



Norman Richards Pty Ltd
PO Box 6268
Wetherill Park NSW 2164
Phone: (02) 9757 2555
Fax: (02) 9757 2511
Email: Sales@nrseals.com.au



Master Seals Catalogue Metric 2022 / 2023

NR Seals Catalogue

Website: <http://www.nrseals.com.au>

Email: sales@nrseals.com.au

Copyright © 2022 by Norman Richards Pty Ltd
All rights reserved. No part of this publication may be reproduced, distributed, or transmitted in any form or by any means, including photocopying, recording, or other electronic or mechanical methods, without the prior written permission of the publisher, except in the case of brief quotations embodied in critical reviews and certain other noncommercial uses permitted by copyright law.



Contents

PISTON DOUBLE ACTING

Metric Seals

- 16. Piston Seals
- 36. Glide Rings
- 55. Piston Rings
- 57. Pneumatic Piston and Seal

PISTON SINGLE ACTING

- 60. Piston Seals
- 96. Piston Seals with Wear Rings
- 100. Piston V Pack Sets
- 106. Piston Seals Pneumatic

CUSHION SEALS

- 116. Pneumatic

ROD SEALS

- 119. Hydraulic Seals
- 179. Glide & Buffer Rings
- 191. V Pack Sets
- 200. Pneumatic Seals
- 210. Pneumatic Seal & Wiper Combination

ROD WIPERS

- 215. Pneumatic Seal Wipers

BEARINGS

- 265. Bearing Rings & Strip
- 290. DU Bushes

ANCILLARY

- 300. O-rings, Backup Washers & Quad Rings


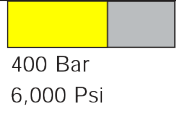
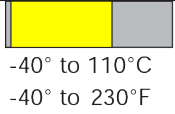
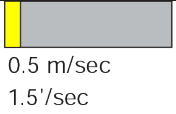

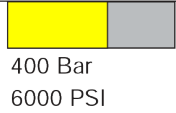
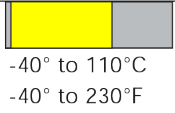
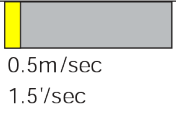

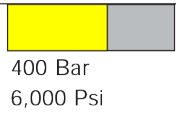
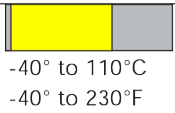
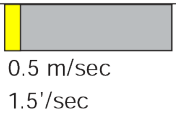

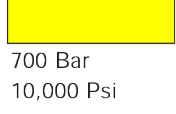
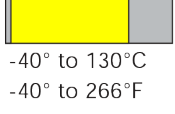


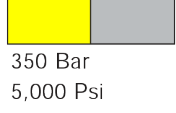
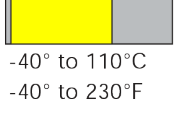


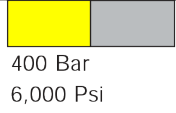
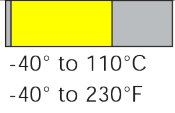


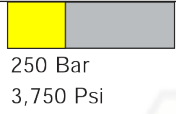
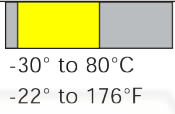
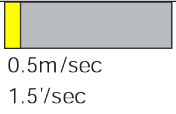

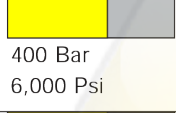
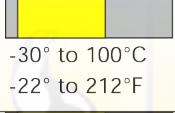
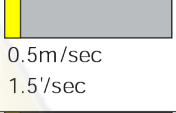


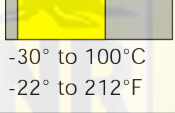
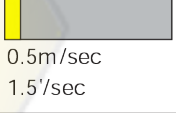


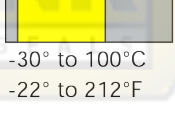
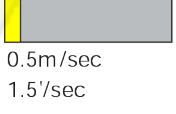

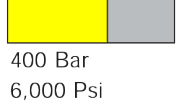
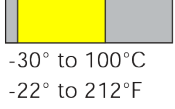





Designs

Double Acting Seals

01 Piston Seals


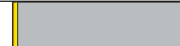

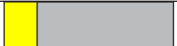
























Type	Composition	Pressure	Temperature	Speed
	DAS NBR element Hytel support Polyacetal wear rings	 400 Bar 6,000 Psi	 -40° to 110°C -40° to 230°F	 0.5 m/sec 1.5'/sec
	DAS NBR element Hytel support Polyacetal wear rings	 400 Bar 6000 PSI	 -40° to 110°C -40° to 230°F	 0.5m/sec 1.5'/sec
	SPE NBR element 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

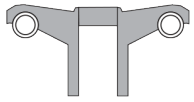
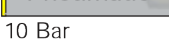
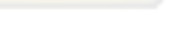

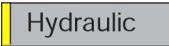


02 Glide Rings

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		
		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



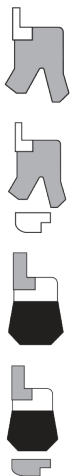
Type	Composition	Pressure	Temperature	Speed
RSE	Polyurethane Asymmetrical	400 Bar 6,000 Psi	-40° to 105°C -40° to 221°F	0.8m/sec 2.5'/sec
RSEA	Polyurethane shell Polyacetal AE ring Asymmetrical	400 Bar 6,000 Psi	-40° to 105°C -40° to 221°F	0.8m/sec 2.5'/sec
RSEA	Polyurethane shell Nylon backup Asymmetrical	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

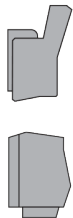
	GPP Polyurethane Asymmetrical	16 Bar 230 Psi	-30° to 80°C -22° to 176°F	1.0m/sec 3.0'/sec
	DE NBR Asymmetrical	16 Bar 230 Psi	-30° to 100°C -22° to 212°F	0.5m/sec 1.5'/sec
	U-70 NBR 70 Shore A Symmetrical	16 Bar 230 Psi	-30° to 100°C -22° to 212°F	0.5m/sec 1.5'/sec
	U-90 NBR 90 Shore A Symmetrical	85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

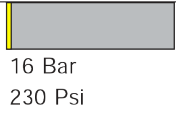
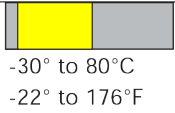
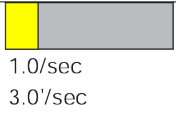
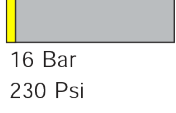
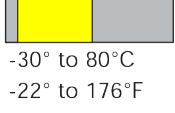
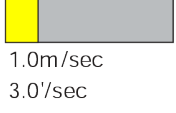


Designs

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.
-----	-------------------------	---

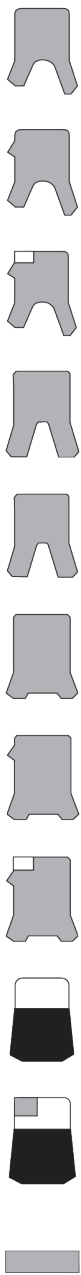




Designs

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

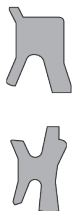
Rod Seals

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



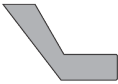


























Type	Composition	Pressure	Temperature	Speed
CSW	Nylon MOS ₂ filler Inserted		-40° to 100°C -40° to 212°F	5.0m/sec 15.0'/sec
DH	Polyurethane Twin lip design Inserted		-30° to 100°C -22° to 212°F	1.0m/sec 3.0'/sec
DSI	Polyurethane Inserted		-30° to 100°C -22° to 212°F	1.0m/sec 3.0'/sec
PW	Polyurethane 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
---	----------------------------------	--	---	--


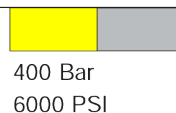
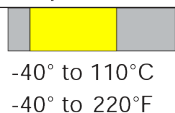

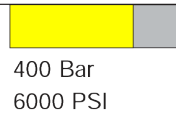
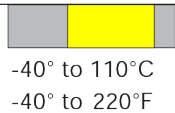


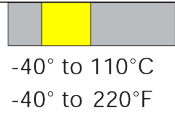

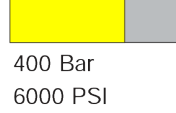
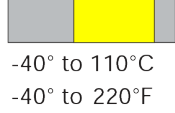

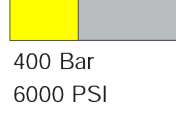
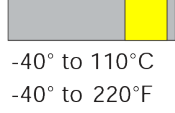


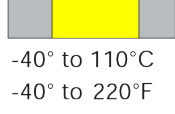

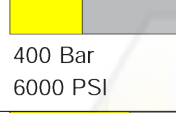
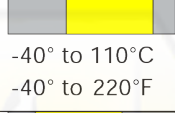

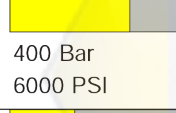
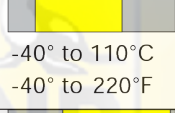

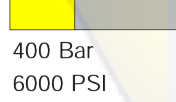
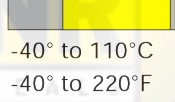




Designs

Ancillary

19 O-rings, Backup Washers & Quad Rings

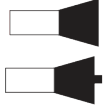
Type	Composition	Pressure	Temperature
 2- 3-	NBR70 O-ring Imperial NBR70 O-ring Metric	 400 Bar 6000 PSI	 -40° to 110°C -40° to 220°F
 2- 3-	NBR90 O-ring Imperial NBR90 O-ring Metric	 400 Bar 6000 PSI	 -40° to 110°C -40° to 220°F
 2- 3-	Polyurethane O-ring Imperial O-ring Metric	 400 Bar 6000 PSI	 -40° 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					
$\text{\O}D$	$\text{\O}d1$	$\text{\O}d2$	$\text{\O}d3$	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

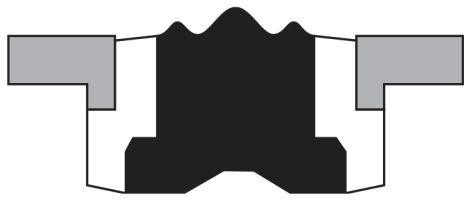
Chamfer Radii					
C/S	5.0	8.0	10.0	12.5	15.0
C	2.4	5.0	5.0	6.5	7.5
r1	0.4	0.4	0.4	0.8	0.8
r2	0.4	0.4	0.4	0.4	0.4

Typical Examples

Reciprocating Rotary Oscillating Helix

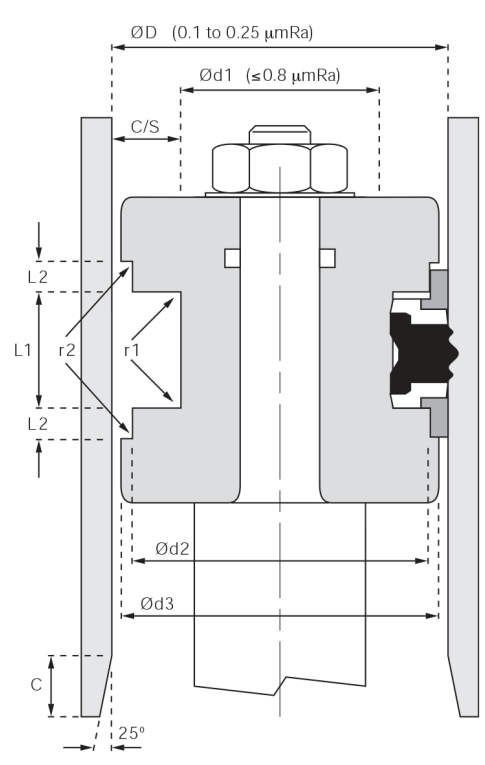
Similar Styles

Double acting seals



Key Features

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





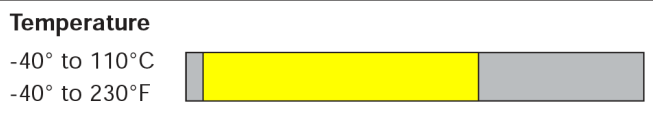
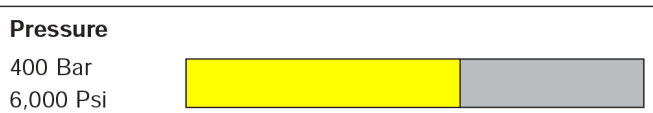
DAS

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

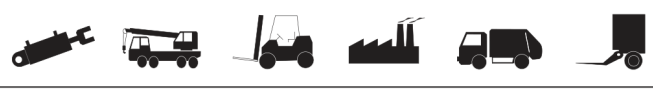
$\text{\O}D$	$\text{\O}d1$	$\text{\O}d2$	$\text{\O}d3$	L1	L2
H10	-0.0 +0.1	-0.05 +0.00	-0.2 +0.2	-0.0 +0.2	-0.1 +0.1

Chamfer Radii

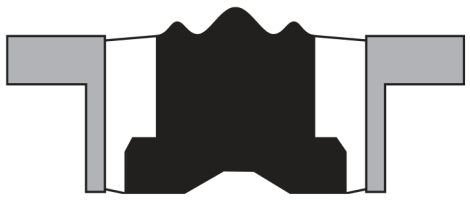
	5.0	8.0	10.0	12.5	15.0
C/S					
C	2.4	5.0	5.0	6.5	7.5
r1	0.4	0.4	0.4	0.8	0.8
r2	0.4	0.4	0.4	0.4	0.4

Typical Examples

Reciprocating Rotary Oscillating Helix

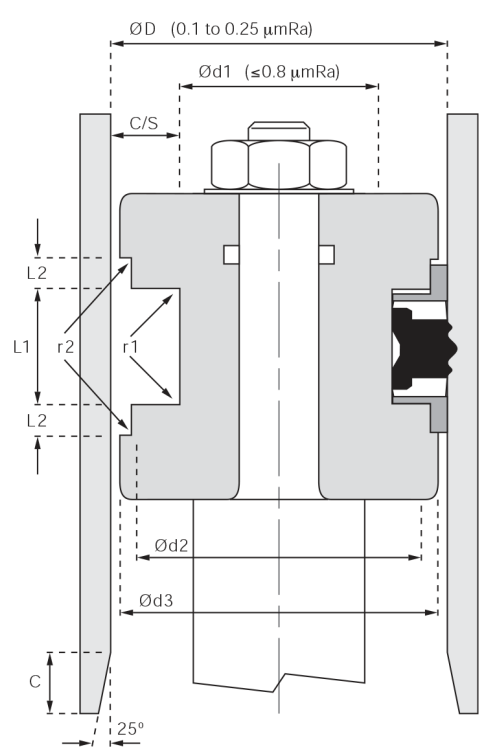


Double acting seals



Key Features

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



Double acting seals



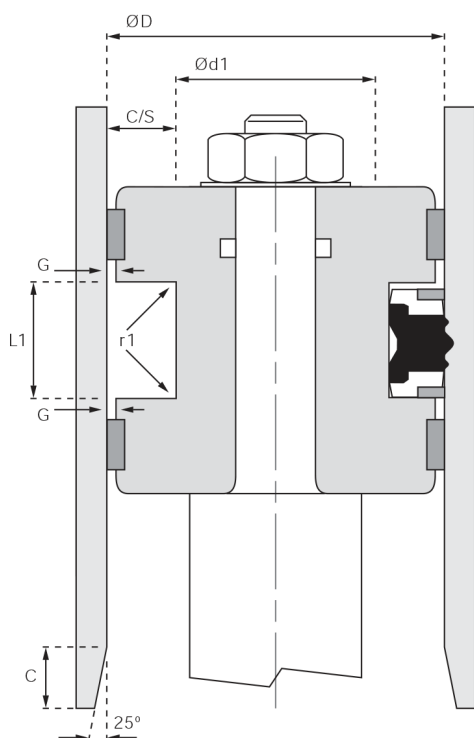
Key Features

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

400 Bar
6,000 Psi



Temperature

-40° to 110°C
-40° to 230°F



Speed

0.5m/sec
1.5'/sec



Surface Finish μmRa

$\varnothing D$	$\varnothing d1$	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

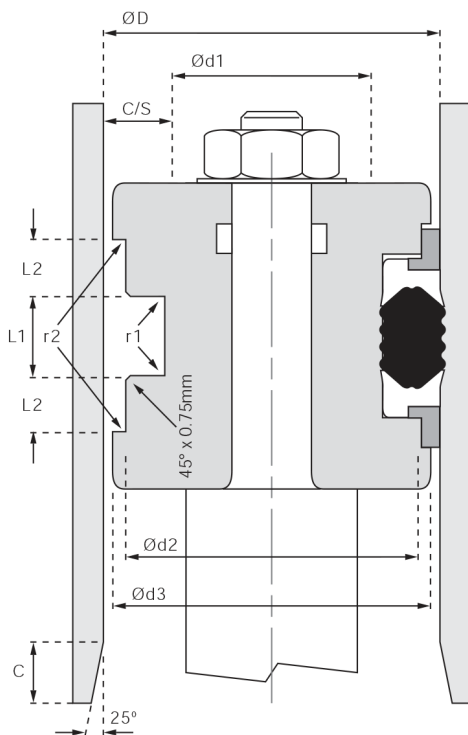
Heavy duty

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	-0.05	-0.2	-0.0	-0.0
	+0.15	+0.05	+0.2	+0.2	+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

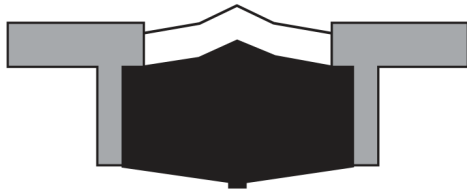
Reciprocating Rotary Oscillating Helix



Similar Styles



Double acting seals



Key Features

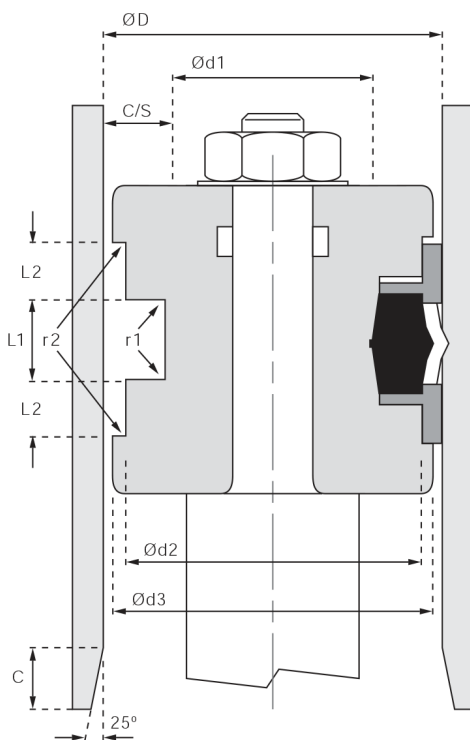
Medium duty

One piece piston

Relatively compact

Easy assembly

Medium / high pressure capability





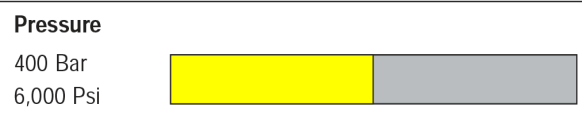
EUD

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



Surface Finish μmRa

$\text{\O}D$	$\text{\O}d1$	$\text{\O}d2$	$\text{\O}d3$	L1	L2
$\text{\O}D$	$\text{\O}d1$	$\text{\O}d2$	$\text{\O}d3$	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
$\text{\O}D$	$\text{\O}d1$	$\text{\O}d2$	$\text{\O}d3$	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/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

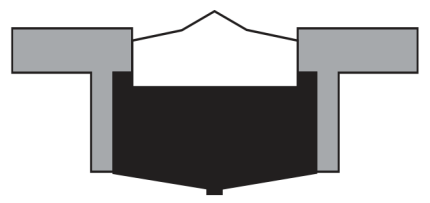
Reciprocating Rotary Oscillating Helix



Similar Styles

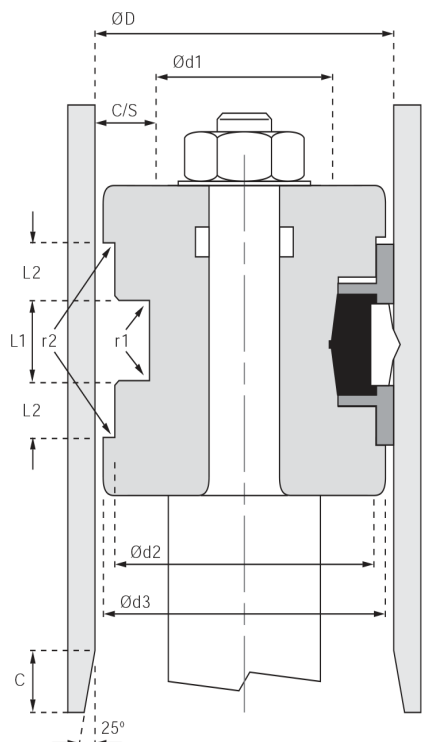


Double acting seals



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

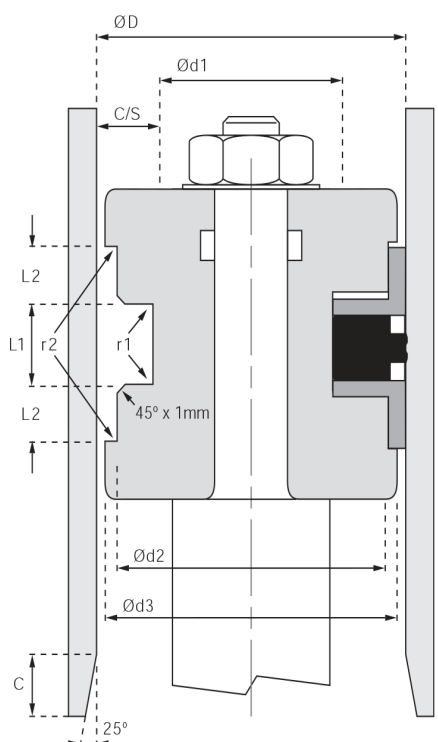
Tolerances					
$\varnothing D$	$\varnothing d1$	$\varnothing d2$	$\varnothing d3$	L1	L2
H10	h9	h9	h9	-0.0 +0.27	-0.13 +0.0

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

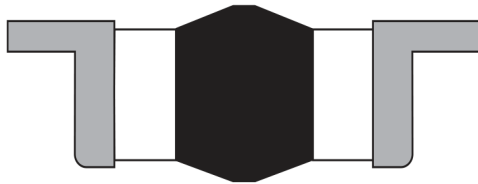




DPWL

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

400 Bar
6,000 Psi



Temperature

-30° to 100°C
-22° to 212°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	js11	h9	js11	-0.0 +0.25	-0.0 +0.15

Chamfer Radii

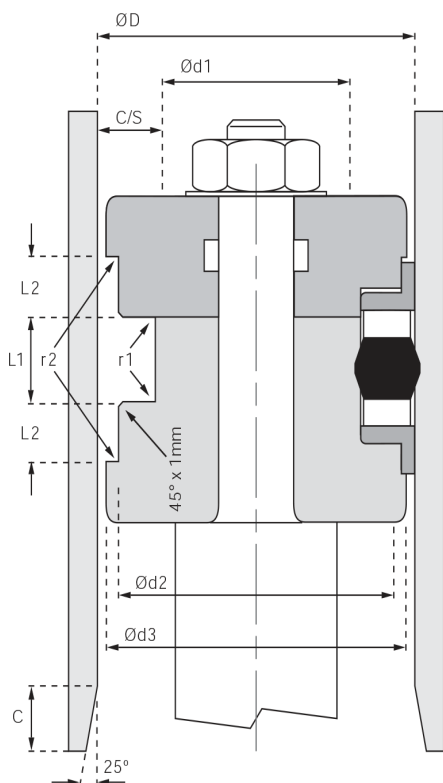
C/S	5.0	7.5	10.0	12.5
C	3.0	4.0	5.0	6.5
r1	0.2	0.2	0.2	0.4
r2	0.2	0.2	0.2	0.4

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

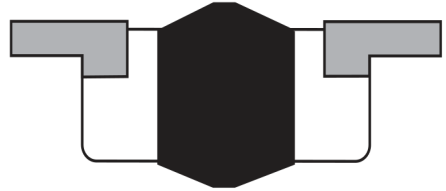
Chamfer Radii					
C/S	6.5	8.0	10.0	12.5	15.0
C	2.5	4.0	5.0	6.5	7.5
r1	0.4	0.4	0.8	1.2	1.2
r2	0.2	0.2	0.2	0.4	0.4

Typical Examples
 Reciprocating Rotary Oscillating Helix



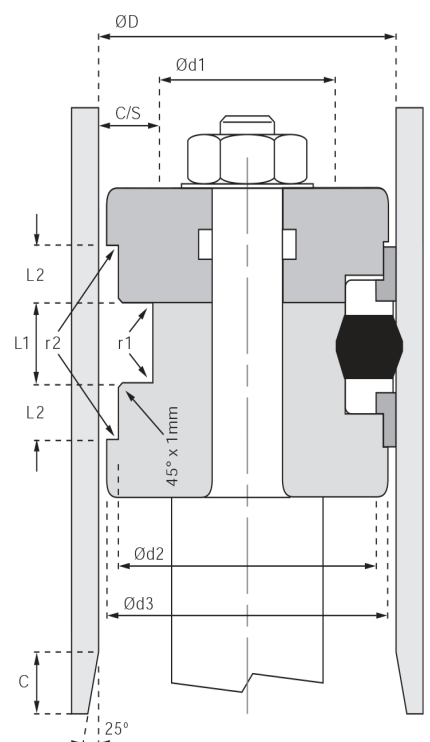
Similar Styles

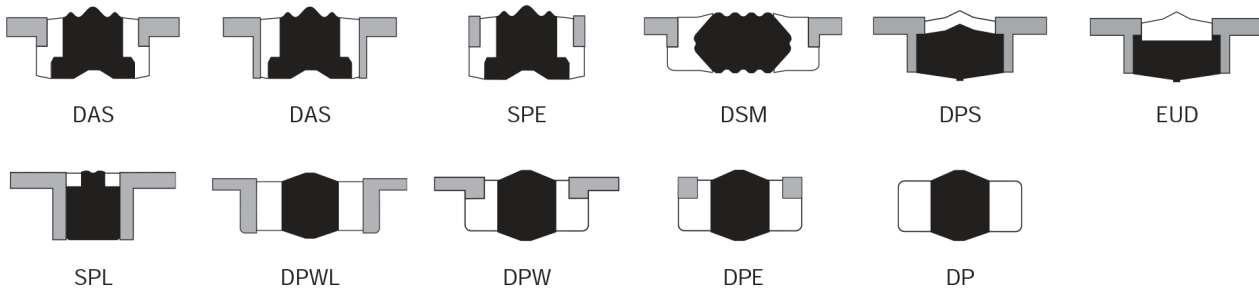
Double acting seals



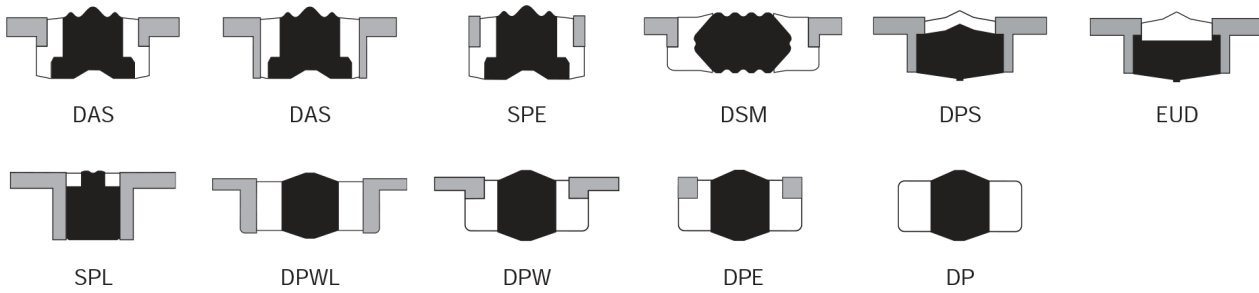
Key Features

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

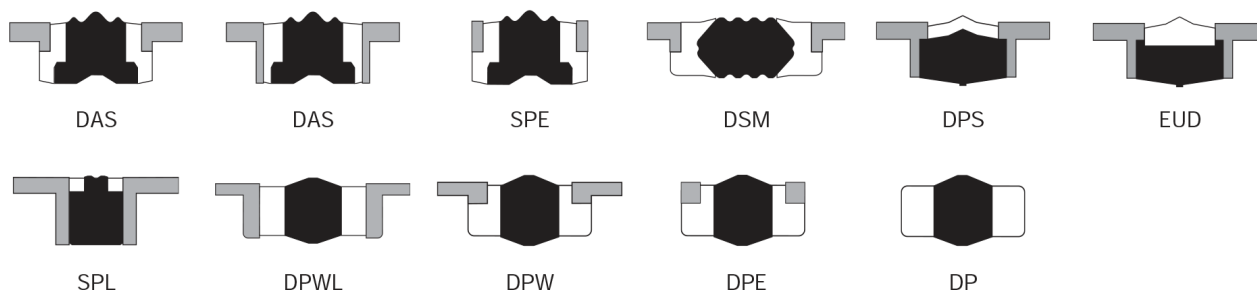




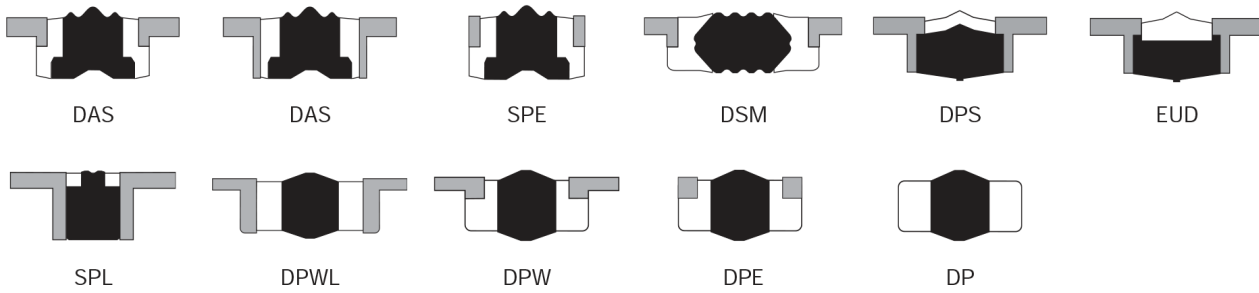
OD	ID	L1	L2	OD2	OD3	Product Name
20.00	11.00	13.50	2.10	17.00	19.00	DAS-020011-135
22.00	13.00	13.50	2.10	19.00	21.00	DAS-022013-135
25.00	15.00	12.00	4.00	21.00	23.00	DAS-025015-125/1
25.00	15.00	12.50	4.00	22.00	24.00	DAS-025015-125/2
25.00	15.00	16.40	6.35	21.45	23.50	DAS-025015-164
25.00	16.00	13.50	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
35.00	27.00	15.50	3.20	31.00	34.40	DPS-035027-155
35.00	27.00	15.50	3.20	31.00	34.40	DAS-035027-155
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



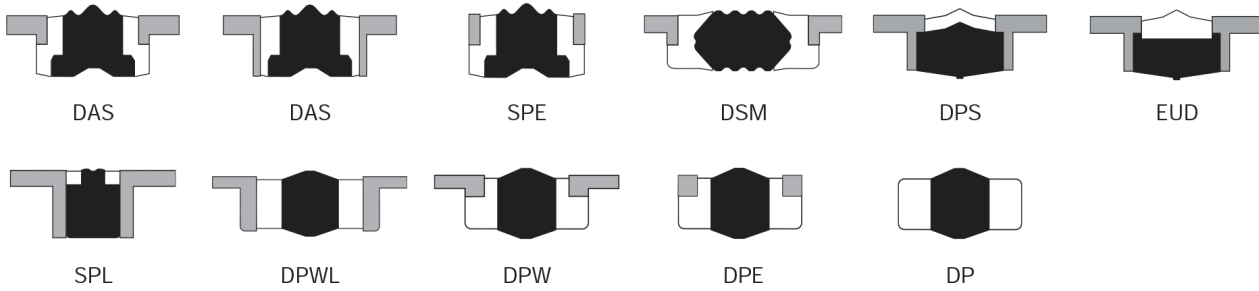
OD	ID	L1	L2	OD2	OD3	Product Name
40.00	30.00	10.00	5.00	36.50	39.00	DAS-040030-100
40.00	30.00	11.00	4.00	35.50	39.00	SPL-040030-110
40.00	30.00	12.50	4.00	36.00	38.00	DAS-040030-125/1
40.00	30.00	12.50	4.00	37.00	39.00	DAS-040030-125/2
40.00	30.00	16.40	6.35	35.40	38.50	DAS-040030-164
40.00	32.00	10.00	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



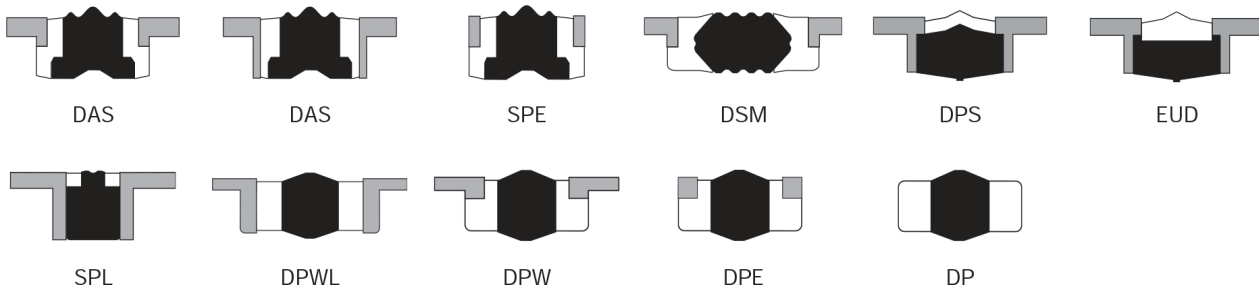
OD	ID	L1	L2	OD2	OD3	Product Name
55.00	40.00	32.00	6.35	48.77	52.85	DSM-055040-320
55.00	43.00	20.50	4.20	51.00	54.40	EUD-055043-205
55.00	43.00	20.50	4.20	51.00	54.40	DAS-055043-205
55.00	45.00	11.00	4.00	50.50	54.00	SPL-055045-110
55.00	45.00	12.50	4.00	52.00	54.00	DAS-055045-125
56.00	40.00	20.50	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



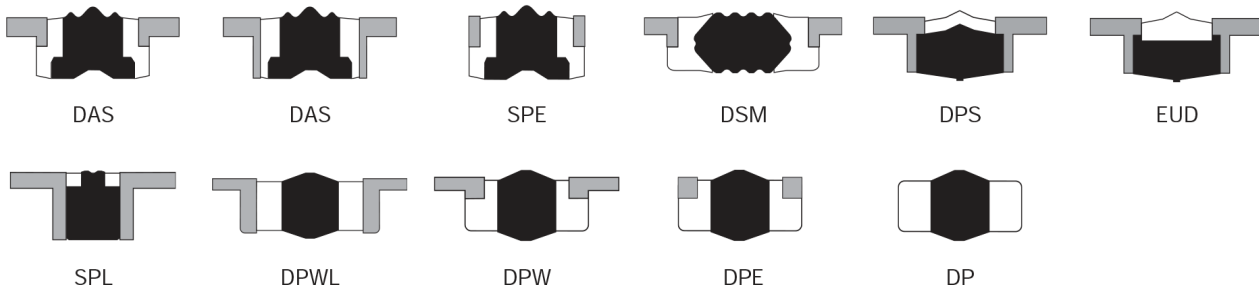
OD	ID	L1	L2	OD2	OD3	Product Name
70.00	50.00	35.00	9.52	62.62	67.54	DSM-070050-350
70.00	54.00	20.50	3.10	66.00	69.00	DAS-070054-205
70.00	55.00	20.00	5.00	66.00	68.50	DAS-070055-200
70.00	55.00	22.50	0.00	0.00	0.00	SPE-070055-225
70.00	58.00	20.50	4.20	66.00	69.40	EUD-070058-205
70.00	58.00	20.50	4.20	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



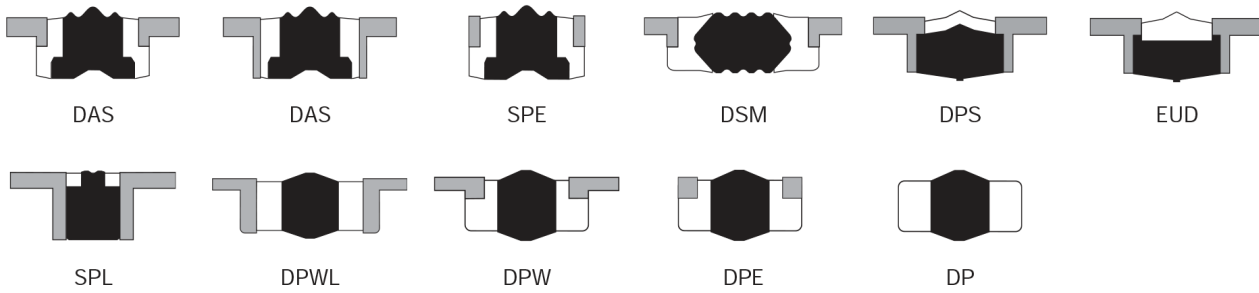
OD	ID	L1	L2	OD2	OD3	Product Name
85.00	71.00	22.50	5.20	81.00	84.40	EUD-085071-225
85.00	71.00	22.50	5.20	81.00	84.40	DAS-085071-225
85.00	75.00	20.00	4.00	81.00	83.34	DAS-085075-200
90.00	70.00	21.00	6.35	84.15	88.31	DAS-090070-210
90.00	70.00	22.40	6.35	84.15	88.30	DAS-090070-224
90.00	70.00	30.00	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



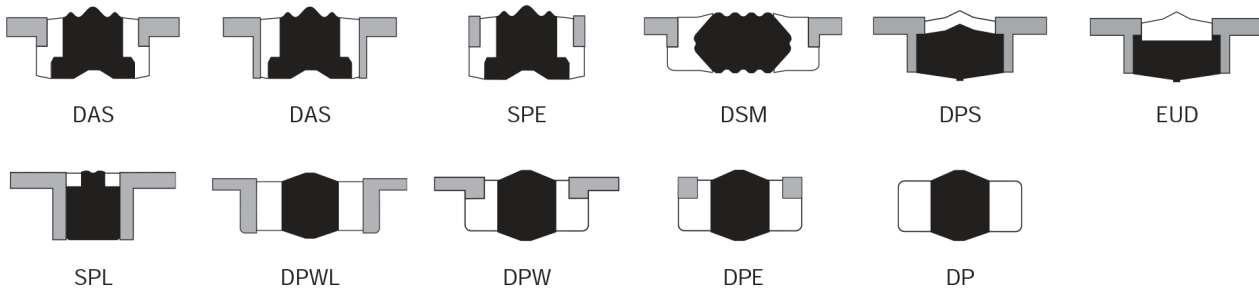
OD	ID	L1	L2	OD2	OD3	Product Name
100.00	80.00	31.00	7.00	93.80	98.00	DPWL-100080-310
100.00	80.00	35.00	9.52	92.60	97.50	DSM-100080-350
100.00	82.00	22.50	3.60	96.00	99.00	DAS-100082-225
100.00	85.00	19.50	20.00	0.00	0.00	SPE-100085-200
100.00	85.00	20.00	5.00	96.00	98.50	DAS-100085-200
100.00	86.00	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	30.00	6.35	103.10	108.00	DAS-110090-300
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



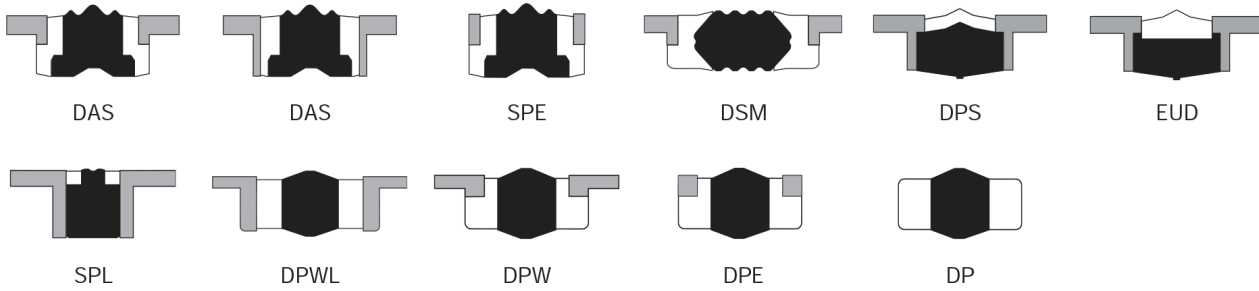
OD	ID	L1	L2	OD2	OD3	Product Name
120.00	100.00	25.40	6.35	114.10	118.30	WDA-120100-254
120.00	100.00	30.00	0.00	0.00	0.00	SPE-120100-300
120.00	100.00	31.00	7.00	113.80	118.00	DPWL-120100-310
120.00	100.00	35.00	9.52	112.80	117.51	DSM-120100-350
120.00	106.00	22.50	5.20	116.00	119.40	EUD-120106-225
120.00	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	32.00	10.00	119.00	123.00	DAS-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



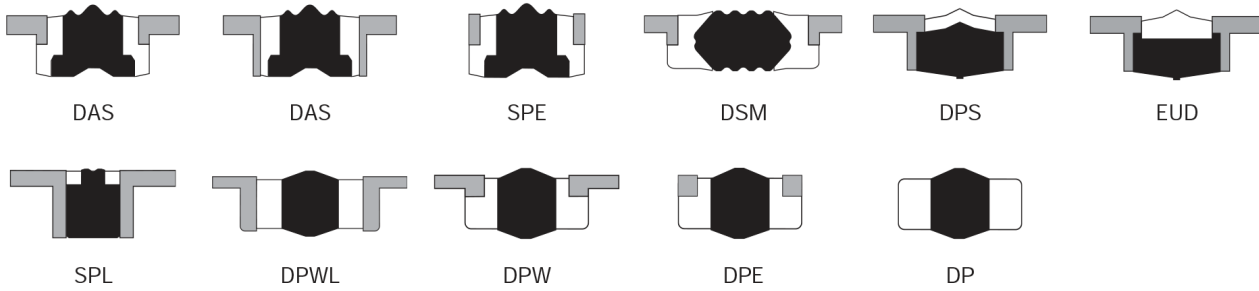
OD	ID	L1	L2	OD2	OD3	Product Name
135.00	110.00	38.00	9.50	128.35	133.00	DPWL-135110-380
135.00	110.00	45.00	12.70	126.82	132.33	DSM-135110-450
140.00	115.00	25.40	0.00	0.00	0.00	SPE-140115-254
140.00	115.00	25.40	9.50	132.60	137.50	DAS-140115-254
140.00	115.00	25.40	6.35	133.00	138.00	DAS-140115-254/1
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	25.00	9.50	142.60	0.00	DAS-150125-250
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



OD	ID	L1	L2	OD2	OD3	Product Name
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
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



OD	ID	L1	L2	OD2	OD3	Product Name
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
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



OD	ID	L1	L2	OD2	OD3	Product Name
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
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

$\varnothing D$	$\varnothing d$
0.1 - 0.25	≤ 0.8

Tolerances

$\varnothing D$	$\varnothing d$	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

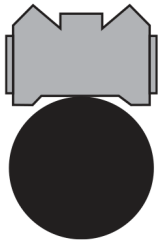
Reciprocating Rotary Oscillating Helix



Similar Styles



Double acting seals



Key Features

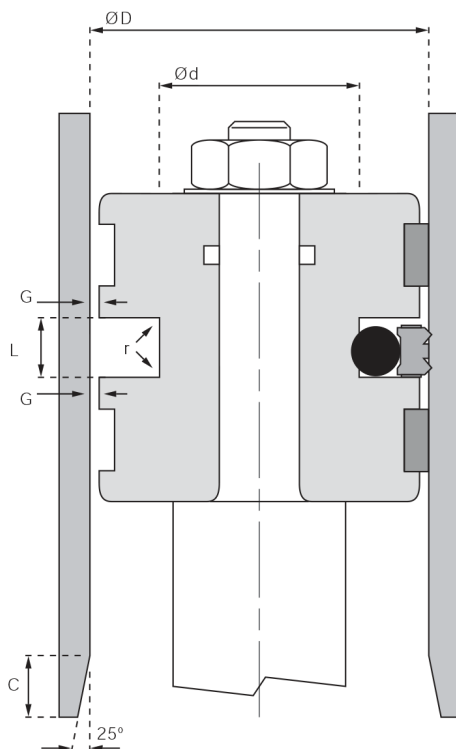
Dry or lubricated pneumatics

Lower pressures

Compact design

Reduced coefficient of friction

Easy to fit

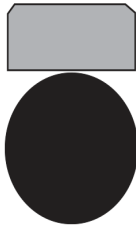




GP2

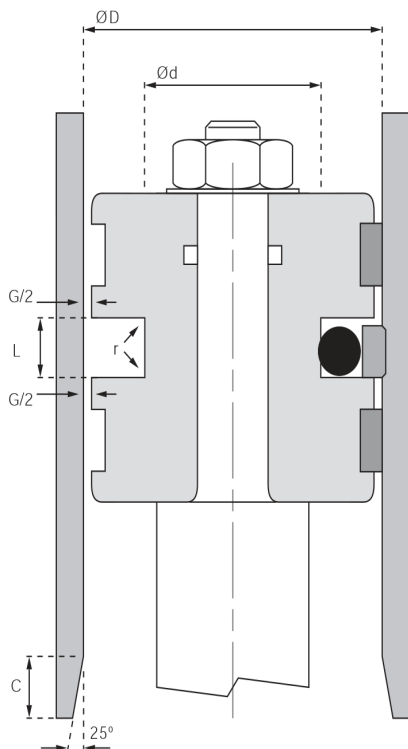
Glide Rings

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

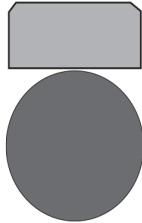




GP4

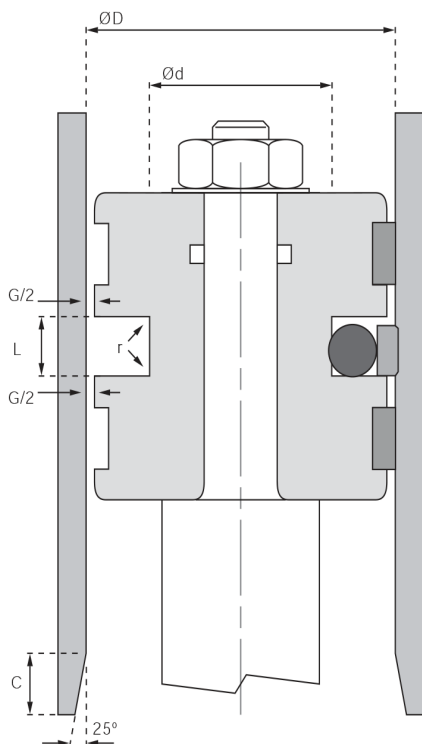
Glide Rings

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

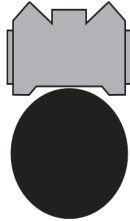




GP6

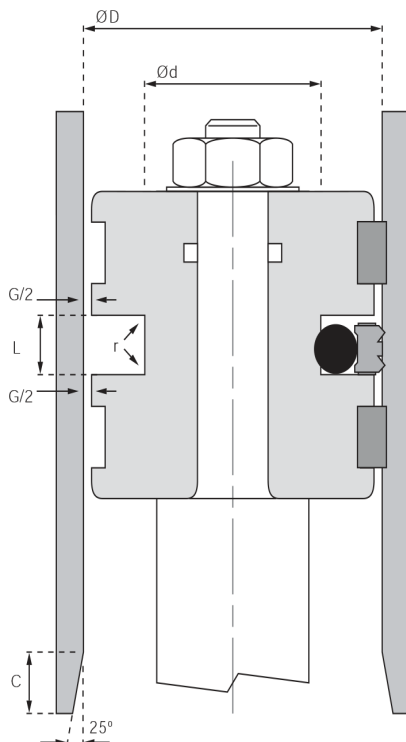
Glide Rings

Double acting seals



Key Features

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

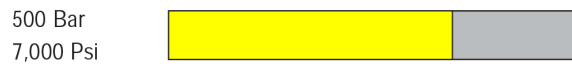


Design

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

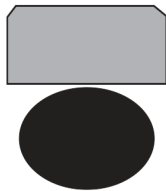




GP8

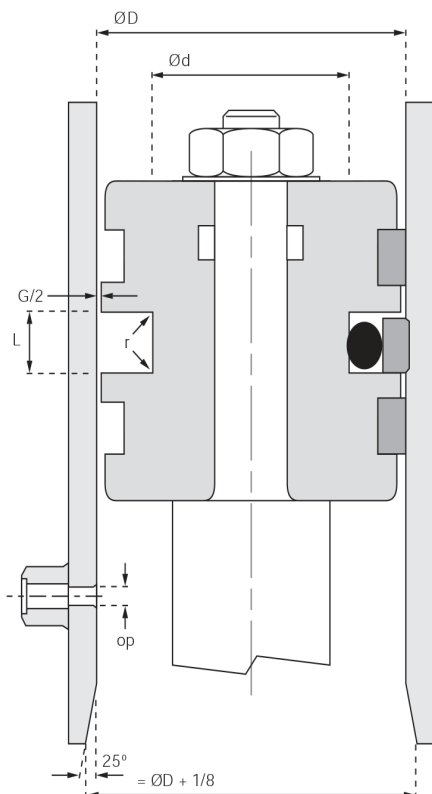
Glide Rings

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

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

Tolerances

$\varnothing D$	$\varnothing d$	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





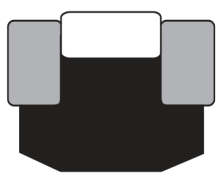
PHD

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.

Double acting seals



Key Features

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

Operating Conditions

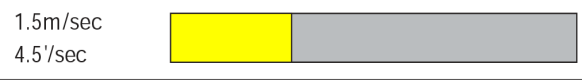
Pressure



Temperature



Speed



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

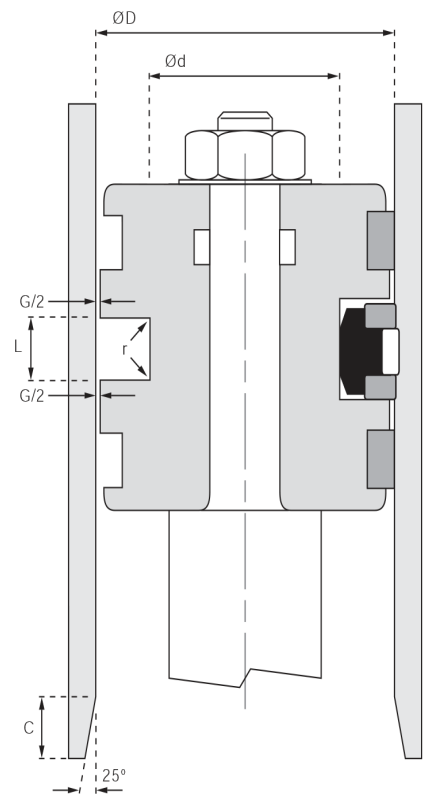
	7.0	7.5	11.5	14
C/S	7.0	7.5	11.5	14
C	4.0	5.0	6.5	7.5
r	0.3	0.5	0.6	0.8

Extrusion Gap

Pressure	Bar	350	450
G		1.00	0.60

Typical Examples

- Reciprocating Rotary Oscillating Helix

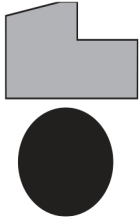




GP3

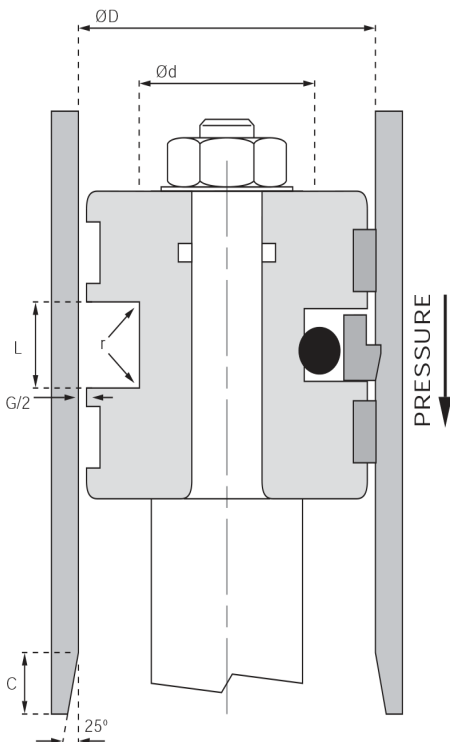
Glide Rings

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

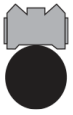


PHD



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	GP6-016008-032
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	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	GP4-020012-032
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	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	GP4-025017-032



KPDP



GP2



GP4



GP6



GP8



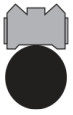
PHD



GP3 (Made to order)

OD	ID	L1	L2	OD2	OD3	Product Name
25.00	17.50	3.20	0.00	0.00	0.00	GP6-025017-032
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	GP4-035027-032
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	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	GP4-038030-032
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	GP2-038030-032
40.00	20.00	4.30	4.50	0.00	0.00	GP2-040030-045
40.00	24.50	6.30	0.00	0.00	0.00	GP6-040024-063
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	GP4-040029-042
40.00	29.00	4.20	0.00	0.00	0.00	GP2-040029-042





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	GP6-040032-032
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	GP4-045034-042
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	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	GP6-050039-042
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	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	GP6-055044-042
55.00	44.00	4.20	0.00	0.00	0.00	GP4-055044-042





KPDP



GP2



GP4



GP6



GP8



PHD



GP3 (Made to order)

OD	ID	L1	L2	OD2	OD3	Product Name
55.00	44.00	4.20	0.00	0.00	0.00	GP2-055044-042
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	GP6-060049-042
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	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	GP6-065054-042
65.00	54.00	4.20	0.00	0.00	0.00	GP4-065054-042





KPDP



GP2



GP4



GP6



GP8

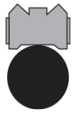


PHD



GP3 (Made to order)

OD	ID	L1	L2	OD2	OD3	Product Name
65.00	54.00	4.20	0.00	0.00	0.00	GP2-065054-042
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	7.50	0.00	0.00	0.00	GP6-070055-075
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	59.00	8.10	0.00	0.00	0.00	GP2-080059-081
80.00	60.00	10.80	0.00	0.00	0.00	GP2-080060-108
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	GP4-080064-063
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	GP2-080064-063
80.00	65.00	7.50	0.00	0.00	0.00	GP2-080065-075



KPDP



GP2



GP4



GP6



GP8



PHD



GP3 (Made to order)

OD	ID	L1	L2	OD2	OD3	Product Name
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
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	69.00	8.10	0.00	0.00	0.00	GP2-090069-081
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





KPDP



GP2



GP4



GP6



GP8



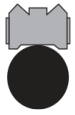
PHD



GP3 (Made to order)

OD	ID	L1	L2	OD2	OD3	Product Name
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
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	GP4-110094-063
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	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	GP6-115099-063
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	GP2-115099-063





KPDP



GP2



GP4



GP6



GP8



PHD



GP3 (Made to order)

OD	ID	L1	L2	OD2	OD3	Product Name
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	GP6-120099-105
120.00	99.00	8.10	0.00	0.00	0.00	GP8-120099-081
120.00	99.00	8.10	0.00	0.00	0.00	GP2-120099-081
120.00	100.00	16.00	0.00	0.00	0.00	PHD-120100-160
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	GP6-125104-081
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	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



KPDP



GP2



GP4



GP6



GP8

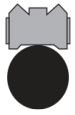


PHD



GP3 (Made to order)

OD	ID	L1	L2	OD2	OD3	Product Name
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
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	7.50	0.00	0.00	0.00	GP6-140124-075
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	GP6-160139-081
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	GP4-160139-081
160.00	139.00	8.10	0.00	0.00	0.00	GP2-160139-081



KPDP



GP2



GP4



GP6



GP8



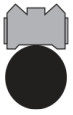
PHD



GP3 (Made to order)

OD	ID	L1	L2	OD2	OD3	Product Name
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
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	GP4-170149-081
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	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	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	GP6-180159-081
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





KPDP



GP2



GP4



GP6



GP8



PHD



GP3 (Made to order)

OD	ID	L1	L2	OD2	OD3	Product Name
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	GP4-200179-081
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	GP2-200179-081M
200.00	179.00	8.10	0.00	0.00	0.00	GP6-200179-081
200.00	179.00	8.10	0.00	0.00	0.00	GP2-200179-081
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
200.00	184.50	6.30	0.00	0.00	0.00	GP2-200184-063
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



KPDP



GP2



GP4



GP6



GP8



PHD



GP3 (Made to order)

OD	ID	L1	L2	OD2	OD3	Product Name
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
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

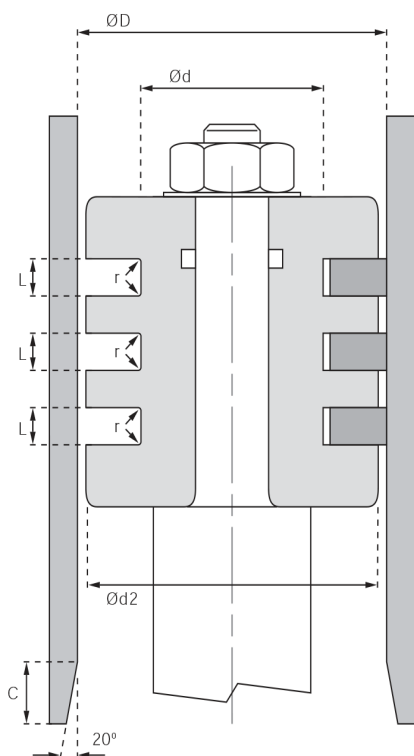


Double acting seals



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.

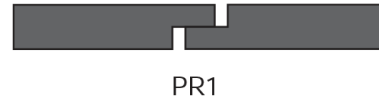
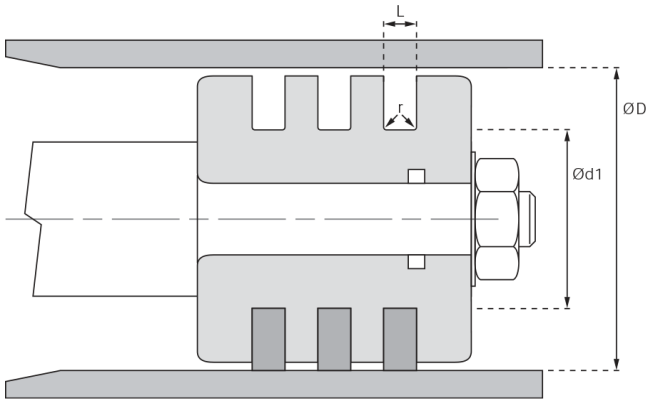
Typical Examples

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

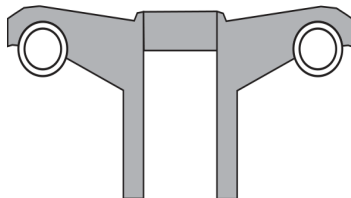
Surface Finish μmRa

$\varnothing d1$ Rt <2um

Tolerance

$\varnothing d1$ H12

Double acting seals



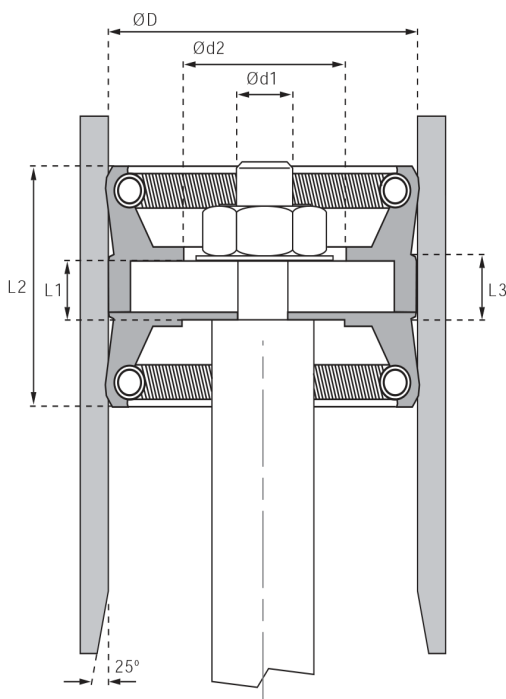
Key Features

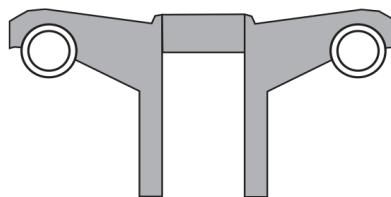
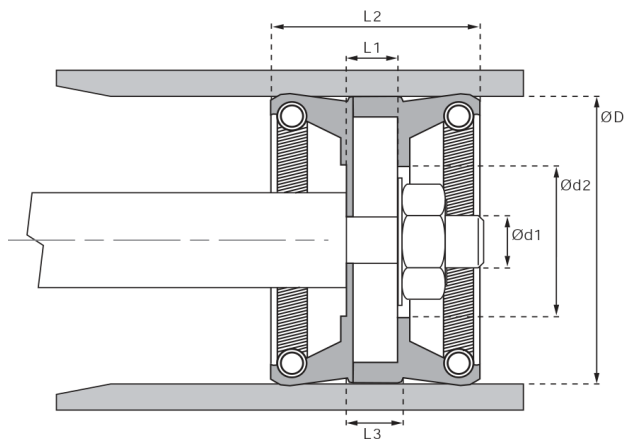
Low pressures

Compact design

Complete piston with bearing support

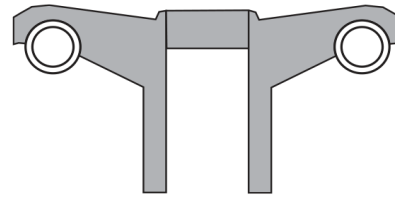
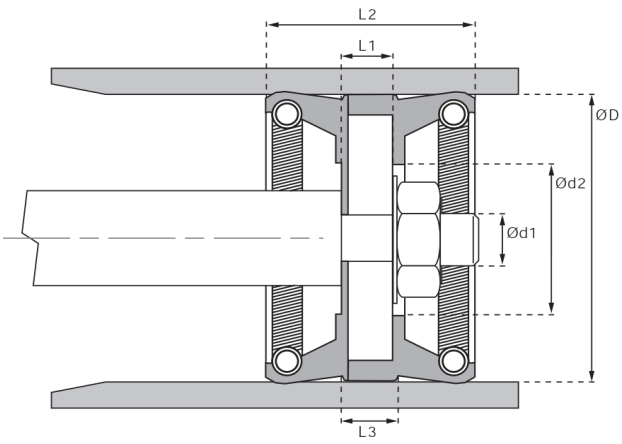
Can run dry oil free air





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
50.00	10.20	4.00	25.00	27.00	7.00	TET-050010-250
55.00	10.20	4.00	25.00	32.00	7.00	TET-055010-250
60.00	12.20	4.00	26.00	37.00	7.00	TET-060012-260
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



TET

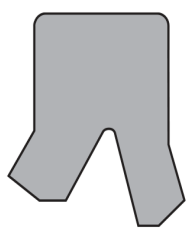
OD	ID	L1	L2	OD2	OD3	Product Name
110.00	12.20	6.00	40.00	78.00	10.00	TET-110012-400
115.00	20.20	8.00	30.00	83.00	13.00	TET-115020-300
120.00	20.20	8.00	40.00	88.00	13.00	TET-120020-400
125.00	20.20	0.00	0.00	0.00	0.00	TET-125020-260
125.00	20.20	8.00	40.00	85.00	14.00	TET-125020-400
130.00	20.20	40.00	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

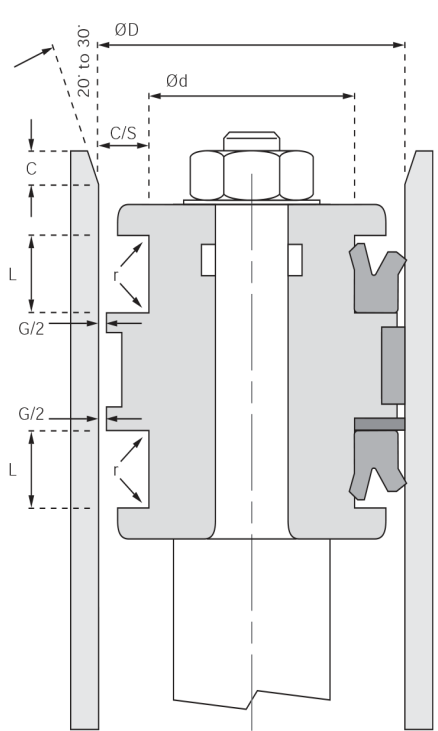
Piston Seals

Single acting seals



Key Features

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



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		
ØD	Ød	L
0.1 - 0.25	≤ 0.8	2.0

Tolerances		
ØD	Ød	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





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

$\varnothing D$	$\varnothing d$	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

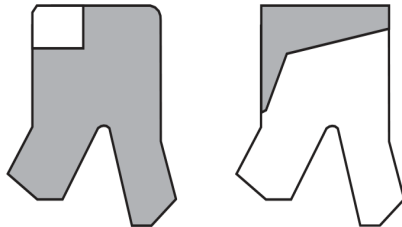
Pressure (Bar)	50	100	200	300	400	500
Seal Only (mm)	1.20	0.80	0.40	0.25	0.17	0.10
Seal + BU (mm)	n/a	1.10	0.80	0.70	0.60	0.50

Typical Examples

Reciprocating Rotary Oscillating Helix



Single acting seals



Key Features

Medium to heavy duty

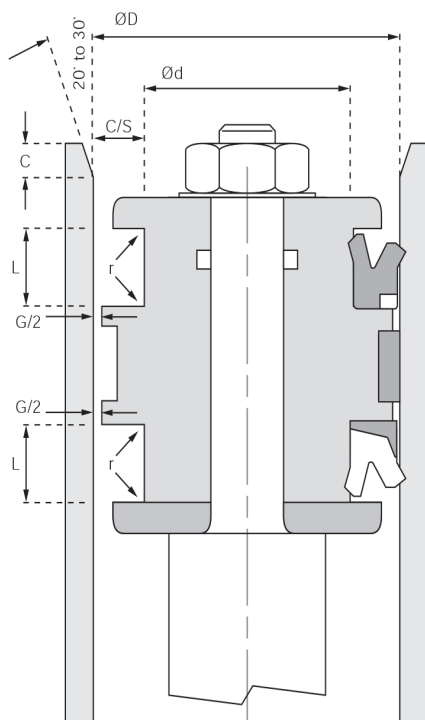
Piston only

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

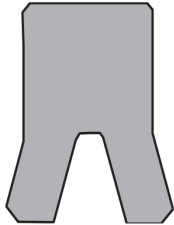
Pressure (Bar)	50	100	200	300	400	500
Seal Only (mm)	1.20	0.80	0.40	0.25	0.17	0.10
Seal + BU (mm)	n/a	1.10	0.80	0.70	0.60	0.50

Typical Examples

Reciprocating Rotary Oscillating Helix



Single acting seals



Key Features

Medium to heavy duty

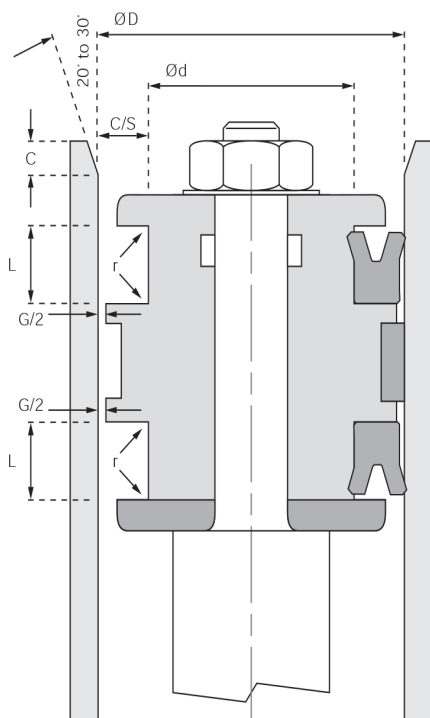
Piston or rod

Symmetrical lip design

Excellent wear resistance

Good extrusion resistance

Flexible to fit

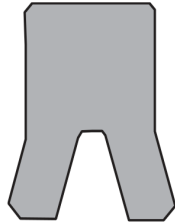




MAD

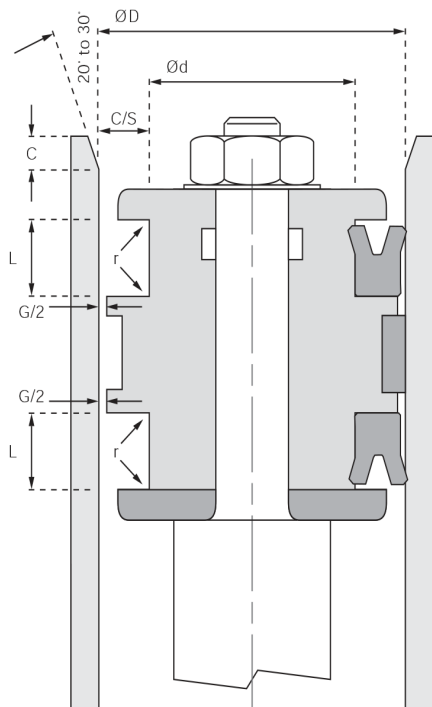
Piston Seals

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

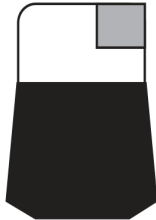




CPE

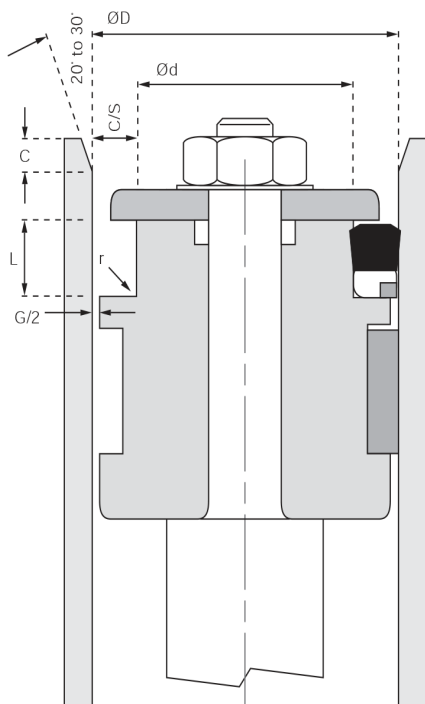
Piston Seals

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

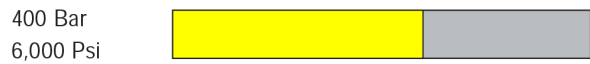
Piston Seals

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

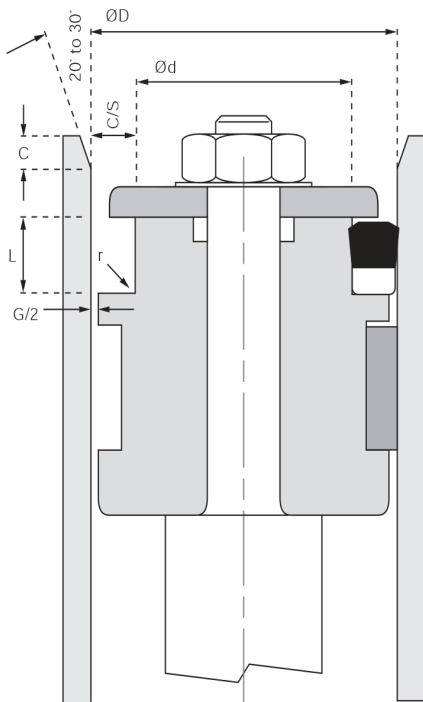


Single acting seals



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	5.20	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
15.00	10.00	4.00	4.50	0.00	0.00	RSS-010015-045



RSE



RSEA



RSEA



RSS



MAD



JPS



CPE



CP



19M

OD	ID	L1	L2	OD2	OD3	Product Name
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	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	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	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
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	4.50	5.00	0.00	0.00	RSS-014020-050
20.00	14.00	4.80	5.30	16.00	0.00	RSS-014020-053



RSE



RSEA



RSEA



RSS



MAD



JPS



CPE



CP



19M

OD	ID	L1	L2	OD2	OD3	Product Name
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	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
24.00	16.00	9.00	10.00	18.00	0.00	RSS-016024-100
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



RSE



RSEA



RSEA



RSS



MAD



JPS



CPE



CP



19M

OD	ID	L1	L2	OD2	OD3	Product Name
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	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
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



RSE



RSEA



RSEA



RSS



MAD



JPS



CPE



CP



19M

OD	ID	L1	L2	OD2	OD3	Product Name
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
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



RSE



RSEA



RSEA



RSS



MAD



JPS



CPE



CP



19M

OD	ID	L1	L2	OD2	OD3	Product Name
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	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
33.00	25.00	5.80	6.30	0.00	0.00	CP-025033-063
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
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



RSE



RSEA



RSEA



RSS



MAD



JPS



CPE



CP



19M

OD	ID	L1	L2	OD2	OD3	Product Name
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
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



RSE



RSEA



RSEA



RSS



MAD



JPS



CPE



CP



19M

OD	ID	L1	L2	OD2	OD3	Product Name
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
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



RSE



RSEA



RSEA



RSS



MAD



JPS



CPE



CP



19M

OD	ID	L1	L2	OD2	OD3	Product Name
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
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



RSE



RSEA



RSEA



RSS



MAD



JPS



CPE



CP



19M

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	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
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



RSE



RSEA



RSEA



RSS



MAD



JPS



CPE



CP



19M

OD	ID	L1	L2	OD2	OD3	Product Name
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	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	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
60.00	40.00	10.00	11.00	45.00	0.00	RSS-040060-110
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



RSE



RSEA



RSEA



RSS



MAD



JPS



CPE



CP



19M

OD	ID	L1	L2	OD2	OD3	Product Name
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	7.50	8.00	0.00	0.00	CP-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
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



RSE



RSEA



RSEA



RSS



MAD



JPS



CPE



CP



19M

OD	ID	L1	L2	OD2	OD3	Product Name
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	7.00	8.00	57.00	0.00	RSE-053063-080
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
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



RSE



RSEA



RSEA



RSS



MAD



JPS



CPE



CP



19M

OD	ID	L1	L2	OD2	OD3	Product Name
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	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
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	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



RSE



RSEA



RSEA



RSS



MAD



JPS



CPE



CP



19M

OD	ID	L1	L2	OD2	OD3	Product Name
71.00	60.00	7.00	8.00	0.00	0.00	RSS-060071-080
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	60.00	8.00	0.00	0.00	0.00	RSS-060073-090
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
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	13.50	14.50	60.00	0.00	RSE-065075-145
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



RSE



RSEA



RSEA



RSS



MAD



JPS



CPE



CP



19M

OD	ID	L1	L2	OD2	OD3	Product Name
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
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



RSE



RSEA



RSEA



RSS



MAD



JPS



CPE



CP



19M

OD	ID	L1	L2	OD2	OD3	Product Name
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
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	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



RSE



RSEA



RSEA



RSS



MAD



JPS



CPE



CP



19M

OD	ID	L1	L2	OD2	OD3	Product Name
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
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



RSE



RSEA



RSEA



RSS



MAD



JPS



CPE



CP



19M

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	8.00	9.00	0.00	0.00	RSS-080093-090
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	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
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	80.00	14.00	14.50	0.00	0.00	CPE-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



RSE



RSEA



RSEA



RSS



MAD



JPS



CPE



CP



19M

OD	ID	L1	L2	OD2	OD3	Product Name
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	0.00	0.00	RSE-090100-090
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
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



RSE



RSEA



RSEA



RSS



MAD



JPS



CPE



CP



19M

OD	ID	L1	L2	OD2	OD3	Product Name
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
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	10.50	11.50	105.00	0.00	RSE-100115-115
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



RSE



RSEA



RSEA



RSS



MAD



JPS



CPE



CP



19M

OD	ID	L1	L2	OD2	OD3	Product Name
120.00	100.00	12.00	13.00	105.00	0.00	RSS-100120-130
120.00	100.00	13.50	14.50	105.00	0.00	RSE-100120-145
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	3.00	0.00	0.00	0.00	19M-105125-030
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
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	7.50	8.00	0.00	0.00	CP-115125-080
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



RSE



RSEA



RSEA



RSS



MAD



JPS



CPE



CP



19M

OD	ID	L1	L2	OD2	OD3	Product Name
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	RSS-110130-160
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
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



RSE



RSEA



RSEA



RSS



MAD



JPS



CPE



CP



19M

OD	ID	L1	L2	OD2	OD3	Product Name
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
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	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



RSE



RSEA



RSEA



RSS



MAD



JPS



CPE



CP



19M

OD	ID	L1	L2	OD2	OD3	Product Name
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	12.00	13.00	145.00	0.00	RSS-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
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



RSE



RSEA



RSEA



RSS



MAD



JPS



CPE



CP



19M

OD	ID	L1	L2	OD2	OD3	Product Name
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
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



RSE



RSEA



RSEA



RSS



MAD



JPS



CPE



CP



19M

OD	ID	L1	L2	OD2	OD3	Product Name
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
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
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



RSE



RSEA



RSEA



RSS



MAD



JPS



CPE



CP



19M

OD	ID	L1	L2	OD2	OD3	Product Name
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
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



RSE



RSEA



RSEA



RSS



MAD



JPS



CPE



CP



19M

OD	ID	L1	L2	OD2	OD3	Product Name
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
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



RSE



RSEA



RSEA



RSS



MAD



JPS



CPE



CP



19M

OD	ID	L1	L2	OD2	OD3	Product Name
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

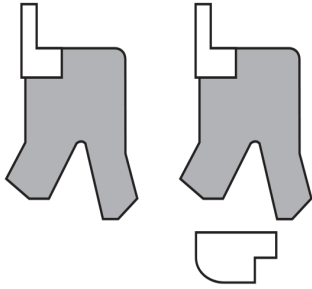
Typical Examples

Reciprocating Rotary Oscillating Helix



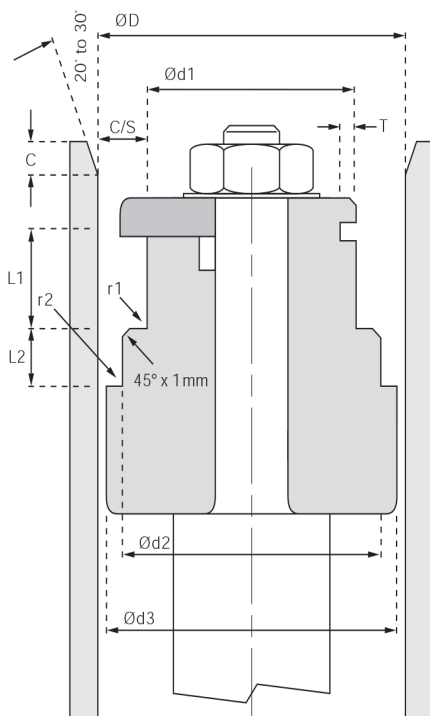
Similar Styles

Single acting seals



Key Features

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

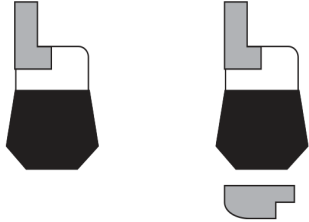




CPLR

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

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 - 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

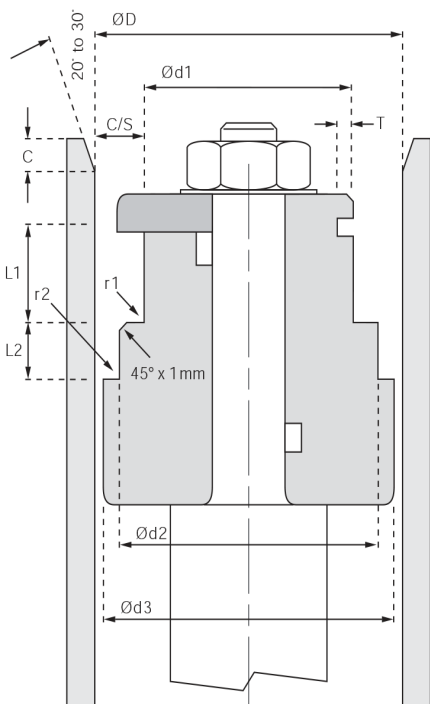
c/s	5.0	7.5	10.0
C	2.5	4.0	5.0
r1	0.4	0.6	0.8
r2	0.2	0.2	0.2

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	25.00	8.50	9.50	0.00	0.00	RSEW-025040-095
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



RSEW



RSEWR



CPW



CPLR

OD	ID	L1	L2	OD2	OD3	Product Name
105.00	85.00	13.50	6.35	99.20	103.20	CPLR-085105-140
110.00	90.00	12.50	6.30	104.10	108.30	CPLR-090110-130
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

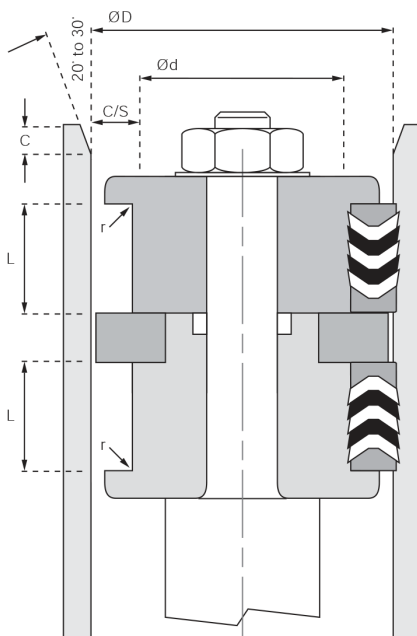
Piston Seal V Pack Sets

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

400 Bar
6,000 Psi



Temperature

-40° to 110°C
-40° to 220°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
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

ØD	Ød	L
0.1 - 0.25	≤ 0.8	2.0

Tolerances

ØD	Ød	L	G
H10	h10	-0 + 0.2	0.25

Chamfer Radii

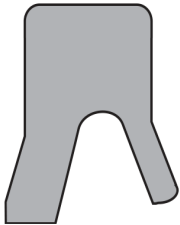
	1.5	3.0	5.0	7.5	10.0
c/s	1.5	3.0	5.0	7.5	10.0
C	1.0	2.0	2.5	3.0	3.0
r	0.2	0.2	0.2	0.2	0.2

Typical Examples

Reciprocating Rotary Oscillating Helix



Single acting seals



Key Features

Lubricated / non-lubricated
air applications

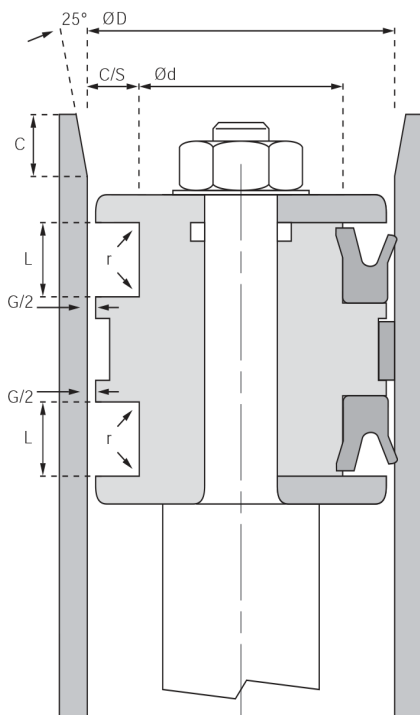
Piston only

Low pressure capability

Dynamic lip reaction

Low friction

Excellent wear resistance





DE

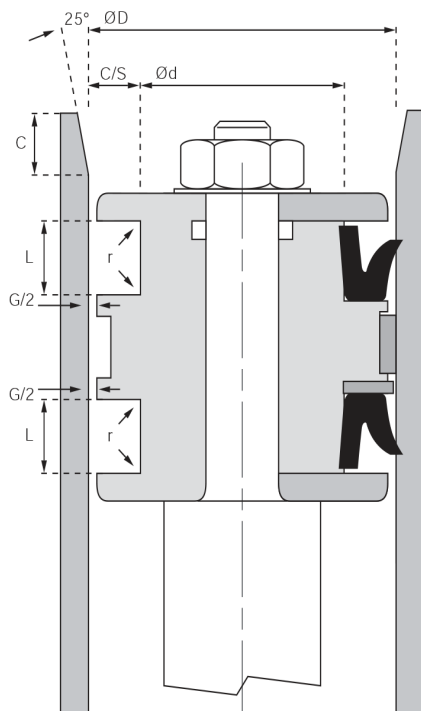
Pneumatic Piston Seals

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

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

Tolerances

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

Chamfer Radii

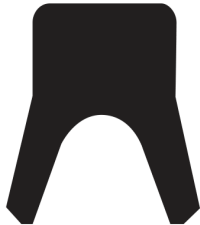
	5.0	7.5	10.0
C/S			
C	2.5	4.0	5.0
r	0.2	0.4	0.4

Typical Examples

Reciprocating Rotary Oscillating Helix

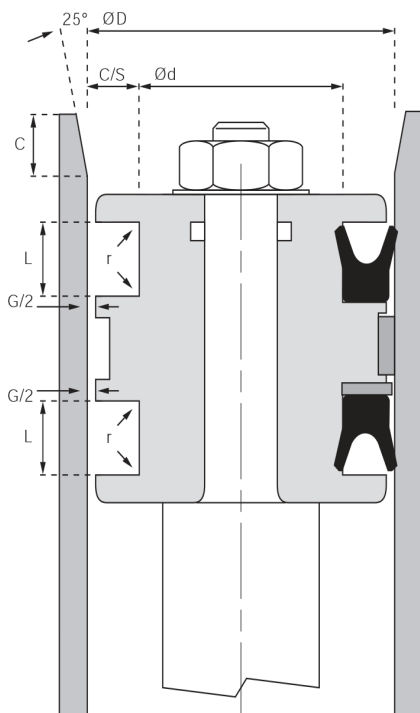


Single acting seals



Key Features

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

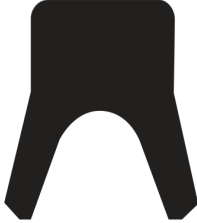




U-90

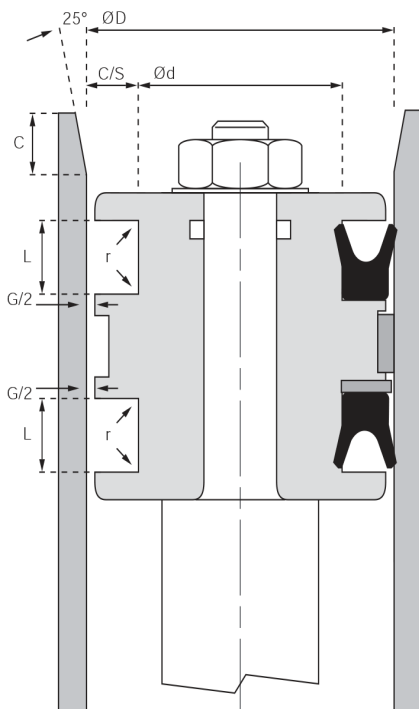
Pneumatic Piston Seals

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	3.00	0.00	0.00	0.00	19M-105125-030
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



GPP



DE



U-70



U-90



19M

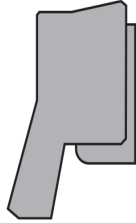
OD	ID	L1	L2	OD2	OD3	Product Name
170.00	150.00	4.00	0.00	0.00	0.00	19M-150170-040
170.00	155.00	2.00	0.00	0.00	0.00	19M-155170-020
180.00	160.00	4.00	0.00	0.00	0.00	19M-160180-040
180.00	160.00	14.00	15.00	170.00	0.00	GPP-160180-150
180.00	165.00	0.00	0.00	0.00	0.00	19M-165180-030
185.00	160.00	3.00	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

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

Tolerances

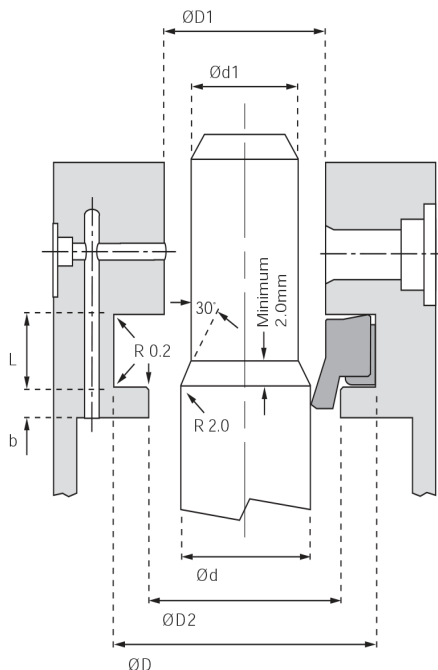
$\text{\O}d$	$\text{\O}D$	$\text{\O}D1$	$\text{\O}D2$	$\text{\O}d1$	L	b
h10	H11	H11	H11	h11	± 0.10	+ 0.2 - 0.0

Chamfer Radii

As noted!

Typical Examples

Reciprocating Rotary Oscillating Helix

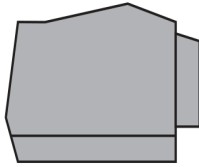




AMV

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

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	0.8	2.0
<0.25		

Tolerances

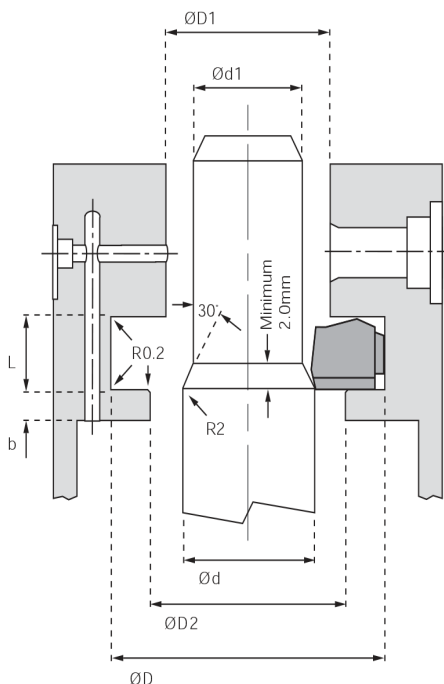
$\varnothing d$	$\varnothing D$	$\varnothing D1$	$\varnothing D2$	L	$\varnothing d1$	b
h10	H11	H11	H11	± 0.1	h11	+ 0.2 - 0.0

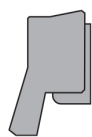
Chamfer Radii

As noted!

Typical Examples

Reciprocating Rotary Oscillating Helix





AMM



AMV

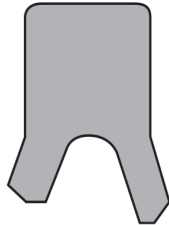
OD	ID	L1	L2	OD2	OD3	Product Name
10.00	6.00	3.70	4.00	6.50	8.00	AMM-006010-037
11.60	8.00	3.30	3.50	8.50	10.00	AMM-008011-033
15.00	9.50	4.50	4.50	10.00	12.00	AMM-009015-045
18.00	10.00	7.00	7.80	11.00	15.00	AMM-010018-070
18.00	12.00	4.80	5.00	13.00	15.50	AMM-012018-048
20.00	12.00	7.00	7.80	13.00	17.00	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

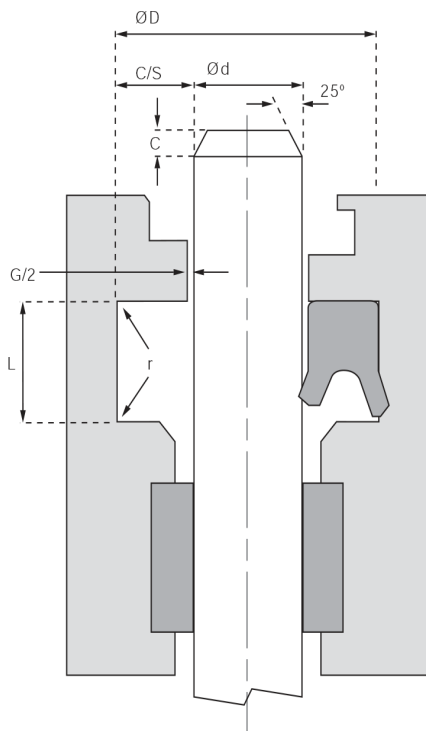
Hydraulic
Design

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

	5.0	7.5	10.0	15.0	20.0
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

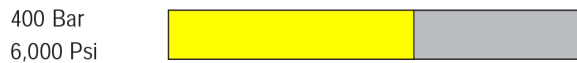
Hydraulic

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

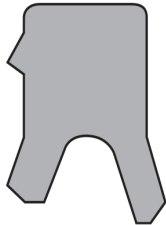
Pressure (Bar)	50	100	200	300	400	500
Seal Only (mm)	1.20	0.80	0.40	0.25	0.17	0.10
Seal + BU (mm)	n/a	1.10	0.80	0.70	0.60	0.50

Typical Examples

Reciprocating Rotary Oscillating Helix

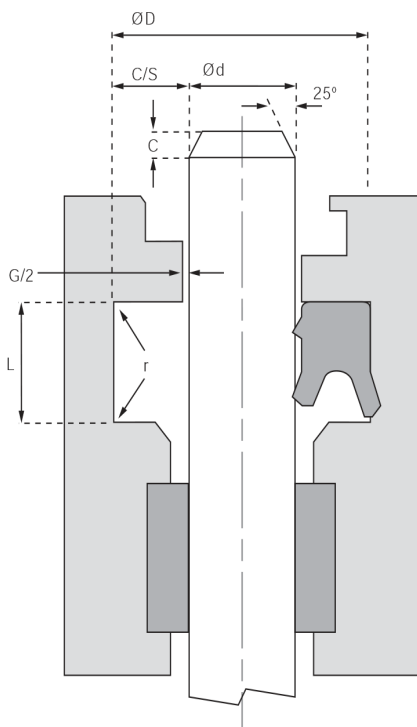


Rod seals



Key Features

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

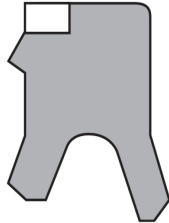




RSLA

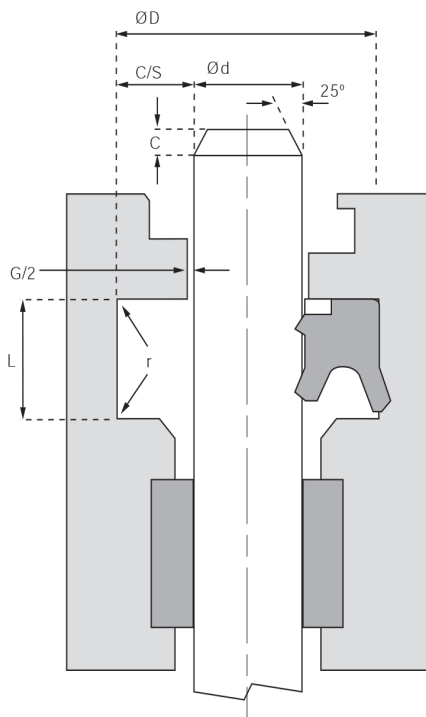
Hydraulic

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

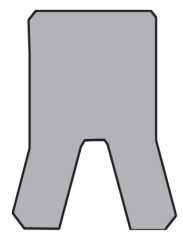




RSS

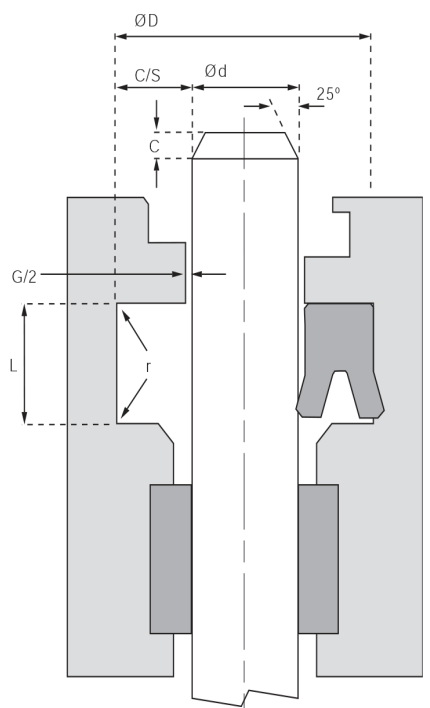
Hydraulic

Rod seals



Key Features

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

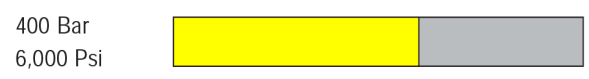


Design

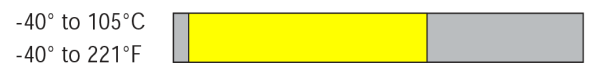
RSS are a symmetrical U-cup made from 94 Shore A Polyurethane with a high modulus of elasticity and low permanent deformation. Its excellent wear resistance offers long service life in a wide range of applications. The symmetrical configuration, with equal lip interference and equal heel clearance on 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





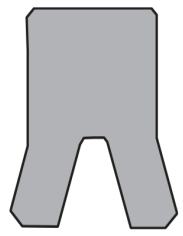
MAD

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

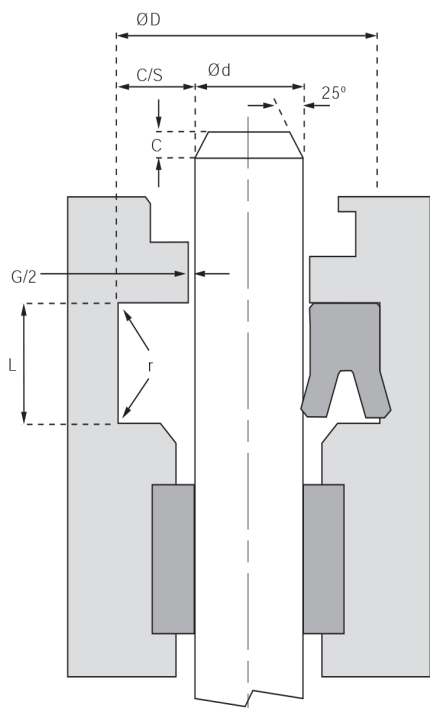
C/S	5.0	7.5	10.0	15.0	20.0
C	2.5	4.0	5.0	7.5	10.0
r	0.4	0.8	0.8	1.6	1.6

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

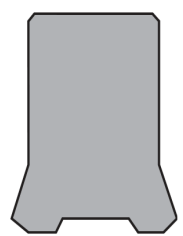




TS

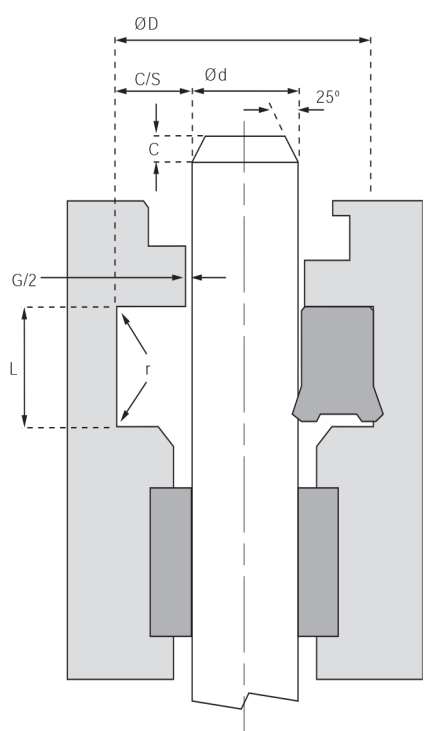
Hydraulic

Rod seals



Key Features

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



Design

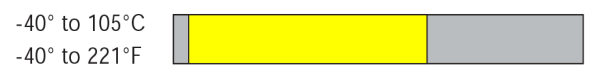
TS symmetrical single acting rod seal is made from Polyurethane 94 Shore A. The outside diameter is greater than the nominal dimension for the housing and when assembled the seal has an asymmetrical configuration. The entire outer wall of the packing adheres to the static sealing surface, whilst the 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.

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 + 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

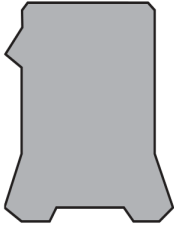




TSL

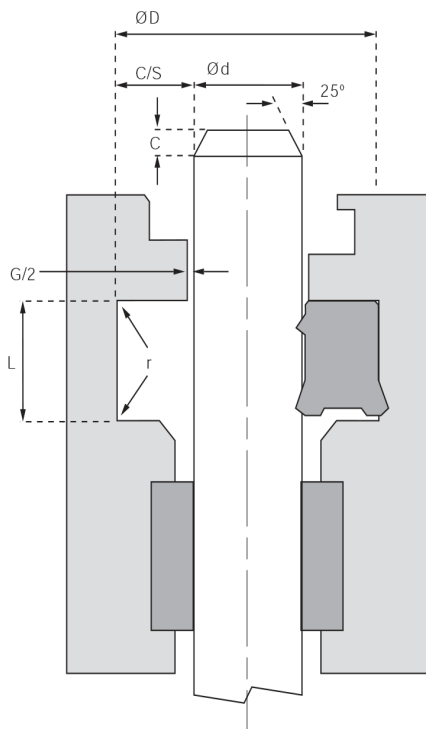
Hydraulic

Rod seals



Key Features

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



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

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



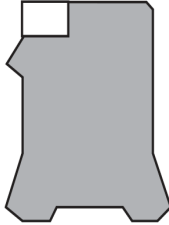


TSLA

Hydraulic

Design

Rod seals



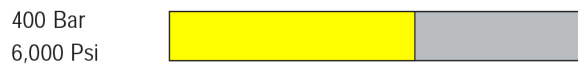
Key Features

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

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



Temperature



Speed



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

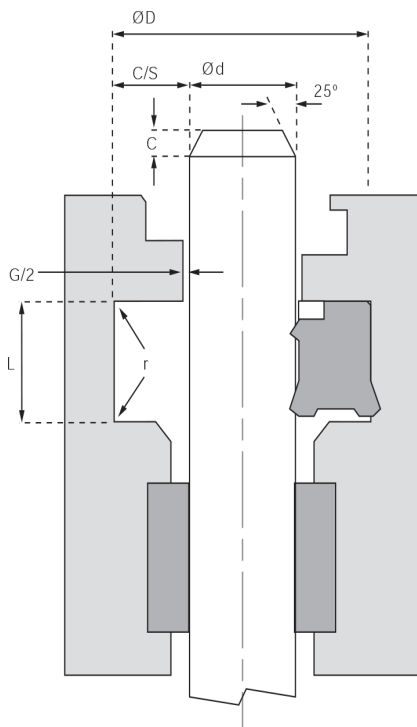
C/S	5.0	7.5	10.0	15.0	20.0
C	2.5	4.0	5.0	7.5	10.0
r	0.4	0.8	0.8	1.6	1.6

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





CP

Hydraulic

Rod seals




Key Features


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


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	
400 Bar	
6,000 Psi	

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

Speed	
0.5m/sec	
1.5'/sec	

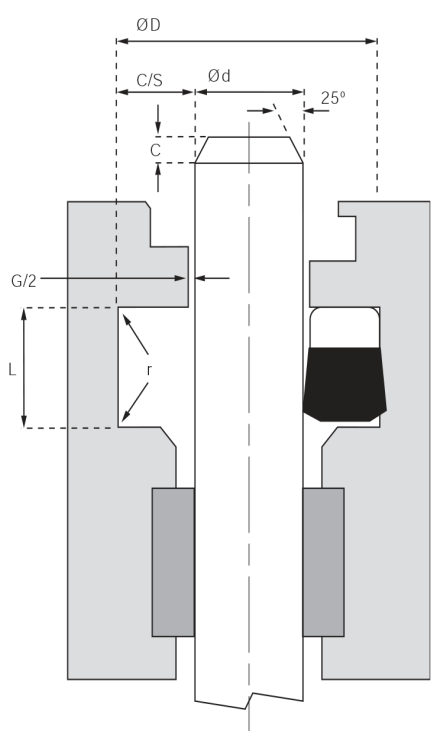
Surface Finish μmRa		
$\varnothing d$	$\varnothing D$	L
0.1 - 0.25	≤ 0.8	2.0

Tolerances		
$\varnothing d$	$\varnothing D$	L
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

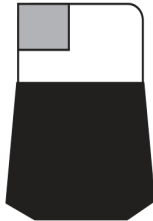




CPI

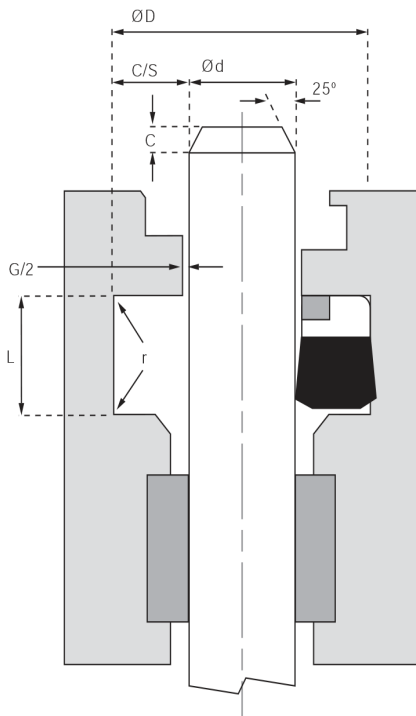
Hydraulic

Rod seals



Key Features

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



Design

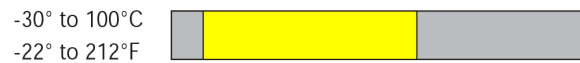
CPI are used as anti-extrusion single acting rod seals. This seal is a precision moulded Nitrile rubber sealing element with a fabric reinforced base and an Polyacetal support ring to resist extrusion. The Polyacetal anti-extrusion ring allows larger clearances and higher pressures. Designed with initial 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

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

Tolerances

$\text{\O}d$	$\text{\O}D$	L
f8	Js11	-0 + 0.25

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	5.20	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
15.00	8.00	5.80	6.30	10.00	0.00	RSS-008015-063



RS



RSL



RSLA



RSS



MAD



TS



TSL



TSLA



CP



CPI



19M

OD	ID	L1	L2	OD2	OD3	Product Name
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	4.80	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	5.80	6.30	0.00	0.00	TSL-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
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



RS



RSL



RSLA



RSS



MAD



TS



TSL



TSLA



CP



CPI



19M

OD	ID	L1	L2	OD2	OD3	Product Name
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	4.50	5.00	0.00	0.00	RSS-014020-050
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
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



RS



RSL



RSLA



RSS



MAD



TS



TSL



TSLA



CP



CPI



19M

OD	ID	L1	L2	OD2	OD3	Product Name
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	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
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
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



RS



RSL



RSLA



RSS



MAD



TS



TSL



TSLA



CP



CPI



19M

OD	ID	L1	L2	OD2	OD3	Product Name
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	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
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



RS



RSL



RSLA



RSS



MAD



TS



TSL



TSLA



CP



CPI



19M

OD	ID	L1	L2	OD2	OD3	Product Name
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
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



RS



RSL



RSLA



RSS



MAD



TS



TSL



TSLA



CP



CPI



19M

OD	ID	L1	L2	OD2	OD3	Product Name
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
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	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



RS



RSL



RSLA



RSS



MAD



TS



TSL



TSLA



CP



CPI



19M

OD	ID	L1	L2	OD2	OD3	Product Name
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	5.80	6.30	0.00	0.00	CP-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	5.80	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
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



RS



RSL



RSLA



RSS



MAD



TS



TSL



TSLA



CP



CPI



19M

OD	ID	L1	L2	OD2	OD3	Product Name
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	9.00	10.00	0.00	0.00	CPI-025038-100
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
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



RS



RSL



RSLA



RSS



MAD



TS



TSL



TSLA



CP



CPI



19M

OD	ID	L1	L2	OD2	OD3	Product Name
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
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	5.70	6.30	0.00	0.00	RS-030040-063
40.00	30.00	6.00	7.00	0.00	0.00	RSS-030040-070





RS



RSL



RSLA



RSS



MAD



TS



TSL



TSLA



CP



CPI



19M

OD	ID	L1	L2	OD2	OD3	Product Name
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	9.50	10.50	0.00	0.00	RS-030040-105
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
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



RS



RSL



RSLA



RSS



MAD



TS



TSL



TSLA



CP



CPI



19M

OD	ID	L1	L2	OD2	OD3	Product Name
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
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



RS



RSL



RSLA



RSS



MAD



TS



TSL



TSLA



CP



CPI



19M

OD	ID	L1	L2	OD2	OD3	Product Name
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
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



RS



RSL



RSLA



RSS



MAD



TS



TSL



TSLA



CP



CPI



19M

OD	ID	L1	L2	OD2	OD3	Product Name
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
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



RS



RSL



RSLA



RSS



MAD



TS



TSL



TSLA



CP



CPI



19M

OD	ID	L1	L2	OD2	OD3	Product Name
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
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



RS



RSL



RSLA



RSS



MAD



TS



TSL



TSLA



CP



CPI



19M

OD	ID	L1	L2	OD2	OD3	Product Name
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
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



RS



RSL



RSLA



RSS



MAD



TS



TSL



TSLA



CP



CPI



19M

OD	ID	L1	L2	OD2	OD3	Product Name
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	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
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	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



RS



RSL



RSLA



RSS



MAD



TS



TSL



TSLA



CP



CPI



19M

OD	ID	L1	L2	OD2	OD3	Product Name
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	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	45.00	11.50	12.50	0.00	0.00	RS-045060-125
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
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	7.30	0.00	0.00	0.00	TSLA-050060-080
60.00	50.00	7.50	0.00	0.00	0.00	CPI-050060-080
60.00	50.00	7.50	8.00	0.00	0.00	CP-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



RS



RSL



RSLA



RSS



MAD



TS



TSL



TSLA



CP



CPI



19M

OD	ID	L1	L2	OD2	OD3	Product Name
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
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



RS



RSL



RSLA



RSS



MAD



TS



TSL



TSLA



CP



CPI



19M

OD	ID	L1	L2	OD2	OD3	Product Name
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	TSLA-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
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



RS



RSL



RSLA



RSS



MAD



TS



TSL



TSLA



CP



CPI



19M

OD	ID	L1	L2	OD2	OD3	Product Name
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
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	9.50	10.00	0.00	0.00	RS-055070-100



RS



RSL



RSLA



RSS



MAD



TS



TSL



TSLA



CP



CPI



19M

OD	ID	L1	L2	OD2	OD3	Product Name
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	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	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	12.50	13.50	0.00	0.00	TSLA-060070-135
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
71.00	56.00	10.00	10.50	0.00	0.00	CPI-056071-105
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



RS



RSL



RSLA



RSS



MAD



TS



TSL



TSLA



CP



CPI



19M

OD	ID	L1	L2	OD2	OD3	Product Name
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	8.70	0.00	0.00	0.00	TSLA-060072-096
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	8.00	0.00	0.00	0.00	RSS-060073-090
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	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
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



RS



RSL



RSLA



RSS



MAD



TS



TSL



TSLA



CP



CPI



19M

OD	ID	L1	L2	OD2	OD3	Product Name
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	12.50	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
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



RS



RSL



RSLA



RSS



MAD



TS



TSL



TSLA



CP



CPI



19M

OD	ID	L1	L2	OD2	OD3	Product Name
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
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



RS



RSL



RSLA



RSS



MAD



TS



TSL



TSLA



CP



CPI



19M

OD	ID	L1	L2	OD2	OD3	Product Name
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
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



RS



RSL



RSLA



RSS



MAD



TS



TSL



TSLA



CP



CPI



19M

OD	ID	L1	L2	OD2	OD3	Product Name
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-070085-125
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	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	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
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



RS



RSL



RSLA



RSS



MAD



TS



TSL



TSLA



CP



CPI



19M

OD	ID	L1	L2	OD2	OD3	Product Name
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
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



RS



RSL



RSLA



RSS



MAD



TS



TSL



TSLA



CP



CPI



19M

OD	ID	L1	L2	OD2	OD3	Product Name
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
93.00	80.00	3.00	0.00	0.00	0.00	19M-080093-030
93.00	80.00	8.00	9.00	0.00	0.00	RSS-080093-090
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



RS



RSL



RSLA



RSS



MAD



TS



TSL



TSLA



CP



CPI



19M

OD	ID	L1	L2	OD2	OD3	Product Name
93.00	85.00	10.00	11.00	0.00	0.00	RSL-085093-110
93.00	85.00	11.50	12.50	0.00	0.00	TSL-085093-125
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	3.00	0.00	0.00	0.00	19M-080095-030
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	11.50	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
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



RS



RSL



RSLA



RSS



MAD



TS



TSL



TSLA



CP



CPI



19M

OD	ID	L1	L2	OD2	OD3	Product Name
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
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



RS



RSL



RSLA



RSS



MAD



TS



TSL



TSLA



CP



CPI



19M

OD	ID	L1	L2	OD2	OD3	Product Name
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	TSLA-090105-095
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	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	10.00	11.00	0.00	0.00	RS-090105-110
105.00	90.00	11.50	0.00	0.00	0.00	TSL-090105-125
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	95.00	12.00	13.00	0.00	0.00	RSL-095105-130



RS



RSL



RSLA



RSS



MAD



TS



TSL



TSLA



CP



CPI



19M

OD	ID	L1	L2	OD2	OD3	Product Name
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	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
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



RS



RSL



RSLA



RSS



MAD



TS



TSL



TSLA



CP



CPI



19M

OD	ID	L1	L2	OD2	OD3	Product Name
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
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



RS



RSL



RSLA



RSS



MAD



TS



TSL



TSLA



CP



CPI



19M

OD	ID	L1	L2	OD2	OD3	Product Name
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	13.00	0.00	0.00	EUS-105120-130
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



RS



RSL



RSLA



RSS



MAD



TS



TSL



TSLA



CP



CPI



19M

OD	ID	L1	L2	OD2	OD3	Product Name
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	3.00	0.00	0.00	0.00	19M-105125-030
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	15.00	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
125.00	113.00	9.50	10.50	116.00	0.00	RSS-113125-105
125.00	115.00	7.50	8.00	0.00	0.00	CP-115125-080
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



RS



RSL



RSLA



RSS



MAD



TS



TSL



TSLA



CP



CPI



19M

OD	ID	L1	L2	OD2	OD3	Product Name
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	15.00	16.00	115.00	0.00	RSS-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
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



RS



RSL



RSLA



RSS



MAD



TS



TSL



TSLA



CP



CPI



19M

OD	ID	L1	L2	OD2	OD3	Product Name
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	TSLA-120135-125
135.00	120.00	11.50	12.50	0.00	0.00	RS-120135-125
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



RS



RSL



RSLA



RSS



MAD



TS



TSL



TSLA



CP



CPI



19M

OD	ID	L1	L2	OD2	OD3	Product Name
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
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



RS



RSL



RSLA



RSS



MAD



TS



TSL



TSLA



CP



CPI



19M

OD	ID	L1	L2	OD2	OD3	Product Name
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	RS-130145-100
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	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
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	13.00	0.00	0.00	TSL-130150-130



RS



RSL



RSLA



RSS



MAD



TS



TSL



TSLA



CP



CPI



19M

OD	ID	L1	L2	OD2	OD3	Product Name
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
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



RS



RSL



RSLA



RSS



MAD



TS



TSL



TSLA



CP



CPI



19M

OD	ID	L1	L2	OD2	OD3	Product Name
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	12.00	13.00	145.00	0.00	RSS-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	0.00	0.00	RS-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
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



RS



RSL



RSLA



RSS



MAD



TS



TSL



TSLA



CP



CPI



19M

OD	ID	L1	L2	OD2	OD3	Product Name
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
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



RS



RSL



RSLA



RSS



MAD



TS



TSL



TSLA



CP



CPI



19M

OD	ID	L1	L2	OD2	OD3	Product Name
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	170.00	9.00	10.00	0.00	0.00	RS-170185-100
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



RS



RSL



RSLA



RSS



MAD



TS



TSL



TSLA



CP



CPI



19M

OD	ID	L1	L2	OD2	OD3	Product Name
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
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



RS



RSL



RSLA



RSS



MAD



TS



TSL



TSLA



CP



CPI



19M

OD	ID	L1	L2	OD2	OD3	Product Name
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
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



RS



RSL



RSLA



RSS



MAD



TS



TSL



TSLA



CP



CPI



19M

OD	ID	L1	L2	OD2	OD3	Product Name
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
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



RS



RSL



RSLA



RSS



MAD



TS



TSL



TSLA



CP



CPI



19M

OD	ID	L1	L2	OD2	OD3	Product Name
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
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



RS



RSL



RSLA



RSS



MAD



TS



TSL



TSLA



CP



CPI



19M

OD	ID	L1	L2	OD2	OD3	Product Name
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
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



RS



RSL



RSLA



RSS



MAD



TS



TSL



TSLA



CP



CPI



19M

OD	ID	L1	L2	OD2	OD3	Product Name
410.00	385.00	12.00	13.00	0.00	0.00	RSS-385410-130

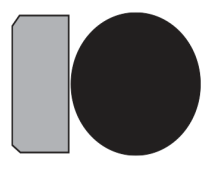




GR2

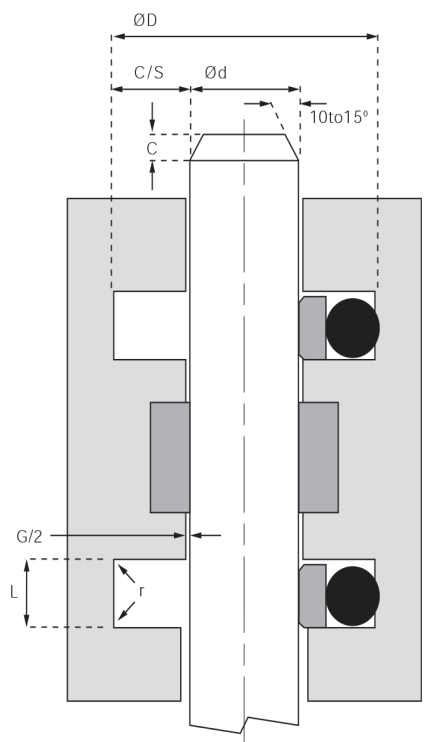
Glide & Buffer Rings

Rod seals



Key Features

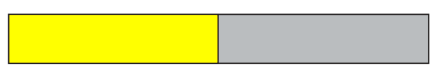


- Medium to heavy duty
- Rod seal only
- Higher pressures
- High speed capability
- Compact housing
- Easy to fit



Design

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		
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

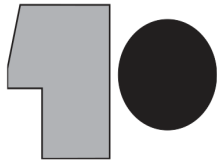




GR3

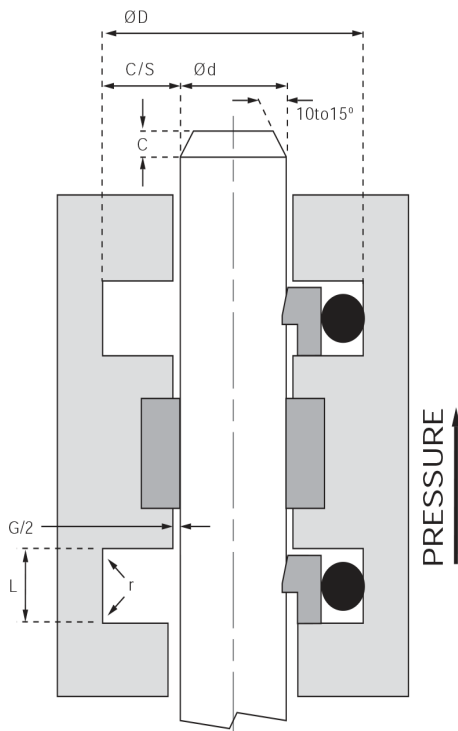
Glide & Buffer Rings

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



Temperature



Speed



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

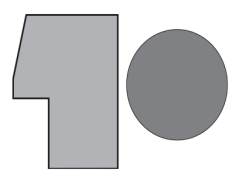
Chamfer Radii						
C/S	2.5	3.75	5.50	7.75	10.5	12.25
C	1.5	2.0	2.5	5.0	7.5	10.0
r	0.3	0.5	0.8	1.2	1.5	1.5

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

Typical Examples
 Reciprocating Rotary Oscillating Helix

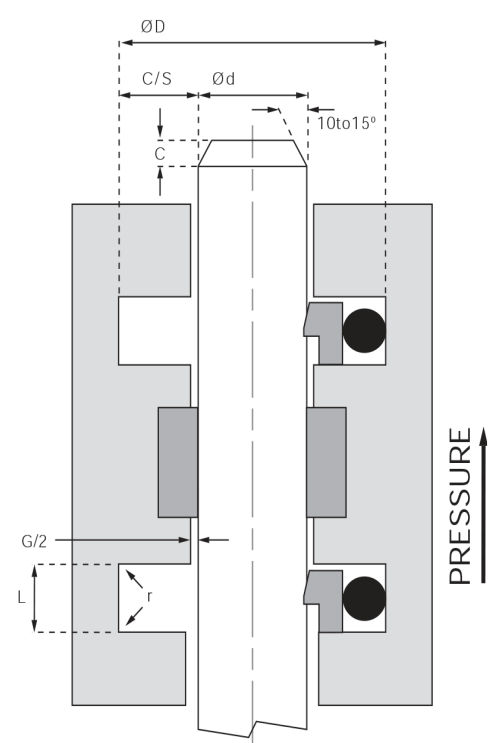


Rod seals



Key Features

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





GRU

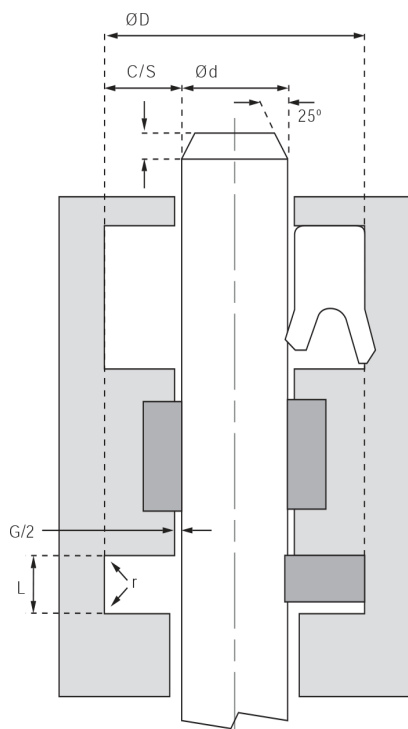
Glide & Buffer Rings

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

Ød	ØD	L
0.1 - 0.25	≤0.8	2.0

Tolerances

Ød	ØD	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

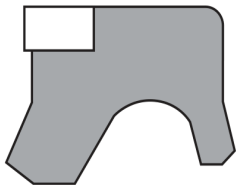
Reciprocating Rotary Oscillating Helix



HBY

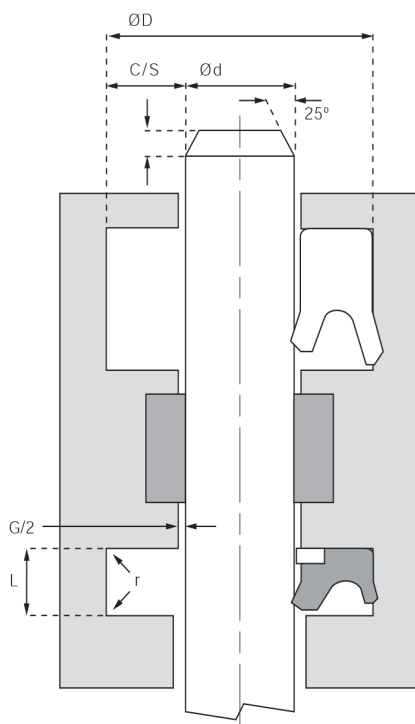
Glide & Buffer Rings

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	HBY-045056-042
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
70.00	56.00	3.00	3.20	0.00	0.00	GRU-056070-032
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



GR2



GR3



GR5



GRU



HBY

OD	ID	L1	L2	OD2	OD3	Product Name
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
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
80.00	63.00	4.60	5.00	0.00	0.00	GRU-063080-050
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



GR2



GR3



GR5



GRU



HBY

OD	ID	L1	L2	OD2	OD3	Product Name
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
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



GR2



GR3



GR5



GRU



HBY

OD	ID	L1	L2	OD2	OD3	Product Name
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
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



GR2



GR3



GR5



GRU



HBY

OD	ID	L1	L2	OD2	OD3	Product Name
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
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

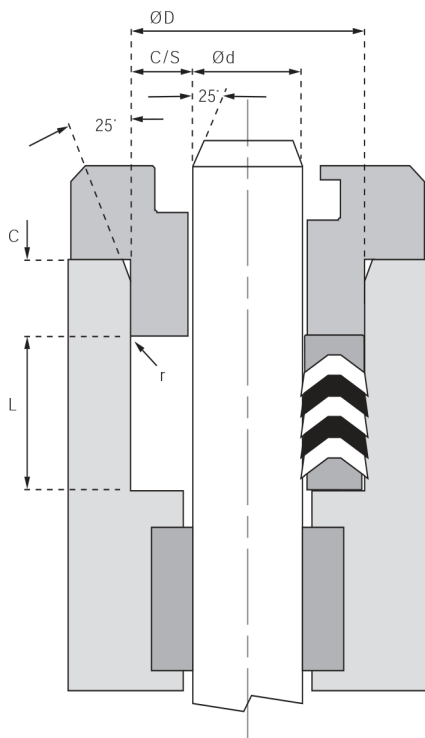
V Pack Sets

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

Ød	ØD	L
0.1 - 0.25	≤0.8	2.0

Tolerances

Ød	ØD	L
f9	H11	-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



SM1

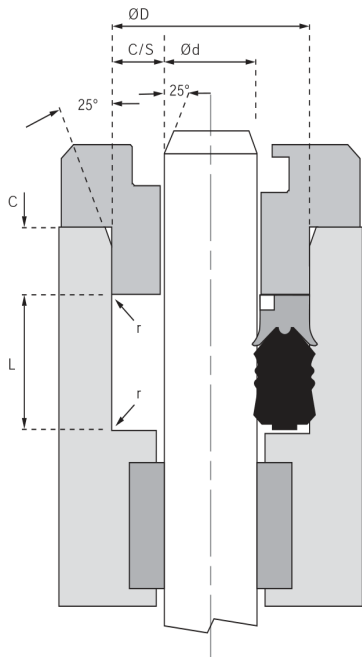
V Pack Sets

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

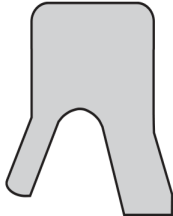
OD	ID	L1	L2	OD2	OD3	Product Name
280.00	250.00	33.00	0.00	0.00	0.00	VS1-250280-330
290.00	265.00	33.50	35.00	0.00	0.00	SM1-265290-350
305.00	280.00	33.50	35.00	0.00	0.00	SM1-280305-350
315.00	280.00	38.45	0.00	0.00	0.00	VS1-280315-384
320.00	290.00	50.80	0.00	0.00	0.00	VS1-290320-508
320.00	300.00	32.00	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

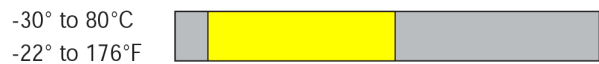
GSP pneumatic Polyurethane 90 shore A rod seal, has been redesigned with respect to traditional u-profile use in pneumatics to give significant improvements. The dynamic lip has no sharp edges to reduce friction, along with increased depth of the u-profile to increase flexibility. The use of urethane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

Operating Conditions

Pressure



Temperature



Speed



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

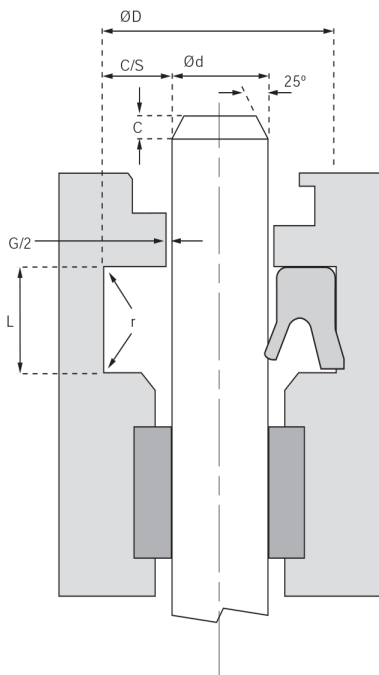
r
0.20

Typical Examples

Reciprocating Rotary Oscillating Helix



Similar Styles

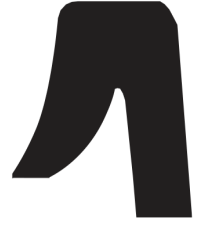




DI

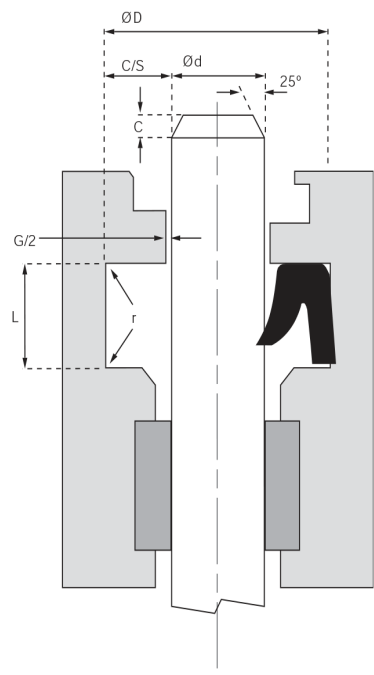
Pneumatic

Rod seals



Key Features

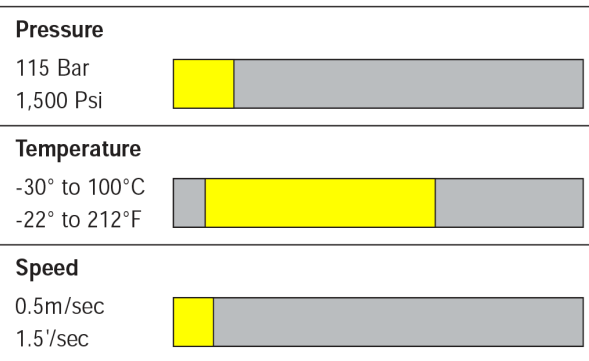
- Light duty
- Rod only
- Low pressure capability
- Dynamic lip reaction
- Low friction
- Easy to fit



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



Surface Finish µmRa

Ød	ØD	L
0.1 - 0.25	≤0.8	2.0

Tolerances

Ød	ØD	L	G
f7	H8	-0 + 0.2	0.25

Chamfer Radii

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



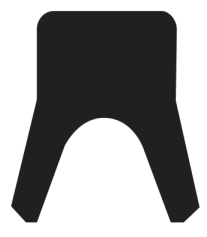
Similar Styles



U-70

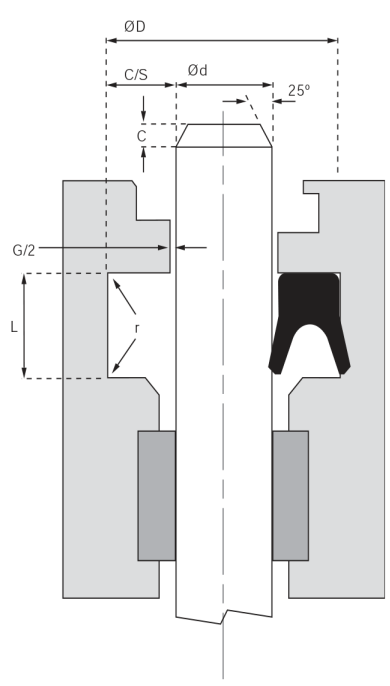
Pneumatic

Rod seals



Key Features

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



Design

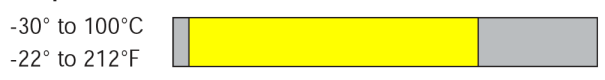
U-70 type rubber single acting seals are designed for rods or pistons. Manufactured in NBR 70 Shore A, this type can handle low pressure applications although predominately used in pneumatic cylinders, low pressure hydraulic cylinders can be accommodated. These precision moulded seals have equally distributed 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



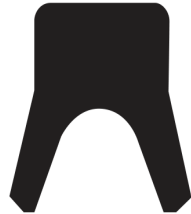
Similar Styles



U-90

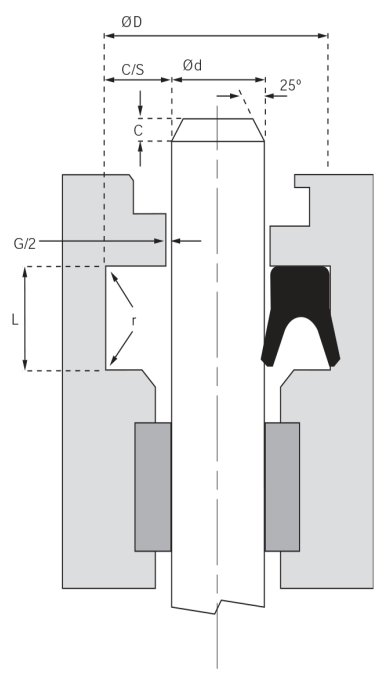
Pneumatic

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

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
105.00	125.00	3.00	0.00	0.00	0.00	19M-105125-030
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



GSP



DI



U70



U90



19M

ID	OD	L1	L2	OD2	OD3	Product Name
110.00	130.00	3.00	0.00	0.00	0.00	19M-110130-030
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



GSP



DI



U70



U90



19M

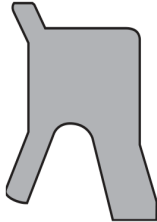
ID	OD	L1	L2	OD2	OD3	Product Name
190.00	215.00	4.00	0.00	0.00	0.00	19M-190215-040
210.00	230.00	4.00	0.00	0.00	0.00	19M-210230-040
220.00	240.00	3.00	0.00	0.00	0.00	19M-220240-030
220.00	245.00	0.00	0.00	0.00	0.00	19M-220245-040
240.00	260.00	4.00	0.00	0.00	0.00	19M-240260-040
250.00	270.00	4.00	0.00	0.00	0.00	19M-250270-040
260.00	290.00	4.00	0.00	0.00	0.00	19M-260290-040



RBP

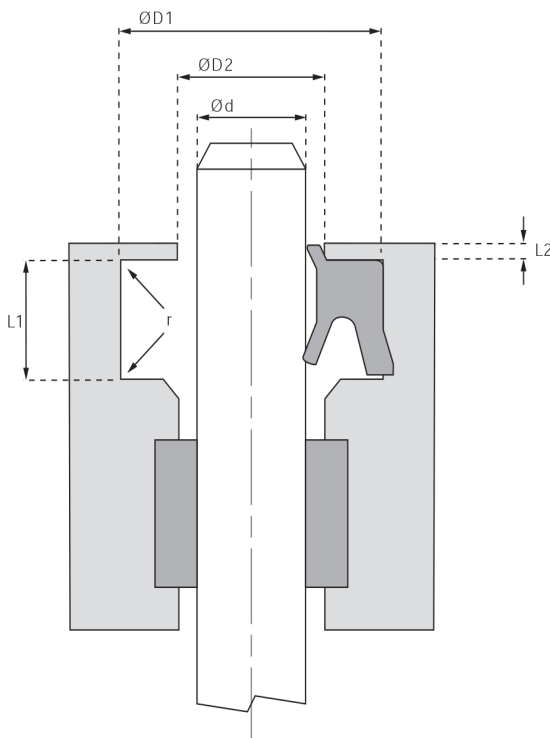
Wiper Combo

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

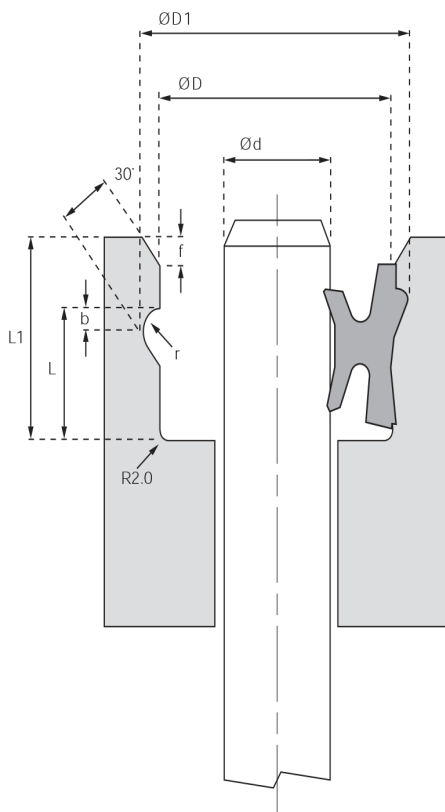
Wiper Combo

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

16 Bar
230 Psi



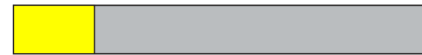
Temperature

-30° to 80°C
-22° to 176°F



Speed

1.0m/sec
3.0'/sec



Surface Finish μmRa

$\varnothing D$	$\varnothing d$	L1
0.1 - 0.25	≤ 0.8	2.0

Tolerances

$\varnothing d$	$\varnothing D$	$\varnothing D1$	L1	L
e9	H10	H10	+ 0.15 -0.00	+ 0.25 -0.00

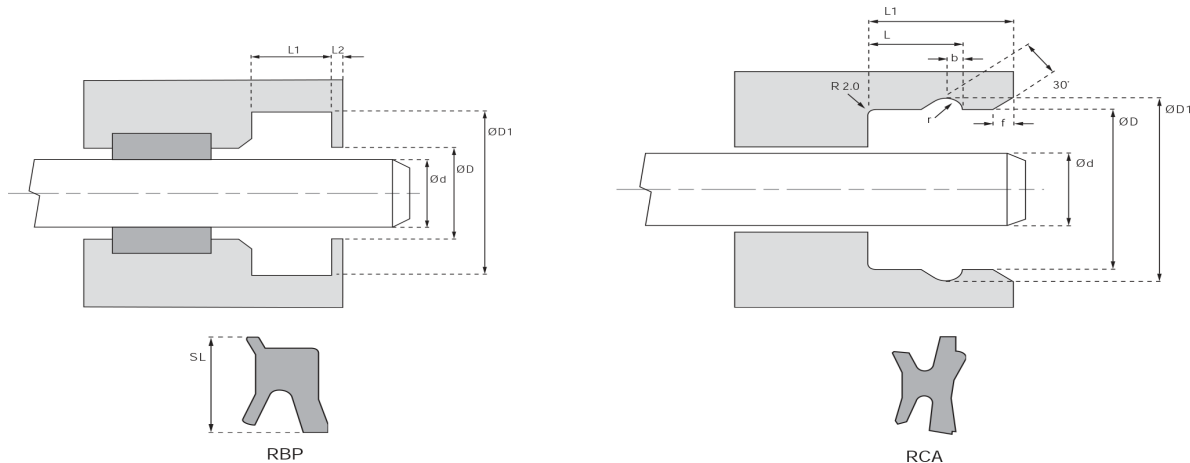
Chamfer Radii

as noted in data table

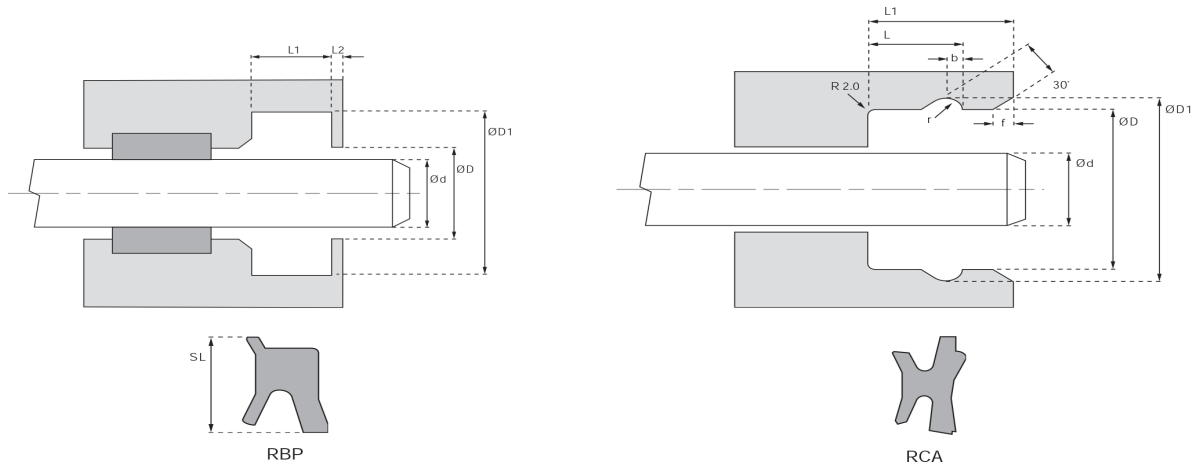
Typical Examples

Reciprocating Rotary Oscillating Helix

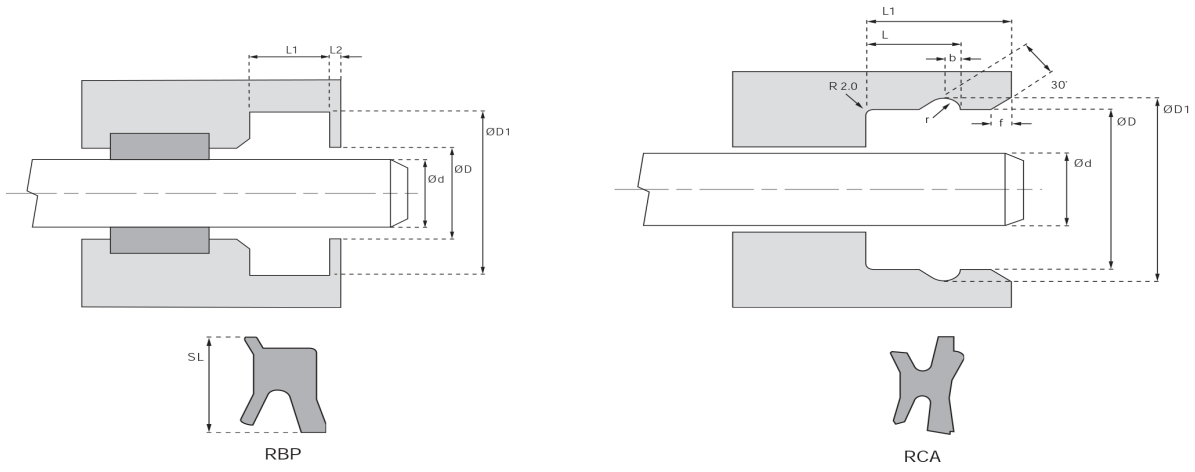




ID	OD	L1	L2	OD2	OD3	Product Name
4.00	7.00	2.70	2.80	5.40	1.00	RBP-004007-027
5.00	8.00	2.30	2.80	6.20	1.00	RBP-005008-027
3.00	8.80	4.50	5.20	5.00	1.20	RBP-003008-045
4.00	8.80	4.50	5.20	6.00	1.20	RBP-004008-045
6.00	9.00	2.30	2.80	7.20	1.00	RBP-006009-027
6.00	10.80	4.50	5.20	8.00	1.20	RBP-006010-045
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	16.80	4.50	5.20	13.00	1.20	RBP-010016-045
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	0.00	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



ID	OD	L1	L2	OD2	OD3	Product Name
20.00	26.00	4.00	4.80	0.00	0.00	RBP-020026-040
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	38.00	5.00	5.80	0.00	0.00	RBP-030038-050
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	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	7.00	10.00	0.00	0.00	KPS-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



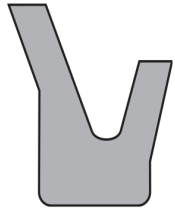
ID	OD	L1	L2	OD2	OD3	Product Name
45.00	55.00	12.00	12.50	0.00	0.00	RCA-045055-125
50.00	60.00	12.20	12.50	0.00	0.00	RCA-050060-125
50.00	62.00	8.50	9.00	0.00	0.00	RBP-050062-085
63.00	75.00	12.50	13.00	0.00	0.00	RCA-063075-130



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	

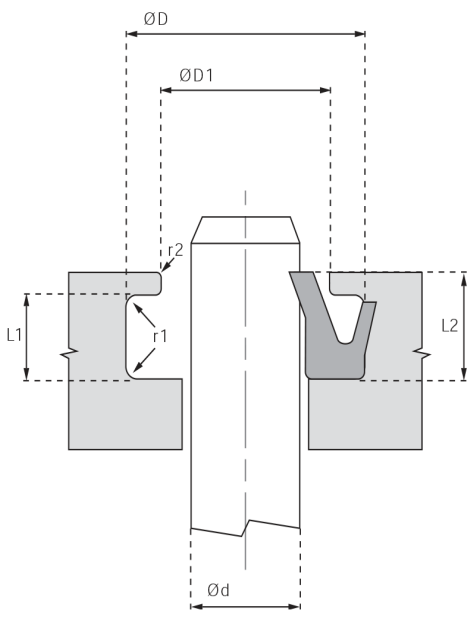
Speed	
5.0m/sec	
15.0'/sec	

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"/>





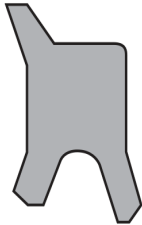
DH

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

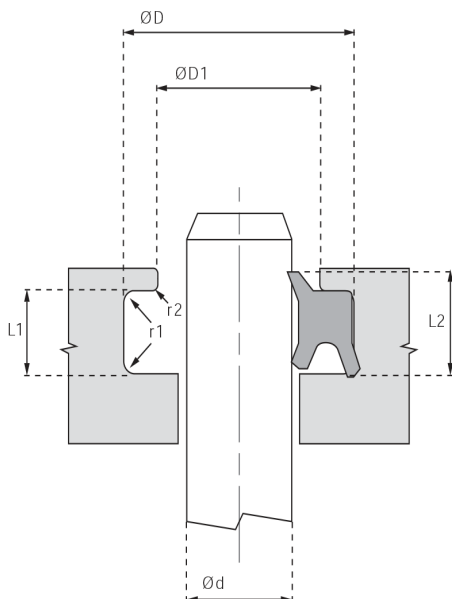
Ød	ØD	ØD1	L1
Refer seal specs' for d Dia	+ 0.20	± 0.1	+ 0.30
	- 0.00		- 0.00

Chamfer Radii

r1	r2
0.3	0.4

Typical Examples

Reciprocating Rotary Oscillating Helix





DSI

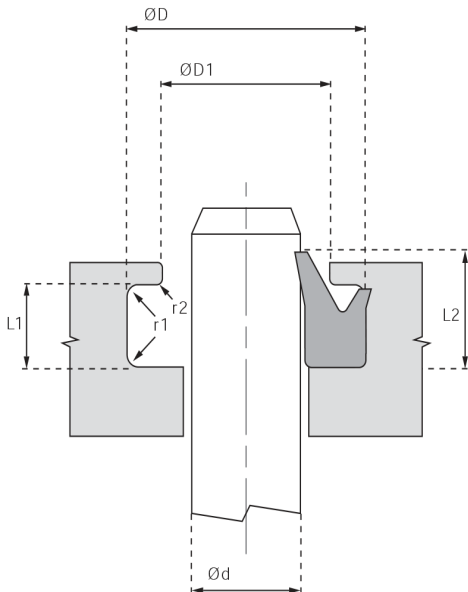
Rod Wipers

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 sideloading, 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	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	+ 0.14	± 0.1	+ 0.3
	- 0.00		- 0.0

Chamfer Radii

r1	r2
0.3	0.4

Typical Examples

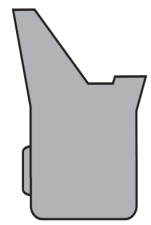
Reciprocating Rotary Oscillating Helix



PW

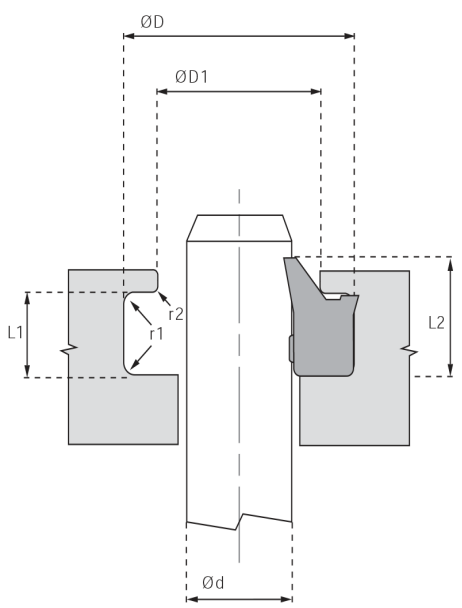
Rod Wipers

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	
-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	+ 0.20	+ 0.20	+ 0.10
specs' for d Dia	- 0.00	- 0.00	- 0.00

Chamfer Radii	
r1	r2
0.3	0.4

Typical Examples

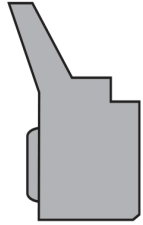
- Reciprocating Rotary Oscillating Helix



PWF

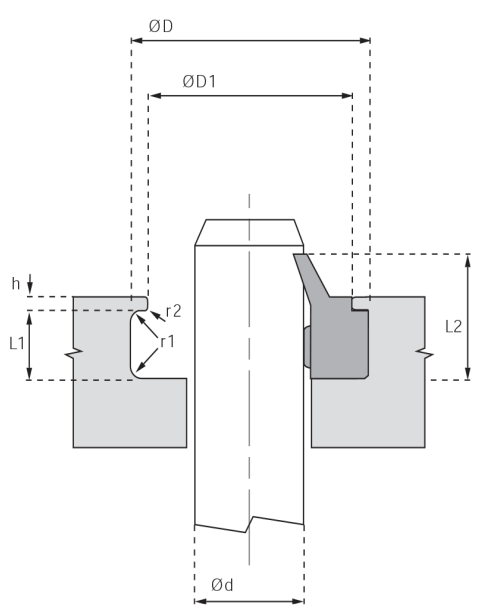
Rod Wipers

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		
$\text{\O}d$	$\text{\O}D$ & $\text{\O}D1$	L1
0.1 - 0.25 μmRa	$\leq 0.8 \mu\text{mRa}$	$\leq 3.2 \mu\text{mRa}$

Tolerances			
$\text{\O}d$	$\text{\O}D$	$\text{\O}D1$	L1
Refer seal	± 0.10	± 0.10	$+ 0.10$
specs' for d Dia			$- 0.00$

Chamfer Radii	
r1	r2
0.4	0.2

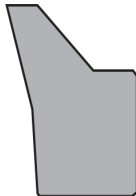
Typical Examples	
Reciprocating	<input checked="" type="checkbox"/>
Rotary	<input type="checkbox"/>
Oscillating	<input type="checkbox"/>
Helix	<input type="checkbox"/>



PWM

Rod Wipers

Rod wipers



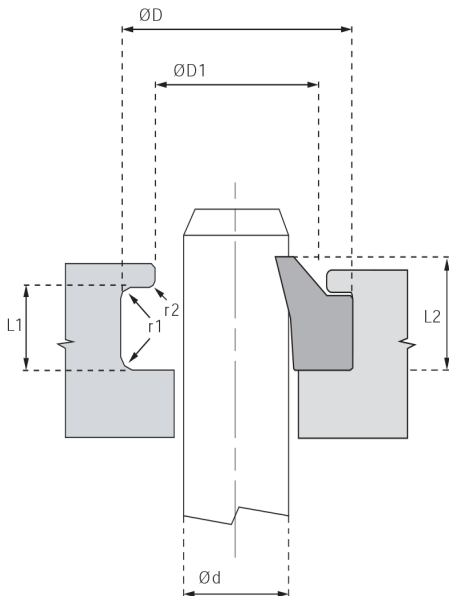
Key Features

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

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.

Rod wipers



Key Features

Easy installation

Sealing beads ensures a drier rod

Flexible design

Operating Conditions

Temperature

-30° to 100°C
-22° to 212°F



Speed

3.0m/sec
9.0'/sec



Surface Finish μmRa

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

Tolerances

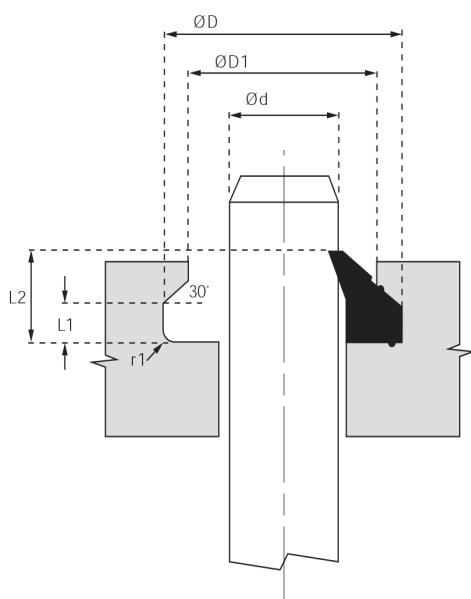
$\varnothing d$	$\varnothing D$	$\varnothing D1$	L1
Refer seal	+ 0.2	+ 0.2	+ 0.2
specs' for d Dia	- 0.0	- 0.0	- 0.0

Chamfer Radii

r1
0.2

Typical Examples

Reciprocating Rotary Oscillating Helix

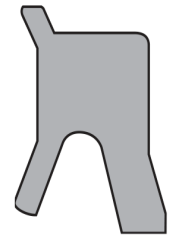




RBP

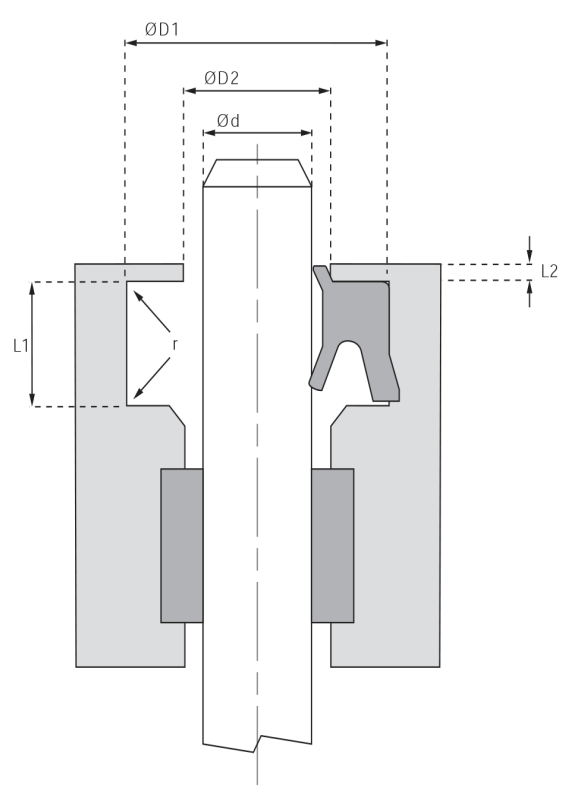
Rod Wipers

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	Bar	Psi
16 Bar	230 Psi	

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

Speed	m/sec	ft/sec
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	Value
r	0.2

Typical Examples
 Reciprocating Rotary Oscillating Helix





RCA

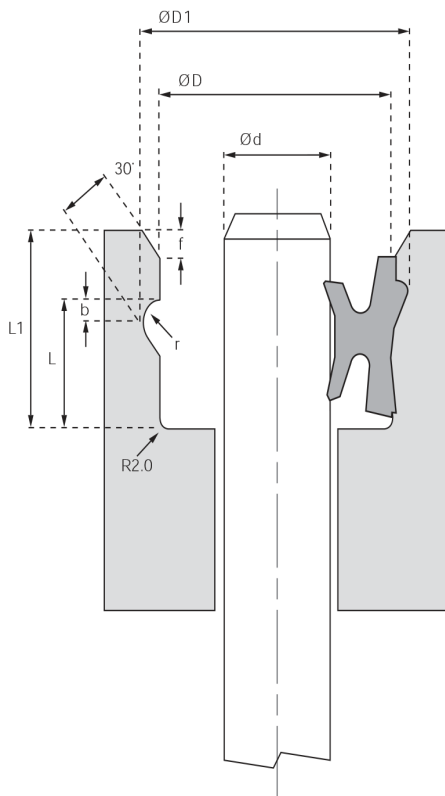
Rod Wipers

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

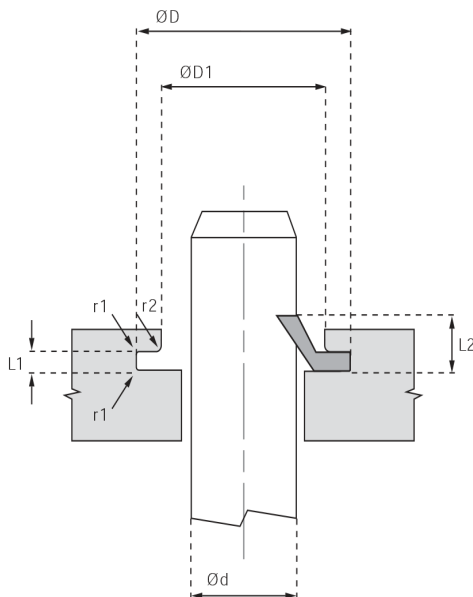
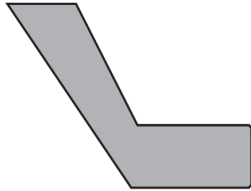




SDK

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

Ød	ØD	ØD1	L1
0.1 - 0.25 µmRa	1.6	2.0	3.2 µmRa

Tolerances

Ød	ØD	ØD1	L1
Refer seal specs' for d Dia	H11	H11	0.1

Chamfer Radii

r1	r2
0.5	0.3

Typical Examples

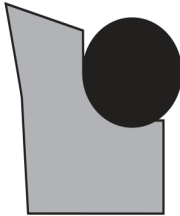
Reciprocating Rotary Oscillating Helix



WTN

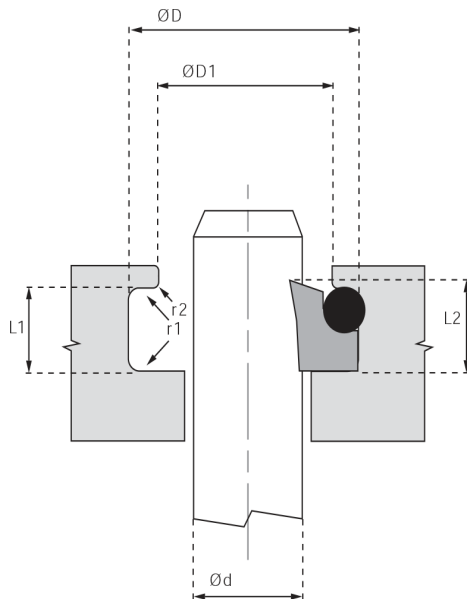
Rod Wipers

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	+ 0.20
		- 0.00	- 0.00

Chamfer Radii

r1	r2
0.5	0.3

Typical Examples

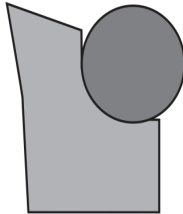
Reciprocating ✓ Rotary ✗ Oscillating ✓ Helix ✓



WTV

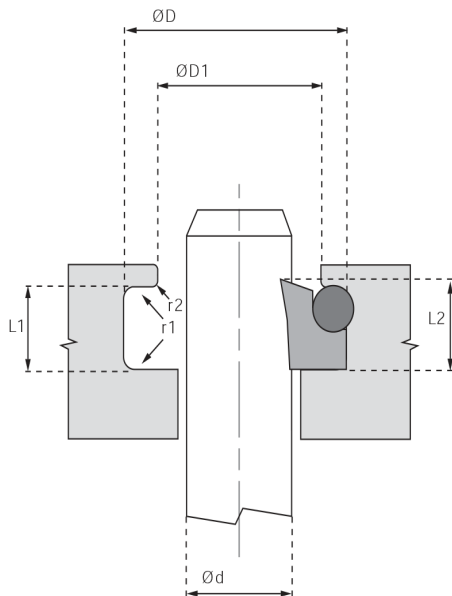
Rod Wipers

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

Ød	ØD	L1
0.1 - 0.25 μmRa	≤ 12.5	$\leq 3.2 \mu\text{mRa}$

Tolerances

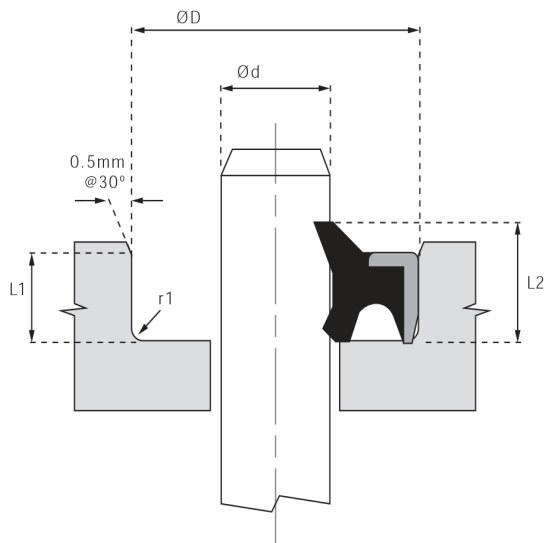
Ød	ØD	L1
Refer seal specs' for d Dia	H8	+ 0.3 - 0

Chamfer Radii

r1	C
0.3	0.5 @ 30°

Typical Examples

Reciprocating Rotary Oscillating Helix

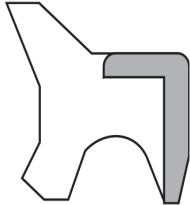




DKBI

Rod Wipers

Rod wipers

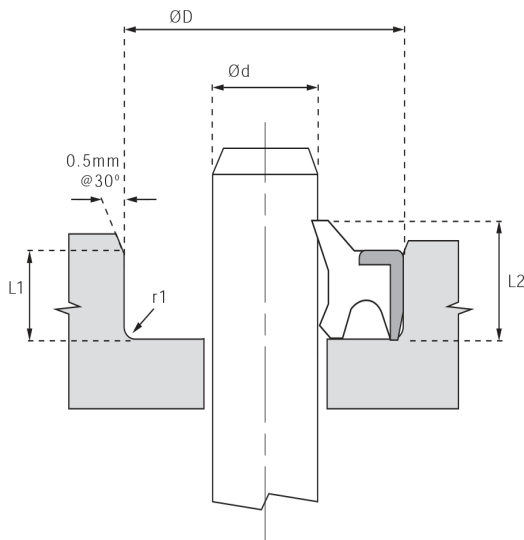


Key Features

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	$\leq 3.2 \mu\text{mRa}$

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

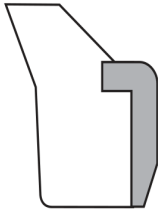
Reciprocating Rotary Oscillating Helix



DKI

Rod Wipers

Rod wipers

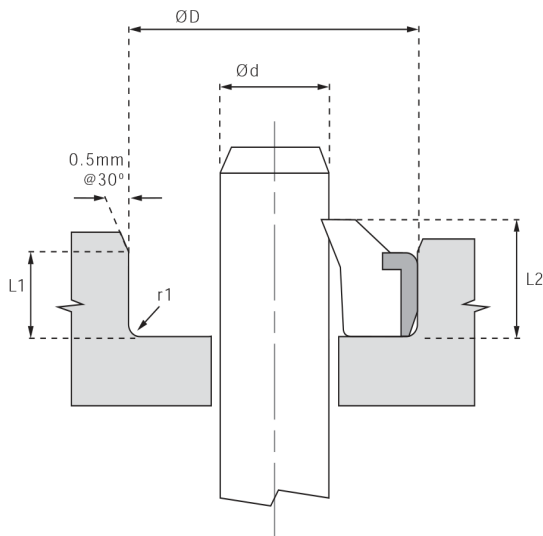


Key Features

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	$\leq 3.2 \mu\text{mRa}$

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



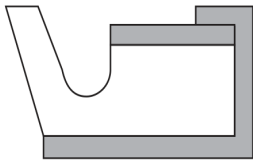
DKIY

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

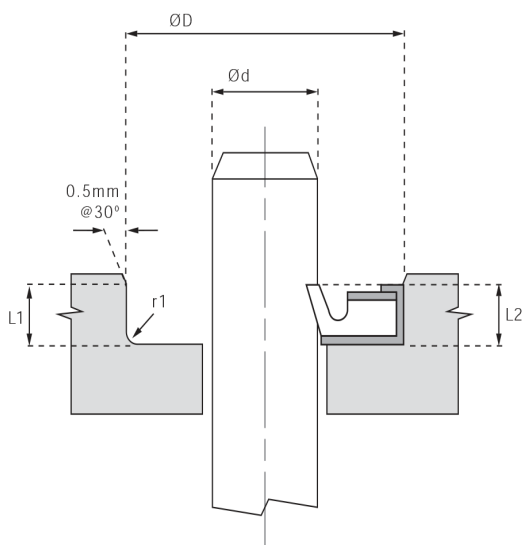
$\text{\O}d$	$\text{\O}D$	L1
Refer seal	H8	+ 0.2
specs' for d Dia		- 0.0

Chamfer Radii

r1	C
0.3	0.5 @ 30°

Typical Examples

Reciprocating Rotary Oscillating Helix





MCR

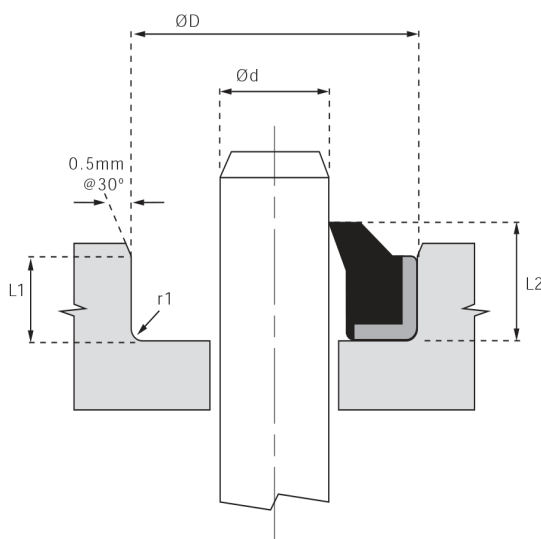
Rod Wipers

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

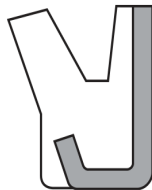
Reciprocating Rotary Oscillating Helix



MCU

Rod Wipers

Rod wipers

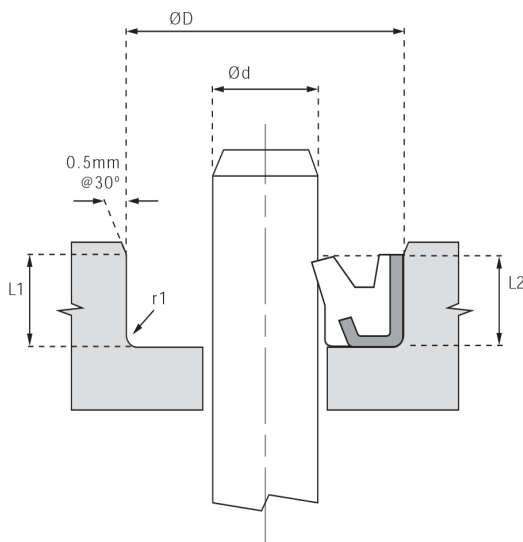


Key Features

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

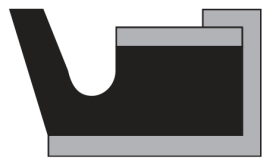
Reciprocating ✓ Rotary ✓ Oscillating ✗ Helix ✗



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	

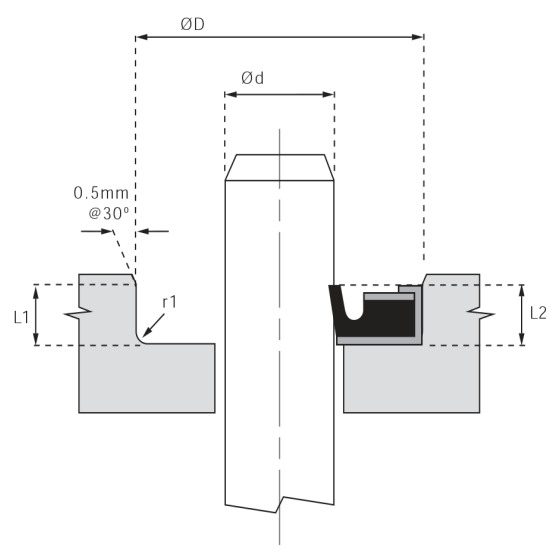
Speed	
3.0m/sec	
9.0/sec	

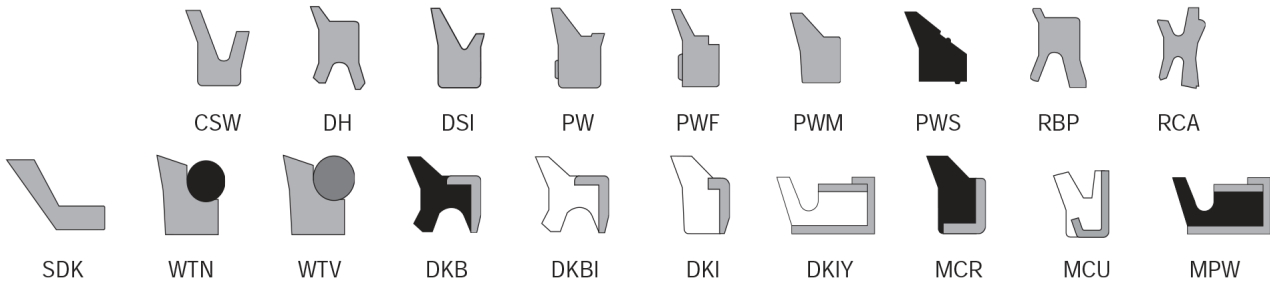
Surface Finish μmRa		
$\varnothing d$	$\varnothing D$	L1
0.1 - 0.25 μmRa	≤ 12.5	$\leq 3.2 \mu\text{mRa}$

Tolerances		
$\varnothing d$	$\varnothing D$	L1
Refer seal specs' for d Dia	H8	+ 0.2 - 0.0

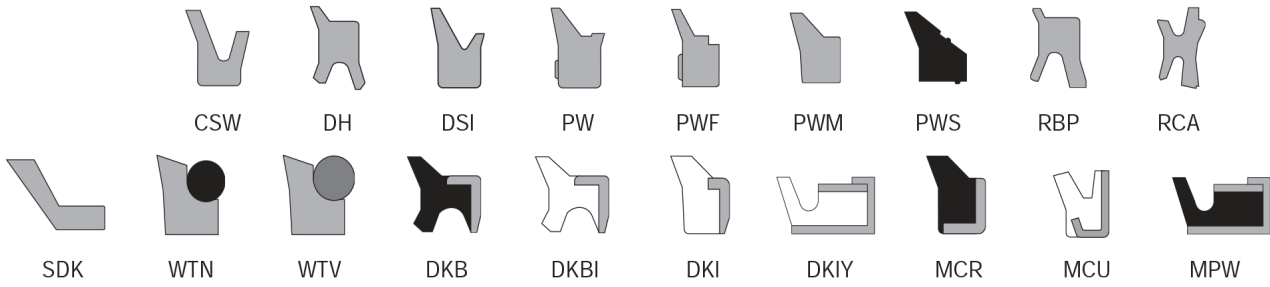
Chamfer Radii	
r1	C
0.3	0.5 @ 30°

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

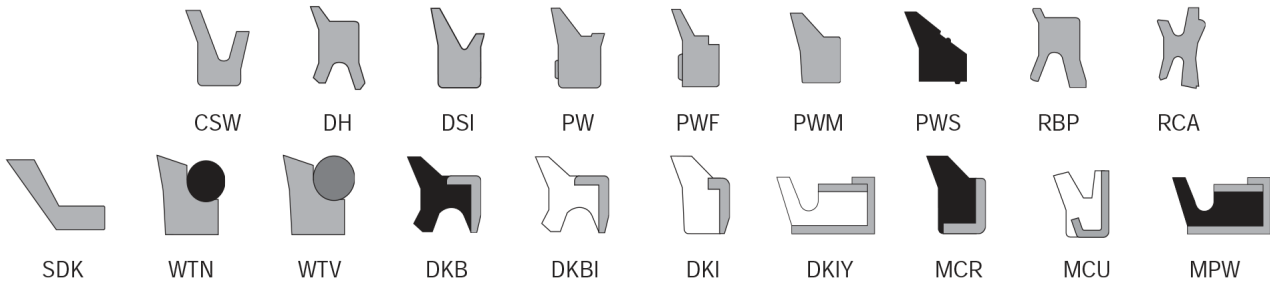




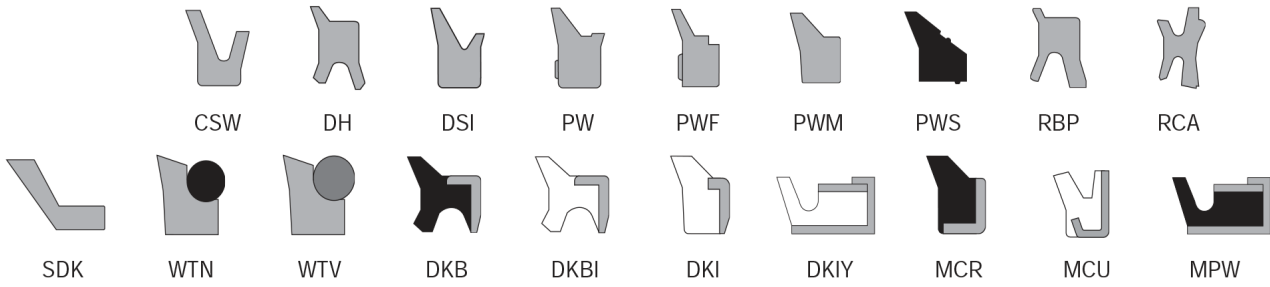
ID	OD	L1	L2	OD2	OD3	Product Name
3.00	8.80	4.50	5.20	5.00	1.20	RBP-003008-045
4.00	7.00	2.70	2.80	5.40	1.00	RBP-004007-027
4.00	8.80	4.50	5.20	6.00	1.20	RBP-004008-045
4.00	12.00	3.00	5.00	9.00	0.00	PW-004012-030
4.00	12.00	4.00	7.00	10.00	1.00	PWF-004012-040
5.00	8.00	2.30	2.80	6.20	1.00	RBP-005008-027
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	16.80	4.50	5.20	13.00	1.20	RBP-010016-045
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



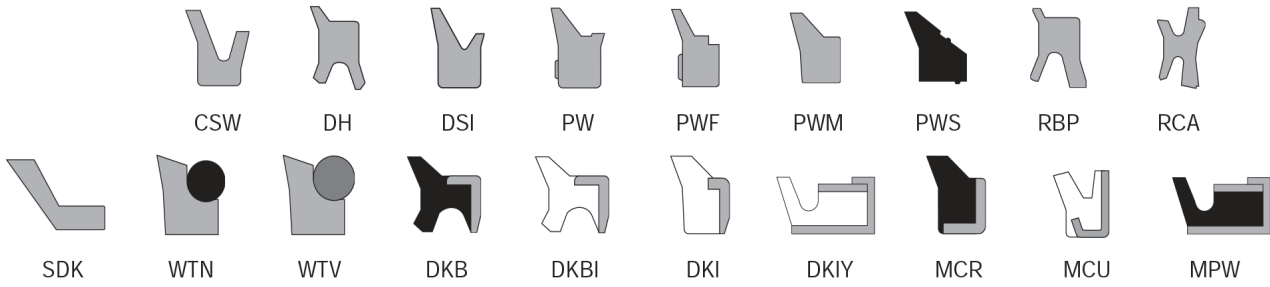
ID	OD	L1	L2	OD2	OD3	Product Name
11.20	21.00	5.00	7.00	0.00	0.00	DKI-011021-050
12.00	16.50	3.70	4.00	13.70	1.20	RBP-012016-037
12.00	18.00	3.50	0.00	0.00	0.00	MCR-012018-035
12.00	18.00	4.00	4.80	14.50	1.20	RBP-012018-040
12.00	18.60	3.80	5.00	15.00	0.00	PW-012018-038
12.00	18.80	5.00	5.00	13.50	0.00	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	21.00	3.50	0.00	0.00	0.00	MCR-015021-035
15.00	21.00	5.00	5.00	0.00	0.00	MCU-015021-050



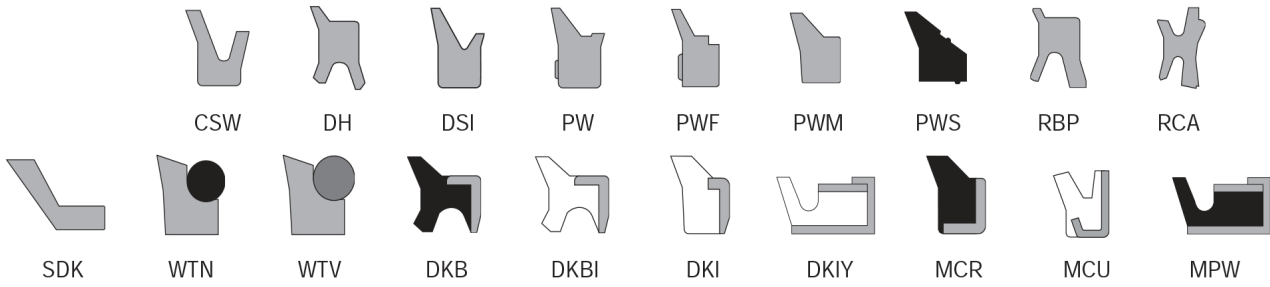
ID	OD	L1	L2	OD2	OD3	Product Name
15.00	21.60	3.80	5.00	0.00	0.00	PW-015021-038
15.00	21.80	5.00	5.00	0.00	0.00	WTN-015021-050
15.00	23.00	4.00	7.00	0.00	0.00	PWF-015023-040
15.00	25.00	5.00	8.00	0.00	0.00	MCR-015025-050
15.00	27.00	5.00	7.00	0.00	0.00	PW-015027-050
16.00	20.50	3.70	4.00	18.50	0.00	RBP-016020-037
16.00	22.00	3.00	4.00	0.00	0.00	MCR-016022-030
16.00	22.00	4.00	5.00	0.00	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	1.20	3.00	0.00	0.00	SDK-018026-012
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



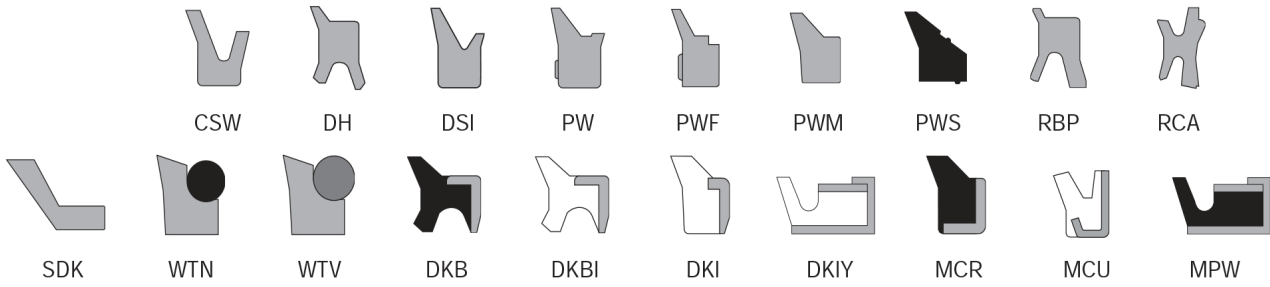
ID	OD	L1	L2	OD2	OD3	Product Name
18.00	26.00	5.00	6.00	0.00	0.00	RBP-018026-050
18.00	26.00	10.50	11.00	0.00	0.00	RCA-018026-110
18.00	26.60	5.30	7.00	0.00	0.00	PW-018026-053
18.00	28.00	4.50	7.00	0.00	0.00	DH-018028-055
18.00	28.00	5.00	7.00	0.00	0.00	MCR-018028-050
18.00	28.00	6.00	6.50	0.00	0.00	RBP-018028-060
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	3.40	5.00	0.00	0.00	PW-020026-034
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



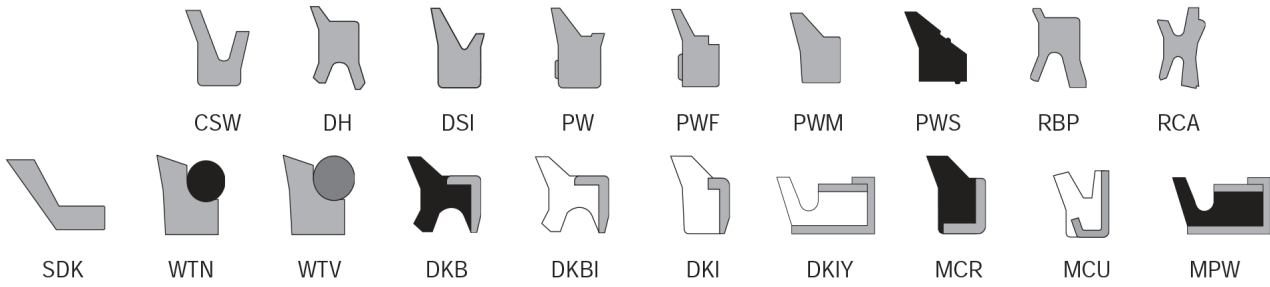
ID	OD	L1	L2	OD2	OD3	Product Name
20.00	32.00	6.00	9.00	0.00	0.00	DKBI-020032-060
20.00	33.00	6.00	8.50	0.00	0.00	CSW-020033-060
20.00	35.00	7.00	10.00	0.00	0.00	MCR-020035-070
22.00	27.00	4.00	4.60	0.00	0.00	RBP-022027-040
22.00	28.00	3.50	7.00	0.00	0.00	DH-022028-040
22.00	28.00	4.00	5.00	0.00	0.00	RBP-022028-040
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



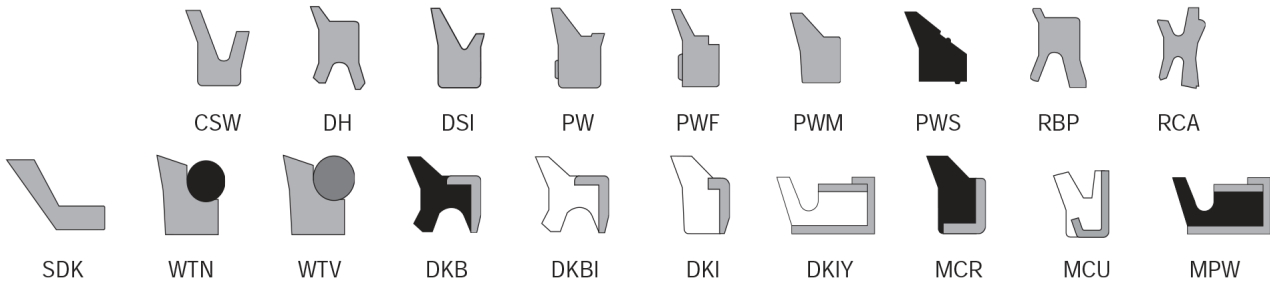
ID	OD	L1	L2	OD2	OD3	Product Name
25.00	31.00	5.00	7.00	0.00	0.00	MCR-025031-050
25.00	31.80	5.00	5.00	0.00	0.00	WTN-025031-050
25.00	32.00	5.00	8.00	0.00	0.00	MCR-025032-050
25.00	32.00	7.00	7.00	0.00	0.00	MCU-025032-070
25.00	32.50	1.60	3.00	0.00	0.00	SDK-025032-016
25.00	33.00	4.00	6.00	0.00	0.00	DH-025033-050
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



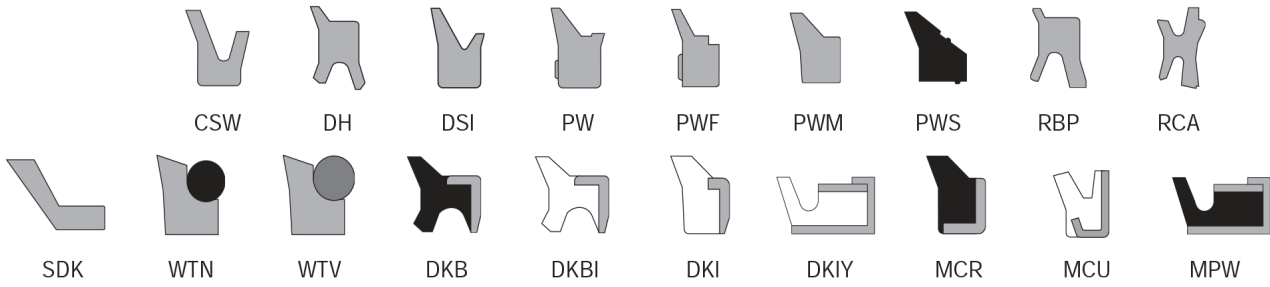
ID	OD	L1	L2	OD2	OD3	Product Name
28.00	36.60	5.30	7.00	31.00	0.00	PW-028036-053
28.00	38.00	5.00	8.00	0.00	0.00	MCR-028038-050
28.00	38.00	7.00	7.50	0.00	0.00	RBP-028038-070
28.00	38.00	7.00	10.00	0.00	0.00	MCR-028038-070
28.00	40.00	6.00	9.00	0.00	0.00	DKI-028040-060
28.00	40.00	6.00	9.00	0.00	0.00	DKB-028040-060
28.00	40.00	7.00	10.00	0.00	0.00	MCR-028040-070
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	5.80	0.00	0.00	RBP-030038-050
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



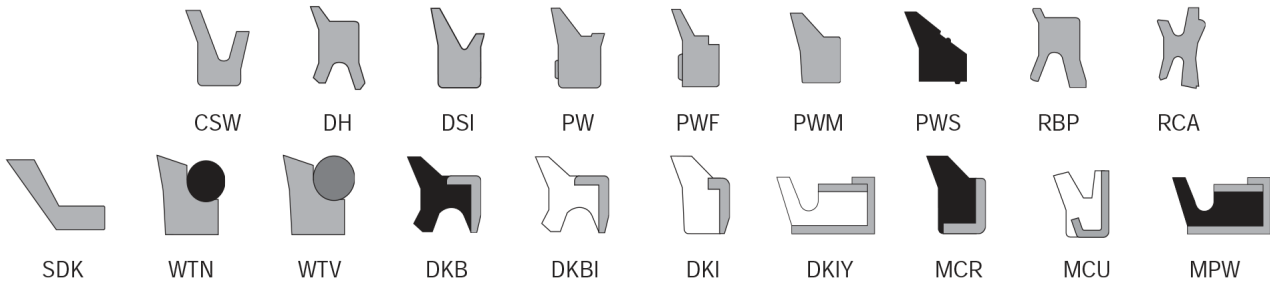
ID	OD	L1	L2	OD2	OD3	Product Name
31.00	39.60	5.30	7.00	0.00	0.00	PW-031039-053
31.50	44.00	7.00	10.00	0.00	0.00	DKI-031044-070
32.00	37.50	4.55	5.00	0.00	0.00	RBP-032037-045
32.00	38.80	5.00	5.00	0.00	0.00	WTN-032038-050
32.00	39.50	1.60	3.00	0.00	0.00	SDK-032039-016
32.00	40.00	3.70	5.00	0.00	0.00	PW-032040-037
32.00	40.00	4.00	7.00	0.00	0.00	PWF-032040-040
32.00	40.00	4.00	7.00	0.00	0.00	MCR-032040-040
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



ID	OD	L1	L2	OD2	OD3	Product Name
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	DKYI-035045-060
35.00	45.00	6.00	7.50	0.00	0.00	RBP-035045-070
35.00	45.00	7.00	10.00	0.00	0.00	MCU-035045-070
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

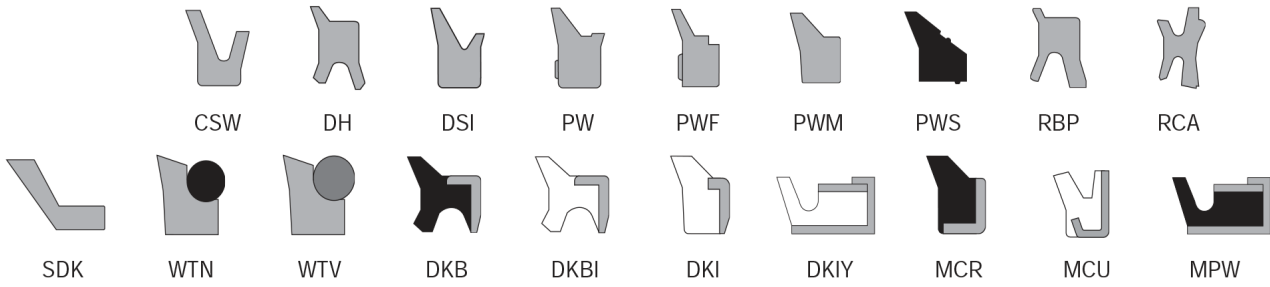


ID	OD	L1	L2	OD2	OD3	Product Name
40.00	47.50	1.60	3.00	0.00	0.00	SDK-040047-016
40.00	48.00	4.00	4.00	0.00	0.00	MCR-040048-040
40.00	48.00	4.00	7.00	0.00	0.00	PWF-040048-040
40.00	48.00	5.00	6.50	0.00	0.00	DH-040048-060
40.00	48.60	5.30	7.00	43.00	0.00	PW-040048-053
40.00	50.00	4.00	4.00	0.00	0.00	MPW-040050-040
40.00	50.00	5.00	6.50	0.00	0.00	DH-040050-060
40.00	50.00	5.00	8.00	0.00	0.00	MCR-040050-050
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	KPS-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

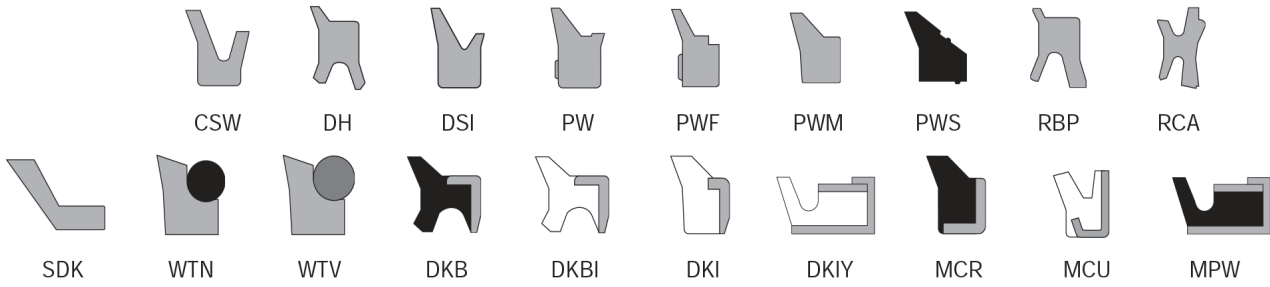


ID	OD	L1	L2	OD2	OD3	Product Name
45.00	55.00	5.00	7.00	0.00	0.00	MCR-045055-050
45.00	55.00	6.00	6.00	0.00	0.00	DKYI-045055-060
45.00	55.00	7.00	7.50	0.00	0.00	RBP-045055-070
45.00	55.00	7.00	8.00	0.00	0.00	DSI-045055-070
45.00	55.00	7.00	10.00	0.00	0.00	MCR-045055-070
45.00	55.00	12.00	12.50	0.00	0.00	RCA-045055-125
45.00	55.60	5.30	7.00	0.00	0.00	PW-045055-053
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
50.00	60.00	4.00	4.00	0.00	0.00	MPW-050060-040

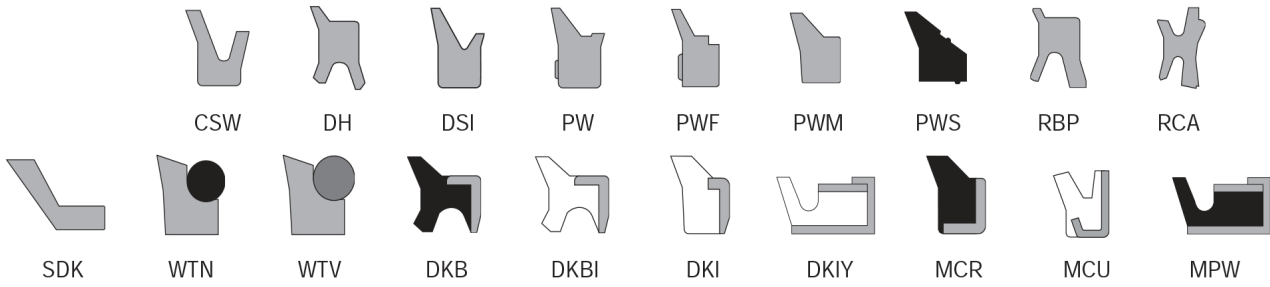
Rod Wipers



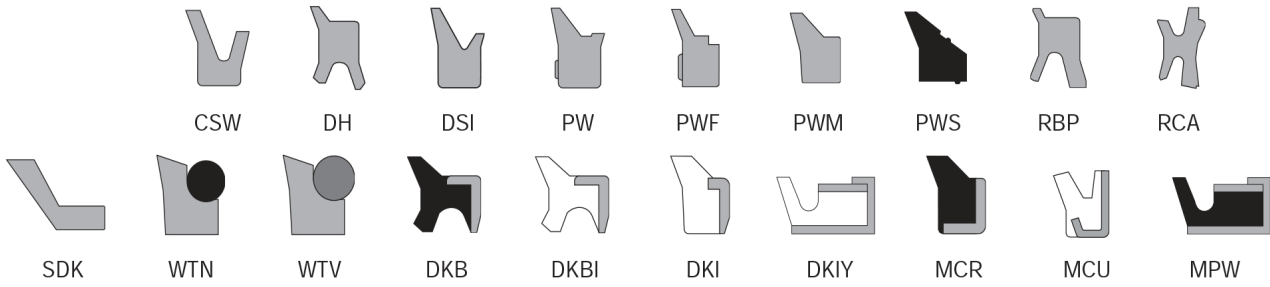
ID	OD	L1	L2	OD2	OD3	Product Name
50.00	60.00	5.00	5.00	0.00	0.00	DKIY-050060-050
50.00	60.00	5.00	8.00	0.00	0.00	MCR-050060-050
50.00	60.00	6.00	6.00	0.00	0.00	DKIY-050060-060
50.00	60.00	7.00	8.00	0.00	0.00	DSI-050060-070
50.00	60.00	7.00	10.00	0.00	0.00	MCR-050060-070
50.00	60.00	7.10	12.00	0.00	0.00	PW-050060-071
50.00	60.00	12.20	12.50	0.00	0.00	RCA-050060-125
50.00	60.60	5.30	7.00	0.00	0.00	PW-050060-053
50.00	62.00	6.00	9.00	0.00	0.00	PWM-050062-060
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
50.00	62.70	5.30	9.00	0.00	0.00	PWS-050062-053
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	DKIY-050064-080
50.00	65.00	5.00	5.00	0.00	0.00	MCU-050065-050
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	DKIY-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
50.00	72.00	8.00	11.00	0.00	0.00	DKB-050072-080
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
55.00	63.00	4.00	7.00	0.00	0.00	PWF-055063-040



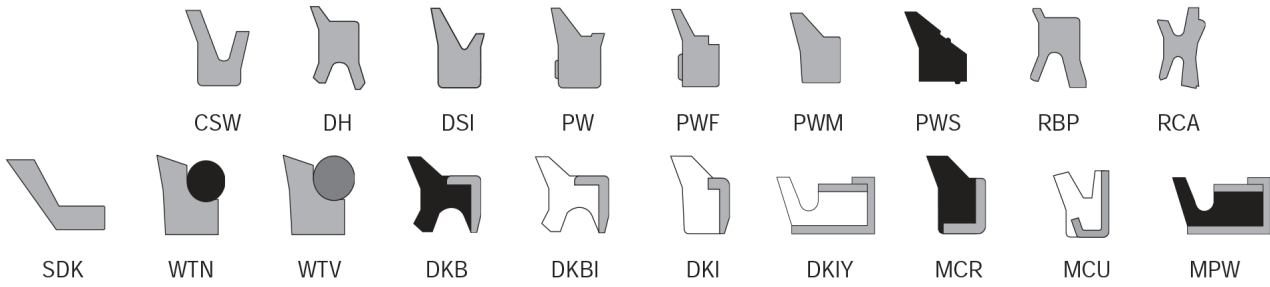
ID	OD	L1	L2	OD2	OD3	Product Name
55.00	63.00	5.00	6.50	59.00	0.00	DH-055063-060
55.00	63.00	7.00	10.00	0.00	0.00	MCR-055063-070
55.00	63.60	5.30	7.00	0.00	0.00	PW-055063-053
55.00	65.00	2.15	4.00	0.00	0.00	SDK-055065-021
55.00	65.00	4.00	0.00	0.00	0.00	MCR-055065-040
55.00	65.00	5.00	5.00	0.00	0.00	DKYI-055065-050
55.00	65.00	5.00	7.00	0.00	0.00	MCR-055065-050
55.00	65.00	6.00	6.00	0.00	0.00	DKYI-055065-060
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



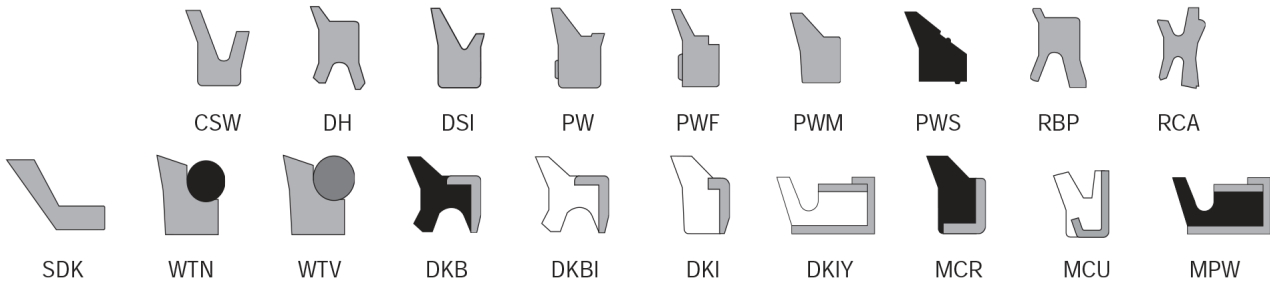
ID	OD	L1	L2	OD2	OD3	Product Name
58.00	66.00	4.00	7.00	0.00	0.00	PWF-058066-040
59.50	68.00	5.10	7.00	0.00	0.00	PW-059068-051
60.00	66.80	5.00	5.00	0.00	0.00	WTN-060066-050
60.00	68.00	4.00	7.00	0.00	0.00	PWF-060068-040
60.00	68.00	5.00	6.50	0.00	0.00	DH-060068-060
60.00	68.60	5.30	7.00	0.00	0.00	PW-060068-053
60.00	70.00	0.00	0.00	0.00	0.00	MCU-060070-060
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



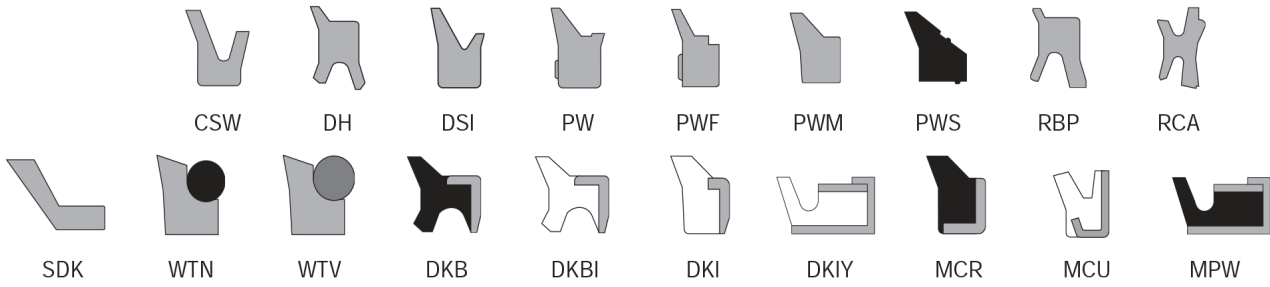
ID	OD	L1	L2	OD2	OD3	Product Name
63.00	73.00	5.00	7.00	0.00	0.00	MCR-063073-050
63.00	73.00	6.30	10.00	0.00	0.00	PW-063073-063
63.00	73.60	5.30	7.00	0.00	0.00	PW-063073-053
63.00	75.00	7.00	10.00	0.00	0.00	MCR-063075-070
63.00	75.00	12.50	13.00	0.00	0.00	RCA-063075-130
63.00	76.00	6.00	8.50	0.00	0.00	CSW-063076-060
63.00	77.00	0.00	0.00	0.00	0.00	MCU-063077-080
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	DKYI-065080-060
65.00	85.00	5.00	5.00	0.00	0.00	DKYI-065085-050
65.00	85.00	6.00	6.00	0.00	0.00	DKYI-065085-060



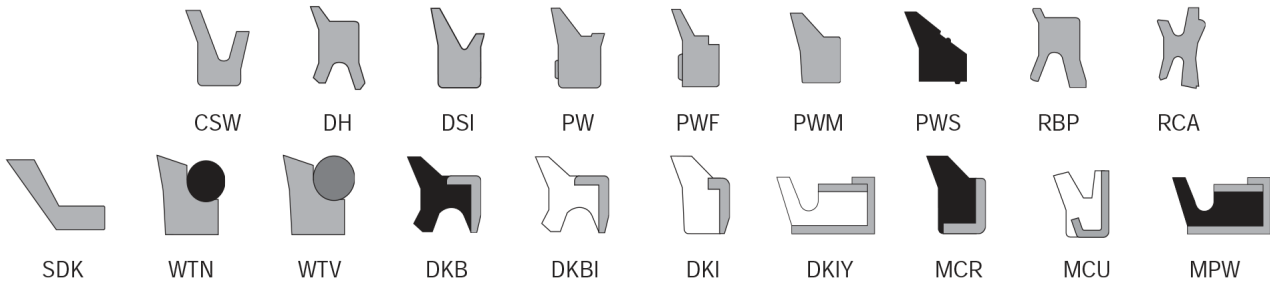
ID	OD	L1	L2	OD2	OD3	Product Name
67.00	75.00	5.00	6.50	0.00	0.00	DH-067075-060
67.00	76.60	5.50	7.00	0.00	0.00	PW-067076-055
67.00	81.00	8.00	11.00	0.00	0.00	DKI-067081-080
68.50	78.00	4.80	8.00	0.00	0.00	PWM-068078-048
70.00	76.00	4.30	6.00	0.00	0.00	PWM-070076-043
70.00	78.00	4.00	7.00	0.00	0.00	PWF-070078-040
70.00	78.60	5.30	7.00	0.00	0.00	PW-070078-053
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	0.00	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



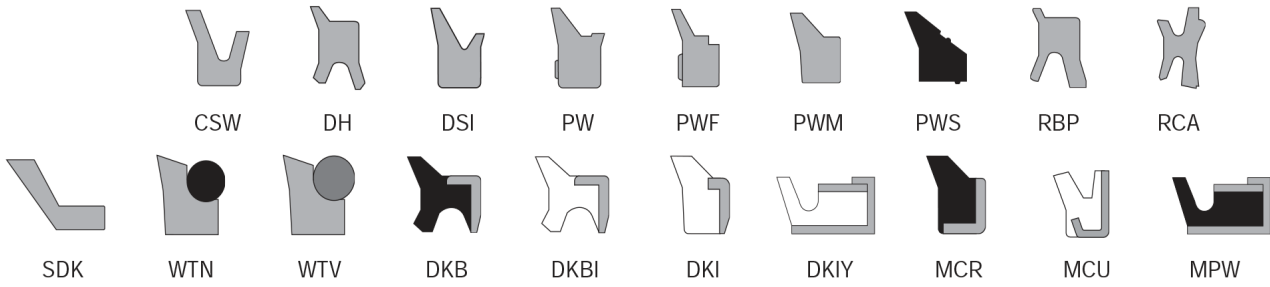
ID	OD	L1	L2	OD2	OD3	Product Name
71.00	85.00	8.00	11.00	0.00	0.00	DKI-071085-080
71.00	86.00	5.00	0.00	0.00	0.00	MCU-071086-050
72.00	80.60	5.30	7.00	0.00	0.00	PWM-072080-053
72.00	82.00	7.00	10.00	0.00	0.00	MCR-072082-070
73.00	79.80	5.00	5.00	0.00	0.00	WTN-073079-050
73.00	81.60	5.30	7.00	0.00	0.00	PW-073081-053
73.00	83.60	7.30	10.00	0.00	0.00	PW-073083-073
74.50	83.50	5.10	7.00	0.00	0.00	PW-074083-051
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



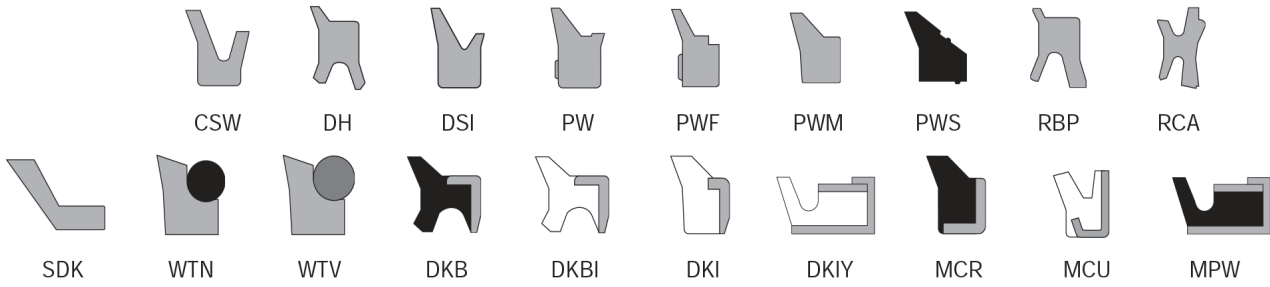
ID	OD	L1	L2	OD2	OD3	Product Name
80.00	88.00	4.00	7.00	0.00	0.00	PWF-080088-040
80.00	88.00	7.00	10.00	0.00	0.00	MCR-080088-070
80.00	88.60	5.30	7.00	0.00	0.00	PW-080088-053
80.00	88.80	6.00	0.00	0.00	0.00	WTV-080088-060
80.00	88.80	6.00	6.00	0.00	0.00	WTN-080088-060
80.00	90.00	0.00	0.00	0.00	0.00	MCU-080090-045
80.00	90.00	2.15	4.00	0.00	0.00	SDK-080090-021
80.00	90.00	2.90	4.00	0.00	0.00	SDK-080090-029
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	90.60	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	DKYI-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



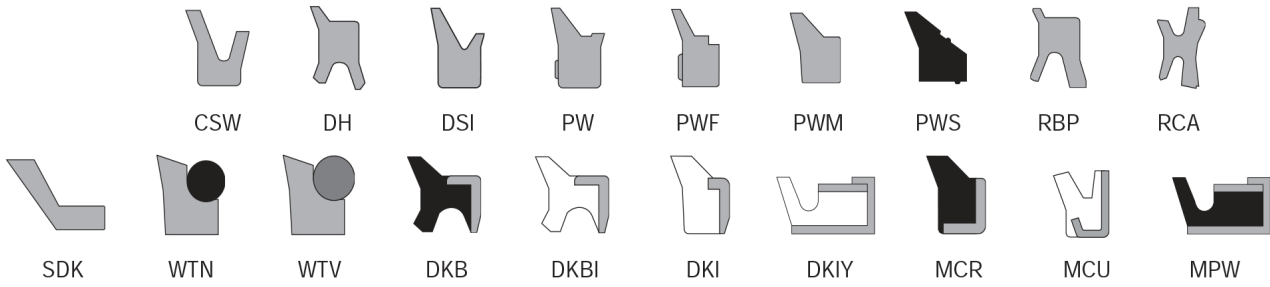
ID	OD	L1	L2	OD2	OD3	Product Name
85.00	93.60	5.30	7.00	0.00	0.00	PW-085093-053
85.00	93.80	6.00	6.00	0.00	0.00	WTN-085093-060
85.00	95.00	2.15	4.00	0.00	0.00	SDK-085095-020
85.00	95.00	5.00	5.00	0.00	0.00	MCU-085095-050
85.00	95.00	6.00	8.00	0.00	0.00	DH-085095-070
85.00	97.20	7.10	10.00	0.00	0.00	PW-085097-071
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	10.00	0.00	0.00	MCR-090100-070
90.00	102.00	6.00	10.00	0.00	0.00	PW-090102-060



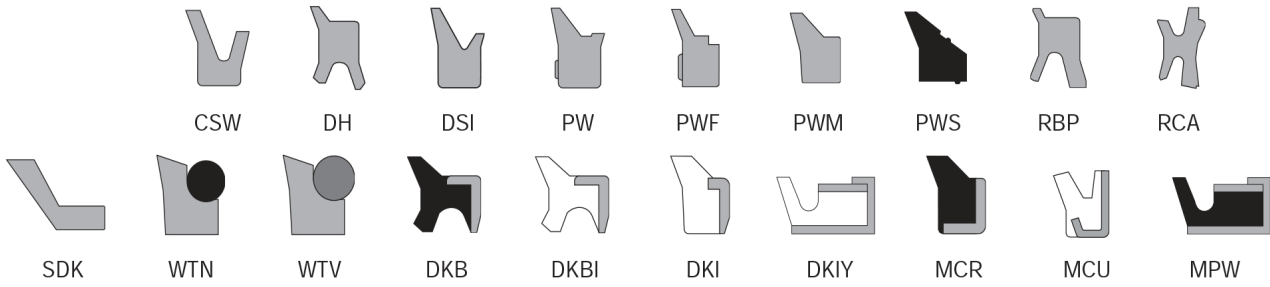
ID	OD	L1	L2	OD2	OD3	Product Name
90.00	102.20	7.10	10.00	0.00	0.00	PW-090102-071
90.00	102.20	8.10	92.00	0.00	0.00	WTN-090102-081
90.00	102.70	5.30	9.00	0.00	0.00	PWS-090102-053
90.00	103.00	6.00	8.50	101.50	0.00	CSW-090103-060
90.00	103.00	8.00	9.50	0.00	0.00	DSI-090103-080
90.00	104.00	8.00	8.00	0.00	0.00	MCU-090104-080
90.00	104.00	8.00	11.00	0.00	0.00	DKBI-090104-080
90.00	104.00	8.00	11.00	0.00	0.00	DKI-090104-080
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



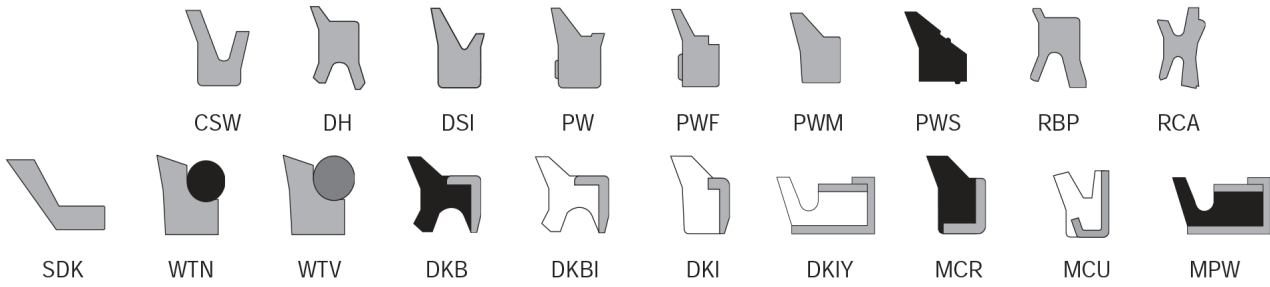
ID	OD	L1	L2	OD2	OD3	Product Name
95.00	105.00	10.00	14.00	0.00	0.00	PW-095105-100
95.00	107.20	7.10	10.00	0.00	0.00	PW-095107-071
95.00	107.70	5.30	9.00	0.00	0.00	PWS-095107-053
95.00	108.00	8.00	9.50	0.00	0.00	DSI-095108-080
95.00	109.00	8.00	11.50	0.00	0.00	DKBI-095109-080
95.00	110.00	0.00	0.00	0.00	0.00	MPW-095110-060
95.00	110.00	4.00	4.00	0.00	0.00	MPW-095110-040
95.00	110.00	9.50	9.50	0.00	0.00	DKIY-095110-095
95.00	115.00	9.50	9.50	0.00	0.00	DKIY-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



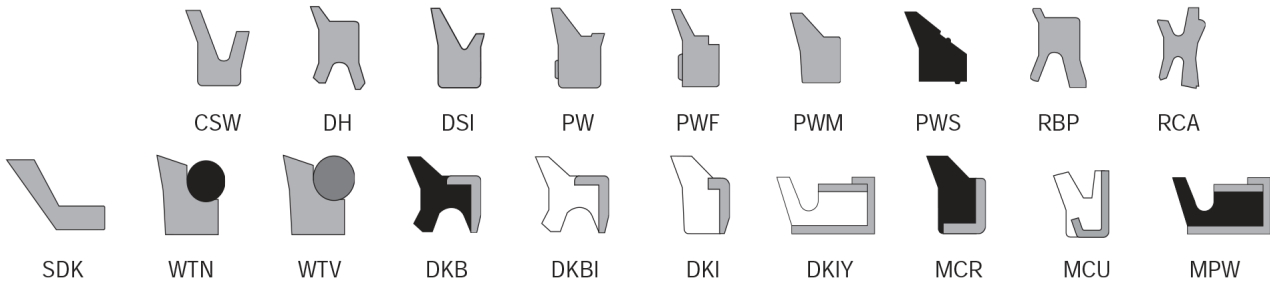
ID	OD	L1	L2	OD2	OD3	Product Name
100.00	115.00	4.00	4.00	0.00	0.00	MPW-100115-040
100.00	115.00	4.00	4.00	0.00	0.00	DKYI-100115-040
100.00	115.00	6.00	6.00	0.00	0.00	MCU-100115-060
100.00	115.00	7.00	7.00	0.00	0.00	MCU-100115-070
100.00	115.00	8.00	8.00	0.00	0.00	DKYI-100115-080
100.00	115.00	9.50	14.00	0.00	0.00	PW-100115-095
100.00	116.00	8.00	0.00	0.00	0.00	MCU-100116-080
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	DKYI-100120-060
100.00	120.00	8.00	8.00	0.00	0.00	DKYI-100120-080
100.00	120.00	9.50	9.50	0.00	0.00	DKYI-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	DKYI-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	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



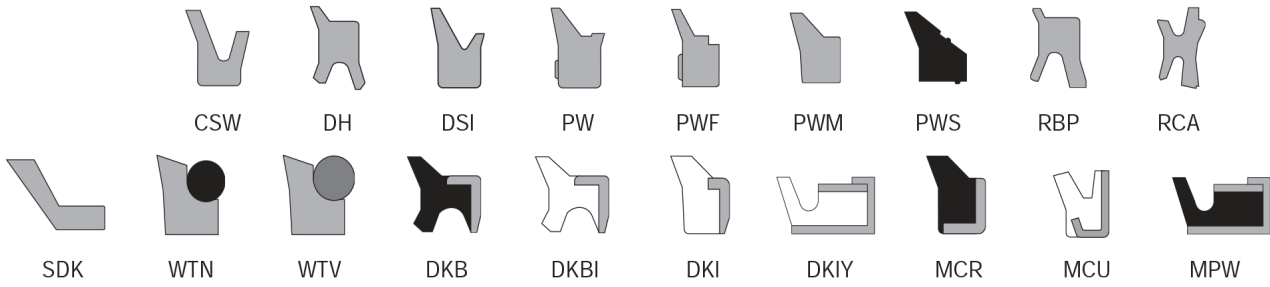
ID	OD	L1	L2	OD2	OD3	Product Name
110.00	118.60	5.30	7.00	0.00	0.00	PW-110118-053
110.00	118.80	6.00	6.00	0.00	0.00	WTN-110118-060
110.00	120.00	6.00	8.00	115.00	0.00	DH-110120-070
110.00	120.00	7.00	10.00	0.00	0.00	MCR-110120-070
110.00	122.00	5.50	10.00	0.00	0.00	PWF-110122-055A
110.00	122.00	5.50	10.00	0.00	0.00	PWF-110122-055
110.00	122.20	7.10	10.00	0.00	0.00	PW-110122-071
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



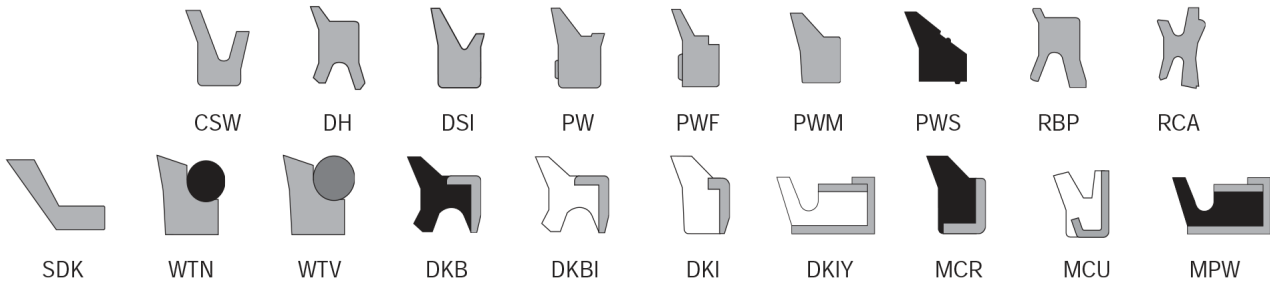
ID	OD	L1	L2	OD2	OD3	Product Name
115.00	125.00	7.00	10.00	0.00	0.00	MCR-115125-070
115.00	127.00	5.50	10.00	0.00	0.00	PWF-115127-055
115.00	127.00	10.00	14.00	0.00	0.00	PW-115127-100
115.00	127.20	7.10	10.00	0.00	0.00	PW-115127-071
115.00	131.00	9.00	12.00	0.00	0.00	DKBI-115131-090
115.00	131.00	9.00	12.00	0.00	0.00	DKB-115131-090
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	5.50	10.00	0.00	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
120.00	135.00	0.00	0.00	0.00	0.00	DH-120135-085
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	DKYI-120135-080
120.00	135.00	9.50	9.50	0.00	0.00	DKYI-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	DKYI-120140-080
120.00	140.00	9.50	9.50	0.00	0.00	DKYI-120140-095



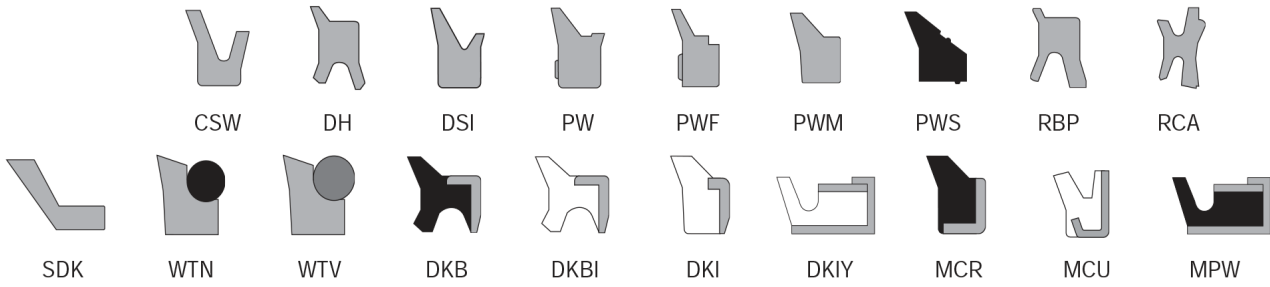
ID	OD	L1	L2	OD2	OD3	Product Name
120.00	140.00	10.00	10.00	0.00	0.00	MCU-120140-100
121.00	113.00	7.00	9.50	0.00	0.00	PW-121133-070
121.00	131.00	5.30	7.00	0.00	0.00	PWM-121131-053
125.00	133.60	5.30	7.00	0.00	0.00	PW-125133-053
125.00	133.80	6.00	6.00	0.00	0.00	WTN-125133-060
125.00	137.00	5.50	10.00	0.00	0.00	PWF-125137-055
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
125.00	140.00	4.00	0.00	0.00	0.00	MCU-125140-040
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



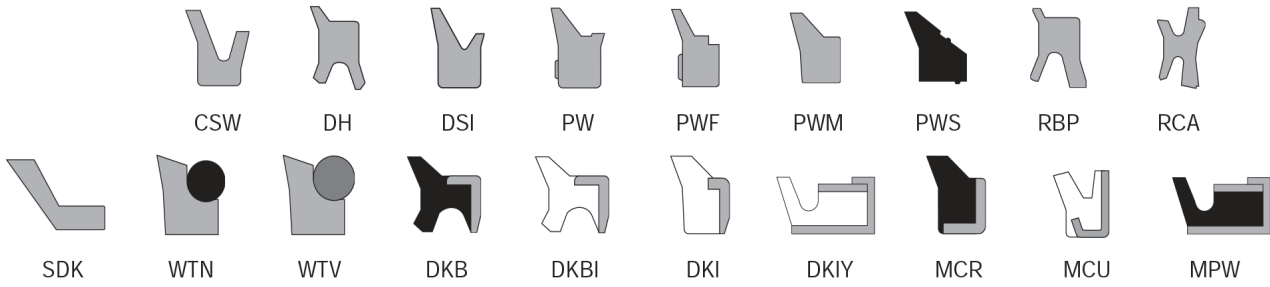
ID	OD	L1	L2	OD2	OD3	Product Name
135.00	147.20	7.10	10.00	0.00	0.00	PW-135147-071
135.00	150.00	8.00	11.50	0.00	0.00	DKBI-135150-080
135.00	150.00	9.00	12.00	0.00	0.00	MCR-135150-090
135.00	155.00	10.00	14.00	0.00	0.00	DKI-135155-100
136.00	146.00	5.50	7.50	0.00	0.00	DH-136146-065
136.00	149.00	7.00	9.50	0.00	0.00	DH-136149-080
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



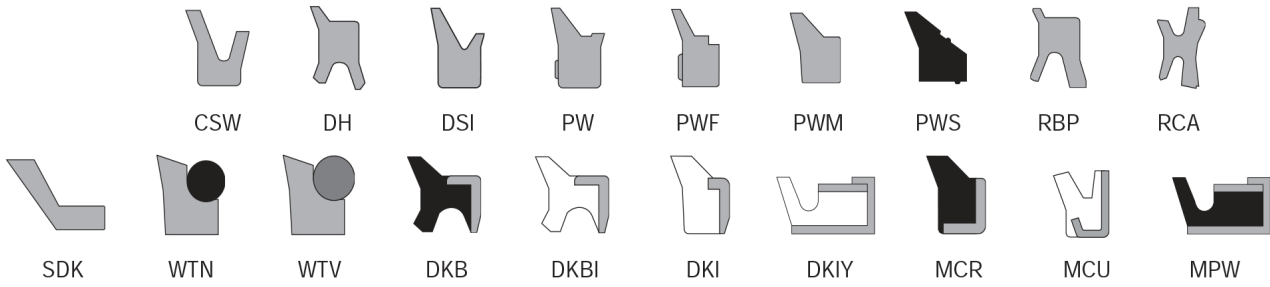
ID	OD	L1	L2	OD2	OD3	Product Name
146.00	158.00	6.30	8.00	0.00	0.00	PWM-146158-063
148.00	160.00	7.00	10.00	0.00	0.00	PW-148160-070
148.50	156.50	4.00	7.00	0.00	0.00	PWF-148156-040
149.50	158.50	5.10	7.00	0.00	0.00	PW-149158-051
150.00	158.00	5.30	7.00	0.00	0.00	PW-150158-053
150.00	162.00	5.50	10.00	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	DKYI-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



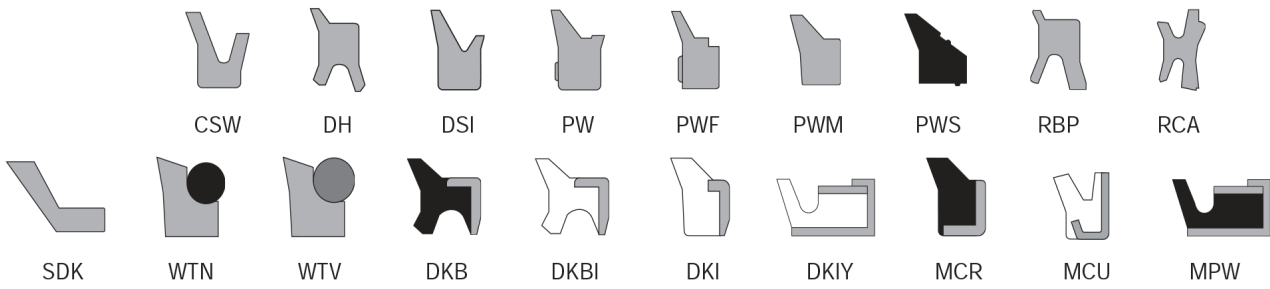
ID	OD	L1	L2	OD2	OD3	Product Name
163.00	175.20	7.10	10.00	0.00	0.00	PW-163175-071
165.00	178.00	9.50	0.00	172.00	0.00	DH-165178-080
165.00	179.00	7.00	9.50	0.00	0.00	DH-165179-080
165.00	180.00	8.00	12.00	0.00	0.00	MCR-165180-080
165.00	180.00	9.50	14.00	0.00	0.00	PW-165180-095
165.00	185.00	10.00	14.00	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	11.00	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



ID	OD	L1	L2	OD2	OD3	Product Name
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
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	0.00	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



ID	OD	L1	L2	OD2	OD3	Product Name
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
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



ID	OD	L1	L2	OD2	OD3	Product Name
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
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

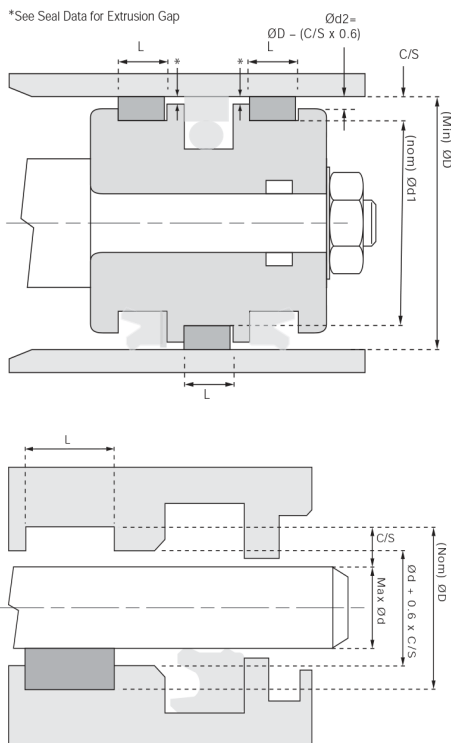
Bearings

Bearings



Key Features

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

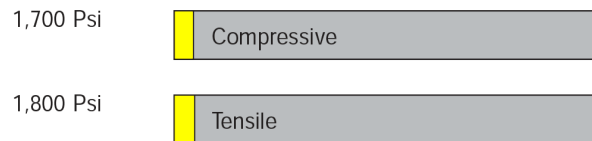


Design

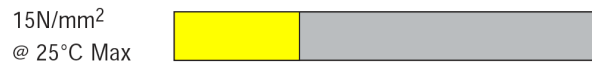
GT strip is designed for use with glide ring type piston and rod seals. Made from Bronze filled PTFE, the strip allows contaminate particles to embed in the non working surface helping to keep the main seal and cylinder bore/rod free from scoring. Bearing strip is designed to allow pressure relief to 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

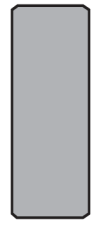
Piston	Ød = minØD – 2x c/s	H11
Rod	ØD = maxØd + 2x c/s	f9
L	-0.0 + 0.2	



B1

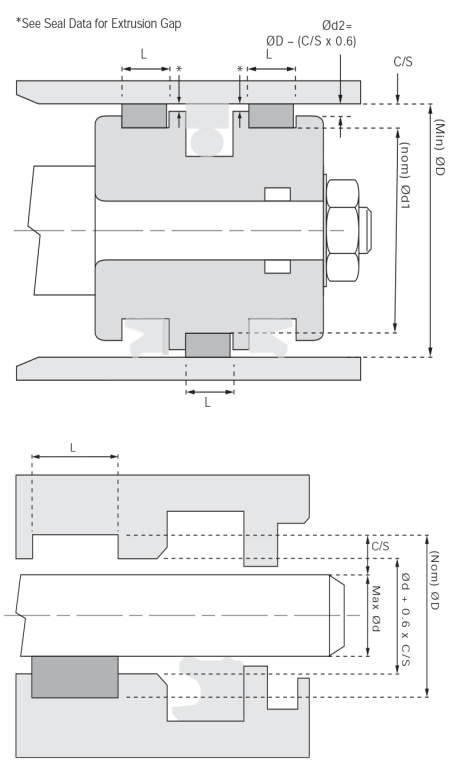
Bearings

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/mm ² @ 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	<table border="1"> <thead> <tr> <th></th> <th>ØD</th> <th>Ød</th> <th>L</th> </tr> </thead> <tbody> <tr> <td>Piston</td> <td>H9</td> <td>≤ 100mm +0 - 0.05 > 100mm +0 - 0.08</td> <td>-0 + 0.25</td> </tr> <tr> <td>Rod</td> <td>f8</td> <td>≤ 100mm -0 + 0.05 > 100mm -0 + 0.08</td> <td>-0 + 0.25</td> </tr> </tbody> </table>		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	
	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

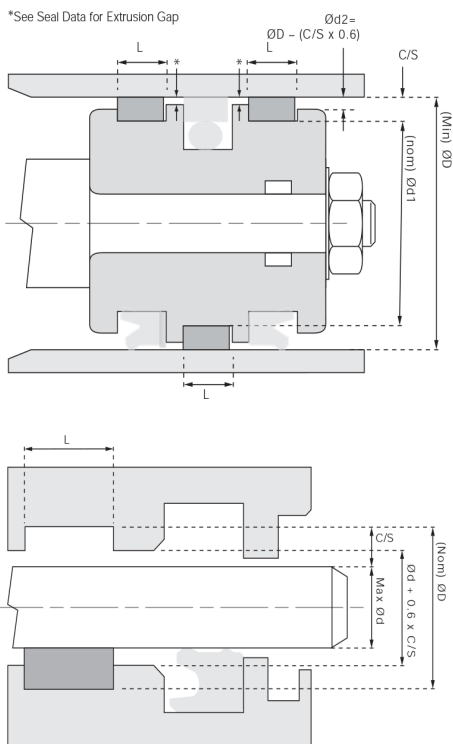
Bearings

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

	$\text{Ø}D$	$\text{Ø}d$	L
Piston	H8	+0 -0.05 -0 +0.25	
Rod	f7	-0 +0.05 -0 +0.25	



B8

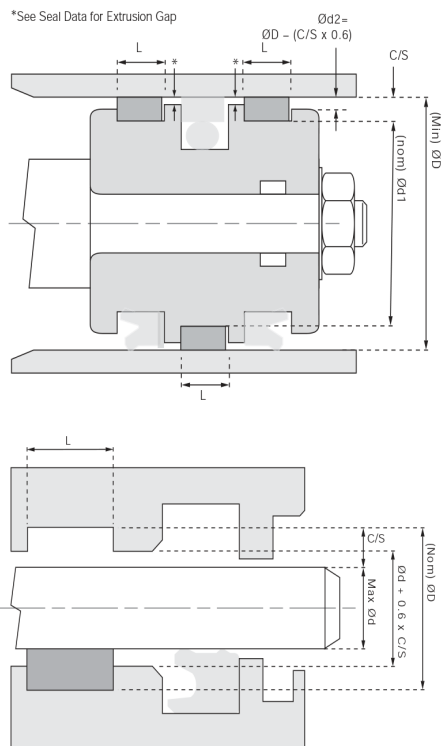
Bearings

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

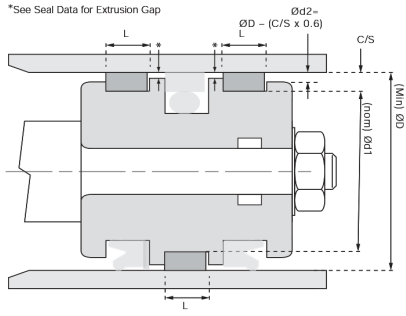
Dynamic 0.1 - 0.25 Optimum

Dynamic 0.1 - 0.4 Range

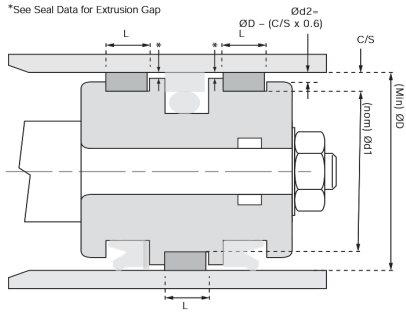
Static ≤2.6

Tolerances

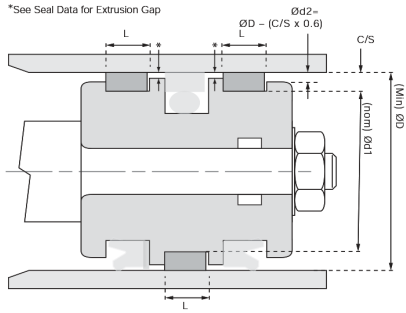
	ØD	Ød	L
Piston	H9	≤ 100mm +0 - 0.05	-0.00 +0.20
		> 100mm +0 - 0.08	
Rod	f8	≤ 100mm -0 + 0.05	-0.00 +0.20
		> 100mm -0 + 0.08	



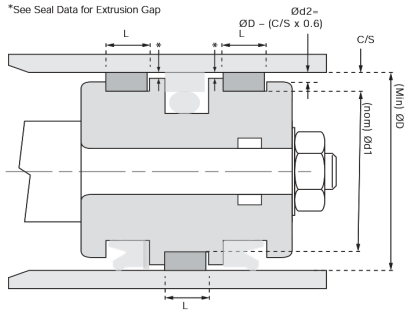
OD	ID	L1	C/S	Width	Product Name
0.00	0.00	0.00	0.00	0.00	B8-40300
1.50	0.00	0.00	1.50	3.20	GT-15032
1.50	0.00	0.00	0.00	5.60	GT-15056
1.50	0.00	0.00	1.50	6.30	GT-15063
1.55	0.00	0.00	1.55	4.00	GT-15540
2.00	0.00	0.00	2.00	6.30	GT-20063
2.00	0.00	0.00	2.00	8.10	GT-20081
2.00	0.00	0.00	2.00	9.70	GT-20097
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

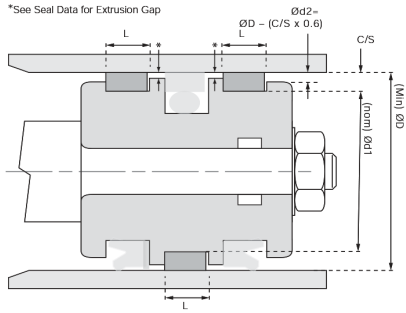


OD	ID	L1	C/S	Width	Product Name
36.00	32.00	8.00	0.00	0.00	B8-036032-080
36.00	32.00	9.60	0.00	0.00	B6-036032-096
36.00	32.00	20.00	0.00	0.00	B8-036032-200
38.00	32.00	10.00	0.00	0.00	B6-038032-100
38.00	34.00	8.00	0.00	0.00	B8-038034-080
39.00	35.00	9.60	0.00	0.00	B6-039035-096
39.00	35.00	25.00	0.00	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	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	39.00	14.50	0.00	0.00	B1-045039-145
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	8.00	0.00	0.00	B8-049045-081

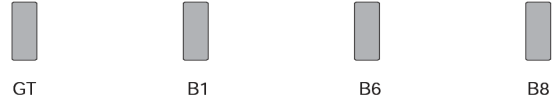
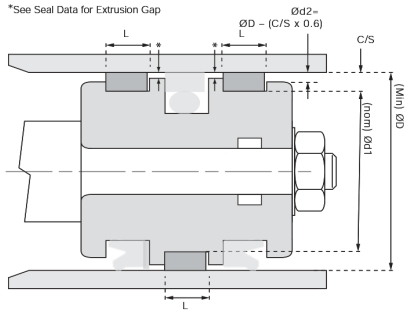


OD	ID	L1	C/S	Width	Product Name
49.00	45.00	25.00	0.00	0.00	B8-049045-250
50.00	43.40	12.60	0.00	0.00	B8-050043-126
50.00	44.00	5.00	0.00	0.00	B1-050044-050
50.00	45.00	0.00	0.00	0.00	B8-050045-130
50.00	45.00	5.60	0.00	0.00	B6-050045-056
50.00	45.00	7.00	0.00	0.00	B8-050045-070
50.00	45.00	9.70	0.00	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	10.20	0.00	0.00	B6-050046-102
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
54.00	48.00	9.60	0.00	0.00	B6-054048-096
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	8.10	0.00	0.00	B1-055050-081
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

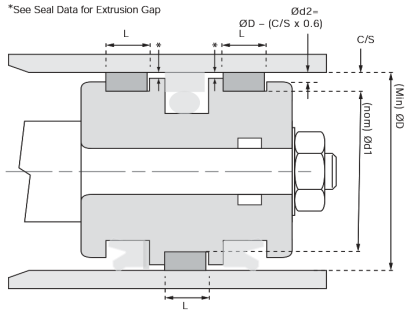




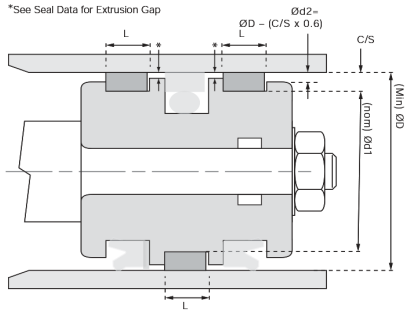
OD	ID	L1	C/S	Width	Product Name
56.00	50.00	12.80	0.00	0.00	B6-056050-128
56.00	50.00	25.00	0.00	0.00	B8-056050-250
56.00	51.00	15.00	0.00	0.00	B1-056051-150
58.00	50.00	30.00	0.00	0.00	B8-058050-300
60.00	54.00	12.50	0.00	0.00	B6-060054-125
60.00	54.00	12.80	0.00	0.00	B6-060054-128
60.00	55.00	0.00	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
62.00	56.00	25.00	0.00	0.00	B8-062056-250
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



OD	ID	L1	C/S	Width	Product Name
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
65.00	60.00	19.70	0.00	0.00	B8-065060-200
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	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

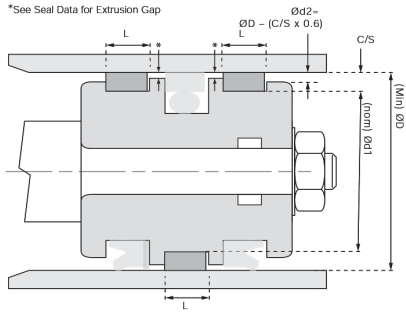


OD	ID	L1	C/S	Width	Product Name
70.00	65.00	15.00	0.00	0.00	B8-070065-150
70.00	65.00	20.00	0.00	0.00	B8-070065-200
70.00	65.00	20.50	0.00	0.00	B6-070065-205
70.00	65.00	30.00	0.00	0.00	B8-070065-300
70.00	66.00	10.00	0.00	0.00	B8-070066-100
70.00	66.00	10.20	0.00	0.00	B6-070066-102
71.00	60.00	11.00	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	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

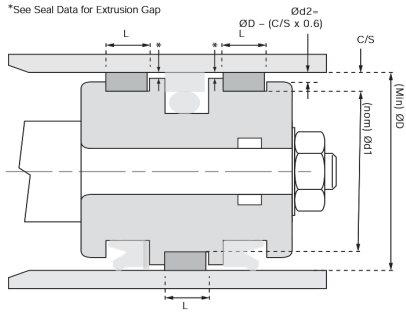


OD	ID	L1	C/S	Width	Product Name
80.00	74.00	25.00	0.00	0.00	B8-080074-250
80.00	74.00	30.00	0.00	0.00	B8-080074-300
80.00	75.00	0.00	0.00	0.00	B8-080075-056
80.00	75.00	0.00	0.00	0.00	B8-080075-097
80.00	75.00	13.00	0.00	0.00	B1-080075-130
80.00	75.00	15.00	0.00	0.00	B8-080075-150
80.00	75.00	20.00	0.00	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	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



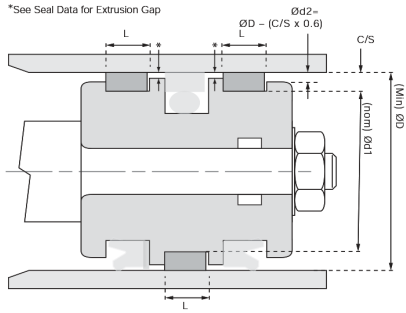


OD	ID	L1	C/S	Width	Product Name
90.00	84.00	10.00	0.00	0.00	B8-090084-100
90.00	84.00	12.50	0.00	0.00	B8-090084-125
90.00	84.00	12.80	0.00	0.00	B6-090084-128
90.00	84.00	15.00	0.00	0.00	B8-090084-150
90.00	84.00	15.00	0.00	0.00	B1-090084-150
90.00	84.00	20.00	0.00	0.00	B8-090084-200
90.00	84.00	25.00	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

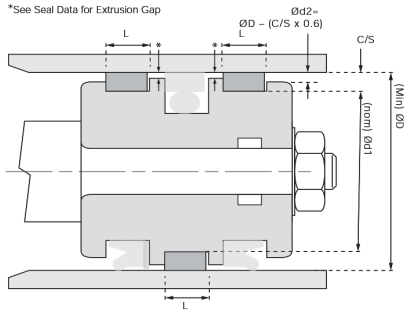


OD	ID	L1	C/S	Width	Product Name
100.00	94.00	12.80	0.00	0.00	B6-100094-128
100.00	94.00	15.00	0.00	0.00	B8-100094-150
100.00	94.00	22.40	0.00	0.00	B1-100094-225
100.00	94.00	25.00	0.00	0.00	B8-100094-250
100.00	94.00	30.00	0.00	0.00	B8-100094-300
100.00	95.00	5.60	0.00	0.00	B6-100095-056
100.00	95.00	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	B8-105100-097
105.00	100.00	0.00	0.00	0.00	B8-105100-150
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



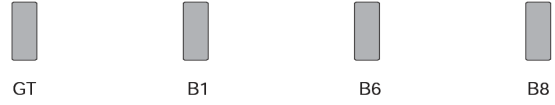
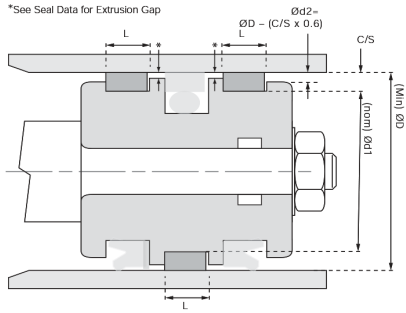


OD	ID	L1	C/S	Width	Product Name
110.00	99.00	5.00	0.00	0.00	B6-110099-050L
110.00	102.00	6.00	0.00	0.00	B8-110102-060
110.00	103.80	15.00	0.00	0.00	B1-110103-150
110.00	104.00	6.00	0.00	0.00	B1-110104-060
110.00	104.00	12.50	0.00	0.00	B8-110104-125
110.00	104.00	12.80	0.00	0.00	B6-110104-128
110.00	104.00	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

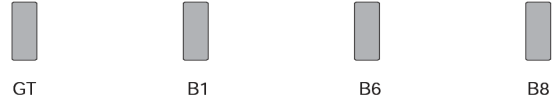
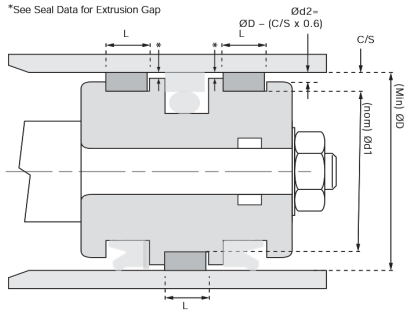


OD	ID	L1	C/S	Width	Product Name
115.00	108.80	8.00	0.00	0.00	F101-115108-081
115.00	108.80	8.00	0.00	0.00	B1-115108-081
115.00	109.00	12.80	0.00	0.00	B6-115109-128
115.00	109.00	14.80	0.00	15.00	B8-115109-150
115.00	109.00	15.00	0.00	0.00	B1-115109-150
115.00	110.00	8.10	0.00	0.00	B8-115110-081
115.00	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	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

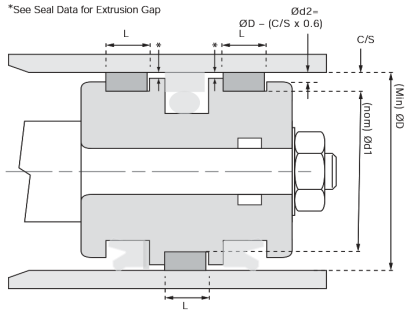




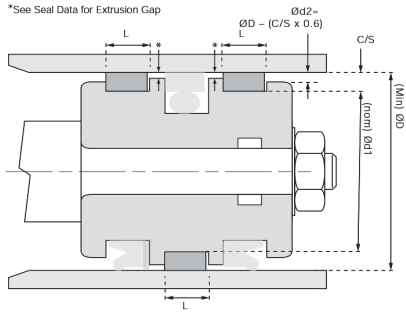
OD	ID	L1	C/S	Width	Product Name
121.00	115.00	19.20	0.00	0.00	B6-121115-192
125.00	115.00	0.00	0.00	0.00	B8-125115-150
125.00	118.00	14.80	0.00	0.00	B8-125118-150
125.00	118.00	17.00	0.00	0.00	B8-125118-170
125.00	119.00	0.00	0.00	0.00	B6-125119-128
125.00	119.00	10.00	0.00	0.00	B8-125119-100
125.00	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



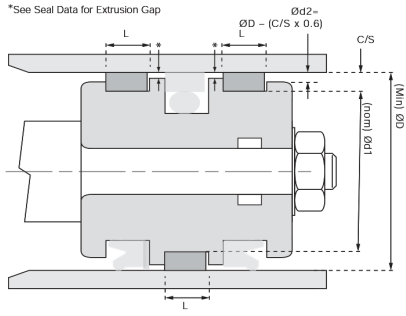
OD	ID	L1	C/S	Width	Product Name
130.00	125.00	7.90	0.00	0.00	B8-130125-081
130.00	125.00	9.70	0.00	0.00	B8-130125-097
130.00	125.00	15.00	0.00	0.00	B8-130125-150
130.00	125.00	15.00	0.00	0.00	B6-130125-150
130.00	125.00	20.00	0.00	0.00	B8-130125-200
130.00	125.00	25.00	0.00	0.00	B8-130125-250
130.00	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



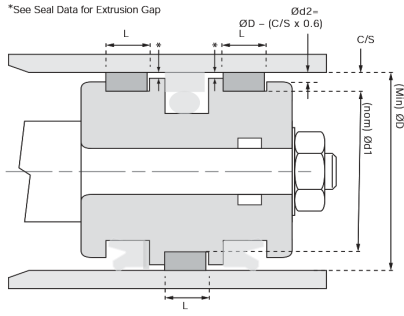
OD	ID	L1	C/S	Width	Product Name
140.00	133.00	40.00	0.00	0.00	B8-140133-400
140.00	133.00	45.00	0.00	0.00	B1-140133-450
140.00	134.00	12.00	0.00	0.00	B8-140134-120
140.00	134.00	12.80	0.00	0.00	B6-140134-128
140.00	134.00	15.00	0.00	0.00	B1-140134-150
140.00	134.00	19.20	0.00	0.00	B6-140134-192
140.00	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



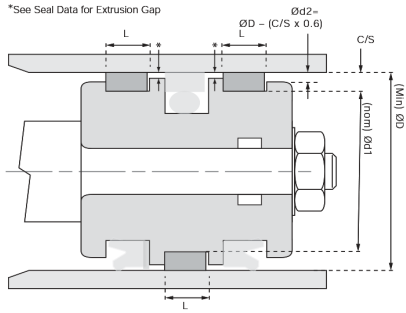
OD	ID	L1	C/S	Width	Product Name
150.00	143.00	40.00	0.00	0.00	B8-150143-400
150.00	143.00	45.00	0.00	0.00	B1-150143-450
150.00	144.00	19.20	0.00	0.00	B6-150144-192
150.00	144.00	20.00	0.00	0.00	B8-150144-200
150.00	144.00	42.00	0.00	0.00	B8-150144-420
150.00	145.00	8.10	0.00	0.00	B8-150145-081
150.00	145.00	9.70	0.00	0.00	B8-150145-097
150.00	145.00	15.00	0.00	0.00	B8-150145-150
152.00	141.00	5.00	0.00	0.00	B6-152141-050L
153.00	145.00	15.00	0.00	0.00	B6-153145-150
154.00	146.00	30.00	0.00	0.00	B6-154146-300
155.00	149.00	19.20	0.00	0.00	B6-155149-192
155.00	150.00	15.00	0.00	0.00	B8-155150-150
155.00	150.00	19.80	0.00	20.00	B8-155150-250
155.00	150.00	19.80	0.00	20.00	B8-155150-200
155.00	160.40	23.50	0.00	0.00	B1-160155-240
156.00	150.00	12.80	0.00	0.00	B6-156150-128
160.00	148.00	0.00	0.00	0.00	B1-160148-150
160.00	148.00	20.00	0.00	0.00	B8-160148-200
160.00	152.00	25.00	0.00	0.00	B8-160152-250
160.00	153.00	15.00	0.00	0.00	B8-160153-150
160.00	153.00	20.00	0.00	0.00	B8-160153-200
160.00	153.00	40.00	0.00	0.00	B8-160153-400
160.00	153.00	40.00	0.00	0.00	B1-160153-400
160.00	153.00	45.00	0.00	0.00	B8-160153-450
160.00	153.76	20.00	0.00	0.00	B1-160154-200
160.00	154.00	15.00	0.00	0.00	B1-160154-150
160.00	154.00	19.20	0.00	0.00	B6-160154-192
160.00	154.00	30.00	0.00	0.00	B8-160154-300
160.00	154.00	35.00	0.00	0.00	B8-160154-350
160.00	154.00	50.00	0.00	0.00	B8-160154-500



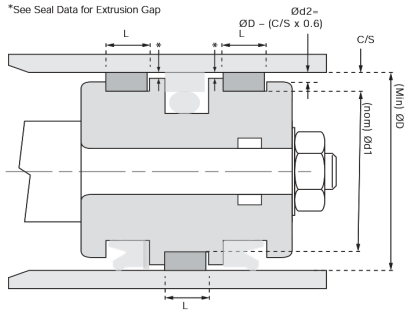
OD	ID	L1	C/S	Width	Product Name
160.00	155.00	9.70	0.00	0.00	B8-160155-097
160.00	155.00	15.00	0.00	0.00	B8-160155-150
160.00	155.00	25.00	0.00	0.00	B8-160155-250
160.00	155.00	35.00	0.00	0.00	B8-160155-350
165.00	157.00	15.00	0.00	0.00	B8-165157-150
165.00	157.00	20.00	0.00	0.00	B8-165157-200
165.00	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



OD	ID	L1	C/S	Width	Product Name
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
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

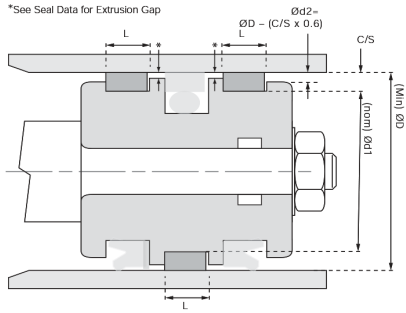


OD	ID	L1	C/S	Width	Product Name
190.00	185.00	15.00	0.00	0.00	B8-190185-150
190.00	186.00	15.00	0.00	0.00	B8-190186-150
194.00	183.00	5.00	0.00	0.00	B6-194183-050L
196.00	190.00	19.20	0.00	0.00	B6-196190-192
200.00	188.00	22.50	0.00	0.00	B1-200188-225
200.00	192.00	22.00	0.00	0.00	B1-200192-220
200.00	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	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

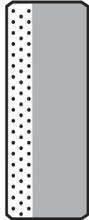


OD	ID	L1	C/S	Width	Product Name
224.00	216.00	45.00	0.00	0.00	B1-224216-450
225.00	213.00	25.00	0.00	0.00	B1-225213-250
225.00	217.00	0.00	0.00	0.00	B8-225217-250
225.00	217.00	25.00	0.00	0.00	B1-225217-250
225.00	217.00	45.00	0.00	0.00	B8-225217-450
225.00	217.00	50.00	0.00	0.00	B8-225217-500
225.00	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
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



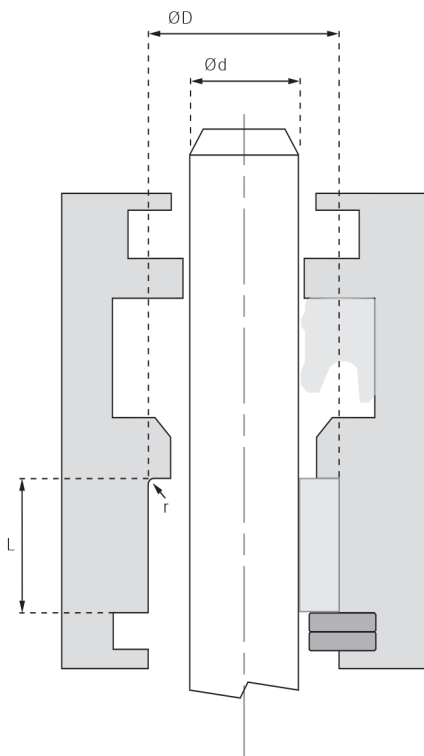


OD	ID	L1	C/S	Width	Product Name
280.00	272.00	60.00	0.00	0.00	B1-280272-600
280.00	274.00	19.20	0.00	0.00	B6-280274-192
280.00	275.00	25.00	0.00	0.00	B8-280275-250
288.00	280.00	25.00	0.00	0.00	B8-288280-250
290.00	284.00	19.20	0.00	0.00	B6-290284-192
300.00	288.00	30.00	0.00	0.00	B1-300288-300
300.00	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

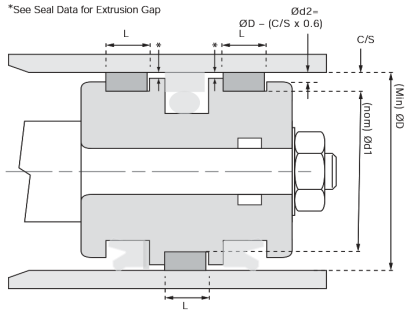
r
0.2

Typical Examples

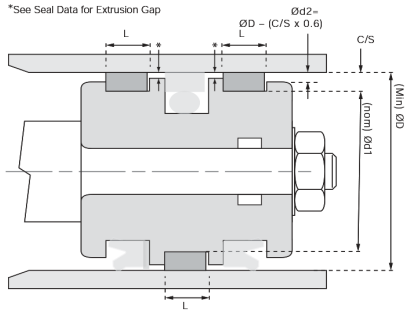
Reciprocating Rotary Oscillating Helix



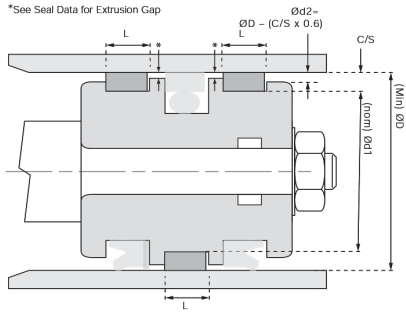
Similar Styles



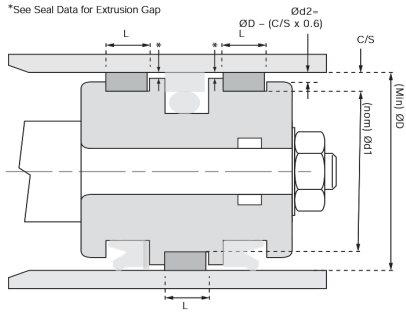
ID	OD	L1	L2	OD2	OD3	Product Name
3.00	5.00	3.00	0.00	0.00	0.00	DUB-003005-030
3.00	5.00	4.00	0.00	0.00	0.00	DUB-003005-040
3.00	5.00	5.00	0.00	0.00	0.00	DUB-003005-050
3.00	5.00	6.00	0.00	0.00	0.00	DUB-003005-060
4.00	6.00	4.00	0.00	0.00	0.00	DUB-004006-040
4.00	6.00	6.00	0.00	0.00	0.00	DUB-004006-060
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	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
16.00	18.00	12.00	0.00	0.00	0.00	DUB-016018-120



ID	OD	L1	L2	OD2	OD3	Product Name
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
30.00	34.00	15.00	0.00	0.00	0.00	DUB-030034-150

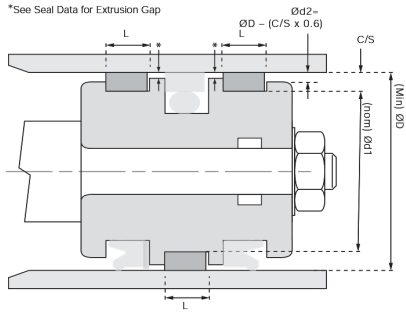


ID	OD	L1	L2	OD2	OD3	Product Name
30.00	34.00	20.00	0.00	0.00	0.00	DUB-030034-200
30.00	34.00	25.00	0.00	0.00	0.00	DUB-030034-250
30.00	34.00	30.00	0.00	0.00	0.00	DUB-030034-300
30.00	34.00	35.00	0.00	0.00	0.00	DUB-030034-350
30.00	34.00	40.00	0.00	0.00	0.00	DUB-030034-400
31.00	35.00	25.00	0.00	0.00	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
45.00	50.00	35.00	0.00	0.00	0.00	DUB-045050-350

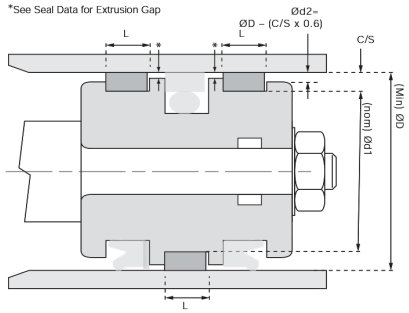


ID	OD	L1	L2	OD2	OD3	Product Name
45.00	50.00	40.00	0.00	0.00	0.00	DUB-045050-400
45.00	50.00	50.00	0.00	0.00	0.00	DUB-045050-500
50.00	55.00	12.00	0.00	0.00	0.00	DUB-050055-120
50.00	55.00	15.00	0.00	0.00	0.00	DUB-050055-150
50.00	55.00	20.00	0.00	0.00	0.00	DUB-050055-200
50.00	55.00	25.00	0.00	0.00	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
65.00	70.00	60.00	0.00	0.00	0.00	DUB-065070-600



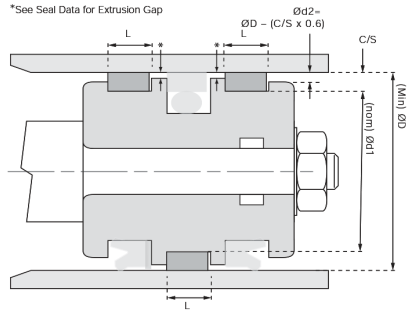


ID	OD	L1	L2	OD2	OD3	Product Name
70.00	75.00	12.00	0.00	0.00	0.00	DUB-070075-120
70.00	75.00	15.00	0.00	0.00	0.00	DUB-070075-150
70.00	75.00	20.00	0.00	0.00	0.00	DUB-070075-200
70.00	75.00	30.00	0.00	0.00	0.00	DUB-070075-300
70.00	75.00	35.00	0.00	0.00	0.00	DUB-070075-350
70.00	75.00	40.00	0.00	0.00	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	35.00	0.00	0.00	0.00	DUB-085090-350
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

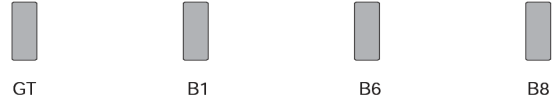
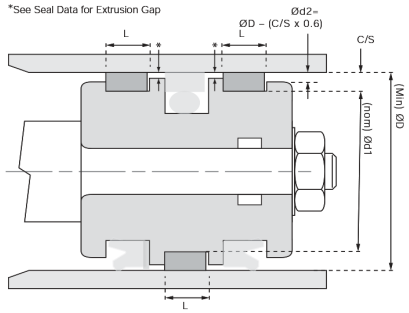


ID	OD	L1	L2	OD2	OD3	Product Name
80.00	95.00	35.00	0.00	0.00	0.00	DUB-080085-350
90.00	95.00	20.00	0.00	0.00	0.00	DUB-090095-200
90.00	95.00	30.00	0.00	0.00	0.00	DUB-090095-300
90.00	95.00	35.00	0.00	0.00	0.00	DUB-090095-350
90.00	95.00	40.00	0.00	0.00	0.00	DUB-090095-400
90.00	95.00	45.00	0.00	0.00	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

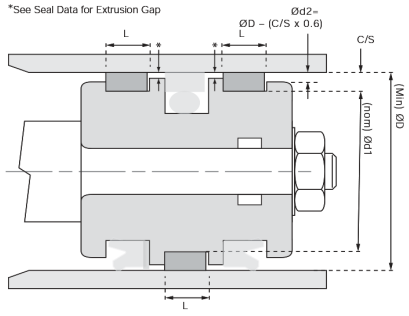




ID	OD	L1	L2	OD2	OD3	Product Name
105.00	110.00	60.00	0.00	0.00	0.00	DUB-105110-600
105.00	110.00	70.00	0.00	0.00	0.00	DUB-105110-700
110.00	115.00	30.00	0.00	0.00	0.00	DUB-110115-300
110.00	115.00	35.00	0.00	0.00	0.00	DUB-110115-350
110.00	115.00	40.00	0.00	0.00	0.00	DUB-110115-400
110.00	115.00	45.00	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	70.00	0.00	0.00	0.00	DUB-120125-700
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



ID	OD	L1	L2	OD2	OD3	Product Name
130.00	135.00	60.00	0.00	0.00	0.00	DUB-130135-600
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	35.00	0.00	0.00	0.00	DUB-140145-350
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



GT



B1



B6



B8

ID	OD	L1	L2	OD2	OD3	Product Name
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

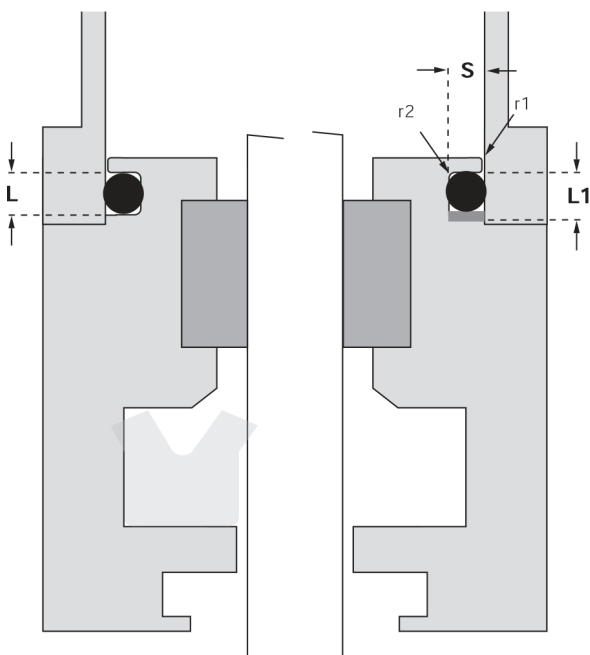
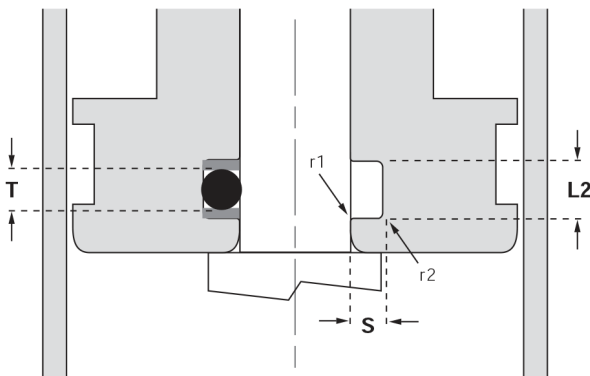
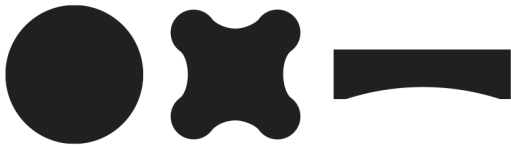
O-ring C/S		Housing Depth		Housing Width		
T	S	Max	Min	L	L1	L2
mm	Inch					
1.00		0.80	0.75	1.30		
1.20		0.96	0.91	1.56		
1.50		1.20	1.15	1.95		
1.60		1.28	1.23	2.08	3.80*	5.20*
1.78	1/16	1.44	1.39	2.36	3.76	5.16
1.90		1.53	1.48	2.50	3.90	5.30
2.00		1.60	1.55	2.60	4.00	5.40
2.40		1.92	1.87	3.20	4.60	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

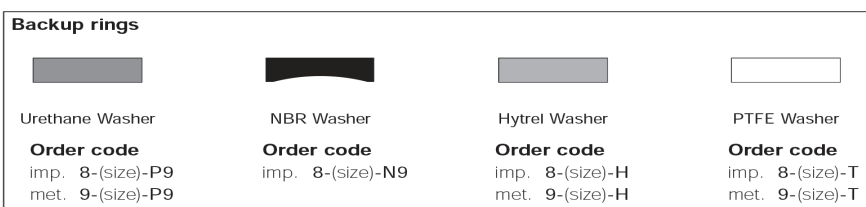
Order code
imp. 4-(size)

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



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

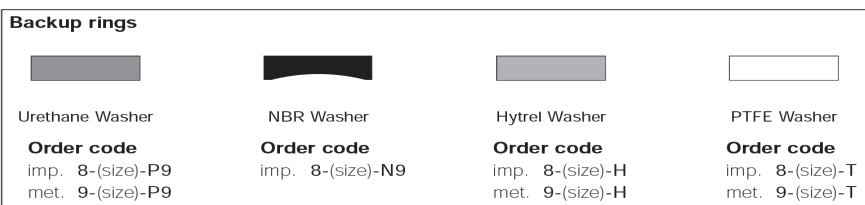
Order code
imp. 4-(size)

Backup rings

			
Urethane Washer	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		
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

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	
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	NBR Washer	Hytrell 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	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

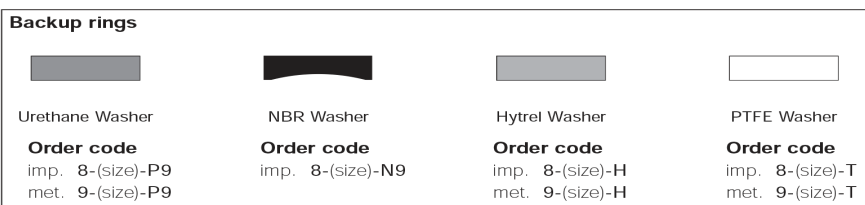
Order code
imp. 4-(size)

Backup rings

			
Urethane Washer	NBR Washer	Hytrell 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	Hytrell		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



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

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		
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


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
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

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

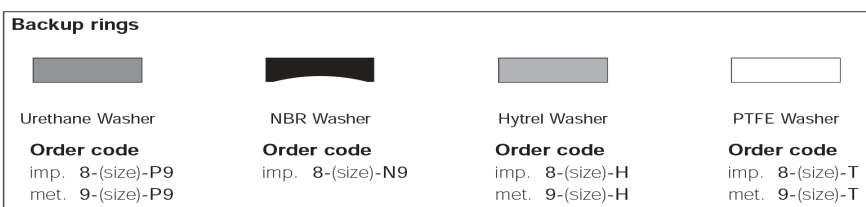


PTFE Washer

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	
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



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



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



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



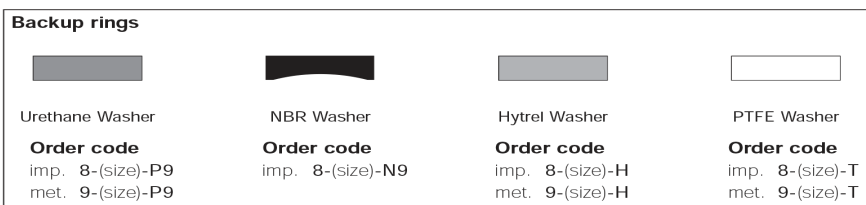
Hytrek Washer
Order code
imp. 8-(size)-H
met. 9-(size)-H



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		
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



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	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	
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

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	
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	
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



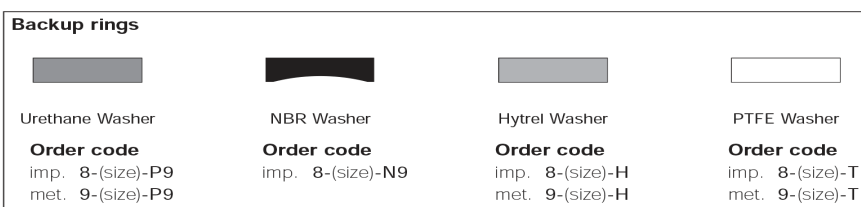
Hytrel Washer
Order code
imp. 8-(size)-H
met. 9-(size)-H



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



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



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

Kit Types

O-ring

Quad ring

Back up washers

Flange seals

Bonded washers

Tools

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)

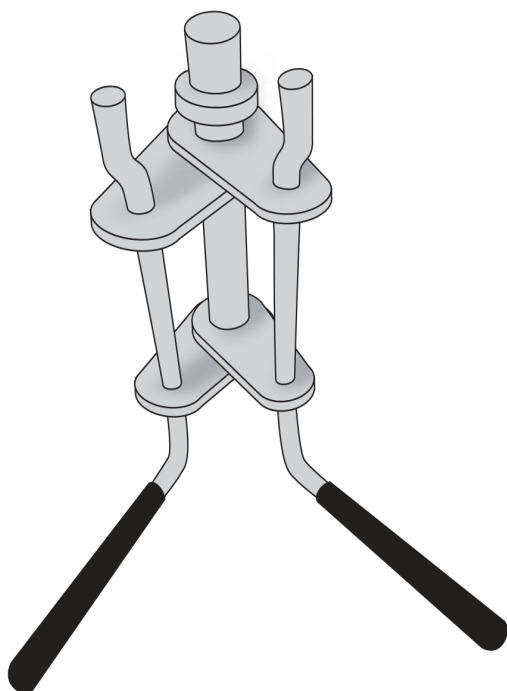
Polyurethane 92 Shore A - Type 61 & 62 flanges
NBR90 Shore A o-Rings - Type 61 flanges only

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		





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	
	Box 4 – 3/32 c/s O-Rings NBR70	10ea	029	030					
		25ea	109	110	111	112	113	114	115
			116	117	118				
		20ea	119	120					
		15ea	121	122	123	124	125	126	127
	Box 5 – 1/8 c/s O-Rings NBR70	10ea	128	129	131	133			
		5ea	135						
		20ea	210	211	212	213	214		
		15ea	215	216	217	218	219	220	221
		10ea	222	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	020
			021	022	025	026	027	028	029
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	119
			120	122	123	124	125	126	127
			128						
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	119
			120	122	123	124	125	126	127
			128						
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	2
		10ea	Tube	1/4	5/16	3/8	1/2	5/8	3/4
			7/8	1	1 1/4	1 1/2			



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

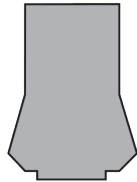




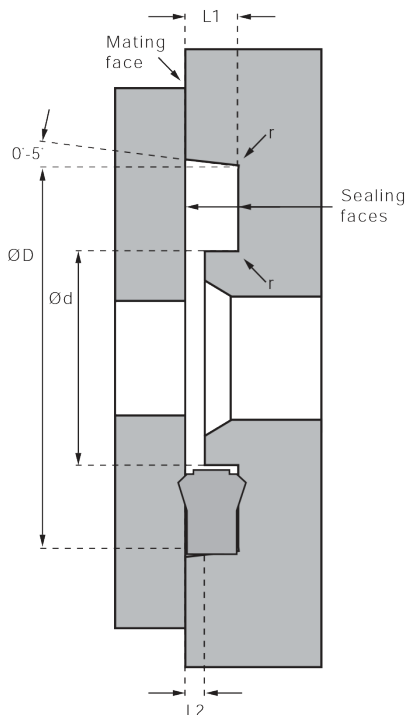
CFS

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

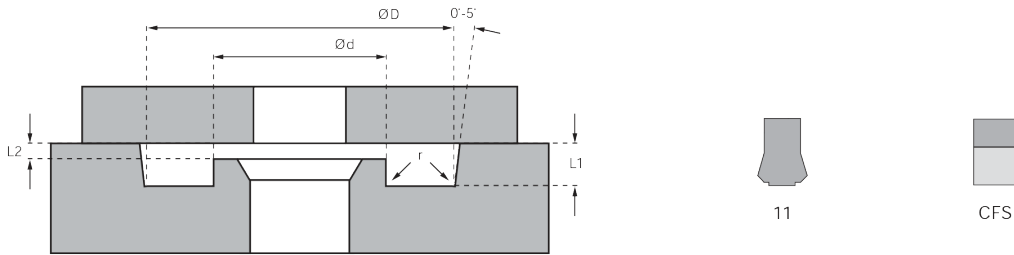
60 pieces 6 sizes

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

Typical Examples

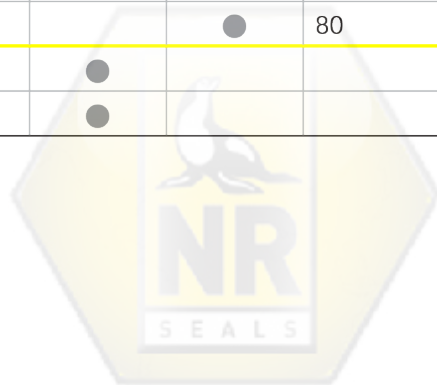
Static 





Nominal SAE J518

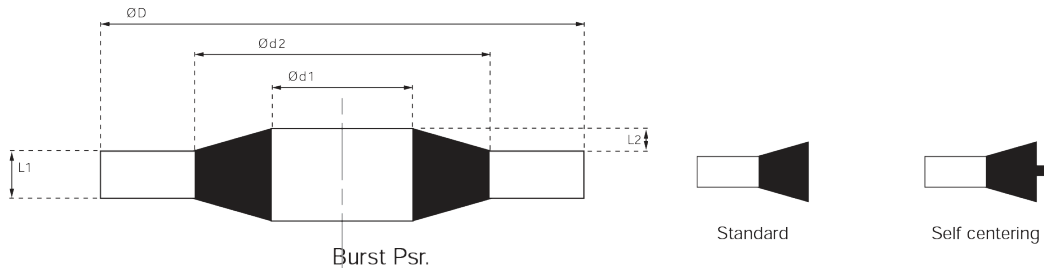
FLANGE	ØD	Ød	L1	L2	CFS	11	Flange No.	SIZE CODE
1/2	1.000	0.670	0.110	0.010	●		08	0500
3/4	1.250	0.920	0.110	0.010	●		12	0750
1	1.560	1.230	0.110	0.010	●		16	1000
1 1/4	1.750	1.420	0.110	0.010	●		20	1250
1 1/2	2.125	1.785	0.110	0.010	●		24	1500
2	2.500	2.160	0.110	0.010	●		32	2000
2 1/2	3.005	2.665	0.110	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

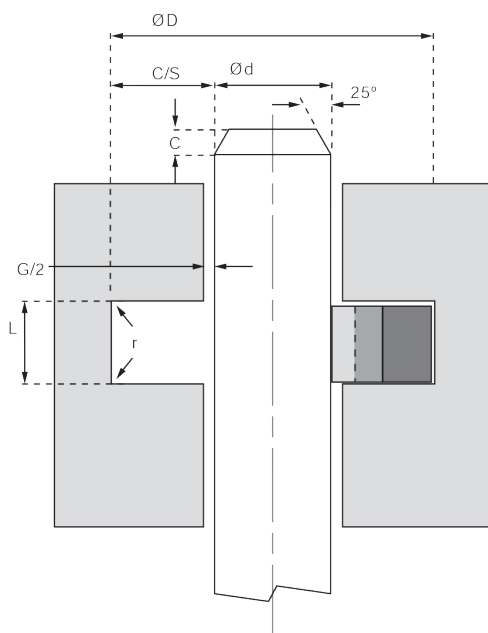
Rotary Joint Seals

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

NORMAN RICHARDS PTY LTD COPYRIGHT

Unless otherwise indicated, the material in this catalogue is copyright © of Norman Richards Pty Ltd ABN 43958671889 (Norman Richards) and protected by the copyright laws of Australia. All rights are reserved. You must not modify copy or redistribute this catalogue or any part of it. If this catalogue is in electronic or CD Rom form you also must not print it or any part of it.

Warranty

This catalogue is for information only. The details of the products in this catalogue were provided by the manufacturer of the products. Norman Richards does not warrant that the products will comply with those details. Norman Richards supplies products strictly in accordance with specifications given by our customers. We do not provide any advice or recommendation about the suitability of products for any particular use. We do not warrant that products are suitable for the use intended by our customers. Before ordering any products from Norman Richards you must satisfy yourself that the products you are ordering are suitable for your intended use of the products.

Payment terms

When ordering products from Norman Richards you agree that payment must be made in full for all products you order at the time stated in writing by Norman Richards, including in any credit application. If no time is stated in writing by Norman Richards, payment must be made in full within thirty days of the date of the monthly statement. If payment is not made on these terms, Norman Richards may charge you interest on any unpaid amount. Interest will be charged daily and from the date payment is due until payment is received.

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

