| 90.00 | 85.00 | 5.60 | 0.00 | 0.00 | B6-090085-056 |
| 90.00 | 85.00 | 9.70 | 0.00 | 0.00 | B8-090085-097 |
| 90.00 | 85.00 | 9.70 | 0.00 | 0.00 | B6-090085-097 |
| 90.00 | 85.00 | 15.00 | 0.00 | 0.00 | B8-090085-150 |
| 90.00 | 86.00 | 15.00 | 0.00 | 0.00 | B8-090086-150 |
| 94.00 | 90.00 | 32.00 | 0.00 | 0.00 | B8-094090-320 |
| 95.00 | 86.00 | 12.50 | 0.00 | 0.00 | B1-095086-125 |
| 95.00 | 89.00 | 0.00 | 0.00 | 0.00 | B8-095089-128 |
| 95.00 | 89.00 | 12.80 | 0.00 | 0.00 | B6-095089-128 |
| 95.00 | 90.00 | 5.85 | 0.00 | 0.00 | B8-095090-060 |
| 95.00 | 90.00 | 8.10 | 0.00 | 0.00 | B8-095090-081 |
| 95.00 | 90.00 | 9.70 | 0.00 | 0.00 | B8-095090-097 |
| 95.00 | 90.00 | 14.80 | 0.00 | 15.00 | B8-095090-150 |
| 95.00 | 90.00 | 25.00 | 0.00 | 0.00 | B8-095090-250 |
| 95.00 | 90.00 | 50.00 | 0.00 | 0.00 | B8-095090-500 |
| 96.00 | 90.00 | 12.80 | 0.00 | 0.00 | B6-096090-128 |
| 96.00 | 90.00 | 18.80 | 0.00 | 19.00 | B6-096090-190 |
| 100.00 | 91.00 | 12.50 | 0.00 | 0.00 | B8-100091-125 |
| 100.00 | 92.00 | 6.00 | 0.00 | 0.00 | B8-100092-060 |
| 100.00 | 94.00 | 0.00 | 0.00 | 0.00 | B8-100094-200 |
| 100.00 | 94.00 | 0.00 | 0.00 | 0.00 | B8-100094-097 |
| 100.00 | 94.00 | 6.00 | 0.00 | 0.00 | B1-100094-060 |
| 100.00 | 94.00 | 12.50 | 0.00 | 0.00 | B8-100094-125 |
| 100.00 | 94.00 | 12.80 | 0.00 | 0.00 | B6-100094-128 |
| 100.00 | 94.00 | 15.00 | 0.00 | 0.00 | B8-100094-150 |
| 100.00 | 94.00 | 22.40 | 0.00 | 0.00 | B1-100094-225 |



| OD | ID | L1 | C/S | Width | Product Name |
|--------|--------|-------|------|-------|----------------|
| 100.00 | 94.00 | 25.00 | 0.00 | 0.00 | B8-100094-250 |
| 100.00 | 94.00 | 30.00 | 0.00 | 0.00 | B8-100094-300 |
| 100.00 | 95.00 | 5.60 | 0.00 | 0.00 | B6-100095-056 |
| 100.00 | 95.00 | 7.90 | 0.00 | 8.10 | B8-100095-081 |
| 100.00 | 95.00 | 9.50 | 0.00 | 0.00 | B6-100095-097 |
| 100.00 | 95.00 | 9.70 | 0.00 | 0.00 | B8-100095-097 |
| 100.00 | 95.00 | 15.00 | 0.00 | 0.00 | B8-100095-150 |
| 100.00 | 95.00 | 20.00 | 0.00 | 0.00 | B8-100095-200 |
| 100.00 | 95.00 | 24.80 | 0.00 | 25.00 | B8-100095-250 |
| 100.00 | 95.00 | 40.00 | 0.00 | 0.00 | B8-100095-400 |
| 101.00 | 95.00 | 12.80 | 0.00 | 0.00 | B6-101095-128 |
| 101.00 | 95.00 | 19.20 | 0.00 | 0.00 | B6-101095-192 |
| 103.40 | 98.00 | 23.50 | 0.00 | 0.00 | B1-103098-240 |
| 105.00 | 95.00 | 40.00 | 0.00 | 0.00 | B8-105095-400 |
| 105.00 | 96.00 | 10.00 | 0.00 | 4.50 | B1-105096-100 |
| 105.00 | 96.00 | 12.50 | 0.00 | 0.00 | B8-105096-125 |
| 105.00 | 99.00 | 24.50 | 0.00 | 0.00 | B1-105099-245 |
| 105.00 | 100.00 | 0.00 | 0.00 | 0.00 | B8-105100-250 |
| 105.00 | 100.00 | 0.00 | 0.00 | 0.00 | B8-105100-150 |
| 105.00 | 100.00 | 0.00 | 0.00 | 0.00 | B8-105100-097 |
| 105.00 | 100.00 | 0.00 | 0.00 | 0.00 | B6-105100-097 |
| 105.00 | 100.00 | 5.60 | 0.00 | 0.00 | B6-105100-056 |
| 105.00 | 100.00 | 20.00 | 0.00 | 0.00 | B8-105100-200 |
| 105.00 | 101.00 | 10.00 | 0.00 | 0.00 | B8-105101-100 |
| 106.00 | 100.00 | 12.80 | 0.00 | 0.00 | B6-106100-128 |
| 106.00 | 100.00 | 20.00 | 0.00 | 0.00 | B8-106100-200 |
| 107.00 | 101.00 | 25.00 | 0.00 | 0.00 | B6-107101-250 |
| 108.00 | 102.00 | 15.00 | 0.00 | 0.00 | B6-108102-150 |
| 110.00 | 99.00 | 5.00 | 0.00 | 0.00 | B6-110099-050L |
| 110.00 | 102.00 | 6.00 | 0.00 | 0.00 | B8-110102-060 |
| 110.00 | 103.80 | 15.00 | 0.00 | 0.00 | B1-110103-150 |

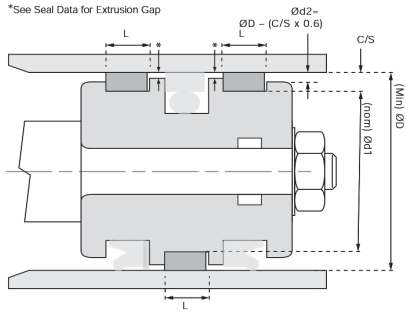


| OD | ID | L1 | C/S | Width | Product Name |
|--------|--------|-------|------|-------|-----------------|
| 110.00 | 104.00 | 6.00 | 0.00 | 0.00 | B1-110104-060 |
| 110.00 | 104.00 | 12.50 | 0.00 | 0.00 | B8-110104-125 |
| 110.00 | 104.00 | 12.80 | 0.00 | 0.00 | B6-110104-128 |
| 110.00 | 104.00 | 15.00 | 0.00 | 0.00 | B8-110104-150 |
| 110.00 | 104.00 | 20.00 | 0.00 | 0.00 | B8-110104-200 |
| 110.00 | 104.00 | 22.40 | 0.00 | 0.00 | B1-110104-225 |
| 110.00 | 104.00 | 25.00 | 0.00 | 0.00 | B8-110104-250 |
| 110.00 | 104.00 | 27.50 | 0.00 | 0.00 | B8-110104-275 |
| 110.00 | 104.00 | 30.00 | 0.00 | 0.00 | B8-110104-300 |
| 110.00 | 104.00 | 35.00 | 0.00 | 0.00 | B8-110104-350 |
| 110.00 | 104.50 | 12.50 | 0.00 | 0.00 | B1-110104-125A |
| 110.00 | 105.00 | 8.00 | 0.00 | 0.00 | B8-110105-081 |
| 110.00 | 105.00 | 9.70 | 0.00 | 0.00 | B8-110105-097 |
| 110.00 | 105.00 | 9.70 | 0.00 | 0.00 | B6-110105-097 |
| 110.00 | 105.00 | 13.00 | 0.00 | 0.00 | B8-110105-130 |
| 110.00 | 105.00 | 15.00 | 0.00 | 0.00 | B8-110105-150 |
| 110.00 | 105.00 | 20.00 | 0.00 | 0.00 | B8-110105-200 |
| 110.00 | 106.00 | 15.00 | 0.00 | 0.00 | B8-110106-150 |
| 111.00 | 105.00 | 18.00 | 0.00 | 0.00 | B8-111105-180 |
| 111.00 | 105.00 | 19.20 | 0.00 | 0.00 | B6-111105-192 |
| 111.35 | 105.00 | 12.70 | 0.00 | 0.00 | B8-111105-127 |
| 111.35 | 105.00 | 25.40 | 0.00 | 0.00 | B8-111105-254 |
| 113.00 | 105.00 | 20.00 | 0.00 | 0.00 | B8-113105-200 |
| 114.00 | 110.00 | 25.00 | 0.00 | 0.00 | B8-114110-250 |
| 115.00 | 106.00 | 15.00 | 0.00 | 0.00 | B8-115106-150 |
| 115.00 | 107.00 | 0.00 | 0.00 | 0.00 | B8-115107-150 |
| 115.00 | 107.00 | 6.00 | 0.00 | 0.00 | B8-115107-060 |
| 115.00 | 107.00 | 15.00 | 0.00 | 0.00 | B8-110102-150 |
| 115.00 | 108.80 | 8.00 | 0.00 | 0.00 | F101-115108-081 |
| 115.00 | 108.80 | 8.00 | 0.00 | 0.00 | B1-115108-081 |
| 115.00 | 109.00 | 14.80 | 0.00 | 15.00 | B8-115109-150 |

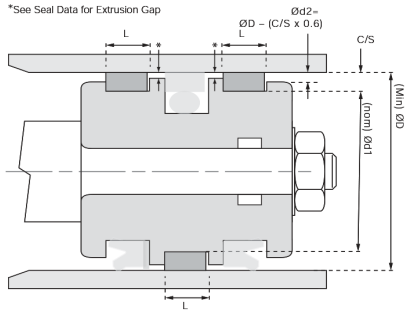


| OD | ID | L1 | C/S | Width | Product Name |
|--------|--------|-------|------|-------|---------------|
| 115.00 | 109.00 | 15.00 | 0.00 | 0.00 | B1-115109-150 |
| 115.00 | 110.00 | 8.10 | 0.00 | 0.00 | B8-115110-081 |
| 115.00 | 110.00 | 9.70 | 0.00 | 0.00 | B8-115110-097 |
| 115.00 | 110.00 | 9.70 | 0.00 | 0.00 | B6-115110-097 |
| 115.00 | 110.00 | 15.00 | 0.00 | 0.00 | B8-115110-150 |
| 115.00 | 110.00 | 25.00 | 0.00 | 0.00 | B8-115110-250 |
| 115.00 | 111.00 | 15.00 | 0.00 | 0.00 | B6-115111-150 |
| 116.00 | 110.00 | 12.80 | 0.00 | 0.00 | B6-116110-128 |
| 117.00 | 122.40 | 23.50 | 0.00 | 0.00 | B1-122117-240 |
| 119.00 | 115.00 | 42.00 | 0.00 | 0.00 | B8-119115-420 |
| 120.00 | 111.00 | 15.00 | 0.00 | 0.00 | B8-120111-150 |
| 120.00 | 112.00 | 0.00 | 0.00 | 0.00 | B1-120112-081 |
| 120.00 | 112.00 | 6.00 | 0.00 | 0.00 | B8-120112-060 |
| 120.00 | 113.00 | 14.80 | 0.00 | 0.00 | B8-120113-150 |
| 120.00 | 113.00 | 30.00 | 0.00 | 0.00 | B8-120113-300 |
| 120.00 | 114.00 | 6.00 | 0.00 | 0.00 | B1-120114-060 |
| 120.00 | 114.00 | 12.50 | 0.00 | 0.00 | B8-120114-125 |
| 120.00 | 114.00 | 14.80 | 0.00 | 0.00 | B8-120114-150 |
| 120.00 | 114.00 | 22.40 | 0.00 | 0.00 | B1-120114-225 |
| 120.00 | 114.00 | 25.00 | 0.00 | 0.00 | B8-120114-250 |
| 120.00 | 114.00 | 30.00 | 0.00 | 0.00 | B8-120114-300 |
| 120.00 | 114.00 | 35.00 | 0.00 | 0.00 | B8-120114-350 |
| 120.00 | 114.00 | 35.00 | 0.00 | 0.00 | B1-120114-350 |
| 120.00 | 115.00 | 7.90 | 0.00 | 0.00 | B8-120115-081 |
| 120.00 | 115.00 | 9.50 | 0.00 | 9.70 | B8-120115-097 |
| 120.00 | 115.00 | 15.00 | 0.00 | 0.00 | B8-120115-150 |
| 120.00 | 115.00 | 24.80 | 0.00 | 25.00 | B8-120115-250 |
| 121.00 | 115.00 | 12.80 | 0.00 | 0.00 | B6-121115-128 |
| 121.00 | 115.00 | 19.20 | 0.00 | 0.00 | B6-121115-192 |
| 125.00 | 115.00 | 0.00 | 0.00 | 0.00 | B8-125115-150 |
| 125.00 | 118.00 | 14.80 | 0.00 | 0.00 | B8-125118-150 |



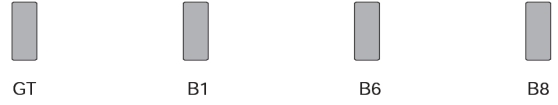
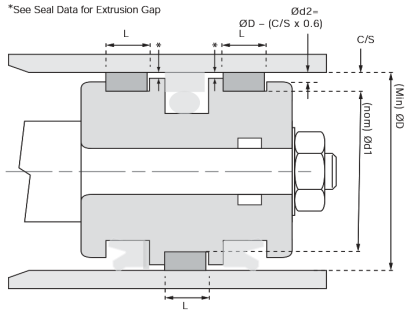


| OD | ID | L1 | C/S | Width | Product Name |
|--------|--------|-------|------|-------|---------------|
| 125.00 | 118.00 | 17.00 | 0.00 | 0.00 | B8-125118-170 |
| 125.00 | 119.00 | 0.00 | 0.00 | 0.00 | B6-125119-128 |
| 125.00 | 119.00 | 10.00 | 0.00 | 0.00 | B8-125119-100 |
| 125.00 | 119.00 | 14.80 | 0.00 | 0.00 | B8-125119-150 |
| 125.00 | 119.00 | 15.00 | 0.00 | 0.00 | B1-125119-150 |
| 125.00 | 119.00 | 20.00 | 0.00 | 0.00 | B1-125119-200 |
| 125.00 | 120.00 | 5.60 | 0.00 | 0.00 | B6-125120-056 |
| 125.00 | 120.00 | 7.90 | 0.00 | 0.00 | B8-125120-081 |
| 125.00 | 120.00 | 9.70 | 0.00 | 0.00 | B8-125120-097 |
| 125.00 | 120.00 | 9.70 | 0.00 | 0.00 | B6-125120-097 |
| 125.00 | 120.00 | 15.00 | 0.00 | 0.00 | B8-125120-150 |
| 125.00 | 120.00 | 25.00 | 0.00 | 0.00 | B8-125120-250 |
| 125.00 | 121.00 | 22.00 | 0.00 | 0.00 | B8-125121-220 |
| 126.00 | 120.00 | 12.80 | 0.00 | 0.00 | B6-126120-128 |
| 126.00 | 120.00 | 19.20 | 0.00 | 0.00 | B8-126120-192 |
| 126.00 | 120.00 | 19.20 | 0.00 | 0.00 | B6-126120-192 |
| 127.00 | 132.40 | 23.40 | 0.00 | 0.00 | B1-132127-240 |
| 128.00 | 122.00 | 15.00 | 0.00 | 0.00 | B6-128122-150 |
| 130.00 | 120.00 | 15.00 | 0.00 | 0.00 | B8-130120-150 |
| 130.00 | 121.00 | 15.00 | 0.00 | 0.00 | B6-130121-150 |
| 130.00 | 122.00 | 20.00 | 0.00 | 0.00 | B8-130122-200 |
| 130.00 | 123.00 | 14.80 | 0.00 | 0.00 | B8-130123-150 |
| 130.00 | 123.00 | 15.00 | 0.00 | 0.00 | B1-130123-150 |
| 130.00 | 123.00 | 30.00 | 0.00 | 0.00 | B1-130123-300 |
| 130.00 | 123.00 | 40.00 | 0.00 | 0.00 | B1-130123-400 |
| 130.00 | 123.65 | 25.40 | 0.00 | 0.00 | B8-130123-254 |
| 130.00 | 124.00 | 12.80 | 0.00 | 0.00 | B6-130124-128 |
| 130.00 | 124.00 | 30.00 | 0.00 | 0.00 | B8-130124-300 |
| 130.00 | 125.00 | 7.90 | 0.00 | 0.00 | B8-130125-081 |
| 130.00 | 125.00 | 9.70 | 0.00 | 0.00 | B8-130125-097 |
| 130.00 | 125.00 | 15.00 | 0.00 | 0.00 | B8-130125-150 |

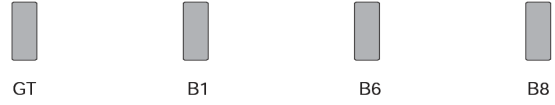
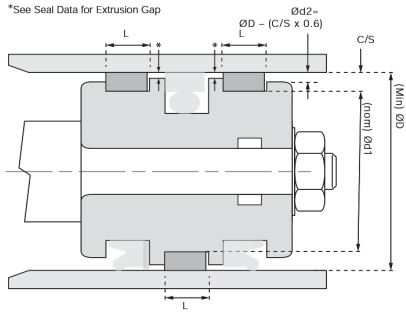


| OD | ID | L1 | C/S | Width | Product Name |
|--------|--------|-------|------|-------|----------------|
| 130.00 | 125.00 | 15.00 | 0.00 | 0.00 | B6-130125-150 |
| 130.00 | 125.00 | 20.00 | 0.00 | 0.00 | B8-130125-200 |
| 130.00 | 125.00 | 25.00 | 0.00 | 0.00 | B8-130125-250 |
| 130.00 | 125.00 | 40.00 | 0.00 | 0.00 | B8-130125-400 |
| 130.00 | 126.00 | 42.00 | 0.00 | 0.00 | B8-130126-420 |
| 131.00 | 120.00 | 5.00 | 0.00 | 0.00 | B6-131120-050L |
| 131.00 | 125.00 | 12.80 | 0.00 | 0.00 | B6-131125-128 |
| 135.00 | 125.00 | 9.70 | 0.00 | 10.00 | B1-135125-100 |
| 135.00 | 125.00 | 15.00 | 0.00 | 0.00 | B8-135125-150 |
| 135.00 | 128.00 | 10.00 | 0.00 | 0.00 | B8-135128-100 |
| 135.00 | 128.00 | 14.80 | 0.00 | 0.00 | B8-135128-150 |
| 135.00 | 129.00 | 19.20 | 0.00 | 0.00 | B6-135129-192 |
| 135.00 | 130.00 | 8.10 | 0.00 | 0.00 | B8-135130-081 |
| 135.00 | 130.00 | 9.70 | 0.00 | 0.00 | B8-135130-097 |
| 135.00 | 130.00 | 9.70 | 0.00 | 0.00 | B6-135130-097 |
| 135.00 | 130.00 | 14.80 | 0.00 | 15.00 | B8-135130-150 |
| 136.00 | 130.00 | 12.80 | 0.00 | 0.00 | B6-136130-128 |
| 136.00 | 141.40 | 23.50 | 0.00 | 0.00 | B1-141136-240 |
| 140.00 | 128.00 | 12.50 | 0.00 | 0.00 | B1-140128-125 |
| 140.00 | 128.00 | 17.50 | 0.00 | 0.00 | B8-140128-175 |
| 140.00 | 132.00 | 8.00 | 0.00 | 0.00 | B8-140132-080 |
| 140.00 | 132.00 | 20.00 | 0.00 | 0.00 | B8-140132-200 |
| 140.00 | 133.00 | 12.00 | 0.00 | 0.00 | B8-140133-120 |
| 140.00 | 133.00 | 14.80 | 0.00 | 0.00 | B8-140133-150 |
| 140.00 | 133.00 | 17.50 | 0.00 | 0.00 | B1-140133-175 |
| 140.00 | 133.00 | 20.00 | 0.00 | 0.00 | B8-140133-200 |
| 140.00 | 133.00 | 25.00 | 0.00 | 0.00 | B8-140133-250 |
| 140.00 | 133.00 | 35.00 | 0.00 | 0.00 | B8-140133-350 |
| 140.00 | 133.00 | 40.00 | 0.00 | 0.00 | B8-140133-400 |
| 140.00 | 133.00 | 45.00 | 0.00 | 0.00 | B1-140133-450 |
| 140.00 | 134.00 | 12.00 | 0.00 | 0.00 | B8-140134-120 |

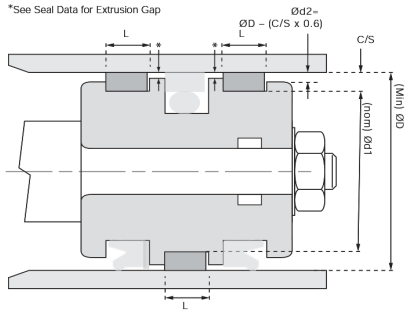




| OD | ID | L1 | C/S | Width | Product Name |
|--------|--------|-------|------|-------|---------------|
| 140.00 | 134.00 | 12.80 | 0.00 | 0.00 | B6-140134-128 |
| 140.00 | 134.00 | 15.00 | 0.00 | 0.00 | B1-140134-150 |
| 140.00 | 134.00 | 19.20 | 0.00 | 0.00 | B6-140134-192 |
| 140.00 | 134.00 | 20.00 | 0.00 | 0.00 | B1-140134-200 |
| 140.00 | 134.00 | 27.50 | 0.00 | 0.00 | B8-140134-275 |
| 140.00 | 134.00 | 30.00 | 0.00 | 0.00 | B8-140134-300 |
| 140.00 | 134.00 | 50.00 | 0.00 | 0.00 | B8-140134-500 |
| 140.00 | 135.00 | 7.90 | 0.00 | 0.00 | B1-140135-081 |
| 140.00 | 135.00 | 9.70 | 0.00 | 0.00 | B8-140135-097 |
| 140.00 | 135.00 | 15.00 | 0.00 | 0.00 | B8-140135-150 |
| 140.00 | 135.00 | 25.00 | 0.00 | 0.00 | B8-140135-250 |
| 145.00 | 138.00 | 9.70 | 0.00 | 0.00 | B8-145138-097 |
| 145.00 | 138.00 | 14.80 | 0.00 | 0.00 | B8-145138-150 |
| 145.00 | 139.00 | 12.80 | 0.00 | 0.00 | B6-145139-128 |
| 145.00 | 140.00 | 9.70 | 0.00 | 0.00 | B8-145140-097 |
| 145.00 | 140.00 | 15.00 | 0.00 | 0.00 | B8-145140-150 |
| 145.00 | 140.00 | 25.00 | 0.00 | 0.00 | B8-145140-250 |
| 146.00 | 140.00 | 12.80 | 0.00 | 0.00 | B8-146140-128 |
| 146.00 | 140.00 | 12.80 | 0.00 | 0.00 | B6-146140-128 |
| 146.00 | 141.00 | 0.00 | 0.00 | 0.00 | B8-146141-097 |
| 147.00 | 152.40 | 23.50 | 0.00 | 0.00 | B1-152147-240 |
| 150.00 | 138.00 | 12.50 | 0.00 | 0.00 | B1-150138-125 |
| 150.00 | 138.00 | 17.50 | 0.00 | 0.00 | B1-150138-175 |
| 150.00 | 142.00 | 8.10 | 0.00 | 0.00 | B8-150142-081 |
| 150.00 | 143.00 | 14.80 | 0.00 | 0.00 | B8-150143-150 |
| 150.00 | 143.00 | 20.00 | 0.00 | 0.00 | B8-150143-200 |
| 150.00 | 143.00 | 20.00 | 0.00 | 0.00 | B1-150143-200 |
| 150.00 | 143.00 | 35.00 | 0.00 | 0.00 | B8-150143-350 |
| 150.00 | 143.00 | 40.00 | 0.00 | 0.00 | B8-150143-400 |
| 150.00 | 143.00 | 45.00 | 0.00 | 0.00 | B1-150143-450 |
| 150.00 | 144.00 | 19.20 | 0.00 | 0.00 | B6-150144-192 |

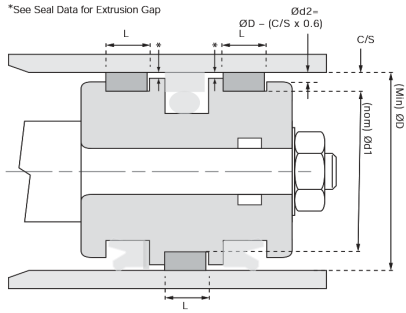


| OD | ID | L1 | C/S | Width | Product Name |
|--------|--------|-------|------|-------|----------------|
| 160.00 | 155.00 | 35.00 | 0.00 | 0.00 | B8-160155-350 |
| 165.00 | 157.00 | 15.00 | 0.00 | 0.00 | B8-165157-150 |
| 165.00 | 157.00 | 20.00 | 0.00 | 0.00 | B8-165157-200 |
| 165.00 | 158.00 | 14.80 | 0.00 | 0.00 | B8-165158-150 |
| 165.00 | 159.00 | 19.20 | 0.00 | 0.00 | B6-165159-192 |
| 165.00 | 160.00 | 14.80 | 0.00 | 15.00 | B8-165160-150 |
| 165.00 | 160.00 | 25.00 | 0.00 | 0.00 | B8-165160-250 |
| 166.00 | 160.00 | 19.20 | 0.00 | 0.00 | B6-166160-192 |
| 167.00 | 172.40 | 23.50 | 0.00 | 0.00 | B1-172167-240 |
| 170.00 | 162.00 | 9.70 | 0.00 | 0.00 | B8-170162-097 |
| 170.00 | 162.00 | 14.80 | 0.00 | 0.00 | B8-170162-150 |
| 170.00 | 162.00 | 25.00 | 0.00 | 0.00 | B8-170162-250 |
| 170.00 | 162.00 | 50.00 | 0.00 | 0.00 | B8-170162-500 |
| 170.00 | 162.00 | 50.00 | 0.00 | 0.00 | B1-170162-500 |
| 170.00 | 163.00 | 14.80 | 0.00 | 0.00 | B8-170163-150 |
| 170.00 | 163.00 | 40.00 | 0.00 | 0.00 | B8-170163-400 |
| 170.00 | 164.00 | 9.60 | 0.00 | 0.00 | B8-170164-097 |
| 170.00 | 164.00 | 19.20 | 0.00 | 0.00 | B6-170164-192 |
| 170.00 | 165.00 | 8.10 | 0.00 | 0.00 | B8-170165-081 |
| 170.00 | 165.00 | 9.70 | 0.00 | 0.00 | B8-170165-097 |
| 170.00 | 165.00 | 15.00 | 0.00 | 0.00 | B8-170165-150 |
| 170.00 | 165.00 | 25.00 | 0.00 | 0.00 | B8-170165-250 |
| 171.00 | 165.00 | 19.20 | 0.00 | 0.00 | B6-171165-192 |
| 173.00 | 162.00 | 5.00 | 0.00 | 0.00 | B6-173162-050L |
| 174.00 | 170.00 | 28.00 | 0.00 | 0.00 | B8-174170-280 |
| 175.00 | 167.00 | 40.00 | 0.00 | 0.00 | B8-175167-400 |
| 175.00 | 169.00 | 19.20 | 0.00 | 0.00 | B6-175169-192 |
| 175.00 | 170.00 | 15.00 | 0.00 | 0.00 | B8-175170-150 |
| 176.00 | 170.00 | 19.20 | 0.00 | 0.00 | B6-176170-192 |
| 177.00 | 182.40 | 23.50 | 0.00 | 0.00 | B1-182177-240 |
| 178.00 | 170.00 | 15.00 | 0.00 | 0.00 | B6-178170-150 |

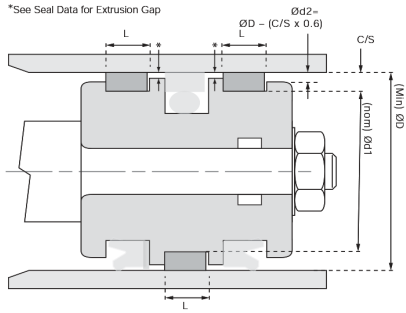


| OD | ID | L1 | C/S | Width | Product Name |
|--------|--------|-------|------|-------|----------------|
| 178.00 | 170.00 | 25.00 | 0.00 | 0.00 | B8-178170-250 |
| 179.00 | 171.00 | 30.00 | 0.00 | 0.00 | B6-179171-300 |
| 180.00 | 168.00 | 22.50 | 0.00 | 0.00 | B8-180168-225 |
| 180.00 | 172.00 | 0.00 | 0.00 | 0.00 | B8-180172-225 |
| 180.00 | 172.00 | 20.00 | 0.00 | 0.00 | B8-180172-200 |
| 180.00 | 172.00 | 22.00 | 0.00 | 0.00 | B8-180172-220 |
| 180.00 | 172.00 | 22.50 | 0.00 | 0.00 | B1-180172-225 |
| 180.00 | 172.00 | 25.00 | 0.00 | 0.00 | B6-180172-250 |
| 180.00 | 172.00 | 30.00 | 0.00 | 0.00 | B8-180172-300 |
| 180.00 | 172.00 | 40.00 | 0.00 | 0.00 | B8-180172-400 |
| 180.00 | 172.00 | 45.00 | 0.00 | 0.00 | B8-180172-450 |
| 180.00 | 172.00 | 55.00 | 0.00 | 0.00 | B8-180172-550 |
| 180.00 | 174.00 | 19.20 | 0.00 | 0.00 | B6-180174-192 |
| 180.00 | 174.00 | 20.00 | 0.00 | 0.00 | B1-180174-200 |
| 180.00 | 175.00 | 8.10 | 0.00 | 0.00 | B8-180175-081 |
| 180.00 | 175.00 | 9.70 | 0.00 | 0.00 | B8-180175-097 |
| 180.00 | 175.00 | 15.00 | 0.00 | 0.00 | B8-180175-150 |
| 180.00 | 175.00 | 25.00 | 0.00 | 0.00 | B8-180175-250 |
| 180.00 | 176.00 | 25.00 | 0.00 | 0.00 | B8-180176-250 |
| 180.00 | 176.00 | 28.00 | 0.00 | 0.00 | B8-180176-280 |
| 185.00 | 173.00 | 22.00 | 0.00 | 0.00 | B8-185173-220 |
| 185.00 | 173.00 | 22.50 | 0.00 | 0.00 | B8-185173-225 |
| 185.00 | 180.00 | 15.00 | 0.00 | 0.00 | B8-185180-150 |
| 185.00 | 180.00 | 25.00 | 0.00 | 0.00 | B8-185180-250 |
| 190.00 | 182.00 | 45.00 | 0.00 | 0.00 | B1-190182-450 |
| 190.00 | 182.00 | 55.00 | 0.00 | 0.00 | B1-190182-550 |
| 190.00 | 184.00 | 14.80 | 0.00 | 0.00 | B8-190184-150 |
| 190.00 | 184.00 | 19.20 | 0.00 | 0.00 | B6-190184-192 |
| 190.00 | 185.00 | 15.00 | 0.00 | 0.00 | B8-190185-150 |
| 190.00 | 186.00 | 15.00 | 0.00 | 0.00 | B8-190186-150 |
| 194.00 | 183.00 | 5.00 | 0.00 | 0.00 | B6-194183-050L |



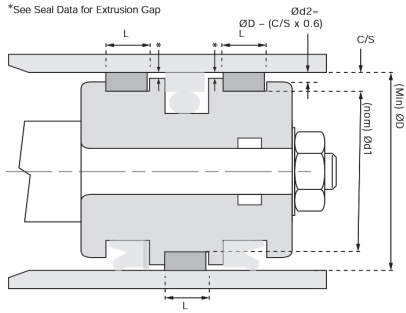


| OD | ID | L1 | C/S | Width | Product Name |
|--------|--------|-------|------|-------|----------------|
| 196.00 | 190.00 | 19.20 | 0.00 | 0.00 | B6-196190-192 |
| 200.00 | 188.00 | 22.50 | 0.00 | 0.00 | B1-200188-225 |
| 200.00 | 192.00 | 22.00 | 0.00 | 0.00 | B1-200192-220 |
| 200.00 | 192.00 | 25.00 | 0.00 | 0.00 | B8-200192-250 |
| 200.00 | 192.00 | 40.00 | 0.00 | 0.00 | B8-200192-400 |
| 200.00 | 192.00 | 45.00 | 0.00 | 0.00 | B8-200192-450 |
| 200.00 | 192.00 | 45.00 | 0.00 | 0.00 | B1-200192-450 |
| 200.00 | 193.50 | 60.00 | 0.00 | 0.00 | B1-200193-600 |
| 200.00 | 194.00 | 19.20 | 0.00 | 0.00 | B6-200194-192 |
| 200.00 | 194.00 | 30.00 | 0.00 | 0.00 | B8-200194-300 |
| 200.00 | 195.00 | 0.00 | 0.00 | 0.00 | B8-200195-150 |
| 200.00 | 195.00 | 20.00 | 0.00 | 0.00 | B8-200195-200 |
| 200.00 | 195.00 | 25.00 | 0.00 | 0.00 | B8-200195-250 |
| 204.00 | 196.00 | 15.00 | 0.00 | 0.00 | B6-204196-150 |
| 205.00 | 197.00 | 30.00 | 0.00 | 0.00 | B6-205197-300 |
| 205.00 | 200.00 | 25.00 | 0.00 | 0.00 | B8-205200-250 |
| 210.00 | 204.00 | 20.00 | 0.00 | 0.00 | B8-210204-200 |
| 210.00 | 205.00 | 0.00 | 0.00 | 0.00 | B8-210205-150 |
| 210.00 | 205.00 | 9.70 | 0.00 | 0.00 | B8-210205-097 |
| 214.00 | 210.00 | 22.00 | 0.00 | 0.00 | B8-214210-220 |
| 215.00 | 209.00 | 25.00 | 0.00 | 0.00 | B8-215209-250 |
| 215.00 | 220.00 | 0.00 | 0.00 | 0.00 | B8-220215-250 |
| 216.00 | 210.00 | 19.20 | 0.00 | 0.00 | B6-216210-192 |
| 218.00 | 207.00 | 5.00 | 0.00 | 0.00 | B6-218207-050L |
| 220.00 | 212.00 | 0.00 | 0.00 | 0.00 | B6-220212-150 |
| 220.00 | 213.50 | 60.00 | 0.00 | 0.00 | B1-220213-600 |
| 220.00 | 214.00 | 19.20 | 0.00 | 0.00 | B6-220214-192 |
| 220.00 | 215.00 | 9.70 | 0.00 | 0.00 | B8-220215-097 |
| 220.00 | 216.00 | 22.00 | 0.00 | 0.00 | B8-220216-220 |
| 224.00 | 216.00 | 45.00 | 0.00 | 0.00 | B1-224216-450 |
| 225.00 | 213.00 | 25.00 | 0.00 | 0.00 | B1-225213-250 |

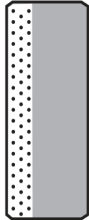


| OD | ID | L1 | C/S | Width | Product Name |
|--------|--------|-------|------|-------|----------------|
| 225.00 | 217.00 | 0.00 | 0.00 | 0.00 | B8-225217-250 |
| 225.00 | 217.00 | 25.00 | 0.00 | 0.00 | B1-225217-250 |
| 225.00 | 217.00 | 45.00 | 0.00 | 0.00 | B8-225217-450 |
| 225.00 | 217.00 | 50.00 | 0.00 | 0.00 | B8-225217-500 |
| 225.00 | 220.00 | 0.00 | 0.00 | 0.00 | B8-225220-150 |
| 225.00 | 220.00 | 15.00 | 0.00 | 0.00 | B8-225220-250 |
| 226.00 | 220.00 | 19.20 | 0.00 | 0.00 | B6-226220-192 |
| 228.00 | 220.00 | 25.00 | 0.00 | 0.00 | B8-228220-250 |
| 230.00 | 222.00 | 15.00 | 0.00 | 0.00 | B6-230222-150 |
| 230.00 | 224.00 | 19.20 | 0.00 | 0.00 | B6-230224-192 |
| 230.00 | 225.00 | 25.00 | 0.00 | 0.00 | B8-230225-250 |
| 231.00 | 223.00 | 30.00 | 0.00 | 0.00 | B6-231223-300 |
| 236.00 | 230.00 | 19.20 | 0.00 | 0.00 | B6-236230-192 |
| 240.00 | 234.00 | 0.00 | 0.00 | 0.00 | B6-240234-192 |
| 242.00 | 231.00 | 5.00 | 0.00 | 0.00 | B6-242231-050L |
| 248.00 | 240.00 | 25.00 | 0.00 | 0.00 | B8-248240-250 |
| 250.00 | 238.00 | 27.50 | 0.00 | 0.00 | B1-250238-275 |
| 250.00 | 242.00 | 55.00 | 0.00 | 0.00 | B1-250242-550 |
| 250.00 | 244.00 | 19.20 | 0.00 | 0.00 | B6-250244-192 |
| 250.00 | 245.00 | 9.70 | 0.00 | 0.00 | B8-250245-097 |
| 250.00 | 245.00 | 15.00 | 0.00 | 0.00 | B8-250245-150 |
| 250.00 | 245.00 | 20.00 | 0.00 | 0.00 | B8-250245-200 |
| 250.00 | 245.00 | 25.00 | 0.00 | 0.00 | B8-250245-250 |
| 256.00 | 248.00 | 15.00 | 0.00 | 0.00 | B6-256248-150 |
| 257.00 | 249.00 | 30.00 | 0.00 | 0.00 | B6-257249-300 |
| 260.00 | 248.00 | 27.50 | 0.00 | 0.00 | B1-260248-275 |
| 260.00 | 254.00 | 19.20 | 0.00 | 0.00 | B6-260254-192 |
| 266.00 | 260.00 | 19.20 | 0.00 | 0.00 | B6-266260-192 |
| 268.00 | 260.00 | 25.00 | 0.00 | 0.00 | B8-268260-250 |
| 280.00 | 268.00 | 30.00 | 0.00 | 0.00 | B8-280268-300 |
| 280.00 | 272.00 | 60.00 | 0.00 | 0.00 | B1-280272-600 |



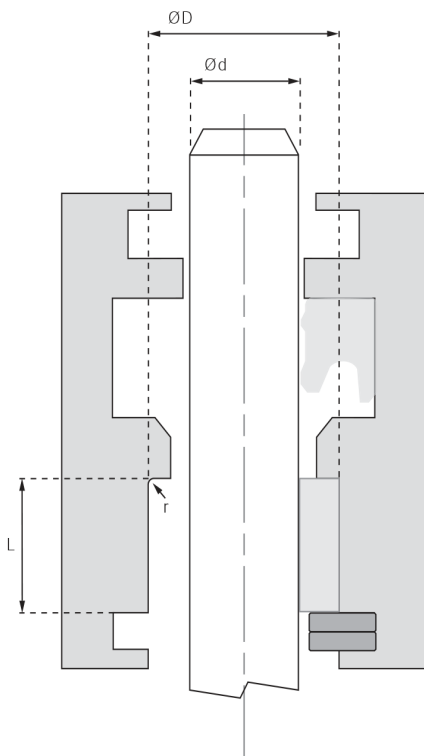


| OD | ID | L1 | C/S | Width | Product Name |
|--------|--------|-------|------|-------|---------------|
| 280.00 | 274.00 | 19.20 | 0.00 | 0.00 | B6-280274-192 |
| 280.00 | 275.00 | 25.00 | 0.00 | 0.00 | B8-280275-250 |
| 288.00 | 280.00 | 25.00 | 0.00 | 0.00 | B8-288280-250 |
| 290.00 | 284.00 | 19.20 | 0.00 | 0.00 | B6-290284-192 |
| 300.00 | 288.00 | 30.00 | 0.00 | 0.00 | B1-300288-300 |
| 300.00 | 294.00 | 19.20 | 0.00 | 0.00 | B6-300294-192 |
| 300.00 | 295.00 | 25.00 | 0.00 | 0.00 | B8-300295-250 |
| 300.00 | 295.00 | 35.00 | 0.00 | 0.00 | B8-300295-350 |
| 320.00 | 312.00 | 25.00 | 0.00 | 0.00 | B8-320312-250 |
| 320.00 | 315.00 | 25.00 | 0.00 | 0.00 | B8-320315-250 |
| 340.00 | 332.00 | 25.00 | 0.00 | 0.00 | B8-340332-250 |
| 350.00 | 345.00 | 25.00 | 0.00 | 0.00 | B8-350345-250 |
| 360.00 | 352.00 | 25.00 | 0.00 | 0.00 | B8-360352-250 |
| 360.00 | 355.00 | 40.00 | 0.00 | 0.00 | B8-360355-400 |
| 400.00 | 395.00 | 25.00 | 0.00 | 0.00 | B8-400395-250 |
| 420.00 | 412.00 | 25.00 | 0.00 | 0.00 | B8-420412-250 |
| 440.00 | 432.00 | 25.00 | 0.00 | 0.00 | B8-440432-250 |



Key Features

- Low coefficient of friction
- Excellent wear resistance
- Wide temperature range
- Excellent dimensional stability
- Excellent chemical resistance



DUB

DU Bushes

Design

The bush is a thin-walled steel bush, axially split, with its inside diameter bronze-plated then PTFE coated. The bush can be used in dry environments and is ideal as a rod guide bearing in hydraulic cylinders. It can be fitted between the rod seal and the rod wiper, or on the pressure side of the rod seal. The PTFE coating has a very low coefficient of friction to help eliminate stick-slip, particularly in low speed applications, and is impervious to almost any chemical attack. The bush is axially split to facilitate fitting, however an appropriate tool should be used on a press.

Operating Conditions

Temperature

-195° to 270°C
-319° to 518°F



Speed

4.0m/sec
12'/sec



Surface Finish μmRa

| ØD | Ød | L |
|-------------|-------------|------|
| 0.1-0.25 | ≤ 0.8 | 0.20 |

Tolerances

| ØD | Ød | L |
|-------------|-------------|----------------|
| H8 | f9 | -0.00 +0.25 |

Chamfer Radii

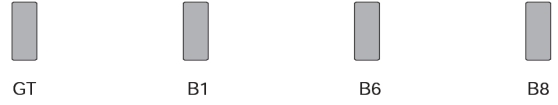
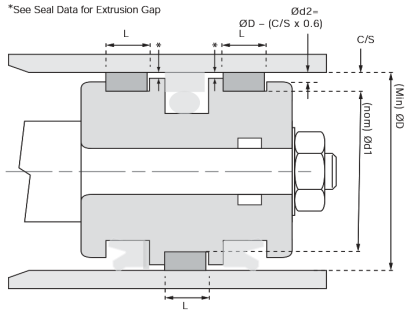
r
0.2

Typical Examples

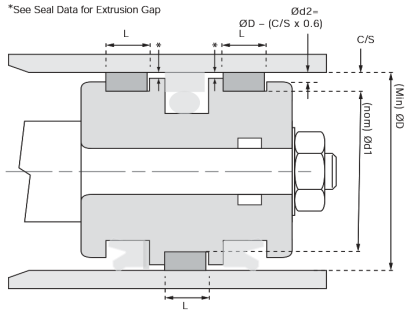
Reciprocating Rotary Oscillating Helix



Similar Styles

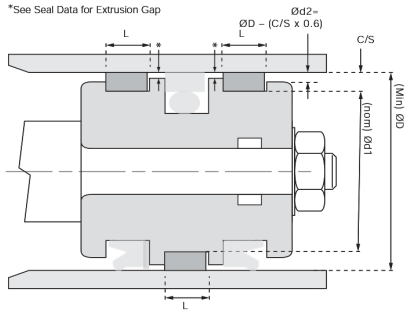


| ID | OD | L1 | L2 | OD2 | OD3 | Product Name |
|-------|-------|-------|------|------|------|----------------|
| 3.00 | 5.00 | 3.00 | 0.00 | 0.00 | 0.00 | DUB-003005-030 |
| 3.00 | 5.00 | 4.00 | 0.00 | 0.00 | 0.00 | DUB-003005-040 |
| 3.00 | 5.00 | 5.00 | 0.00 | 0.00 | 0.00 | DUB-003005-050 |
| 3.00 | 5.00 | 6.00 | 0.00 | 0.00 | 0.00 | DUB-003005-060 |
| 4.00 | 6.00 | 4.00 | 0.00 | 0.00 | 0.00 | DUB-004006-040 |
| 4.00 | 6.00 | 6.00 | 0.00 | 0.00 | 0.00 | DUB-004006-060 |
| 4.00 | 6.00 | 8.00 | 0.00 | 0.00 | 0.00 | DUB-004006-080 |
| 5.00 | 7.00 | 4.00 | 0.00 | 0.00 | 0.00 | DUB-005007-040 |
| 6.00 | 8.00 | 6.00 | 0.00 | 0.00 | 0.00 | DUB-006008-060 |
| 6.00 | 8.00 | 8.00 | 0.00 | 0.00 | 0.00 | DUB-006008-080 |
| 6.00 | 8.00 | 10.00 | 0.00 | 0.00 | 0.00 | DUB-006008-100 |
| 7.00 | 9.00 | 8.00 | 0.00 | 0.00 | 0.00 | DUB-007009-080 |
| 8.00 | 10.00 | 8.00 | 0.00 | 0.00 | 0.00 | DUB-008010-080 |
| 8.00 | 10.00 | 10.00 | 0.00 | 0.00 | 0.00 | DUB-008010-100 |
| 8.00 | 10.00 | 12.00 | 0.00 | 0.00 | 0.00 | DUB-008010-120 |
| 8.00 | 10.00 | 15.00 | 0.00 | 0.00 | 0.00 | DUB-008010-150 |
| 10.00 | 12.00 | 6.00 | 0.00 | 0.00 | 0.00 | DUB-010012-060 |
| 10.00 | 12.00 | 8.00 | 0.00 | 0.00 | 0.00 | DUB-010012-080 |
| 10.00 | 12.00 | 10.00 | 0.00 | 0.00 | 0.00 | DUB-010012-100 |
| 10.00 | 12.00 | 12.00 | 0.00 | 0.00 | 0.00 | DUB-010012-120 |
| 10.00 | 12.00 | 20.00 | 0.00 | 0.00 | 0.00 | DUB-010012-200 |
| 12.00 | 14.00 | 0.00 | 0.00 | 0.00 | 0.00 | DUB-012014-100 |
| 12.00 | 14.00 | 6.00 | 0.00 | 0.00 | 0.00 | DUB-012014-060 |
| 12.00 | 14.00 | 8.00 | 0.00 | 0.00 | 0.00 | DUB-012014-080 |
| 12.00 | 14.00 | 12.00 | 0.00 | 0.00 | 0.00 | DUB-012014-120 |
| 14.00 | 16.00 | 10.00 | 0.00 | 0.00 | 0.00 | DUB-014016-100 |
| 14.00 | 16.00 | 12.00 | 0.00 | 0.00 | 0.00 | DUB-014016-120 |
| 14.00 | 16.00 | 15.00 | 0.00 | 0.00 | 0.00 | DUB-014016-150 |
| 15.00 | 17.00 | 20.00 | 0.00 | 0.00 | 0.00 | DUB-015017-200 |
| 16.00 | 18.00 | 5.00 | 0.00 | 0.00 | 0.00 | DUB-016018-050 |
| 16.00 | 18.00 | 10.00 | 0.00 | 0.00 | 0.00 | DUB-016018-100 |

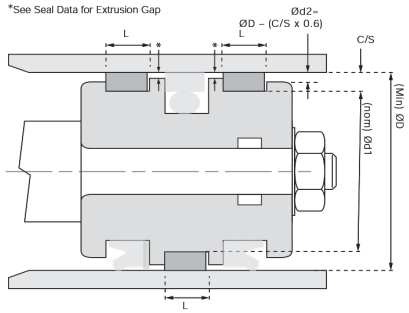


| ID | OD | L1 | L2 | OD2 | OD3 | Product Name |
|-------|-------|-------|------|------|------|----------------|
| 16.00 | 18.00 | 12.00 | 0.00 | 0.00 | 0.00 | DUB-016018-120 |
| 16.00 | 18.00 | 15.00 | 0.00 | 0.00 | 0.00 | DUB-016018-150 |
| 16.00 | 18.00 | 25.00 | 0.00 | 0.00 | 0.00 | DUB-016018-250 |
| 18.00 | 20.00 | 5.00 | 0.00 | 0.00 | 0.00 | DUB-018020-050 |
| 18.00 | 20.00 | 12.00 | 0.00 | 0.00 | 0.00 | DUB-018020-120 |
| 18.00 | 20.00 | 25.00 | 0.00 | 0.00 | 0.00 | DUB-018020-250 |
| 20.00 | 23.00 | 12.00 | 0.00 | 0.00 | 0.00 | DUB-020023-120 |
| 20.00 | 23.00 | 15.00 | 0.00 | 0.00 | 0.00 | DUB-020023-150 |
| 20.00 | 23.00 | 20.00 | 0.00 | 0.00 | 0.00 | DUB-020023-200 |
| 20.00 | 23.00 | 25.00 | 0.00 | 0.00 | 0.00 | DUB-020023-250 |
| 20.00 | 23.00 | 30.00 | 0.00 | 0.00 | 0.00 | DUB-020023-300 |
| 22.00 | 25.00 | 0.00 | 0.00 | 0.00 | 0.00 | DUB-022025-300 |
| 22.00 | 25.00 | 15.00 | 0.00 | 0.00 | 0.00 | DUB-022025-150 |
| 22.00 | 25.00 | 20.00 | 0.00 | 0.00 | 0.00 | DUB-022025-200 |
| 22.00 | 25.00 | 25.00 | 0.00 | 0.00 | 0.00 | DUB-022025-250 |
| 24.00 | 27.00 | 15.00 | 0.00 | 0.00 | 0.00 | DUB-024027-150 |
| 24.00 | 27.00 | 20.00 | 0.00 | 0.00 | 0.00 | DUB-024027-200 |
| 24.00 | 27.00 | 25.00 | 0.00 | 0.00 | 0.00 | DUB-024027-250 |
| 24.00 | 27.00 | 30.00 | 0.00 | 0.00 | 0.00 | DUB-024027-300 |
| 25.00 | 28.00 | 0.00 | 0.00 | 0.00 | 0.00 | DUB-025028-500 |
| 25.00 | 28.00 | 15.00 | 0.00 | 0.00 | 0.00 | DUB-025028-150 |
| 25.00 | 28.00 | 20.00 | 0.00 | 0.00 | 0.00 | DUB-025028-200 |
| 25.00 | 28.00 | 25.00 | 0.00 | 0.00 | 0.00 | DUB-025028-250 |
| 25.00 | 28.00 | 30.00 | 0.00 | 0.00 | 0.00 | DUB-025028-300 |
| 25.00 | 28.00 | 35.00 | 0.00 | 0.00 | 0.00 | DUB-025028-350 |
| 25.00 | 28.00 | 40.00 | 0.00 | 0.00 | 0.00 | DUB-025028-400 |
| 28.00 | 32.00 | 20.00 | 0.00 | 0.00 | 0.00 | DUB-028032-200 |
| 28.00 | 32.00 | 25.00 | 0.00 | 0.00 | 0.00 | DUB-028032-250 |
| 28.00 | 32.00 | 30.00 | 0.00 | 0.00 | 0.00 | DUB-028032-300 |
| 28.00 | 32.00 | 40.00 | 0.00 | 0.00 | 0.00 | DUB-028032-400 |
| 30.00 | 34.00 | 12.00 | 0.00 | 0.00 | 0.00 | DUB-030034-120 |

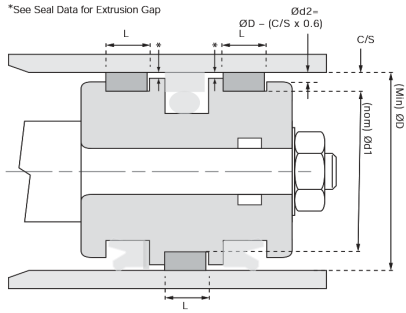




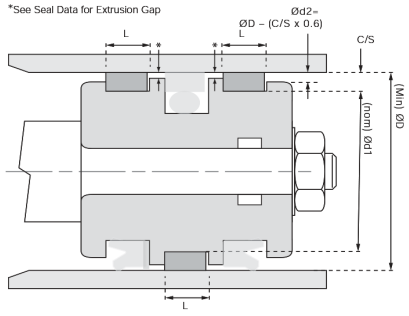
| ID | OD | L1 | L2 | OD2 | OD3 | Product Name |
|-------|-------|-------|------|------|------|----------------|
| 30.00 | 34.00 | 15.00 | 0.00 | 0.00 | 0.00 | DUB-030034-150 |
| 30.00 | 34.00 | 20.00 | 0.00 | 0.00 | 0.00 | DUB-030034-200 |
| 30.00 | 34.00 | 25.00 | 0.00 | 0.00 | 0.00 | DUB-030034-250 |
| 30.00 | 34.00 | 30.00 | 0.00 | 0.00 | 0.00 | DUB-030034-300 |
| 30.00 | 34.00 | 35.00 | 0.00 | 0.00 | 0.00 | DUB-030034-350 |
| 30.00 | 34.00 | 40.00 | 0.00 | 0.00 | 0.00 | DUB-030034-400 |
| 31.00 | 35.00 | 25.00 | 0.00 | 0.00 | 0.00 | DUB-031035-250 |
| 31.00 | 35.00 | 40.00 | 0.00 | 0.00 | 0.00 | DUB-031035-400 |
| 32.00 | 36.00 | 20.00 | 0.00 | 0.00 | 0.00 | DUB-032036-200 |
| 32.00 | 36.00 | 25.00 | 0.00 | 0.00 | 0.00 | DUB-032036-250 |
| 32.00 | 36.00 | 30.00 | 0.00 | 0.00 | 0.00 | DUB-032036-300 |
| 32.00 | 36.00 | 40.00 | 0.00 | 0.00 | 0.00 | DUB-032036-400 |
| 35.00 | 39.00 | 12.00 | 0.00 | 0.00 | 0.00 | DUB-035039-120 |
| 35.00 | 39.00 | 20.00 | 0.00 | 0.00 | 0.00 | DUB-035039-200 |
| 35.00 | 39.00 | 25.00 | 0.00 | 0.00 | 0.00 | DUB-035039-250 |
| 35.00 | 39.00 | 30.00 | 0.00 | 0.00 | 0.00 | DUB-035039-300 |
| 35.00 | 39.00 | 35.00 | 0.00 | 0.00 | 0.00 | DUB-035039-350 |
| 35.00 | 39.00 | 40.00 | 0.00 | 0.00 | 0.00 | DUB-035039-400 |
| 35.00 | 39.00 | 45.00 | 0.00 | 0.00 | 0.00 | DUB-035039-450 |
| 35.00 | 39.00 | 50.00 | 0.00 | 0.00 | 0.00 | DUB-035039-500 |
| 40.00 | 44.00 | 15.00 | 0.00 | 0.00 | 0.00 | DUB-040044-150 |
| 40.00 | 44.00 | 20.00 | 0.00 | 0.00 | 0.00 | DUB-040044-200 |
| 40.00 | 44.00 | 25.00 | 0.00 | 0.00 | 0.00 | DUB-040044-250 |
| 40.00 | 44.00 | 30.00 | 0.00 | 0.00 | 0.00 | DUB-040044-300 |
| 40.00 | 44.00 | 35.00 | 0.00 | 0.00 | 0.00 | DUB-040044-350 |
| 40.00 | 44.00 | 40.00 | 0.00 | 0.00 | 0.00 | DUB-040044-400 |
| 40.00 | 44.00 | 50.00 | 0.00 | 0.00 | 0.00 | DUB-040044-500 |
| 40.00 | 45.00 | 50.00 | 0.00 | 0.00 | 0.00 | DUB-040045-500 |
| 45.00 | 50.00 | 12.00 | 0.00 | 0.00 | 0.00 | DUB-045050-120 |
| 45.00 | 50.00 | 20.00 | 0.00 | 0.00 | 0.00 | DUB-045050-200 |
| 45.00 | 50.00 | 30.00 | 0.00 | 0.00 | 0.00 | DUB-045050-300 |



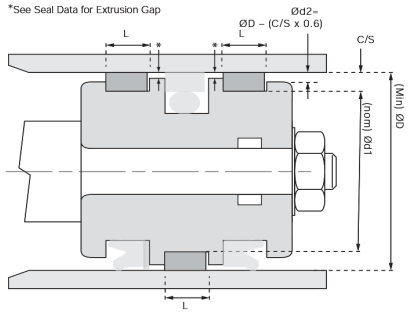
| ID | OD | L1 | L2 | OD2 | OD3 | Product Name |
|-------|-------|-------|------|------|------|----------------|
| 45.00 | 50.00 | 35.00 | 0.00 | 0.00 | 0.00 | DUB-045050-350 |
| 45.00 | 50.00 | 40.00 | 0.00 | 0.00 | 0.00 | DUB-045050-400 |
| 45.00 | 50.00 | 50.00 | 0.00 | 0.00 | 0.00 | DUB-045050-500 |
| 50.00 | 55.00 | 12.00 | 0.00 | 0.00 | 0.00 | DUB-050055-120 |
| 50.00 | 55.00 | 15.00 | 0.00 | 0.00 | 0.00 | DUB-050055-150 |
| 50.00 | 55.00 | 20.00 | 0.00 | 0.00 | 0.00 | DUB-050055-200 |
| 50.00 | 55.00 | 25.00 | 0.00 | 0.00 | 0.00 | DUB-050055-250 |
| 50.00 | 55.00 | 30.00 | 0.00 | 0.00 | 0.00 | DUB-050055-300 |
| 50.00 | 55.00 | 35.00 | 0.00 | 0.00 | 0.00 | DUB-050055-350 |
| 50.00 | 55.00 | 40.00 | 0.00 | 0.00 | 0.00 | DUB-050055-400 |
| 50.00 | 55.00 | 50.00 | 0.00 | 0.00 | 0.00 | DUB-050055-500 |
| 50.00 | 55.00 | 60.00 | 0.00 | 0.00 | 0.00 | DUB-050055-600 |
| 55.00 | 60.00 | 12.00 | 0.00 | 0.00 | 0.00 | DUB-055060-120 |
| 55.00 | 60.00 | 25.00 | 0.00 | 0.00 | 0.00 | DUB-055060-250 |
| 55.00 | 60.00 | 30.00 | 0.00 | 0.00 | 0.00 | DUB-055060-300 |
| 55.00 | 60.00 | 35.00 | 0.00 | 0.00 | 0.00 | DUB-055060-350 |
| 55.00 | 60.00 | 40.00 | 0.00 | 0.00 | 0.00 | DUB-055060-400 |
| 55.00 | 60.00 | 50.00 | 0.00 | 0.00 | 0.00 | DUB-055060-500 |
| 55.00 | 60.00 | 60.00 | 0.00 | 0.00 | 0.00 | DUB-055060-600 |
| 60.00 | 65.00 | 0.00 | 0.00 | 0.00 | 0.00 | DXB-060065-400 |
| 60.00 | 65.00 | 15.00 | 0.00 | 0.00 | 0.00 | DUB-060065-150 |
| 60.00 | 65.00 | 30.00 | 0.00 | 0.00 | 0.00 | DUB-060065-300 |
| 60.00 | 65.00 | 40.00 | 0.00 | 0.00 | 0.00 | DUB-060065-400 |
| 60.00 | 65.00 | 50.00 | 0.00 | 0.00 | 0.00 | DUB-060065-500 |
| 60.00 | 65.00 | 60.00 | 0.00 | 0.00 | 0.00 | DUB-060065-600 |
| 60.00 | 65.00 | 70.00 | 0.00 | 0.00 | 0.00 | DUB-060065-700 |
| 65.00 | 70.00 | 15.00 | 0.00 | 0.00 | 0.00 | DUB-065070-150 |
| 65.00 | 70.00 | 30.00 | 0.00 | 0.00 | 0.00 | DUB-065070-300 |
| 65.00 | 70.00 | 35.00 | 0.00 | 0.00 | 0.00 | DUB-065070-350 |
| 65.00 | 70.00 | 40.00 | 0.00 | 0.00 | 0.00 | DUB-065070-400 |
| 65.00 | 70.00 | 50.00 | 0.00 | 0.00 | 0.00 | DUB-065070-500 |



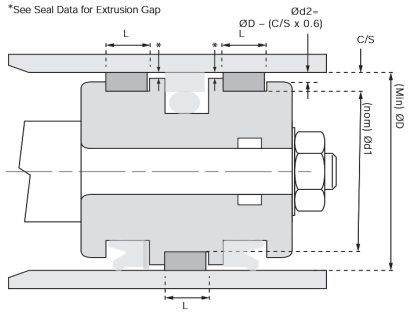
| ID | OD | L1 | L2 | OD2 | OD3 | Product Name |
|-------|-------|-------|------|------|------|----------------|
| 65.00 | 70.00 | 60.00 | 0.00 | 0.00 | 0.00 | DUB-065070-600 |
| 70.00 | 75.00 | 12.00 | 0.00 | 0.00 | 0.00 | DUB-070075-120 |
| 70.00 | 75.00 | 15.00 | 0.00 | 0.00 | 0.00 | DUB-070075-150 |
| 70.00 | 75.00 | 20.00 | 0.00 | 0.00 | 0.00 | DUB-070075-200 |
| 70.00 | 75.00 | 30.00 | 0.00 | 0.00 | 0.00 | DUB-070075-300 |
| 70.00 | 75.00 | 35.00 | 0.00 | 0.00 | 0.00 | DUB-070075-350 |
| 70.00 | 75.00 | 40.00 | 0.00 | 0.00 | 0.00 | DUB-070075-400 |
| 70.00 | 75.00 | 50.00 | 0.00 | 0.00 | 0.00 | DUB-070075-500 |
| 70.00 | 75.00 | 60.00 | 0.00 | 0.00 | 0.00 | DUB-070075-600 |
| 70.00 | 75.00 | 70.00 | 0.00 | 0.00 | 0.00 | DUB-070075-700 |
| 70.00 | 75.00 | 80.00 | 0.00 | 0.00 | 0.00 | DUB-070075-800 |
| 75.00 | 80.00 | 12.00 | 0.00 | 0.00 | 0.00 | DUB-075080-150 |
| 75.00 | 80.00 | 30.00 | 0.00 | 0.00 | 0.00 | DUB-075080-300 |
| 75.00 | 80.00 | 35.00 | 0.00 | 0.00 | 0.00 | DUB-075080-350 |
| 75.00 | 80.00 | 40.00 | 0.00 | 0.00 | 0.00 | DUB-075080-400 |
| 75.00 | 80.00 | 50.00 | 0.00 | 0.00 | 0.00 | DUB-075080-500 |
| 75.00 | 80.00 | 60.00 | 0.00 | 0.00 | 0.00 | DUB-075080-600 |
| 75.00 | 80.00 | 80.00 | 0.00 | 0.00 | 0.00 | DUB-075080-800 |
| 80.00 | 85.00 | 15.00 | 0.00 | 0.00 | 0.00 | DUB-080085-150 |
| 80.00 | 85.00 | 20.00 | 0.00 | 0.00 | 0.00 | DUB-080085-200 |
| 80.00 | 85.00 | 30.00 | 0.00 | 0.00 | 0.00 | DUB-080085-300 |
| 80.00 | 85.00 | 40.00 | 0.00 | 0.00 | 0.00 | DUB-080085-400 |
| 80.00 | 85.00 | 50.00 | 0.00 | 0.00 | 0.00 | DUB-080085-500 |
| 80.00 | 85.00 | 60.00 | 0.00 | 0.00 | 0.00 | DUB-080085-600 |
| 80.00 | 85.00 | 78.00 | 0.00 | 0.00 | 0.00 | DUB-080085-780 |
| 80.00 | 85.00 | 80.00 | 0.00 | 0.00 | 0.00 | DUB-080085-800 |
| 85.00 | 90.00 | 30.00 | 0.00 | 0.00 | 0.00 | DUB-085090-300 |
| 85.00 | 90.00 | 40.00 | 0.00 | 0.00 | 0.00 | DUB-085090-400 |
| 85.00 | 90.00 | 50.00 | 0.00 | 0.00 | 0.00 | DUB-085090-500 |
| 85.00 | 90.00 | 60.00 | 0.00 | 0.00 | 0.00 | DUB-085090-600 |
| 85.00 | 90.00 | 70.00 | 0.00 | 0.00 | 0.00 | DUB-085090-700 |



| ID | OD | L1 | L2 | OD2 | OD3 | Product Name |
|--------|--------|--------|------|------|------|----------------|
| 80.00 | 95.00 | 35.00 | 0.00 | 0.00 | 0.00 | DUB-080085-350 |
| 90.00 | 95.00 | 20.00 | 0.00 | 0.00 | 0.00 | DUB-090095-200 |
| 90.00 | 95.00 | 30.00 | 0.00 | 0.00 | 0.00 | DUB-090095-300 |
| 90.00 | 95.00 | 35.00 | 0.00 | 0.00 | 0.00 | DUB-090095-350 |
| 90.00 | 95.00 | 40.00 | 0.00 | 0.00 | 0.00 | DUB-090095-400 |
| 90.00 | 95.00 | 45.00 | 0.00 | 0.00 | 0.00 | DUB-090095-450 |
| 90.00 | 95.00 | 50.00 | 0.00 | 0.00 | 0.00 | DUB-090095-500 |
| 90.00 | 95.00 | 60.00 | 0.00 | 0.00 | 0.00 | DUB-090095-600 |
| 90.00 | 95.00 | 90.00 | 0.00 | 0.00 | 0.00 | DUB-090095-900 |
| 90.00 | 95.00 | 100.00 | 0.00 | 0.00 | 0.00 | DUB-090095-100 |
| 95.00 | 100.00 | 30.00 | 0.00 | 0.00 | 0.00 | DUB-095100-300 |
| 95.00 | 100.00 | 35.00 | 0.00 | 0.00 | 0.00 | DUB-095100-350 |
| 95.00 | 100.00 | 40.00 | 0.00 | 0.00 | 0.00 | DUB-095100-400 |
| 95.00 | 100.00 | 45.00 | 0.00 | 0.00 | 0.00 | DUB-095100-450 |
| 95.00 | 100.00 | 50.00 | 0.00 | 0.00 | 0.00 | DUB-095100-500 |
| 95.00 | 100.00 | 60.00 | 0.00 | 0.00 | 0.00 | DUB-095100-600 |
| 95.00 | 100.00 | 100.00 | 0.00 | 0.00 | 0.00 | DUB-095100-998 |
| 100.00 | 105.00 | 20.00 | 0.00 | 0.00 | 0.00 | DUB-100105-200 |
| 100.00 | 105.00 | 30.00 | 0.00 | 0.00 | 0.00 | DUB-100105-300 |
| 100.00 | 105.00 | 35.00 | 0.00 | 0.00 | 0.00 | DUB-100105-350 |
| 100.00 | 105.00 | 40.00 | 0.00 | 0.00 | 0.00 | DUB-100105-400 |
| 100.00 | 105.00 | 45.00 | 0.00 | 0.00 | 0.00 | DUB-100105-450 |
| 100.00 | 105.00 | 50.00 | 0.00 | 0.00 | 0.00 | DUB-100105-500 |
| 100.00 | 105.00 | 60.00 | 0.00 | 0.00 | 0.00 | DUB-100105-600 |
| 100.00 | 105.00 | 70.00 | 0.00 | 0.00 | 0.00 | DUB-100105-700 |
| 100.00 | 105.00 | 90.00 | 0.00 | 0.00 | 0.00 | DUB-100105-900 |
| 100.00 | 105.00 | 95.00 | 0.00 | 0.00 | 0.00 | DUB-100105-950 |
| 105.00 | 110.00 | 30.00 | 0.00 | 0.00 | 0.00 | DUB-105110-300 |
| 105.00 | 110.00 | 35.00 | 0.00 | 0.00 | 0.00 | DUB-105110-350 |
| 105.00 | 110.00 | 40.00 | 0.00 | 0.00 | 0.00 | DUB-105110-400 |
| 105.00 | 110.00 | 50.00 | 0.00 | 0.00 | 0.00 | DUB-105110-500 |



| ID | OD | L1 | L2 | OD2 | OD3 | Product Name |
|--------|--------|--------|------|------|------|----------------|
| 105.00 | 110.00 | 60.00 | 0.00 | 0.00 | 0.00 | DUB-105110-600 |
| 105.00 | 110.00 | 70.00 | 0.00 | 0.00 | 0.00 | DUB-105110-700 |
| 110.00 | 115.00 | 30.00 | 0.00 | 0.00 | 0.00 | DUB-110115-300 |
| 110.00 | 115.00 | 35.00 | 0.00 | 0.00 | 0.00 | DUB-110115-350 |
| 110.00 | 115.00 | 40.00 | 0.00 | 0.00 | 0.00 | DUB-110115-400 |
| 110.00 | 115.00 | 45.00 | 0.00 | 0.00 | 0.00 | DUB-110115-450 |
| 110.00 | 115.00 | 50.00 | 0.00 | 0.00 | 0.00 | DUB-110115-500 |
| 110.00 | 115.00 | 55.00 | 0.00 | 0.00 | 0.00 | DUB-110115-550 |
| 110.00 | 115.00 | 60.00 | 0.00 | 0.00 | 0.00 | DUB-110115-600 |
| 110.00 | 115.00 | 70.00 | 0.00 | 0.00 | 0.00 | DUB-110115-700 |
| 110.00 | 115.00 | 80.00 | 0.00 | 0.00 | 0.00 | DUB-110115-800 |
| 110.00 | 115.00 | 95.00 | 0.00 | 0.00 | 0.00 | DUB-110115-950 |
| 110.00 | 115.00 | 115.00 | 0.00 | 0.00 | 0.00 | DUB-110115-115 |
| 115.00 | 120.00 | 50.00 | 0.00 | 0.00 | 0.00 | DUB-115120-500 |
| 115.00 | 120.00 | 60.00 | 0.00 | 0.00 | 0.00 | DUB-115120-600 |
| 115.00 | 120.00 | 70.00 | 0.00 | 0.00 | 0.00 | DUB-115120-700 |
| 125.00 | 120.00 | 40.00 | 0.00 | 0.00 | 0.00 | DUB-120125-400 |
| 120.00 | 125.00 | 0.00 | 0.00 | 0.00 | 0.00 | DUB-120125-450 |
| 120.00 | 125.00 | 20.00 | 0.00 | 0.00 | 0.00 | DUB-120125-200 |
| 120.00 | 125.00 | 35.00 | 0.00 | 0.00 | 0.00 | DUB-120125-350 |
| 120.00 | 125.00 | 50.00 | 0.00 | 0.00 | 0.00 | DUB-120125-500 |
| 120.00 | 125.00 | 60.00 | 0.00 | 0.00 | 0.00 | DUB-120125-600 |
| 120.00 | 125.00 | 95.00 | 0.00 | 0.00 | 0.00 | DUB-120125-950 |
| 120.00 | 125.00 | 100.00 | 0.00 | 0.00 | 0.00 | DUB-120125-998 |
| 125.00 | 130.00 | 50.00 | 0.00 | 0.00 | 0.00 | DUB-125130-500 |
| 125.00 | 130.00 | 70.00 | 0.00 | 0.00 | 0.00 | DUB-125130-700 |
| 130.00 | 135.00 | 0.00 | 0.00 | 0.00 | 0.00 | DUB-130135-100 |
| 130.00 | 135.00 | 35.00 | 0.00 | 0.00 | 0.00 | DUB-130135-350 |
| 130.00 | 135.00 | 40.00 | 0.00 | 0.00 | 0.00 | DUB-130135-400 |
| 130.00 | 135.00 | 50.00 | 0.00 | 0.00 | 0.00 | DUB-130135-500 |
| 130.00 | 135.00 | 60.00 | 0.00 | 0.00 | 0.00 | DUB-130135-600 |



| ID | OD | L1 | L2 | OD2 | OD3 | Product Name |
|--------|--------|--------|------|------|------|----------------|
| 130.00 | 135.00 | 80.00 | 0.00 | 0.00 | 0.00 | DUB-130135-800 |
| 130.00 | 135.00 | 95.00 | 0.00 | 0.00 | 0.00 | DUB-130135-950 |
| 135.00 | 140.00 | 60.00 | 0.00 | 0.00 | 0.00 | DUB-135140-600 |
| 135.00 | 140.00 | 80.00 | 0.00 | 0.00 | 0.00 | DUB-135140-800 |
| 140.00 | 145.00 | 40.00 | 0.00 | 0.00 | 0.00 | DUB-140145-400 |
| 140.00 | 145.00 | 50.00 | 0.00 | 0.00 | 0.00 | DUB-140145-500 |
| 140.00 | 145.00 | 60.00 | 0.00 | 0.00 | 0.00 | DUB-140145-600 |
| 140.00 | 145.00 | 70.00 | 0.00 | 0.00 | 0.00 | DUB-140145-700 |
| 140.00 | 145.00 | 80.00 | 0.00 | 0.00 | 0.00 | DUB-140145-800 |
| 140.00 | 145.00 | 100.00 | 0.00 | 0.00 | 0.00 | DUB-140145-998 |
| 150.00 | 155.00 | 40.00 | 0.00 | 0.00 | 0.00 | DUB-150155-400 |
| 150.00 | 155.00 | 50.00 | 0.00 | 0.00 | 0.00 | DUB-150155-500 |
| 150.00 | 155.00 | 60.00 | 0.00 | 0.00 | 0.00 | DUB-150155-600 |
| 150.00 | 155.00 | 80.00 | 0.00 | 0.00 | 0.00 | DUB-150155-800 |
| 150.00 | 155.00 | 100.00 | 0.00 | 0.00 | 0.00 | DUB-150155-998 |
| 160.00 | 165.00 | 35.00 | 0.00 | 0.00 | 0.00 | DUB-160165-350 |
| 160.00 | 165.00 | 50.00 | 0.00 | 0.00 | 0.00 | DUB-160165-500 |
| 160.00 | 165.00 | 80.00 | 0.00 | 0.00 | 0.00 | DUB-160165-900 |
| 170.00 | 175.00 | 60.00 | 0.00 | 0.00 | 0.00 | DUB-170175-600 |
| 180.00 | 185.00 | 60.00 | 0.00 | 0.00 | 0.00 | DUB-180185-600 |
| 180.00 | 185.00 | 100.00 | 0.00 | 0.00 | 0.00 | DUB-180185-100 |
| 180.00 | 185.00 | 120.00 | 0.00 | 0.00 | 0.00 | DUB-180185-120 |
| 190.00 | 195.00 | 40.00 | 0.00 | 0.00 | 0.00 | DUB-190195-400 |
| 190.00 | 195.00 | 80.00 | 0.00 | 0.00 | 0.00 | DUB-190195-800 |
| 200.00 | 205.00 | 20.00 | 0.00 | 0.00 | 0.00 | DUB-200205-200 |
| 200.00 | 205.00 | 60.00 | 0.00 | 0.00 | 0.00 | DUB-200205-600 |
| 200.00 | 205.00 | 100.00 | 0.00 | 0.00 | 0.00 | DUB-200205-100 |
| 220.00 | 225.00 | 100.00 | 0.00 | 0.00 | 0.00 | DUB-220225-100 |
| 230.00 | 235.00 | 50.00 | 0.00 | 0.00 | 0.00 | DUB-230235-500 |
| 230.00 | 235.00 | 60.00 | 0.00 | 0.00 | 0.00 | DUB-230235-600 |
| 330.00 | 335.00 | 100.00 | 0.00 | 0.00 | 0.00 | DUB-330335-100 |



Ancillary

O-rings, Backup Washers & Quad Rings

Design

O-rings, Quad rings and Back up washers are almost entirely used as static seals. Generally O-rings and Quad rings should be backed up for pressures above 1500 Psi, however, the operating environment must always be considered, regardless of operating pressure. The groove dimension table below is based on static use only. For dynamic applications, please consult our technical staff.

Static Housing Data

Ring and Groove Dimensions

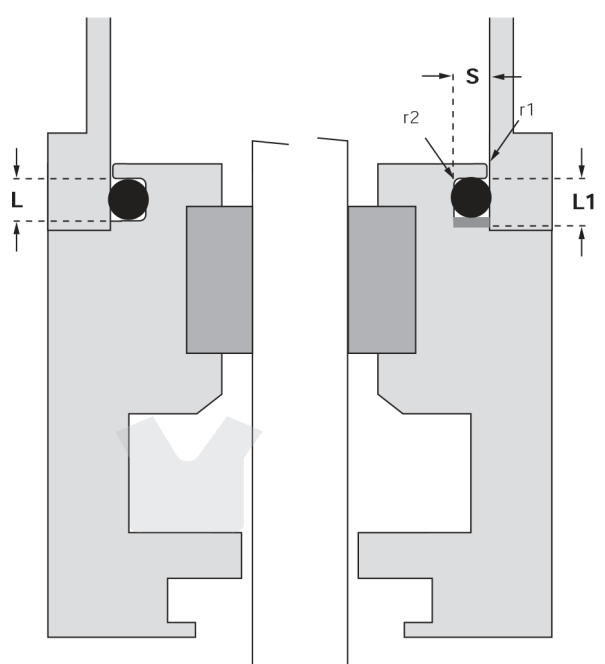
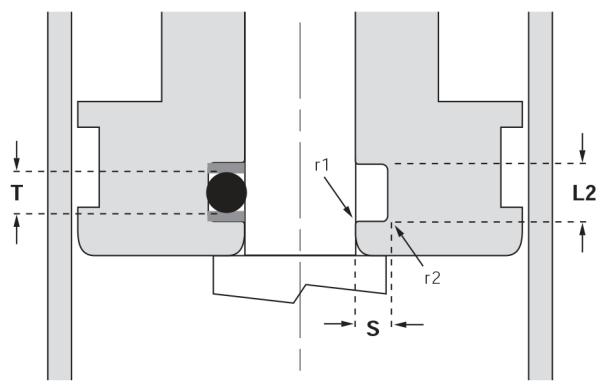
| O-ring C/S | | Housing Depth | | Housing Width | | |
|------------|------|---------------|------|---------------|-------|--------|
| T | S | Max | Min | L | L1 | L2 |
| mm | Inch | | | | | |
| 1.00 | | 0.80 | 0.75 | 1.30 | | |
| 1.20 | | 0.96 | 0.91 | 1.56 | | |
| 1.50 | | 1.20 | 1.15 | 1.95 | | |
| 1.60 | | 1.28 | 1.23 | 2.08 | 3.80* | 5.20* |
| 1.78 | 1/16 | 1.44 | 1.39 | 2.36 | 3.76 | 5.16 |
| 1.90 | | 1.53 | 1.48 | 2.50 | 3.90 | 5.30 |
| 2.00 | | 1.60 | 1.55 | 2.60 | 4.00 | 5.40 |
| 2.40 | | 1.92 | 1.87 | 3.20 | 4.60 | 6.00 |
| 2.50 | | 2.00 | 1.95 | 3.25 | 4.65 | 6.05 |
| 2.62 | 3/32 | 2.08 | 2.03 | 3.57 | 4.97 | 6.37 |
| 2.70 | | 2.13 | 2.08 | 3.50 | 4.97* | 6.37* |
| 3.00 | | 2.50 | 2.30 | 3.90 | 5.30 | 6.70 |
| 3.10 | | 2.52 | 2.32 | 4.10 | 5.50 | 6.90 |
| 3.50 | | 2.90 | 2.70 | 4.55 | 5.95 | 7.35 |
| 3.53 | 1/8 | 2.90 | 2.70 | 4.75 | 6.15 | 7.55 |
| 4.00 | | 3.30 | 3.10 | 5.20 | 6.90* | 8.60* |
| 5.00 | | 4.15 | 3.85 | 6.50 | 8.20* | 9.90* |
| 5.33 | 3/16 | 4.42 | 4.12 | 7.15 | 8.85 | 10.55 |
| 5.70 | | 5.00 | 4.85 | 7.50 | 9.20 | 10.90 |
| 6.00 | | 5.00 | 4.85 | 7.80 | 9.50* | 11.20* |
| 6.99 | 1/4 | 6.00 | 6.85 | 9.54 | 12.04 | 14.54 |
| 8.40 | | 7.40 | 7.25 | 11.00 | 13.50 | 16.00 |

*Check availability, not normally stocked


Chamfer Radii

| | T | r1 | r2 |
|-------------|-------------|------|------|
| L (no BU's) | 1.00 - 2.62 | 0.10 | 0.25 |
| | 3.00 - 8.40 | 0.20 | 0.63 |
| L1 & L2 | 1.78 - 4.00 | 0.25 | 0.25 |
| | 5.00 - 8.40 | 0.25 | 0.25 |

Ancillary







Quad ring



NBR Quad ring

Order code
imp. 4-(size)

Backup rings

| | | | |
|---|---|--|---|
|  |  |  |  |
| Urethane Washer | NBR Washer | Hytrel Washer | PTFE Washer |
| Order code imp. 8-(size)-P9 met. 9-(size)-P9 | Order code imp. 8-(size)-N9 | Order code imp. 8-(size)-H met. 9-(size)-H | Order code imp. 8-(size)-T met. 9-(size)-T |

| Shaft | Cylinder | O-Ring | Quad | | O-Rings | | | | | Back Up Rings | | | | Size |
|-------|----------|-----------|------|-----|---------|-------|-------|------|-------|---------------|------|--------|------|--------|
| | | | C/S | nom | NBR70 | NBR70 | NBR90 | Poly | Viton | NBR | Poly | Hytrel | PTFE | |
| 0.00 | 0.00 | 1.50 | | | ● | | | | | | | | | 000015 |
| 0.00 | 0.00 | 1.78 1/16 | | | ● | | | | ● | | | | | 000070 |
| 0.00 | 0.00 | 2.00 | | | ● | | | | | | | | | 000020 |
| 0.00 | 0.00 | 2.40 | | | ● | | | | | | | | | 000024 |
| 0.00 | 0.00 | 2.50 | | | ● | | | | | | | | | 000025 |
| 0.00 | 0.00 | 2.62 3/32 | | | ● | | | | ● | | | | | 000103 |
| 0.00 | 0.00 | 3.00 | | | ● | | | | ● | | | | | 000030 |
| 0.00 | 0.00 | 3.53 1/8 | ● | ● | ● | | | | ● | | | | | 000139 |
| 0.00 | 0.00 | 4.00 | | | ● | | | | ● | | | | | 000040 |
| 0.00 | 0.00 | 5.00 | | | ● | | | | ● | | | | | 000050 |
| 0.00 | 0.00 | 5.33 3/16 | ● | ● | ● | | | | ● | | | | | 000210 |
| 0.00 | 0.00 | 5.70 | | | ● | | | | | | | | | 000057 |
| 0.00 | 0.00 | 6.00 | | | ● | | | | | | | | | 000060 |
| 0.00 | 0.00 | 6.99 1/4 | ● | ● | ● | | | | ● | | | | | 000275 |
| 0.00 | 0.00 | 8.40 | | | ● | | | | | | | | | 000084 |
| 0.79 | 2.39 | 1.02 | | | ● | | | | ● | | | | | 001 |
| 1.17 | 3.56 | 1.27 | | | ● | | | | ● | | | | | 002 |
| 1.57 | 4.75 | 1.52 | | | ● | | | | ● | | | | | 003 |
| 1.57 | 6.35 | 2.62 3/32 | | | ● | ● | | | ● | ● | | | | 102 |
| 1.98 | 5.16 | 1.78 1/16 | ● | ● | ● | | | | ● | ● | | | ● | 004 |
| 2.00 | 3.60 | 1.00 | | | ● | | | | ● | | | | | 002010 |
| 2.00 | 4.40 | 1.50 | | | ● | | | | | | | | | 002015 |
| 2.36 | 5.54 | 1.78 1/16 | ● | ● | ● | | | | ● | ● | | | ● | 005 |
| 2.36 | 7.14 | 2.62 3/32 | | | ● | ● | | | ● | ● | | | | 103 |
| 2.50 | 4.10 | 1.00 | | | ● | | | | | | | | | 002510 |
| 2.50 | 4.90 | 1.50 | | | ● | | | | | | | | | 002515 |
| 2.50 | 5.00 | 1.60 | | | ● | | | | | | | | | 002516 |
| 2.50 | 5.50 | 2.00 | | | ● | | | | | | | | | 002520 |
| 3.00 | 4.60 | 1.00 | | | ● | | | | ● | | | | | 003010 |
| 3.00 | 5.40 | 1.50 | | | ● | ● | | | ● | | | | | 003015 |
| 3.00 | 6.00 | 1.90 | | | ● | ● | | | ● | | | | ● | 003019 |
| 3.00 | 6.00 | 2.00 | | | ● | | | | ● | | | | | 003020 |
| 3.18 | 6.35 | 1.78 1/16 | ● | ● | ● | ● | | | ● | ● | | | ● | 006 |
| 3.18 | 7.92 | 2.62 3/32 | | | ● | ● | | | ● | ● | | | | 104 |
| 3.50 | 5.90 | 1.50 | | | ● | | | | | | | | | 003515 |
| 3.50 | 6.00 | 1.60 | | | ● | | | | ● | | | | | 003516 |
| 3.96 | 7.14 | 1.78 1/16 | ● | ● | ● | ● | | | ● | ● | | | ● | 007 |

Metric sizes denoted by yellow shading





Quad ring



NBR Quad ring

Order code
imp. 4-(size)

Backup rings

| | | | |
|---|---|--|---|
|  |  |  |  |
| Urethane Washer | NBR Washer | Hytrel Washer | PTFE Washer |
| Order code imp. 8-(size)-P9 met. 9-(size)-P9 | Order code imp. 8-(size)-N9 | Order code imp. 8-(size)-H met. 9-(size)-H | Order code imp. 8-(size)-T met. 9-(size)-T |

| Shaft | Cylinder | O-Ring | Quad | | | | | O-Rings | | | | Back Up Rings | | | | Size |
|-------|----------|-----------|------|-----|-------|-------|-------|---------|-------|-----|------|---------------|------|--|--|--------|
| | | | C/S | nom | NBR70 | NBR70 | NBR90 | Poly | Viton | NBR | Poly | Hytrel | PTFE | | | |
| 3.96 | 8.71 | 2.62 3/32 | | | | | | | | | | | | | | 105 |
| 4.00 | 5.60 | 1.00 | | | | | | | | | | | | | | 004010 |
| 4.00 | 6.40 | 1.50 | | | | | | | | | | | | | | 004015 |
| 4.00 | 7.00 | 1.90 | | | | | | | | | | | | | | 004019 |
| 4.00 | 7.00 | 2.00 | | | | | | | | | | | | | | 004020 |
| 4.00 | 8.00 | 2.40 | | | | | | | | | | | | | | 004024 |
| 4.00 | 8.00 | 2.50 | | | | | | | | | | | | | | 004025 |
| 4.50 | 6.10 | 1.00 | | | | | | | | | | | | | | 004510 |
| 4.50 | 6.90 | 1.50 | | | | | | | | | | | | | | 004515 |
| 4.50 | 7.00 | 1.60 | | | | | | | | | | | | | | 004516 |
| 4.70 | 7.54 | 1.42 | | | | | | | | | | | | | | 901 |
| 4.75 | 7.92 | 1.78 1/16 | | | | | | | | | | | | | | 008 |
| 4.75 | 9.53 | 2.62 3/32 | | | | | | | | | | | | | | 106 |
| 4.75 | 11.10 | 3.53 1/8 | | | | | | | | | | | | | | 201 |
| 5.00 | 6.60 | 1.00 | | | | | | | | | | | | | | 005010 |
| 5.00 | 7.40 | 1.50 | | | | | | | | | | | | | | 005015 |
| 5.00 | 8.00 | 1.90 | | | | | | | | | | | | | | 005019 |
| 5.00 | 8.00 | 2.00 | | | | | | | | | | | | | | 005020 |
| 5.00 | 9.00 | 2.40 | | | | | | | | | | | | | | 005024 |
| 5.00 | 9.00 | 2.50 | | | | | | | | | | | | | | 005025 |
| 5.50 | 7.90 | 1.50 | | | | | | | | | | | | | | 005515 |
| 5.50 | 8.00 | 1.60 | | | | | | | | | | | | | | 005516 |
| 5.54 | 8.71 | 1.78 1/16 | | | | | | | | | | | | | | 009 |
| 5.54 | 10.31 | 2.62 3/32 | | | | | | | | | | | | | | 107 |
| 6.00 | 7.60 | 1.00 | | | | | | | | | | | | | | 006010 |
| 6.00 | 8.40 | 1.50 | | | | | | | | | | | | | | 006015 |
| 6.00 | 9.00 | 1.90 | | | | | | | | | | | | | | 006019 |
| 6.00 | 9.00 | 2.00 | | | | | | | | | | | | | | 006020 |
| 6.00 | 10.00 | 2.40 | | | | | | | | | | | | | | 006024 |
| 6.00 | 10.00 | 2.50 | | | | | | | | | | | | | | 006025 |
| 6.00 | 11.00 | 3.00 | | | | | | | | | | | | | | 006030 |
| 6.07 | 9.32 | 1.63 | | | | | | | | | | | | | | 902 |
| 6.35 | 9.53 | 1.78 1/16 | | | | | | | | | | | | | | 010 |
| 6.35 | 11.10 | 2.62 3/32 | | | | | | | | | | | | | | 108 |
| 6.35 | 12.70 | 3.53 1/8 | | | | | | | | | | | | | | 202 |
| 6.50 | 8.10 | 1.00 | | | | | | | | | | | | | | 006510 |
| 6.50 | 9.00 | 1.60 | | | | | | | | | | | | | | 006516 |

Metric sizes denoted by yellow shading


Quad ring



NBR Quad ring


Order code
imp. 4-(size)

Backup rings




Urethane Washer

Order code
imp. 8-(size)-P9
met. 9-(size)-P9




NBR Washer

Order code
imp. 8-(size)-N9



Hytrel Washer

Order code
imp. 8-(size)-H
met. 9-(size)-H

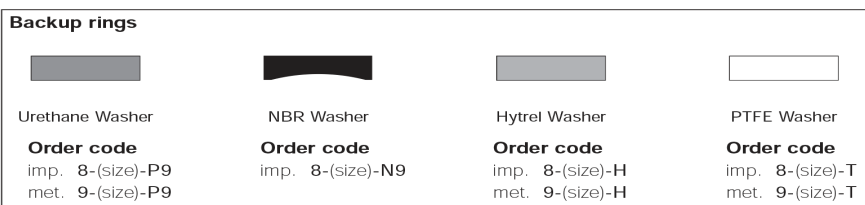


PTFE Washer

Order code
imp. 8-(size)-T
met. 9-(size)-T

| Shaft | Cylinder | O-Ring | Quad | | O-Rings | | | | | Back Up Rings | | | | Size |
|-------|----------|--------|------|-----|---------|-------|-------|------|-------|---------------|------|--------|------|--------|
| | | | C/S | nom | NBR70 | NBR70 | NBR90 | Poly | Viton | NBR | Poly | Hytrel | PTFE | |
| 6.76 | 9.91 | 1.78 | 1/16 | | ● | | | | | | | | | 610 |
| 7.00 | 8.60 | 1.00 | | | ● | | | | | | | | | 007010 |
| 7.00 | 9.40 | 1.50 | | | ● | ● | | ● | | | | | | 007015 |
| 7.00 | 10.00 | 1.90 | | | ● | ● | | ● | | | | ● | | 007019 |
| 7.00 | 10.00 | 2.00 | | | ● | | | ● | | | | | | 007020 |
| 7.00 | 11.00 | 2.40 | | | ● | | | | | | | | | 007024 |
| 7.00 | 11.00 | 2.50 | | | ● | | | ● | | | ● | | | 007025 |
| 7.00 | 12.00 | 3.00 | | | ● | | | | | | | | | 007030 |
| 7.50 | 9.90 | 1.50 | | | ● | | | | | | | | | 007515 |
| 7.50 | 10.00 | 1.60 | | | ● | | | ● | | | | | | 007516 |
| 7.65 | 10.90 | 1.63 | | | | ● | | ● V9 | | | | | | 903 |
| 7.92 | 11.10 | 1.78 | 1/16 | ● | ● | ● | ● | ● | ● | | ● | ● | | 011 |
| 7.92 | 12.70 | 2.62 | 3/32 | ● | ● | ● | | ● | ● | | ● | ● | | 109 |
| 7.92 | 14.27 | 3.53 | 1/8 | | ● | ● | | ● | ● | | | | | 203 |
| 8.00 | 9.60 | 1.00 | | | ● | | | ● | | | | | | 008010 |
| 8.00 | 10.40 | 1.50 | | | ● | | | ● | | | | | | 008015 |
| 8.00 | 11.00 | 1.90 | | | ● | ● | | ● | | | | ● | | 008019 |
| 8.00 | 11.00 | 2.00 | | | ● | ● | | ● | | | | | | 008020 |
| 8.00 | 12.00 | 2.40 | | | ● | | | ● | | | | | | 008024 |
| 8.00 | 12.00 | 2.50 | | | ● | | | ● | | | ● | ● | | 008025 |
| 8.00 | 13.00 | 3.00 | | | ● | | | ● | | | | | | 008030 |
| 8.00 | 15.00 | 4.00 | | | ● | | | | | | | | | 008040 |
| 8.00 | 17.00 | 5.00 | | | ● | | | | | | | | | 008050 |
| 8.50 | 11.00 | 1.60 | | | ● | | | ● | | | | | | 008516 |
| 8.74 | 11.91 | 1.78 | 1/16 | | ● | | | | | | | | | 611 |
| 8.92 | 12.57 | 1.83 | | | | ● | | ● V9 | | | | | | 904 |
| 9.00 | 10.60 | 1.00 | | | ● | | | ● | | | | | | 009010 |
| 9.00 | 11.40 | 1.50 | | | ● | | | ● | | | | | | 009015 |
| 9.00 | 12.00 | 1.90 | | | ● | ● | | ● | | | | ● | | 009019 |
| 9.00 | 12.00 | 2.00 | | | ● | ● | | ● | | | | | | 009020 |
| 9.00 | 13.00 | 2.40 | | | ● | | | ● | | | | | | 009024 |
| 9.00 | 13.00 | 2.50 | | | ● | | | ● | | | ● | | | 009025 |
| 9.00 | 14.00 | 3.00 | | | ● | | | ● | | | | | | 009030 |
| 9.50 | 12.00 | 1.60 | | | ● | | | ● | | | | | | 009516 |
| 9.53 | 12.70 | 1.78 | 1/16 | ● | ● | ● | ● | ● | ● | | ● | ● | | 012 |
| 9.53 | 14.27 | 2.62 | 3/32 | ● | ● | ● | ● | ● | | ● | ● | ● | | 110 |
| 9.53 | 15.88 | 3.53 | 1/8 | ● | ● | ● | ● | ● | ● | | | ● | | 204 |


Metric sizes denoted by yellow shading



| Shaft | Cylinder | O-Ring | | Quad | O-Rings | | | | Back Up Rings | | | | Size |
|-------|----------|--------|------|-------|---------|-------|------|-------|---------------|------|--------|------|--------|
| | | C/S | nom | NBR70 | NBR70 | NBR90 | Poly | Viton | NBR | Poly | Hytrel | PTFE | |
| 10.00 | 11.60 | 1.00 | | | ● | ● | | ● | | | | | 010010 |
| 10.00 | 12.40 | 1.50 | | | ● | ● | | ● | | | | | 010015 |
| 10.00 | 13.00 | 1.90 | | | ● | ● | | ● | | | | ● | 010019 |
| 10.00 | 13.00 | 2.00 | | | ● | ● | | ● | | | | | 010020 |
| 10.00 | 14.00 | 2.40 | | | ● | ● | | ● | | | | ● | 010024 |
| 10.00 | 14.00 | 2.50 | | | ● | ● | | ● | | | ● | | 010025 |
| 10.00 | 15.00 | 3.00 | | | ● | | | ● | | | | | 010030 |
| 10.00 | 17.00 | 4.00 | | | ● | | | | | | | | 010040 |
| 10.00 | 19.00 | 5.00 | | | ● | | | | | | | | 010050 |
| 10.31 | 15.06 | 2.62 | 3/32 | | ● | | | | | | | | 110A |
| 10.50 | 13.00 | 1.60 | | | ● | ● | | | | | | | 010516 |
| 10.52 | 14.17 | 1.83 | | | | ● | | ● V9 | | | | | 905 |
| 11.00 | 12.60 | 1.00 | | | ● | | | | | | | | 011010 |
| 11.00 | 13.40 | 1.50 | | | ● | | | ● | | | | | 011015 |
| 11.00 | 14.00 | 2.00 | | | ● | | | ● | | | | | 011020 |
| 11.00 | 15.00 | 2.40 | | | ● | ● | | ● | | | | ● | 011024 |
| 11.00 | 15.00 | 2.50 | | | ● | ● | | ● | | | ● | ● | 011025 |
| 11.00 | 16.00 | 3.00 | | | ● | | | ● | | | | | 011030 |
| 11.10 | 14.27 | 1.78 | 1/16 | ● | ● | ● | ● | ● | | ● | ● | ● | 013 |
| 11.10 | 15.88 | 2.62 | 3/32 | ● | ● | ● | ● | ● | | ● | ● | ● | 111 |
| 11.10 | 17.45 | 3.53 | 1/8 | ● | ● | ● | ● | ● | ● | | | | 205 |
| 11.10 | 20.62 | 5.33 | 3/16 | | ● | | | ● | ● | | | | 309 |
| 11.50 | 14.00 | 1.60 | | | ● | | | ● | | | | | 011516 |
| 11.89 | 15.85 | 1.98 | | | | ● | | ● V9 | | | | | 906 |
| 12.00 | 13.60 | 1.00 | | | ● | | | | | | | | 012010 |
| 12.00 | 14.40 | 1.50 | | | ● | | | ● | | | | | 012015 |
| 12.00 | 15.00 | 2.00 | | | ● | ● | | ● | | | | | 012020 |
| 12.00 | 16.00 | 2.40 | | | ● | ● | | ● | | | | ● | 012024 |
| 12.00 | 16.00 | 2.50 | | | ● | ● | | ● | | | ● | | 012025 |
| 12.00 | 17.00 | 3.00 | | | ● | | | ● | | | | | 012030 |
| 12.50 | 15.00 | 1.60 | | | ● | | | | | | | | 012516 |
| 12.70 | 15.88 | 1.78 | 1/16 | ● | ● | ● | ● | ● | | ● | ● | ● | 014 |
| 12.70 | 17.45 | 2.62 | 3/32 | ● | ● | ● | ● | ● | | ● | ● | ● | 112 |
| 12.70 | 19.05 | 3.53 | 1/8 | ● | ● | ● | ● | ● | ● | | | | 206 |
| 12.70 | 22.23 | 5.33 | 3/16 | | ● | | | ● | ● | | | | 310 |
| 13.00 | 14.60 | 1.00 | | | ● | | | | | | | | 013010 |
| 13.00 | 15.40 | 1.50 | | | ● | ● | | ● | | | | | 013015 |

Metric sizes denoted by yellow shading





Quad ring



NBR Quad ring

Order code
imp. 4-(size)

Backup rings

| | | | |
|---|---|--|---|
|  |  |  |  |
| Urethane Washer | NBR Washer | Hytrel Washer | PTFE Washer |
| Order code imp. 8-(size)-P9 met. 9-(size)-P9 | Order code imp. 8-(size)-N9 | Order code imp. 8-(size)-H met. 9-(size)-H | Order code imp. 8-(size)-T met. 9-(size)-T |

| Shaft | Cylinder | O-Ring | Quad | | O-Rings | | | | | Back Up Rings | | | | Size | |
|-------|----------|--------|------|-----|---------|-------|-------|------|-------|---------------|------|--------|------|------|--------|
| | | | C/S | nom | NBR70 | NBR70 | NBR90 | Poly | Viton | NBR | Poly | Hytrel | PTFE | | |
| 13.00 | 16.00 | 2.00 | | | | ● | | | | ● | | | | | 013020 |
| 13.00 | 17.00 | 2.40 | | | | ● | | | | ● | | | | ● | 013024 |
| 13.00 | 17.00 | 2.50 | | | | ● | ● | | | ● | | | ● | | 013025 |
| 13.00 | 18.00 | 3.00 | | | | ● | | | | ● | | | | | 013030 |
| 13.46 | 17.63 | 2.08 | | | | | ● | | | ● V9 | | | | | 907 |
| 13.50 | 16.00 | 1.60 | | | | ● | | | | ● | | | | | 013516 |
| 14.00 | 15.60 | 1.00 | | | | ● | | | | ● | | | | | 014010 |
| 14.00 | 16.40 | 1.50 | | | | ● | ● | | | ● | | | | | 014015 |
| 14.00 | 17.00 | 2.00 | | | | ● | ● | | | ● | | | | | 014020 |
| 14.00 | 18.00 | 2.40 | | | | ● | ● | | | ● | | | | ● | 014024 |
| 14.00 | 18.00 | 2.50 | | | | ● | | | | ● | | | | | 014025 |
| 14.00 | 19.00 | 3.00 | | | | ● | | | | ● | | | | | 014030 |
| 14.27 | 17.45 | 1.78 | 1/16 | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | 015 |
| 14.27 | 19.05 | 2.62 | 3/32 | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | 113 |
| 14.27 | 20.62 | 3.53 | 1/8 | ● | ● | ● | ● | ● | ● | ● | | | | | 207 |
| 14.27 | 23.80 | 5.33 | 3/16 | | ● | | | | ● | | | | | | 311 |
| 14.50 | 17.00 | 1.60 | | | | ● | | | | ● | | | | | 014516 |
| 15.00 | 16.60 | 1.00 | | | | ● | | | | | | | | | 015010 |
| 15.00 | 17.40 | 1.50 | | | | ● | | | | ● | | | | | 015015 |
| 15.00 | 18.00 | 2.00 | | | | ● | | | | ● | | | | | 015020 |
| 15.00 | 19.00 | 2.40 | | | | ● | ● | | | ● | | | | ● | 015024 |
| 15.00 | 19.00 | 2.50 | | | | ● | | | | ● | | | | | 015025 |
| 15.00 | 19.00 | 2.50 | | | | | ● | | | | | | | | 015925 |
| 15.00 | 20.00 | 3.00 | | | | ● | ● | | | ● | | | | | 015030 |
| 15.00 | 22.00 | 4.00 | | | | ● | | | | | | | | | 015040 |
| 15.00 | 24.00 | 5.00 | | | | ● | | | | | | | | | 015050 |
| 15.50 | 18.00 | 1.60 | | | | ● | | | | | | | | ● | 015516 |
| 15.88 | 19.05 | 1.78 | 1/16 | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | 016 |
| 15.88 | 20.62 | 2.62 | 3/32 | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | 114 |
| 15.88 | 22.23 | 3.53 | 1/8 | ● | ● | ● | ● | ● | ● | ● | | | | | 208 |
| 15.88 | 25.40 | 5.33 | 3/16 | | ● | ● | | | ● | | | | | | 312 |
| 16.00 | 17.60 | 1.00 | | | | ● | | | | | | | | | 016010 |
| 16.00 | 18.40 | 1.50 | | | | ● | | | | ● | | | | | 016015 |
| 16.00 | 19.00 | 2.00 | | | | ● | | | | ● | | | | ● | 016020 |
| 16.00 | 20.00 | 2.40 | | | | ● | ● | | | ● | | | | ● | 016024 |
| 16.00 | 20.00 | 2.50 | | | | ● | ● | | | ● | | | | | 016025 |
| 16.00 | 21.00 | 3.00 | | | | ● | | | | ● | | | | | 016030 |

Metric sizes denoted by yellow shading


Quad ring



NBR Quad ring


Order code
imp. 4-(size)

Backup rings




Urethane Washer

Order code
imp. 8-(size)-P9
met. 9-(size)-P9




NBR Washer

Order code
imp. 8-(size)-N9



Hytrel Washer

Order code
imp. 8-(size)-H
met. 9-(size)-H



PTFE Washer

Order code
imp. 8-(size)-T
met. 9-(size)-T

| Shaft | Cylinder | O-Ring | Quad | | O-Rings | | | | Back Up Rings | | | | Size | |
|-------|----------|--------|------|-----|---------|-------|-------|------|---------------|-----|------|--------|------|--------|
| | | | C/S | nom | NBR70 | NBR70 | NBR90 | Poly | Viton | NBR | Poly | Hytrel | | PTFE |
| 16.00 | 23.00 | 4.00 | | | ● | | | | | | | | | 016040 |
| 16.36 | 20.78 | 2.21 | | | | ● | | ● V9 | | | | | | 908 |
| 16.50 | 19.00 | 1.60 | | | ● | | | | | | | | | 016516 |
| 17.00 | 19.40 | 1.50 | | | ● | | | ● | | | | | | 017015 |
| 17.00 | 20.00 | 2.00 | | | ● | | | ● | | | | ● | | 017020 |
| 17.00 | 21.00 | 2.40 | | | ● | ● | | ● | | | | | | 017024 |
| 17.00 | 21.00 | 2.50 | | | ● | ● | | ● | | | ● | | | 017025 |
| 17.00 | 22.00 | 3.00 | | | ● | ● | | ● | | | | | | 017030 |
| 17.00 | 24.00 | 4.00 | | | ● | | | | | | | | | 017040 |
| 17.45 | 20.62 | 1.78 | 1/16 | ● | ● | ● | ● | ● | | ● | ● | ● | | 017 |
| 17.45 | 22.23 | 2.62 | 3/32 | ● | ● | ● | ● | ● | | ● | ● | ● | | 115 |
| 17.45 | 23.80 | 3.53 | 1/8 | ● | ● | ● | | ● | ● | | | | ● | 209 |
| 17.45 | 26.97 | 5.33 | 3/16 | | ● | | | ● | ● | | | | | 313 |
| 17.50 | 20.00 | 1.60 | | | ● | | | ● | | | | | | 017516 |
| 17.93 | 22.86 | 2.46 | | | | ● | | ● V9 | | | | | | 909 |
| 18.00 | 19.60 | 1.00 | | | ● | | | | | | | | | 018010 |
| 18.00 | 20.40 | 1.50 | | | ● | | | ● | | | | | ● | 018015 |
| 18.00 | 21.00 | 2.00 | | | ● | ● | | ● | | | | | | 018020 |
| 18.00 | 22.00 | 2.40 | | | ● | ● | | ● | | | | ● | | 018024 |
| 18.00 | 22.00 | 2.50 | | | ● | ● | | ● | | | ● | | | 018025 |
| 18.00 | 23.00 | 3.00 | | | ● | | | ● | | | | | | 018030 |
| 18.00 | 25.00 | 4.00 | | | ● | | | | | | | | | 018040 |
| 18.24 | 23.01 | 2.62 | 3/32 | | ● | | | | | | | | | 115A |
| 18.50 | 21.00 | 1.60 | | | ● | | | | | | | | | 018516 |
| 19.00 | 21.40 | 1.50 | | | | ● | | ● | | | | | ● | 019015 |
| 19.00 | 22.00 | 2.00 | | | ● | | | ● | | | | | | 019020 |
| 19.00 | 23.00 | 2.40 | | | ● | ● | | ● | | | | | ● | 019024 |
| 19.00 | 23.00 | 2.50 | | | ● | ● | | ● | | | | | | 019025 |
| 19.00 | 24.00 | 3.00 | | | ● | | | ● | | | | | | 019030 |
| 19.00 | 26.00 | 4.00 | | | ● | | | ● | | | | | | 019040 |
| 19.05 | 22.23 | 1.78 | 1/16 | | ● | ● | ● | ● | | ● | ● | ● | | 018 |
| 19.05 | 23.80 | 2.62 | 3/32 | ● | ● | ● | ● | ● | | ● | ● | ● | | 116 |
| 19.05 | 25.40 | 3.53 | 1/8 | ● | ● | ● | ● | ● | | ● | ● | ● | | 210 |
| 19.05 | 28.58 | 5.33 | 3/16 | ● | ● | ● | | ● | ● | | | | | 314 |
| 19.18 | 24.10 | 2.46 | | | | ● | | ● V9 | | | | | | 910 |
| 19.50 | 22.00 | 1.60 | | | ● | | | | | | | | | 019516 |
| 20.00 | 21.60 | 1.00 | | | ● | | | | | | | | | 020010 |

Metric sizes denoted by yellow shading





Quad ring



NBR Quad ring

Order code
imp. 4-(size)

Backup rings

| | | | |
|---|---|--|---|
|  |  |  |  |
| Urethane Washer | NBR Washer | Hytrel Washer | PTFE Washer |
| Order code imp. 8-(size)-P9 met. 9-(size)-P9 | Order code imp. 8-(size)-N9 | Order code imp. 8-(size)-H met. 9-(size)-H | Order code imp. 8-(size)-T met. 9-(size)-T |

| Shaft | Cylinder | O-Ring | | Quad | O-Rings | | | | Back Up Rings | | | | Size |
|-------|----------|--------|------|-------|---------|-------|------|-------|---------------|------|--------|------|--------|
| | | C/S | nom | NBR70 | NBR70 | NBR90 | Poly | Viton | NBR | Poly | Hytrel | PTFE | |
| 20.00 | 22.40 | 1.50 | | | ● | | | ● | | | | | 020015 |
| 20.00 | 23.00 | 2.00 | | | ● | | | ● | | | | ● | 020020 |
| 20.00 | 24.00 | 2.40 | | | ● | ● | | ● | | | | ● | 020024 |
| 20.00 | 24.00 | 2.50 | | | ● | | | ● | | | | | 020025 |
| 20.00 | 25.00 | 3.00 | | | ● | ● | | ● | | | ● | | 020030 |
| 20.00 | 27.00 | 4.00 | | | ● | | | | | | | | 020040 |
| 20.00 | 29.00 | 5.00 | | | ● | | | | | | | | 020050 |
| 20.62 | 23.80 | 1.78 | 1/16 | ● | ● | ● | | ● | | ● | ● | ● | 019 |
| 20.62 | 25.40 | 2.62 | 3/32 | ● | ● | ● | ● | ● | | ● | ● | ● | 117 |
| 20.62 | 26.97 | 3.53 | 1/8 | ● | ● | ● | ● | ● | | ● | ● | ● | 211 |
| 20.62 | 30.15 | 5.33 | 3/16 | | ● | | | ● | ● | | | | 315 |
| 21.00 | 22.60 | 1.00 | | | ● | | | | | | | | 021010 |
| 21.00 | 23.40 | 1.50 | | | | | | ● | | | | | 021015 |
| 21.00 | 24.00 | 2.00 | | | ● | | | ● | | | | | 021020 |
| 21.00 | 25.00 | 2.40 | | | ● | ● | | ● | | | | ● | 021024 |
| 21.00 | 25.00 | 2.50 | | | ● | | | ● | | | | | 021025 |
| 21.00 | 26.00 | 3.00 | | | ● | | | ● | | | | | 021030 |
| 21.00 | 28.00 | 4.00 | | | ● | | | ● | | | | | 021040 |
| 21.92 | 27.81 | 2.95 | | | | ● | | ● V9 | | | | | 911 |
| 22.00 | 24.40 | 1.50 | | | ● | | | ● | | | | ● | 022015 |
| 22.00 | 25.00 | 2.00 | | | ● | | | ● | | | | | 022020 |
| 22.00 | 26.00 | 2.40 | | | ● | ● | | ● | | | | ● | 022024 |
| 22.00 | 26.00 | 2.50 | | | ● | | | ● | | | | | 022025 |
| 22.00 | 27.00 | 3.00 | | | ● | | | ● | | | | | 022030 |
| 22.00 | 28.00 | 3.50 | | | ● | ● | | ● | | | | ● | 022035 |
| 22.00 | 29.00 | 4.00 | | | ● | | | ● | | | | | 022040 |
| 22.00 | 32.00 | 6.00 | | | ● | | | | | | | | 002206 |
| 22.23 | 25.40 | 1.78 | 1/16 | ● | ● | ● | ● | ● | | ● | ● | ● | 020 |
| 22.23 | 26.97 | 2.62 | 3/32 | ● | ● | ● | ● | ● | | ● | ● | ● | 118 |
| 22.23 | 28.58 | 3.53 | 1/8 | ● | ● | ● | ● | ● | | ● | ● | ● | 212 |
| 22.23 | 31.75 | 5.33 | 3/16 | ● | ● | ● | | ● | ● | | | | 316 |
| 22.50 | 25.00 | 1.60 | | | ● | | | ● | | | | | 022516 |
| 23.00 | 25.40 | 1.50 | | | ● | | | ● | | | | | 023015 |
| 23.00 | 26.00 | 2.00 | | | ● | | | ● | | | | ● | 023020 |
| 23.00 | 27.00 | 2.50 | | | ● | | | ● | | | | | 023025 |
| 23.00 | 28.00 | 3.00 | | | ● | | | ● | | | | ● | 023030 |
| 23.00 | 30.00 | 4.00 | | | ● | | | ● | | | | | 023040 |


Metric sizes denoted by yellow shading

Quad ring




NBR Quad ring
Order code
imp. 4-(size)


Backup rings




Urethane Washer
Order code
imp. 8-(size)-P9
met. 9-(size)-P9



NBR Washer
Order code
imp. 8-(size)-N9



Hytrek Washer
Order code
imp. 8-(size)-H
met. 9-(size)-H




PTFE Washer
Order code
imp. 8-(size)-T
met. 9-(size)-T

| Shaft | Cylinder | O-Ring | | Quad | O-Rings | | | | | Back Up Rings | | | | Size |
|-------|----------|--------|------|-------|---------|-------|------|-------|-----|---------------|--------|------|--------|------|
| | | C/S | nom | NBR70 | NBR70 | NBR90 | Poly | Viton | NBR | Poly | Hytrek | PTFE | | |
| 23.47 | 29.36 | 2.95 | | | | ● | | ● V9 | | | | | 912 | |
| 23.80 | 26.97 | 1.78 | 1/16 | ● | ● | ● | | ● | | ● | | ● | 021 | |
| 23.80 | 28.58 | 2.62 | 3/32 | ● | ● | ● | ● | ● | | ● | ● | ● | 119 | |
| 23.80 | 30.15 | 3.53 | 1/8 | ● | ● | ● | ● | ● | | ● | ● | ● | 213 | |
| 23.80 | 33.32 | 5.33 | 3/16 | | ● | ● | | ● | ● | | | | 317 | |
| 24.00 | 26.40 | 1.50 | | | ● | | | ● | | | | | 024015 | |
| 24.00 | 27.00 | 2.00 | | | ● | | | ● | | | | ● | 024020 | |
| 24.00 | 28.00 | 2.50 | | | ● | | | ● | | | | ● | 024025 | |
| 24.00 | 29.00 | 3.00 | | | ● | | | ● | | | | | 024030 | |
| 24.00 | 30.00 | 3.50 | | | ● | ● | | ● | | | | ● | 024035 | |
| 24.00 | 31.00 | 4.00 | | | ● | | | | | | | | 024040 | |
| 25.00 | 27.40 | 1.50 | | | | | | ● | | | | | 025015 | |
| 25.00 | 28.00 | 2.00 | | | ● | | | ● | | | | | 025020 | |
| 25.00 | 29.00 | 2.40 | | | ● | | | ● | | | | | 025024 | |
| 25.00 | 29.00 | 2.50 | | | ● | ● | | ● | | | | | 025025 | |
| 25.00 | 30.00 | 3.10 | | | ● | ● | | ● | | ● | ● | | 025031 | |
| 25.00 | 31.00 | 3.50 | | | ● | ● | | ● | | | | ● | 025035 | |
| 25.00 | 32.00 | 4.00 | | | ● | | | ● | | | | | 025040 | |
| 25.00 | 34.00 | 5.00 | | | ● | | | | | | | | 025050 | |
| 25.00 | 35.00 | 6.00 | | | ● | | | | | | | | 025060 | |
| 25.04 | 30.94 | 2.95 | | | | ● | | ● V9 | | | | | 913 | |
| 25.40 | 28.58 | 1.78 | 1/16 | ● | ● | ● | ● | ● | | ● | ● | ● | 022 | |
| 25.40 | 30.15 | 2.62 | 3/32 | ● | ● | ● | ● | ● | | ● | ● | ● | 120 | |
| 25.40 | 31.75 | 3.53 | 1/8 | ● | ● | ● | ● | ● | | ● | ● | ● | 214 | |
| 25.40 | 34.93 | 5.33 | 3/16 | ● | ● | ● | ● | ● | ● | | | | 318 | |
| 25.50 | 28.00 | 1.60 | | | ● | | | ● | | | | | 025516 | |
| 26.00 | 28.40 | 1.50 | | | ● | | | ● | | | | | 026015 | |
| 26.00 | 29.00 | 2.00 | | | ● | | | ● | | | | | 026020 | |
| 26.00 | 30.00 | 2.50 | | | ● | | | ● | | | | | 026025 | |
| 26.00 | 31.00 | 3.00 | | | ● | | | ● | | | | | 026030 | |
| 26.00 | 32.00 | 3.50 | | | ● | ● | | ● | | | | ● | 026035 | |
| 26.00 | 33.00 | 4.00 | | | | | | ● | | | | | 026040 | |
| 26.59 | 32.49 | 2.95 | | | | ● | | ● V9 | | | | | 914 | |
| 26.97 | 30.15 | 1.78 | 1/16 | ● | ● | ● | ● | ● | ● | | ● | ● | 023 | |
| 26.97 | 31.75 | 2.62 | 3/32 | ● | ● | ● | ● | ● | | ● | ● | ● | 121 | |
| 26.97 | 33.32 | 3.53 | 1/8 | ● | ● | ● | ● | ● | | ● | ● | ● | 215 | |
| 26.97 | 36.50 | 5.33 | 3/16 | ● | ● | ● | ● | ● | ● | | | | 319 | |





Metric sizes denoted by yellow shading

Quad ring



NBR Quad ring
Order code
imp. 4-(size)

Backup rings

| | | | |
|---|---|--|---|
|  |  |  |  |
| Urethane Washer | NBR Washer | Hytrel Washer | PTFE Washer |
| Order code imp. 8-(size)-P9 met. 9-(size)-P9 | Order code imp. 8-(size)-N9 | Order code imp. 8-(size)-H met. 9-(size)-H | Order code imp. 8-(size)-T met. 9-(size)-T |

| Shaft | Cylinder | O-Ring | Quad | | O-Rings | | | | Back Up Rings | | | | Size | |
|-------|----------|--------|------|-----|---------|-------|-------|------|---------------|-----|------|--------|------|--------|
| | | | C/S | nom | NBR70 | NBR70 | NBR90 | Poly | Viton | NBR | Poly | Hytrel | | PTFE |
| 27.00 | 29.40 | 1.50 | | | | | | | ● | | | | | 027015 |
| 27.00 | 30.00 | 2.00 | | | ● | | | | ● | | | | | 027020 |
| 27.00 | 31.00 | 2.50 | | | ● | ● | | | ● | | | | | 027025 |
| 27.00 | 32.00 | 3.00 | | | ● | ● | | | ● | | ● | ● | | 027030 |
| 27.50 | 30.00 | 1.60 | | | ● | | | | | | | | | 027516 |
| 28.00 | 30.40 | 1.50 | | | ● | | | | ● | | | | | 028015 |
| 28.00 | 31.00 | 2.00 | | | ● | | | | ● | | | | | 028020 |
| 28.00 | 32.00 | 2.40 | | | ● | | | | | | | | | 028024 |
| 28.00 | 32.00 | 2.50 | | | ● | | | | ● | | | | | 028025 |
| 28.00 | 33.00 | 3.00 | | | ● | | | | ● | | | | | 028030 |
| 28.00 | 34.00 | 3.50 | | | ● | ● | | | ● | | | ● | | 028035 |
| 28.00 | 35.00 | 4.00 | | | ● | | | | | | | | | 028040 |
| 28.00 | 37.00 | 5.00 | | | ● | | | | | | | | | 028050 |
| 28.58 | 31.75 | 1.78 | 1/16 | ● | ● | ● | ● | ● | ● | | ● | ● | | 024 |
| 28.58 | 33.32 | 2.62 | 3/32 | ● | ● | ● | ● | ● | | ● | ● | ● | | 122 |
| 28.58 | 34.93 | 3.53 | 1/8 | ● | ● | ● | ● | ● | | ● | ● | ● | | 216 |
| 28.58 | 38.10 | 5.33 | 3/16 | ● | ● | ● | | ● | ● | | | ● | | 320 |
| 29.00 | 31.40 | 1.50 | | | | | | | ● | | | | | 029015 |
| 29.00 | 32.00 | 2.00 | | | ● | | | | ● | | | | | 029020 |
| 29.00 | 33.00 | 2.50 | | | ● | | | | ● | | | | | 029025 |
| 29.00 | 34.00 | 3.00 | | | ● | | | | ● | | | | | 029030 |
| 29.00 | 35.00 | 3.50 | | | ● | ● | | | ● | | | ● | | 029035 |
| 29.50 | 32.00 | 1.60 | | | ● | | | | ● | | | | | 029516 |
| 29.74 | 35.64 | 2.95 | | | | ● | | ● | V9 | | | | | 916 |
| 30.00 | 32.40 | 1.50 | | | ● | | | | ● | | | | | 030015 |
| 30.00 | 33.00 | 2.00 | | | ● | ● | | | ● | | | | | 030020 |
| 30.00 | 34.00 | 2.40 | | | ● | ● | | | ● | | | | | 030024 |
| 30.00 | 34.00 | 2.50 | | | ● | | | | ● | | | ● | | 030025 |
| 30.00 | 35.00 | 3.10 | | | ● | ● | | | ● | | ● | ● | | 030031 |
| 30.00 | 36.00 | 3.50 | | | ● | ● | | | ● | | | ● | | 030035 |
| 30.00 | 37.00 | 4.00 | | | ● | | | | ● | | | | | 030040 |
| 30.00 | 39.00 | 5.00 | | | ● | | | | | | | | | 030050 |
| 30.15 | 33.32 | 1.78 | 1/16 | ● | ● | ● | ● | ● | ● | | ● | ● | | 025 |
| 30.15 | 34.93 | 2.62 | 3/32 | ● | ● | ● | ● | ● | ● | | ● | ● | | 123 |
| 30.15 | 36.50 | 3.53 | 1/8 | ● | ● | ● | ● | ● | | ● | ● | ● | | 217 |
| 30.15 | 39.67 | 5.33 | 3/16 | ● | ● | ● | ● | ● | ● | | | | | 321 |
| 31.00 | 33.40 | 1.50 | | | ● | | | | | | | | | 031015 |

Metric sizes denoted by yellow shading


Quad ring



NBR Quad ring


Order code
imp. 4-(size)

Backup rings




Urethane Washer

Order code
imp. 8-(size)-P9
met. 9-(size)-P9




NBR Washer

Order code
imp. 8-(size)-N9



Hytrell Washer

Order code
imp. 8-(size)-H
met. 9-(size)-H



PTFE Washer

Order code
imp. 8-(size)-T
met. 9-(size)-T

| Shaft | Cylinder | O-Ring | | Quad | O-Rings | | | | Back Up Rings | | | | Size |
|-------|----------|--------|------|-------|---------|-------|------|-------|---------------|------|---------|------|--------|
| | | C/S | nom | NBR70 | NBR70 | NBR90 | Poly | Viton | NBR | Poly | Hytrell | PTFE | |
| 31.00 | 34.00 | 2.00 | | | | | | ● | | | | | 031020 |
| 31.00 | 35.00 | 2.50 | | | | | | ● | | | | | 031025 |
| 31.00 | 36.00 | 3.00 | | | ● | | | ● | | | | | 031030 |
| 31.00 | 37.00 | 3.50 | | | ● | ● | | ● | | | | ● | 031035 |
| 31.75 | 34.93 | 1.78 | 1/16 | ● | ● | ● | ● | ● | ● | | ● | ● | 026 |
| 31.75 | 36.50 | 2.62 | 3/32 | ● | ● | ● | ● | ● | ● | | ● | ● | 124 |
| 31.75 | 38.10 | 3.53 | 1/8 | ● | ● | ● | ● | ● | | ● | ● | ● | 218 |
| 31.75 | 41.28 | 5.33 | 3/16 | ● | ● | ● | ● | ● | ● | | | | 322 |
| 31.75 | 44.45 | 6.99 | 1/4 | | ● | | | | | | | | 400 |
| 32.00 | 35.00 | 2.00 | | | ● | ● | | ● | | | | | 032020 |
| 32.00 | 36.00 | 2.40 | | | ● | | | ● | | | | | 032024 |
| 32.00 | 36.00 | 2.50 | | | ● | | | ● | | | | | 032025 |
| 32.00 | 37.00 | 3.00 | | | ● | | | ● | | | | | 032030 |
| 32.00 | 38.00 | 3.50 | | | ● | ● | | ● | | | | ● | 032035 |
| 32.00 | 39.00 | 4.00 | | | ● | | | ● | | | | | 032040 |
| 32.50 | 35.00 | 1.60 | | | ● | | | | | | | | 032516 |
| 33.00 | 36.00 | 2.00 | | | ● | | | ● | | | | | 033020 |
| 33.00 | 37.00 | 2.50 | | | ● | ● | | ● | | | | | 033025 |
| 33.00 | 38.00 | 3.00 | | | ● | ● | | ● | | | ● | | 033030 |
| 33.00 | 40.00 | 4.00 | | | ● | | | | | | | | 033040 |
| 33.32 | 36.50 | 1.78 | 1/16 | ● | ● | ● | | ● | ● | | | ● | 027 |
| 33.32 | 38.10 | 2.62 | 3/32 | ● | ● | ● | | ● | | ● | ● | ● | 125 |
| 33.32 | 39.67 | 3.53 | 1/8 | ● | ● | ● | ● | ● | | ● | ● | ● | 219 |
| 33.32 | 42.85 | 5.33 | 3/16 | ● | ● | ● | | ● | ● | | | | 323 |
| 34.00 | 37.00 | 2.00 | | | ● | | | ● | | | | | 034020 |
| 34.00 | 38.00 | 2.50 | | | ● | | | ● | | | | | 034025 |
| 34.00 | 39.00 | 3.00 | | | ● | | | ● | | | | | 034030 |
| 34.00 | 40.00 | 3.50 | | | ● | ● | | ● | | | | ● | 034035 |
| 34.00 | 41.00 | 4.00 | | | ● | | | | | | | | 034040 |
| 34.00 | 43.00 | 5.00 | | | ● | | | | | | | | 034050 |
| 34.42 | 40.31 | 2.95 | | | | ● | | ● V9 | | | | | 918 |
| 34.93 | 38.10 | 1.78 | 1/16 | ● | ● | ● | ● | ● | ● | | | ● | 028 |
| 34.93 | 39.67 | 2.62 | 3/32 | ● | ● | ● | ● | ● | | ● | ● | ● | 126 |
| 34.93 | 41.28 | 3.53 | 1/8 | ● | ● | ● | ● | ● | | ● | ● | ● | 220 |
| 34.93 | 44.45 | 5.33 | 3/16 | ● | ● | ● | | ● | ● | | | | 324 |
| 35.00 | 37.40 | 1.50 | | | ● | | | ● | | | | | 035015 |
| 35.00 | 38.00 | 2.00 | | | ● | | | ● | | | | | 035020 |

Metric sizes denoted by yellow shading


Quad ring



NBR Quad ring


Order code
imp. 4-(size)

Backup rings




Urethane Washer

Order code
imp. 8-(size)-P9
met. 9-(size)-P9




NBR Washer

Order code
imp. 8-(size)-N9



Hytrel Washer

Order code
imp. 8-(size)-H
met. 9-(size)-H



PTFE Washer

Order code
imp. 8-(size)-T
met. 9-(size)-T

| Shaft | Cylinder | O-Ring | | Quad | O-Rings | | | | Back Up Rings | | | | Size |
|-------|----------|--------|------|-------|---------|-------|------|-------|---------------|------|--------|------|--------|
| | | C/S | nom | NBR70 | NBR70 | NBR90 | Poly | Viton | NBR | Poly | Hytrel | PTFE | |
| 35.00 | 39.00 | 2.40 | | | ● | | | | | | | | 035024 |
| 35.00 | 39.00 | 2.50 | | | ● | | | ● | | | | | 035025 |
| 35.00 | 40.00 | 3.10 | | | ● | ● | | ● | | ● | ● | | 035031 |
| 35.00 | 41.00 | 3.50 | | | ● | ● | | ● | | | | ● | 035035 |
| 35.00 | 42.00 | 4.00 | | | ● | | | ● | | | | | 035040 |
| 35.00 | 44.00 | 5.00 | | | ● | | | | | | | | 035050 |
| 35.00 | 45.00 | 5.70 | | | ● | | | | | | | | 035057 |
| 35.50 | 38.00 | 1.60 | | | ● | | | | | | | | 035516 |
| 36.00 | 39.00 | 2.00 | | | ● | | | ● | | | | | 036020 |
| 36.00 | 40.00 | 2.50 | | | ● | | | ● | | | | | 036025 |
| 36.00 | 41.00 | 3.00 | | | ● | | | ● | | | | | 036030 |
| 36.00 | 42.00 | 3.50 | | | ● | ● | | ● | | | | ● | 036035 |
| 36.00 | 43.00 | 4.00 | | | ● | | | | | | | | 036040 |
| 36.50 | 41.28 | 2.62 | 3/32 | ● | ● | ● | ● | ● | ● | ● | ● | ● | 127 |
| 36.50 | 42.85 | 3.53 | 1/8 | ● | ● | ● | ● | ● | ● | ● | ● | ● | 221 |
| 37.00 | 40.00 | 2.00 | | | | | | ● | | | | | 037020 |
| 37.00 | 41.00 | 2.50 | | | ● | | | ● | | | | | 037025 |
| 37.00 | 42.00 | 3.00 | | | ● | | | ● | | ● | | | 037030 |
| 37.00 | 52.00 | 8.40 | | | ● | | | | | | | | 037084 |
| 37.47 | 43.46 | 3.00 | | | | ● | | ● V9 | | | | | 920 |
| 37.50 | 40.00 | 1.60 | | | ● | | | ● | | | | | 037516 |
| 38.00 | 41.00 | 2.00 | | | ● | | | ● | | | | | 038020 |
| 38.00 | 42.00 | 2.40 | | | ● | | | | | | | | 038024 |
| 38.00 | 42.00 | 2.50 | | | ● | ● | | ● | | | | | 038025 |
| 38.00 | 43.00 | 3.00 | | | ● | ● | | ● | | | | ● | 038030 |
| 38.00 | 44.00 | 3.50 | | | ● | ● | | ● | | | | ● | 038035 |
| 38.00 | 45.00 | 4.00 | | | ● | | | ● | | | | | 038040 |
| 38.10 | 41.28 | 1.78 | 1/16 | ● | ● | ● | ● | ● | ● | ● | ● | ● | 029 |
| 38.10 | 42.85 | 2.62 | 3/32 | ● | ● | ● | ● | ● | ● | ● | ● | ● | 128 |
| 38.10 | 44.45 | 3.53 | 1/8 | ● | ● | ● | ● | ● | ● | ● | ● | ● | 222 |
| 38.10 | 47.63 | 5.33 | 3/16 | ● | ● | ● | ● | ● | ● | ● | ● | ● | 325 |
| 38.10 | 50.80 | 6.99 | 1/4 | | ● | | | | | ● | | | 401 |
| 39.00 | 42.00 | 2.00 | | | ● | | | ● | | | | | 039020 |
| 39.00 | 43.00 | 2.50 | | | ● | | | ● | | | | | 039025 |
| 39.00 | 44.00 | 3.00 | | | ● | | | ● | | | | | 039030 |
| 39.00 | 45.00 | 3.50 | | | ● | ● | | ● | | | | ● | 039035 |
| 39.67 | 44.45 | 2.62 | 3/32 | ● | ● | ● | ● | ● | ● | ● | ● | ● | 129 |

Metric sizes denoted by yellow shading





Quad ring



NBR Quad ring

Order code
imp. 4-(size)

Backup rings

| | | | |
|---|---|--|---|
|  |  |  |  |
| Urethane Washer | NBR Washer | Hytrel Washer | PTFE Washer |
| Order code imp. 8-(size)-P9 met. 9-(size)-P9 | Order code imp. 8-(size)-N9 | Order code imp. 8-(size)-H met. 9-(size)-H | Order code imp. 8-(size)-T met. 9-(size)-T |

| Shaft | Cylinder | O-Ring | Quad | | O-Rings | | | | | Back Up Rings | | | | Size | |
|-------|----------|--------|------|-----|---------|-------|-------|------|-------|---------------|------|--------|------|------|--------|
| | | | C/S | nom | NBR70 | NBR70 | NBR90 | Poly | Viton | NBR | Poly | Hytrel | PTFE | | |
| 40.00 | 42.40 | 1.50 | | | | ● | | | | ● | | | | | 040015 |
| 40.00 | 43.00 | 2.00 | | | | ● | | | | ● | | | | | 040020 |
| 40.00 | 44.00 | 2.40 | | | | ● | | | | ● | | | | | 040024 |
| 40.00 | 44.00 | 2.50 | | | | ● | | | | ● | | | | | 040025 |
| 40.00 | 45.00 | 3.10 | | | | ● | | ● | | ● | | | ● | ● | 040031 |
| 40.00 | 46.00 | 3.50 | | | | ● | | ● | | | | | | ● | 040035 |
| 40.00 | 47.00 | 4.00 | | | | ● | | | | ● | | | | | 040040 |
| 40.00 | 48.40 | 5.00 | | | | ● | | | | ● | | | | | 040050 |
| 40.00 | 50.00 | 5.70 | | | | ● | | | | | | | ● | | 040057 |
| 40.00 | 50.00 | 6.00 | | | | ● | | | | | | | | | 040060 |
| 41.00 | 44.00 | 2.00 | | | | | | | | ● | | | | | 041020 |
| 41.00 | 45.00 | 2.50 | | | | | | | | ● | | | | | 041025 |
| 41.00 | 46.00 | 3.00 | | | | | | | | ● | | | | | 041030 |
| 41.00 | 47.00 | 3.50 | | | | ● | | ● | | ● | | | | ● | 041035 |
| 41.28 | 44.45 | 1.78 | 1/16 | | ● | ● | ● | | | ● | | | | ● | 030 |
| 41.28 | 46.02 | 2.62 | 3/32 | | ● | ● | ● | ● | | ● | | | ● | ● | 130 |
| 41.28 | 47.63 | 3.53 | 1/8 | | ● | ● | ● | ● | | ● | | ● | ● | ● | 223 |
| 41.28 | 50.80 | 5.33 | 3/16 | | ● | ● | ● | ● | | ● | | ● | ● | ● | 326 |
| 41.28 | 53.98 | 6.99 | 1/4 | | | ● | | | | | | | | | 402 |
| 42.00 | 44.40 | 1.50 | | | | ● | | | | | | | | | 042015 |
| 42.00 | 45.00 | 2.00 | | | | ● | | | | ● | | | | | 042020 |
| 42.00 | 46.00 | 2.40 | | | | ● | | | | | | | | | 042024 |
| 42.00 | 46.00 | 2.50 | | | | ● | | | | ● | | | | | 042025 |
| 42.00 | 47.00 | 3.10 | | | | ● | | ● | | ● | | | | | 042031 |
| 42.00 | 48.00 | 3.50 | | | | ● | | ● | | | | | | ● | 042035 |
| 42.00 | 49.00 | 4.00 | | | | ● | | | | ● | | | | | 042040 |
| 42.00 | 51.00 | 5.00 | | | | ● | | | | ● | | | | | 042050 |
| 42.85 | 47.63 | 2.62 | 3/32 | | ● | ● | ● | ● | | ● | | ● | ● | ● | 131 |
| 43.00 | 46.00 | 2.00 | | | | ● | | | | ● | | | | | 043020 |
| 43.00 | 47.00 | 2.50 | | | | ● | | | | ● | | | | | 043025 |
| 43.00 | 48.00 | 3.00 | | | | ● | | | | | | ● | | | 043030 |
| 43.69 | 49.68 | 3.00 | | | | | ● | | | ● V9 | | | | | 924 |
| 44.00 | 47.00 | 2.00 | | | | | | | | ● | | | | | 044020 |
| 44.00 | 48.00 | 2.50 | | | | | ● | | | ● | | | | | 044025 |
| 44.00 | 49.00 | 3.00 | | | | ● | ● | | | ● | | | | | 044030 |
| 44.00 | 50.00 | 3.50 | | | | ● | ● | | | ● | | | | ● | 044035 |
| 44.00 | 51.00 | 4.00 | | | | ● | | | | ● | | | | | 044040 |


Metric sizes denoted by yellow shading

Quad ring




NBR Quad ring
Order code
imp. 4-(size)


Backup rings




Urethane Washer
Order code
imp. 8-(size)-P9
met. 9-(size)-P9



NBR Washer
Order code
imp. 8-(size)-N9



Hytrel Washer
Order code
imp. 8-(size)-H
met. 9-(size)-H



PTFE Washer
Order code
imp. 8-(size)-T
met. 9-(size)-T

| Shaft | Cylinder | O-Ring | | Quad | O-Rings | | | | Back Up Rings | | | | Size |
|-------|----------|--------|------|-------|---------|-------|------|-------|---------------|------|--------|------|--------|
| | | C/S | nom | NBR70 | NBR70 | NBR90 | Poly | Viton | NBR | Poly | Hytrel | PTFE | |
| 44.45 | 47.63 | 1.78 | 1/16 | ● | ● | ● | | ● | ● | | | | 031 |
| 44.45 | 49.20 | 2.62 | 3/32 | ● | ● | ● | ● | ● | | ● | ● | ● | 132 |
| 44.45 | 50.80 | 3.53 | 1/8 | ● | ● | ● | ● | ● | | ● | ● | ● | 224 |
| 44.45 | 53.98 | 5.33 | 3/16 | ● | ● | ● | ● | ● | | ● | ● | ● | 327 |
| 44.45 | 57.15 | 6.99 | 1/4 | | ● | | | | | | | | 403 |
| 45.00 | 47.40 | 1.50 | | | ● | | | | | | | | 045015 |
| 45.00 | 48.00 | 2.00 | | | ● | | | ● | | | | | 045020 |
| 45.00 | 49.00 | 2.40 | | | ● | | | ● | | | | | 045024 |
| 45.00 | 49.00 | 2.50 | | | ● | | | ● | | | | | 045025 |
| 45.00 | 50.00 | 3.10 | | | ● | ● | | ● | | | ● | ● | 045031 |
| 45.00 | 51.00 | 3.50 | | | ● | ● | | ● | | | | ● | 045035 |
| 45.00 | 52.00 | 4.00 | | | ● | | | | | | | | 045040 |
| 45.00 | 54.00 | 5.00 | | | ● | | | ● | | | | | 045050 |
| 45.00 | 55.00 | 5.70 | | | | | | | | | ● | | 045057 |
| 45.00 | 55.00 | 6.00 | | | ● | | | | | | | | 045060 |
| 46.00 | 49.00 | 2.00 | | | ● | | | ● | | | | | 046020 |
| 46.00 | 50.00 | 2.50 | | | | | | ● | | | | | 046025 |
| 46.00 | 51.00 | 3.00 | | | ● | | | ● | | | | | 046030 |
| 46.00 | 52.00 | 3.50 | | | ● | ● | | ● | | | | ● | 046035 |
| 46.00 | 53.00 | 4.00 | | | ● | | | ● | | | | | 046040 |
| 46.00 | 56.00 | 5.70 | | | ● | | | | | | | | 046057 |
| 46.02 | 50.80 | 2.62 | 3/32 | ● | ● | ● | | ● | | ● | ● | ● | 133 |
| 47.00 | 50.00 | 2.00 | | | ● | | | ● | | | | | 047020 |
| 47.00 | 51.00 | 2.50 | | | | | | ● | | | | | 047025 |
| 47.00 | 52.00 | 3.00 | | | | | | ● | | | ● | | 047030 |
| 47.63 | 50.80 | 1.78 | 1/16 | ● | ● | ● | | ● | ● | | ● | | 032 |
| 47.63 | 52.37 | 2.62 | 3/32 | ● | ● | ● | ● | ● | | ● | | ● | 134 |
| 47.63 | 53.98 | 3.53 | 1/8 | ● | ● | ● | ● | ● | | ● | ● | ● | 225 |
| 47.63 | 57.15 | 5.33 | 3/16 | ● | ● | ● | ● | ● | | ● | ● | ● | 328 |
| 47.63 | 60.33 | 6.99 | 1/4 | | ● | | | | | | | | 404 |
| 48.00 | 51.00 | 2.00 | | | ● | | | ● | | | | | 048020 |
| 48.00 | 52.00 | 2.40 | | | ● | | | | | | | | 048024 |
| 48.00 | 52.00 | 2.50 | | | | | | ● | | | | | 048025 |
| 48.00 | 53.00 | 3.00 | | | ● | | | ● | | | | | 048030 |
| 48.00 | 54.00 | 3.50 | | | ● | ● | | ● | | | | ● | 048035 |
| 48.00 | 55.00 | 4.00 | | | ● | | | ● | | | | | 048040 |
| 48.00 | 57.00 | 5.00 | | | ● | | | | | | | | 048050 |





Metric sizes denoted by yellow shading

Quad ring



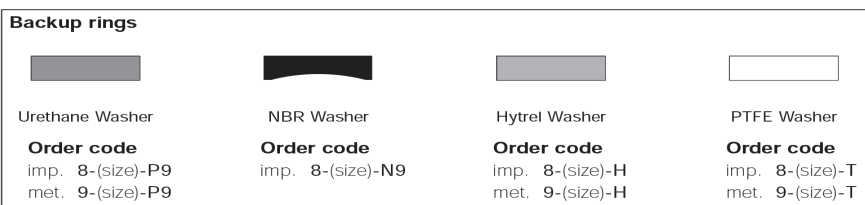
NBR Quad ring
Order code
imp. 4-(size)

Backup rings

| | | | |
|---|---|--|---|
|  |  |  |  |
| Urethane Washer | NBR Washer | Hytrel Washer | PTFE Washer |
| Order code imp. 8-(size)-P9 met. 9-(size)-P9 | Order code imp. 8-(size)-N9 | Order code imp. 8-(size)-H met. 9-(size)-H | Order code imp. 8-(size)-T met. 9-(size)-T |

| Shaft | Cylinder | O-Ring | | Quad | O-Rings | | | | | Back Up Rings | | | | Size |
|-------|----------|--------|------|-------|---------|-------|------|-------|-----|---------------|--------|------|---|--------|
| | | C/S | nom | NBR70 | NBR70 | NBR90 | Poly | Viton | NBR | Poly | Hytrel | PTFE | | |
| 48.00 | 58.00 | 5.70 | | | ● | | | | | | | | | 048057 |
| 48.50 | 53.50 | 3.00 | | | | | | | | | ● | | | 048530 |
| 49.00 | 52.00 | 2.00 | | | | | | ● | | | | | | 049020 |
| 49.00 | 53.00 | 2.50 | | | | ● | | ● | | | | | | 049025 |
| 49.00 | 54.00 | 3.00 | | | ● | | | ● | | | | | | 049030 |
| 49.00 | 55.00 | 3.50 | | | ● | ● | | ● | | | | | ● | 049035 |
| 49.20 | 55.55 | 1.63 | 1/8 | | | | | | | ● | | | | 225A |
| 49.20 | 53.98 | 2.62 | 3/32 | ● | ● | ● | ● | ● | ● | | | | ● | 135 |
| 50.00 | 53.00 | 2.00 | | | ● | | | ● | | | | | | 050020 |
| 50.00 | 54.00 | 2.40 | | | ● | | | | | | | | | 050024 |
| 50.00 | 54.00 | 2.50 | | | ● | | | ● | | | | | | 050025 |
| 50.00 | 55.00 | 3.10 | | | ● | ● | | ● | | | ● | | ● | 050031 |
| 50.00 | 56.00 | 3.50 | | | ● | ● | | ● | | | | | ● | 050035 |
| 50.00 | 57.00 | 4.00 | | | ● | | | ● | | | | | | 050040 |
| 50.00 | 59.00 | 5.00 | | | ● | | | ● | | | | | | 050050 |
| 50.00 | 60.00 | 5.70 | | | ● | ● | | ● | | | ● | | ● | 050057 |
| 50.00 | 60.00 | 6.00 | | | ● | | | | | | | | | 050060 |
| 50.80 | 53.98 | 1.78 | 1/16 | ● | ● | ● | | ● | ● | | | | | 033 |
| 50.80 | 55.55 | 2.62 | 3/32 | ● | ● | ● | ● | ● | | ● | | | ● | 136 |
| 50.80 | 57.15 | 3.53 | 1/8 | ● | ● | ● | ● | ● | | ● | ● | | ● | 226 |
| 50.80 | 60.33 | 5.33 | 3/16 | ● | ● | ● | ● | ● | | ● | ● | | ● | 329 |
| 50.80 | 63.50 | 6.99 | 1/4 | | ● | | | | | | | | | 405 |
| 51.00 | 55.00 | 2.50 | | | | | | ● | | | | | | 051025 |
| 52.00 | 55.00 | 2.00 | | | ● | | | ● | | | | | | 052020 |
| 52.00 | 56.00 | 2.40 | | | ● | | | | | | | | | 052024 |
| 52.00 | 56.00 | 2.50 | | | | | | ● | | | | | | 052025 |
| 52.00 | 57.00 | 3.00 | | | ● | | | | | | | | | 052030 |
| 52.00 | 59.00 | 4.00 | | | ● | | | ● | | | | | | 052040 |
| 52.00 | 62.00 | 5.70 | | | ● | ● | | | | | | | | 052057 |
| 52.37 | 57.15 | 2.62 | 3/32 | ● | ● | ● | | ● | ● | | | | ● | 137 |
| 53.00 | 57.00 | 2.50 | | | | | | ● | | | | | | 053025 |
| 53.00 | 63.00 | 5.70 | | | ● | ● | | ● | | | ● | | ● | 053057 |
| 53.09 | 59.08 | 3.00 | | | | ● | | ● V9 | | | | | | 928 |
| 53.98 | 57.15 | 1.78 | 1/16 | ● | ● | ● | | ● | ● | | | | | 034 |
| 53.98 | 58.72 | 2.62 | 3/32 | ● | ● | ● | ● | ● | | ● | | | ● | 138 |
| 53.98 | 60.33 | 3.53 | 1/8 | ● | ● | ● | ● | ● | | ● | ● | | ● | 227 |
| 53.98 | 63.50 | 5.33 | 3/16 | ● | ● | ● | ● | ● | | ● | ● | | ● | 330 |

Metric sizes denoted by yellow shading



| Shaft | Cylinder | O-Ring | | Quad | O-Rings | | | | Back Up Rings | | | | Size |
|-------|----------|--------|------|-------|---------|-------|------|-------|---------------|------|--------|------|--------|
| | | C/S | nom | NBR70 | NBR70 | NBR90 | Poly | Viton | NBR | Poly | Hytrel | PTFE | |
| 53.98 | 66.68 | 6.99 | 1/4 | | ● | | | | | | | | 406 |
| 54.00 | 57.00 | 2.00 | | | ● | | | | | | | | 054020 |
| 54.00 | 58.00 | 2.50 | | | | | | ● | | | | | 054025 |
| 54.00 | 61.00 | 4.00 | | | | | | ● | | | | | 054040 |
| 55.00 | 58.00 | 2.00 | | | ● | | | | | | | | 055020 |
| 55.00 | 59.00 | 2.40 | | | ● | | | | | | | | 055024 |
| 55.00 | 59.00 | 2.50 | | | ● | | | ● | | | | | 055025 |
| 55.00 | 60.00 | 3.10 | | | ● | ● | | ● | | ● | ● | | 055031 |
| 55.00 | 62.00 | 4.00 | | | ● | | | ● | | | | | 055040 |
| 55.00 | 64.00 | 5.00 | | | ● | | | ● | | | | | 055050 |
| 55.00 | 65.00 | 5.70 | | | ● | ● | | ● | | ● | ● | | 055057 |
| 55.55 | 60.33 | 2.62 | 3/32 | ● | ● | ● | ● | ● | | ● | | ● | 139 |
| 56.00 | 59.00 | 2.00 | | | ● | | | | | | | | 056020 |
| 56.00 | 60.00 | 2.50 | | | | | | ● | | | | | 056025 |
| 56.00 | 61.00 | 3.00 | | | | | | ● | | | | | 056030 |
| 56.00 | 63.00 | 4.00 | | | | | | ● | | | | | 056040 |
| 56.00 | 66.00 | 5.70 | | | ● | ● | | ● | | | | ● | 056057 |
| 57.00 | 60.00 | 2.00 | | | ● | | | | | | | | 057020 |
| 57.00 | 61.00 | 2.50 | | | | | | ● | | | | | 057025 |
| 57.00 | 62.00 | 3.00 | | | ● | ● | | ● | | | | | 057030 |
| 57.15 | 60.33 | 1.78 | 1/16 | ● | ● | ● | ● | ● | | ● | | | 035 |
| 57.15 | 61.90 | 2.62 | 3/32 | ● | ● | ● | ● | ● | ● | | | ● | 140 |
| 57.15 | 63.50 | 3.53 | 1/8 | ● | ● | ● | ● | ● | | ● | ● | ● | 228 |
| 57.15 | 66.68 | 5.33 | 3/16 | ● | ● | ● | ● | ● | | ● | ● | ● | 331 |
| 57.15 | 69.85 | 6.99 | 1/4 | | ● | | | | | | | | 407 |
| 58.00 | 61.00 | 2.00 | | | ● | | | | | | | | 058020 |
| 58.00 | 62.00 | 2.40 | | | ● | | | | | | | | 058024 |
| 58.00 | 62.00 | 2.50 | | | | | | ● | | | | | 058025 |
| 58.00 | 63.00 | 3.10 | | | ● | | | ● | | ● | ● | | 058031 |
| 58.00 | 65.00 | 4.00 | | | ● | | | ● | | | | | 058040 |
| 58.00 | 68.00 | 5.70 | | | ● | ● | | | | | | ● | 058057 |
| 58.00 | 68.00 | 6.00 | | | ● | | | | | | | | 058060 |
| 58.72 | 63.50 | 2.62 | 3/32 | ● | ● | ● | | ● | ● | | | ● | 141 |
| 59.00 | 63.00 | 2.50 | | | | | | ● | | | | | 059025 |
| 59.00 | 64.00 | 3.00 | | | ● | | | ● | | | | | 059030 |
| 59.36 | 65.35 | 3.00 | | | | ● | | ● V9 | | | | | 932 |
| 60.00 | 63.00 | 2.00 | | | ● | | | | | | | | 060020 |





Metric sizes denoted by yellow shading

Quad ring



NBR Quad ring
Order code
imp. 4-(size)

Backup rings

| | | | |
|---|---|--|---|
|  |  |  |  |
| Urethane Washer | NBR Washer | Hytrel Washer | PTFE Washer |
| Order code imp. 8-(size)-P9 met. 9-(size)-P9 | Order code imp. 8-(size)-N9 | Order code imp. 8-(size)-H met. 9-(size)-H | Order code imp. 8-(size)-T met. 9-(size)-T |

| Shaft | Cylinder | O-Ring | | Quad | O-Rings | | | | | Back Up Rings | | | | Size |
|-------|----------|--------|------|-------|---------|-------|------|-------|-----|---------------|--------|------|---|--------|
| | | C/S | nom | NBR70 | NBR70 | NBR90 | Poly | Viton | NBR | Poly | Hytrel | PTFE | | |
| 60.00 | 64.00 | 2.40 | | | ● | | | | ● | | | | | 060024 |
| 60.00 | 64.00 | 2.50 | | | ● | | | | ● | | | | | 060025 |
| 60.00 | 65.00 | 3.10 | | | ● | ● | | | ● | | ● | ● | | 060031 |
| 60.00 | 67.00 | 4.00 | | | ● | | | | ● | | | | | 060040 |
| 60.00 | 69.00 | 5.00 | | | ● | | | | ● | | | | | 060050 |
| 60.00 | 70.00 | 5.70 | | | ● | ● | | | ● | | ● | ● | | 060057 |
| 60.00 | 78.00 | 9.00 | | | ● | | | | | | | | | 060090 |
| 60.33 | 63.50 | 1.78 | 1/16 | ● | ● | ● | | | ● | ● | | | ● | 036 |
| 60.33 | 65.07 | 2.62 | 3/32 | ● | ● | ● | | | ● | ● | | | ● | 142 |
| 60.33 | 66.68 | 3.53 | 1/8 | ● | ● | ● | ● | | ● | ● | ● | ● | ● | 229 |
| 60.33 | 69.85 | 5.33 | 3/16 | ● | ● | ● | ● | | ● | ● | ● | ● | ● | 332 |
| 60.33 | 73.03 | 6.99 | 1/4 | | ● | | | | | | | | | 408 |
| 61.00 | 65.00 | 2.50 | | | | | | | ● | | | | | 061025 |
| 61.90 | 66.68 | 2.62 | 3/32 | ● | ● | ● | | | ● | ● | | ● | ● | 143 |
| 62.00 | 64.40 | 1.50 | | | ● | | | | | | | | | 062015 |
| 62.00 | 66.00 | 2.40 | | | ● | | | | | | | | | 062024 |
| 62.00 | 66.00 | 2.50 | | | ● | | | | ● | | | | | 062025 |
| 62.00 | 67.00 | 3.00 | | | ● | | | | | | | | | 062030 |
| 62.00 | 69.00 | 4.00 | | | ● | | | | ● | | | | | 062040 |
| 62.00 | 72.00 | 5.70 | | | ● | ● | | | ● | | | | | 062057 |
| 63.00 | 66.00 | 2.00 | | | ● | | | | | | | | | 063020 |
| 63.00 | 67.00 | 2.50 | | | ● | | | | ● | | | | | 063025 |
| 63.00 | 68.00 | 3.00 | | | ● | ● | | | ● | | ● | | | 063030 |
| 63.00 | 73.00 | 5.70 | | | ● | ● | | | ● | | | | | 063057 |
| 63.50 | 66.68 | 1.78 | 1/16 | ● | ● | ● | | | ● | ● | | | ● | 037 |
| 63.50 | 68.25 | 2.62 | 3/32 | ● | ● | ● | | | ● | ● | | | ● | 144 |
| 63.50 | 69.85 | 3.53 | 1/8 | ● | ● | ● | ● | | ● | ● | ● | ● | ● | 230 |
| 63.50 | 73.03 | 5.33 | 3/16 | ● | ● | ● | ● | | ● | ● | ● | ● | ● | 333 |
| 63.50 | 76.20 | 6.99 | 1/4 | | ● | | | | | | | | | 409 |
| 64.00 | 69.00 | 3.00 | | | | | | | ● | | | | | 064030 |
| 64.00 | 71.00 | 4.00 | | | ● | | | | ● | | | | ● | 064040 |
| 65.00 | 68.00 | 2.00 | | | ● | | | | | | | | | 065020 |
| 65.00 | 69.00 | 2.40 | | | ● | | | | | | | | | 065024 |
| 65.00 | 69.00 | 2.50 | | | ● | | | | ● | | | | | 065025 |
| 65.00 | 70.00 | 3.10 | | | ● | ● | | | ● | | ● | ● | | 065031 |
| 65.00 | 72.00 | 4.00 | | | ● | | | | | | | | | 065040 |
| 65.00 | 74.00 | 5.00 | | | ● | | | | ● | | | | | 065050 |


Metric sizes denoted by yellow shading

Quad ring




NBR Quad ring
Order code
imp. 4-(size)


Backup rings




Urethane Washer
Order code
imp. 8-(size)-P9
met. 9-(size)-P9



NBR Washer
Order code
imp. 8-(size)-N9



Hytrel Washer
Order code
imp. 8-(size)-H
met. 9-(size)-H




PTFE Washer
Order code
imp. 8-(size)-T
met. 9-(size)-T

| Shaft | Cylinder | O-Ring | | Quad | O-Rings | | | | Back Up Rings | | | | Size |
|-------|----------|--------|------|-------|---------|-------|------|-------|---------------|------|--------|------|--------|
| | | C/S | nom | NBR70 | NBR70 | NBR90 | Poly | Viton | NBR | Poly | Hytrel | PTFE | |
| 65.00 | 75.00 | 5.70 | | | ● | ● | | ● | | | ● | ● | 065057 |
| 65.07 | 69.85 | 2.62 | 3/32 | ● | ● | ● | | ● | ● | | | ● | 145 |
| 66.00 | 69.00 | 2.00 | | | ● | | | | | | | | 066020 |
| 66.00 | 73.00 | 4.00 | | | | | | ● | | | | | 066040 |
| 66.68 | 69.85 | 1.78 | 1/16 | ● | ● | ● | | ● | ● | | | | 038 |
| 66.68 | 71.42 | 2.62 | 3/32 | ● | ● | ● | | ● | ● | | | ● | 146 |
| 66.68 | 73.03 | 3.53 | 1/8 | ● | ● | ● | ● | ● | | ● | ● | ● | 231 |
| 66.68 | 76.20 | 5.33 | 3/16 | ● | ● | ● | ● | ● | ● | ● | ● | ● | 334 |
| 66.68 | 79.38 | 6.99 | 1/4 | | ● | | | | | | | | 410 |
| 67.00 | 71.00 | 2.50 | | | | | | ● | | | | | 067025 |
| 67.00 | 77.00 | 5.70 | | | ● | ● | | | | | | ● | 067057 |
| 68.00 | 72.00 | 2.40 | | | ● | | | | | | | | 068024 |
| 68.00 | 72.00 | 2.50 | | | | | | ● | | | | | 068025 |
| 68.00 | 75.00 | 4.00 | | | ● | | | ● | | | | | 068040 |
| 68.25 | 73.03 | 2.62 | 3/32 | ● | ● | | ● | ● | ● | | | ● | 147 |
| 69.00 | 73.00 | 2.50 | | | | | | ● | | | | | 069025 |
| 69.00 | 74.00 | 3.00 | | | | | | | | ● | | | 069030 |
| 69.85 | 73.03 | 1.78 | 1/16 | ● | ● | ● | | ● | | ● | | | 039 |
| 69.85 | 74.60 | 2.62 | 3/32 | ● | ● | ● | | ● | ● | | | ● | 148 |
| 69.85 | 76.20 | 3.53 | 1/8 | ● | ● | ● | ● | ● | ● | ● | ● | ● | 232 |
| 69.85 | 79.38 | 5.33 | 3/16 | ● | ● | ● | | ● | ● | ● | ● | ● | 335 |
| 69.85 | 82.55 | 6.99 | 1/4 | | ● | | | | | | | | 411 |
| 70.00 | 73.00 | 2.00 | | | ● | | | | | | | | 070020 |
| 70.00 | 74.00 | 2.40 | | | ● | | | | | | | | 070024 |
| 70.00 | 74.00 | 2.50 | | | ● | | | ● | | | | | 070025 |
| 70.00 | 75.00 | 3.10 | | | ● | ● | | ● | | ● | ● | | 070031 |
| 70.00 | 77.00 | 4.00 | | | ● | | | ● | | | | | 070040 |
| 70.00 | 79.00 | 5.00 | | | ● | | | ● | | | | | 070050 |
| 70.00 | 80.00 | 5.70 | | | ● | ● | | ● | | ● | ● | | 070057 |
| 70.00 | 80.00 | 6.00 | | | ● | | | | | | | | 070060 |
| 71.00 | 75.00 | 2.50 | | | | | | ● | | | | | 071025 |
| 71.00 | 81.00 | 5.70 | | | ● | ● | | | | | | ● | 071057 |
| 71.42 | 76.20 | 2.62 | 3/32 | ● | ● | ● | | ● | ● | | | ● | 149 |
| 72.00 | 76.00 | 2.50 | | | | | | ● | | | | | 072025 |
| 72.00 | 77.00 | 3.00 | | | ● | | | ● | | | | | 072030 |
| 72.00 | 79.00 | 4.00 | | | ● | | | ● | | | | | 072040 |
| 72.50 | 77.50 | 3.00 | | | | | | | | ● | | | 072530 |


Metric sizes denoted by yellow shading

Quad ring




NBR Quad ring
Order code
imp. 4-(size)


Backup rings




Urethane Washer
Order code
imp. 8-(size)-P9
met. 9-(size)-P9



NBR Washer
Order code
imp. 8-(size)-N9



Hytrek Washer
Order code
imp. 8-(size)-H
met. 9-(size)-H




PTFE Washer
Order code
imp. 8-(size)-T
met. 9-(size)-T

| Shaft | Cylinder | O-Ring | | Quad | O-Rings | | | | | Back Up Rings | | | | Size |
|-------|----------|--------|------|-------|---------|-------|------|-------|-----|---------------|--------|------|--|--------|
| | | C/S | nom | NBR70 | NBR70 | NBR90 | Poly | Viton | NBR | Poly | Hytrek | PTFE | | |
| 72.50 | 82.50 | 5.70 | | | | | | | | | | | | 072557 |
| 73.00 | 77.00 | 2.50 | | | | | | | | | | | | 073025 |
| 73.00 | 83.00 | 5.70 | | | | | | | | | | | | 073057 |
| 73.03 | 76.20 | 1.78 | 1/16 | | | | | | | | | | | 040 |
| 73.03 | 77.77 | 2.62 | 3/32 | | | | | | | | | | | 150 |
| 73.03 | 79.38 | 3.53 | 1/8 | | | | | | | | | | | 233 |
| 73.03 | 82.55 | 5.33 | 3/16 | | | | | | | | | | | 336 |
| 73.03 | 85.73 | 6.99 | 1/4 | | | | | | | | | | | 412 |
| 74.00 | 77.00 | 2.00 | | | | | | | | | | | | 074020 |
| 74.00 | 78.00 | 2.50 | | | | | | | | | | | | 074025 |
| 74.00 | 79.00 | 3.00 | | | | | | | | | | | | 074030 |
| 74.00 | 81.00 | 4.00 | | | | | | | | | | | | 074040 |
| 75.00 | 79.00 | 2.50 | | | | | | | | | | | | 075025 |
| 75.00 | 80.00 | 3.10 | | | | | | | | | | | | 075031 |
| 75.00 | 81.00 | 3.50 | | | | | | | | | | | | 075035 |
| 75.00 | 82.00 | 4.00 | | | | | | | | | | | | 075040 |
| 75.00 | 84.00 | 5.00 | | | | | | | | | | | | 075050 |
| 75.00 | 85.00 | 5.70 | | | | | | | | | | | | 075057 |
| 76.00 | 79.00 | 2.00 | | | | | | | | | | | | 076020 |
| 76.00 | 83.00 | 4.00 | | | | | | | | | | | | 076040 |
| 76.20 | 79.38 | 1.78 | 1/16 | | | | | | | | | | | 041 |
| 76.20 | 80.95 | 2.62 | 3/32 | | | | | | | | | | | 151 |
| 76.20 | 82.55 | 3.53 | 1/8 | | | | | | | | | | | 234 |
| 76.20 | 85.73 | 5.33 | 3/16 | | | | | | | | | | | 337 |
| 76.20 | 88.90 | 6.99 | 1/4 | | | | | | | | | | | 413 |
| 78.00 | 83.00 | 3.00 | | | | | | | | | | | | 078030 |
| 78.00 | 85.00 | 4.00 | | | | | | | | | | | | 078040 |
| 78.00 | 86.00 | 5.00 | | | | | | | | | | | | 078050 |
| 78.00 | 88.00 | 5.70 | | | | | | | | | | | | 078057 |
| 79.00 | 84.00 | 3.00 | | | | | | | | | | | | 079030 |
| 79.38 | 85.73 | 3.53 | 1/8 | | | | | | | | | | | 235 |
| 79.38 | 88.90 | 5.33 | 3/16 | | | | | | | | | | | 338 |
| 79.38 | 92.08 | 6.99 | 1/4 | | | | | | | | | | | 414 |
| 80.00 | 83.00 | 2.00 | | | | | | | | | | | | 080020 |
| 80.00 | 84.00 | 2.50 | | | | | | | | | | | | 080025 |
| 80.00 | 85.00 | 3.10 | | | | | | | | | | | | 080031 |
| 80.00 | 87.00 | 4.00 | | | | | | | | | | | | 080040 |

Metric sizes denoted by yellow shading


Quad ring



NBR Quad ring


Order code
imp. 4-(size)

Backup rings




Urethane Washer

Order code
imp. 8-(size)-P9
met. 9-(size)-P9




NBR Washer

Order code
imp. 8-(size)-N9



Hytrel Washer

Order code
imp. 8-(size)-H
met. 9-(size)-H




PTFE Washer

Order code
imp. 8-(size)-T
met. 9-(size)-T

| Shaft | Cylinder | O-Ring | | Quad | O-Rings | | | | | Back Up Rings | | | | Size | |
|-------|----------|--------|------|-------|---------|-------|------|-------|-----|---------------|--------|------|---|------|--------|
| | | | | NBR70 | NBR70 | NBR90 | Poly | Viton | NBR | Poly | Hytrel | PTFE | | | |
| 80.00 | 89.00 | 5.00 | | | ● | | | | ● | | | | | | 080050 |
| 80.00 | 90.00 | 5.70 | | | ● | ● | | | ● | | | ● | ● | | 080057 |
| 82.00 | 85.00 | 2.00 | | | ● | | | | | | | | | | 082020 |
| 82.00 | 89.00 | 4.00 | | | ● | | | | ● | | | | | | 082040 |
| 82.55 | 85.73 | 1.78 | 1/16 | ● | ● | ● | | | ● | | | | | | 042 |
| 82.55 | 87.30 | 2.62 | 3/32 | ● | ● | ● | | | ● | | ● | | | | 152 |
| 82.55 | 88.90 | 3.53 | 1/8 | ● | ● | ● | ● | | ● | | ● | ● | | | 236 |
| 82.55 | 92.08 | 5.33 | 3/16 | ● | ● | ● | ● | | ● | | ● | ● | ● | | 339 |
| 82.55 | 95.25 | 6.99 | 1/4 | | ● | | | | | | | | | | 415 |
| 84.00 | 89.00 | 3.00 | | | ● | | | | | | | | | | 084030 |
| 84.00 | 91.00 | 4.00 | | | ● | | | | ● | | | | | | 084040 |
| 85.00 | 88.00 | 2.00 | | | ● | | | | ● | | | | | | 085020 |
| 85.00 | 89.00 | 2.50 | | | ● | | | | | | | | | | 085025 |
| 85.00 | 90.00 | 3.10 | | | ● | ● | | | ● | | | ● | ● | | 085031 |
| 85.00 | 92.00 | 4.00 | | | ● | | | | ● | | | | | | 085040 |
| 85.00 | 94.00 | 5.00 | | | ● | | | | ● | | | | | | 085050 |
| 85.00 | 95.00 | 5.70 | | | ● | ● | | | ● | | | ● | ● | | 085057 |
| 85.73 | 92.08 | 3.53 | 1/8 | ● | ● | ● | ● | | ● | | ● | ● | ● | | 237 |
| 85.73 | 95.25 | 5.33 | 3/16 | ● | ● | ● | ● | | ● | | ● | ● | ● | | 340 |
| 85.73 | 98.43 | 6.99 | 1/4 | | ● | | | | | | | | | | 416 |
| 86.00 | 89.00 | 2.00 | | | ● | | | | | | | | | | 086020 |
| 86.00 | 93.00 | 4.00 | | | | | | | ● | | | | | | 086040 |
| 87.00 | 92.00 | 3.00 | | | ● | | | | | | | | | | 087030 |
| 87.00 | 94.00 | 4.00 | | | ● | | | | | | | | | | 087040 |
| 88.00 | 95.00 | 4.00 | | | | | | | ● | | | | | | 088040 |
| 88.00 | 98.00 | 6.00 | | | ● | | | | | | | | | | 088060 |
| 88.90 | 92.08 | 1.78 | 1/16 | ● | ● | ● | | | ● | | | | | | 043 |
| 88.90 | 93.65 | 2.62 | 3/32 | ● | ● | ● | ● | | ● | | | | | | 153 |
| 88.90 | 95.25 | 3.53 | 1/8 | ● | ● | ● | ● | | ● | | ● | ● | ● | | 238 |
| 88.90 | 98.43 | 5.33 | 3/16 | ● | ● | ● | | | ● | | ● | ● | ● | | 341 |
| 88.90 | 101.60 | 6.99 | 1/4 | | ● | | | | | | | | | | 417 |
| 90.00 | 93.00 | 2.00 | | | ● | | | | | | | | | | 090020 |
| 90.00 | 94.00 | 2.50 | | | ● | | | | | | | | | | 090025 |
| 90.00 | 95.00 | 3.10 | | | ● | ● | | | ● | | | ● | ● | | 090031 |
| 90.00 | 97.00 | 4.00 | | | ● | | | | ● | | | | | | 090040 |
| 90.00 | 99.00 | 5.00 | | | ● | | | | ● | | | | | | 090050 |
| 90.00 | 100.00 | 5.70 | | | ● | ● | | | ● | | | ● | ● | | 090057 |





Metric sizes denoted by yellow shading

Quad ring



NBR Quad ring
Order code
imp. 4-(size)


Backup rings

| | | | |
|---|---|--|---|
|  |  |  |  |
| Urethane Washer | NBR Washer | Hytrel Washer | PTFE Washer |
| Order code imp. 8-(size)-P9 met. 9-(size)-P9 | Order code imp. 8-(size)-N9 | Order code imp. 8-(size)-H met. 9-(size)-H | Order code imp. 8-(size)-T met. 9-(size)-T |

| Shaft | Cylinder | O-Ring | Quad | | O-Rings | | | | | Back Up Rings | | | | Size | |
|--------|----------|-----------|------|-----|---------|-------|-------|------|-------|---------------|------|--------|------|------|--------|
| | | | C/S | nom | NBR70 | NBR70 | NBR90 | Poly | Viton | NBR | Poly | Hytrel | PTFE | | |
| 91.00 | 95.00 | 2.50 | | | | ● | | | | | | | | | 091025 |
| 92.00 | 97.00 | 3.00 | | | | ● | | | | | | | | | 092030 |
| 92.00 | 99.00 | 4.00 | | | | ● | | | ● | | | | | | 092040 |
| 92.08 | 98.43 | 3.53 1/8 | ● | ● | ● | | | ● | | ● | ● | ● | | | 239 |
| 92.08 | 101.60 | 5.33 3/16 | ● | ● | ● | ● | ● | ● | | ● | ● | ● | | | 342 |
| 92.08 | 104.78 | 6.99 1/4 | | ● | | | | | | | | | | | 418 |
| 94.00 | 97.00 | 2.00 | | ● | | | | | | | | | | | 094020 |
| 94.00 | 99.00 | 3.00 | | | | | | | | | ● | | | | 094030 |
| 94.00 | 101.00 | 4.00 | | | | | | ● | | | | | | | 094040 |
| 94.00 | 103.00 | 5.00 | | ● | | | | | | | | | | | 094050 |
| 95.00 | 99.00 | 2.50 | | ● | | | | | | | | | | | 095025 |
| 95.00 | 100.00 | 3.10 | | ● | ● | | | ● | | | ● | | ● | | 095031 |
| 95.00 | 102.00 | 4.00 | | ● | | | | | | | | | | | 095040 |
| 95.00 | 104.00 | 5.00 | | ● | | | | ● | | | | | | | 095050 |
| 95.00 | 105.00 | 5.70 | | ● | ● | | | ● | | | ● | | ● | | 095057 |
| 95.25 | 98.43 | 1.78 1/16 | ● | ● | ● | | | ● | ● | | | | | | 044 |
| 95.25 | 100.00 | 2.62 3/32 | ● | ● | ● | | | ● | ● | | | | | | 154 |
| 95.25 | 101.60 | 3.53 1/8 | ● | ● | ● | ● | ● | ● | | ● | ● | ● | | | 240 |
| 95.25 | 104.78 | 5.33 3/16 | ● | ● | ● | | | ● | | ● | ● | ● | | | 343 |
| 95.25 | 107.95 | 6.99 1/4 | | ● | | | | | | | | | | | 419 |
| 96.00 | 99.00 | 2.00 | | ● | | | | | | | | | | | 096020 |
| 96.00 | 103.00 | 4.00 | | | | | | ● | | | | | | | 096040 |
| 98.00 | 105.00 | 4.00 | | ● | | | | ● | | | | | | | 098040 |
| 98.43 | 104.78 | 3.53 1/8 | ● | ● | ● | ● | ● | ● | | ● | ● | ● | | | 241 |
| 98.43 | 107.95 | 5.33 3/16 | ● | ● | ● | ● | ● | ● | | ● | ● | ● | | | 344 |
| 98.43 | 111.13 | 6.99 1/4 | | ● | | | | | | | | | | | 420 |
| 99.00 | 103.00 | 2.50 | | ● | | | | | | | | | | | 099025 |
| 100.00 | 103.00 | 2.00 | | ● | | | | | | | | | | | 100020 |
| 100.00 | 104.00 | 2.50 | | ● | | | | | | | | | | | 100025 |
| 100.00 | 105.00 | 3.10 | | ● | ● | | | ● | | | ● | | ● | | 100031 |
| 100.00 | 107.00 | 4.00 | | ● | | | | ● | | | | | | | 100040 |
| 100.00 | 109.00 | 5.00 | | ● | ● | | | ● | | | | | | | 100050 |
| 100.00 | 110.00 | 5.70 | | ● | ● | | | ● | | | ● | | ● | | 100057 |
| 100.00 | 110.00 | 6.00 | | ● | | | | | | | | | | | 100060 |
| 101.60 | 104.78 | 1.78 1/16 | ● | ● | | | | ● | ● | | | | | | 045 |
| 101.60 | 106.35 | 2.62 3/32 | | ● | ● | | | ● | ● | | | | | | 155 |
| 101.60 | 107.95 | 3.53 1/8 | ● | ● | ● | ● | ● | ● | | ● | ● | ● | | | 242 |


Metric sizes denoted by yellow shading

Quad ring




NBR Quad ring
Order code
imp. 4-(size)


Backup rings




Urethane Washer
Order code
imp. 8-(size)-P9
met. 9-(size)-P9



NBR Washer
Order code
imp. 8-(size)-N9



Hytrel Washer
Order code
imp. 8-(size)-H
met. 9-(size)-H



PTFE Washer
Order code
imp. 8-(size)-T
met. 9-(size)-T

| Shaft | Cylinder | O-Ring | | Quad | O-Rings | | | | | Back Up Rings | | | | Size |
|--------|----------|--------|------|-------|---------|-------|------|-------|-----|---------------|--------|------|--------|------|
| | | C/S | nom | NBR70 | NBR70 | NBR90 | Poly | Viton | NBR | Poly | Hytrel | PTFE | | |
| 101.60 | 111.13 | 5.33 | 3/16 | ● | ● | ● | ● | ● | | ● | ● | ● | 345 | |
| 101.60 | 114.30 | 6.99 | 1/4 | | ● | | | | | | | | 421 | |
| 102.00 | 109.00 | 4.00 | | | ● | | | ● | | | | | 102040 | |
| 102.00 | 112.00 | 5.70 | | | | | | | | | | ● | 102057 | |
| 104.00 | 111.00 | 4.00 | | | | | | ● | | | | | 104040 | |
| 104.78 | 111.13 | 3.53 | 1/8 | ● | ● | ● | | ● | | ● | ● | ● | 243 | |
| 104.78 | 114.30 | 5.33 | 3/16 | ● | ● | ● | ● | ● | | ● | ● | ● | 346 | |
| 104.78 | 117.48 | 6.99 | 1/4 | | ● | | | | | | | | 422 | |
| 105.00 | 110.00 | 3.10 | | | ● | ● | | ● | | | ● | ● | 105031 | |
| 105.00 | 112.00 | 4.00 | | | ● | | | | | | | | 105040 | |
| 105.00 | 114.00 | 5.00 | | | ● | | | ● | | | | | 105050 | |
| 105.00 | 115.00 | 5.70 | | | ● | ● | | ● | | | ● | ● | 105057 | |
| 106.00 | 113.00 | 4.00 | | | | | | ● | | | | | 106040 | |
| 107.95 | 111.13 | 1.78 | 1/16 | ● | ● | | ● | ● | ● | | | | 046 | |
| 107.95 | 112.70 | 2.62 | 3/32 | ● | ● | ● | | ● | | ● | | | 156 | |
| 107.95 | 114.30 | 3.53 | 1/8 | ● | ● | ● | ● | ● | | ● | ● | ● | 244 | |
| 107.95 | 117.48 | 5.33 | 3/16 | ● | ● | ● | ● | ● | ● | | ● | ● | 347 | |
| 107.95 | 120.65 | 6.99 | 1/4 | | ● | | | | | | | | 423 | |
| 108.00 | 115.00 | 4.00 | | | | | | ● | | | | | 108040 | |
| 110.00 | 113.00 | 2.00 | | | ● | | | | | | | | 110020 | |
| 110.00 | 114.00 | 2.50 | | | ● | | | | | | | | 110025 | |
| 110.00 | 115.00 | 3.10 | | | ● | ● | | ● | | | ● | ● | 110031 | |
| 110.00 | 117.00 | 4.00 | | | ● | | | ● | | | | | 110040 | |
| 110.00 | 119.00 | 5.00 | | | ● | | | ● | | | | | 110050 | |
| 110.00 | 120.00 | 5.70 | | | ● | ● | | ● | | | ● | ● | 110057 | |
| 111.13 | 117.48 | 3.53 | 1/8 | ● | ● | ● | ● | ● | | ● | ● | ● | 245 | |
| 111.13 | 120.65 | 5.33 | 3/16 | ● | ● | ● | ● | ● | | ● | ● | ● | 348 | |
| 111.13 | 123.83 | 6.99 | 1/4 | | ● | | | | | | | | 424 | |
| 112.00 | 117.00 | 3.00 | | | ● | | | ● | | | | | 112030 | |
| 112.00 | 119.00 | 4.00 | | | | | | ● | | | | | 112040 | |
| 112.00 | 122.00 | 5.70 | | | | | | | | | | ● | 112057 | |
| 113.00 | 118.00 | 3.00 | | | ● | | | | | | ● | | 113030 | |
| 113.00 | 120.00 | 4.00 | | | ● | | | | | | | | 113040 | |
| 114.00 | 121.00 | 4.00 | | | | | | ● | | | | | 114040 | |
| 114.30 | 117.48 | 1.78 | 1/16 | ● | ● | | | ● | | ● | | | 047 | |
| 114.30 | 119.05 | 2.62 | 3/32 | ● | ● | ● | | ● | ● | | ● | | 157 | |
| 114.30 | 120.65 | 3.53 | 1/8 | ● | ● | ● | | ● | | ● | ● | ● | 246 | |


Metric sizes denoted by yellow shading

Quad ring




NBR Quad ring
Order code
imp. 4-(size)


Backup rings




Urethane Washer
Order code
imp. 8-(size)-P9
met. 9-(size)-P9



NBR Washer
Order code
imp. 8-(size)-N9



Hytrel Washer
Order code
imp. 8-(size)-H
met. 9-(size)-H



PTFE Washer
Order code
imp. 8-(size)-T
met. 9-(size)-T

| Shaft | Cylinder | O-Ring | | Quad | O-Rings | | | | Back Up Rings | | | | Size |
|--------|----------|--------|------|-------|---------|-------|------|-------|---------------|------|--------|------|--------|
| | | C/S | nom | NBR70 | NBR70 | NBR90 | Poly | Viton | NBR | Poly | Hytrel | PTFE | |
| 114.30 | 123.83 | 5.33 | 3/16 | ● | ● | ● | ● | ● | | ● | ● | ● | 349 |
| 114.30 | 127.00 | 6.99 | 1/4 | ● | ● | ● | ● | ● | | ● | ● | ● | 425 |
| 115.00 | 120.00 | 3.10 | | | ● | ● | | ● | | | ● | ● | 115031 |
| 115.00 | 122.00 | 4.00 | | | ● | | | | | | | | 115040 |
| 115.00 | 125.00 | 5.70 | | | ● | ● | | ● | | | ● | ● | 115057 |
| 115.00 | 125.00 | 6.00 | | | ● | | | | | | | | 115060 |
| 116.00 | 123.00 | 4.00 | | | ● | | | ● | | | | | 116040 |
| 117.00 | 124.00 | 4.00 | | | ● | | | ● | | | | | 117040 |
| 117.48 | 123.83 | 3.53 | 1/8 | ● | ● | ● | | ● | | ● | ● | ● | 247 |
| 117.48 | 127.00 | 5.33 | 3/16 | ● | ● | ● | ● | ● | | ● | | ● | 350 |
| 117.48 | 130.18 | 6.99 | 1/4 | ● | ● | ● | ● | ● | ● | | ● | ● | 426 |
| 118.00 | 125.00 | 4.00 | | | ● | | | ● | | | | | 118040 |
| 119.00 | 126.00 | 4.00 | | | ● | | | | | | | | 119040 |
| 120.00 | 123.00 | 2.00 | | | ● | | | | | | | | 120020 |
| 120.00 | 125.00 | 3.10 | | | ● | ● | | ● | | | ● | ● | 120031 |
| 120.00 | 127.00 | 4.00 | | | ● | | | ● | | | | | 120040 |
| 120.00 | 129.00 | 5.00 | | | ● | ● | | ● | | | | | 120050 |
| 120.00 | 130.00 | 5.70 | | | ● | ● | | ● | | | ● | ● | 120057 |
| 120.65 | 123.83 | 1.78 | 1/16 | ● | ● | ● | | ● | | ● | | | 048 |
| 120.65 | 125.40 | 2.62 | 3/32 | ● | ● | ● | | ● | ● | | | | 158 |
| 120.65 | 127.00 | 3.53 | 1/8 | ● | ● | ● | ● | ● | | ● | ● | ● | 248 |
| 120.65 | 130.18 | 5.33 | 3/16 | ● | ● | ● | ● | ● | | ● | ● | | 351 |
| 120.65 | 133.35 | 6.99 | 1/4 | ● | ● | ● | ● | ● | | ● | | ● | 427 |
| 121.00 | 128.00 | 4.00 | | | ● | | | | | | | | 121040 |
| 122.00 | 129.00 | 4.00 | | | ● | | | ● | | | | | 122040 |
| 123.83 | 130.18 | 3.53 | 1/8 | ● | ● | ● | ● | ● | | ● | ● | | 249 |
| 123.83 | 133.35 | 5.33 | 3/16 | ● | ● | ● | | ● | ● | | | | 352 |
| 123.83 | 136.53 | 6.99 | 1/4 | ● | ● | ● | | ● | | ● | ● | ● | 428 |
| 124.00 | 129.00 | 3.00 | | | ● | | | | | | | | 124030 |
| 124.00 | 131.00 | 4.00 | | | | | | ● | | | | | 124040 |
| 125.00 | 128.00 | 2.00 | | | ● | | | | | | | | 125020 |
| 125.00 | 130.00 | 3.10 | | | ● | ● | | ● | | | ● | ● | 125031 |
| 125.00 | 132.00 | 4.00 | | | ● | | | ● | | | | | 125040 |
| 125.00 | 134.00 | 5.00 | | | ● | | | ● | | | | | 125050 |
| 125.00 | 135.00 | 5.70 | | | ● | ● | | ● | | | ● | ● | 125057 |
| 125.00 | 135.00 | 6.00 | | | ● | | | | | | | | 125060 |
| 126.00 | 133.00 | 4.00 | | | | | | ● | | | | | 126040 |





Metric sizes denoted by yellow shading

Quad ring



NBR Quad ring
Order code
imp. 4-(size)

Backup rings

| | | | |
|---|---|--|---|
|  |  |  |  |
| Urethane Washer | NBR Washer | Hytrek Washer | PTFE Washer |
| Order code imp. 8-(size)-P9 met. 9-(size)-P9 | Order code imp. 8-(size)-N9 | Order code imp. 8-(size)-H met. 9-(size)-H | Order code imp. 8-(size)-T met. 9-(size)-T |

| Shaft | Cylinder | O-Ring | | Quad | O-Rings | | | | Back Up Rings | | | | Size |
|--------|----------|--------|------|-------|---------|-------|------|-------|---------------|------|--------|------|--------|
| | | C/S | nom | NBR70 | NBR70 | NBR90 | Poly | Viton | NBR | Poly | Hytrek | PTFE | |
| 127.00 | 130.18 | 1.78 | 1/16 | | ● | | | ● | | ● | | | 049 |
| 127.00 | 131.75 | 2.62 | 3/32 | ● | ● | | | ● | ● | | | | 159 |
| 127.00 | 133.35 | 3.53 | 1/8 | ● | ● | ● | ● | ● | | ● | ● | ● | 250 |
| 127.00 | 134.00 | 4.00 | | | ● | | | | | | | | 127040 |
| 127.00 | 136.53 | 5.33 | 3/16 | ● | ● | | | ● | | ● | ● | | 353 |
| 127.00 | 139.70 | 6.99 | 1/4 | ● | ● | ● | ● | ● | | ● | ● | ● | 429 |
| 130.00 | 134.00 | 2.50 | | | ● | | | | | | | | 130025 |
| 130.00 | 135.00 | 3.10 | | | ● | ● | | ● | | | ● | ● | 130031 |
| 130.00 | 137.00 | 4.00 | | | ● | | | ● | | | | | 130040 |
| 130.00 | 139.00 | 5.00 | | | ● | | | ● | | | | | 130050 |
| 130.00 | 140.00 | 5.70 | | | ● | ● | | ● | | | ● | ● | 130057 |
| 130.00 | 140.00 | 6.00 | | | ● | | | ● | | | | | 130060 |
| 130.18 | 136.53 | 3.53 | 1/8 | ● | ● | ● | ● | ● | | ● | ● | | 251 |
| 130.18 | 139.70 | 5.33 | 3/16 | ● | ● | ● | | ● | ● | | ● | | 354 |
| 130.18 | 142.88 | 6.99 | 1/4 | ● | ● | ● | | ● | ● | | | ● | 430 |
| 132.00 | 137.00 | 3.00 | | | | | | ● | | | | | 132030 |
| 132.00 | 139.00 | 4.00 | | | | | | ● | | | | | 132040 |
| 132.00 | 142.00 | 5.70 | | | | | | | | | | ● | 132057 |
| 133.35 | 136.53 | 1.78 | 1/16 | ● | ● | | | ● | ● | | | | 050 |
| 133.35 | 138.10 | 2.62 | 3/32 | ● | ● | | ● | ● | ● | | | | 160 |
| 133.35 | 139.70 | 3.53 | 1/8 | ● | ● | ● | ● | ● | | ● | ● | ● | 252 |
| 133.35 | 142.88 | 5.33 | 3/16 | ● | ● | ● | | ● | ● | | | ● | 355 |
| 133.35 | 146.05 | 6.99 | 1/4 | ● | ● | ● | ● | ● | | ● | ● | ● | 431 |
| 134.00 | 141.00 | 4.00 | | | | | | ● | | | | | 134040 |
| 135.00 | 139.00 | 2.50 | | | | | | ● | | | | | 135025 |
| 135.00 | 140.00 | 3.10 | | | ● | ● | | ● | | | ● | ● | 135031 |
| 135.00 | 142.00 | 4.00 | | | ● | | | | | | | | 135040 |
| 135.00 | 144.00 | 5.00 | | | ● | | | ● | | | | | 135050 |
| 135.00 | 145.00 | 5.70 | | | ● | ● | | ● | | | ● | ● | 135057 |
| 135.00 | 145.00 | 6.00 | | | ● | | | | | | | | 135060 |
| 136.00 | 143.00 | 4.00 | | | | | | ● | | | | | 136040 |
| 136.53 | 142.88 | 3.53 | 1/8 | ● | ● | ● | ● | ● | | | ● | | 253 |
| 136.53 | 146.05 | 5.33 | 3/16 | ● | ● | ● | | ● | ● | | ● | | 356 |
| 136.53 | 149.23 | 6.99 | 1/4 | ● | ● | ● | | ● | ● | | ● | ● | 432 |
| 138.00 | 145.00 | 4.00 | | | | | | ● | | | | | 138040 |
| 139.00 | 148.00 | 5.00 | | | ● | | | | | | | | 139050 |
| 139.70 | 144.45 | 2.62 | 3/32 | ● | ● | ● | ● | ● | ● | | | | 161 |


Metric sizes denoted by yellow shading

Quad ring




NBR Quad ring
Order code
imp. 4-(size)


Backup rings




Urethane Washer
Order code
imp. 8-(size)-P9
met. 9-(size)-P9



NBR Washer
Order code
imp. 8-(size)-N9



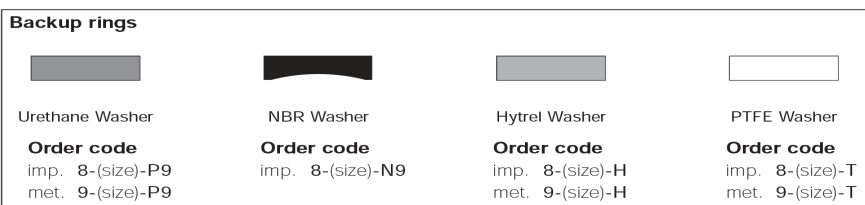
Hytrek Washer
Order code
imp. 8-(size)-H
met. 9-(size)-H



PTFE Washer
Order code
imp. 8-(size)-T
met. 9-(size)-T

| Shaft | Cylinder | O-Ring | | Quad | O-Rings | | | | Back Up Rings | | | | Size |
|--------|----------|--------|------|-------|---------|-------|------|-------|---------------|------|--------|------|--------|
| | | C/S | nom | NBR70 | NBR70 | NBR90 | Poly | Viton | NBR | Poly | Hytrek | PTFE | |
| 139.70 | 146.05 | 3.53 | 1/8 | ● | ● | ● | ● | ● | ● | | ● | ● | 254 |
| 139.70 | 149.23 | 5.33 | 3/16 | ● | ● | ● | ● | ● | ● | | ● | | 357 |
| 139.70 | 152.40 | 6.99 | 1/4 | ● | ● | ● | ● | ● | | ● | ● | ● | 433 |
| 140.00 | 144.00 | 2.50 | | | ● | | | | | | | | 140025 |
| 140.00 | 145.00 | 3.10 | | | ● | ● | | ● | | | ● | ● | 140031 |
| 140.00 | 147.00 | 4.00 | | | ● | | | ● | | | | | 140040 |
| 140.00 | 149.00 | 5.00 | | | ● | | | ● | | | | | 140050 |
| 140.00 | 150.00 | 5.70 | | | ● | ● | | ● | | | ● | ● | 140057 |
| 142.00 | 149.00 | 4.00 | | | | | | ● | | | | | 142040 |
| 142.00 | 152.00 | 6.00 | | | ● | | | | | | | | 142060 |
| 142.88 | 149.23 | 3.53 | 1/8 | ● | ● | ● | | ● | | ● | ● | | 255 |
| 142.88 | 152.40 | 5.33 | 3/16 | ● | ● | ● | | ● | | ● | ● | | 358 |
| 142.88 | 155.58 | 6.99 | 1/4 | ● | ● | ● | | ● | ● | | | ● | 434 |
| 144.00 | 151.00 | 4.00 | | | | | | ● | | | | | 144040 |
| 145.00 | 150.00 | 3.10 | | | ● | ● | | ● | | | ● | ● | 145031 |
| 145.00 | 152.00 | 4.00 | | | ● | | | ● | | | | | 145040 |
| 145.00 | 154.00 | 5.00 | | | ● | | | ● | | | | | 145050 |
| 145.00 | 155.00 | 5.70 | | | ● | ● | | ● | | | ● | ● | 145057 |
| 145.00 | 160.00 | 8.40 | | | ● | | | | | | | | 145084 |
| 146.00 | 153.00 | 4.00 | | | | | | ● | | | | | 146040 |
| 146.05 | 150.80 | 2.62 | 3/32 | ● | ● | ● | | ● | ● | | | | 162 |
| 146.05 | 152.40 | 3.53 | 1/8 | ● | ● | ● | ● | ● | | ● | ● | ● | 256 |
| 146.05 | 155.58 | 5.33 | 3/16 | ● | ● | ● | | ● | ● | | | | 359 |
| 146.05 | 158.75 | 6.99 | 1/4 | ● | ● | ● | | ● | | ● | ● | ● | 435 |
| 147.00 | 152.00 | 3.00 | | | ● | | | | | | | | 147030 |
| 148.00 | 153.00 | 3.00 | | | ● | | | | | | | | 148030 |
| 148.00 | 155.00 | 4.00 | | | | | | ● | | | | | 148040 |
| 149.23 | 155.58 | 3.53 | 1/8 | ● | ● | ● | | ● | ● | | ● | | 257 |
| 149.23 | 158.75 | 5.33 | 3/16 | | ● | ● | | ● | ● | | ● | | 360 |
| 149.23 | 161.93 | 6.99 | 1/4 | ● | ● | ● | | ● | | ● | | ● | 436 |
| 150.00 | 154.00 | 2.50 | | | ● | | | | | | | | 150025 |
| 150.00 | 155.00 | 3.00 | | | ● | | | ● | | | | | 150030 |
| 150.00 | 157.00 | 4.00 | | | ● | | | ● | | | | | 150040 |
| 150.00 | 159.00 | 5.00 | | | ● | ● | | ● | | | | | 150050 |
| 150.00 | 160.00 | 5.70 | | | ● | ● | | ● | | | ● | ● | 150057 |
| 150.00 | 165.00 | 8.40 | | | ● | ● | | | | | | ● | 150084 |
| 152.40 | 157.15 | 2.62 | 3/32 | | ● | ● | ● | ● | ● | | | | 163 |

Metric sizes denoted by yellow shading



| Shaft | Cylinder | O-Ring | | Quad | O-Rings | | | | Back Up Rings | | | | Size |
|--------|----------|--------|------|-------|---------|-------|------|-------|---------------|------|--------|------|--------|
| | | C/S | nom | NBR70 | NBR70 | NBR90 | Poly | Viton | NBR | Poly | Hytrel | PTFE | |
| 152.40 | 158.75 | 3.53 | 1/8 | ● | ● | ● | | ● | | ● | ● | ● | 258 |
| 152.40 | 161.93 | 5.33 | 3/16 | ● | ● | ● | | ● | | ● | | | 361 |
| 152.40 | 165.10 | 6.99 | 1/4 | ● | ● | ● | ● | ● | | ● | | ● | 437 |
| 155.00 | 160.00 | 3.00 | | | ● | | | ● | | | | ● | 155030 |
| 155.00 | 164.00 | 5.00 | | | ● | | | ● | | | | | 155050 |
| 155.00 | 165.00 | 5.70 | | | ● | ● | | ● | | | ● | ● | 155057 |
| 155.00 | 170.00 | 8.40 | | | ● | ● | | | | | | ● | 155084 |
| 158.75 | 163.50 | 2.62 | 3/32 | ● | ● | ● | | ● | ● | | | | 164 |
| 158.75 | 165.10 | 3.53 | 1/8 | ● | ● | ● | | ● | | ● | | | 259 |
| 158.75 | 168.28 | 5.33 | 3/16 | ● | ● | ● | ● | ● | | ● | ● | ● | 362 |
| 158.75 | 171.45 | 6.99 | 1/4 | ● | ● | ● | ● | ● | | ● | | ● | 438 |
| 160.00 | 165.00 | 3.00 | | | ● | | | ● | | | | ● | 160030 |
| 160.00 | 167.00 | 4.00 | | | ● | | | ● | | | | | 160040 |
| 160.00 | 169.00 | 5.00 | | | ● | ● | | ● | | | | | 160050 |
| 160.00 | 170.00 | 5.70 | | | ● | ● | | ● | | | ● | ● | 160057 |
| 160.00 | 175.00 | 8.40 | | | ● | ● | | ● | | | | ● | 160084 |
| 164.00 | 171.00 | 4.00 | | | ● | | | | | | | | 164040 |
| 165.00 | 170.00 | 3.00 | | | ● | | | ● | | | | | 165030 |
| 165.00 | 172.00 | 4.00 | | | ● | | | | | | | | 165040 |
| 165.00 | 174.00 | 5.00 | | | ● | | | ● | | | | | 165050 |
| 165.00 | 175.00 | 5.70 | | | ● | ● | | ● | | | ● | ● | 165057 |
| 165.00 | 180.00 | 8.40 | | | ● | ● | | | | | | ● | 165084 |
| 165.10 | 169.85 | 2.62 | 3/32 | | ● | ● | | ● | ● | | | | 165 |
| 165.10 | 171.45 | 3.53 | 1/8 | ● | ● | ● | | ● | | ● | | | 260 |
| 165.10 | 174.63 | 5.33 | 3/16 | ● | ● | ● | ● | ● | | ● | ● | ● | 363 |
| 165.10 | 177.80 | 6.99 | 1/4 | ● | ● | ● | ● | ● | | ● | | ● | 439 |
| 170.00 | 174.00 | 2.40 | | | ● | | | | | | | | 170024 |
| 170.00 | 175.00 | 3.00 | | | ● | | | ● | | | | | 170030 |
| 170.00 | 177.00 | 4.00 | | | ● | | | | | | | | 170040 |
| 170.00 | 179.00 | 5.00 | | | ● | | | ● | | | | | 170050 |
| 170.00 | 180.00 | 5.70 | | | ● | ● | | ● | | | ● | ● | 170057 |
| 170.00 | 185.00 | 8.40 | | | ● | ● | | | | | | ● | 170084 |
| 171.45 | 176.20 | 2.62 | 3/32 | | ● | ● | ● | ● | | ● | | | 166 |
| 171.45 | 177.80 | 3.53 | 1/8 | ● | ● | ● | | ● | | ● | | ● | 261 |
| 171.45 | 180.98 | 5.33 | 3/16 | | ● | ● | | ● | | ● | ● | | 364 |
| 171.45 | 184.15 | 6.99 | 1/4 | ● | ● | ● | | ● | | ● | | ● | 440 |
| 172.00 | 179.00 | 4.00 | | | | | | ● | | | | | 172040 |

Metric sizes denoted by yellow shading





Quad ring



NBR Quad ring

Order code
imp. 4-(size)


Backup rings

| | | | |
|---|---|--|---|
|  |  |  |  |
| Urethane Washer | NBR Washer | Hytrek Washer | PTFE Washer |
| Order code imp. 8-(size)-P9 met. 9-(size)-P9 | Order code imp. 8-(size)-N9 | Order code imp. 8-(size)-H met. 9-(size)-H | Order code imp. 8-(size)-T met. 9-(size)-T |

| Shaft | Cylinder | O-Ring | | Quad | O-Rings | | | | | Back Up Rings | | | | Size |
|--------|----------|--------|------|-------|---------|-------|------|-------|-----|---------------|--------|------|--|--------|
| | | C/S | nom | NBR70 | NBR70 | NBR90 | Poly | Viton | NBR | Poly | Hytrek | PTFE | | |
| 175.00 | 180.00 | 3.00 | | | ● | | | | ● | | | | | 175030 |
| 175.00 | 184.00 | 5.00 | | | ● | | | | ● | | | | | 175050 |
| 175.00 | 185.00 | 5.70 | | | ● | ● | | | ● | | ● | ● | | 175057 |
| 175.00 | 190.00 | 8.40 | | | ● | ● | | | | | | ● | | 175084 |
| 177.80 | 182.55 | 2.62 | 3/32 | | ● | | | | ● | ● | | | | 167 |
| 177.80 | 184.15 | 3.53 | 1/8 | ● | ● | ● | ● | ● | ● | ● | | ● | | 262 |
| 177.80 | 187.33 | 5.33 | 3/16 | ● | ● | ● | | ● | | ● | ● | | | 365 |
| 177.80 | 190.50 | 6.99 | 1/4 | ● | ● | ● | | ● | | ● | | ● | | 441 |
| 180.00 | 185.00 | 3.00 | | | ● | | | | ● | | | | | 180030 |
| 180.00 | 187.00 | 4.00 | | | ● | | | | | | | | | 180040 |
| 180.00 | 189.00 | 5.00 | | | ● | | | | ● | | | | | 180050 |
| 180.00 | 190.00 | 5.70 | | | ● | ● | | | ● | | ● | ● | | 180057 |
| 180.00 | 195.00 | 8.40 | | | ● | ● | | | | | | ● | | 180084 |
| 183.00 | 186.00 | 2.00 | | | | | | | ● | | | | | 183020 |
| 184.15 | 188.90 | 2.62 | 3/32 | | ● | ● | | | ● | ● | | | | 168 |
| 184.15 | 190.50 | 3.53 | 1/8 | ● | ● | ● | | ● | ● | | | | | 263 |
| 184.15 | 193.68 | 5.33 | 3/16 | ● | ● | ● | | ● | | ● | | | | 366 |
| 184.15 | 196.85 | 6.99 | 1/4 | ● | ● | ● | | ● | | ● | ● | ● | | 442 |
| 185.00 | 190.00 | 3.00 | | | ● | | | | ● | | | | | 185030 |
| 185.00 | 194.00 | 5.00 | | | ● | | | | ● | | | | | 185050 |
| 185.00 | 195.00 | 5.70 | | | ● | ● | | | ● | | ● | ● | | 185057 |
| 185.00 | 200.00 | 8.40 | | | ● | ● | | | ● | | | | | 185084 |
| 186.00 | 193.00 | 4.00 | | | ● | | | | | | | | | 186040 |
| 190.00 | 195.00 | 3.00 | | | ● | | | | ● | | | | | 190030 |
| 190.00 | 197.00 | 4.00 | | | | | | | ● | | | | | 190040 |
| 190.00 | 199.00 | 5.00 | | | ● | | | | ● | | | | | 190050 |
| 190.00 | 200.00 | 5.70 | | | ● | ● | | | ● | | ● | ● | | 190057 |
| 190.00 | 205.00 | 8.40 | | | ● | ● | | | | | | ● | | 190084 |
| 190.50 | 195.25 | 2.62 | 3/32 | | ● | | | | ● | ● | | | | 169 |
| 190.50 | 196.85 | 3.53 | 1/8 | | ● | ● | | | ● | ● | ● | | | 264 |
| 190.50 | 200.03 | 5.33 | 3/16 | ● | ● | ● | ● | ● | ● | ● | ● | | | 367 |
| 190.50 | 203.20 | 6.99 | 1/4 | ● | ● | ● | | ● | | ● | ● | ● | | 443 |
| 192.00 | 199.00 | 4.00 | | | ● | | | | ● | | | | | 192040 |
| 195.00 | 200.00 | 3.00 | | | ● | | | | ● | | | | | 195030 |
| 195.00 | 204.00 | 5.00 | | | | | | | ● | | | | | 195050 |
| 195.00 | 205.00 | 5.70 | | | ● | ● | | | ● | | ● | ● | | 195057 |
| 195.00 | 210.00 | 8.40 | | | ● | ● | | | | | | ● | | 195084 |


Metric sizes denoted by yellow shading

Quad ring




NBR Quad ring
Order code
imp. 4-(size)


Backup rings




Urethane Washer
Order code
imp. 8-(size)-P9
met. 9-(size)-P9



NBR Washer
Order code
imp. 8-(size)-N9



Hytrek Washer
Order code
imp. 8-(size)-H
met. 9-(size)-H



PTFE Washer
Order code
imp. 8-(size)-T
met. 9-(size)-T

| Shaft | Cylinder | O-Ring | | Quad | O-Rings | | | | Back Up Rings | | | | Size |
|--------|----------|--------|------|-------|---------|-------|------|-------|---------------|------|--------|------|--------|
| | | C/S | nom | NBR70 | NBR70 | NBR90 | Poly | Viton | NBR | Poly | Hytrek | PTFE | |
| 196.85 | 201.60 | 2.62 | 3/32 | | ● | ● | | ● | ● | | | | 170 |
| 196.85 | 203.20 | 3.53 | 1/8 | ● | ● | ● | | ● | | ● | | | 265 |
| 196.85 | 206.38 | 5.33 | 3/16 | ● | ● | ● | | ● | ● | | | | 368 |
| 196.85 | 209.55 | 6.99 | 1/4 | ● | ● | ● | ● | ● | | ● | ● | ● | 444 |
| 200.00 | 205.00 | 3.00 | | | ● | | | ● | | | | | 200030 |
| 200.00 | 207.00 | 4.00 | | | ● | | | | | | | | 200040 |
| 200.00 | 209.00 | 5.00 | | | ● | | | ● | | | | | 200050 |
| 200.00 | 210.00 | 5.70 | | | ● | ● | | ● | | | ● | ● | 200057 |
| 200.00 | 215.00 | 8.40 | | | ● | ● | | | | | | ● | 200084 |
| 203.20 | 207.95 | 2.62 | 3/32 | | ● | | ● | ● | | | | | 171 |
| 203.20 | 209.55 | 3.53 | 1/8 | ● | ● | ● | | ● | | ● | | ● | 266 |
| 203.20 | 212.73 | 5.33 | 3/16 | ● | ● | ● | | ● | ● | | | | 369 |
| 203.20 | 215.90 | 6.99 | 1/4 | ● | ● | ● | ● | ● | | ● | | ● | 445 |
| 205.00 | 210.00 | 3.00 | | | ● | | | | | | | | 205030 |
| 205.00 | 214.00 | 5.00 | | | | | | ● | | | | | 205050 |
| 205.00 | 215.00 | 5.70 | | | | | | | | | | ● | 205057 |
| 205.00 | 220.00 | 8.40 | | | ● | ● | | | | | | ● | 205084 |
| 209.55 | 214.30 | 2.62 | 3/32 | | ● | | | ● | | | | | 172 |
| 209.55 | 215.90 | 3.53 | 1/8 | | ● | ● | | ● | | ● | | | 267 |
| 209.55 | 219.08 | 5.33 | 3/16 | ● | ● | ● | | ● | ● | | ● | ● | 370 |
| 209.55 | 222.25 | 6.99 | 1/4 | | ● | | | | | | | | 445A |
| 210.00 | 215.00 | 3.00 | | | ● | | | ● | | | | | 210030 |
| 210.00 | 219.00 | 5.00 | | | ● | | | | | | | | 210050 |
| 210.00 | 220.00 | 5.70 | | | ● | ● | | ● | | | ● | ● | 210057 |
| 210.00 | 225.00 | 8.40 | | | ● | ● | | | | | | ● | 210084 |
| 215.00 | 222.00 | 4.00 | | | | | | ● | | | | | 215040 |
| 215.00 | 224.00 | 5.00 | | | ● | | | | | | | | 215050 |
| 215.00 | 225.00 | 5.70 | | | | | | | | | | ● | 215057 |
| 215.00 | 230.00 | 8.40 | | | ● | | | | | | | ● | 215084 |
| 215.90 | 220.65 | 2.62 | 3/32 | | ● | | | ● | | | | | 173 |
| 215.90 | 222.25 | 3.53 | 1/8 | ● | ● | ● | | ● | ● | | | | 268 |
| 215.90 | 225.43 | 5.33 | 3/16 | ● | ● | ● | | ● | ● | | | | 371 |
| 215.90 | 228.60 | 6.99 | 1/4 | ● | ● | ● | | ● | | ● | | ● | 446 |
| 220.00 | 225.00 | 3.00 | | | ● | | | ● | | | | | 220030 |
| 220.00 | 227.00 | 4.00 | | | | | | ● | | | | | 220040 |
| 220.00 | 229.00 | 5.00 | | | ● | | | | | | | | 220050 |
| 220.00 | 230.00 | 5.70 | | | ● | ● | | ● | | | ● | ● | 220057 |


Metric sizes denoted by yellow shading

Quad ring




NBR Quad ring
Order code
imp. 4-(size)


Backup rings




Urethane Washer
Order code
imp. 8-(size)-P9
met. 9-(size)-P9



NBR Washer
Order code
imp. 8-(size)-N9



Hytrek Washer
Order code
imp. 8-(size)-H
met. 9-(size)-H



PTFE Washer
Order code
imp. 8-(size)-T
met. 9-(size)-T

| Shaft | Cylinder | O-Ring | | Quad | O-Rings | | | | Back Up Rings | | | | Size |
|--------|----------|--------|------|-------|---------|-------|------|-------|---------------|------|--------|------|--------|
| | | C/S | nom | NBR70 | NBR70 | NBR90 | Poly | Viton | NBR | Poly | Hytrek | PTFE | |
| 220.00 | 235.00 | 8.40 | | | ● | ● | | | | | | ● | 220084 |
| 222.25 | 227.00 | 2.62 | 3/32 | | ● | ● | | ● | | | | | 174 |
| 222.25 | 228.60 | 3.53 | 1/8 | | ● | ● | | ● | ● | | | | 269 |
| 222.25 | 231.78 | 5.33 | 3/16 | ● | ● | ● | | ● | ● | | | | 372 |
| 225.00 | 240.00 | 8.40 | | | ● | | | | | | | ● | 225084 |
| 228.60 | 233.35 | 2.62 | 3/32 | | ● | | | ● | | | | | 175 |
| 228.60 | 234.95 | 3.53 | 1/8 | ● | ● | ● | | ● | ● | | | | 270 |
| 228.60 | 238.13 | 5.33 | 3/16 | | ● | | | ● | ● | | | | 373 |
| 228.60 | 241.30 | 6.99 | 1/4 | ● | ● | ● | | ● | | ● | | ● | 447 |
| 230.00 | 235.00 | 3.00 | | | ● | | | ● | | | | | 230030 |
| 230.00 | 239.00 | 5.00 | | | ● | | | ● | | | | | 230050 |
| 230.00 | 240.00 | 5.70 | | | ● | ● | | ● | | | ● | ● | 230057 |
| 230.00 | 245.00 | 8.40 | | | ● | ● | | | | | | ● | 230084 |
| 234.95 | 239.70 | 2.62 | 3/32 | | ● | ● | | ● | | | | | 176 |
| 234.95 | 241.30 | 3.53 | 1/8 | ● | ● | ● | | ● | ● | | | | 271 |
| 234.95 | 244.48 | 5.33 | 3/16 | ● | ● | | | ● | ● | | | | 374 |
| 234.95 | 247.65 | 6.99 | 1/4 | | | | | ● | | | | | 446A |
| 235.00 | 250.00 | 8.40 | | | ● | ● | | | | | | ● | 235084 |
| 240.00 | 245.00 | 3.00 | | | ● | | | ● | | | | | 240030 |
| 240.00 | 250.00 | 5.70 | | | ● | ● | | ● | | | ● | ● | 240057 |
| 240.00 | 255.00 | 8.40 | | | ● | ● | | | | | | ● | 240084 |
| 241.30 | 246.05 | 2.62 | 3/32 | | ● | | | ● | | | | | 177 |
| 241.30 | 247.65 | 3.53 | 1/8 | ● | ● | ● | | ● | ● | | | | 272 |
| 241.30 | 250.83 | 5.33 | 3/16 | ● | ● | ● | | ● | ● | | | | 375 |
| 241.30 | 254.00 | 6.99 | 1/4 | ● | ● | ● | | ● | | ● | | ● | 448 |
| 245.00 | 252.00 | 4.00 | | | ● | | | | | | | | 245040 |
| 245.00 | 260.00 | 8.40 | | | ● | | | | | | | ● | 245084 |
| 247.65 | 252.40 | 2.62 | 3/32 | | ● | | | ● | | | | | 178 |
| 247.65 | 254.00 | 3.53 | 1/8 | | ● | ● | | ● | | ● | | | 273 |
| 247.65 | 257.18 | 5.33 | 3/16 | ● | ● | ● | | ● | | ● | | | 376 |
| 250.00 | 255.00 | 3.00 | | | ● | | | ● | | | | | 250030 |
| 250.00 | 257.00 | 4.00 | | | ● | | | | | | | | 250040 |
| 250.00 | 259.00 | 5.00 | | | ● | | | | | | | | 250050 |
| 250.00 | 260.00 | 5.70 | | | ● | ● | | ● | | | ● | ● | 250057 |
| 250.00 | 265.00 | 8.40 | | | ● | ● | | | | | | ● | 250084 |
| 254.00 | 260.35 | 3.53 | 1/8 | | ● | ● | | ● | ● | | | | 274 |
| 254.00 | 263.53 | 5.33 | 3/16 | | ● | ● | | ● | ● | | | | 377 |


Metric sizes denoted by yellow shading

Quad ring




NBR Quad ring
Order code
imp. 4-(size)


Backup rings




Urethane Washer
Order code
imp. 8-(size)-P9
met. 9-(size)-P9



NBR Washer
Order code
imp. 8-(size)-N9



Hytrel Washer
Order code
imp. 8-(size)-H
met. 9-(size)-H




PTFE Washer
Order code
imp. 8-(size)-T
met. 9-(size)-T

| Shaft | Cylinder | O-Ring | Quad | | O-Rings | | | | Back Up Rings | | | | Size |
|--------|----------|-----------|------|-----|---------|-------|-------|------|---------------|-----|------|--------|--------|
| | | | C/S | nom | NBR70 | NBR70 | NBR90 | Poly | Viton | NBR | Poly | Hytrel | |
| 254.00 | 266.70 | 6.99 1/4 | | ● | ● | ● | | ● | | ● | | ● | 449 |
| 255.00 | 270.00 | 8.40 | | | ● | ● | | | | | | ● | 255084 |
| 260.00 | 269.00 | 5.00 | | | ● | | | | | | | | 260050 |
| 260.00 | 270.00 | 5.70 | | | ● | ● | | ● | | | | ● | 260057 |
| 265.00 | 280.00 | 8.40 | | | ● | ● | | | | | | ● | 265084 |
| 266.70 | 273.05 | 3.53 1/8 | | ● | ● | ● | | ● | ● | | | | 275 |
| 266.70 | 276.23 | 5.33 3/16 | | | ● | ● | | ● | ● | | | | 378 |
| 266.70 | 279.40 | 6.99 1/4 | | ● | ● | ● | | ● | | ● | | ● | 450 |
| 270.00 | 277.00 | 4.00 | | | ● | | | | | | | | 270040 |
| 270.00 | 280.00 | 5.70 | | | ● | ● | | ● | | | ● | ● | 270057 |
| 273.05 | 285.75 | 6.99 1/4 | | | | | | ● | | | | | 450A |
| 275.00 | 290.00 | 8.40 | | | ● | | | | | | | ● | 275084 |
| 279.40 | 285.75 | 3.53 1/8 | | ● | ● | ● | | ● | | ● | | | 276 |
| 279.40 | 288.93 | 5.33 3/16 | | ● | ● | ● | | ● | | ● | | | 379 |
| 279.40 | 292.10 | 6.99 1/4 | | ● | ● | ● | | ● | ● | | | ● | 451 |
| 280.00 | 285.00 | 3.00 | | | ● | | | | | | | | 280030 |
| 280.00 | 287.00 | 4.00 | | | ● | | | | | | | | 280040 |
| 280.00 | 289.00 | 5.00 | | | ● | | | | | | | | 280050 |
| 280.00 | 290.00 | 5.70 | | | ● | ● | | ● | | | | ● | 280057 |
| 280.00 | 295.00 | 8.40 | | | ● | ● | | | | | | | 280084 |
| 285.00 | 300.00 | 8.40 | | | ● | ● | | | | | | ● | 285084 |
| 285.75 | 298.45 | 6.99 1/4 | | | | | | ● | | | | | 451A |
| 290.00 | 300.00 | 5.70 | | | ● | ● | | ● | | | | ● | 290057 |
| 290.00 | 305.00 | 8.40 | | | ● | ● | | ● | | | | | 290084 |
| 292.10 | 298.45 | 3.53 1/8 | | ● | ● | ● | | ● | ● | | | | 277 |
| 292.10 | 301.63 | 5.33 3/16 | | | ● | ● | | ● | ● | | | | 380 |
| 292.10 | 304.80 | 6.99 1/4 | | ● | ● | ● | | ● | | ● | | ● | 452 |
| 295.00 | 310.00 | 8.40 | | | | | | ● | | | | ● | 295084 |
| 298.45 | 311.15 | 6.99 1/4 | | | ● | | | | | | | | 452A |
| 300.00 | 310.00 | 5.70 | | | ● | ● | | ● | | | | ● | 300057 |
| 304.80 | 311.15 | 3.53 1/8 | | ● | ● | ● | | ● | ● | | | | 278 |
| 304.80 | 314.33 | 5.33 3/16 | | | ● | ● | | ● | ● | | | | 381 |
| 304.80 | 317.50 | 6.99 1/4 | | ● | ● | ● | | ● | ● | | | ● | 453 |
| 310.00 | 319.00 | 5.00 | | | | | | ● | | | | | 310050 |
| 310.00 | 320.00 | 5.70 | | | ● | ● | | | | | | | 310057 |
| 315.00 | 330.00 | 8.40 | | | ● | ● | | | | | | ● | 315084 |
| 317.50 | 330.20 | 6.99 1/4 | | ● | ● | ● | | ● | ● | | | ● | 454 |


Metric sizes denoted by yellow shading

Quad ring




NBR Quad ring
Order code
imp. 4-(size)


Backup rings




Urethane Washer
Order code
imp. 8-(size)-P9
met. 9-(size)-P9



NBR Washer
Order code
imp. 8-(size)-N9



Hytrel Washer
Order code
imp. 8-(size)-H
met. 9-(size)-H




PTFE Washer
Order code
imp. 8-(size)-T
met. 9-(size)-T

| Shaft | Cylinder | O-Ring | | Quad | O-Rings | | | | Back Up Rings | | | | Size |
|--------|----------|--------|------|-------|---------|-------|------|-------|---------------|------|--------|------|--------|
| | | C/S | nom | NBR70 | NBR70 | NBR90 | Poly | Viton | NBR | Poly | Hytrel | PTFE | |
| 320.00 | 330.00 | 5.70 | | | ● | | | | | | | | 320057 |
| 320.00 | 335.00 | 8.40 | | | ● | | | | | | | | 320084 |
| 330.00 | 340.00 | 5.70 | | | ● | | | | | | | | 330057 |
| 330.20 | 336.55 | 3.53 | 1/8 | | ● | ● | | ● | | ● | | | 279 |
| 330.20 | 339.73 | 5.33 | 3/16 | | ● | ● | | ● | | | | | 382 |
| 330.20 | 342.90 | 6.99 | 1/4 | ● | ● | ● | | ● | ● | | | ● | 455 |
| 340.00 | 349.00 | 5.00 | | | ● | | | | | | | | 340050 |
| 340.00 | 350.00 | 5.70 | | | ● | | | | | | | | 340057 |
| 340.00 | 355.00 | 8.40 | | | ● | ● | | | | | | | 340084 |
| 342.90 | 355.60 | 6.99 | 1/4 | | ● | ● | | ● | ● | | | ● | 456 |
| 355.60 | 361.95 | 3.53 | 1/8 | | ● | ● | | ● | ● | | | | 280 |
| 355.60 | 365.13 | 5.33 | 3/16 | | ● | ● | | ● | | | | | 383 |
| 355.60 | 368.30 | 6.99 | 1/4 | | ● | ● | | ● | ● | | | ● | 457 |
| 360.00 | 367.00 | 4.00 | | | ● | | | | | | | | 360040 |
| 360.00 | 370.00 | 5.70 | | | ● | | | | | | | | 360057 |
| 361.00 | 368.00 | 4.00 | | | | | | ● | | | | | 361040 |
| 368.30 | 374.65 | 3.53 | 1/8 | | ● | | | | | | | | 280A |
| 368.30 | 381.00 | 6.99 | 1/4 | ● | ● | ● | | ● | ● | | | ● | 458 |
| 370.00 | 379.00 | 5.00 | | | ● | | | | | | | | 370050 |
| 375.00 | 390.00 | 8.40 | | | ● | ● | | | | | | | 375084 |
| 380.00 | 390.00 | 5.70 | | | ● | | | | | | | | 380057 |
| 381.00 | 387.35 | 3.53 | 1/8 | | ● | ● | | ● | ● | | | | 281 |
| 381.00 | 390.53 | 5.33 | 3/16 | | ● | | | ● | | | | | 384 |
| 381.00 | 393.70 | 6.99 | 1/4 | | ● | ● | | ● | ● | | | ● | 459 |
| 385.00 | 394.00 | 5.00 | | | ● | | | | | | | | 385050 |
| 385.00 | 400.00 | 8.40 | | | ● | ● | | | | | | | 385084 |
| 393.70 | 406.40 | 6.99 | 1/4 | | ● | ● | | ● | ● | | | ● | 460 |
| 400.00 | 410.00 | 5.70 | | | ● | | | ● | | | | | 400057 |
| 406.40 | 412.75 | 3.53 | 1/8 | | ● | | | ● | | | | | 282 |
| 406.40 | 415.93 | 5.33 | 3/16 | | ● | ● | | ● | | | | | 385 |
| 406.40 | 419.10 | 6.99 | 1/4 | ● | ● | | | ● | | | | | 461 |
| 419.10 | 431.80 | 6.99 | 1/4 | | ● | ● | | ● | ● | | | | 462 |
| 420.00 | 430.00 | 5.70 | | | ● | | | | | | | | 420057 |
| 431.80 | 438.15 | 3.53 | 1/8 | | ● | | | ● | | | | | 283 |
| 431.80 | 441.33 | 5.33 | 3/16 | | ● | ● | | ● | | | | | 386 |
| 431.80 | 444.50 | 6.99 | 1/4 | | ● | | | ● | ● | | | | 463 |
| 435.00 | 444.00 | 5.00 | | | | | | ● | | | | | 435050 |





Metric sizes denoted by yellow shading

Quad ring



NBR Quad ring
Order code
imp. 4-(size)

Backup rings

| | | | |
|---|---|--|---|
|  |  |  |  |
| Urethane Washer | NBR Washer | Hytrel Washer | PTFE Washer |
| Order code imp. 8-(size)-P9 met. 9-(size)-P9 | Order code imp. 8-(size)-N9 | Order code imp. 8-(size)-H met. 9-(size)-H | Order code imp. 8-(size)-T met. 9-(size)-T |

| Shaft | Cylinder | O-Ring | Quad | | O-Rings | | | | | Back Up Rings | | | | Size |
|--------|----------|-----------|------|-----|---------|-------|-------|------|-------|---------------|------|--------|------|--------|
| | | | C/S | nom | NBR70 | NBR70 | NBR90 | Poly | Viton | NBR | Poly | Hytrel | PTFE | |
| 440.00 | 447.00 | 4.00 | | | ● | | | | | | | | | 440040 |
| 440.00 | 450.00 | 5.70 | | | ● | | | | | | | | | 440057 |
| 444.50 | 457.20 | 6.99 1/4 | ● | ● | ● | | | ● | ● | | | | | 464 |
| 450.00 | 457.00 | 4.00 | | | ● | | | | | | | | | 450040 |
| 457.20 | 463.55 | 3.53 1/8 | | | ● | | | ● | | | | | | 284 |
| 457.20 | 466.73 | 5.33 3/16 | ● | ● | | | | ● | | | | | | 387 |
| 457.20 | 469.90 | 6.99 1/4 | | | ● | ● | | ● | ● | | | | | 465 |
| 460.00 | 470.00 | 5.70 | | | ● | | | | | | | | | 460057 |
| 469.90 | 482.60 | 6.99 1/4 | | | ● | | | ● | ● | | | | | 466 |
| 480.00 | 490.00 | 5.70 | | | ● | | | | | | | | | 480057 |
| 482.60 | 492.13 | 5.33 3/16 | | | | | | ● | | | | | | 388 |
| 482.60 | 495.30 | 6.99 1/4 | | | ● | | | ● | ● | | | | | 467 |
| 495.30 | 508.00 | 6.99 1/4 | | | ● | | | ● | ● | | | | | 468 |
| 497.00 | 504.00 | 4.00 | | | ● | | | | | | | | | 497040 |
| 500.00 | 510.00 | 5.70 | | | ● | | | | | | | | | 500057 |
| 500.00 | 515.00 | 8.40 | | | ● | | | | | | | | | 500084 |
| 508.00 | 517.53 | 5.33 3/16 | | | ● | ● | | ● | | | | | | 389 |
| 508.00 | 520.70 | 6.99 1/4 | | | ● | | | ● | ● | | | | | 469 |
| 533.40 | 542.93 | 5.33 3/16 | | | ● | ● | | ● | ● | | | | | 390 |
| 533.40 | 546.10 | 6.99 1/4 | | | ● | ● | | ● | ● | | | | | 470 |
| 558.80 | 568.33 | 5.33 3/16 | | | ● | ● | | ● | | | | | | 391 |
| 558.80 | 571.50 | 6.99 1/4 | | | ● | ● | | ● | | | | | | 471 |
| 584.20 | 593.73 | 5.33 3/16 | | | ● | ● | | ● | | | | | | 392 |
| 584.20 | 596.90 | 6.99 1/4 | | | ● | ● | | ● | ● | | | | | 472 |
| 609.60 | 619.13 | 5.33 3/16 | | | ● | | | ● | | | | | | 393 |
| 609.60 | 622.30 | 6.99 1/4 | | | ● | | | ● | | | | | | 473 |
| 635.00 | 644.53 | 5.33 3/16 | | | | | | ● | | | | | | 394 |
| 635.00 | 647.70 | 6.99 1/4 | | | ● | ● | | ● | ● | | | | | 474 |
| 660.40 | 669.93 | 5.33 3/16 | | | | | | ● | | | | | | 395 |
| 660.40 | 673.10 | 6.99 1/4 | | | ● | | | ● | | | | | | 475 |

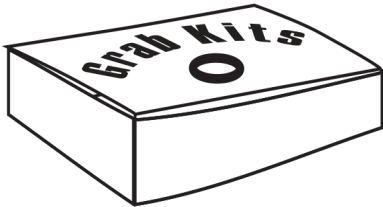
Metric sizes denoted by yellow shading



Grab Kits

O-rings, Quad Rings, Flange seal, Backup & Bonded washers
Design

Ancillary



Kit Types

O-ring

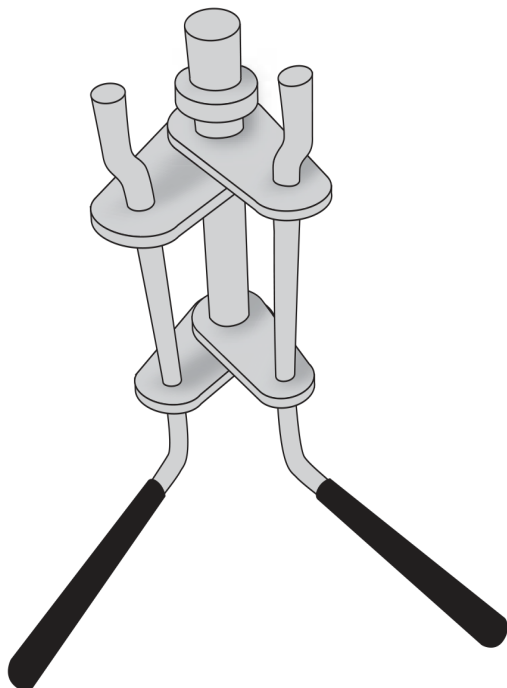
Quad ring

Back up washers

Flange seals

Bonded washers

Tools



Full Range of Grab Box kits to suit the Hydraulic Industry.

Kit Definitions

O-Ring Kits

NBR70 & 90 Shore A
Viton, EDPM & other compounds
Boss Gasket NBR90 Shore A
Splicing Kit

Quad Ring Kits

NBR70 Shore A

Back Up Washer Kits

NBR90 Shore A
Polyurethane
PTFE

Flange Seal Kits (SAE J518)

Polyurethane 92 Shore A - Type 61 & 62 flanges
NBR90 Shore A o-Rings - Type 61 flanges only

Bonded Washers

Popular bonded washer sizes (Dowty Washer)

Tools

O-ring picks
O-ring measuring cone and chart
U-ring installation tools and kits



Grab Kits

Ancillary

| Prod Code | Kit Description | Qty | Contents Desc | | | | | | | |
|-----------|--|-------|---------------|-----|------|-----|-------|-------|-----|-----|
| GKM-10919 | O-Rings NBR90,European Metric 386 O-Rings, 30 sizes | 20ea | 3.0 | 3.1 | 4.1 | 7.1 | | | | |
| | | 16ea | 2.0c/s | 4.0 | 6.0 | 7.0 | 8.0 | | | |
| GKI-30017 | Quad Rings NBR70 226 Quad Rings, 36 Sizes | 10ea | 005 | 006 | 007 | 008 | 009 | 010 | 011 | 012 |
| | | 6ea | 013 | 014 | 015 | 016 | 110 | 111 | 112 | 113 |
| GKI-20599 | Flange Seals, 60 pieces, 6 sizes O-Rings NBR90 Tube boss fittings, 100 O-Rings, 10 sizes Total 160 pieces, 16 sizes | 10ea | Flange | 1/2 | 3/4 | 1 | 1 1/4 | 1 1/2 | 2 | |
| | | 10 ea | Tube | 1/4 | 5/16 | 3/8 | 1/2 | 5/8 | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
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Grab Kits

Ancillary

| Prod Code | Kit Description | Qty | Contents Description | | | | | | |
|---|---|------|----------------------|-----|-----|-----|-----|-----|-----|
| GKI-10019W | O-Ring NBR90 Warehouse, 1110 O-Rings, 150 sizes | 20ea | 001 | 002 | 003 | 004 | 005 | 006 | 007 |
| | | | 008 | 009 | 010 | 011 | 012 | 013 | 014 |
| | | | 015 | 016 | | | | | |
| | | 15ea | 110 | 111 | 112 | 113 | 114 | 115 | 116 |
| | | 10ea | 017 | 018 | 019 | 020 | 021 | 022 | 023 |
| | | | 024 | 117 | 118 | 119 | 120 | 121 | 122 |
| | | | 123 | 124 | 210 | 211 | 212 | 213 | 214 |
| | | | 215 | 216 | | | | | |
| | | 7ea | 025 | 026 | 027 | 028 | 029 | 030 | 031 |
| | | 5ea | 032 | 033 | 034 | 035 | 036 | 037 | 038 |
| | | | 039 | 040 | 041 | 042 | 043 | 125 | 126 |
| | | | 127 | 128 | 129 | 130 | 131 | 132 | 133 |
| 134 | 135 | | 136 | 137 | 138 | 139 | 140 | | |
| 141 | 142 | | 217 | 218 | 219 | 220 | 221 | | |
| 222 | 223 | | 224 | 225 | 226 | 227 | 228 | | |
| 229 | 325 | | 326 | 327 | 328 | 901 | 902 | | |
| 903 | 904 | | 905 | 906 | 907 | 908 | 909 | | |
| 910 | 911 | | 912 | 913 | 914 | 916 | 918 | | |
| 920 | 924 | | 928 | 932 | | | | | |
| 4ea | 329 | 330 | | | | | | | |
| 3ea | 143 | 144 | 145 | 146 | 230 | 231 | 232 | | |
| 2ea | 044 | 045 | 046 | 147 | 148 | 149 | 150 | | |
| | 151 | 233 | 234 | 235 | 236 | 237 | 331 | | |
| | 332 | 333 | 334 | 335 | 336 | 337 | 338 | | |
| <p>Our warehouse kit is ideally suited for the repair shop that needs a large on-hand selection of o-rings to ensure quick repair of all machine types. Each size is individually packed in a heavy duty Zip-lock bag for protection. All stored in a sturdy styrene cabinet with slide-out draws for easy access. Included is a card showing the size, dimensions and draw location for each ring.</p> | | | | | | | | | |
| GKI-10019H | O-Rings NBR90, Hose end & adaptors | 8ea | 011 | 012 | 014 | 016 | 018 | 021 | 025 |
| | | | 029 | 210 | 214 | 219 | 221 | 223 | 228 |
| | | | 902 | 903 | 904 | 905 | 906 | 908 | 910 |
| | | | 912 | 914 | 916 | 920 | 924 | 932 | |





Grab Kits

Ancillary

| Prod Code | Kit Description | Qty | Contents Description | | | | | | |
|------------|--|------|----------------------|-------|------|-------|-------|-------|-----|
| GKI-10019M | O-ring NBR90 mega kit, 5-in-1 box, 1415 Pieces in 81 sizes | | | | | | | | |
| | Box 1 – SAE Flange O-Rings | 10ea | 1/2 | 3/4 | 1 | | | | |
| | | 5ea | 1 1/4 | 1 1/2 | 2 | | | | |
| | Box 2 – Boss O-Rings NBR90 | 25ea | 904 | 907 | 908 | 910 | | | |
| | | 15ea | 903 | 906 | 912 | | | | |
| | | 10ea | 916 | | | | | | |
| | Box 3 – 1/16 c/s O-Rings NBR70 | 25ea | 006 | 007 | 008 | 009 | 010 | 011 | 012 |
| | | | 013 | 014 | 015 | 016 | 017 | 018 | |
| | | 20ea | 019 | 020 | 021 | | | | |
| | | 15ea | 022 | 023 | 024 | 025 | 026 | 028 | |
| | | 10ea | 029 | 030 | | | | | |
| | Box 4 – 3/32 c/s O-Rings NBR70 | 25ea | 109 | 110 | 111 | 112 | 113 | 114 | 115 |
| | | | 116 | 117 | 118 | | | | |
| | | 20ea | 119 | 120 | | | | | |
| | | 15ea | 121 | 122 | 123 | 124 | 125 | 126 | 127 |
| | | 10ea | 128 | 129 | 131 | 133 | | | |
| | | 5ea | 135 | | | | | | |
| | Box 5 – 1/8 c/s O-Rings NBR70 | 20ea | 210 | 211 | 212 | 213 | 214 | | |
| | | 15ea | 215 | 216 | 217 | 218 | 219 | 220 | 221 |
| | | | 222 | | | | | | |
| | 10ea | 223 | 224 | 226 | 228 | 232 | 236 | | |
| GKI-10117 | O-Rings NBR70, 276 O-Rings, 25 sizes | 20ea | 017 | 023 | 024 | | | | |
| GKI-10119 | O-Rings NBR90 | 18ea | 012 | | | | | | |
| | | 10ea | 013 | 014 | 015 | 016 | 018 | 019 | |
| | | | 021 | 022 | 025 | 026 | 027 | 028 | |
| | | 8ea | 006 | 007 | 008 | 009 | 010 | 011 | |
| GKI-10217 | O-Rings NBR70, 218 O-rings, 25 sizes | 6ea | 104 | 105 | 106 | 107 | 108 | 109 | |
| | | 8ea | 111 | 112 | 113 | 116 | 117 | 118 | |
| | | | 120 | 122 | 123 | 124 | 125 | 126 | |
| | | | 128 | | | | 127 | 127 | |
| | | 12ea | 110 | | | | | | |
| | | 16ea | 114 | 115 | 121 | | | | |
| GKI-10219 | O-Rings NBR90, 218 O-rings, 25 sizes | 6ea | 104 | 105 | 106 | 107 | 108 | 109 | |
| | | 8ea | 111 | 112 | 113 | 116 | 117 | 118 | |
| | | | 120 | 122 | 123 | 124 | 125 | 126 | |
| | | | 128 | | | | 127 | 127 | |
| | | 12ea | 110 | | | | | | |
| | | 16ea | 114 | 115 | 121 | | | | |
| GKI-10619 | O-Rings NBR90, Flange & Tube boss fitting, 160 O-Rings, 16 sizes | 10ea | Flange | 1/2 | 3/4 | 1 | 1 1/4 | 1 1/2 | |
| | | 10ea | Tube | 1/4 | 5/16 | 3/8 | 1/2 | 5/8 | |
| | | | | 7/8 | 1 | 1 1/4 | 1 1/2 | 2 | |



Grab Kits

Ancillary

| Prod Code | Kit Description | Qty | Contents Description | | | | | | | |
|-----------|--|------|----------------------|-------|-------|-------|------|-------|-------|------|
| GKI-10030 | O-Rings PTFE, 325 O-Rings, 36 sizes | 15ea | 005 | 006 | 007 | 008 | 009 | 010 | 011 | 012 |
| | | 10ea | 013 | 014 | 015 | 016 | 017 | 018 | | |
| | | 10ea | 110 | 111 | 112 | 113 | 114 | 115 | 116 | |
| | | 5ea | 117 | 118 | 119 | 120 | 121 | | | |
| | | 5ea | 210 | 211 | 212 | 213 | 214 | 215 | 216 | 217 |
| GKM-10817 | O-Rings NBR70 Japanese Industrial Metric 380 O-Rings, 36 sizes | 25ea | P3 | | | | | | | |
| | | 20ea | P4 | P5 | P6 | | | | | |
| | | 15ea | P7 | P8 | P9 | P10 | P10A | P11 | P11.2 | |
| | | 12ea | P12 | P12.5 | P14 | P15 | P16 | | | |
| | | 8ea | P18 | P20 | P21 | P22 | | | | |
| | | 7ea | G30 | P24 | P25 | P25.5 | P26 | P28 | | |
| | | 6ea | G25 | P29 | P29.5 | P30 | P31 | P31.5 | V24 | |
| | | 5ea | P22A | P22.4 | | | | | | |
| GKM-10819 | O-Rings NBR90 Japanese Industrial Metric 396 O-Rings, 30 sizes | 20ea | P3 | P4 | | | | | | |
| | | 18ea | P5 | P6 | P7 | P8 | P9 | | | |
| | | 14ea | P10A | P11 | P12 | P14 | P16 | P18 | | |
| | | 13ea | P20 | | | | | | | |
| | | 12ea | G22 | G25 | | | | | | |
| | | 11ea | G20 | G30 | G35 | G40 | G45 | | | |
| | | 10ea | P22.4 | P25 | P26 | P30 | P32 | P34 | P36 | P40 |
| GKM-10917 | O-Rings NBR70, European Metric 500 O-Rings, 36 sizes | 20ea | 1.5c/s | 5.0 | | | | | | |
| | | 20ea | 1.6c/s | 2.2 | 3.1 | 4.1 | 7.1 | | | |
| | | 20ea | 2.0c/s | 4.0 | 6.0 | | | | | |
| | | 15ea | 1.5c/s | 13.0 | | | | | | |
| | | 15ea | 1.6c/s | 9.1 | 10.1 | 13.1 | | | | |
| | | 15ea | 2.0c/s | 8.0 | 9.0 | 10.0 | 12.0 | | | |
| | | 15ea | 2.4c/s | 4.3 | 5.3 | 5.6 | 7.6 | 8.3 | 8.6 | |
| | | 10ea | 1.5c/s | 16.0 | | | | | | |
| | | 10ea | 2.0c/s | 14.0 | 16.0 | 19.0 | 20.0 | | | |
| | | 10ea | 2.5c/s | 10.0 | 13.0 | 14.0 | 15.0 | 17.0 | 18.0 | 19.0 |
| | | 10ea | 3.0c/s | 9.0 | 10.0 | 11.0 | | | | |



Grab Kits

Ancillary

| Prod Code | Kit Description | Qty | Contents Description | | | | | | | |
|------------|--|---------|----------------------|---------|------------|---------|-----------|-------|------|--|
| GKM-10919 | O-Rings NBR90, European Metric 500 O-Rings, 36 sizes | 20ea | 1.5c/s 5.0 | | | | | | | |
| | | 20ea | 1.6c/s | 2.2 | 3.1 | 4.1 | 7.1 | | | |
| | | 20ea | 2.0c/s 4.0 | | 6.0 | | | | | |
| | | 15ea | 1.5c/s 13.0 | | | | | | | |
| | | 15ea | 1.6c/s | 9.1 | 10.1 | 13.1 | | | | |
| | | 15ea | 2.0c/s | 8.0 | 9.0 | 10.0 | 12.0 | | | |
| | | 15ea | 2.4c/s | 4.3 | 5.3 | 5.6 | 7.6 | 8.3 | 8.6 | |
| | | 10ea | 1.5c/s 16.0 | | | | | | | |
| | | 10ea | 2.0c/s | 14.0 | 16.0 | 19.0 | 20.0 | | | |
| | | 10ea | 2.5c/s | 10.0 | 13.0 | 14.0 | 15.0 | 17.0 | 18.0 | |
| | | | | 10ea | 3.0c/s 9.0 | | 10.0 11.0 | | | |
| GKI-30017 | Quad Rings NBR70 226 Quad Rings, 36 sizes | 10ea | 005 | 006 | 007 | 008 | 009 | 010 | 011 | |
| | | | 012 | | | | | | | |
| | | 6ea | 013 | 014 | 015 | 016 | 110 | 111 | 112 | |
| | | | 113 | 114 | 115 | 116 | | | | |
| 5ea | 017 | 018 | 210 | 211 | 212 | 213 | 214 | | | |
| | 215 | 216 | 217 | 218 | 219 | | | | | |
| 4ea | 117 | 118 | 119 | 120 | 121 | | | | | |
| GKI-20099C | Flange Seals, 60 pieces, 6 sizes | 10ea | 1/2 | 3/4 | 1 | 1 1/4 | 1 1/2 | 2 | | |
| GKI-20599 | Flange Seals, 60 pieces, 6 sizes O-Rings NBR90 Tube boss fittings, 100 O-Rings, 10 sizes Total 160 pieces, 16 sizes | 10ea | Flange | 1/2 | 3/4 | 1 | 1 1/4 | 1 1/2 | 2 | |
| | | 10ea | Tube | 1/4 | 5/16 | 3/8 | 1/2 | 5/8 | 3/4 | |
| | | | 7/8 | 1 | 1 1/4 | 1 1/2 | | | | |
| 10ea | o-rings | 1/2 | 3/4 | 1 | 1 1/4 | 1 1/2 | 2 | | | |
| GKI-80019 | Back up rings NBR90 293 Back ups, 36 sizes | 10ea | 005 | 006 | 007 | 008 | 009 | 010 | 011 | |
| | | | 012 | 013 | 014 | 015 | 016 | 017 | 018 | |
| | | | 110 | 111 | 112 | 113 | 114 | 115 | 116 | |
| | | 7ea | 210 | 211 | 212 | 213 | | | | |
| | | 5ea | 117 | 118 | 119 | 120 | 121 | 214 | 215 | |
| | 216 | 217 | 218 | 219 | | | | | | |
| GKI-80030 | Back up rings PTFE 325 Back ups, 36 sizes Solid, scarf cut | 15ea | 005 | 006 | 007 | 008 | 009 | 010 | 011 | |
| | | | 012 | | | | | | | |
| | | 10ea | 013 | 014 | 015 | 016 | 017 | 018 | 110 | |
| | 111 | 112 | 113 | 114 | 115 | 116 | | | | |
| 5ea | 117 | 118 | 119 | 120 | 121 | 210 | 211 | | | |
| | 212 | 213 | 214 | 215 | 216 | 217 | 218 | | | |
| | | 219 | | | | | | | | |
| GKM-40010 | Bonded Washers, German Metric | 25ea | BWM-202 | BWM-203 | | BWM-207 | | | | |
| | | | BWM-213 | BWM-217 | | BWM-222 | | | | |
| | | | BWM-229 | | | | | | | |
| | | 20ea | BWM-232 | BWM-233 | | BWM-238 | | | | |
| | BWM-239 | BWM-240 | | | | | | | | |
| 10ea | BWM-243 | | BWM-244 | | | | | | | |
| 5ea | BWM-247 | BWM-248 | | | | | | | | |



Grab Kits

Ancillary

| Prod Code | Tool Type | Description |
|-----------|------------------------|---|
| T-001 | Seal / O-Ring picks | 4 pieces with handles, pick and hook type |
| T-002 | Seal / O-Ring picks | 4 attachments, 1 handle with magnet, pick and hook |
| T-020 | O-Ring Measuring cone | Measures 184 of the most popular Imperial o-ring sizes in 5 standard cross sections |
| T-021 | O-Ring Measuring chart | For measuring most sizes of Imperial o-rings |
| T-100 | U-Ring Installation | Seal range 3/4" to 1 1/4" 19 to 32mm |
| T-101 | U-Ring Installation | Seal range 1 3/8" to 1 7/8" 35 to 48mm |
| T-102 | U-Ring Installation | Seal range 2" to 3" 50 to 76mm |
| T-105 | U-Ring Installation | Tool kit Contains above 3 tools in a plastic case |

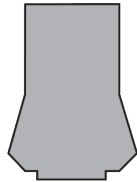




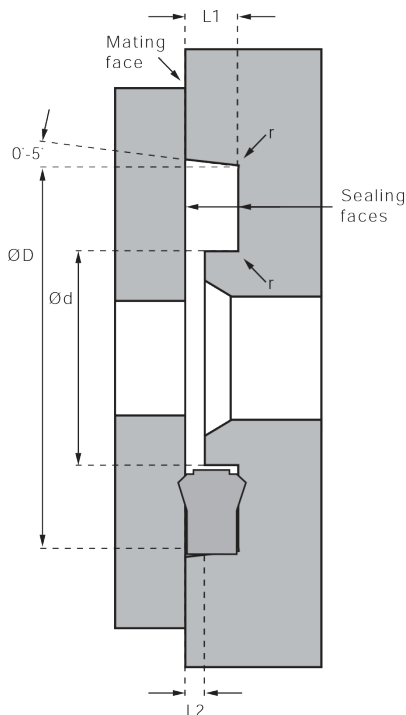
CFS

Flange Seal

Ancillary



- SAE flange sizes
- Snap in easy fit
- Heavy duty
- O-ring replacement



Design

CFS flange seal is designed to suit the SAE J518 range of flanges and common metric flange sizes. The seal is manufactured in a high performance grade of Polyurethane with excellent resistance to extrusion and compression set over a wide temperature range. They provide a direct replacement for o-rings without any modifications of existing grooves. This design offers many performance advantages over common o-ring or rubber based flange seals, including the elimination of the 'pumping effect'.

Operating Conditions

Pressure

400 Bar
6,000 Psi



Temperature

-40° to 110° C
-40° to 230° F



Surface Finish µmRa

mating face 3.0
sealing face 0.8

Tolerances

| ØD | Ød | L1 | L2 |
|--------|--------|--------|--------|
| -0.000 | ±0.015 | -0.000 | -0.010 |
| +0.005 | | +0.005 | +0.000 |

Radii

r 0.030

GKI-20099C Grab box

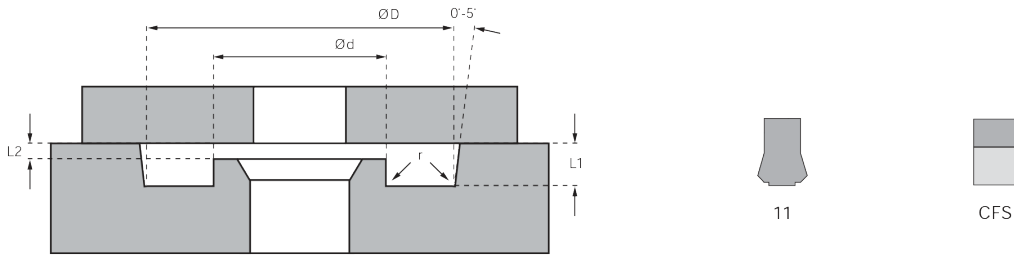
60 pieces 6 sizes

| sizes | 1/2 | 3/4 | 1 | 1 1/4 | 1 1/2 | 2 |
|-------|-----|-----|----|-------|-------|----|
| qty | 10 | 10 | 10 | 10 | 10 | 10 |

Typical Examples

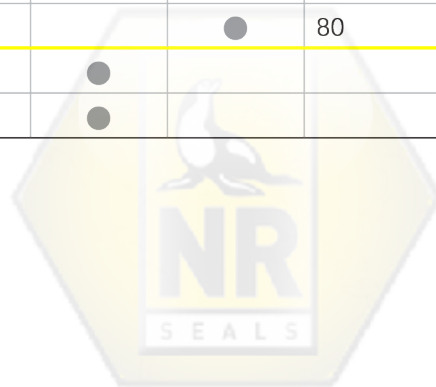
Static





Nominal SAE J518

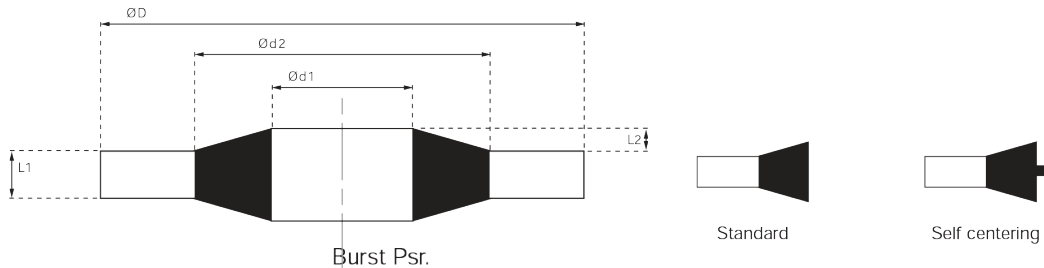
| FLANGE | ØD | Ød | L1 | L2 | CFS | 11 | Flange No. | SIZE CODE |
|--------|-------|-------|-------|-------|-----|----|------------|-----------|
| 1/2 | 1.000 | 0.670 | 0.110 | 0.010 | ● | | 08 | 0500 |
| 3/4 | 1.250 | 0.920 | 0.110 | 0.010 | ● | | 12 | 0750 |
| 1 | 1.560 | 1.230 | 0.110 | 0.010 | ● | | 16 | 1000 |
| 1 1/4 | 1.750 | 1.420 | 0.110 | 0.010 | ● | | 20 | 1250 |
| 1 1/2 | 2.125 | 1.785 | 0.110 | 0.010 | ● | | 24 | 1500 |
| 2 | 2.500 | 2.160 | 0.110 | 0.010 | ● | | 32 | 2000 |
| 2 1/2 | 3.005 | 2.665 | 0.110 | 0.010 | | ● | 40 | 2500 |
| 3 | 3.625 | 3.285 | 0.110 | 0.010 | | ● | 48 | 3000 |
| 3 1/2 | 4.115 | 3.775 | 0.110 | 0.010 | | ● | 56 | 3500 |
| 4 | 4.615 | 4.275 | 0.110 | 0.010 | | ● | 64 | 4000 |
| 5 | 5.615 | 5.275 | 0.110 | 0.010 | | ● | 80 | 5000 |
| | 33.5 | 26.3 | 2.2 | 0.25 | ● | | | M20 |
| | 45.0 | 36.2 | 3.3 | 0.25 | ● | | | M30 |





Ancillary

Bonded Washer



| ØD | Ød1 | Ød2 | L1 | L2 | Min BAR | Material | Standard | Type | Product code |
|----------------|----------------|----------------|----------------|----------------|---------|-------------|--------------|--------------|--------------|
| +0.15 -0.00 | +0.10 -0.10 | +0.10 -0.10 | +0.01 -0.01 | +0.25 -0.00 | | | | | |
| 7.0 | 4.5 | 5.4 | 1.0 | 0.3 | 1270 | Steel/NBR90 | German M4 | Self Centred | BWM-202 |
| 9.0 | 5.7 | 6.8 | 1.0 | 0.3 | 1400 | Steel/NBR90 | German M5 | Self Centred | BWM-203 |
| 10.0 | 5.7 | 7.4 | 1.0 | 0.3 | 1500 | Steel/NBR90 | German M5 | Self Centred | BWM-204 |
| 9.2 | 6.2 | 7.2 | 1.0 | 0.3 | 1220 | Steel/NBR90 | German M5.5 | Standard | BWM-205 |
| 10.0 | 6.7 | 8.0 | 1.0 | 0.3 | 1120 | Steel/NBR90 | German M6 | Self Centred | BWM-206 |
| 11.0 | 6.7 | 8.2 | 1.0 | 0.3 | 1480 | Steel/NBR90 | German M6 | Standard | BWM-207 |
| 13.0 | 8.7 | 10.0 | 1.0 | 0.3 | 1330 | Steel/NBR90 | German M8 | Self Centred | BWM-212 |
| 14.0 | 8.7 | 10.4 | 1.0 | 0.3 | 1510 | Steel/NBR90 | German M8 | Self Centred | BWM-213 |
| 13.3 | 9.3 | 10.5 | 1.0 | 0.3 | 1200 | Steel/NBR90 | German M8.5 | Self Centred | BWM-215 |
| 16.0 | 10.7 | 12.4 | 1.5 | 0.4 | 1300 | Steel/NBR90 | German M10 | Self Centred | BWM-217 |
| 18.0 | 10.7 | 12.4 | 1.5 | 0.4 | 1880 | Steel/NBR90 | German M10 | Self Centred | BWM-218 |
| 19.1 | 11.8 | 12.7 | 1.5 | 0.4 | 1250 | Steel/NBR90 | German M11 | Standard | BWM-219 |
| 18.0 | 12.7 | 14.4 | 1.5 | 0.4 | 1150 | Steel/NBR90 | German M12 | Self Centred | BWM-222 |
| 20.0 | 12.7 | 14.4 | 1.5 | 0.4 | 1680 | Steel/NBR90 | German M12 | Standard | BWM-223 |
| 22.0 | 13.7 | 15.4 | 1.5 | 0.4 | 1810 | Steel/NBR90 | German M13 | Self Centred | BWM-225 |
| 22.0 | 14.7 | 16.4 | 1.5 | 0.4 | 1510 | Steel/NBR90 | German M14 | Self Centred | BWM-227 |
| 24.0 | 16.7 | 18.4 | 1.5 | 0.4 | 1370 | Steel/NBR90 | German M16 | Self Centred | BWM-229 |
| 24.0 | 17.4 | 19.2 | 1.5 | 0.4 | 1150 | Steel/NBR90 | German M17 | Standard | BWM-230 |
| 24.7 | 18.0 | 20.1 | 1.5 | 0.4 | 1070 | Steel/NBR90 | German M17.5 | Standard | BWM-231 |
| 26.0 | 18.7 | 20.4 | 1.5 | 0.4 | 1260 | Steel/NBR90 | German M18 | Self Centred | BWM-232 |
| 28.0 | 20.7 | 22.5 | 1.5 | 0.4 | 1140 | Steel/NBR90 | German M20 | Self Centred | BWM-233 |
| 28.7 | 21.5 | 23.3 | 2.5 | 0.4 | 1080 | Steel/NBR90 | German M21 | Standard | BWM-234 |
| 30.0 | 22.7 | 24.4 | 2.0 | 0.4 | 1080 | Steel/NBR90 | German M22 | Self Centred | BWM-236 |
| 32.0 | 24.7 | 26.4 | 2.0 | 0.4 | 1000 | Steel/NBR90 | German M24 | Self Centred | BWM-238 |
| 35.0 | 26.7 | 28.4 | 2.0 | 0.4 | 1090 | Steel/NBR90 | German M26 | Self Centred | BWM-239 |
| 36.0 | 27.2 | 29.0 | 2.0 | 0.4 | 1130 | Steel/NBR90 | German M27 | Self Centred | BWM-240 |
| 42.0 | 33.7 | 35.8 | 2.0 | 0.4 | 840 | Steel/NBR90 | German M33 | Self Centred | BWM-243 |
| 43.0 | 34.3 | 36.4 | 2.0 | 0.4 | 870 | Steel/NBR90 | German M34 | Standard | BWM-244 |
| 53.0 | 42.7 | 44.4 | 3.0 | 0.4 | 930 | Steel/NBR90 | German M42 | Standard | BWM-247 |
| 59.0 | 48.7 | 50.8 | 3.0 | 0.4 | 790 | Steel/NBR90 | German M48 | Standard | BWM-248 |



RJS

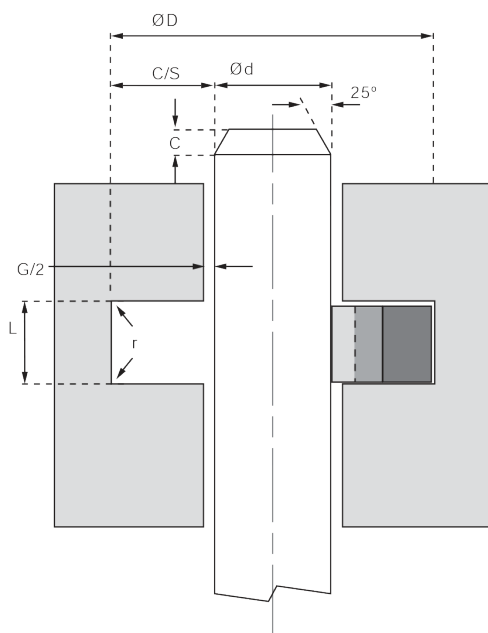
Rotary Joint Seals

Rotary joint seal



Key Features

- Medium to heavy duty
- Compact housing
- Specifically for swivel joints



Design

RJS rotary pressure seal is a seal designed specifically for use in hydraulic swivel joints. It is manufactured in high specification dual durometer Polyurethane to provide ease of installation and excellent sealing characteristics. These are a popular replacement seal for Asian excavators.

Operating Conditions

Pressure

350 Bar
5,000 Psi



Temperature

-40° to 110°C
-40° to 230°F



Speed

1.0m/sec
3.0'/sec



Surface Finish μmRa

REPLACEMENT SEAL ONLY

Tolerances

REPLACEMENT SEAL ONLY

Chamfer Radii

REPLACEMENT SEAL ONLY

Typical Examples

Reciprocating Rotary Oscillating Helix





Charts

Metric & Imperial Conversion

| Frac. | Imp dec. | Met mm | Frac. | Imp dec. | Met mm | Frac. | Imp dec. | Met mm | Frac. | Imp dec. | Met mm |
|-------|----------|--------|-------|----------|--------|--------|----------|--------|---------|----------|--------|
| | 0.004 | 0.100 | | 0.335 | 8.500 | | 0.709 | 18.000 | 1 1/4 | 1.250 | 31.750 |
| | 0.010 | 0.250 | 11/32 | 0.344 | 8.731 | 23/32 | 0.719 | 18.256 | | 1.260 | 32.000 |
| 1/64 | 0.016 | 0.397 | | 0.354 | 9.000 | | 0.728 | 18.500 | 1 9/32 | 1.281 | 32.544 |
| | 0.020 | 0.510 | 23/64 | 0.359 | 9.128 | 47/64 | 0.734 | 18.653 | | 1.299 | 33.000 |
| | 0.030 | 0.762 | | 0.374 | 9.500 | | 0.748 | 19.000 | 1 5/16 | 1.313 | 33.338 |
| 1/32 | 0.031 | 0.794 | 3/8 | 0.375 | 9.525 | 3/4 | 0.750 | 19.050 | | 1.339 | 34.000 |
| | 0.039 | 1.000 | 25/64 | 0.391 | 9.922 | 49/64 | 0.766 | 19.447 | 1 11/32 | 1.344 | 34.131 |
| 3/64 | 0.047 | 1.191 | | 0.394 | 10.000 | 25/32 | 0.781 | 19.844 | 1 3/8 | 1.375 | 34.925 |
| | 0.059 | 1.500 | 13/32 | 0.406 | 10.319 | | 0.787 | 20.000 | | 1.378 | 35.000 |
| 1/16 | 0.063 | 1.588 | | 0.413 | 10.500 | 51/64 | 0.797 | 20.241 | 1 13/32 | 1.406 | 35.719 |
| 5/64 | 0.078 | 1.984 | 27/64 | 0.422 | 10.716 | 13/16 | 0.813 | 20.638 | | 1.417 | 36.000 |
| | 0.079 | 2.000 | | 0.433 | 11.000 | | 0.827 | 21.000 | 1 7/16 | 1.438 | 36.513 |
| 3/32 | 0.094 | 2.381 | 7/16 | 0.438 | 11.113 | 53/64 | 0.828 | 21.034 | | 1.457 | 37.000 |
| | 0.098 | 2.500 | | 0.452 | 11.500 | 27/32 | 0.844 | 21.431 | 1 15/32 | 1.469 | 37.306 |
| 7/64 | 0.109 | 2.778 | 29/64 | 0.453 | 11.510 | 55/64 | 0.859 | 21.828 | | 1.496 | 38.000 |
| | 0.118 | 3.000 | 15/32 | 0.469 | 11.906 | | 0.866 | 22.000 | 1 1/2 | 1.500 | 38.100 |
| 1/8 | 0.125 | 3.175 | | 0.472 | 12.000 | 7/8 | 0.875 | 22.225 | 1 17/32 | 1.531 | 38.894 |
| | 0.138 | 3.500 | 31/64 | 0.484 | 12.303 | 57/64 | 0.891 | 22.622 | | 1.535 | 39.000 |
| 9/64 | 0.141 | 3.572 | | 0.492 | 12.500 | | 0.906 | 23.000 | 1 9/16 | 1.563 | 39.688 |
| 5/32 | 0.156 | 3.969 | 1/2 | 0.500 | 12.700 | 59/64 | 0.922 | 23.416 | | 1.575 | 40.000 |
| | 0.158 | 4.000 | | 0.512 | 13.000 | 15/16 | 0.938 | 23.813 | 1 19/32 | 1.594 | 40.481 |
| 11/64 | 0.172 | 4.366 | 29/32 | 0.516 | 13.097 | | 0.945 | 24.000 | | 1.614 | 41.000 |
| | 0.177 | 4.500 | 17/32 | 0.531 | 13.494 | 61/64 | 0.953 | 24.209 | 1 5/8 | 1.625 | 41.275 |
| 3/16 | 0.188 | 4.763 | 35/64 | 0.547 | 13.891 | 31/32 | 0.969 | 24.606 | | 1.654 | 42.000 |
| | 0.197 | 5.000 | | 0.551 | 14.000 | | 0.984 | 25.000 | 1 21/32 | 1.656 | 42.069 |
| 13/64 | 0.203 | 5.159 | 9/16 | 0.563 | 14.288 | 63/64 | 0.984 | 25.003 | 1 11/16 | 1.688 | 42.863 |
| | 0.217 | 5.500 | | 0.571 | 14.500 | 1 | 1.000 | 25.400 | | 1.693 | 43.000 |
| 7/32 | 0.219 | 5.556 | 37/64 | 0.578 | 14.684 | | 1.024 | 26.000 | 1 23/32 | 1.719 | 43.656 |
| 15/64 | 0.234 | 5.953 | | 0.591 | 15.000 | 1 1/32 | 1.031 | 26.194 | | 1.732 | 44.000 |
| | 0.236 | 6.000 | 19/32 | 0.594 | 15.081 | 1 1/16 | 1.063 | 26.988 | 1 3/4 | 1.750 | 44.450 |
| 1/4 | 0.250 | 6.350 | 39/64 | 0.609 | 15.478 | | 1.063 | 27.000 | | 1.772 | 45.000 |
| | 0.256 | 6.500 | 5/8 | 0.625 | 15.875 | 1 3/32 | 1.094 | 27.781 | 1 25/32 | 1.781 | 45.244 |
| 17/64 | 0.266 | 6.747 | | 0.630 | 16.000 | | 1.102 | 28.000 | | 1.811 | 46.000 |
| | 0.276 | 7.000 | 41/64 | 0.641 | 16.272 | 1 1/8 | 1.125 | 28.575 | 1 13/16 | 1.813 | 46.038 |
| 9/32 | 0.281 | 7.144 | | 0.650 | 16.500 | | 1.142 | 29.000 | 1 27/32 | 1.844 | 46.831 |
| | 0.295 | 7.500 | 21/32 | 0.656 | 16.669 | 1 5/32 | 1.156 | 29.369 | | 1.850 | 47.000 |
| 19/64 | 0.297 | 7.541 | | 0.669 | 17.000 | | 1.181 | 30.000 | 1 7/8 | 1.875 | 47.625 |
| 5/16 | 0.313 | 7.938 | 43/64 | 0.672 | 17.066 | 1 3/16 | 1.188 | 30.163 | | 1.890 | 48.000 |
| | 0.315 | 8.000 | 11/16 | 0.688 | 17.463 | 1 7/32 | 1.219 | 30.956 | 1 29/32 | 1.906 | 48.419 |
| 21/64 | 0.328 | 8.334 | 45/64 | 0.703 | 17.859 | | 1.221 | 31.000 | | 1.929 | 49.000 |



Charts

Metric & Imperial Conversion

| Frac. | Imp dec. | Met mm | Frac. | Imp dec. | Met mm | Frac. | Imp dec. | Met mm | Frac. | Imp dec. | Met mm |
|---------|----------|--------|---------|----------|--------|---------|----------|---------|---------|----------|---------|
| 1 15/16 | 1.938 | 49.213 | | 2.638 | 67.000 | 3 11/32 | 3.344 | 84.931 | 4 3/8 | 4.375 | 111.125 |
| | 1.969 | 50.000 | 2 21/32 | 2.656 | 67.469 | | 3.347 | 85.000 | 4 7/16 | 4.438 | 112.713 |
| 1 31/32 | 1.969 | 50.006 | | 2.677 | 68.000 | 3 3/8 | 3.375 | 85.725 | 4 1/2 | 4.500 | 114.300 |
| 2 | 2.000 | 50.800 | 2 11/16 | 2.688 | 68.263 | | 3.386 | 86.000 | | 4.528 | 115.000 |
| | 2.008 | 51.000 | | 2.717 | 69.000 | 3 13/32 | 3.406 | 86.519 | 4 9/16 | 4.563 | 115.888 |
| 2 1/32 | 2.031 | 51.594 | 2 23/32 | 2.719 | 69.056 | | 3.425 | 87.000 | 4 5/8 | 4.625 | 117.475 |
| | 2.047 | 52.000 | 2 3/4 | 2.750 | 69.850 | 3 7/16 | 3.438 | 87.313 | 4 11/16 | 4.688 | 119.063 |
| 2 1/16 | 2.063 | 52.388 | | 2.756 | 70.000 | | 3.465 | 88.000 | | 4.724 | 120.000 |
| | 2.087 | 53.000 | 2 25/32 | 2.781 | 70.644 | 3 15/32 | 3.469 | 88.106 | 4 3/4 | 4.750 | 120.650 |
| 2 3/32 | 2.094 | 53.181 | | 2.795 | 71.000 | 3 1/2 | 3.500 | 88.900 | 4 13/16 | 4.813 | 122.238 |
| 2 1/8 | 2.125 | 53.975 | 2 13/16 | 2.813 | 71.438 | | 3.504 | 89.000 | 4 7/8 | 4.875 | 123.825 |
| | 2.126 | 54.000 | | 2.835 | 72.000 | 3 17/32 | 3.531 | 89.694 | | 4.921 | 125.000 |
| 2 5/32 | 2.156 | 54.769 | 2 27/32 | 2.844 | 72.231 | | 3.543 | 90.000 | 4 15/16 | 4.938 | 125.413 |
| | 2.165 | 55.000 | | 2.874 | 73.000 | 3 9/16 | 3.563 | 90.488 | 5 | 5.000 | 127.000 |
| 2 3/16 | 2.188 | 55.563 | 2 7/8 | 2.875 | 73.025 | | 3.583 | 91.000 | | 5.118 | 130.000 |
| | 2.205 | 56.000 | 2 29/32 | 2.906 | 73.819 | 3 19/32 | 3.594 | 91.281 | 5 1/4 | 5.250 | 133.350 |
| 2 7/32 | 2.219 | 56.356 | | 2.913 | 74.000 | | 3.622 | 92.000 | 5 1/2 | 5.500 | 139.700 |
| | 2.244 | 57.000 | 2 15/16 | 2.938 | 74.613 | 3 5/8 | 3.625 | 92.075 | | 5.512 | 140.000 |
| 2 1/4 | 2.250 | 57.150 | | 2.953 | 75.000 | 3 21/32 | 3.656 | 92.862 | 5 3/4 | 5.750 | 146.050 |
| 2 9/32 | 2.281 | 57.944 | 2 31/32 | 2.969 | 75.406 | 3 11/16 | 3.687 | 93.650 | | 5.906 | 150.000 |
| | 2.283 | 58.000 | | 2.992 | 76.000 | 3 23/32 | 3.719 | 94.463 | 6 | 6.000 | 152.400 |
| 2 5/16 | 2.313 | 58.738 | 3 | 3.000 | 76.200 | 3 3/4 | 3.750 | 95.250 | 6 1/4 | 6.250 | 158.750 |
| | 2.323 | 59.000 | 3 1/32 | 3.031 | 76.994 | 3 25/32 | 3.781 | 96.037 | | 6.299 | 160.000 |
| 2 11/32 | 2.344 | 59.531 | | 3.032 | 77.000 | 3 13/16 | 3.812 | 96.825 | 6 1/2 | 6.500 | 165.100 |
| | 2.362 | 60.000 | 3 1/16 | 3.063 | 77.788 | 3 27/32 | 3.844 | 97.638 | | 6.693 | 170.000 |
| 2 3/8 | 2.375 | 60.325 | | 3.071 | 78.000 | 3 7/8 | 3.875 | 98.425 | 6 3/4 | 6.750 | 171.450 |
| | 2.402 | 61.000 | 3 3/32 | 3.094 | 78.581 | | 3.898 | 99.000 | 7 | 7.000 | 177.800 |
| 2 13/32 | 2.406 | 61.119 | | 3.110 | 79.000 | 3 29/32 | 3.906 | 99.219 | | 7.087 | 180.000 |
| 2 7/16 | 2.438 | 61.913 | 3 1/8 | 3.125 | 79.375 | | 3.937 | 100.000 | | 7.480 | 190.000 |
| | 2.441 | 62.000 | | 3.150 | 80.000 | 3 15/16 | 3.938 | 100.013 | 7 1/2 | 7.500 | 190.500 |
| 2 15/32 | 2.469 | 62.706 | 3 5/32 | 3.156 | 80.169 | 3 31/32 | 3.969 | 100.806 | | 7.874 | 200.000 |
| | 2.480 | 63.000 | 3 3/16 | 3.188 | 80.963 | | 3.976 | 101.000 | 8 | 8.000 | 203.200 |
| 2 1/2 | 2.500 | 63.500 | | 3.189 | 81.000 | 4 | 4.000 | 101.600 | | 8.268 | 210.000 |
| | 2.520 | 64.000 | 3 7/32 | 3.219 | 81.756 | 4 1/16 | 4.063 | 103.188 | 8 1/2 | 8.500 | 215.900 |
| 2 17/32 | 2.531 | 64.294 | | 3.228 | 82.000 | 4 1/8 | 4.125 | 104.775 | | 8.661 | 220.000 |
| | 2.559 | 65.000 | 3 1/4 | 3.250 | 82.550 | | 4.134 | 105.000 | 9 | 9.000 | 228.600 |
| 2 9/16 | 2.563 | 65.088 | | 3.268 | 83.000 | 4 3/16 | 4.188 | 106.363 | | 9.055 | 230.000 |
| 2 19/32 | 2.594 | 65.881 | 3 9/32 | 3.281 | 83.344 | 4 1/4 | 4.250 | 107.950 | | 9.449 | 240.000 |
| | 2.598 | 66.000 | | 3.307 | 84.000 | 4 5/16 | 4.313 | 109.538 | 9 1/2 | 9.500 | 241.300 |
| 2 5/8 | 2.625 | 66.675 | 3 5/16 | 3.313 | 84.138 | | 4.331 | 110.000 | | 9.843 | 250.000 |



Charts

Metric & Imperial Conversion

| Frac. | Imp dec. | Met mm |
|-------|----------|---------|
| 10 | 10.000 | 254.000 |
| | 10.236 | 260.000 |
| | 10.630 | 270.000 |
| 11 | 11.000 | 279.400 |
| | 11.024 | 280.000 |
| | 11.417 | 290.000 |
| | 11.811 | 300.000 |
| 12 | 12.000 | 304.800 |
| 13 | 13.000 | 330.200 |
| | 13.780 | 350.000 |
| 14 | 14.000 | 355.600 |
| 15 | 15.000 | 381.000 |
| | 15.748 | 400.000 |
| 16 | 16.000 | 406.400 |
| 17 | 17.000 | 431.800 |
| | 17.717 | 450.000 |
| 18 | 18.000 | 457.200 |
| 19 | 19.000 | 482.601 |
| | 19.685 | 500.000 |
| 20 | 20.000 | 508.000 |





Charts

Imperial Tolerance Chart

| Nom. Size Inches | | Shafts (outside diameters) Units 0.001 inches | | | | | | | | Bores (inside diameters) Units 0.001 inches | | | | |
|------------------|-------|---|-------|------|------|-------|-------|------|------|---|------|-------|-------|------|
| over | to | f8 | f9 | h8 | h9 | h10 | h11 | js10 | js11 | H8 | H9 | H10 | H11 | Js11 |
| 0.04 | 0.12 | -0.3 | -0.3 | 0 | 0 | 0 | 0 | +0.8 | +1.3 | +0.6 | +1.0 | +1.6 | +2.5 | +1.3 |
| | | -0.9 | -1.2 | -0.6 | -1.0 | -1.6 | -2.5 | -0.8 | -1.3 | 0 | 0 | 0 | 0 | -1.3 |
| 0.12 | 0.24 | -0.4 | -0.4 | 0 | 0 | 0 | 0 | +0.9 | +1.5 | +0.7 | +1.2 | +1.8 | +3.0 | +1.5 |
| | | -1.1 | -1.6 | -0.7 | -1.2 | -1.8 | -3.0 | -0.9 | -1.5 | 0 | 0 | 0 | 0 | -1.5 |
| 0.24 | 0.40 | -0.5 | -0.5 | 0 | 0 | 0 | 0 | +1.1 | +1.8 | +0.9 | +1.4 | +2.2 | +3.5 | +1.8 |
| | | -1.4 | -1.9 | -0.9 | -1.4 | -2.2 | -3.5 | -1.1 | -1.8 | 0 | 0 | 0 | 0 | -1.8 |
| 0.40 | 0.71 | -0.6 | -0.6 | 0 | 0 | 0 | 0 | +1.4 | +2.0 | +1.0 | +1.6 | +2.8 | +4.0 | +2.0 |
| | | -1.6 | -2.3 | -1.0 | -1.6 | -2.8 | -4.0 | -1.4 | -2.0 | 0 | 0 | 0 | 0 | -2.0 |
| 0.71 | 1.19 | -0.8 | -0.8 | 0 | 0 | 0 | 0 | +1.8 | +2.5 | +1.2 | +2.0 | +3.5 | +5.0 | +2.5 |
| | | -2.0 | -2.8 | -1.2 | -2.0 | -3.5 | -5.0 | -1.8 | -2.5 | 0 | 0 | 0 | 0 | -2.5 |
| 1.19 | 1.97 | -1.0 | -1.0 | 0 | 0 | 0 | 0 | +2.0 | +3.0 | +1.6 | +2.5 | +4.0 | +6.0 | +3.0 |
| | | -2.6 | -3.4 | -1.6 | -2.5 | -4.0 | -6.0 | -2.0 | -3.0 | 0 | 0 | 0 | 0 | -3.0 |
| 1.97 | 3.15 | -1.2 | -1.2 | 0 | 0 | 0 | 0 | +2.3 | +3.5 | +1.8 | +3.0 | +4.5 | +7.0 | +3.5 |
| | | -3.0 | -4.1 | -1.8 | -3.0 | -4.5 | -7.0 | -2.3 | -3.5 | 0 | 0 | 0 | 0 | -3.5 |
| 3.15 | 4.73 | -1.4 | -1.4 | 0 | 0 | 0 | 0 | +2.5 | +4.5 | +2.2 | +3.5 | +5.0 | +9.0 | +4.5 |
| | | -3.6 | -4.8 | -2.2 | -3.5 | -5.0 | -9.0 | -2.5 | -4.5 | 0 | 0 | 0 | 0 | -4.5 |
| 4.73 | 7.09 | -1.6 | -1.6 | 0 | 0 | 0 | 0 | +3.0 | +5.0 | +2.5 | +4.0 | +6.0 | +10.0 | +5.0 |
| | | -4.1 | -5.6 | -2.5 | -4.0 | -6.0 | -10.0 | -3.0 | -5.0 | 0 | 0 | 0 | 0 | -5.0 |
| 7.09 | 9.85 | -2.0 | -2.0 | 0 | 0 | 0 | 0 | +3.5 | +6.0 | +2.8 | +4.5 | +7.0 | +12.0 | +6.0 |
| | | -4.8 | -6.5 | -2.8 | -4.5 | -7.0 | -12.0 | -3.5 | -6.0 | 0 | 0 | 0 | 0 | -6.0 |
| 9.85 | 12.41 | -2.2 | -2.2 | 0 | 0 | 0 | 0 | +4.0 | +6.0 | +3.0 | +5.0 | +8.0 | +12.0 | +6.0 |
| | | -5.2 | -7.3 | -3.0 | -5.0 | -8.0 | -12.0 | -4.0 | -6.0 | 0 | 0 | 0 | 0 | -6.0 |
| 12.41 | 15.75 | -2.5 | -2.5 | 0 | 0 | 0 | 0 | +4.5 | +7.0 | +3.5 | +6.0 | +9.0 | +14.0 | +7.0 |
| | | -6.0 | -8.0 | -3.5 | -6.0 | -9.0 | -14.0 | -4.5 | -7.0 | 0 | 0 | 0 | 0 | -7.0 |
| 15.75 | 19.69 | -2.8 | -2.8 | 0 | 0 | 0 | 0 | +5.0 | +8.0 | +4.0 | +6.0 | +10.0 | +16.0 | +8.0 |
| | | -6.5 | -8.8 | -4.0 | -6.0 | -10.0 | -16.0 | -5.0 | -8.0 | 0 | 0 | 0 | 0 | -8.0 |
| 16.69 | 24.80 | -3.0 | -3.0 | 0 | 0 | 0 | 0 | +5.5 | +8.7 | +4.3 | +6.9 | +11.0 | +17.3 | +8.7 |
| | | -7.0 | -9.9 | -4.3 | -6.9 | -11.0 | -17.3 | -5.5 | -8.7 | 0 | 0 | 0 | 0 | -8.7 |
| 24.80 | 31.49 | -3.1 | -3.1 | 0 | 0 | 0 | 0 | +6.3 | +9.8 | +4.9 | +7.9 | +12.6 | +19.7 | +9.8 |
| | | -8.1 | -11.0 | -4.9 | -7.9 | -12.6 | -19.7 | -6.3 | -9.8 | 0 | 0 | 0 | 0 | -9.8 |



Charts

Metric Tolerance Chart

| Nom. Sizes mm | | Shafts (outside diameters) Units 0.001 mm | | | | | | | | Bores (inside diameters) Units 0.001 mm | | | | |
|---------------|-----|---|-------------|-----------|-----------|-----------|-----------|--------------|----------------|---|-----------|-----------|-----------|----------------|
| over | to | f8 | f9 | h8 | h9 | h10 | h11 | js10 | js11 | H8 | H9 | H10 | H11 | Js11 |
| 1.60 | 3 | -6 -20 | -6 -31 | 0 -14 | 0 -25 | 0 -40 | 0 -60 | +20 -20 | +30 -30 | +14 0 | +25 0 | +40 0 | +60 0 | +30 -30 |
| 3 | 6 | -10 -28 | -10 -40 | 0 -18 | 0 -30 | 0 -48 | 0 -75 | +24 -24 | +37.5 -37.5 | +18 0 | +30 0 | +48 0 | +75 0 | +37.5 -37.5 |
| 6 | 10 | -13 -35 | -13 -49 | 0 -22 | 0 -36 | 0 -58 | 0 -90 | +29 -29 | +45 -45 | +22 0 | +36 0 | +58 0 | +90 0 | +45 -45 |
| 10 | 18 | -16 -43 | -16 -59 | 0 -27 | 0 -43 | 0 -70 | 0 -110 | +35 -35 | +55 -55 | +27 0 | +43 0 | +70 0 | +110 0 | +55 -55 |
| 18 | 30 | -20 -53 | -20 -72 | 0 -33 | 0 -52 | 0 -84 | 0 -130 | +42 -42 | +65 -65 | +33 0 | +52 0 | +84 0 | +130 0 | +65 -65 |
| 30 | 50 | -25 -64 | -25 -87 | 0 -39 | 0 -62 | 0 -100 | 0 -160 | +50 -50 | +80 -80 | +39 0 | +62 0 | +100 0 | +160 0 | +80 -80 |
| 50 | 80 | -30 -76 | -30 -104 | 0 -46 | 0 -74 | 0 -120 | 0 -190 | +60 -60 | +95 -95 | +46 0 | +74 0 | +120 0 | +190 0 | +95 -95 |
| 80 | 120 | -36 -90 | -36 -123 | 0 -54 | 0 -87 | 0 -140 | 0 -220 | +70 -70 | +110 -110 | +54 0 | +87 0 | +140 0 | +220 0 | +110 -110 |
| 120 | 180 | -43 -106 | -43 -143 | 0 -63 | 0 -100 | 0 -160 | 0 -250 | +80 -80 | +125 -125 | +63 0 | +100 0 | +160 0 | +250 0 | +125 -125 |
| 180 | 250 | -50 -122 | -50 -165 | 0 -72 | 0 -115 | 0 -185 | 0 -290 | +92 -92 | +145 -145 | +72 0 | +115 0 | +185 0 | +290 0 | +145 -145 |
| 250 | 315 | -56 -137 | -56 -186 | 0 -81 | 0 -130 | 0 -210 | 0 -320 | +105 -105 | +160 -160 | +81 0 | +130 0 | +210 0 | +320 0 | +160 -160 |
| 315 | 400 | -62 -151 | -62 -212 | 0 -89 | 0 -140 | 0 -230 | 0 -360 | +115 -115 | +180 -180 | +89 0 | +140 0 | +230 0 | +360 0 | +180 -180 |
| 400 | 500 | -68 -165 | -68 -223 | 0 -97 | 0 -155 | 0 -250 | 0 -400 | +125 -125 | +200 -200 | +97 0 | +155 0 | +250 0 | +400 0 | +200 -200 |
| 500 | 630 | -76 -186 | -76 -251 | 0 -110 | 0 -175 | 0 -280 | 0 -440 | +140 -140 | +220 -220 | +110 0 | +175 0 | +280 0 | +440 0 | +220 -220 |
| 630 | 800 | -80 -205 | -80 -280 | 0 -125 | 0 -200 | 0 -320 | 0 -500 | +160 -160 | +250 -250 | +125 0 | +200 0 | +320 0 | +500 0 | +250 -250 |



Conditions

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1 Conditions of sale

Definitions

In these conditions:

- (a) The Company means Norman Richards Pty Ltd ABN 43958671 889
- (b) The customer is any party who requests that the company supply Products to it
- (c) The Order means the agreement between the Customer and the Company for the supply of Products by the Company to the Customer
- (d) Products means any of the Company's products that are ordered by the Customer
- (e) Quote means a quote for the cost of the Products given by the Company to the Customer
- (f) Shipping address means the address specified by the customer for delivery of the Products.

2 Application

By ordering Products, the Customer accepts these conditions and acknowledges that they:

- (a) Apply to and are incorporated into every order
- (b) May only be changed by a written statement from the Company
- (c) Supersede and are not modified or excluded by any conditions of purchase stated verbally or appearing on any document provided by the Customer.

3 Price

- (a) The price of the Products is:
- (b) The price stated in the Quote, if the Customer makes an order within 30 days from the date of the Quote or any other period stated in the Quote, or
- (c) If no quote has been provided, the price stated in the Company's current price list.
- (d) The Customer must pay any GST payable on the supply of the Products.

4 Terms of payment

- (a) The Customer must pay the Company in full for the Products by:
 - (i) The time stated in writing by the Company, including in any credit application, or
 - (ii) If no time is stated in writing by the Company, the last day of the month following the month of supply.
- (b) If the Customer does not pay the Company in full for the Products in the time specified in clause 4(a) the Company may charge interest on any unpaid amount
- (c) The interest rate will be the rate equivalent to 2% more than the rate charged to the Company for overdraft accommodation by its bankers at that time. Interest accrues daily and is calculated from the date payment is due to the date of payment in full and payments will be credited to interest first.

5 Delivery

- (a) The Company must deliver the Products to the Shipping Address and may deliver the Products in any number of installments.
- (b) The Customer acknowledges that delivery times given by the Company are estimates only and that the Company is not liable for:
 - (i) Any late or non-delivery of the Products or any loss or damage to any installment of the Products whether or not the Company is legally responsible for the party who caused or contributed to that loss or damage
 - (ii) Any loss (including consequential loss), damage or delay suffered by the Customer or any third party arising from any late or non-delivery of, or loss or damage to any installment of the Products.

6 Passing of risk

- (a) The risk of loss or damage to the Products passes to the Customer when the Products are delivered to the Shipping Address.
- (b) The Customer must insure all Products that are at the Customer's risk.

7 Retention of title

- (a) Despite clause 6(a), title to the Products will not pass to the Customer until all amounts owed by the Customer to the Company are paid in full. Until that time:
 - (i) The Company:
 - (1) May at anytime, repossess the Products from any premises and will not be liable for trespass or any resulting damage
 - (2) May keep or resell any Products repossessed under clause 7(a) (i)
 - (ii) The Customer:
 - (1) Must not claim any lien over the Products
 - (2) Is a bailee of the Products and owes the Company the duties and liabilities of a bailee
 - (3) Must not supply any of the Products to any party outside of its usual or ordinary course of business or allow any party to acquire any security interest in the Products
 - (4) Must properly store and insure the Products.
- (b) Despite clause 7(a), if the Customer sells the Products or anything that incorporates any of the Products before paying the Company in full, then the Customer must:
 - (i) Hold the proceeds of sale representing the price of the Products on trust for the Company as soon as they are received
 - (ii) Either pays the amount of the proceeds referred to in clause 7(b) (i) to the Company as soon as they are received or pay those proceeds into a separate identifiable account as trustee for the Company and pay the Company upon request.

8 Cancellation

- (a) The Customer cannot cancel an Order unless authorised in writing by the Company.
- (b) If the Customer cancels an Order it indemnifies the Company against all losses arising from the Order and cancellation.



Conditions

9 Return

- (a) The Customer cannot return:
 - (i) Any machined, cut or non-standard Products under any circumstances
 - (ii) Any other Products unless expressly stated in writing by the Company.
- (b) If the Customer returns any Products, it may have to pay the Company a re stocking fee of 20% (of the value of the Products) or \$5.00 (greater of) surcharge per line item to the Company.
- (c) If the Customer returns any Products — they must be accompanied with a company credit request form.

10 Acceptances

- (a) The Customer must notify the Company within fourteen days of delivery of the Products of any allegation that any Products are not in accordance with the original Order.
- (b) Unless the Customer notifies the Company as set out in clause 10(a) the Customer must accept and pay for the products.

11 Default by customer

- (a) The Customer is in default under an Order if it:
 - (i) Does not pay the Company in full for the Products in the time specified in clause 4(a)
 - (ii) Has its property seized under any distress or execution
 - (iii) Enters into a scheme or arrangement with creditors
 - (iv) Stops payment of or is unable to pay its debts when they fall due
 - (v) Is placed under any form of insolvency or bankruptcy administration.
- (b) If the Customer is in default under clause 11(a), the Company:
 - (i) Is released from its outstanding obligations to the Customer under any Order and has no liability to the Customer arising out of any Order
 - (ii) Can recover damages from the Customer for the price of the Products, interest payable under clause 4(b), charges or expenses incurred by the Company as a consequence of the Customer's default and any other costs
 - (iii) Repossess the Products under clause 7(a) (i).

12 Liabilities and indemnities

- (a) The Customer acknowledges that the Company:
 - (i) Supplies the Products in accordance with the specifications given by the Customer and does not warrant that the products are suitable for the use intended by the Customer
 - (ii) Relies on specifications provided by the manufacturer of the Products and does not warrant that the products will comply with those specifications
 - (iii) Is not liable for any advice or recommendation given by the Company, its employees, servants or agents or any other party in relation to the suitability of the Products for any particular use and the Customer relies on such advice at its own risk.
- (b) The Customer:
 - (i) Must satisfy itself that the Products are suitable for any purpose for which the Customer intends to use or resupply them.
 - (ii) Indemnifies the Company on a continuing and full indemnity basis in relation to any loss (including consequential loss) caused by the Products suffered by any person including a third party who has acquired Products from the Customer.
- (c) Subject to clause 12(d) and except as expressly provided to the contrary in an order:
 - (i) All conditions, warranties, undertakings, inducements and representations whether expressed, implied, statutory or otherwise relating in any way to any Products sold under an Order are excluded
 - (ii) The Company is not liable to the Customer for any loss (including consequential loss) or damage caused by:
 - (1) The Products
 - (2) Any failure or omission by the Company to comply with its obligations
 - (3) Any failure of the Products to comply with the manufacturer's specifications or meet the needs of the Customer.
- (d) Nothing in these conditions will change any condition, warranty or liability that may be implied by any Australian legislation or regulation where to do so is illegal or would render any provision of an Order void. In those cases, the Company's liability will be limited at the option of the Company to any one or more of the following:
 - (i) Replacement of the Products or the supply of equivalent Products
 - (ii) Repair of the Products
 - (iii) Payment of the cost of replacing or repairing the Products or of acquiring equivalent Products
- (e) Title to any Products and any defective or replaced parts of the Products will revert to the Company upon the replacement or repair of the Products.

13 General

- (a) These conditions are governed by the laws of New South Wales and the parties submit to the non-exclusive jurisdiction of the courts of New South Wales and courts of appeal from them.
- (b) Any of these conditions held to be prohibited, invalid or unenforceable in any jurisdiction is ineffective to the extent of the prohibition, invalidity or unenforceability as to that jurisdiction without invalidating the rest of these conditions and will not affect the validity or unenforceability of that provision in any other jurisdiction.

APRIL 2005

