

# HALLITE

## FLUID POWER SEAL CATALOGUE

METRIC EDITION



## HOW TO USE THIS CATALOGUE

Within the next few pages you'll find an introductory section of technical data to assist you with seal selection including information about our materials.

On each product datasheet we will provide you with the technical details of that particular product along with size listings where applicable. Parts suitable for ISO standard housings and Asian housings are clearly identified within each product part number range.

A product index by function and size is included in the yellow paged section.

The information contained within this catalogue is based on many years of fluid sealing experience, along with extensive in-house testing and is given in good faith. No warranty or guarantee is expressed save in our standard terms and conditions of sale (available upon request) since the conditions of use are beyond our control.

Hallite is continuously improving our range of profiles and sizes. We reserve the right to withdraw or modify any item shown in this catalogue. For the most up-to-date size and part listings, please visit our website at [www.hallite.com](http://www.hallite.com) and contact your nearest Hallite sales office or official Hallite distributor for further information.

## LEGAL LIABILITIES

All descriptions, design and performance information, and recommended uses for the products described herein are based generally on our design and manufacturing experience, product testing in specific conditions, and industry standards. The catalogue is for general guidance only, does not constitute professional advice or a guarantee or warranty of design or warranty of performance and should not be relied upon or treated as a substitute for specific consideration and advice relevant to particular circumstances. The information provided herein is provided "as is," and we reserve the right to make product changes from time to time, without prior notification, which may change some of the information provided herein. Hallite and its affiliated companies disclaim all express and implied warranties with regard to the information, materials, and opinions contained in this brochure, including without limitation implied warranties of merchantability, fitness for a particular purpose, compatibility, and non-infringement. All warranties applicable to Hallite products are found exclusively in the terms and conditions of sale, as stated in sales contracts related to the sale of such products. Each purchaser of such products must decide if the products are suitable to the intended use of such purchaser. This edition supersedes all previous brochures.

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TRIED &  
TRUSTED

**For over 100 years,**

Hallite has been a leading supplier and pioneer of high-quality fluid sealing technologies and engineered sealing solutions. As a global organisation with a keen focus on worldwide delivery through regional manufacturing sites and fabrication centres, we are able to leverage our expertise in engineering design, superior quality, and advanced manufacturing and production processes to meet your supply needs when and where you need them the most. From high-volume production runs to bespoke sealing solutions, the longevity of our success in meeting the demands of OEMs, distributors and aftermarket specialists can be attributed to doing things the “Hallite Way.”

We bring to market a blend of catalogued and fit-for-purpose, quality products that offer cost-effective performance. Over the years, we have refined our business approach to provide services to our customers that are searching for both engineered solutions and off-the-shelf products from a single-source supplier.

We are constantly adding to our range of profiles and sizes for ISO standard and Asian housings. Please review the product catalogue for a complete list of products or contact your nearest Hallite sales office or official Hallite distributor for further information.



## THE HALLITE WAY

### **Whatever You Need, We Can Help**

A robust portfolio of catalogued products and value-added engineering and manufacturing services that meet and exceed customer needs and expectations.

### **One High Standard, Everywhere**

A commitment to global quality and production standards that ensure consistency everywhere in the world.

















### **Service As Reliable As Our Seals**

A dedication to getting it done right and on time — the first time. Ensuring products and value-added services are delivered on time and to exact specifications.

## MAJOR INDUSTRIES

- Agriculture
- Chemical Processing
- Construction & Forestry
- Food & Beverage
- General Industry
- Hydro-Power
- Injection Moulding
- Machine Tools
- Marine
- Material Handling
- Mining & Mineral Extraction
- Mobile Hydraulics/Off-Highway
- Oil & Gas
- Steel & Aluminium Processing
- Transportation

# HALLITE SEAL DESIGN AND SELECTION INDEX






PROFILE DESIGNATION	Page	Profile	Maximum Pressure bar	Temperature Range °C	Maximum Speed m/sec
<b>DOUBLE-ACTING PISTON SEALS</b>					
714	37		500	-40°C +110°C	1.0
730	43		700	-40°C +110°C	0.3
754	53		350 500*	-40°C +110°C	1.0
764	59		250	-30°C +110°C	1.0
780	63		400	-30°C +100°C	0.5
<b>NOTE</b>	*Pressure rating of seal design can be extended by the use of a face seal in TPE 051 material. If this option is required, please seek advice from your local Hallite office.				
<b>SINGLE-ACTING PISTON SEALS</b>					
606	73		400 700*	-45°C +110°C	1.0
659	79		400	-45°C +110°C	1.0
<b>NOTE</b>	*Pressure rating of seal design can be extended by the use of a back-up ring. If this option is required, please seek advice from your local Hallite office.				
<b>SINGLE-ACTING ROD AND PISTON SEALS</b>					
601	85		400 700*	-45°C +110°C	1.0
<b>NOTE</b>	*Pressure rating of seal design can be extended by the use of a back-up ring. If this option is required, please seek advice from your local Hallite office.				
<b>UNITISED PISTON</b>					
720	101		350	-30°C +100°C	1.0
<b>ROD SEALS</b>					
605	107		400 700*	-45°C +110°C	1.0
610	131		400	-45°C +110°C	1.0
616	137		240	-45°C +110°C	1.0
621	143		700	-45°C +110°C	1.0
652	151		700	-45°C +110°C	1.0
663	159		400 700*	-45°C +110°C	1.0
673	165		400 700*	-45°C +110°C	1.0
<b>NOTE</b>	*Pressure rating of seal design can be extended by the use of a back-up ring. If this option is required, please seek advice from your local Hallite office.				



## HALLITE SEAL DESIGN AND SELECTION INDEX

PROFILE DESIGNATION	Page	Profile	Maximum Pressure bar	Temperature Range °C	Maximum Speed m/sec
<b>ROD BUFFER SEALS</b>					
653	173		700	-45°C +110°C	1.0
660	177		700	-45°C +110°C	1.0
<b>WIPERS</b>					
37	183		-	-30°C +100°C	1.0
38	191		-	-40°C +120°C	4.0
831	203		-	-45°C +110°C	4.0
834	209		-	-45°C +110°C	4.0
839	213		-	-45°C +110°C	4.0
839N	217		-	-45°C +110°C	4.0
842	223		-	-45°C +110°C	4.0
844	229		-	-45°C +110°C	4.0
846	233		-	-45°C +110°C	4.0
847	237		-	-40°C +100°C	4.0
860	241		-	-40°C +100°C	1.0
864	249		-	-45°C +110°C	1.0
<b>NOTE</b>	Additional wiper seals are available upon request and include ranges for standard American grooves. 37, 831, 834, 839, 839N, and 846 wipers are produced in materials capable of operating at temperatures below 0°C but are not designed to scrape ice.				
<b>BEARINGS</b>					
87	257		-	-50°C +200°C	5.0
506	261		-	-40°C +120°C	5.0
533	269		-	-40°C +120°C	5.0
708	271		-	-40°C +100°C	5.0
<b>NOTE</b>	87, 506, 533, and 708 wear strips are also suitable for oscillating and rotary applications. 506 is available in three different formats: spiral lengths, cut rings, and flat coils.				

## HALLITE SEAL DESIGN AND SELECTION INDEX

PROFILE DESIGNATION	Page	Profile	Maximum Pressure bar	Temperature Range °C	Maximum Speed m/sec
<b>SWIVEL SEALS</b>					
80	275		350	-30°C +80°C	0.1
800	279		350	-30°C +80°C	0.2
<b>ADDITIONAL PRODUCTS</b>					
155	285		500	-30°C +100°C	Static
657	289		600	-45°C +110°C -30°C +100°C*	Static
668	293		500	-45°C +110°C	
<b>NOTE</b>	*Temperature range based on material option selected.				





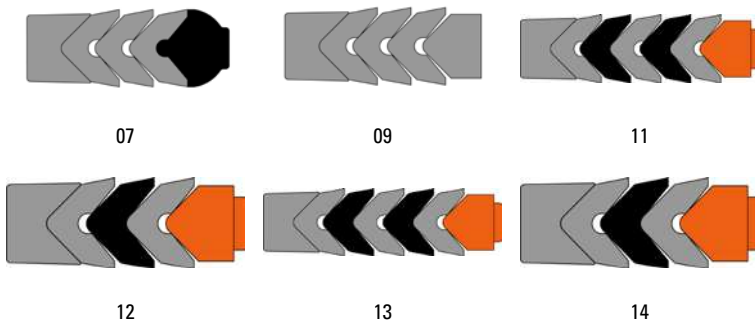
## LEGACY PRODUCTS - METRIC

Over our 110 year history, Hallite has offered a range of products to service the fluid power industry. Some of these products are still recognised as the industry standard. Some have been eclipsed by new engineering knowledge and material advances or adjusted and fine-tuned based on testing in the laboratory and in the field.

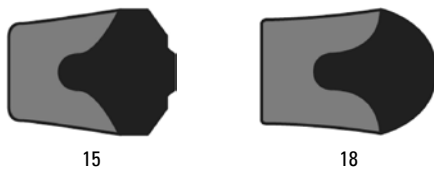
Below are our legacy products. Many of these profiles have been replaced by more modern designs. These products are still available in some regions but the tooling range may be limited. For a list of sizes, please see the legacy section of the yellow pages in the back of this catalogue.

We advise customers who still purchase these items to meet with their local sales or engineering team to discuss if there is a superior Hallite product for your application.

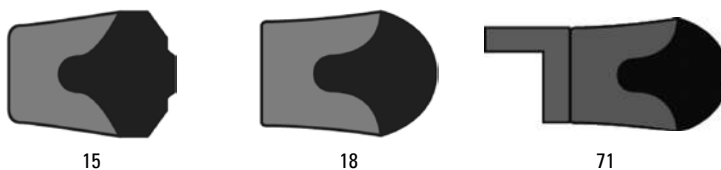
### VEE PACKS



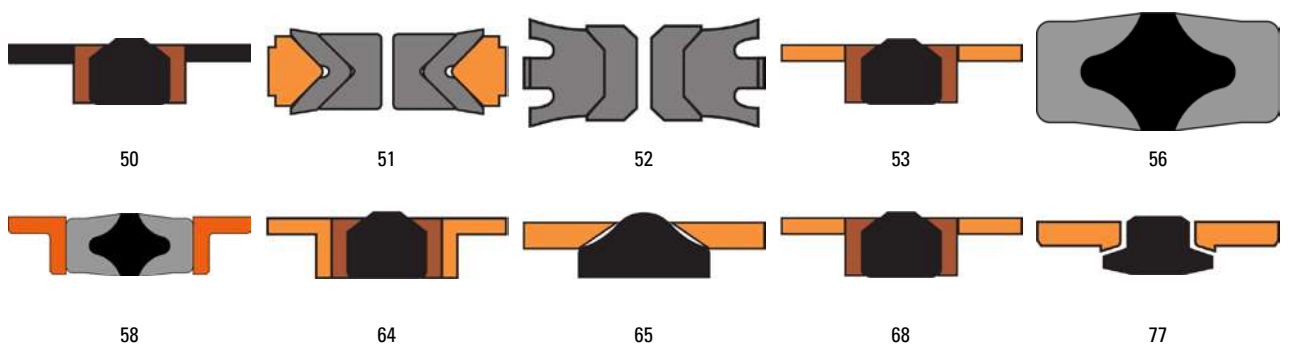
### ROD SEALS



### SINGLE-ACTING PISTON SEALS



### DOUBLE-ACTING PISTON SEALS



## ARMORLENE® PTFE FLUID POWER SEALS PORTFOLIO

Hallite's Armorlene® PTFE portfolio has expanded the range of products we can now supply customers around the world. Developed from material and compound production expertise within Hallite and our sister companies, CDI Energy Products and EGC Critical Components, our PTFE seals come in a complete range of product profiles, forming one of the most comprehensive collections of its kind in the industry. Plus, as with all of our seals, they come with the support of our technical team to provide the advice necessary in developing tailored product solutions.

Because of the size of this new product offering, we have created a separate catalogue for the Armorlene® range. Please refer to the Armorlene® PTFE catalogue and our website for complete information of all technical, material, and part number range information.

### ROD SEALS



716SPN



R16



RCG



RDA



RDS



SRB



SRS

### PISTON SEALS



CT



G54



GP2



GPS - ROUND



GPS - SQUARE



P16



P54



PCA



PCG



PDS



PFR

### WIPERS



E2W



E5W



ELA



EXF



EXG

### SWIVEL SEALS



SSP



SSR

Some profile designations previously included in our standard catalogue may have been superseded by new PTFE profile designations and will no longer be included in this catalogue. Below are the product groups that have been affected.

NEW PROFILE DESIGNATION	SUPERSEDES LEGACY PRODUCT
CT	735
E2W	335
E5W	335
G54	54
P16	355
P54	54, 454

NEW PROFILE DESIGNATION	SUPERSEDES LEGACY PRODUCT
PFR	455
PME	90 PSTM
R16	16, 416
RDA	316
SSR	310

## HALLITE SERVICE® MACHINED SEALS

In addition to our extensive range of catalogue products, Hallite Service®, our quick turnaround custom machined seals department, has the ability to produce an infinite number of profiles using the latest CAD/CAM and CNC machines to produce rubber and plastic parts to the customers' drawings or by utilising one of the 100+ computerized profiles as individual pieces or in economical small series

Many situations in the fluid power industry require an immediate response and rapid manufacturing and delivery for your urgent repair or prototyping needs. Whether you require a custom profile and material or customised solution of one

of our standard profiles, we can ensure the highest quality product at an economical cost due to small batch, lower mould and tooling costs, and minimal manufacturing time. Instances where Hallite Service® benefits customers the most are:

- Machinery breakdown
- Non-standard seal dimensions
- Prototyping
- Discontinued spare parts
- Material change due to non-standard or aggressive media

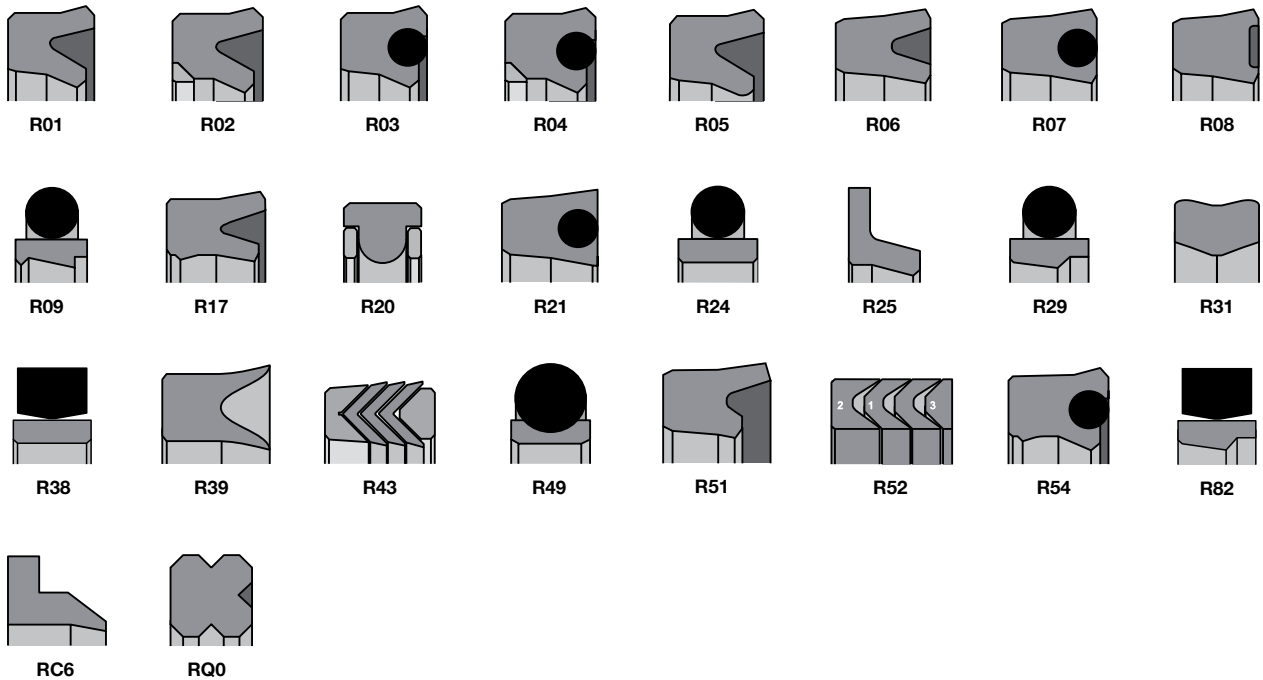
Hallite Service® products can be manufactured from 6.35 mm (0.25 in) to over 1320 mm (52.00 in) in a wide range of application-specific specialty elastomers and high performance plastics.

Hallite Service® centres are located close to customers in a number of countries in Australia, Europe, North America, and China.

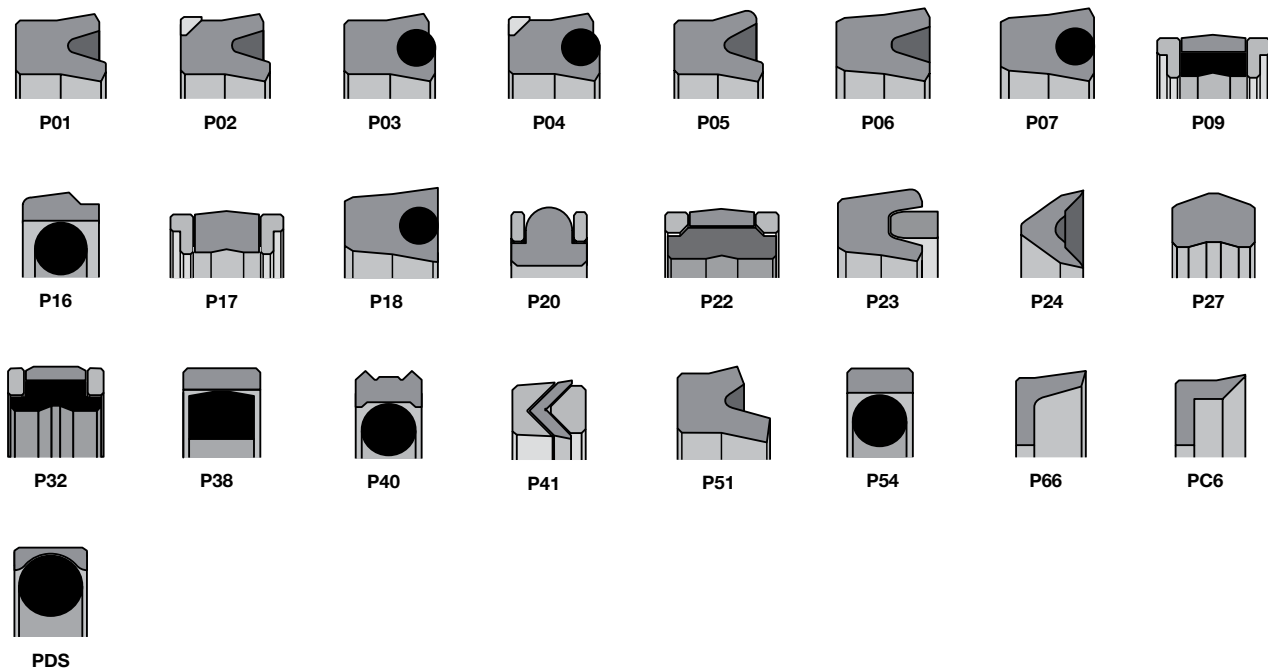
Below you can find a small selection of our vast range of custom machined parts. If you do not see the profile you need here, contact our Hallite Service® team for a complete list of machined seal profiles.

For a custom seal quotation, submit your seal specifications and requirements online at [www.hallite.com/hallite-service](http://www.hallite.com/hallite-service) or contact your local Hallite Service® office for a physical order form.

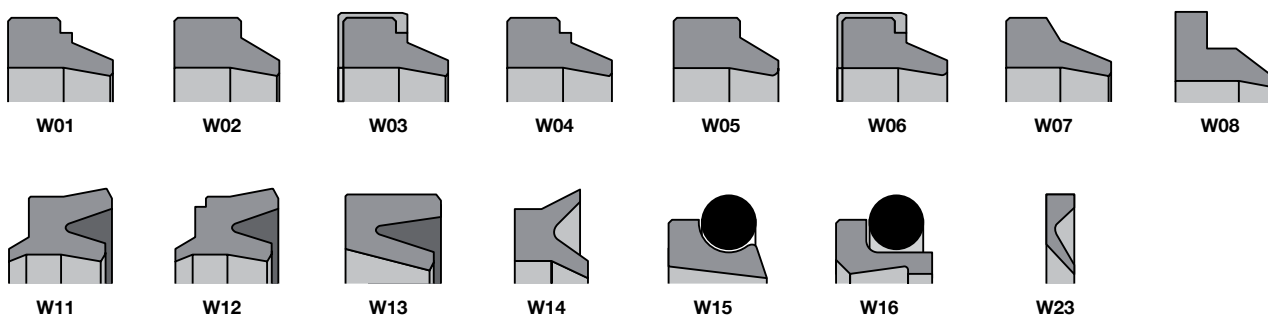
### ROD SEALS



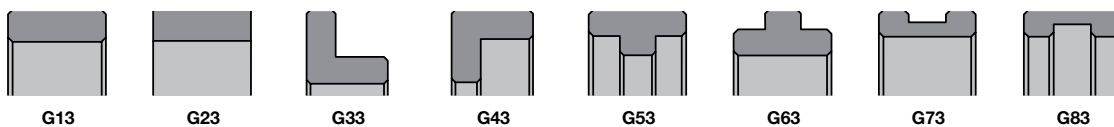
**PISTON SEALS**



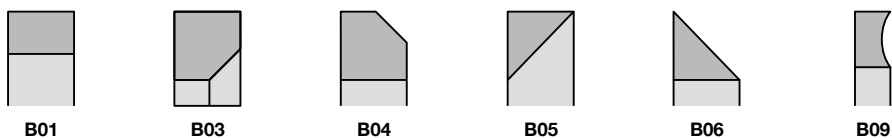
**WIPERS**



**BEARINGS**



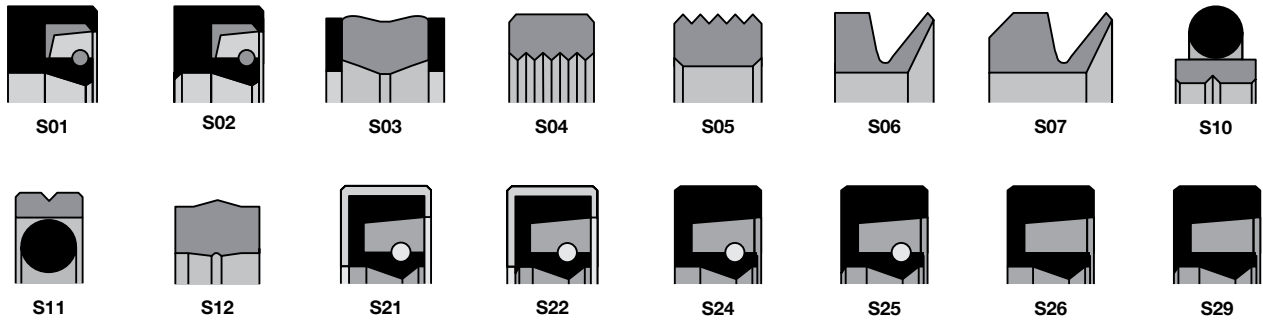
**BACK-UP RINGS**



**NOTE**

For bearings, profiles with 30° cut angle are standard. Other angle cuts are available upon request.  
 For back-up rings, profile with unsplit back rings are standard. Split versions are available upon request.

## ROTARY SEALS



## MATERIALS

Hallite Service® custom machined seals come in a variety of material. Contact your local office to find out which material best suits your chosen profile and applications. These can include:

- Polyurethane
- Polyester
- NBR Rubber
- HNBR Rubber
- FPM/FKM/Viton®
- POM
- PA
- PTFE
  - Virgin PTFE
  - Bronze-filled PTFE
  - Carbon-filled PTFE
  - Glass-filled PTFE
- EPDM Rubber
- Silicon Rubber

# GLOBAL QUALITY CERTIFICATIONS

It's more than simply what  
we do, it's who we are.

At Hallite, quality, health, safety, and environmental concerns are more than checklist items. Our focus on QHSE is ingrained into our company culture and is an integral component of corporate responsibility. A safe, healthy work environment positions our global team to provide the highest quality, on-time delivery, and service excellence. Industry standards such as the ISO 14001, ISO 9001:2010, and the OHSAS 18001 management systems help us continually improve on all elements of QHSE while ensuring regulatory compliance.

Our commitment to QHSE comes from genuine concern about our people, our customers, the environment, and corporate responsibility. The health and safety culture at Hallite is based on personal empowerment, encouraging each employee to take personal responsibility in following the protocols and procedures that ensure QHSE compliance.





## MANUFACTURING FACILITIES WITH QHSE CERTIFICATIONS

WIXOM, MI, USA	<ul style="list-style-type: none"> <li>• ISO 9001 Quality</li> <li>• ISO 14001 Environmental</li> <li>• OHSAS 18001 Health and Safety</li> </ul>	HAMBURG, GERMANY	<ul style="list-style-type: none"> <li>• ISO 9001 Quality</li> <li>• ISO 14001 Environmental</li> <li>• OHSAS 18001 Health and Safety</li> </ul>
TORONTO, ON, CANADA	<ul style="list-style-type: none"> <li>• ISO 9001 Quality</li> </ul>	BANGALORE, INDIA	<ul style="list-style-type: none"> <li>• ISO 9001 Quality</li> <li>• ISO 14001 Environmental</li> </ul>
HAMPTON, UK	<ul style="list-style-type: none"> <li>• ISO 9001 Quality</li> <li>• AS 9100 Aerospace Quality</li> <li>• ISO 14001 Environmental</li> <li>• OHSAS 18001 Health and Safety</li> </ul>	JIADING, SHANGHAI, CHINA	<ul style="list-style-type: none"> <li>• ISO 9001 Quality</li> <li>• OHSAS 18001 Health and Safety</li> </ul>
LIVORNO, ITALY	<ul style="list-style-type: none"> <li>• ISO 9001 Quality</li> </ul>	AUSTRALIA	<ul style="list-style-type: none"> <li>• ISO 9001 Quality</li> </ul>

## OTHER DIVISIONAL MANUFACTURING SITES

CDI ENERGY PRODUCTS	<ul style="list-style-type: none"> <li>• Houston, TX, USA</li> <li>• Singapore</li> <li>• Leeds, UK</li> <li>• Stavanger, Norway</li> <li>• Hampton, UK</li> </ul>
EGC CRITICAL COMPONENTS	<ul style="list-style-type: none"> <li>• Houston, TX, USA</li> </ul>
AIP PRECISION MACHINING	<ul style="list-style-type: none"> <li>• Daytona Beach, FL, USA</li> </ul>

## MATERIAL CHART

Hallite has an extensive portfolio of materials and not all materials are listed below. If your application requires alternative materials or if you're unsure which material best suits your application, please contact your local Hallite team.

MATERIAL NAME	MATERIAL GROUP	MATERIAL TYPE	TEMPERATURE RANGE °C (INTERMITTENT)	TEMPERATURE RANGE °F (INTERMITTENT)
<b>Hythane® 181</b>	Polyether Urethane	TPU-EU	-45 +110	-50 +230
<b>Hythane® 221</b>	Polyether Urethane	TPU-EU	-45 +110	-50 +230
<b>Hythane® 251</b>	Polyether Urethane	TPU-EU	-45 +110	-50 +230
<b>Hythane® 321</b>	Polyester Urethane	TPU-AU	-40 +100	-40 +212
<b>Hythane® 361</b>	Polyester Urethane	TPU-AU	-30 +110	-22 +230
<b>Hythane® 371</b>	Polyether Urethane	TPU-EU	-40 +100	-40 +212
<b>Hythane® 441</b>	Polyester Urethane	TPU-AU	-30 +110	-22 +230
<b>Hythane® 591</b>	Polyester Urethane	TPU-AU	-30 +110	-22 +230
<b>PU 021</b>	Polyester Urethane	TPU-AU	-30 +111	-22 +231
<b>TPE 051</b>	Polyester	TPE	-40 +120	-40 +250
<b>TPE 061</b>	Polyester	TPE	-40 +120	-40 +250
<b>TPE 111</b>	Polyester	TPE	-40 +120	-40 +250
<b>TPE 201</b>	Polyester	TPE	-30 +100	-22 +212
<b>TPE 261</b>	Polyester	TPE	-40 +120	-40 +250
<b>TPE 121</b>	Polyester	TPE	-40 +120	-40 +250
<b>Armorlene® 702</b>	Engineered Plastic	PTFE	-73 +260	-100 +500
<b>Armorlene® HLX</b>	Engineered Plastic	PTFE	-73 +288	-100 +550
<b>TSE 041</b>	Composite	Thermoset Polyester	-40 +120	-40 +250
<b>TSE 042</b>	Composite	Thermoset Polyester (Reduced Friction)	-40 +120	-40 +250
<b>POM 0011</b>	Engineered Plastic	POM	-45 +120	-50 +250
<b>POM 0172</b>	Engineered Plastic	POM w Filler	-45 +120	-50 +250
<b>PA 041</b>	Engineered Plastic	PA	-40 +120	-40 +250
<b>PA 533</b>	Engineered Plastic	PA-GF	-40 +120	-40 +250
<b>PA 707</b>	Engineered Plastic	POM w Filler	-40 +120	-40 +250
<b>Hallprene C-FKM 0051</b>	Synthetic Rubber	FKM	-20 +200	-4 +392
<b>Hallprene C-NBR 0251</b>	Composite	Cotton/NBR	-30 +120	-40 +250
<b>Hallprene C-FKM 0431</b>	Composite	Cotton/FKM	-20 +150	-4 +302
<b>Nitrile 70°</b>	Synthetic Rubber	NBR	-30 +100	-22 +212
<b>Nitrile 75°</b>	Synthetic Rubber	NBR	-30 +100	-22 +212
<b>Nitrile 90°</b>	Synthetic Rubber	NBR	-30 +100	-22 +212
<b>Nitrile 0041</b>	Synthetic Rubber	NBR	-10 +140	-14 +284
<b>Nitrile 0141</b>	Synthetic Rubber	NBR	-30 +100	-22 +212
<b>Nitrile 0211</b>	Synthetic Rubber	NBR	-45 +100	-50 +212
<b>Nitrile 0271</b>	Synthetic Rubber	NBR	-30 +100	-22 +212
<b>Nitrile 0471</b>	Synthetic Rubber	NBR	-45 +100	-50 +212
<b>Nitrile 0801</b>	Synthetic Rubber	NBR	-30 +100	-22 +212
<b>Nitrile 1411</b>	Synthetic Rubber	NBR	-30 +100	-22 +212



	HARDNESS	COLOUR	PRODUCTS (STANDARD SHOWN IN BOLD)
	93 IRHD	Blue	<b>80, 601, 605, 606, 607, 609, 610, 616, 620, 616, 620, 621, 622, 652, 653, 657, 658, 659, 660, 661, 663, 667, 668, 673, 755, 770, 800, 834, 839, 839N, 842, 844, 846, 851, 853, 864</b>
	93 IRHD	Black	511, 512, 513
	93 IRHD	Dark Blue	520, 521, 820, 831
	94 IRHD	Dark Blue	860, 862
	96 IRHD	Orange	511, 512, 513, 520, 653, 663, <b>764, 775</b> , 820, 842, <b>844, 864</b>
	55D	Dark Green	820, 842, <b>847</b>
	93 IRHD	Grey	Special material option
	96 IRHD	Orange	660, <b>673</b>
	93 IRHD	Dark Blue	657
	72D	Dark Red	754, 755, 770
	55D	Red	<b>38, 754, 755, 770</b>
	55D	Grey	<b>730, 755, 770</b>
	40D	Light Grey	<b>155</b>
	55D	Cream	<b>770, 755</b>
	55D	Orange	511, 512, 513, 520, 521, 770
	62D	Grey	See Hallite's Armorlene® PTFE Catalogue
	66D	Gold	See Hallite's Armorlene® PTFE Catalogue
	NA	Red	<b>506</b>
	NA	Red	506
	R115	Orange	<b>AE Rings 621, 652, 653, 660, 730; Bearings 780</b>
	R120	Red	<b>708</b>
	72D	Brown	Special material option
	R124	Black	<b>533, 714, 720</b>
	R115	Black	Special material option
	75 IRHD	Black	Special material option for standard rubber and rubber/ fabric products (Additional tooling may be required)
	NA	Black	Special material option
	NA	Black	Special material option for standard rubber and rubber/ fabric products (Additional tooling may be required)
	70 IRHD	Black	Standard O-Ring / Square Ring / X-Ring
	75 IRHD	Black	Standard O-Ring / Square Ring / X-Ring
	90 IRHD	Black	Standard O-Ring / Square Ring / X-Ring
	80 IRHD	Black	Special material option
	90 IRHD	Black	Special material option
	70 IRHD	Black	Special material option
	73 IRHD	Black	Special material option
	80 IRHD	Black	Special material option
	75 IRHD	Black	Special material option
	80 IRHD	Black	<b>730, 780</b>

# FLUID COMPATIBILITY CHART

Material	Continuous material service temperature range °C	Intermittent material service temperature range °C	Service Fluids								
			Fluids based on mineral oils				Greases		Fuels		
			Motor Oils	Hypoid Gear Oils	Automatic Transmission Fluid	ISO 6743-4 Hydraulic Oils (HL, HM, HV)	Mineral oil based greases	Silicon based greases	Diesel Fuel	Fuel for gasoline/petrol engines - normal	Fuel for gasoline/petrol engines - super
			+150 -40	+150 -40	+160 -50	+100 -30	+100 -30	+250 -50			
			Maximum continuous service temperature in fluids °C								
NBR 70 IRHD NBR 90 IRHD Nitrile (medium)	+100 -30	+120 -30	+100	+90	+100	+100	+100	+100	*	*	*
FKM 75 IRHD FKM 90 IRHD Fluoro-elastomer	+200 -20	+250 -20	+150	+150	+160	+100	+100	+200	+150	+150	+150
EPDM 70 IRHD EPDM 80 IRHD	+120 -50	+150 -50	NS	NS	NS	NS	NS	+120	NS	NS	NS
VMQ 70 IRHD Silicone	+200 -55	+250 -55	*	*	*	*	+100	*	NS	NS	NS
HNBR 75 IRHD Hydrogenated Nitrile	+130 -30	+150 -30	+130	+110	+130	+100	+100	+130	*	*	*
AU Polyester PU	+100 -30	+110 -30	+100	+100	+100	+100	+100	+100	+60	+60	+60
EU Polyether PU	+100 -40	+110 -45	+100	+100	+100	+100	+100	+100	+60	+60	+60
Polyester-elastomer	+100 -40	+120 -40	+100	+100	+100	+100	+100	+100	+60	+60	+60
PA Polyamide	+100 -40	+120 -40	+100	+100	+100	+100	+100	+100	+100	+100	+100
POM Acetal	+100 -45	+120 -40	+100	+100	+100	+100	+100	+100	+100	+100	+100
PPS Polyphenylene sulphide	+200 -40	+200 -40	+150	+150	+160	+100	+100	+200	+150	+150	+150
PTFE Polytetra-fluoroethylene	+200 -200	+200 -200	+150	+150	+160	+100	+100	+200	+150	+150	+150
Thermosetting Polyester Resin	+100 -50	+130 -200	+100	+100	+100	+100	+100	+100	+100	+100	+100
PEEK Polyether-etherketone	+250 -65	+300 -65	+150	+150	+160	+100	+100	+250	+150	+150	+150

**NOTE**

\* denotes that values vary greatly for individual elastomers within the group  
 NS denotes that the elastomer is not suitable  
 This table is credited to the BFPA technical working group 'TC16/WG8'.

Service Fluids											
Fire-resistant hydraulic fluids					Environmentally acceptable fluids				Other service fluids		
ISO 6743-4 HFA-Fluids (5/95 waterbased)	ISO 6734-4 HFB-Fluids (60/40 invert emulsion)	ISO 6743-4 HFC-Fluids (water glycol)	ISO 6743-4 HFDR-Fluids (phosphate ester ALKYL (Aero))	ISO 6743-4 HFDR-Fluids (phosphate ester ARYL (ind.))	ISO 6743-4 HETG-Fluids (vegetable oil based)	ISO 6743-4 HEES-Fluids (synthetic ester based)	ISO 6743-4 HEPG-Fluid (synthetic glycol based)	ISO 6743-4 HEPR-Fluid (synthetic hydrocarbons)	Water in fluid power applications	Air	Brake Fluids
+60 +5	+60 +5	+60 -30	+100 -50	+150 +0	+60 -10	+100 -40	+100 -50	+150 -50	+60 +5	+200 +2	+130 -50
Maximum continuous service temperature in fluids °C											
+60	+60	+60	NS	NS	+60	+60	+60	+100	+80	+100	NS
+60	+60	NS	NS	+150	+60	+100	+80	+105	+100	+200	NS
NS	NS	+60	+80	+80	NS	NS	NS	NS	+120	+120	+120
NS	NS	NS	NS	NS	NS	NS	NS	*	+100	+200	+80
+60	+60	+60	NS	NS	+60	+60	+80	+130	+130	+130	NS
+40	+40	NS	NS	NS	+60	+60	+60	+100	+40	+40	NS
+60	+60	+40	NS	NS	+60	+80	+60	+100	+60	+80	NS
+60	+60	NS	NS	NS	+60	+80	+60	+100	+60	+80	NS
+60	+60	+60	+100	+100	+60	+100	+100	+100	+60	+80	+80
+60	+60	+60	+100	+100	+60	+100	+100	+100	+80	+80	+80
+60	+60	+60	+100	+150	+60	+100	+100	+150	+150	+200	+130
+60	+60	+60	+100	+150	+60	+100	+100	+150	+150	+200	+130
+60	+60	+40	+100	+100	+60	+100	+100	+100	+80	+100	NS
+60	+60	+60	+100	+150	+60	+100	+100	+150	+150	+200	+130

**NOTE**

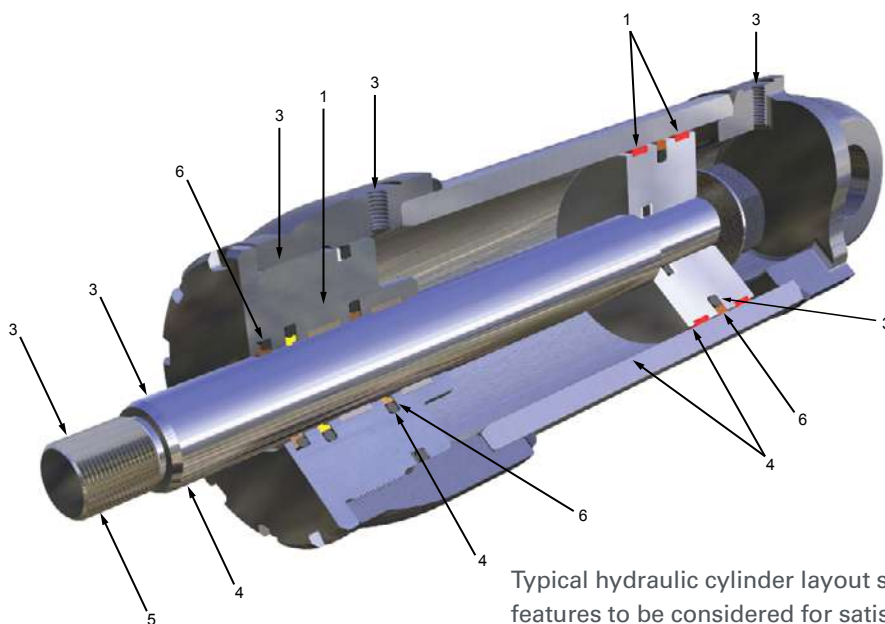
Maximum continuous working temperatures °C and temperature ranges for materials within fluid power fluids. In view of the variations in formulation of both oils and polymers, the compatibility of all combinations should be confirmed by testing and field service performance for each application.



## USE & FITTING OF SEALS

Our quality control methods for material and manufacturing processes ensure that all seals leaving our factories are in a condition capable of giving a long and reliable service life. We have found, from many years of experience, that premature seal failure can be avoided if the following recommendations are considered at the design and manufacturing stage of the cylinder:




1. Specify piston and gland bearings which are adequately proportioned to support the cylinder loads. As a result of mounting misalignments and/or the working action of the cylinder, piston and gland bearings will be subjected to sideloading, causing damage to the rod or the tube surface and hence the seal, if the bearings are inadequate.
2. Ensure that seals are stored distortion free in a cool, dry, and dark place prior to fitting. See "Storage of Seals" directions.
3. Check that the seal housing is free from damage likely to harm the seal. Remove all sharp edges and burrs from metal parts, paying particular attention to ports, grooves, and threads over or through which the seal passes during assembly.
4. Clean all seal housing areas, ensuring that all metallic particles and other contaminants have been removed. Check that other surfaces adjacent to the passage of the seal upon fitting are also free of dirt, swarf, or other contaminants. Check that both static and dynamic housing surface finishes meet specifications.
5. Where the difference between a thread diameter over which the seal must pass and the seal diameter is small, use some form of protection over the thread, such as a fitting sleeve made of hard plastic.
6. Check that the seal is of the correct type, part number, and size, and that the specified material is correct. If there is any doubt regarding the material, contact your local Hallite sales office.
7. Lubricate all seals and metal components liberally with clean operating fluid or a compatible grease prior to assembly. N.B. silicone grease should not be used in normal hydraulic applications.
8. Where seals fitted to sub-assemblies, such as pistons, are awaiting further fitting operations, ensure that the seals are not subjected to any misaligned or localized loading which will cause local deformation. Ensure that sub-assemblies remain clean.
9. The use of metal levers is not recommended, but should they be used it is imperative that they are completely smooth and free from nicks and burrs. When using them, ensure that the metal surfaces adjacent to the seal are not damaged.
10. Flush the hydraulic system thoroughly before connecting the cylinder to it.



Typical hydraulic cylinder layout showing installation features to be considered for satisfactory seal life.



## CYLINDER OPERATING CONDITIONS

CYLINDER SPECIFICATION		LIGHT-DUTY		MEDIUM-DUTY		HEAVY-DUTY	
PRESSURE	Max	350 bar	5000 psi	500 bar	7500 psi	700 bar	10000 psi
	Normal Working	160 bar No pressure peaks	2300 psi	250 bar Intermittent pressure peaks	3625 psi	400 bar Regular pressure peaks	5800 psi
Design		Lower operating stresses. Rigid well-aligned mounting, minimal side loading.		Steady operating stresses with intermittent high stress, some side loading.		Highly stressed for the majority of its working life. Side loading common.	
Condition of Fluid		Good system filtration. No cylinder contamination likely.		Good system filtration, but some cylinder contamination likely.		Contamination unavoidable from internal and external sources.	
Working Environment		Clean and inside a building. Operating temperature variations limited.		Mixture of indoors and outdoors but some protection from the weather.		Outdoors all the time or dirty indoor area. Wide variations in temperature, both ambient and working. Difficult service conditions.	
Usage		Irregular with short section of stroke at working pressures. Regular usage but at low pressure.		Regular usage with most of the stroke at working pressure.		Large amount of usage at high pressure with peaks throughout the stroke.	
Typical Applications		<p>Machine tools Lifting equipment Mechanical handling Injection moulding machines Control and robot equipment Agricultural machinery Packaging equipment Aircraft equipment Light duty tippers</p> 		<p>Heavy duty lifting equipment Agricultural equipment Light duty off-road vehicles Cranes and lifting platforms Heavy duty machine tools Injection moulding machines Some auxiliary mining machinery Aircraft equipment Presses Heavy duty tippers (telescopic) Heavy duty mechanical handling</p> 		<p>Foundry and metal fabrication plant Mining machinery Roof supports Heavy duty earthmoving machinery Heavy duty off-road vehicles Heavy duty presses</p> 	

### NOTE

Data given are maximum values and can apply depending on specific application. Maximum ratings of temperature, pressure, or operating speeds are dependent on fluid medium, surface, gap value, and other variables such as dynamic or static service. Maximum values are not intended for use together at the same time, e.g. max temperature and max pressure. Please contact your Hallite technical representative for application support.

## PRESSURE, SPEED, AND TEMPERATURE RANGE

From many years of application experience with sealing hydraulic equipment, supported by the results from an extensive test program, we know that it is necessary to link the three main operating features — speed, pressure, and temperature — to achieve a satisfactory seal performance. After carefully considering each product, we are able to specify the maximum speed and pressure with a temperature range within which the seal will operate safely. If your operating conditions do not comply with those recommended, please send details to your local Hallite sales office.

## CYLINDER HOUSING AND SEAL OPTIONS

The following diagrams illustrate how Hallite's wide range of products can be applied to a selection of some of the most popular cylinder designs servicing the world's fluid power industry. Below are cylinders used in standard applications and our recommendations for typical sealing solutions. Please note that cylinder renderings may not accurately reflect the recommendations listed. They are for illustrative purposes only.

If the application which you are interested in is of a non-standard nature please contact Hallite's technical department.

Cylinder Type	Wiper	Rod Seal	Rod Bearing	Buffer
Crane Cylinder	842	716SPN	506	R16 Bronze
				
Excavator Cylinder	847	652	506	653 or SRB
				 
Fork Lift Cylinder	846	663	506	-
				
Grapple Cylinder	842	621	506	-
				
Agriculture Cylinder	831 or 834	605	506	-
	 			


**NOTE**

Product details for the following products can be found in the Hallite Armorlene® PTFE catalogue: 716SPN, SRB, R16, CT, E2W, P54, and G54.












Gland Static Seal	Anti-dieseling Ring	Piston Bearing	Piston Seal	Piston Static Seal
155	-	506	730	O-ring & 2 Back ups
O-ring & Back up or 155	87	506	CT or 714	O-ring & 2 Back ups
O-ring	-	506	754	O-ring
155	-	-	720	-
O-ring & Back up	-	-	780	O-ring & 2 Back ups

# CYLINDER HOUSING AND SEAL OPTIONS

Cylinder Type	Wiper	Rod Seal	Rod Bearing	Buffer
High Temperature Cylinder	E2W	R16 Bronze	87	R16 Bronze
				
Injection Molding Machine Cylinder	846	616	87	R16 Glass
				
Roof Support Cylinder	38 or 842	652	708	-
				-
Backhoe Cylinder	844	663	506	653
				

**NOTE**

Product details for the following products can be found in the Hallite Armorlene® PTFE catalogue: 716SPN, SRB, R16, CT, E2W, P54, and G54.

Gland Static Seal	Anti-dieseling Ring	Piston Bearing	Piston Seal	Piston Static Seal
O-ring & Back up	-	87	P54 Bronze	O-ring & 2 Back ups
				
O-ring	-	87	G54	O-ring
				
155	-	708	730	-
				
PU O-ring	-	506	754 or 714	PU O-ring
				

# SPECIFIED TOLERANCE TABLES

## CYLINDER HOUSING AND ROD, PISTON, BORE, AND GLAND TOLERANCES

NOMINAL SIZES mm		SHAFTS (OUTSIDE DIAMETER) UNITS 0.001 mm								BORE (INSIDE DIAMETER) UNITS 0.001 mm				
over	to	f8	f9	h8	h9	h10	h11	js10	js11	H8	H9	H10	H11	Js11
1.6	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 -202	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

NOMINAL SIZES in		SHAFTS (OUTSIDE DIAMETER) UNITS 0.001 in								BORE (INSIDE DIAMETER) UNITS 0.001 in				
over	to	f8	f9	h8	h9	h10	h11	js10	js11	H8	H9	H10	H11	Js11
0.04	0.12	-0.3 -0.9	-0.3 -1.2	0 -0.6	0 -1.0	0 -1.6	0 -2.5	+0.8 -0.8	+1.3 -1.3	+0.6 0	+1.0 0	+1.6 0	+2.5 0	+1.3 -1.3
0.12	0.24	-0.4 -1.1	-0.4 -1.6	0 -0.7	0 -1.2	0 -1.8	0 -3.0	+0.9 -0.9	+1.5 -1.5	+0.7 0	+1.2 0	+1.8 0	+3.0 0	+1.5 -1.5
0.24	0.40	-0.5 -1.4	-0.5 -1.9	0 -0.9	0 -1.4	0 -2.2	0 -3.5	+1.1 -1.1	+1.8 -1.8	+0.9 0	+1.4 0	+2.2 0	+3.5 0	+1.8 -1.8
0.40	0.71	-0.6 -1.6	-0.6 -2.3	0 -1.0	0 -1.6	0 -2.8	0 -4.0	+1.4 -1.4	+2.0 -2.0	+1.0 0	+1.6 0	+2.8 0	+4.0 0	+2.0 -2.0
0.71	1.19	-0.8 -2.0	-0.8 -2.8	0 -1.2	0 -2.0	0 -3.5	0 -5.0	+1.8 -1.8	+2.5 -2.5	+1.2 0	+2.0 0	+3.5 0	+5.0 0	+2.5 -2.5
1.19	1.97	-1.0 -2.6	-1.0 -3.4	0 -1.6	0 -2.5	0 -4.0	0 -6.0	+2.0 -2.0	+3.0 -3.0	+1.6 0	+2.5 0	+4.0 0	+6.0 0	+3.0 -3.0
1.97	3.15	-1.2 -3.0	-1.2 -4.1	0 -1.8	0 -3.0	0 -4.5	0 -7.0	+2.3 -2.3	+3.5 -3.5	+1.8 0	+3.0 0	+4.5 0	+7.0 0	+3.5 -3.5
3.15	4.73	-1.4 -3.6	-1.4 -4.8	0 -2.2	0 -3.5	0 -5.0	0 -9.0	+2.5 -2.5	+4.5 -4.5	+2.2 0	+3.5 0	+5.0 0	+9.0 0	+4.5 -4.5
4.73	7.09	-1.6 -4.1	-1.6 -5.6	0 -2.5	0 -4.0	0 -6.0	0 -10.0	+3.0 -3.0	+5.0 -5.0	+2.5 0	+4.0 0	+6.0 0	+10.0 0	+5.0 -5.0
7.09	9.85	-2.0 -4.8	-2.0 -6.5	0 -2.8	0 -4.5	0 -7.0	0 -12.0	+3.5 -3.5	+6.0 -6.0	+2.8 0	+4.5 0	+7.0 0	+12.0 0	+6.0 -6.0
9.85	12.41	-2.2 -5.2	-2.2 -7.3	0 -3.0	0 -5.0	0 -8.0	0 -12.0	+4.0 -4.0	+6.0 -6.0	+3.0 0	+5.0 0	+8.0 0	+13.0 0	+6.0 -6.0
12.41	15.75	-2.5 -6.0	-2.8 -8.0	0 -3.5	0 -6.0	0 -9.0	0 -14.0	+4.5 -4.5	+7.0 -7.0	+3.5 0	+6.0 0	+9.0 0	+14.0 0	+7.0 -7.0
15.75	19.69	-2.8 -6.5	-2.8 -8.8	0 -4.0	0 -6.0	0 -10.0	0 -16.0	+5.0 -5.0	+8.0 -8.0	+4.0 0	+6.0 0	+10.0 0	+16.0 0	+8.0 -8.0
19.69	24.80	-3.0 -7.0	-3.0 -9.9	0 -4.3	0 -6.9	0 -11.0	0 -17.3	+5.5 -5.5	+8.7 -8.7	+4.3 0	+6.9 0	+11.0 0	+17.3 0	+8.7 -8.7
24.80	31.49	-3.1 -8.1	-3.1 -11.0	0 -4.9	0 -7.9	0 -12.6	0 -19.7	+6.3 -6.3	+9.8 -9.8	+4.9 0	+7.9 0	+12.6 0	+19.7 0	+9.8 -9.8



## BEARING MATERIALS AND DIMENSIONAL TOLERANCES

### HALLITE 87, 506, 533, & 708 BEARING STRIP

Hallite 87 strip is a low-friction bronze-filled PTFE compound produced in a flat tape style ready to be cut to size to suit individual applications. It is particularly effective in friction-conscious applications, such as servo cylinders.

Hallite 506 can be supplied in spiral lengths, generally in 10 metre lengths, as individual cut bearings, and also in 10 metre lengths, packed flat in a box dispenser. Hallite 506 bearing strip is manufactured to extremely accurate thickness tolerances, ensuring reliable cylinder alignment. Other sizes of Hallite 506 are available on request; special sections and diameters can also be produced to suit individual requirements.

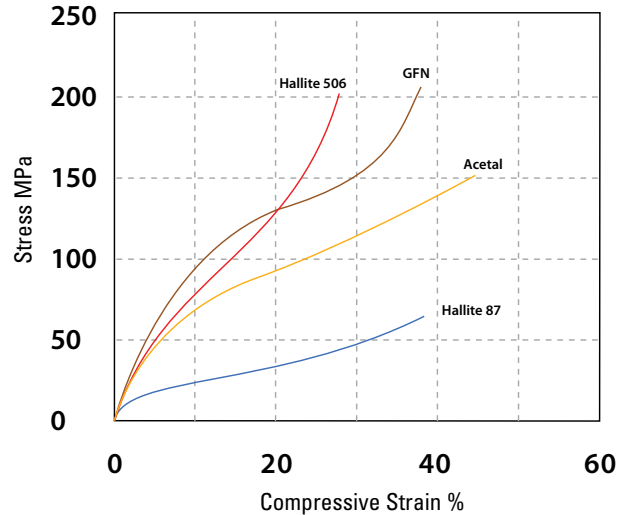
Hallite 533 bearings are formed glass-filled nylon rings made for many different housing sizes.

Hallite 708 bearings are manufactured from POM 0172, an advanced proprietary material for exceptional load bearing and wear resistant capabilities.

### BEARING STRIP HOUSING TOLERANCES

Please refer to the detailed bearing information located in the bearing section of this catalogue or on our website.

Compressive bearing stress versus strain for non-metallic materials



BEARING TYPE	STANDARD MATERIAL
87	PTFE + Bronze
506	Polyester + PTFE
533	GFN
708	POM 0172

SPECIFIED TOLERANCES	METRIC		INCH	
	BEARING LENGTH	BEARING CROSS SECTION	BEARING LENGTH	BEARING CROSS SECTION
	L <sub>1</sub>	S	L <sub>1</sub>	S
Hallite 87	-0.10 to -0.50	+0.03 to -0.05	-	-
Hallite 708	-0.10 to -0.60	-0.02 to -0.10	-	-
Hallite 506	-0.10 to -0.60	-0.02 to -0.08	-0.005 to -0.025	-0.001 to -0.003
Hallite 533	-	-	-0.000 to -0.010	-0.001 to -0.004

# HOUSING DESIGNS AND EXTRUSION GAPS

## HALLITE 87, 506, 533 & 708 BEARING STRIP

Hallite's product data sheets give information indicating the allowable extrusion gap a seal can see at pressure during its working life. The extrusion gap can be calculated using the tolerance build-ups within the cylinder and any dilation that may occur under pressure.

- Maximum extrusion gap = F max (see drawing below).
- F max is the maximum extrusion gap for the seal.
- Minimum metal-to-metal clearance = F min (see drawing below).

F min for cylinders with minimal side loading should be >0.01mm (0.004 in).

## RODS

### Maximum extrusion gap

$$F \text{ max} = \frac{(\text{Ø}D_3 \text{ max} + \text{Ø}D_2 \text{ max}) - S \text{ min} - \text{Ø}d_1 \text{ min}}{2}$$

### Minimum metal-to-metal clearance (extrusion gap)

$$F \text{ min} = S \text{ min} - \frac{(\text{Ø}D_2 \text{ max} - \text{Ø}D_3 \text{ min})}{2}$$

## PISTONS

### Maximum extrusion gap

$$F \text{ max} = \text{Ø}D_1 \text{ max} - S \text{ min} - \frac{(\text{Ø}d_3 \text{ min} + \text{Ø}d_2 \text{ min})}{2} + \text{dilation}$$

### Minimum metal-to-metal clearance (extrusion gap)

$$F \text{ min} = S \text{ min} - \frac{(\text{Ø}d_3 \text{ max} - \text{Ø}d_2 \text{ min})}{2}$$

### Calculate both F max and F min

Ensure the F min is greater than 0.1mm (0.004 in) and F max is less than the maximum extrusion gap stated on the seal data sheet at the application's working pressure.

For built-in metal bearings, the extrusion gap calculation is simpler.

### For F max:

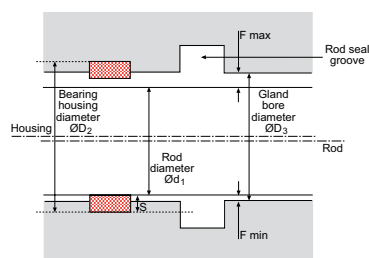
$$\text{Rod} = \text{Ø}D_3 \text{ max} - \text{Ø}d_1 \text{ min}$$

$$\text{Piston} = \text{Ø}D_1 \text{ max} - \text{Ø}d_3 \text{ min} + \text{dilation}$$

F min must be zero.

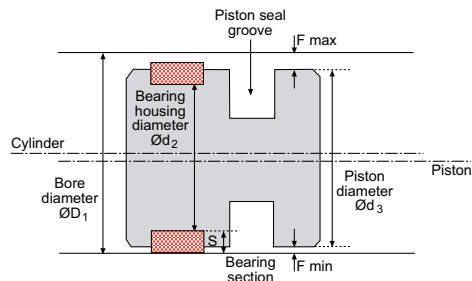
## ROD BEARING

*Note: Rod is not concentric with gland, because of clearances. (shown exaggerated)*



## PISTON BEARING

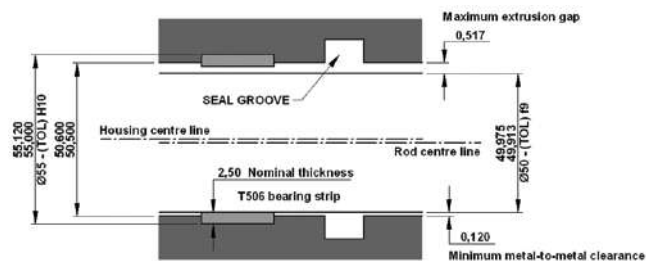
*Note: Piston is not concentric with cylinder bore, because of clearances. (shown exaggerated)*



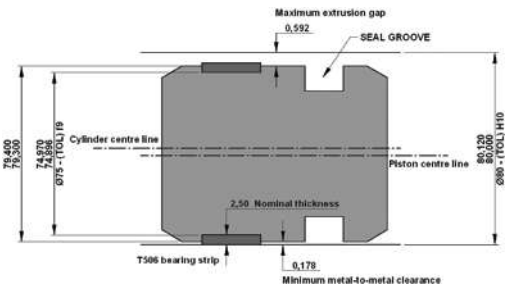
## EXTRUSION GAPS AND METAL-TO-METAL CLEARANCE

The use of remote bearing strips, such as Hallite 506, often creates a conflict between maximising the metal-to-metal clearance, avoiding metal-to-metal contact, and minimising the extrusion gap for the seal. The design decisions that have to be made in this respect are not trivial. The following examples show the effects of looser and tighter tolerances on the minimum metal-to-metal clearance and the maximum extrusion gap. The values have been calculated using the housing design formula. No allowance has been made for the deflection of the bearings under side load or for the cylinder dilation, in the case of the piston example.

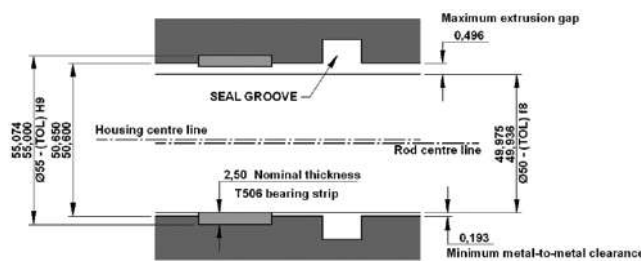
Gland for 50mm rod using 'standard' tolerances.



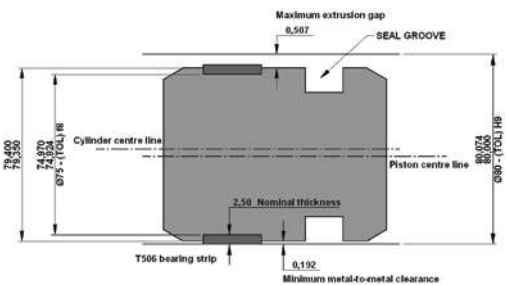
Piston for 80mm bore using 'standard' tolerances.



Gland for 50mm rod with tighter tolerances, showing that the minimum metal-to-metal clearance can be increased and the maximum extrusion gap reduced.



Piston for 80mm bore with tighter tolerances showing that minimum metal-to-metal clearance can be increased and maximum extrusion gap reduced.



Once the maximum extrusion gap has been calculated, the correct seal can be specified with regard to the required operating pressure of the cylinder. For further advice, please contact your local Hallite technical team.

# STORAGE OF SEALS

## STORAGE CONDITIONS

Most polymeric items, including vulcanised rubber and other elastomers, tend to change their properties during storage and may become unserviceable. This may be due to hardening, softening, cracking, crazing, or other degradation and may be the result of oxygen, ozone, light, heat, and/or humidity. The following recommendations indicate the most suitable conditions for storing elastomeric items, whether as a single item or composite product.

1. Temperature - Storage temperatures should not exceed 50°C (122°F). Low temperatures are not permanently harmful, provided the rubber items are handled carefully and not distorted. When taken from low temperatures, items should be raised to approximately 30°C (86°F) before they are used.
2. Humidity - Optimum humidity is about 65% in a draft-free atmosphere.
3. Light - Protection from direct sunlight and strong artificial light with a high ultraviolet content is important. Unless packed in opaque containers, it is advisable to cover windows with red or orange screens or coatings.
4. Oxygen and Ozone - Wrapping, storage in airtight containers, or other suitable means should be used for vulcanised rubber items. Storage in containers that limit exposure to environmental conditions (e.g. sealed plastic bags) should be used for all materials when possible.
5. Deformation - Where possible, rubber items should be stored in a relaxed position, free from tension or compression. Laying the item flat and avoiding suspension or crushing keeps it free from strain and minimises deformation.
6. Contact with Liquid and Semi-Solid Material - Contact with liquids and semi-solid materials, particularly solvents, such as oils or greases should be avoided unless so packed by the manufacturer.
7. Contact with Metals - Metals such as manganese, iron, copper, or copper alloys can have a harmful effect on rubber. A layer of paper, polyethylene, or cellophane will keep these separated.
8. Contact with Non-Metals - Contact with other rubbers or creosotes should be avoided.
9. Stock Rotation - Elastomers should be stored for as short a period as possible, and strict stock rotation should be practiced.
10. Cleaning - Organic solvents such as trichloroethylene, carbon tetrachloride, and petroleum are the most harmful agents. Soap, water, and methylated spirits are the least harmful, and all parts should be dried at room temperature before use.
11. Shelf Life - The table below shows the storage life of seal components made from the more common materials under ideal conditions. Storing under less-than-ideal conditions will reduce the life of the component.

Careful inspection for the following should be made before installation and after storage:

- Mechanical damage
- Cracks or surface crazing
- Permanent distortion
- Tackiness or surface softening/hardening

Thin components (less than 1.6mm {1/16in}) tend to be more critically affected.

The appearance of bloom is relatively unimportant, except in certain non-toxic applications.

BASE POLYMER (ISO DESIGNATION)	PRIMARY STORAGE PERIOD (YEARS)	EXTENSION OF STORAGE PERIOD AFTER RE-INSPECTION (YEARS)
FLUOROCARBON (FKM) ETHYLENE PROPYLENE (EPDM)	10	5
NITRILE (NBR) TPU-EU	7	3
TPU-AU	5	2
ENGINEERING THERMOPLASTICS: ACETAL (POM) / POLYAMIDE (PA) GLASS-FILLED NYLON (PA) / PTFE POLYPHENYLENE SULPHIDE (PPS)	UNLIMITED	-
ENGINEERING THERMOSETS: T506 BEARING STRIP	UNLIMITED	-

# SURFACE FINISH

The dynamic surface finish has an immense influence on operation and service life of a sealing component. If the surface is too smooth, it will not properly retain lubrication and will cause excessive seal wear due to frictional heat. If the surface is too coarse, premature seal failure may occur due to the roughness of the surface, hence causing small cuts or scores in the sealing lip. Proper surface finish is critical in assuring maximum seal performance and life within a given application.

The static sealing and housing surface also has a significant influence on the operation and service life of a seal. Though the surface finish requirements are not as severe, it is critical to ensure surface finish recommendations are met to maximise seal performance and life.

## DYNAMIC SURFACE FINISHES

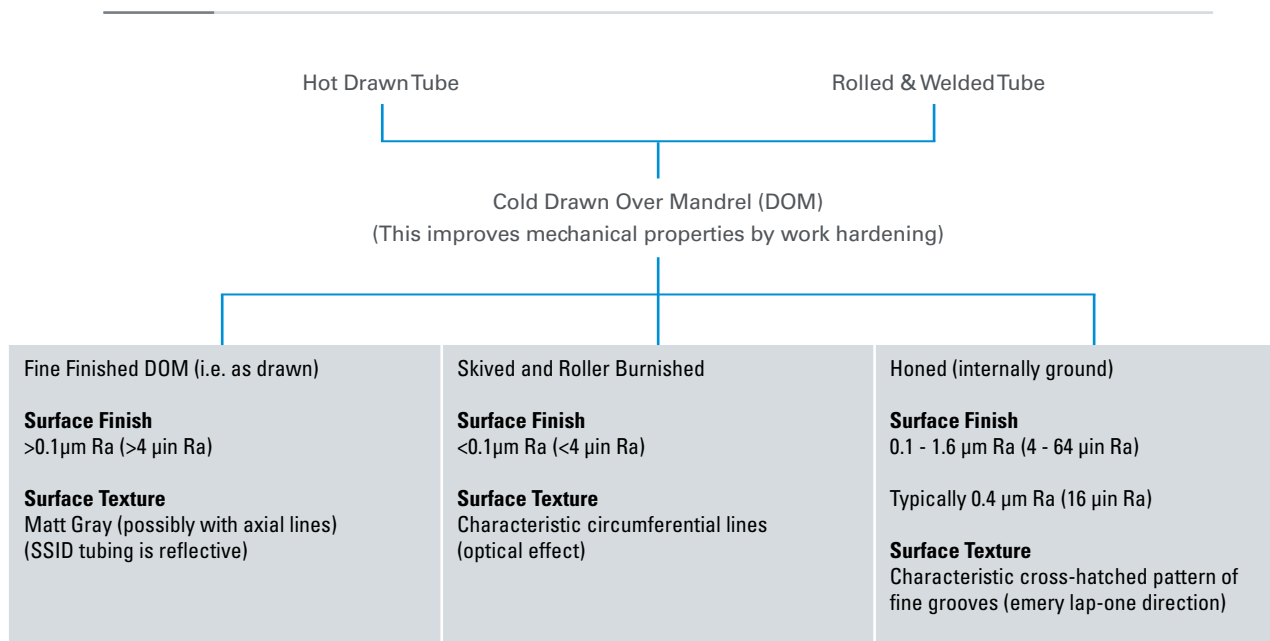
Piston rods are generally hard chrome plated. The hardness target should be at least 67 Rockwell C (900 HV/10). This gives an excellent tribological surface, and provided the rods are produced by an established supplier within a surface finish range of 0.1 to 0.3  $\mu\text{m Ra}$  (4-12  $\mu\text{in Ra}$ ), no major problem should ensue. The optimum surface finish may also depend on the seal material. Bore surface finishes can be more problematic. The typical methods of achieving bore finishes are summarized in the figure below and bulleted details:

- Drawn Over Mandrel (DOM) tubing as produced, can be either adequate or inadequate depending on the actual surface texture achieved and the application.
- Special Smooth Inside Diameter (SSID) DOM: With the advent of improved manufacturing processes, SSID tubing is more commonplace than it was years ago. In certain circumstances however, SSID finishes, just like its rougher finish relative DOM tube, can lead to premature wear of the seal through flow erosion. Careful specification and regular quality inspections are recommended if SSID tube is to be used.
- Optimally, Skived & Roller Burnished or Honed Tube is preferred.
  - Skived & Roller Burnished tubing is very smooth (less than 0.1  $\mu\text{m Ra}$ ) (4  $\mu\text{in Ra}$ ). Rubber sealing elements are more susceptible to damage due to the smoother surfaces.
  - Honed Tube (produced between 0.1 and 0.4  $\mu\text{m Ra}$ ) (4-16  $\mu\text{in Ra}$ ) is potentially the most expensive, but has the best finish and is known to be the friendliest to mating sealing elements.

## STATIC SURFACE FINISHES

The static sealing surface finish must not be ignored in the control of leakage. Generally, these are fine turned and should be free from chatter marks.

### METHODS OF MANUFACTURING OF TUBES FOR HYDRAULIC CYLINDERS AND RESULTING SURFACE TEXTURES

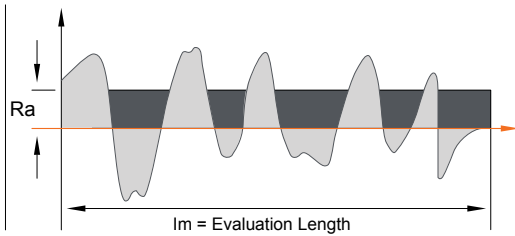


# SURFACE FINISH

## CRITICAL SURFACE FINISH MEASUREMENTS FOR SEALING

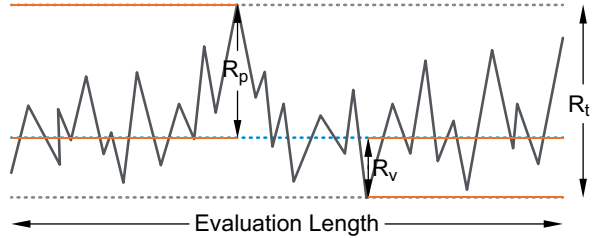
Many parameters can be used to define surface finishes, which are explained in ISO 4287 and ISO 4288. The most commonly used in the fluid power industry include:

### Ra – Surface Finish Measurement



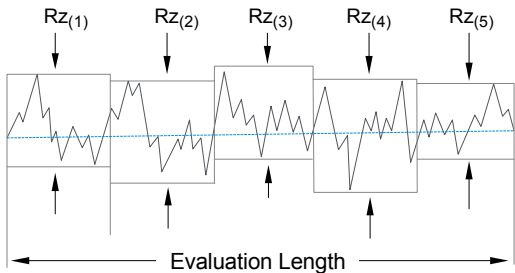
**Ra = Arithmetical mean deviation of an absolute ordinate over the evaluation length**

### Rt – Surface Finish Measurement



**Rt = Sum of height of the largest profile peak height Rp and the largest profile valley Rv over the evaluation length**

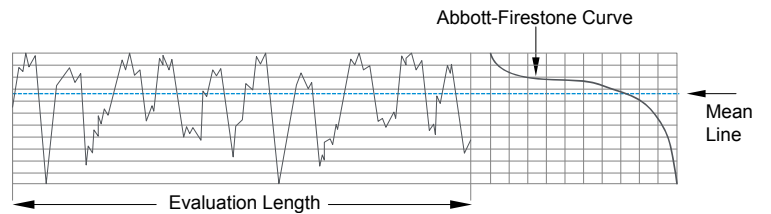
### Rz – Surface Finish Measurement



$$Rz = (Rz_{(1)} + Rz_{(2)} + Rz_{(3)} + Rz_{(4)} + Rz_{(5)})/5$$

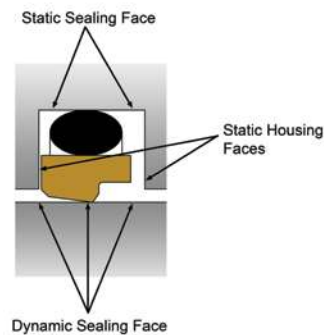
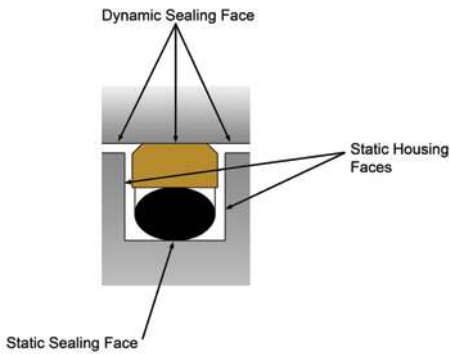
**Rz<sub>(n)</sub> = Sum of height of the largest profile peak height Rp and the largest profile valley Rv within a sampling length**

### Rmr – Surface Finish Measurement



The 'sharpness' of the surface using a material ratio taken from the Abbott-Firestone curve. The material ratio at a particular height is a slice through the profile giving the percentage length of the cut at that height compared to the evaluation length. The Rmr values are at a depth of 25% of the Rz value from a reference level of 5%.

## SEALING FACE PROFILES



## SURFACE FINISH

### SURFACE FINISH RECOMMENDATIONS - PTFE MATERIALS

SURFACE ROUGHNESS	METRIC			INCH			Rmr*
	µmRa	µmRz	µmRt	µinRa	µinRz	µinRt	
<b>Dynamic Sealing Face Ød<sub>1</sub></b>	0.05 - 0.2	1.6 max	2 max	2 - 8	63 max	157 max	50-80%
<b>Static Sealing Face ØD<sub>1</sub></b>	1.6 max	6.3 max	10 max	63 max	250 max	394 max	
<b>Static Housing Faces L<sub>1</sub></b>	3.2 max	10 max	16 max	125 max	394 max	630 max	

\*Rmr is measured at a depth of 25% of the Rz value based upon a reference level (zero line) at 5% material/bearing area.

### SURFACE FINISH RECOMMENDATIONS - TPU, TPE, & RUBBER MATERIALS

SURFACE ROUGHNESS	METRIC			INCH			Rmr*
	µmRa	µmRz	µmRt	µinRa	µinRz	µinRt	
<b>Dynamic Sealing Face Ød<sub>1</sub></b>	0.1 - 0.4	1.6 max	4 max	4 - 16	63 max	157 max	50-80%
<b>Static Sealing Face ØD<sub>1</sub></b>	1.6 max	6.3 max	10 max	63 max	250 max	394 max	
<b>Static Housing Faces L<sub>1</sub></b>	3.2 max	10 max	16 max	125 max	394 max	630 max	

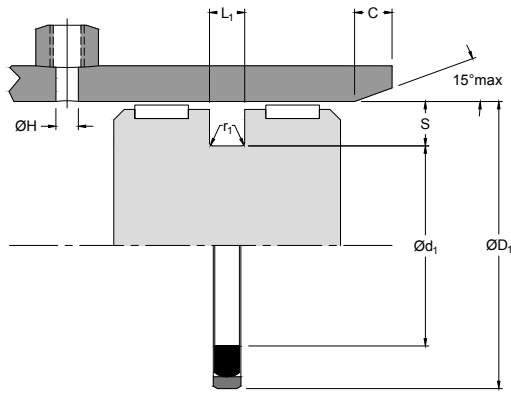
\*Rmr is measured at a depth of 25% of the Rz value based upon a reference level (zero line) at 5% material/bearing area.





# DOUBLE-ACTING PISTON SEALS





# 714

## PISTON SEAL

*Double-Acting  
Glass-Filled Nylon Face with Rubber Energiser  
for Heavy-Duty Applications*

### DESIGN

The Hallite 714 double-acting piston seal is a compact seal for medium to heavy-duty applications.

In double-acting telescopic cylinders or phasing cylinders, the seal's reinforced, heat-stabilized, thermoplastic sealing face with step-cut joint is an ideal choice because it allows the seal to pass over ports without damage. The rugged, extrusion resistant design also performs extremely well in high-pressure off-highway and earthmoving applications where the seal face can tolerate the large extrusion gaps which are required to prevent piston-to-bore contact.

The abrasion resistant glass-filled nylon (GFN) face seal material allows the seal to work well on super smooth inside diameter (SSID) as drawn tube. The precision moulded face has chamfers which coupled with a profiled NBR expander allows for easier cylinder assembly.

The expander material comes in a number of material options to extend operating conditions. Contact your local Hallite technical team to decide which is best for your application.



### FEATURES

- Passes over ports
- High pressure capability
- Static load holding capability
- Excellent wear and abrasion resistance well proven for use on SSID tube
- Replaces multiple piston rings in double-acting telescopic cylinders
- Chamfered cap with profiled expander for easier cylinder assembly
- Excellent dynamic and static sealing performance

### MATERIALS

As standard, this product comes in the following materials. Contact your local Hallite technical team if you would like to find out if this profile can be made in a custom material to suit your application. For further material details, please refer to the Hallite Material Table.

MATERIAL OPTIONS	Name	Face Type	Face Colour
Standard	PA 533-NBR	PA-GF	Black

## TECHNICAL DETAILS

OPERATING CONDITIONS	METRIC	INCH
Maximum Speed	1.0 m/sec	3.0 ft/sec
Temperature Range	-40°C +110°C	-40°F +230°F
Maximum Pressure	500 bar	7250 psi

**NOTE**

Data given are maximum values and can apply depending on specific application. Maximum ratings of temperature, pressure, or operating speeds are dependent on fluid medium, surface, gap value, and other variables such as dynamic or static service. Maximum values are not intended for use together at the same time, e.g. max temperature and max pressure. Please contact your Hallite technical representative for application support.

MAXIMUM EXTRUSION GAP				
Pressure bar	500			
Groove Section S mm	5.5	7.75	10.5	12.25
Maximum Gap mm	0.35	0.50	0.60	0.80
Pressure psi	7250			
Groove Section S in	0.269	0.296	0.38	0.438
Maximum Gap in	0.014	0.020	0.024	0.032

**NOTE**

Figures show the maximum permissible gap all on one side using minimum rod  $\varnothing$  and maximum clearance  $\varnothing$ . Refer to Housing Design section.

SURFACE ROUGHNESS	$\mu\text{mRa}$	$\mu\text{mRz}$	$\mu\text{mRt}$	$\mu\text{inRa}$	$\mu\text{inRz}$	$\mu\text{inRt}$
Dynamic Sealing Face $\varnothing D_1$	0.1 - 0.4	1.6 max	4 max	4 - 16	63 max	157 max
Static Sealing Face $\varnothing d_1$	1.6 max	6.3 max	10 max	63 max	250 max	394 max
Static Housing Faces $L_1$	3.2 max	10 max	16 max	125 max	394 max	630 max

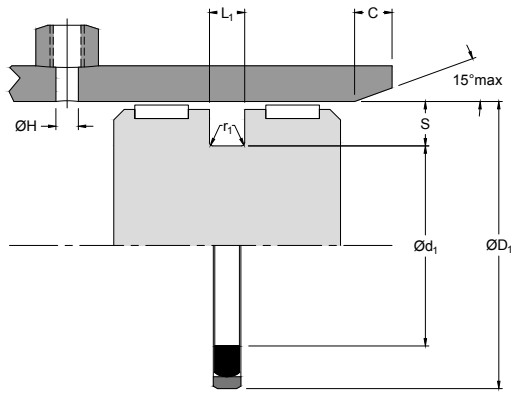
CHAMFERS & RADII								
Groove Section S	5.50	7.75	10.50	12.25	0.269	0.296	0.380	0.438
Min Chamfer C	4.00	6.00	8.00	10.00	0.250	0.250	0.375	0.375
Max Fillet Rad $r_1$	0.40	0.80	0.80	0.80	0.016	0.032	0.032	0.032

PORT DIAMETER		
Max $\varnothing H$	$L_1 \text{ mm} \times 0.85$	$L_1 \text{ in} \times 0.850$

**NOTE**

If the seal is to pass over the port, step-cut joint position must be taken into account.

TOLERANCES	$\varnothing D_1$	$\varnothing d_1$	$L_1$
mm	H9	h9	+0.20 -0
in	H9	h9	+0.008 -0



# 714

## PISTON SEAL

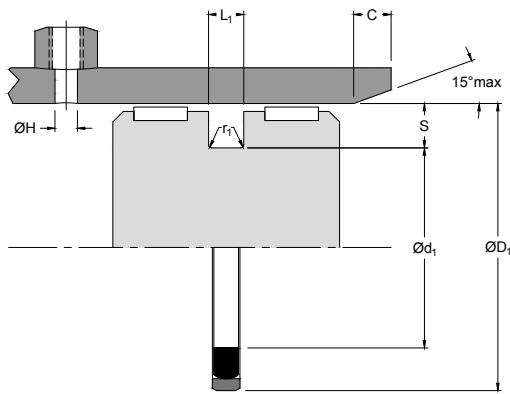
*Double-Acting  
Glass-Filled Nylon Face with Rubber Energiser  
for Heavy-Duty Applications*

### PART NUMBER RANGE

METRIC					
ØD <sub>1</sub>	TOL H9	Ød <sub>1</sub>	TOL h9	L <sub>1</sub> +0.20-0	PART No.
40.00	+0.06 0.00	29.00	0.00 -0.05	4.20	7270510‡
45.00	+0.06 0.00	34.00	0.00 -0.06	4.20	7270610
50.00	+0.06 0.00	34.50	0.00 -0.06	6.30	7272310‡
50.00	+0.06 0.00	39.00	0.00 -0.06	4.20	7270810‡
55.00	+0.07 0.00	39.50	0.00 -0.06	6.30	7274810
60.00	+0.07 0.00	49.00	0.00 -0.06	4.20	7270910‡
63.00	+0.07 0.00	44.70	0.00 -0.06	7.00	7274910
63.00	+0.07 0.00	47.50	0.00 -0.06	6.30	7272410‡
63.00	+0.07 0.00	52.00	0.00 -0.07	4.20	7271010‡
70.00	+0.07 0.00	54.50	0.00 -0.07	6.30	7273710
70.00	+0.07 0.00	59.00	0.00 -0.07	4.20	7271310
75.00	+0.07 0.00	54.00	0.00 -0.07	8.10	7273010
75.00	+0.07 0.00	59.50	0.00 -0.07	6.30	7271410
80.00	+0.07 0.00	59.00	0.00 -0.07	8.10	7273310
80.00	+0.07 0.00	64.50	0.00 -0.07	6.30	7270010‡
85.00	+0.09 0.00	64.00	0.00 -0.07	8.10	7273110
90.00	+0.09 0.00	69.00	0.00 -0.07	8.10	7273210

#### NOTE

Part numbers suffixed by "‡" indicate housing sizes to meet ISO 7425-1.



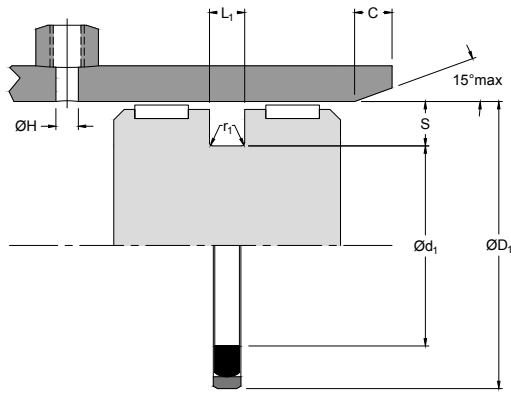
## PART NUMBER RANGE

METRIC					
$\varnothing D_1$	TOL H9 0.00	$\varnothing d_1$	TOL h9 0.00	$L_1$ +0.20-0	PART No.
90.00	+0.09 0.00	74.50	0.00 -0.07	6.30	7271610
95.00	+0.09 0.00	74.00	0.00 -0.07	8.10	7273510
100.00	+0.09 0.00	79.00	0.00 -0.07	8.10	7273810
100.00	+0.09 0.00	84.50	0.00 -0.09	6.30	7271810‡
105.00	+0.09 0.00	84.00	0.00 -0.09	8.10	7272910
110.00	+0.09 0.00	89.00	0.00 -0.09	8.10	7273410
115.00	+0.09 0.00	94.00	0.00 -0.09	8.10	7273910
120.00	+0.09 0.00	99.00	0.00 -0.09	8.10	7272010
120.00	+0.09 0.00	104.50	0.00 -0.09	6.30	7275210
125.00	+0.10 0.00	104.00	0.00 -0.09	8.10	7272110‡
125.00	+0.10 0.00	109.50	0.00 -0.09	6.30	7272810‡
130.00	+0.10 0.00	109.00	0.00 -0.09	8.10	7274010
140.00	+0.10 0.00	119.00	0.00 -0.09	8.10	7272210
150.00	+0.10 0.00	129.00	0.00 -0.10	8.10	7274110
150.00	+0.10 0.00	130.60	0.00 -0.10	9.60	7275310
160.00	+0.10 0.00	139.00	0.00 -0.10	8.10	7272510‡
180.00	+0.10 0.00	159.00	0.00 -0.10	8.10	7272610

### NOTE

Part numbers suffixed by "‡" indicate housing sizes to meet ISO 7425-1.





# 714

## PISTON SEAL

*Double-Acting  
Glass-Filled Nylon Face with Rubber Energiser  
for Heavy-Duty Applications*

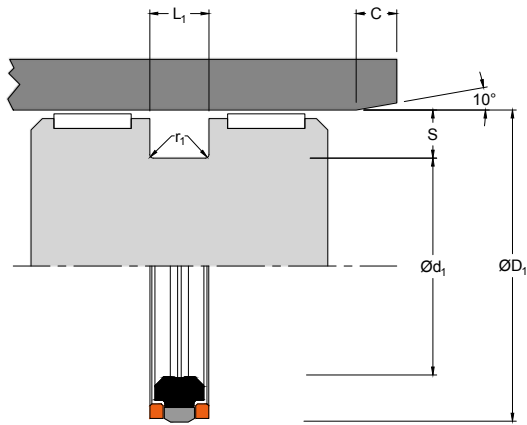
### PART NUMBER RANGE

METRIC					
ØD <sub>1</sub>	TOL H9	Ød <sub>1</sub>	TOL h9	L <sub>1</sub> +0.20-0	PART No.
190.00	+0.12 0.00	169.00	0.00 -0.10	8.10	7274210
200.00	+0.12 0.00	179.00	0.00 -0.10	8.10	7272710‡
220.00	+0.12 0.00	199.00	0.00 -0.12	8.10	7274310
250.00	+0.12 0.00	229.00	0.00 -0.12	8.10	7273610‡
280.00	+0.13 0.00	255.50	0.00 -0.13	8.10	7274410

**NOTE**

Part numbers suffixed by "‡" indicate housing sizes to meet ISO 7425-1.





# 730

## PISTON SEAL

*Double-Acting  
Four Part Assembly with AE Rings  
for Heavy-Duty Applications*

### DESIGN

The Hallite 730 double-acting piston seal in a four part assembly is designed for use in heavy-duty applications where position holding ability is important, such as longwall mining roof support applications using water-based fluids and large diameter crane cylinders using standard hydraulic oils.

The Hallite 730 is comprised of a tough, wear resistant thermoplastic polyester elastomer (TPE) face seal pre-loaded by a profiled nitrile rubber energiser. The Hallite 730 design also contains a pair of rectangular polyacetal anti-extrusion rings.

The standard TPE face material is suitable for both roller-burnished and honed tubing. While rarely used in alternate material, the face material can be provided in a number of material options including lubricated polyester and PTFE.

For your reference, we have included an installation guide for the Hallite 730 double-acting piston seal which you can find after the part number range pages of this data sheet.



### FEATURES

- Excellent position holding characteristics under load
- High pressure and shock load capability
- Extremely well proven in longwall mining applications
- Proven on both roller-burnished and honed tubing
- Extremely well proven in HFA water-based fluids

### MATERIALS

As standard, this product comes in the following materials. Contact your local Hallite technical team if you would like to find out if this profile can be made in a custom material to suit your application. For further material details, please refer to the Hallite Material Table.

MATERIAL OPTIONS	Name	Face Type	Face Colour
Standard	TPE 111-Nitrile 1411-POM 0011	TPE	Grey

## TECHNICAL DETAILS

OPERATING CONDITIONS	METRIC	INCH
Maximum Speed	0.3 m/sec	1.0 ft/sec
Temperature Range Hydraulic Oils	-40°C +110°C	-40°F +230°F
Temperature Range Water-Based Fluids	-0°C +60°C	32°F +140°F
Maximum Pressure	700 bar	10000 psi

**NOTE**

Data given are maximum values and can apply depending on specific application. Maximum ratings of temperature, pressure, or operating speeds are dependent on fluid medium, surface, gap value, and other variables such as dynamic or static service. Maximum values are not intended for use together at the same time, e.g. max temperature and max pressure. Please contact your Hallite technical representative for application support.

MAXIMUM EXTRUSION GAP				
Pressure bar	160	250	500	700
Maximum Gap mm	1.00	0.80	0.40	0.25
Pressure psi	1.00	0.80	0.40	0.25
Maximum Gap in	0.040	0.032	0.016	0.010

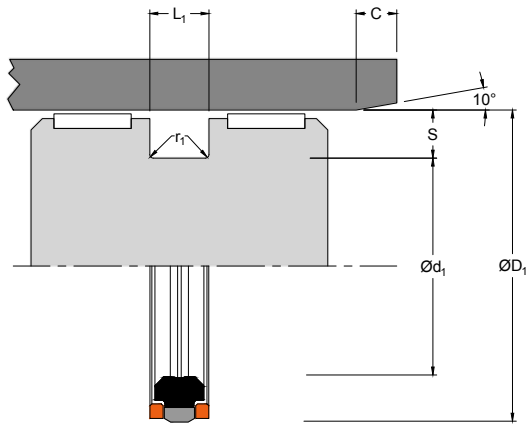
**NOTE**

Figures show the maximum permissible gap all on one side using minimum rod  $\varnothing$  and maximum clearance  $\varnothing$ . Refer to Housing Design section.

SURFACE ROUGHNESS	$\mu\text{mRa}$	$\mu\text{mRz}$	$\mu\text{mRt}$	$\mu\text{inRa}$	$\mu\text{inRz}$	$\mu\text{inRt}$
Dynamic Sealing Face $\varnothing D_1$	0.1 - 0.4	1.6 max	4 max	4 - 16	63 max	157 max
Static Sealing Face $\varnothing d_1$	1.6 max	6.3 max	10 max	63 max	250 max	394 max
Static Housing Faces $L_1$	3.2 max	10 max	16 max	125 max	394 max	630 max

CHAMFERS & RADII				
Groove Section $\leq S$ mm	7.50	10.00	12.50	15.00
Min Chamfer $C$ mm	8.00	10.00	13.00	15.00
Max Fillet Rad $r_1$ mm	0.20	0.40	0.80	0.80

TOLERANCES	$\varnothing D_1$	$\varnothing d_1$	$L_1$
mm	H10	h9	+0.20 -0



# 730

## PISTON SEAL

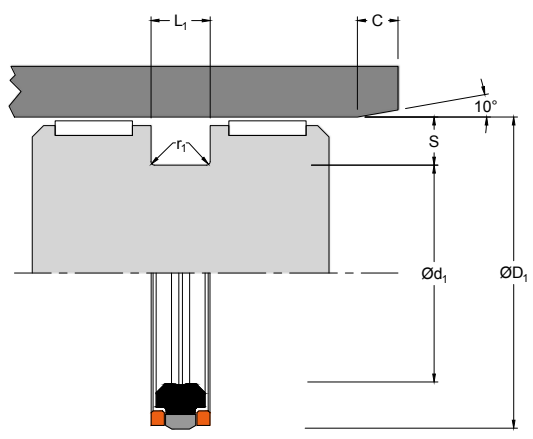
*Double-Acting  
Four Part Assembly with AE Rings  
for Heavy-Duty Applications*

### PART NUMBER RANGE

METRIC					
ØD <sub>1</sub>	TOL H10	Ød <sub>1</sub>	TOL h9	L <sub>1</sub> +0.20-0	PART No.
40.00	+0.10 0.00	28.00	0.00 -0.05	11.50	2390810
50.00	+0.10 0.00	38.00	0.00 -0.06	11.50	2335410
60.00	+0.12 0.00	44.00	0.00 -0.06	13.00	2390710
60.00	+0.12 0.00	44.00	0.00 -0.06	20.50	2356710
63.00	+0.12 0.00	50.00	0.00 -0.06	14.50	2331210
75.00	+0.12 0.00	55.00	0.00 -0.07	23.00	2346420
80.00	+0.12 0.00	66.00	0.00 -0.07	17.00	2330310
90.00	+0.14 0.00	75.00	0.00 -0.07	13.50	2331310
90.00	+0.14 0.00	76.00	0.00 -0.07	16.00	2364810
100.00	+0.14 0.00	82.00	0.00 -0.09	22.50	2331410
100.00	+0.14 0.00	85.00	0.00 -0.09	12.50	2342910*
100.00	+0.14 0.00	85.00	0.00 -0.09	13.50	2335010
100.00	+0.14 0.00	86.00	0.00 -0.09	22.50	2359710
105.00	+0.14 0.00	80.00	0.00 -0.07	22.50	2346710
105.00	+0.14 0.00	91.00	0.00 -0.09	16.50	2348210
110.00	+0.14 0.00	95.00	0.00 -0.09	12.50	2343010*
110.00	+0.14 0.00	95.00	0.00 -0.09	16.00	2331610

#### NOTE

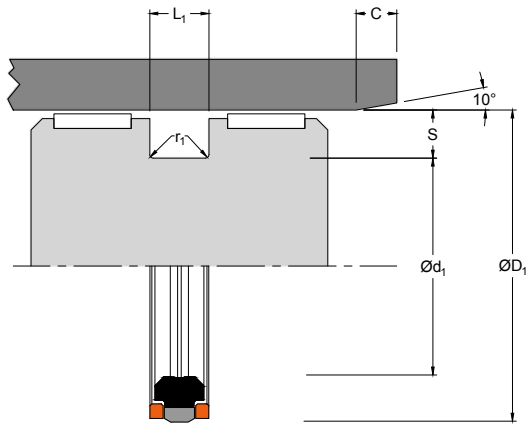
Part numbers suffixed by "\*" indicate use of Hallite 754 face ring.



## PART NUMBER RANGE

METRIC					
$\varnothing D_1$	TOL H10	$\varnothing d_1$	TOL h9	$L_1$ +0.20-0	PART No.
115.00	+0.14 0.00	90.00	0.00 -0.09	21.00	2329110
115.00	+0.14 0.00	97.00	0.00 -0.09	22.50	2356110
115.00	+0.14 0.00	100.00	0.00 -0.09	16.00	2329210
120.00	+0.14 0.00	105.00	0.00 -0.09	16.00	2337410
125.00	+0.16 0.00	110.00	0.00 -0.09	15.80	2331510
130.00	+0.16 0.00	113.00	0.00 -0.09	12.50	2339110*
130.00	+0.16 0.00	113.00	0.00 -0.09	20.50	2369010
135.00	+0.16 0.00	118.00	0.00 -0.09	20.50	2348110
135.00	+0.16 0.00	120.00	0.00 -0.09	16.00	2334010
140.00	+0.16 0.00	123.00	0.00 -0.10	16.00	2357910
140.00	+0.16 0.00	125.00	0.00 -0.10	16.00	2329410
150.00	+0.16 0.00	130.00	0.00 -0.10	16.00	2339010
150.00	+0.16 0.00	133.00	0.00 -0.10	20.00	2360510
150.00	+0.16 0.00	135.00	0.00 -0.10	16.00	2338210
160.00	+0.16 0.00	143.00	0.00 -0.10	20.00	2365510
160.00	+0.16 0.00	145.00	0.00 -0.10	16.00	2331910
165.00	+0.16 0.00	145.00	0.00 -0.10	20.00	2348910

**NOTE** Part numbers suffixed by "\*" indicate use of Hallite 754 face ring.



# 730

## PISTON SEAL

*Double-Acting  
Four Part Assembly with AE Rings  
for Heavy-Duty Applications*

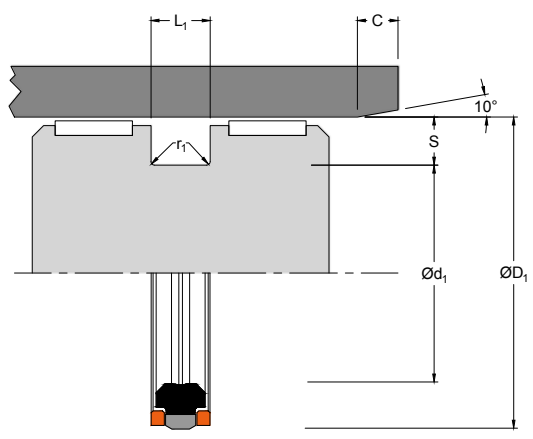
### PART NUMBER RANGE

METRIC					
ØD <sub>1</sub>	TOL H10	Ød <sub>1</sub>	TOL h9	L <sub>1</sub> +0.20-0	PART No.
165.00	+0.16 0.00	150.00	0.00 -0.10	16.00	2332010
170.00	+0.16 0.00	145.00	0.00 -0.10	25.00	2345510
170.00	+0.16 0.00	150.00	0.00 -0.10	16.00	2331110
175.00	+0.16 0.00	155.00	0.00 -0.10	16.00	2335110
180.00	+0.16 0.00	160.00	0.00 -0.10	16.00	2328510
180.00	+0.16 0.00	163.00	0.00 -0.10	20.00	2365210
185.00	+0.19 0.00	165.00	0.00 -0.10	16.00	2328410
185.00	+0.19 0.00	165.00	0.00 -0.10	20.00	2364010
190.00	+0.19 0.00	170.00	0.00 -0.10	16.00	2332210
195.00	+0.19 0.00	175.00	0.00 -0.10	16.00	2334710
200.00	+0.19 0.00	180.00	0.00 -0.10	16.00	2329310
200.00	+0.19 0.00	180.00	0.00 -0.10	20.00	2348810
200.00	+0.19 0.00	183.00	0.00 -0.12	20.00	2365010
210.00	+0.19 0.00	190.00	0.00 -0.12	16.00	2332410
210.00	+0.19 0.00	190.00	0.00 -0.12	20.00	2364710
215.00	+0.19 0.00	195.00	0.00 -0.12	16.00	2332510
215.00	+0.19 0.00	195.00	0.00 -0.12	20.00	2345110

#### NOTE

Part numbers suffixed by "\*" indicate use of Hallite 754 face ring.

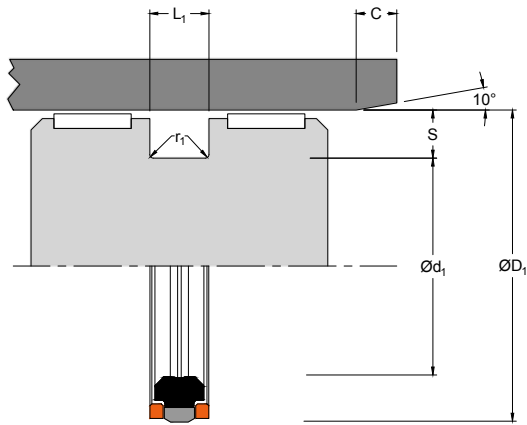




**PART NUMBER RANGE**

METRIC					
$\varnothing D_1$	TOL H10	$\varnothing d_1$	TOL h9	$L_1$ +0.20-0	PART No.
220.00	+0.19 0.00	195.00	0.00 -0.12	16.00	2345810
220.00	+0.19 0.00	195.00	0.00 -0.12	22.00	2333920
220.00	+0.19 0.00	195.00	0.00 -0.12	25.00	2333910
220.00	+0.19 0.00	200.00	0.00 -0.12	20.50	2356510
224.00	+0.19 0.00	204.00	0.00 -0.12	20.50	2348510
225.00	+0.19 0.00	205.00	0.00 -0.12	16.00	2332610
225.00	+0.19 0.00	205.00	0.00 -0.12	20.00	2346810
230.00	+0.19 0.00	210.00	0.00 -0.12	16.00	2332710
230.00	+0.19 0.00	210.00	0.00 -0.12	20.00	2344510
240.00	+0.19 0.00	215.00	0.00 -0.12	25.00	2333010
240.00	+0.19 0.00	220.00	0.00 -0.12	25.00	2364310
245.00	+0.19 0.00	220.00	0.00 -0.12	25.00	2328810
250.00	+0.19 0.00	225.00	0.00 -0.12	25.00	2348310
255.00	+0.21 0.00	230.00	0.00 -0.12	25.00	2348320
260.00	+0.21 0.00	230.00	0.00 -0.12	30.00	2347810
260.00	+0.21 0.00	235.00	0.00 -0.12	25.00	2347910
275.00	+0.21 0.00	250.00	0.00 -0.12	25.00	2362210

**NOTE** Part numbers suffixed by "\*" indicate use of Hallite 754 face ring.



# 730

## PISTON SEAL

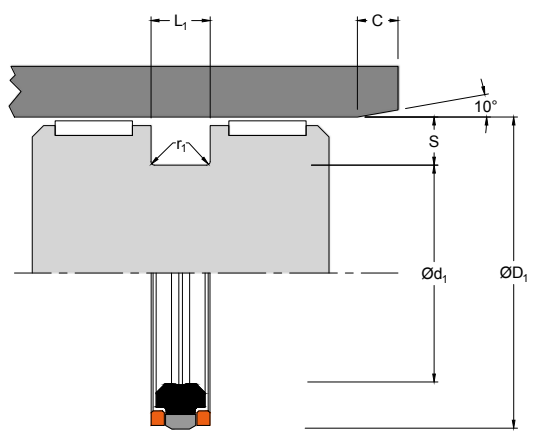
*Double-Acting  
Four Part Assembly with AE Rings  
for Heavy-Duty Applications*

### PART NUMBER RANGE

METRIC					
ØD <sub>1</sub>	TOL H10	Ød <sub>1</sub>	TOL h9	L <sub>1</sub> +0.20-0	PART No.
280.00	+0.21 0.00	255.00	0.00 -0.13	25.00	2333510
285.00	+0.21 0.00	260.00	0.00 -0.13	25.00	2362410
290.00	+0.21 0.00	265.00	0.00 -0.13	27.00	2364410
300.00	+0.21 0.00	275.00	0.00 -0.13	25.00	2333610
305.00	+0.21 0.00	280.00	0.00 -0.13	25.00	2333630
310.00	+0.21 0.00	285.00	0.00 -0.13	25.00	2333710
320.00	+0.23 0.00	290.00	0.00 -0.13	30.00	2348010
340.00	+0.23 0.00	310.00	0.00 -0.13	30.00	2366010
340.00	+0.23 0.00	310.00	0.00 -0.13	32.00	2390910
345.00	+0.23 0.00	315.00	0.00 -0.13	30.00	2363610
350.00	+0.23 0.00	320.00	0.00 -0.14	30.00	2345410
360.00	+0.23 0.00	330.00	0.00 -0.14	30.00	2345430
360.00	+0.23 0.00	330.00	0.00 -0.14	31.50	2365410
370.00	+0.23 0.00	340.00	0.00 -0.14	30.00	2362710
380.00	+0.23 0.00	350.00	0.00 -0.14	32.00	2362110
390.00	+0.23 0.00	360.00	0.00 -0.14	32.00	2362120
400.00	+0.23 0.00	370.00	0.00 -0.14	32.00	2359810

#### NOTE

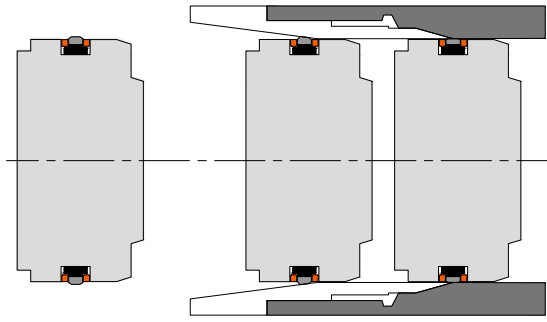
Part numbers suffixed by "\*" indicate use of Hallite 754 face ring.



## PART NUMBER RANGE

METRIC					
$\text{Ø}D_1$	TOL H10	$\text{Ø}d_1$	TOL h9	$L_1$ +0.20-0	PART No.
410.00	+0.25 0.00	380.00	0.00 -0.14	32.00	2359820
420.00	+0.25 0.00	390.00	0.00 -0.14	32.00	2366410
440.00	+0.25 0.00	410.00	0.00 -0.16	32.00	2365910
450.00	+0.25 0.00	410.00	0.00 -0.16	32.00	2390510
480.00	+0.25 0.00	440.00	0.00 -0.16	32.00	2391010
500.00	+0.25 0.00	470.00	0.00 -0.16	32.00	2369410

**NOTE** Part numbers suffixed by “\*” indicate use of Hallite 754 face ring.



# 730

## PISTON SEAL

*Double-Acting  
Four Part Assembly with AE Rings  
for Heavy-Duty Applications*

### INSTALLATION INSTRUCTIONS FOR HALLITE 730

**NOTE**

Before installation of the seals onto the piston, check that the piston is free of dirt and sharp edges. Sharp edged tools which could damage the seal during installation must not be used.

### INSTALLATION

The rubber energiser must be installed first. It can be pulled over the piston with a circling movement using a flexible plastic installation strip to stretch the energiser.

The energiser should then be positioned in the centre of the groove with a clearance on either side.

The first AE-ring is fitted next. It must be positioned opposite the installation side for the TPE face. The face is fitted over the NBR energiser using a flexible plastic installation strip. Please note that the TPE face ring needs to be installed directly against the AE ring. This can be easily achieved by circling movements with a circling movement using a flexible plastic installation strip.

The second AE ring can now be snapped on. To provide the necessary seal interference, the seal will be considerably larger than the piston diameter. The assembly chamfer on the cylinder tube should be as long and as flat as possible. Ensure that all edges are deburred and the intersection points of the assembly chamfers with the bore are smoothly rounded. A maximum slope angle of 10° is recommended.

Before the cylinders are assembled, the seal surface should be well greased. The grease also helps the seal to slip into the tube easily. For tubes longer than 800 mm the bore needs to be greased as well.

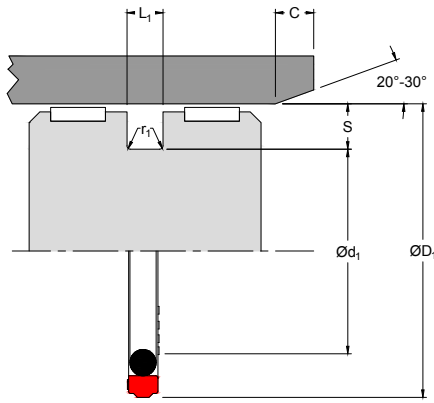
### FURTHER POINTS

Keep the surface between energiser and face ring free of grease.

For Hallite 730 with nominal groove lengths above 16 mm, an installation sleeve is required. An installation sleeve may also be helpful for groove lengths up to 16 mm. This sleeve is needed to extend the assembly chamfer. A slope angle between 7° and 10° is required to prevent the face ring deforming into conical shape, which would allow the rear AE-ring to slip under the TPE face ring. The installation sleeve should be machined from a suitable plastic, such as polyacetal or polyamide. It can be made as a one piece design or as two half shells.

When automatic screwing equipment is used for the installation of the associated gland the maximum surface speed of the seal, with respect to the bore, must not exceed 0.1 m/s.





# 754

## PISTON SEAL

*Double-Acting  
Polyester Face with Pre-Loaded O-Ring*

### DESIGN

The Hallite 754 double-acting piston seal is a compact, low friction seal for light to medium duty applications.

The Hallite 754 is comprised of a tough, wear-resistant thermoplastic elastomer face seal which is pre-loaded by a NBR O-ring. The face material comes in a number of material options to extend operating conditions. The housing width allows a narrow width piston to be used.

We recommend that an adequate bearing, such as the Hallite 506 or 87 bearing strip, is mounted on one or both sides of the seal. For further details of bearing grooves, please refer to the appropriate product data sheet.



### FEATURES

- Excellent position holding characteristics under load
- Low breakout and low operating friction levels
- Excellent wear resistance
- More tolerant to contamination
- Rapid recovery of face after assembly
- Compatible with most hydraulic fluids
- Operates on wide range of surface finishes
- Ideal for use with Hallite 506 or 87 bearing

### MATERIALS

This product comes in a number of material options to extend operating conditions. Contact your local Hallite technical team to decide which is best for your application. Use the part designator in the table below as the last digit of the part number to specify material choice when ordering. For further material details, please refer to the Hallite Material Table.

MATERIAL OPTIONS	Name	Face Type	Face Colour	Part Designator
Standard	TPE 061 - NBR	TPE	Red	0
Optional	TPE 051 - NBR	TPE	Dark Red	3

## TECHNICAL DETAILS

OPERATING CONDITIONS	METRIC	INCH
Maximum Speed	1.0 m/sec	3.0 ft/sec
Temperature Range	-40°C +110°C	-40°F +230°F
Maximum Pressure for TPE 061 Face	350 bar	5000 psi
Maximum Pressure for TPE 051 Face	500 bar	75000 psi

### NOTE

Data given are maximum values and can apply depending on specific application. Maximum ratings of temperature, pressure, or operating speeds are dependent on fluid medium, surface, gap value, and other variables such as dynamic or static service. Maximum values are not intended for use together at the same time, e.g. max temperature and max pressure. Please contact your Hallite technical representative for application support.

MAXIMUM EXTRUSION GAP				
<b>TPE 061 FACE</b>				
Pressure bar	100	160	250	350
Maximum Gap (S>7 mm)	1.00	0.80	0.60	0.40
Maximum Gap (S<7 mm)	0.80	0.60	0.50	0.30
Pressure psi	1500	2400	3750	5000
Maximum Gap (S>0.25 in)	0.040	0.032	0.024	0.016
Maximum Gap (S<0.25 in)	0.032	0.024	0.020	0.012
<b>TPE 051 FACE</b>				
Pressure bar	160	250	400	500
Maximum Gap (S>7 mm)	1.00	0.80	0.60	0.40
Maximum Gap (S<7 mm)	0.80	0.60	0.40	0.20
Pressure psi	2400	3750	6000	7500
Maximum Gap (S>0.25 in)	0.040	0.032	0.024	0.016
Maximum Gap (S<0.25 in)	0.032	0.024	0.016	0.008

### NOTE

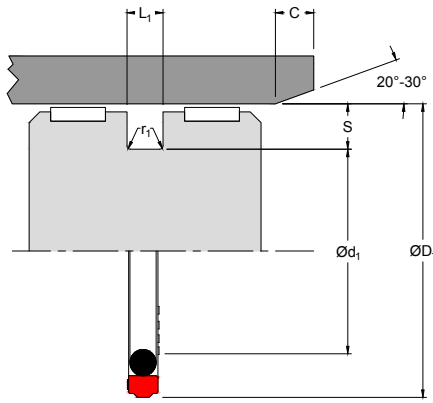
Figures show the maximum permissible gap all on one side using minimum rod  $\varnothing$  and maximum clearance  $\varnothing$ . Refer to Housing Design section.

SURFACE ROUGHNESS	$\mu\text{mRa}$	$\mu\text{mRz}$	$\mu\text{mRt}$	$\mu\text{inRa}$	$\mu\text{inRz}$	$\mu\text{inRt}$
Dynamic Sealing Face $\varnothing D_1$	0.1 - 0.4	1.6 max	4 max	4 - 16	63 max	157 max
Static Sealing Face $\varnothing d_1$	1.6 max	6.3 max	10 max	63 max	250 max	394 max
Static Housing Faces $L_1$	3.2 max	10 max	16 max	125 max	394 max	630 max

CHAMFERS & RADII				
Groove Section $\leq S$ mm	3.75	5.50	7.75	10.50
Min Chamfer C mm	2.00	2.50	5.00	5.00
Max Fillet Rad $r_1$ mm	0.40	0.80	1.20	1.60
Groove Section $\leq S$ in	0.150	0.220	0.310	0.410
Min Chamfer C in	0.080	0.100	0.200	0.200
Max Fillet Rad $r_1$ in	0.016	0.032	0.047	0.063

TOLERANCES	$\varnothing D_1$	$\varnothing d_1$	$L_1$
mm	H9	h9	+0.20 -0
in	H9	h9	+0.008-0





# 754

## PISTON SEAL

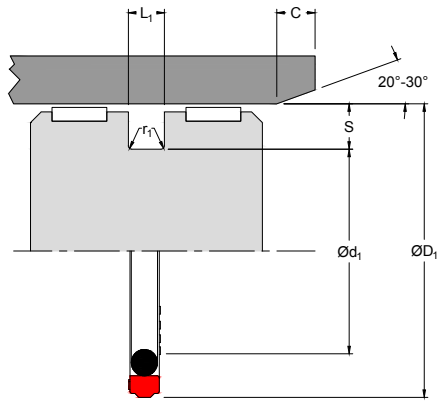
*Double-Acting  
Polyester Face with Pre-Loaded O-Ring*

### PART NUMBER RANGE

METRIC					
ØD <sub>1</sub>	TOL H9	Ød <sub>1</sub>	TOL h9	L <sub>1</sub> +0.20-0	PART No.
15.00	+0.04 0.00	7.50	0.00 -0.04	3.20	4446410
16.00	+0.04 0.00	8.50	0.00 -0.04	3.20	4400610‡
20.00	+0.05 0.00	12.50	0.00 -0.04	3.20	4362310‡
25.00	+0.05 0.00	17.50	0.00 -0.04	3.20	4339610‡
28.00	+0.05 0.00	20.50	0.00 -0.05	3.20	4765910
30.00	+0.05 0.00	22.50	0.00 -0.05	3.20	4339710
32.00	+0.06 0.00	24.50	0.00 -0.05	3.20	4339810‡
35.00	+0.06 0.00	27.50	0.00 -0.05	3.20	4352410
36.00	+0.06 0.00	28.50	0.00 -0.05	3.20	4787510
40.00	+0.06 0.00	29.00	0.00 -0.05	4.20	4339210‡
40.00	+0.06 0.00	32.50	0.00 -0.06	3.20	4740010‡
42.00	+0.06 0.00	31.00	0.00 -0.06	4.20	4787610
45.00	+0.06 0.00	34.00	0.00 -0.06	4.20	4342310
50.00	+0.06 0.00	34.50	0.00 -0.06	6.30	4427410‡
50.00	+0.06 0.00	39.00	0.00 -0.06	4.20	4327110‡
55.00	+0.07 0.00	39.50	0.00 -0.06	6.30	4355610
55.00	+0.07 0.00	44.00	0.00 -0.06	4.20	4465510

#### NOTE

Part numbers suffixed by "‡" indicate housing sizes to meet ISO 7425-1.



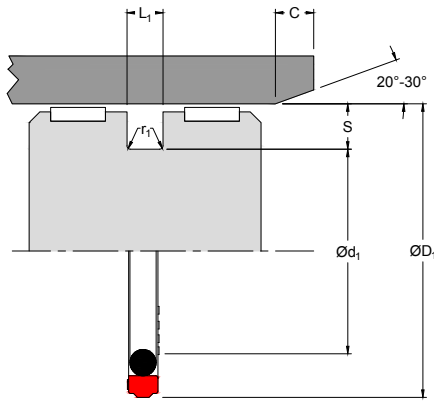
## PART NUMBER RANGE

METRIC					
ØD <sub>1</sub>	TOL H9 0.00	Ød <sub>1</sub>	TOL h9 0.00	L <sub>1</sub> +0.20-0	PART No.
60.00	+0.07 0.00	44.50	0.00 -0.06	6.30	4390710‡
60.00	+0.07 0.00	49.00	0.00 -0.06	4.20	4327010‡
63.00	+0.07 0.00	47.50	0.00 -0.06	6.30	4431110‡
63.00	+0.07 0.00	50.00	0.00 -0.06	6.30	4472310
63.00	+0.07 0.00	52.00	0.00 -0.07	4.20	4326910‡
65.00	+0.07 0.00	49.50	0.00 -0.06	6.30	4362010
65.00	+0.07 0.00	52.00	0.00 -0.07	6.30	4384910
65.00	+0.07 0.00	54.00	0.00 -0.07	4.20	4353010
70.00	+0.07 0.00	54.50	0.00 -0.07	6.30	4763410
70.00	+0.07 0.00	57.00	0.00 -0.07	6.30	4390810
70.00	+0.07 0.00	59.00	0.00 -0.07	4.20	4326810
75.00	+0.07 0.00	59.50	0.00 -0.07	6.30	4704910
75.00	+0.07 0.00	64.00	0.00 -0.07	4.20	4339910
80.00	+0.07 0.00	64.50	0.00 -0.07	6.30	4270910‡
80.00	+0.07 0.00	69.00	0.00 -0.07	4.20	4768510‡
85.00	+0.09 0.00	69.50	0.00 -0.07	6.30	4564010
90.00	+0.09 0.00	74.50	0.00 -0.07	6.30	4372710

### NOTE

Part numbers suffixed by “‡” indicate housing sizes to meet ISO 7425-1.





# 754

## PISTON SEAL

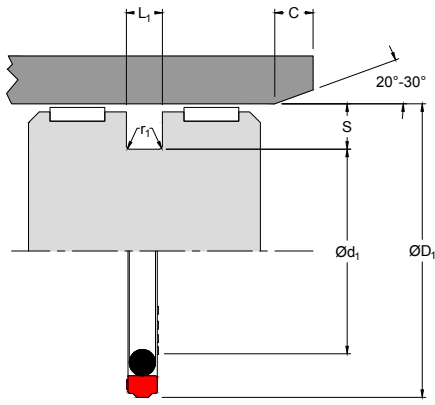
*Double-Acting  
Polyester Face with Pre-Loaded O-Ring*

### PART NUMBER RANGE

METRIC					
ØD <sub>1</sub>	TOL H9	Ød <sub>1</sub>	TOL h9	L <sub>1</sub> +0.20-0	PART No.
95.00	+0.09 0.00	79.50	0.00 -0.07	6.30	4569510
95.00	+0.09 0.00	84.00	0.00 -0.09	4.20	4831610
100.00	+0.09 0.00	84.50	0.00 -0.09	6.30	4339310‡
105.00	+0.09 0.00	89.50	0.00 -0.09	6.30	4372510
110.00	+0.09 0.00	94.50	0.00 -0.09	6.30	4419310
115.00	+0.09 0.00	94.00	0.00 -0.09	8.10	4788510
115.00	+0.09 0.00	99.50	0.00 -0.09	6.30	4355810
120.00	+0.09 0.00	99.00	0.00 -0.09	8.10	4535010
120.00	+0.09 0.00	104.50	0.00 -0.09	6.30	4465410
125.00	+0.10 0.00	104.00	0.00 -0.09	8.10	4376510‡
125.00	+0.10 0.00	109.50	0.00 -0.09	6.30	4340010‡
130.00	+0.10 0.00	109.00	0.00 -0.09	8.10	4402410
130.00	+0.10 0.00	114.50	0.00 -0.09	6.30	4342210
135.00	+0.10 0.00	114.00	0.00 -0.09	8.10	4535110
140.00	+0.10 0.00	119.00	0.00 -0.09	8.10	4340110
140.00	+0.10 0.00	124.50	0.00 -0.10	6.30	4499410
150.00	+0.10 0.00	129.00	0.00 -0.10	8.10	4396910

#### NOTE

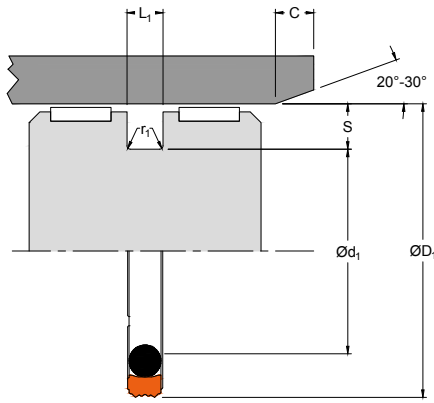
Part numbers suffixed by "‡" indicate housing sizes to meet ISO 7425-1.



**PART NUMBER RANGE**

METRIC					
$\varnothing D_1$	TOL H9	$\varnothing d_1$	TOL h9	$L_1$ +0.20-0	PART No.
160.00	+0.10 0.00	139.00	0.00 -0.10	8.10	4340210‡
165.00	+0.10 0.00	144.00	0.00 -0.10	8.10	4452210
170.00	+0.10 0.00	149.00	0.00 -0.10	8.10	4340310
180.00	+0.10 0.00	159.00	0.00 -0.10	8.10	4340410
190.00	+0.12 0.00	169.00	0.00 -0.10	8.10	4342410
200.00	+0.12 0.00	179.00	0.00 -0.10	8.10	4340510‡
210.00	+0.12 0.00	189.00	0.00 -0.12	8.10	4351510
220.00	+0.12 0.00	199.00	0.00 -0.12	8.10	4735710
225.00	+0.12 0.00	204.00	0.00 -0.12	8.10	4512810
230.00	+0.12 0.00	209.00	0.00 -0.12	8.10	4764010
240.00	+0.12 0.00	219.00	0.00 -0.12	8.10	4553610
250.00	+0.12 0.00	229.00	0.00 -0.12	8.10	4393710‡
300.00	+0.13 0.00	279.00	0.00 -0.13	8.10	4572810

**NOTE** Part numbers suffixed by “‡” indicate housing sizes to meet ISO 7425-1.



# 764

## PISTON SEAL

*Double-Acting  
Polyurethane Face with Pre-Loaded O-Ring*

### DESIGN

The Hallite 764 double-acting piston seal is a compact, low friction seal for light to medium duty applications. The advanced face geometry gives the Hallite 764 single-acting capabilities making it an excellent choice for double-acting applications where minimal dynamic leakage is required.

The Hallite 764 is comprised of a tough, wear resistance-thermoplastic polyurethane face seal which is pre-loaded by a NBR O-ring. The housing width allows a narrow width piston to be used.

We recommend that an adequate bearing, such as the Hallite 506 or 87 bearing strip, is mounted on one or both sides of the seal. For further details of bearing grooves, please refer to the appropriate product data sheet.



### FEATURES

- Double-acting seal with single-acting capabilities
- Advanced face geometry provides enhanced dynamic and static sealing
- Excellent wear resistance and high extrusion resistance
- More tolerant to contamination
- Rapid recovery after assembly
- Operates on wide range of surface finishes
- Ideal for use with Hallite 506 or 87 bearing

### MATERIALS

As standard, this product comes in the following materials. Contact your local Hallite technical team if you would like to find out if this profile can be made in a custom material to suit your application. For further material details, please refer to the Hallite Material Table.

MATERIAL OPTIONS	Name	Face Type	Face Colour
Standard	Hythane® 361- NBR	TPU-AU	Orange

## TECHNICAL DETAILS

OPERATING CONDITIONS	METRIC	INCH
Maximum Speed	1.0 m/sec	3.0 ft/sec
Temperature Range	-30°C +110°C	-22°F + 230°F
Maximum Pressure	250 bar	3600 psi

### NOTE

Data given are maximum values and can apply depending on specific application. Maximum ratings of temperature, pressure, or operating speeds are dependent on fluid medium, surface, gap value, and other variables such as dynamic or static service. Maximum values are not intended for use together at the same time, e.g. max temperature and max pressure. Please contact your Hallite technical representative for application support.

MAXIMUM EXTRUSION GAP			
Pressure bar	100	160	250
Maximum Gap mm	0.60	0.50	0.40
Pressure psi	1500	2400	3750
Maximum Gap in	0.024	0.020	0.016

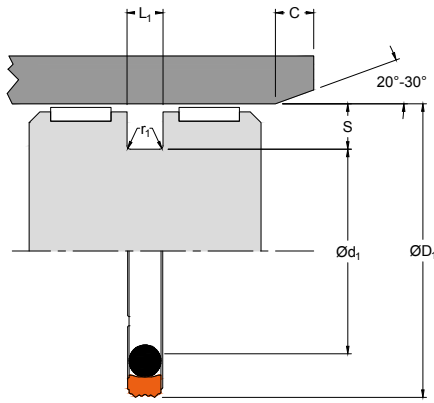
### NOTE

Figures show the maximum permissible gap all on one side using minimum rod  $\varnothing$  and maximum clearance  $\varnothing$ . Refer to Housing Design section.

SURFACE ROUGHNESS	$\mu\text{mRa}$	$\mu\text{mRz}$	$\mu\text{mRt}$	$\mu\text{inRa}$	$\mu\text{inRz}$	$\mu\text{inRt}$
Dynamic Sealing Face $\varnothing D_1$	0.1 - 0.4	1.6 max	4 max	4 - 16	63 max	157 max
Static Sealing Face $\varnothing d_1$	1.6 max	6.3 max	10 max	63 max	250 max	394 max
Static Housing Faces $L_1$	3.2 max	10 max	16 max	125 max	394 max	630 max

CHAMFERS & RADII				
Groove Section $\leq S$ mm	3.75	5.50	7.75	10.50
Min Chamfer C mm	2.00	2.50	5.00	5.00
Max Fillet Rad $r_1$ mm	0.40	0.80	1.20	1.60
Groove Section $\leq S$ in	0.150	0.220	0.310	0.410
Min Chamfer C in	0.080	0.100	0.200	0.200
Max Fillet Rad $r_1$ in	0.016	0.032	0.047	0.063

TOLERANCES	$\varnothing D_1$	$\varnothing d_1$	$L_1$
mm	H9	h9	+0.20 -0
in	H9	h9	+0.008 -0



# 764

## PISTON SEAL

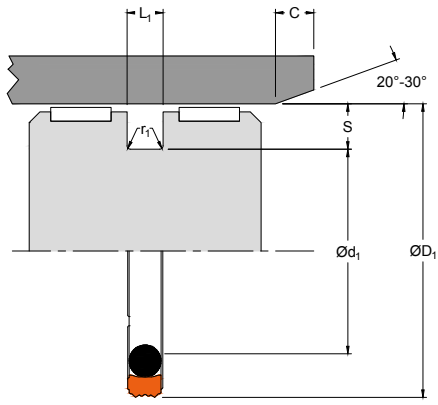
*Double-Acting  
Polyurethane Face with Pre-Loaded O-Ring*

### PART NUMBER RANGE

METRIC					
ØD <sub>1</sub>	TOL H9	Ød <sub>1</sub>	TOL h9	L <sub>1</sub> +0.20-0	PART No.
12.00	+0.04 0.00	7.10	0.00 -0.04	2.20	4845110
22.00	+0.05 0.00	14.50	0.00 -0.04	3.20	4763610
32.00	+0.06 0.00	21.00	0.00 -0.05	4.20	4751210‡
32.00	+0.06 0.00	24.50	0.00 -0.05	3.20	4741010‡
35.00	+0.06 0.00	24.00	0.00 -0.05	4.20	4764110
40.00	+0.06 0.00	29.00	0.00 -0.05	4.20	4741110‡
45.00	+0.06 0.00	34.00	0.00 -0.06	4.20	4744510
50.00	+0.06 0.00	34.50	0.00 -0.06	6.30	4775810‡
50.00	+0.06 0.00	39.00	0.00 -0.06	4.20	4741210‡
55.00	+0.07 0.00	44.00	0.00 -0.06	4.20	4845310
60.00	+0.07 0.00	44.50	0.00 -0.06	6.30	4739910‡
60.00	+0.07 0.00	49.00	0.00 -0.06	4.20	4741310‡
63.00	+0.07 0.00	47.50	0.00 -0.06	6.30	4766810‡
63.00	+0.07 0.00	52.00	0.00 -0.07	4.20	4740810
65.00	+0.07 0.00	54.00	0.00 -0.07	4.20	4845410
70.00	+0.07 0.00	54.50	0.00 -0.07	6.30	4759710
70.00	+0.07 0.00	59.00	0.00 -0.07	4.20	4741410

#### NOTE

Part numbers suffixed by "‡" indicate housing sizes to meet ISO 7425-1.

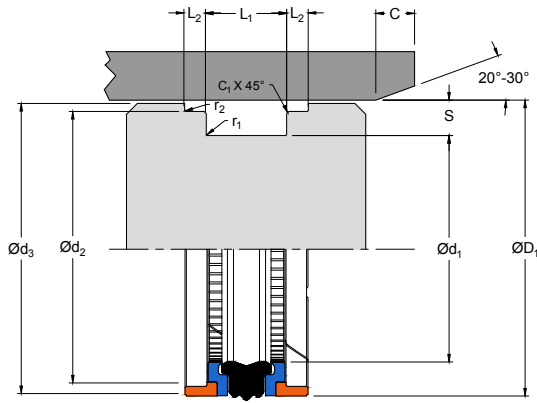


**PART NUMBER RANGE**

METRIC					
$\varnothing D_1$	TOL H9 0.00	$\varnothing d_1$	TOL h9 0.00	$L_1$ +0.20-0	PART No.
75.00	+0.07 0.00	64.00	0.00 -0.07	4.20	4845510
80.00	+0.07 0.00	64.50	0.00 -0.07	6.30	4722210‡
80.00	+0.07 0.00	69.00	0.00 -0.07	4.20	4845610
90.00	+0.09 0.00	74.50	0.00 -0.07	6.30	4741510
100.00	+0.09 0.00	84.50	0.00 -0.09	6.30	4741610
115.00	+0.09 0.00	94.00	0.00 -0.09	8.10	4829910
115.00	+0.09 0.00	99.50	0.00 -0.09	6.30	4761610
120.00	+0.09 0.00	99.00	0.00 -0.09	8.10	4812010
125.00	+0.10 0.00	109.50	0.00 -0.09	6.30	4771710‡

**NOTE** Part numbers suffixed by “‡” indicate housing sizes to meet ISO 7425-1.





# 780

## PISTON SEAL

*Double-Acting  
Five Part Assembly*

### DESIGN

The Hallite 780 double-acting piston seal in a robust five part assembly is designed specifically for one piece pistons in a wide range of medium duty applications. The seal is also suitable for two piece pistons.

The Hallite 780 is comprised of a nitrile rubber sealing element, two split support rings, and two split L-shaped bearings located either side of the seal. The well-proven nitrile rubber sealing element is designed to be extremely wear resistant with multi-lips for efficient dynamic sealing with minimal low pressure friction and, when pressurized, will be protected from extrusion damage by the extending lips of the support rings.

The support ring is manufactured from a tough, flexible, wear resistant thermoplastic polyester elastomer (TPE) and scarf cut for assembly.

Both the L-shaped bearings and support rings are grooved to ensure that the fluid pressure properly energises the sealing element and to prevent the possibility of any pressure trapping within the seal assembly.



### FEATURES

- Excellent position holding characteristics under load
- Excellent on a variety of tube surface finishes
- Extremely well proven in a variety of applications using hydraulic oil
- Extremely wear resistant
- Low friction

### MATERIALS

As standard, this product comes in the following materials. Contact your local Hallite technical team if you would like to find out if this profile can be made in a custom material to suit your application. For further material details, please refer to the Hallite Material Table.

MATERIAL OPTIONS	Name	Colour
Standard	Nitrile 1411-Polyester-POM	Black-Blue-Orange

## TECHNICAL DETAILS

OPERATING CONDITIONS	METRIC	INCH
Maximum Speed	0.5 m/sec	1.5 ft/sec
Temperature Range	-30°C +100°C	-22°F +212°F
Maximum Pressure	400 bar	6000 psi

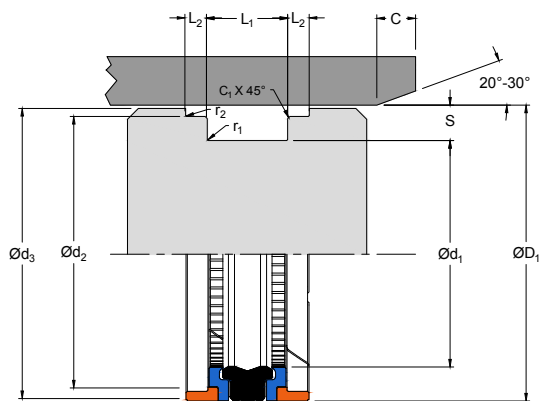
### NOTE

Data given are maximum values and can apply depending on specific application. Maximum ratings of temperature, pressure, or operating speeds are dependent on fluid medium, surface, gap value, and other variables such as dynamic or static service. Maximum values are not intended for use together at the same time, e.g. max temperature and max pressure. Please contact your Hallite technical representative for application support.

SURFACE ROUGHNESS	$\mu\text{mRa}$	$\mu\text{mRz}$	$\mu\text{mRt}$	$\mu\text{inRa}$	$\mu\text{inRz}$	$\mu\text{inRt}$
Dynamic Sealing Face $\text{ØD}_1$	0.1 - 0.4	1.6 max	4 max	4 - 16	63 max	157 max
Static Sealing Face $\text{Ød}_1$	1.6 max	6.3 max	10 max	63 max	250 max	394 max
Static Housing Faces $L_1$	3.2 max	10 max	16 max	125 max	394 max	630 max

RADII						
Groove Section $\leq S$ mm	5.00	7.50	8.00	10.00	12.50	15.00
Min Chamfer $C$ mm	2.40	4.00	5.00	5.00	6.50	7.50
Max Chamfer $C_1$ mm	0.40	0.40	0.40	0.80	0.80	0.80
Max Fillet Rad $r_1$ mm	0.40	0.40	0.40	0.40	0.80	0.80
Max Fillet Rad $r_2$ mm	0.40	0.40	0.40	0.40	0.80	0.80
Groove Section $\leq S$ in	0.312	0.375	0.500			
Min Chamfer $C$ in	0.156	0.187	0.217			
Max Chamfer $C_1$ in	0.016	0.032	0.032			
Max Fillet Rad $r_1$ in	0.016	0.016	0.032			
Max Fillet Rad $r_2$ in	0.016	0.016	0.032			

TOLERANCES	$\text{ØD}_1$	$\text{Ød}_1$	$\text{Ød}_2$	$\text{Ød}_3$	$L_1$	$L_2$
mm	H9	h9	h9	h11	+0.20 -0	+0.10 -0
in	H9	h9	h9	h11	+0.016 +0.005	+0.004 -0



# 780

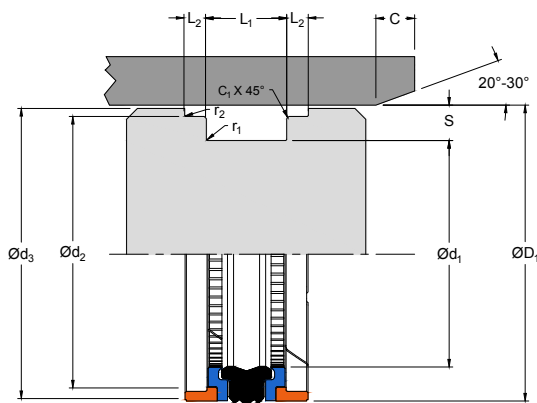
## PISTON SEAL

Double-Acting  
Five Part Assembly

### PART NUMBER RANGE

METRIC										
ØD <sub>1</sub>	TOL H9	Ød <sub>1</sub>	TOL h9	Ød <sub>2</sub>	TOL h9	Ød <sub>3</sub>	TOL h11	L <sub>1</sub> +0.20-0	L <sub>2</sub> +0.10-0	PART No.
20.00	+0.05 0.00	11.00	0.00 -0.04	17.00	0.00 -0.04	19.00	0.00 -0.13	13.50	2.10	5006710
25.00	+0.05 0.00	15.00	0.00 -0.04	21.00	0.00 -0.05	24.00	0.00 -0.13	12.00	4.00	5003710
25.00	+0.05 0.00	15.00	0.00 -0.04	22.00	0.00 -0.05	24.00	0.00 -0.13	12.50	4.00	5003730
25.00	+0.05 0.00	16.00	0.00 -0.04	22.00	0.00 -0.05	24.00	0.00 -0.13	13.50	2.10	5003810
30.00	+0.05 0.00	17.00	0.00 -0.04	27.00	0.00 -0.05	29.00	0.00 -0.13	15.40	6.35	5006410
30.00	+0.05 0.00	21.00	0.00 -0.05	27.00	0.00 -0.05	29.00	0.00 -0.13	13.50	2.10	5003910
32.00	+0.06 0.00	22.00	0.00 -0.05	28.00	0.00 -0.05	31.00	0.00 -0.16	15.50	2.60	5001420
32.00	+0.06 0.00	22.00	0.00 -0.05	28.50	0.00 -0.05	30.50	0.00 -0.16	16.40	6.35	5001410
32.00	+0.06 0.00	24.00	0.00 -0.05	28.00	0.00 -0.05	31.40	0.00 -0.16	15.50	3.20	5009210
35.00	+0.06 0.00	25.00	0.00 -0.05	31.00	0.00 -0.06	34.00	0.00 -0.16	15.50	2.60	5001520
35.00	+0.06 0.00	25.00	0.00 -0.05	31.40	0.00 -0.06	33.50	0.00 -0.16	16.40	6.35	5001510
40.00	+0.06 0.00	24.00	0.00 -0.05	35.40	0.00 -0.06	38.50	0.00 -0.16	18.40	6.35	5001310
40.00	+0.06 0.00	26.00	0.00 -0.05	36.00	0.00 -0.06	39.00	0.00 -0.16	15.50	2.60	5008010
40.00	+0.06 0.00	30.00	0.00 -0.05	35.40	0.00 -0.06	38.50	0.00 -0.16	16.40	6.35	5004010
40.00	+0.06 0.00	30.00	0.00 -0.05	36.00	0.00 -0.06	38.00	0.00 -0.16	12.50	4.00	5005820
40.00	+0.06 0.00	30.00	0.00 -0.05	36.50	0.00 -0.06	39.00	0.00 -0.16	10.00	5.00	5008610
40.00	+0.06 0.00	30.00	0.00 -0.05	37.00	0.00 -0.06	39.00	0.00 -0.16	12.50	4.00	5005810

**NOTE** Part numbers suffixed by "±" indicate housing sizes to meet ISO 6547.

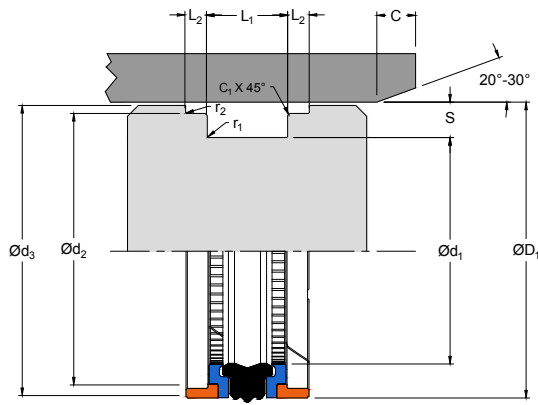


## PART NUMBER RANGE

METRIC										
ØD <sub>1</sub>	TOL H9	Ød <sub>1</sub>	TOL h9	Ød <sub>2</sub>	TOL h9	Ød <sub>3</sub>	TOL h11	L <sub>1</sub> +0.20-0	L <sub>2</sub> +0.10-0	PART No.
40.00	+0.06 0.00	32.00	0.00 -0.06	36.00	0.00 -0.06	39.40	0.00 -0.16	15.50	3.20	5008110
45.00	+0.06 0.00	29.00	0.00 -0.05	40.40	0.00 -0.06	43.50	0.00 -0.16	18.40	6.35	5000710
45.00	+0.06 0.00	31.00	0.00 -0.06	41.00	0.00 -0.06	44.00	0.00 -0.16	15.50	2.60	5004110
45.00	+0.06 0.00	35.00	0.00 -0.06	40.40	0.00 -0.06	43.50	0.00 -0.16	16.40	6.35	5001610
50.00	+0.06 0.00	34.00	0.00 -0.06	45.40	0.00 -0.06	48.50	0.00 -0.16	18.40	6.35	5000810
50.00	+0.06 0.00	34.00	0.00 -0.06	46.00	0.00 -0.06	49.00	0.00 -0.16	20.50	3.10	5000820
50.00	+0.06 0.00	38.00	0.00 -0.06	46.00	0.00 -0.06	49.40	0.00 -0.16	20.50	4.20	5004810
50.00	+0.06 0.00	40.00	0.00 -0.06	47.00	0.00 -0.06	49.00	0.00 -0.16	12.50	4.00	5005910±
55.00	+0.07 0.00	39.00	0.00 -0.06	50.36	0.00 -0.07	53.50	0.00 -0.19	18.40	6.35	5000910
55.00	+0.07 0.00	39.00	0.00 -0.06	51.00	0.00 -0.07	54.00	0.00 -0.19	20.50	3.10	5000920
55.00	+0.07 0.00	45.00	0.00 -0.06	52.00	0.00 -0.07	54.00	0.00 -0.19	12.50	4.00	5009110
60.00	+0.07 0.00	44.00	0.00 -0.06	55.40	0.00 -0.07	58.50	0.00 -0.19	18.40	6.35	5001010
60.00	+0.07 0.00	44.00	0.00 -0.06	56.00	0.00 -0.07	59.00	0.00 -0.19	20.50	3.10	5001020
60.00	+0.07 0.00	48.00	0.00 -0.06	56.00	0.00 -0.07	59.40	0.00 -0.19	20.50	4.20	5004910
63.00	+0.07 0.00	47.00	0.00 -0.06	58.40	0.00 -0.07	61.50	0.00 -0.19	18.40	6.35	5001110
63.00	+0.07 0.00	47.00	0.00 -0.06	58.40	0.00 -0.07	61.50	0.00 -0.19	19.40	6.35	5001120
63.00	+0.07 0.00	47.00	0.00 -0.06	59.00	0.00 -0.07	62.00	0.00 -0.19	20.50	3.10	5001130

### NOTE

Part numbers suffixed by "±" indicate housing sizes to meet ISO 6547.



# 780

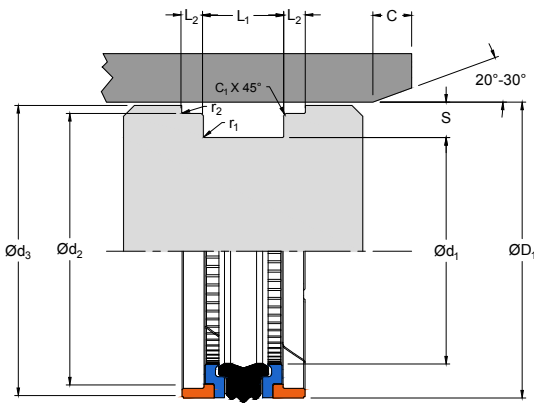
## PISTON SEAL

Double-Acting  
Five Part Assembly

### PART NUMBER RANGE

METRIC										
ØD <sub>1</sub>	TOL H9	Ød <sub>1</sub>	TOL h9	Ød <sub>2</sub>	TOL h9	Ød <sub>3</sub>	TOL h11	L <sub>1</sub> +0.20-0	L <sub>2</sub> +0.10-0	PART No.
63.00	+0.07 0.00	51.00	0.00 -0.07	59.00	0.00 -0.07	62.40	0.00 -0.19	20.50	4.20	5005010
63.00	+0.07 0.00	53.00	0.00 -0.07	60.00	0.00 -0.07	62.00	0.00 -0.19	12.50	4.00	5006010±
65.00	+0.07 0.00	49.00	0.00 -0.06	61.00	0.00 -0.07	64.00	0.00 -0.19	20.50	3.10	5005510
65.00	+0.07 0.00	50.00	0.00 -0.06	60.40	0.00 -0.07	63.50	0.00 -0.19	18.40	6.35	5001210
65.00	+0.07 0.00	53.00	0.00 -0.07	61.00	0.00 -0.07	64.40	0.00 -0.19	20.50	4.20	5010710
70.00	+0.07 0.00	50.00	0.00 -0.06	64.20	0.00 -0.07	68.30	0.00 -0.19	22.40	6.35	5000210
70.00	+0.07 0.00	54.00	0.00 -0.07	66.00	0.00 -0.07	69.00	0.00 -0.19	20.50	3.10	5004210
70.00	+0.07 0.00	58.00	0.00 -0.07	66.00	0.00 -0.07	69.40	0.00 -0.19	20.50	4.20	5005110
75.00	+0.07 0.00	55.00	0.00 -0.07	69.20	0.00 -0.07	73.30	0.00 -0.19	22.40	6.35	5000310
75.00	+0.07 0.00	59.00	0.00 -0.07	71.00	0.00 -0.07	74.00	0.00 -0.19	20.50	3.10	5004310
75.00	+0.07 0.00	63.00	0.00 -0.07	71.00	0.00 -0.07	74.40	0.00 -0.19	20.50	4.20	5010810
80.00	+0.07 0.00	60.00	0.00 -0.07	74.15	0.00 -0.07	78.30	0.00 -0.19	22.40	6.35	5000110
80.00	+0.07 0.00	60.00	0.00 -0.07	75.00	0.00 -0.07	78.00	0.00 -0.19	25.00	6.30	5000120
80.00	+0.07 0.00	62.00	0.00 -0.07	76.00	0.00 -0.07	79.00	0.00 -0.19	22.50	3.60	5004410
80.00	+0.07 0.00	65.00	0.00 -0.07	76.00	0.00 -0.07	78.50	0.00 -0.19	20.00	5.00	5008710±
80.00	+0.07 0.00	66.00	0.00 -0.07	76.00	0.00 -0.07	79.40	0.00 -0.19	22.50	5.20	5005210
85.00	+0.09 0.00	65.00	0.00 -0.07	79.15	0.00 -0.07	83.30	0.00 -0.22	22.40	6.35	5000410

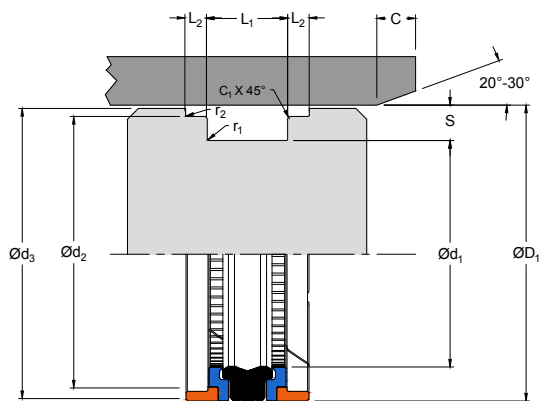
**NOTE** Part numbers suffixed by "±" indicate housing sizes to meet ISO 6547.



## PART NUMBER RANGE

METRIC										
$\text{Ø}D_1$	TOL H9	$\text{Ø}d_1$	TOL h9	$\text{Ø}d_2$	TOL h9	$\text{Ø}d_3$	TOL h11	$L_1$ +0.20-0	$L_2$ +0.10-0	PART No.
90.00	+0.09 0.00	70.00	0.00 -0.07	84.15	0.00 -0.09	88.30	0.00 -0.22	22.40	6.35	5000510
90.00	+0.09 0.00	72.00	0.00 -0.07	86.00	0.00 -0.09	89.00	0.00 -0.22	22.50	3.60	5007910
90.00	+0.09 0.00	76.00	0.00 -0.07	86.00	0.00 -0.09	89.40	0.00 -0.22	22.50	5.20	5005310
95.00	+0.09 0.00	75.00	0.00 -0.07	89.15	0.00 -0.09	93.30	0.00 -0.22	22.40	6.35	5000610
100.00	+0.09 0.00	75.00	0.00 -0.07	93.15	0.00 -0.09	98.00	0.00 -0.22	22.40	6.35	5001710
100.00	+0.09 0.00	80.00	0.00 -0.07	95.00	0.00 -0.09	98.00	0.00 -0.22	25.00	6.30	5004710‡
100.00	+0.09 0.00	82.00	0.00 -0.09	96.00	0.00 -0.09	99.00	0.00 -0.22	22.50	3.60	5004510
100.00	+0.09 0.00	85.00	0.00 -0.09	96.00	0.00 -0.09	98.50	0.00 -0.22	20.00	5.00	5006110‡
100.00	+0.09 0.00	86.00	0.00 -0.09	96.00	0.00 -0.09	99.40	0.00 -0.22	22.50	5.20	5005410
105.00	+0.09 0.00	80.00	0.00 -0.07	98.10	0.00 -0.09	103.00	0.00 -0.22	22.40	6.35	5001810
110.00	+0.09 0.00	85.00	0.00 -0.09	103.10	0.00 -0.09	108.00	0.00 -0.22	22.40	6.35	5001910
110.00	+0.09 0.00	92.00	0.00 -0.09	106.00	0.00 -0.09	109.00	0.00 -0.22	22.50	3.60	5007810
115.00	+0.09 0.00	90.00	0.00 -0.09	108.10	0.00 -0.09	113.00	0.00 -0.22	22.40	6.35	5002010
120.00	+0.09 0.00	95.00	0.00 -0.09	113.10	0.00 -0.09	118.00	0.00 -0.22	22.40	6.35	5002110
120.00	+0.09 0.00	106.00	0.00 -0.09	116.00	0.00 -0.09	119.40	0.00 -0.22	22.50	5.20	5008810
125.00	+0.10 0.00	100.00	0.00 -0.09	118.10	0.00 -0.09	123.00	0.00 -0.25	25.40	6.35	5002310
125.00	+0.10 0.00	103.00	0.00 -0.09	121.00	0.00 -0.10	124.00	0.00 -0.25	26.50	5.10	5007710

**NOTE** Part numbers suffixed by “‡” indicate housing sizes to meet ISO 6547.



# 780

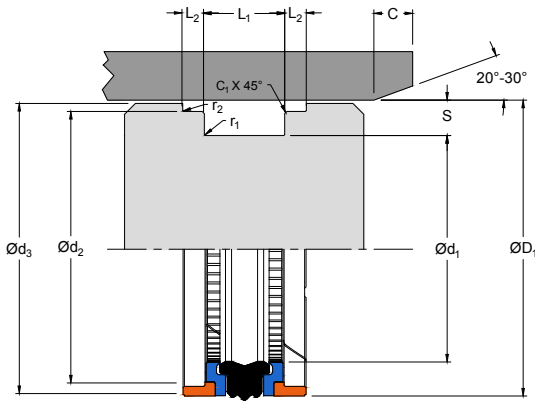
## PISTON SEAL

Double-Acting  
Five Part Assembly

### PART NUMBER RANGE

METRIC										
ØD <sub>1</sub>	TOL H9	Ød <sub>1</sub>	TOL h9	Ød <sub>2</sub>	TOL h9	Ød <sub>3</sub>	TOL h11	L <sub>1</sub> +0.20-0	L <sub>2</sub> +0.10-0	PART No.
125.00	+0.10 0.00	105.00	0.00 -0.09	120.00	0.00 -0.09	123.00	0.00 -0.25	25.00	6.30	5006210±
130.00	+0.10 0.00	105.00	0.00 -0.09	122.60	0.00 -0.10	128.00	0.00 -0.25	25.40	9.50	5002410
130.00	+0.10 0.00	105.00	0.00 -0.09	123.10	0.00 -0.10	128.00	0.00 -0.25	25.40	6.35	5002420
135.00	+0.10 0.00	110.00	0.00 -0.09	127.60	0.00 -0.10	133.00	0.00 -0.25	25.40	9.50	5002510
140.00	+0.10 0.00	115.00	0.00 -0.09	132.60	0.00 -0.10	138.00	0.00 -0.25	25.40	9.50	5002210
140.00	+0.10 0.00	115.00	0.00 -0.09	133.00	0.00 -0.10	138.00	0.00 -0.25	25.40	6.35	5002220
145.00	+0.10 0.00	120.00	0.00 -0.09	137.60	0.00 -0.10	143.00	0.00 -0.25	25.40	9.50	5002610
150.00	+0.10 0.00	125.00	0.00 -0.10	142.60	0.00 -0.10	148.00	0.00 -0.25	25.40	9.50	5002710
150.00	+0.10 0.00	125.00	0.00 -0.10	143.00	0.00 -0.10	148.00	0.00 -0.25	25.40	6.35	5002720
155.00	+0.10 0.00	130.00	0.00 -0.10	147.60	0.00 -0.10	153.00	0.00 -0.25	25.40	9.50	5002810
160.00	+0.10 0.00	130.00	0.00 -0.10	152.60	0.00 -0.10	158.00	0.00 -0.25	25.40	9.50	5004610
160.00	+0.10 0.00	130.00	0.00 -0.10	153.00	0.00 -0.10	158.00	0.00 -0.25	25.40	6.35	5004620
160.00	+0.10 0.00	135.00	0.00 -0.10	152.60	0.00 -0.10	158.00	0.00 -0.25	25.40	9.50	5005610
160.00	+0.10 0.00	143.00	0.00 -0.10	156.00	0.00 -0.10	159.40	0.00 -0.25	26.50	7.20	5008910
165.00	+0.10 0.00	140.00	0.00 -0.10	157.60	0.00 -0.10	163.00	0.00 -0.25	25.40	9.50	5002910
170.00	+0.10 0.00	145.00	0.00 -0.10	161.70	0.00 -0.10	168.00	0.00 -0.25	25.40	12.70	5003010
175.00	+0.10 0.00	150.00	0.00 -0.10	166.70	0.00 -0.10	173.00	0.00 -0.25	25.40	12.70	5003110

**NOTE** Part numbers suffixed by "±" indicate housing sizes to meet ISO 6547.



## PART NUMBER RANGE

### METRIC

ØD <sub>1</sub>	TOL H9	Ød <sub>1</sub>	TOL h9	Ød <sub>2</sub>	TOL h9	Ød <sub>3</sub>	TOL h11	L <sub>1</sub> +0.20-0	L <sub>2</sub> +0.10-0	PART No.
180.00	+0.10 0.00	150.00	0.00 -0.10	172.95	0.00 -0.10	178.00	0.00 -0.25	35.40	6.35	5006310
180.00	+0.10 0.00	155.00	0.00 -0.10	171.70	0.00 -0.10	178.00	0.00 -0.25	25.40	12.70	5003210
185.00	+0.12 0.00	160.00	0.00 -0.10	176.70	0.00 -0.10	183.00	0.00 -0.29	25.40	12.70	5003310
190.00	+0.12 0.00	165.00	0.00 -0.10	181.70	0.00 -0.12	188.00	0.00 -0.29	25.40	12.70	5003410
195.00	+0.12 0.00	170.00	0.00 -0.10	186.70	0.00 -0.12	193.00	0.00 -0.29	25.40	12.70	5003510
200.00	+0.12 0.00	175.00	0.00 -0.10	191.60	0.00 -0.12	198.00	0.00 -0.29	25.40	12.70	5003610
210.00	+0.12 0.00	185.00	0.00 -0.12	201.60	0.00 -0.12	208.00	0.00 -0.29	25.40	12.70	5008210
220.00	+0.12 0.00	195.00	0.00 -0.12	211.60	0.00 -0.12	218.00	0.00 -0.29	25.40	12.70	5008310
230.00	+0.12 0.00	205.00	0.00 -0.12	221.60	0.00 -0.12	227.00	0.00 -0.29	25.40	12.70	5006510
240.00	+0.12 0.00	215.00	0.00 -0.12	231.60	0.00 -0.12	238.00	0.00 -0.29	25.40	12.70	5008410
250.00	+0.12 0.00	225.00	0.00 -0.12	241.60	0.00 -0.12	247.00	0.00 -0.29	25.40	12.70	5006610

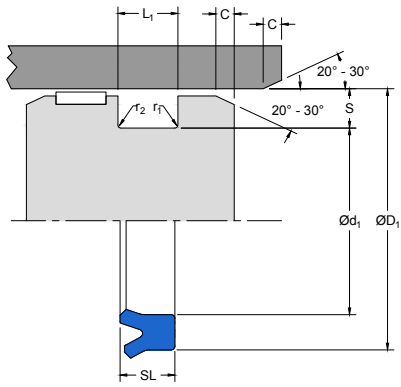
### NOTE

Part numbers suffixed by "±" indicate housing sizes to meet ISO 6547.



# SINGLE-ACTING PISTON SEALS





# 606

## PISTON SEAL

*Single-Acting  
Polyurethane, Single Lip*

### DESIGN

The Hallite 606 single-acting, single lip asymmetric piston seal is designed with precision trimmed sealing lips to provide effective bore sealing in light and medium-duty applications. The seal can be considered for use in heavy-duty applications when used with a suitable full depth back-up ring. The sealing lips are trimmed at an angle to give optimal rod sealing performance.

The range covers most standard housings used in Europe, North America and Asia.

The Hallite 606 is designed to have an interference in the seal housing groove. The outer dynamic lip is shorter and more robust to improving sealing and compression set characteristics over conventional, symmetrical U-rings.

The seal is recommended for use in single-acting piston seal applications. It can also be fitted back-to-back in separate grooves for use in double-acting applications.

The Hallite 606 is moulded in Hythane® 181, Hallite's high-performance polyurethane, for easy installation and excellent low temperature performance.



### FEATURES

- General purpose seal
- Robust design
- Excellent wear resistance
- Performs well over wide temperature range and is extremely effective in low temperatures
- Easy to install

### MATERIALS

As standard, this product comes in the following material. Contact your local Hallite technical team if you would like to find out if this profile can be made in a custom material to suit your application. For further material details, please refer to the Hallite Material Table.

MATERIAL OPTIONS	Name	Type	Colour
Standard	Hythane® 181	TPU-EU	Blue

## TECHNICAL DETAILS

OPERATING CONDITIONS	METRIC	INCH
Maximum Speed	1.0 m/sec	3.0 ft/sec
Temperature Range	-45°C +110°C	-50°F +230°F
Maximum Pressure	400 bar	6000 psi
Maximum Pressure with Backup Ring	700 bar	10000 psi

## NOTE

Data given are maximum values and can apply depending on specific application. Maximum ratings of temperature, pressure, or operating speeds are dependent on fluid medium, surface, gap value, and other variables such as dynamic or static service. Maximum values are not intended for use together at the same time, e.g. max temperature and max pressure. Please contact your Hallite technical representative for application support.

## NOTE

**Pressure Rating:** Can be extended with use of back-up ring. Seek technical advice from local Hallite office.

MAXIMUM EXTRUSION GAP			
Pressure bar	160	250	400
Maximum Gap mm	0.60	0.50	0.40
Pressure psi	2400	3750	6000
Maximum Gap in	0.024	0.020	0.016

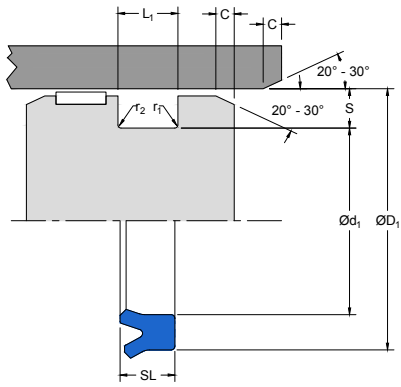
## NOTE

Figures show the maximum permissible gap all on one side, for rod seals using minimum rod  $\varnothing$  and maximum clearance  $\varnothing$  and for piston seals using the minimum clearance  $\varnothing$  and maximum bore  $\varnothing$ . Refer to Housing Design section.

SURFACE ROUGHNESS	$\mu\text{mRa}$	$\mu\text{mRz}$	$\mu\text{mRt}$	$\mu\text{inRa}$	$\mu\text{inRz}$	$\mu\text{inRt}$
Dynamic Sealing Face $\varnothing D_1$	0.1 - 0.4	1.6 max	4 max	4 - 16	63 max	157 max
Static Sealing Face $\varnothing d_1$	1.6 max	6.3 max	10 max	63 max	250 max	394 max
Static Housing Faces $L_1$	3.2 max	10 max	16 max	125 max	394 max	630 max

CHAMFERS & RADII						
Groove Section $<S$ mm	4.00	5.00	7.50	10.00	12.50	15.00
Min Chamfer $C$ mm	3.00	3.50	5.00	6.50	7.00	8.00
Max Fillet Rad $r_1$ mm	0.20	0.40	0.80	0.80	1.20	1.60
Max Fillet Rad $r_2$ mm	0.40	0.80	1.20	1.20	1.60	2.40
Groove Section $\leq S$ in	0.125	0.187	0.250	0.312	0.375	0.500
Min Chamfer $C$ in	0.093	0.093	0.125	0.156	0.187	0.187
Max Fillet Rad $r_1$ in	0.008	0.008	0.016	0.032	0.032	0.032
Max Fillet Rad $r_2$ in	0.016	0.016	0.032	0.047	0.047	0.047

TOLERANCES	$\varnothing D_1$	$\varnothing d_1$	$L_1$
mm	H9	js11	+0.25 -0
in	H9	js11	+0.010 -0



# 606

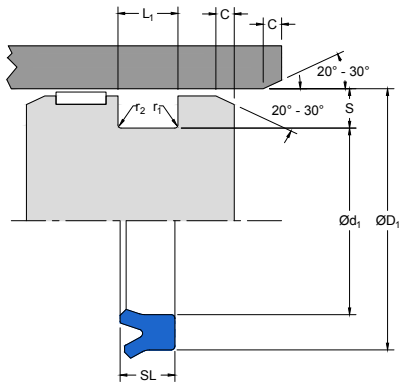
## PISTON SEAL

Single-Acting  
Polyurethane, Single Lip

### PART NUMBER RANGE

METRIC						
ØD <sub>1</sub>	TOL H9 0.00	Ød <sub>1</sub>	TOL js11 -0.04	L <sub>1</sub> +0.25-0	SL	PART No.
16.00	+0.04 0.00	10.00	+0.04 -0.04	5.70	6.30	4830500
25.00	+0.05 0.00	15.00	+0.06 -0.06	8.20	9.00	4390100
25.00	+0.05 0.00	17.00	+0.06 -0.06	5.70	6.30	4418000‡
30.00	+0.05 0.00	20.00	+0.07 -0.07	8.00	9.00	4354200
32.00	+0.06 0.00	24.00	+0.07 -0.07	5.70	6.30	4351900‡
35.00	+0.06 0.00	25.00	+0.07 -0.07	7.30	8.00	4365700
37.00	+0.06 0.00	21.00	+0.07 -0.07	11.80	13.00	4354100
38.00	+0.06 0.00	31.00	+0.08 -0.08	5.20	6.00	4728000
40.00	+0.06 0.00	28.00	+0.07 -0.07	9.00	10.00	4826200
40.00	+0.06 0.00	30.00	+0.07 -0.07	7.30	8.00	4299500‡
40.00	+0.06 0.00	30.00	+0.07 -0.07	10.00	11.00	4400900
45.00	+0.06 0.00	35.00	+0.08 -0.08	7.30	8.00	4315700
50.00	+0.06 0.00	35.00	+0.08 -0.08	9.00	10.00	4649300
50.00	+0.06 0.00	39.00	+0.08 -0.08	3.80	4.20	4460700
50.00	+0.06 0.00	40.00	+0.08 -0.08	7.80	8.00	4319500‡
55.00	+0.07 0.00	45.00	+0.08 -0.08	7.30	8.00	4380000
56.00	+0.07 0.00	45.00	+0.08 -0.08	7.00	8.00	4644200

**NOTE** Part numbers suffixed by "‡" indicate housing sizes to meet ISO 5597.



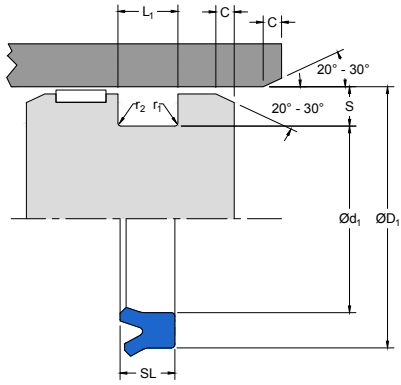
## PART NUMBER RANGE

METRIC						
ØD <sub>1</sub>	TOL H9	Ød <sub>1</sub>	TOL js11	L <sub>1</sub> +0.25-0	SL	PART No.
60.00	+0.07 0.00	44.90	+0.08 -0.08	5.70	6.30	4739800
60.00	+0.07 0.00	45.00	+0.08 -0.08	10.00	11.00	4407000
60.00	+0.07 0.00	50.00	+0.08 -0.08	9.00	10.00	4762000
63.00	+0.07 0.00	48.00	+0.08 -0.08	9.00	10.00	4649400
63.00	+0.07 0.00	48.00	+0.08 -0.08	11.40	12.50	4383200‡
63.00	+0.07 0.00	53.00	+0.10 -0.10	7.30	8.00	4341500‡
63.00	+0.07 0.00	53.00	+0.10 -0.10	11.80	13.00	4318800
65.00	+0.07 0.00	55.00	+0.10 -0.10	7.30	8.00	4424100
70.00	+0.07 0.00	55.00	+0.10 -0.10	10.00	11.00	4448000
70.00	+0.07 0.00	60.00	+0.10 -0.10	8.00	9.00	4709500
71.00	+0.07 0.00	61.00	+0.10 -0.10	6.00	7.00	4492600
75.00	+0.07 0.00	67.00	+0.10 -0.10	5.70	6.30	4844100
75.00	+0.07 0.00	67.00	+0.10 -0.10	8.80	9.70	4322300
76.20	+0.07 0.00	66.20	+0.10 -0.10	7.30	8.00	4649700
80.00	+0.07 0.00	65.00	+0.10 -0.10	11.40	12.50	4363800‡
80.00	+0.07 0.00	70.00	+0.10 -0.10	6.00	7.00	4644800
80.00	+0.07 0.00	70.00	+0.10 -0.10	6.80	7.50	4370300

### NOTE

Part numbers suffixed by "‡" indicate housing sizes to meet ISO 5597.





# 606

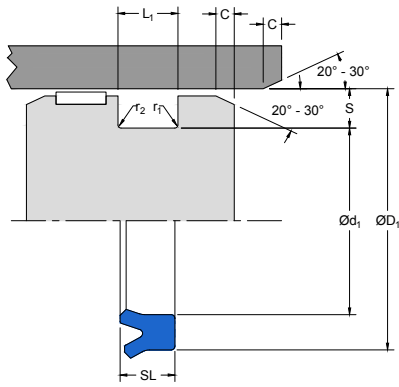
## PISTON SEAL

Single-Acting  
Polyurethane, Single Lip

### PART NUMBER RANGE

METRIC						
ØD <sub>1</sub>	TOL H9 0.00	Ød <sub>1</sub>	TOL js11 -0.10	L <sub>1</sub> +0.25-0	SL	PART No.
80.00	+0.07 0.00	70.00	+0.10 -0.10	8.00	9.00	4709600
80.00	+0.07 0.00	70.00	+0.10 -0.10	11.60	12.80	4649000
85.00	+0.09 0.00	75.00	+0.10 -0.10	8.10	9.00	4709700
85.70	+0.09 0.00	70.70	+0.10 -0.10	10.30	11.40	4493400
90.00	+0.09 0.00	80.00	+0.10 -0.10	11.00	12.00	4798800
100.00	+0.09 0.00	80.00	+0.10 -0.10	10.50	11.60	4874000
100.00	+0.09 0.00	85.00	+0.11 -0.11	9.00	10.00	4644600
100.00	+0.09 0.00	85.00	+0.11 -0.11	11.40	12.50	4363900‡
100.00	+0.09 0.00	85.00	+0.11 -0.11	11.80	13.00	4648900
100.00	+0.09 0.00	90.00	+0.11 -0.11	6.80	7.50	4375900
110.00	+0.09 0.00	100.00	+0.11 -0.11	8.00	9.00	4533100
120.00	+0.09 0.00	100.00	+0.11 -0.11	11.80	13.00	4649100
125.00	+0.10 0.00	105.00	+0.11 -0.11	14.50	16.00	4364000‡
150.00	+0.10 0.00	130.00	+0.13 -0.13	14.50	16.00	4390200
150.00	+0.10 0.00	140.00	+0.13 -0.13	13.60	15.00	4390300
160.00	+0.10 0.00	140.00	+0.13 -0.13	14.50	16.00	4642700‡
160.00	+0.10 0.00	140.00	+0.13 -0.13	18.20	20.00	4364100

**NOTE** Part numbers suffixed by "‡" indicate housing sizes to meet ISO 5597.



## PART NUMBER RANGE

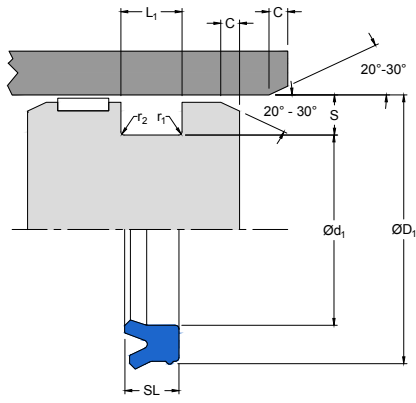
METRIC						
ØD <sub>1</sub>	TOL H9	Ød <sub>1</sub>	TOL js11	L <sub>1</sub> +0.25-0	SL	PART No.
170.00	+0.10 0.00	150.00	+0.13 -0.13	15.00	16.50	4642800
180.00	+0.10 0.00	160.00	+0.13 -0.13	15.00	16.50	4643100
190.00	+0.12 0.00	170.00	+0.13 -0.13	15.00	16.50	4642900
200.00	+0.12 0.00	180.00	+0.13 -0.13	14.50	16.00	4392300
280.00	+0.13 0.00	260.00	+0.16 -0.16	15.50	17.00	4643000
305.00	+0.13 0.00	275.00	+0.16 -0.16	23.80	25.00	4649500
490.00	+0.16 0.00	470.00	+0.20 -0.20	14.50	16.00	4911400

### NOTE

Part numbers suffixed by "‡" indicate housing sizes to meet ISO 5597.







# 659

## PISTON SEAL

Single-Acting  
Polyurethane, Twin Lip

### DESIGN

The Hallite 659 twin lip, asymmetric, single-acting piston seal with precision trimmed sealing lips provides a dry sealing solution in light and medium-duty application. The sealing lips are trimmed at an angle to give optimal rod sealing performance.

The Hallite 659 is designed to have an interference on the piston spigot diameter and has a secondary lip. The secondary sealing lip located behind the primary sealing lip improves stability of the seal in the piston. The outer dynamic lip is shorter and more robust to improving sealing and compression set characteristics over conventional, symmetrical U-rings.

The Hallite 659 is moulded in Hythane® 181, Hallite's high-performance polyurethane, for easy installation and excellent low temperature performance. Depending on tube bore finish, the Hallite 659 is also offered in Hythane® 361 polyurethane.

This seal is for use in single-acting piston seal applications only.



### FEATURES

- Robust design
- Excellent wear resistance
- Increase seal stability
- Performs well over wide temperature range and is extremely effective in low temperatures
- Primary lip protection
- Easy to install

### MATERIALS

As standard, this product comes in the following material. Contact your local Hallite technical team if you would like to find out if this profile can be made in a custom material to suit your application. For further material details, please refer to the Hallite Material Table.

MATERIAL OPTIONS	Name	Type	Colour
Standard	Hythane® 181	TPU-EU	Blue

## TECHNICAL DETAILS

OPERATING CONDITIONS	METRIC	INCH
Maximum Speed	1.0 m/sec	3.0 ft/sec
Temperature Range	-45°C +110°C	-50°F +230°F
Maximum Pressure	400 bar	6000 psi

### NOTE

Data given are maximum values and can apply depending on specific application. Maximum ratings of temperature, pressure, or operating speeds are dependent on fluid medium, surface, gap value, and other variables such as dynamic or static service. Maximum values are not intended for use together at the same time, e.g. max temperature and max pressure. Please contact your Hallite technical representative for application support.

MAXIMUM EXTRUSION GAP			
Pressure bar	160	250	400
Maximum Gap mm	0.60	0.50	0.40
Pressure psi	2400	3750	6000
Maximum Gap in	0.024	0.020	0.016

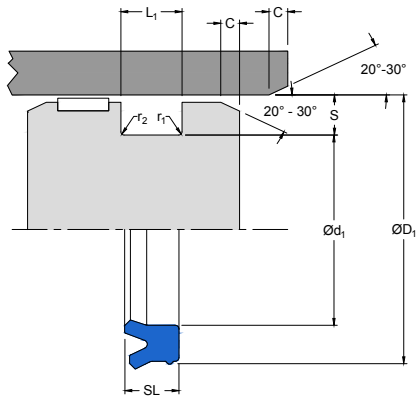
### NOTE

Figures show the maximum permissible gap all on one side using minimum rod  $\varnothing$  and maximum clearance  $\varnothing$ . Refer to Housing Design section.

SURFACE ROUGHNESS	$\mu\text{mRa}$	$\mu\text{mRz}$	$\mu\text{mRt}$	$\mu\text{inRa}$	$\mu\text{inRz}$	$\mu\text{inRt}$
Dynamic Sealing Face $\varnothing D_1$	0.1 - 0.4	1.6 max	4 max	4 - 16	63 max	157 max
Static Sealing Face $\varnothing d_1$	1.6 max	6.3 max	10 max	63 max	250 max	394 max
Static Housing Faces $L_1$	3.2 max	10 max	16 max	125 max	394 max	630 max

CHAMFERS & RADII				
Groove Section $< S$ mm	4.00	5.00	7.50	10.00
Min Chamfer C mm	3.00	3.50	5.00	6.50
Max Fillet Rad $r_1$ mm	0.20	0.40	0.80	0.80
Max Fillet Rad $r_2$ mm	0.40	0.80	1.20	1.20
Groove Section $\leq S$ in	0.125	0.187	0.250	0.500
Min Chamfer C in	0.093	0.093	0.125	0.217
Max Fillet Rad $r_1$ in	0.008	0.008	0.016	0.032
Max Fillet Rad $r_2$ in	0.016	0.016	0.032	0.047

TOLERANCES	$\varnothing D_1$	$\varnothing d_1$	$L_1$
mm	H9	js11	+0.25 -0
in	+0.004 -0	0 -0.002	+0.010 -0



# 659

## PISTON SEAL

Single-Acting  
Polyurethane, Twin Lip

### PART NUMBER RANGE

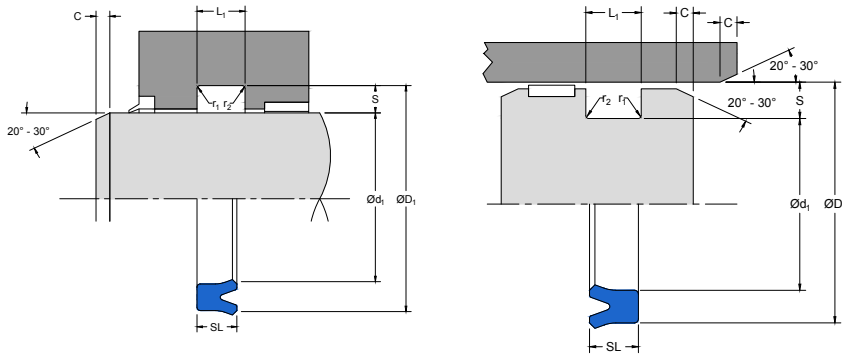
METRIC						
ØD <sub>1</sub>	TOL H9 0.00	Ød <sub>1</sub>	TOL js11 -0.08	SL	L <sub>1</sub> +0.25-0	PART No.
60.00	+0.07 0.00	45.00	+0.08 -0.08	10.00	11.40	4894700
70.00	+0.07 0.00	55.00	+0.10 -0.10	10.00	11.00	4884400
75.00	+0.07 0.00	65.00	+0.10 -0.10	7.30	8.00	4870700
80.00	+0.07 0.00	65.00	+0.10 -0.10	11.50	12.50	4892200‡
90.00	+0.09 0.00	75.00	+0.10 -0.10	11.50	12.50	4775500‡
90.00	+0.09 0.00	80.00	+0.10 -0.10	8.00	9.00	4834000
100.00	+0.09 0.00	80.00	+0.10 -0.10	14.50	16.00	4580300‡
100.00	+0.09 0.00	85.00	+0.11 -0.11	10.00	11.40	4894900
100.00	+0.09 0.00	85.00	+0.11 -0.11	11.50	12.50	4775600‡
105.00	+0.09 0.00	90.00	+0.11 -0.11	11.50	12.50	4892300
110.00	+0.09 0.00	90.00	+0.11 -0.11	14.50	16.00	4580400‡
110.00	+0.09 0.00	95.00	+0.11 -0.11	11.50	12.50	4775700‡
120.00	+0.09 0.00	100.00	+0.11 -0.11	11.80	13.00	4865000
130.00	+0.10 0.00	115.00	+0.11 -0.11	11.50	12.50	4813000

**NOTE** Part numbers suffixed by "‡" indicate housing sizes to meet ISO 5597.



# SINGLE-ACTING ROD AND PISTON SEALS





# 601

## ROD/PISTON SEAL

Single-Acting  
Polyurethane

### DESIGN

The Hallite 601 high-performance, general purpose, single-acting U-ring rod or piston seal is designed to provide a dry sealing solution in light and medium-duty applications and manufactured in Hythane® 181, Hallite's high-performance polyurethane, for easy installation and excellent low temperature performance. The seal can be considered for use in heavy-duty applications when used with a suitable full depth back-up ring. The sealing lips are trimmed at an angle to give optimal sealing performance.

The symmetry of the Hallite 601 makes it ideally suited for single-acting rod or piston applications. The Hallite 601 can also be fitted back-to-back for use in double-acting applications, but the Hallite 606 single-acting piston seal is the preferred option.



### FEATURES

- General purpose seal
- Excellent resistance to abrasion
- Positive lip actuation
- Excellent temperature resistance
- Precision trimmed lips
- Easy to install

### MATERIALS

As standard, this product comes in the following material. Contact your local Hallite technical team if you would like to find out if this profile can be made in a custom material to suit your application. For further material details, please refer to the Hallite Material Table.

MATERIAL OPTIONS	Name	Type	Colour
Standard	Hythane® 181	TPU-EU	Blue

## TECHNICAL DETAILS

OPERATING CONDITIONS	METRIC	INCH
Maximum Speed	1.0 m/sec	3.0 ft/sec
Temperature Range	-45°C +110°C	-50°F +230°F
Maximum Pressure	400 bar	6000 psi
Maximum Pressure with Backup Ring	700 bar	10000 psi

## NOTE

Data given are maximum values and can apply depending on specific application. Maximum ratings of temperature, pressure, or operating speeds are dependent on fluid medium, surface, gap value, and other variables such as dynamic or static service. Maximum values are not intended for use together at the same time, e.g. max temperature and max pressure. Please contact your Hallite technical representative for application support.

## NOTE

**Pressure Rating:** Can be extended with use of backup ring. Seek technical advice from local Hallite office.

MAXIMUM EXTRUSION GAP			
Pressure bar	160	250	400
Maximum Gap mm	0.60	0.50	0.40
Pressure psi	2400	3750	6000
Maximum Gap in	0.024	0.020	0.016

## NOTE

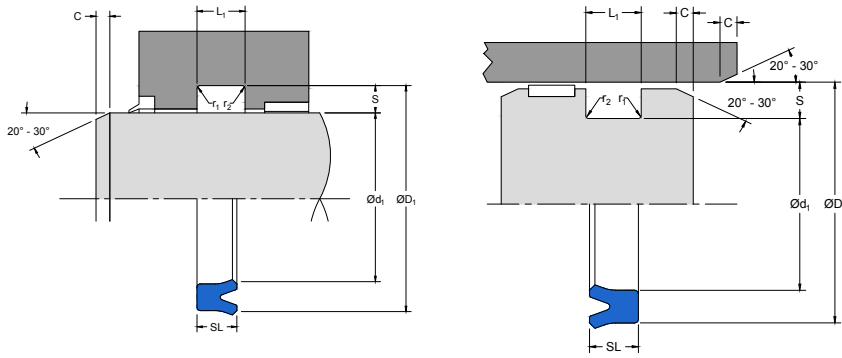
Figures show the maximum permissible gap all on one side, for rod seals using minimum rod  $\varnothing$  and maximum clearance  $\varnothing$  and for piston seals using the minimum clearance  $\varnothing$  and maximum bore  $\varnothing$ . Refer to Housing Design section.

SURFACE ROUGHNESS	$\mu\text{mRa}$	$\mu\text{mRz}$	$\mu\text{mRt}$	$\mu\text{inRa}$	$\mu\text{inRz}$	$\mu\text{inRt}$
Dynamic Sealing Face $\varnothing d_1$ - Rod	0.1 - 0.4	1.6 max	4 max	4 - 16	63 max	157 max
Static Sealing Face $\varnothing D_1$ - Rod	1.6 max	6.3 max	10 max	63 max	250 max	394 max
Dynamic Sealing Face $\varnothing D_1$ - Piston	0.1 - 0.4	1.6 max	4 max	4 - 16	63 max	157 max
Static Sealing Face $\varnothing d_1$ - Piston	1.6 max	6.3 max	10 max	63 max	250 max	394 max
Static Housing Faces $L_1$	3.2 max	10 max	16 max	125 max	394 max	630 max

CHAMFERS & RADII							
Groove Section $<S$ mm	4.00	5.00	7.50	10.00	12.50	15.00	20.00
Min Chamfer $C$ mm	3.00	3.50	5.00	6.50	7.00	8.00	10.00
Max Fillet Rad $r_1$ mm	0.20	0.40	0.80	0.80	1.20	1.60	1.60
Max Fillet Rad $r_2$ mm	0.40	0.80	1.20	1.20	1.60	2.40	2.40
Groove Section $\leq S$ in	0.125	0.187	0.250	0.312	0.375	0.500	
Min Chamfer $C$ in	0.093	0.093	0.125	0.156	0.187	0.187	
Max Fillet Rad $r_1$ in	0.008	0.008	0.016	0.032	0.032	0.032	
Max Fillet Rad $r_2$ in	0.016	0.016	0.032	0.047	0.047	0.047	

TOLERANCES	$\varnothing d_1$	$\varnothing D_1$	$L_1$ mm	$L_1$ in
Rod	f9	Js11	+0.25 -0	+0.010 -0
Piston	js11	H9	+0.25 -0	+0.010 -0





# 601

## ROD/PISTON SEAL

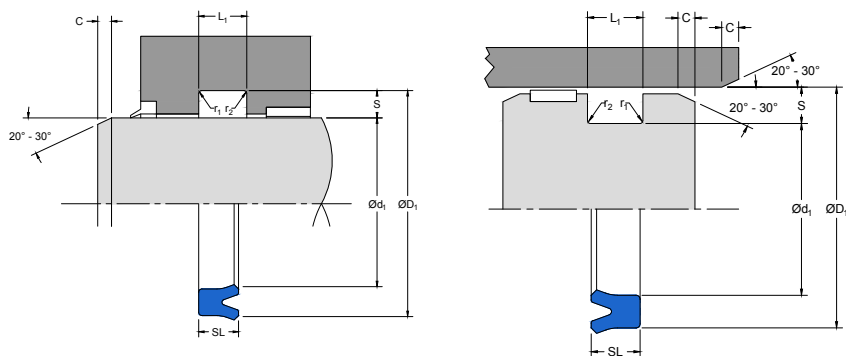
Single-Acting  
Polyurethane

### PART NUMBER RANGE

METRIC						
Ød <sub>1</sub>	TOL f9	ØD <sub>1</sub>	TOL Js11	SL	L <sub>1</sub> +0.25-0	PART No.
4.50	-0.01 -0.04	12.50	+0.06 -0.06	4.40	5.00	4506701
5.00	-0.01 -0.04	12.00	+0.06 -0.06	5.50	6.50	4508601
6.00	-0.01 -0.04	13.00	+0.06 -0.06	8.00	9.00	4460300
10.00	-0.01 -0.05	18.00	+0.06 -0.06	6.00	6.60	4299900
10.00	-0.01 -0.05	20.00	+0.07 -0.07	8.00	9.00	4600000
12.00	-0.02 -0.06	18.00	+0.06 -0.06	6.00	7.00	4621300
12.00	-0.02 -0.06	20.00	+0.07 -0.07	4.40	5.00	4182501‡
12.00	-0.02 -0.06	25.00	+0.07 -0.07	8.00	9.00	4600100
14.00	-0.02 -0.06	22.00	+0.07 -0.07	4.40	5.00	4182601‡
14.00	-0.02 -0.06	22.00	+0.07 -0.07	5.00	5.70	4604000
14.00	-0.02 -0.06	24.00	+0.07 -0.07	8.00	9.00	4600200
15.00	-0.02 -0.06	25.00	+0.07 -0.07	8.00	9.00	4600300
16.00	-0.02 -0.06	24.00	+0.07 -0.07	4.40	5.00	4182701‡
16.00	-0.02 -0.06	24.00	+0.07 -0.07	5.00	5.70	4604100
16.00	-0.02 -0.06	26.00	+0.07 -0.07	8.00	9.00	4600400
18.00	-0.02 -0.06	26.00	+0.07 -0.07	4.40	5.00	4182901‡
18.00	-0.02 -0.06	26.00	+0.07 -0.07	5.00	5.70	4604200

#### NOTE

For piston sealing tolerances refer to technical details. Part numbers commencing "46 . . . ." are designed to suit popular Asian housings. Part numbers suffixed by "‡" indicate housing sizes to meet ISO5597.

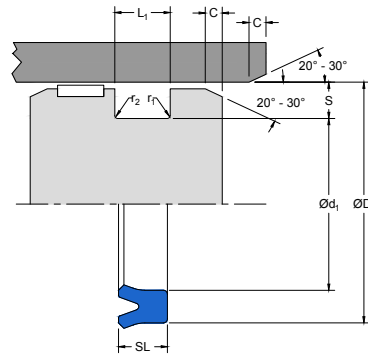
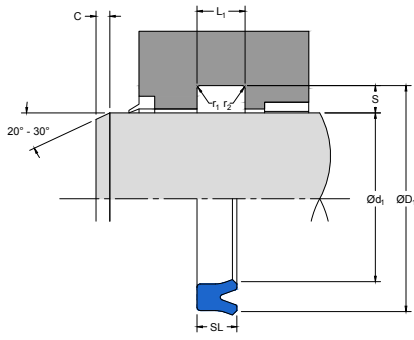


## PART NUMBER RANGE

METRIC						
$\varnothing d_1$	TOL $f_9$	$\varnothing D_1$	TOL $J_s11$	SL	$L_1$ +0.25-0	PART No.
18.00	-0.02 -0.06	28.00	+0.07 -0.07	7.30	8.00	4547900
18.00	-0.02 -0.06	28.00	+0.07 -0.07	8.00	9.00	4600500
20.00	-0.02 -0.07	28.00	+0.07 -0.07	4.40	5.00	4183001‡
20.00	-0.02 -0.07	28.00	+0.07 -0.07	5.00	5.70	4604300
20.00	-0.02 -0.07	30.00	+0.07 -0.07	8.00	9.00	4600600
20.00	-0.02 -0.07	40.00	+0.08 -0.08	12.00	13.00	4621900
22.00	-0.02 -0.07	30.00	+0.07 -0.07	4.40	5.00	4183101‡
22.00	-0.02 -0.07	35.00	+0.08 -0.08	10.00	11.00	4600700
22.00	-0.02 -0.07	40.00	+0.08 -0.08	10.00	11.00	4572900
22.40	-0.02 -0.07	30.00	+0.07 -0.07	5.00	5.70	4604400
22.40	-0.02 -0.07	32.40	+0.08 -0.08	8.00	9.00	4600800
23.50	-0.02 -0.07	31.50	+0.08 -0.08	5.00	5.70	4621500
25.00	-0.02 -0.07	33.00	+0.08 -0.08	4.40	5.00	4183301‡
25.00	-0.02 -0.07	33.00	+0.08 -0.08	5.00	5.70	4604500
25.00	-0.02 -0.07	35.00	+0.08 -0.08	8.00	9.00	4600900
25.00	-0.02 -0.07	35.00	+0.08 -0.08	10.00	11.00	4362600
25.00	-0.02 -0.07	38.00	+0.08 -0.08	8.00	9.00	4601000

### NOTE

For piston sealing tolerances refer to technical details. Part numbers commencing "46 . . . ." are designed to suit popular Asian housings. Part numbers suffixed by "‡" indicate housing sizes to meet ISO5597.



# 601

## ROD/PISTON SEAL

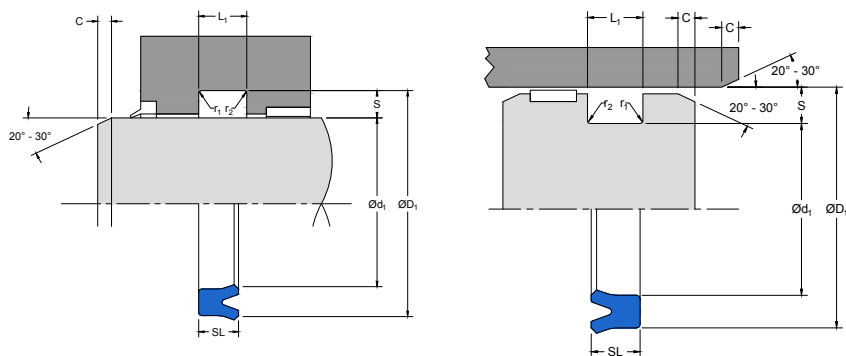
Single-Acting  
Polyurethane

### PART NUMBER RANGE

METRIC						
Ød <sub>1</sub>	TOL f <sub>9</sub>	ØD <sub>1</sub>	TOL Js11	SL	L <sub>1</sub> +0.25-0	PART No.
25.00	-0.02 -0.07	38.00	+0.08 -0.08	10.00	11.00	4621400
25.00	-0.02 -0.07	40.00	+0.08 -0.08	10.00	11.00	4601100
26.00	-0.02 -0.07	40.00	+0.08 -0.08	9.00	10.00	4584900
28.00	-0.02 -0.07	35.50	+0.08 -0.08	5.00	5.70	4604600
28.00	-0.02 -0.07	36.00	+0.08 -0.08	6.50	7.10	4506201
28.00	-0.02 -0.07	38.00	+0.08 -0.08	5.60	6.30	4183401‡
28.00	-0.02 -0.07	38.00	+0.08 -0.08	8.00	9.00	4867600
28.00	-0.02 -0.07	40.00	+0.08 -0.08	10.00	11.00	4601200
28.00	-0.02 -0.07	43.00	+0.08 -0.08	10.00	11.00	4601300
30.00	-0.02 -0.07	37.00	+0.08 -0.08	6.00	7.00	4596800
30.00	-0.02 -0.07	40.00	+0.08 -0.08	5.60	6.30	4183501
30.00	-0.02 -0.07	40.00	+0.08 -0.08	6.00	7.00	4604700
30.00	-0.02 -0.07	40.00	+0.08 -0.08	8.00	9.00	4596900
30.00	-0.02 -0.07	40.00	+0.08 -0.08	10.00	11.00	4362700
30.00	-0.02 -0.07	45.00	+0.08 -0.08	10.00	11.00	4601400
31.50	-0.03 -0.09	41.50	+0.08 -0.08	6.00	7.00	4604800
32.00	-0.03 -0.09	40.00	+0.08 -0.08	8.00	9.00	4867700

#### NOTE

For piston sealing tolerances refer to technical details. Part numbers commencing "46 . . . ." are designed to suit popular Asian housings. Part numbers suffixed by "‡" indicate housing sizes to meet ISO5597.



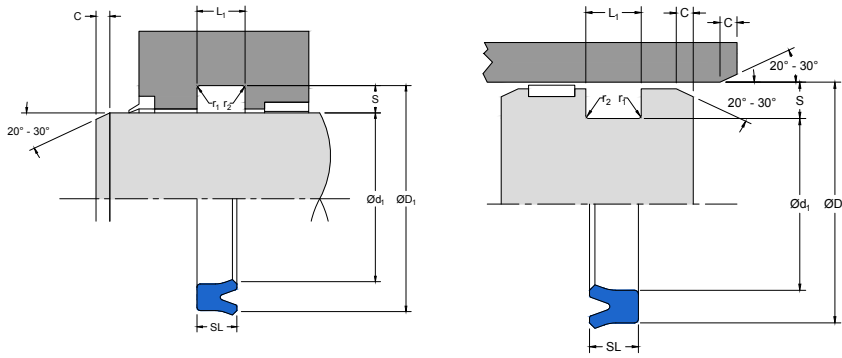
## PART NUMBER RANGE

### METRIC

$\varnothing d_1$	TOL $f_9$	$\varnothing D_1$	TOL $J_s11$	SL	$L_1$ $+0.25-0$	PART No.
32.00	-0.03 -0.09	42.00	+0.08 -0.08	5.60	6.30	4183601±
32.00	-0.03 -0.09	42.00	+0.08 -0.08	6.00	7.00	4604900
32.00	-0.03 -0.09	42.00	+0.08 -0.08	10.00	11.00	4362800
32.00	-0.03 -0.09	47.00	+0.08 -0.08	10.00	11.00	4621200
35.00	-0.03 -0.09	45.00	+0.08 -0.08	6.00	7.00	4605000
35.00	-0.03 -0.09	45.00	+0.08 -0.08	7.00	8.00	4496000
35.00	-0.03 -0.09	48.00	+0.08 -0.08	10.00	11.00	4360300
35.00	-0.03 -0.09	50.00	+0.08 -0.08	10.00	11.00	4601500
35.50	-0.03 -0.09	45.00	+0.08 -0.08	6.00	7.00	4605100
35.50	-0.03 -0.09	50.50	+0.10 -0.10	10.00	11.00	4621100
36.00	-0.03 -0.09	46.00	+0.08 -0.08	5.60	6.30	4183701±
38.00	-0.03 -0.09	48.00	+0.08 -0.08	6.00	7.00	4605200
38.00	-0.03 -0.09	50.00	+0.08 -0.08	9.00	10.00	4709400
38.00	-0.03 -0.09	55.00	+0.10 -0.10	9.70	11.00	4366000
38.00	-0.03 -0.09	58.00	+0.10 -0.10	9.70	11.00	4560100
40.00	-0.03 -0.09	50.00	+0.08 -0.08	5.60	6.30	4183801±
40.00	-0.03 -0.09	50.00	+0.08 -0.08	6.00	7.00	4605300

#### NOTE

For piston sealing tolerances refer to technical details. Part numbers commencing "46 . . . ." are designed to suit popular Asian housings. Part numbers suffixed by "±" indicate housing sizes to meet ISO5597.



# 601

## ROD/PISTON SEAL

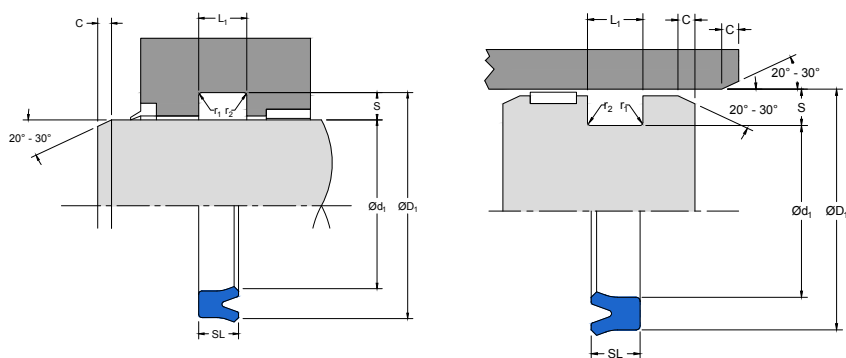
Single-Acting  
Polyurethane

### PART NUMBER RANGE

METRIC						
Ød <sub>1</sub>	TOL f <sub>9</sub>	ØD <sub>1</sub>	TOL Js11	SL	L <sub>1</sub> +0.25-0	PART No.
40.00	-0.03 -0.09	50.00	+0.08 -0.08	10.00	11.00	4362900
40.00	-0.03 -0.09	55.00	+0.10 -0.10	9.90	11.00	4388500
40.00	-0.03 -0.09	55.00	+0.10 -0.10	10.00	11.00	4601600
40.00	-0.03 -0.09	60.00	+0.10 -0.10	12.00	13.00	4601700
45.00	-0.03 -0.09	53.00	+0.10 -0.10	10.00	11.00	4867800
45.00	-0.03 -0.09	55.00	+0.10 -0.10	5.60	6.30	4183901‡
45.00	-0.03 -0.09	55.00	+0.10 -0.10	6.00	7.00	4605400
45.00	-0.03 -0.09	55.00	+0.10 -0.10	10.00	11.00	4363000
45.00	-0.03 -0.09	56.00	+0.10 -0.10	7.00	8.00	4605500
45.00	-0.03 -0.09	60.00	+0.10 -0.10	10.00	11.00	4601800
45.00	-0.03 -0.09	65.00	+0.10 -0.10	10.00	11.00	4575000
46.00	-0.03 -0.09	56.00	+0.10 -0.10	6.00	7.00	4543900
48.00	-0.03 -0.09	63.00	+0.10 -0.10	10.00	11.00	4601900
50.00	-0.03 -0.09	60.00	+0.10 -0.10	5.60	6.30	4184001‡
50.00	-0.03 -0.09	60.00	+0.10 -0.10	6.00	7.00	4605600
50.00	-0.03 -0.09	60.00	+0.10 -0.10	10.00	11.00	4363100
50.00	-0.03 -0.09	65.00	+0.10 -0.10	10.00	11.00	4602000

#### NOTE

For piston sealing tolerances refer to technical details. Part numbers commencing "46 . . ." are designed to suit popular Asian housings. Part numbers suffixed by "‡" indicate housing sizes to meet ISO5597.

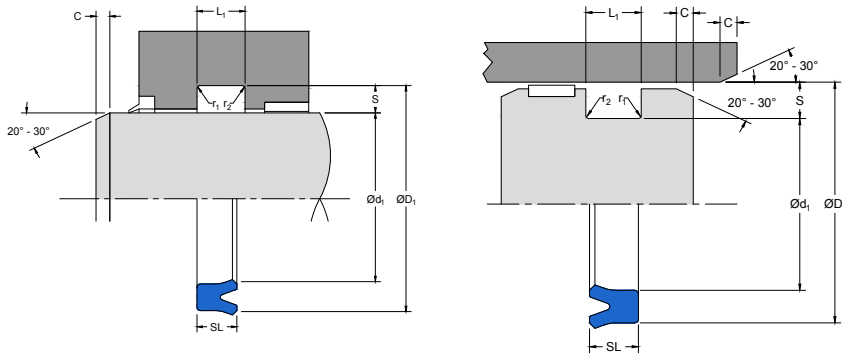


## PART NUMBER RANGE

METRIC						
Ød <sub>1</sub>	TOL f <sub>9</sub>	ØD <sub>1</sub>	TOL Js11	SL	L <sub>1</sub> +0.25-0	PART No.
50.00	-0.03 -0.09	70.00	+0.10 -0.10	12.00	13.00	4602100
52.00	-0.03 -0.10	62.00	+0.10 -0.10	10.00	11.00	4559000
53.00	-0.03 -0.10	63.00	+0.10 -0.10	6.00	7.00	4605700
55.00	-0.03 -0.10	65.00	+0.10 -0.10	6.00	7.00	4605800
55.00	-0.03 -0.10	75.00	+0.10 -0.10	12.00	13.00	4602200
56.00	-0.03 -0.10	66.00	+0.10 -0.10	6.00	7.00	4605900
56.00	-0.03 -0.10	71.00	+0.10 -0.10	8.40	9.50	4184201‡
56.00	-0.03 -0.10	76.00	+0.10 -0.10	12.00	13.00	4622000
60.00	-0.03 -0.10	70.00	+0.10 -0.10	6.00	7.00	4606000
60.00	-0.03 -0.10	70.00	+0.10 -0.10	10.00	11.00	4363200
60.00	-0.03 -0.10	71.00	+0.10 -0.10	7.00	8.00	4606100
60.00	-0.03 -0.10	76.00	+0.10 -0.10	12.00	13.00	4608000
60.00	-0.03 -0.10	80.00	+0.10 -0.10	12.00	13.00	4602300
63.00	-0.03 -0.10	73.00	+0.10 -0.10	6.00	7.00	4606200
63.00	-0.03 -0.10	73.00	+0.10 -0.10	11.80	13.00	4363300
63.00	-0.03 -0.10	78.00	+0.10 -0.10	8.40	9.50	4184301‡
65.00	-0.03 -0.10	75.00	+0.10 -0.10	6.00	7.00	4606300

### NOTE

For piston sealing tolerances refer to technical details. Part numbers commencing "46 . . . ." are designed to suit popular Asian housings. Part numbers suffixed by "‡" indicate housing sizes to meet ISO5597.



# 601

## ROD/PISTON SEAL

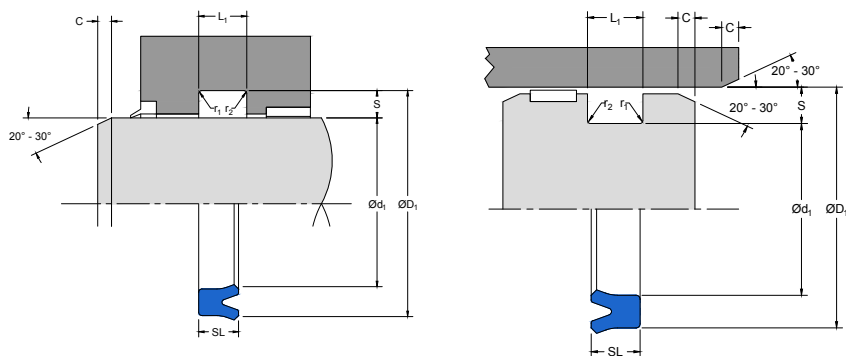
Single-Acting  
Polyurethane

### PART NUMBER RANGE

METRIC						
Ød <sub>1</sub>	TOL f <sub>9</sub>	ØD <sub>1</sub>	TOL Js11	SL	L <sub>1</sub> +0.25-0	PART No.
65.00	-0.03 -0.10	80.00	+0.10 -0.10	8.40	9.50	4184401‡
65.00	-0.03 -0.10	80.00	+0.10 -0.10	12.00	13.00	4867900
65.00	-0.03 -0.10	85.00	+0.11 -0.11	12.00	13.00	4602400
70.00	-0.03 -0.10	80.00	+0.10 -0.10	6.00	7.00	4606400
70.00	-0.03 -0.10	80.00	+0.10 -0.10	11.80	13.00	4363400
70.00	-0.03 -0.10	85.00	+0.11 -0.11	8.40	9.50	4184501‡
70.00	-0.03 -0.10	85.00	+0.11 -0.11	12.00	13.00	4868000
70.00	-0.03 -0.10	90.00	+0.11 -0.11	12.00	13.00	4602500
70.00	-0.03 -0.10	92.00	+0.11 -0.11	12.00	13.00	4602600
71.00	-0.03 -0.10	80.00	+0.10 -0.10	6.00	7.00	4606500
75.00	-0.03 -0.10	85.00	+0.11 -0.11	6.00	7.00	4606600
75.00	-0.03 -0.10	85.00	+0.11 -0.11	11.80	13.00	4363500
75.00	-0.03 -0.10	90.00	+0.11 -0.11	12.00	13.00	4868100
75.00	-0.03 -0.10	95.00	+0.11 -0.11	12.00	13.00	4602700
75.00	-0.03 -0.10	100.00	+0.11 -0.11	22.00	24.00	4584700
80.00	-0.03 -0.10	90.00	+0.11 -0.11	6.00	7.00	4606700
80.00	-0.03 -0.10	90.00	+0.11 -0.11	8.00	8.80	4159001

#### NOTE

For piston sealing tolerances refer to technical details. Part numbers commencing "46 . . . ." are designed to suit popular Asian housings. Part numbers suffixed by "‡" indicate housing sizes to meet ISO5597.



## PART NUMBER RANGE

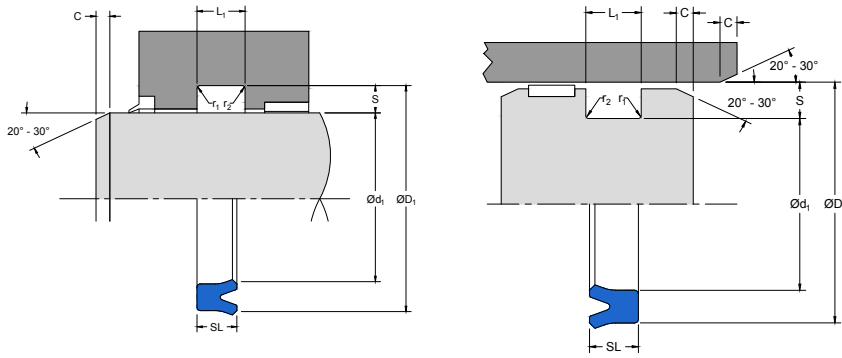
### METRIC

$\varnothing d_1$	TOL $f_9$	$\varnothing D_1$	TOL $J_s11$	SL	$L_1$ $+0.25-0$	PART No.
80.00	-0.03 -0.10	90.00	+0.11 -0.11	11.80	13.00	4363600
80.00	-0.03 -0.10	95.00	+0.11 -0.11	8.40	9.50	4184601‡
80.00	-0.03 -0.10	100.00	+0.11 -0.11	12.00	13.00	4602800
80.00	-0.03 -0.10	100.00	+0.11 -0.11	13.20	14.50	4857100
85.00	-0.04 -0.12	100.00	+0.11 -0.11	8.40	9.50	4184701‡
85.00	-0.04 -0.12	100.00	+0.11 -0.11	8.90	10.00	4606800
85.00	-0.04 -0.12	100.00	+0.11 -0.11	12.00	13.00	4868200
85.00	-0.04 -0.12	105.00	+0.11 -0.11	12.00	13.00	4602900
90.00	-0.04 -0.12	100.00	+0.11 -0.11	11.80	13.00	4363700
90.00	-0.04 -0.12	105.00	+0.11 -0.11	8.40	9.50	4184801‡
90.00	-0.04 -0.12	105.00	+0.11 -0.11	8.90	10.00	4606900
90.00	-0.04 -0.12	110.00	+0.11 -0.11	12.00	13.00	4603000
95.00	-0.04 -0.12	110.00	+0.11 -0.11	8.90	10.00	4607000
95.00	-0.04 -0.12	110.00	+0.11 -0.11	12.00	13.00	4868300
95.00	-0.04 -0.12	115.00	+0.11 -0.11	12.00	13.00	4603100
100.00	-0.04 -0.12	110.00	+0.11 -0.11	6.40	7.00	4878600
100.00	-0.04 -0.12	115.00	+0.11 -0.11	8.90	10.00	4607100

#### NOTE

For piston sealing tolerances refer to technical details. Part numbers commencing "46 . . . ." are designed to suit popular Asian housings. Part numbers suffixed by "‡" indicate housing sizes to meet ISO5597.





# 601

## ROD/PISTON SEAL

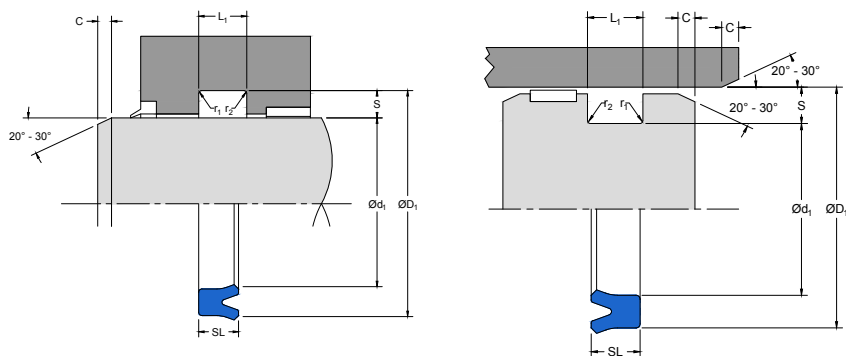
Single-Acting  
Polyurethane

### PART NUMBER RANGE

METRIC						
Ød <sub>1</sub>	TOL f <sub>9</sub>	ØD <sub>1</sub>	TOL Js11	SL	L <sub>1</sub> +0.25-0	PART No.
100.00	-0.04 -0.12	115.00	+0.11 -0.11	12.00	13.00	4868400
100.00	-0.04 -0.12	120.00	+0.11 -0.11	11.00	12.50	4184901‡
100.00	-0.04 -0.12	120.00	+0.11 -0.11	12.00	13.00	4603200
105.00	-0.04 -0.12	125.00	+0.13 -0.13	11.40	12.50	4185001‡
105.00	-0.04 -0.12	125.00	+0.13 -0.13	15.00	17.00	4603300
110.00	-0.04 -0.12	130.00	+0.13 -0.13	11.00	12.50	4185101‡
110.00	-0.04 -0.12	130.00	+0.13 -0.13	15.00	17.00	4603400
112.00	-0.04 -0.12	125.00	+0.13 -0.13	8.90	10.00	4607200
115.00	-0.04 -0.12	130.00	+0.13 -0.13	8.90	10.00	4621600
115.00	-0.04 -0.12	135.00	+0.13 -0.13	15.00	17.00	4608100
118.00	-0.04 -0.12	130.00	+0.13 -0.13	7.30	8.00	4878700
120.00	-0.04 -0.12	140.00	+0.13 -0.13	14.50	16.00	4319600
120.00	-0.04 -0.12	140.00	+0.13 -0.13	15.00	17.00	4603500
125.00	-0.04 -0.14	140.00	+0.13 -0.13	8.90	10.00	4607300
125.00	-0.04 -0.14	145.00	+0.13 -0.13	11.40	12.50	4185201‡
125.00	-0.04 -0.14	145.00	+0.13 -0.13	15.00	17.00	4603600
130.00	-0.04 -0.14	150.00	+0.13 -0.13	15.00	17.00	4603700

#### NOTE

For piston sealing tolerances refer to technical details. Part numbers commencing "46 . . . ." are designed to suit popular Asian housings. Part numbers suffixed by "‡" indicate housing sizes to meet ISO5597.

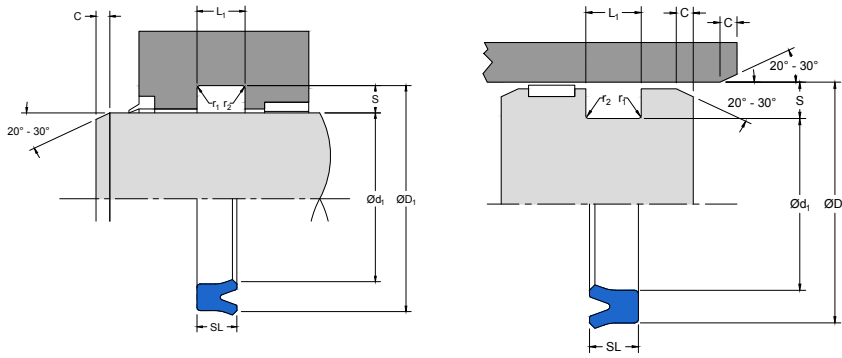


## PART NUMBER RANGE

METRIC						
Ød <sub>1</sub>	TOL f <sub>9</sub>	ØD <sub>1</sub>	TOL Js11	SL	L <sub>1</sub> +0.25-0	PART No.
136.00	-0.04 -0.14	150.00	+0.13 -0.13	8.50	9.50	4607400
140.00	-0.04 -0.14	154.00	+0.13 -0.13	9.00	10.00	4607900
140.00	-0.04 -0.14	155.00	+0.13 -0.13	8.90	10.00	4607500
140.00	-0.04 -0.14	160.00	+0.13 -0.13	15.00	17.00	4603800
145.00	-0.04 -0.14	160.00	+0.13 -0.13	8.90	10.00	4607600
145.00	-0.04 -0.14	165.00	+0.13 -0.13	15.00	17.00	4608200
150.00	-0.04 -0.14	165.00	+0.13 -0.13	8.90	10.00	4607700
150.00	-0.04 -0.14	170.00	+0.13 -0.13	15.00	17.00	4603900
153.00	-0.04 -0.14	165.00	+0.13 -0.13	7.30	8.00	4879000
155.00	-0.04 -0.14	170.00	+0.13 -0.13	8.90	10.00	4621700
155.00	-0.04 -0.14	180.00	+0.13 -0.13	15.00	17.00	4608300
160.00	-0.04 -0.14	175.00	+0.13 -0.13	9.00	10.00	4608400
160.00	-0.04 -0.14	180.00	+0.13 -0.13	15.00	16.00	4868500
160.00	-0.04 -0.14	185.00	+0.14 -0.14	15.00	17.00	4608500
165.00	-0.04 -0.14	180.00	+0.13 -0.13	9.00	10.00	4608600
165.00	-0.04 -0.14	183.00	+0.14 -0.14	10.00	11.00	4607800
165.00	-0.04 -0.14	190.00	+0.14 -0.14	15.00	17.00	4608700

### NOTE

For piston sealing tolerances refer to technical details. Part numbers commencing "46 . . . ." are designed to suit popular Asian housings. Part numbers suffixed by "±" indicate housing sizes to meet ISO5597.



# 601

## ROD/PISTON SEAL

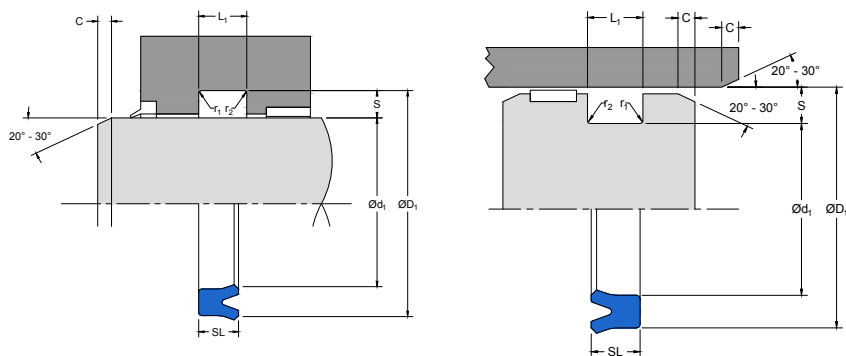
Single-Acting  
Polyurethane

### PART NUMBER RANGE

METRIC						
Ød <sub>1</sub>	TOL f9	ØD <sub>1</sub>	TOL Js11	SL	L <sub>1</sub> +0.25-0	PART No.
170.00	-0.04 -0.14	195.00	+0.14 -0.14	15.00	17.00	4608800
175.00	-0.04 -0.14	190.00	+0.14 -0.14	8.90	10.00	4621800
175.00	-0.04 -0.14	200.00	+0.14 -0.14	15.00	17.00	4608900
180.00	-0.04 -0.14	200.00	+0.14 -0.14	12.00	13.00	4609000
180.00	-0.04 -0.14	205.00	+0.14 -0.14	15.00	17.00	4609100
190.00	-0.05 -0.17	210.00	+0.14 -0.14	12.00	13.00	4609200
190.00	-0.05 -0.17	215.00	+0.14 -0.14	15.00	17.00	4609300
200.00	-0.05 -0.17	220.00	+0.14 -0.14	12.00	13.00	4609400
200.00	-0.05 -0.17	220.00	+0.14 -0.14	15.00	16.00	4678100
200.00	-0.05 -0.17	225.00	+0.14 -0.14	15.00	17.00	4609500
210.00	-0.05 -0.17	230.00	+0.14 -0.14	15.00	16.00	4678200
210.00	-0.05 -0.17	235.00	+0.14 -0.14	18.00	20.00	4609600
220.00	-0.05 -0.17	240.00	+0.14 -0.14	12.00	13.00	4609700
220.00	-0.05 -0.17	240.00	+0.14 -0.14	15.00	16.00	4678300
220.00	-0.05 -0.17	250.00	+0.14 -0.14	17.00	19.20	4426600
230.00	-0.05 -0.17	250.00	+0.14 -0.14	12.00	13.00	4609800
230.00	-0.05 -0.17	250.00	+0.14 -0.14	15.00	16.00	4678400

#### NOTE

For piston sealing tolerances refer to technical details. Part numbers commencing "46 . . . ." are designed to suit popular Asian housings. Part numbers suffixed by "‡" indicate housing sizes to meet ISO5597.



## PART NUMBER RANGE

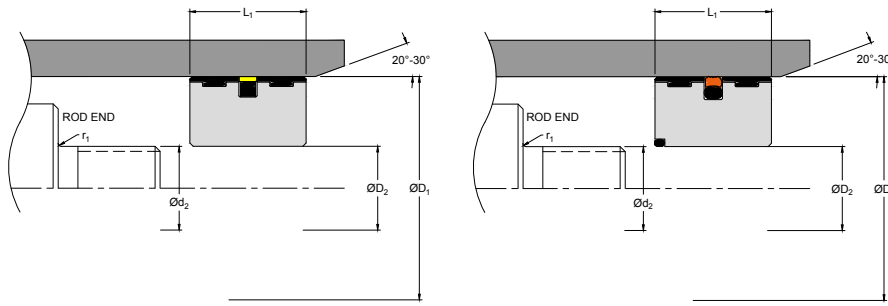
METRIC						
$\varnothing d_1$	TOL $f_9$	$\varnothing D_1$	TOL $J_s11$	SL	$L_1$ $+0.25-0$	PART No.
240.00	-0.05 -0.17	260.00	+0.16 -0.16	12.00	13.00	4621000
240.00	-0.05 -0.17	260.00	+0.16 -0.16	15.00	16.00	4678500
240.00	-0.05 -0.17	265.00	+0.16 -0.16	18.00	20.00	4609900
250.00	-0.05 -0.17	275.00	+0.16 -0.16	18.00	20.00	4610000
260.00	-0.06 -0.19	280.00	+0.16 -0.16	15.00	16.00	4678600
260.00	-0.06 -0.19	290.00	+0.16 -0.16	18.00	20.00	4620100
265.00	-0.06 -0.19	295.00	+0.16 -0.16	18.00	20.00	4620200
270.00	-0.06 -0.19	290.00	+0.16 -0.16	11.00	12.00	4879100
270.00	-0.06 -0.19	300.00	+0.16 -0.16	18.00	20.00	4620300
280.00	-0.06 -0.19	300.00	+0.16 -0.16	11.00	12.00	4879200
280.00	-0.06 -0.19	310.00	+0.16 -0.16	18.00	20.00	4620400
290.00	-0.06 -0.19	320.00	+0.18 -0.18	18.00	20.00	4620500
300.00	-0.06 -0.19	330.00	+0.18 -0.18	18.00	20.00	4620600
330.00	-0.06 -0.20	350.00	+0.18 -0.18	11.00	12.00	4879300
375.00	-0.06 -0.20	405.00	+0.20 -0.20	22.00	24.00	4620700
400.00	-0.06 -0.20	425.00	+0.20 -0.20	25.00	27.00	4620800

### NOTE

For piston sealing tolerances refer to technical details. Part numbers commencing "46 . . . ." are designed to suit popular Asian housings. Part numbers suffixed by "‡" indicate housing sizes to meet ISO5597.

# UNITISED PISTON





# 720

## UNITISED PISTON

### DESIGN

The Hallite 720 is a completely self-contained piston, bearing, and seal-in-one assembly that solves difficult assembly problems and can be a cost-effective alternative to the traditional piston assembly which has a separately fitted seal and bearing(s).

The Hallite 720 improves stability and has smaller extrusion gaps that extend the life of the piston seal. Moulding the bearing material over the outer diameter gives an extremely tight fit between the piston and the cylinder bore. The piston diameter is tightly controlled which reduces the tolerance build up and results in increased performance.

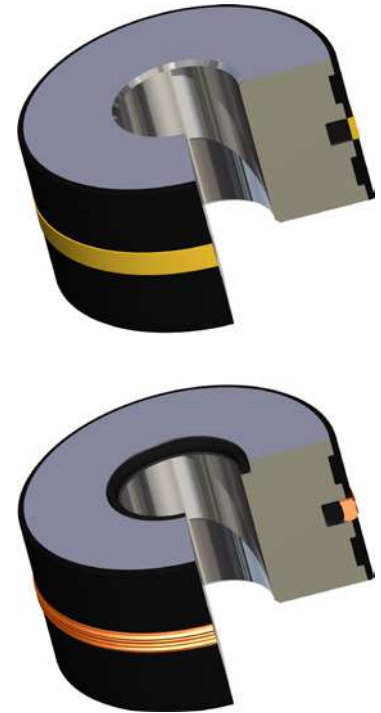
The Hallite 720 unitised piston is constructed using four components:

- High strength steel body
- Non-metallic bearing
- Rubber energiser
- Filled PTFE seal ring for inch sizes
- Polyurethane seal ring for metric sizes

The steel piston body is machined to exact dimensions. The non-metallic bearing material is moulded to the piston using a special proprietary process. It is then machined to the final precise outer diameter dimension to suit the cylinder bore and the seal is fitted. It is supplied ready to be attached to the piston rod for use in a cylinder.

In many cases the Hallite 720 is also supplied with an internal static sealing O-ring to provide a positive seal between the piston and the rod. Those marked with an asterisk in the part number range on the following pages do not have this internal seal.

The materials used in the standard unitised piston are selected to handle a broad range of application parameters. Contact your local Hallite technical team to decide which is best for your application.



### FEATURES

- Maximum bearing surface area for the piston length
- Works on a variety of cylinder bore finishes
- Increases side load capacity
- Diminishes effect of fluid contamination
- Eliminates metal-to-metal contact and extends seal life
- Compact piston design enables increase in stroke or reduction in overall cylinder length
- Improves supply chain management by reducing warranty claims, increasing manufacturing capacity and reducing inventory

## TECHNICAL DETAILS

OPERATING CONDITIONS	METRIC	INCH
Maximum Speed	1.0 m/sec	3.0 ft/sec
Temperature Range	-30°C +100°C	-22°F +212°F
Maximum Pressure	350 bar	5000 psi

### NOTE

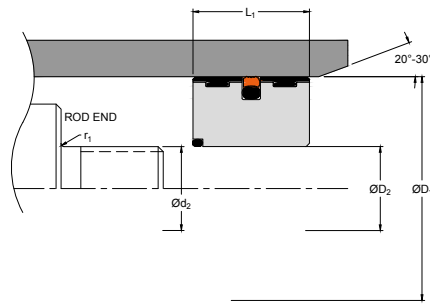
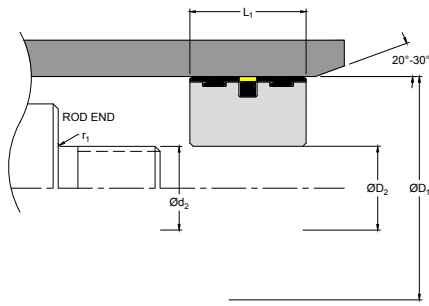
Data given are maximum values and can apply depending on specific application. Maximum ratings of temperature, pressure, or operating speeds are dependent on fluid medium, surface, gap value, and other variables such as dynamic or static service. Maximum values are not intended for use together at the same time, e.g. max temperature and max pressure. Please contact your Hallite technical representative for application support.

SURFACE ROUGHNESS	$\mu\text{mRa}$	$\mu\text{mRz}$	$\mu\text{mRt}$	$\mu\text{inRa}$	$\mu\text{inRz}$	$\mu\text{inRt}$
Dynamic Sealing Face $\text{ØD}_1$	0.1 - 0.4	1.6 max	4 max	4 - 16	63 max	157 max
Static Sealing Face $\text{Ød}_2$	1.6 max	6.3 max	10 max	63 max	250 max	394 max
Static Housing Rod End	3.2 max	10 max	16 max	125 max	394 max	630 max

RADII		
Max Fillet Rad $r_1$ with Internal O-Ring	3.00	0.125
Max Fillet Rad $r_1$ without Internal O-Ring	NA	0.031

TOLERANCES	$\text{ØD}_1$	$\text{ØD}_2$	$\text{Ød}_2$	$L_1$
mm	H9	+0.05 -0	f9	+0.20-0
in	H9	+0.002 -0	f9	+0.008-0





# 720

## UNITISED PISTON

### PART NUMBER RANGE

METRIC				
ØD <sub>1</sub>	TOL H9	ØD <sub>2</sub> +0.05-0	L <sub>1</sub> +0.20-0	PART No.
32.00	+0.06 0.00	12.00	25.00	7240510
40.00	+0.06 0.00	16.00	25.00	7241010
50.00	+0.06 0.00	20.00	25.00	7241510
60.00	+0.07 0.00	25.00	25.00	7242010
63.00	+0.07 0.00	25.00	25.00	7242510
70.00	+0.07 0.00	25.00	29.00	7243010
80.00	+0.07 0.00	25.00	29.00	7243510
100.00	+0.09 0.00	32.00	40.00	7244010

INCH				
ØD <sub>1</sub>	TOL H9	ØD <sub>2</sub> +0.002-0	L <sub>1</sub> +0.008-0	PART No.
1.500	+0.003 0.000	0.500	1.000	H1380*
2.000	+0.003 0.000	0.750	1.000	H1381*
2.250	+0.003 0.000	1.000	1.000	H1443*
2.500	+0.003 0.000	1.000	1.000	H1382*
3.000	+0.003 0.000	1.000	1.000	H1383
3.500	+0.004 0.000	1.000	1.000	H1384
3.500	+0.004 0.000	1.000	1.500	H1385
4.000	+0.004 0.000	1.000	1.000	H1386
4.000	+0.004 0.000	1.000	1.500	H1387
4.500	+0.004 0.000	1.000	1.500	H1388
5.000	+0.004 0.000	1.500	1.250	H1389
5.000	+0.004 0.000	1.500	1.750	H1390

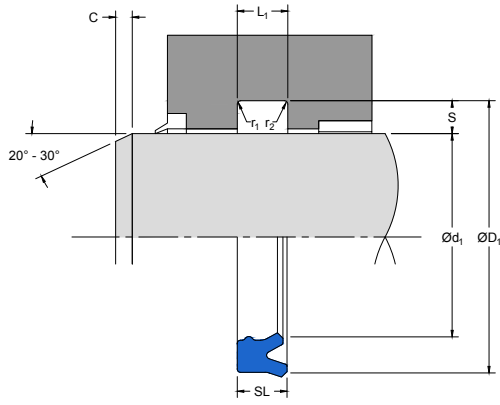
#### NOTE

Part numbers suffixed by "\*" are not fitted with an internal static sealing O-Ring.



# ROD SEALS





# 605

## ROD SEAL

*Twin Lip  
Polyurethane*

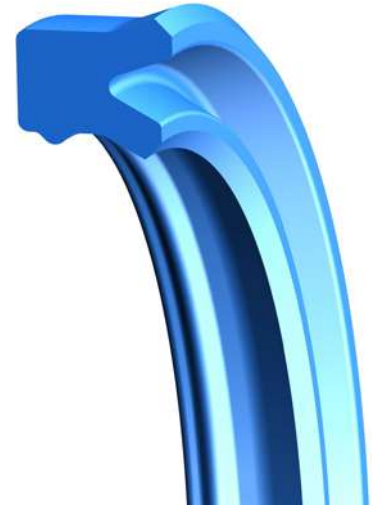
### DESIGN

The Hallite 605 twin lip, asymmetric rod seal is designed with precision trimmed sealing lips to provide a dry sealing solution in light and medium-duty applications. The seal can be considered for use in heavy-duty applications when used with a suitable full depth back-up ring. The sealing lips are precision trimmed at an angle to give optimal rod sealing performance.

The range covers most standard housings used in Europe, North America and Asia.

The Hallite 605 is designed to have interference in the seal housing groove and has a secondary lip. The secondary sealing lip located behind the primary sealing lip improves stability of the seal in the gland. The inner dynamic lip is shorter and more robust to improving sealing and compression set characteristics over conventional, symmetrical U-rings.

The Hallite 605 is moulded in Hythane® 181, Hallite's high-performance polyurethane, for easy installation and excellent low temperature performance.



### FEATURES

- General purpose rod seal
- Robust design
- Excellent wear resistance
- Increase seal stability
- Performs well over wide temperature range and is extremely effective in low temperatures
- Primary lip protection
- Easy to install

### MATERIALS

As standard, this product comes in the following material. Contact your local Hallite technical team if you would like to find out if this profile can be made in a custom material to suit your application. For further material details, please refer to the Hallite Material Table.

MATERIAL OPTIONS	Name	Type	Colour
Standard	Hythane® 181	TPU-EU	Blue

## TECHNICAL DETAILS

OPERATING CONDITIONS	METRIC	INCH
Maximum Speed	1.0 m/sec	3.0 ft/sec
Temperature Range	-45°C +110°C	-50°F +230°F
Maximum Pressure	400 bar	6000 psi
Maximum Pressure with Backup Ring	700 bar	10000 psi

## NOTE

Data given are maximum values and can apply depending on specific application. Maximum ratings of temperature, pressure, or operating speeds are dependent on fluid medium, surface, gap value, and other variables such as dynamic or static service. Maximum values are not intended for use together at the same time, e.g. max temperature and max pressure. Please contact your Hallite technical representative for application support.

## NOTE

**Pressure Rating:** Can be extended with use of back-up ring. Seek technical advice from local Hallite office.

MAXIMUM EXTRUSION GAP			
Pressure bar	160	250	400
Maximum Gap mm	0.60	0.50	0.40
Pressure psi	2400	3750	6000
Maximum Gap in	0.024	0.020	0.016

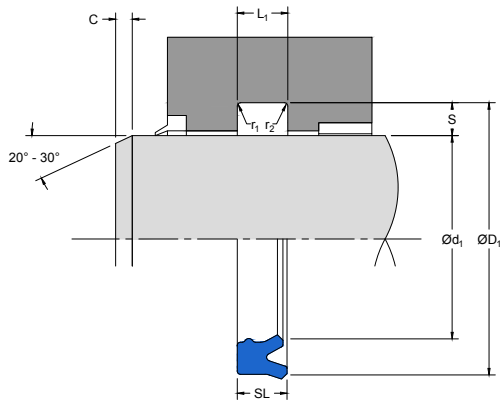
## NOTE

Figures show the maximum permissible gap all on one side, for rod seals using minimum rod  $\varnothing$  and maximum clearance  $\varnothing$  and for piston seals using the minimum clearance  $\varnothing$  and maximum bore  $\varnothing$ . Refer to Housing Design section.

SURFACE ROUGHNESS	$\mu\text{mRa}$	$\mu\text{mRz}$	$\mu\text{mRt}$	$\mu\text{inRa}$	$\mu\text{inRz}$	$\mu\text{inRt}$
Dynamic Sealing Face $\varnothing d_1$	0.1 - 0.4	1.6 max	4 max	4 - 16	63 max	157 max
Static Sealing Face $\varnothing D_1$	1.6 max	6.3 max	10 max	63 max	250 max	394 max
Static Housing Faces $L_1$	3.2 max	10 max	16 max	125 max	394 max	630 max

CHAMFERS & RADII						
Groove Section $<S$ mm	4.00	5.00	7.50	10.00	12.50	15.00
Min Chamfer $C$ mm	3.00	3.50	5.00	6.50	7.00	8.00
Max Fillet Rad $r_1$ mm	0.20	0.40	0.80	0.80	1.20	1.60
Max Fillet Rad $r_2$ mm	0.40	0.80	1.20	1.20	1.60	2.40
Groove Section $\leq S$ in	0.125	0.187	0.250	0.312	0.375	0.500
Min Chamfer $C$ in	0.093	0.093	0.125	0.156	0.187	0.187
Max Fillet Rad $r_1$ in	0.008	0.008	0.016	0.032	0.032	0.032
Max Fillet Rad $r_2$ in	0.016	0.016	0.032	0.047	0.047	0.047

TOLERANCES	$\varnothing d_1$	$\varnothing D_1$	$L_1$
mm	f9	Js11	+0.25 -0
in	f9	Js11	+0.010 -0



# 605

## ROD SEAL

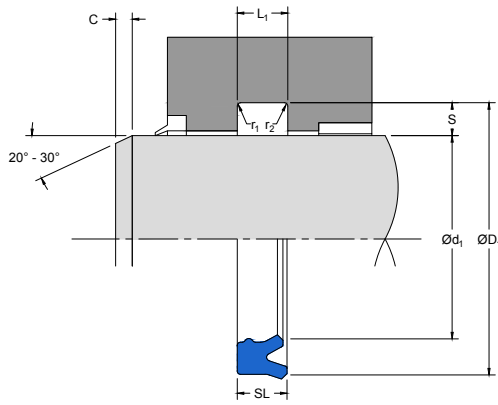
*Twin Lip  
Polyurethane*

### PART NUMBER RANGE

METRIC						
Ød <sub>1</sub>	TOL f9	ØD <sub>1</sub>	TOL Js11	SL	L <sub>1</sub> +0.25-0	PART No.
6.00	-0.01 -0.04	15.00	+0.06 -0.06	7.30	8.00	4790600
6.00	-0.01 -0.04	16.00	+0.06 -0.06	7.00	8.00	4580600
8.00	-0.01 -0.05	18.00	+0.06 -0.06	7.00	8.00	4580500
10.00	-0.01 -0.05	15.00	+0.06 -0.06	3.60	4.00	4402300
12.00	-0.02 -0.06	18.00	+0.06 -0.06	4.00	4.50	4578000
12.00	-0.02 -0.06	18.00	+0.06 -0.06	5.70	6.30	4314900
12.00	-0.02 -0.06	19.00	+0.07 -0.07	4.50	5.00	4341600
12.00	-0.02 -0.06	19.00	+0.07 -0.07	5.10	5.60	4710000‡
12.00	-0.02 -0.06	20.00	+0.07 -0.07	5.70	6.30	4310900‡
12.00	-0.02 -0.06	22.00	+0.07 -0.07	7.30	8.00	4857200‡
12.00	-0.02 -0.06	22.00	+0.07 -0.07	7.70	9.00	4315000
12.70	-0.02 -0.06	18.00	+0.06 -0.06	5.50	6.00	4370400
13.00	-0.02 -0.06	20.00	+0.07 -0.07	4.50	5.00	4351600
14.00	-0.02 -0.06	21.00	+0.07 -0.07	5.10	5.60	4710100‡
14.00	-0.02 -0.06	22.00	+0.07 -0.07	5.70	6.30	4311000‡
14.00	-0.02 -0.06	24.00	+0.07 -0.07	7.30	8.00	4310000‡
15.00	-0.02 -0.06	22.00	+0.07 -0.07	5.70	6.30	4762200

#### NOTE

Part numbers commencing "46 . . . ." or suffixed by "Σ" are designed to suit popular Asian housings.  
Part numbers suffixed by "‡" indicate housing sizes to meet ISO5597.

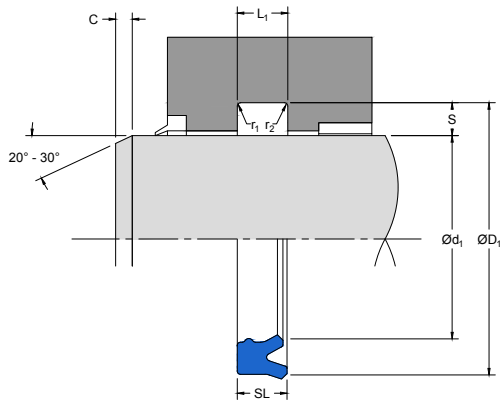


**PART NUMBER RANGE**

METRIC						
Ød <sub>1</sub>	TOL f <sub>9</sub>	ØD <sub>1</sub>	TOL Js11	SL	L <sub>1</sub> +0.25-0	PART No.
15.37	-0.02 -0.06	25.50	+0.07 -0.07	6.35	7.40	4333800
16.00	-0.02 -0.06	22.00	+0.07 -0.07	4.50	5.00	4341700
16.00	-0.02 -0.06	22.00	+0.07 -0.07	5.00	6.00	4314100
16.00	-0.02 -0.06	24.00	+0.07 -0.07	5.80	6.30	4295200‡
16.00	-0.02 -0.06	26.00	+0.07 -0.07	7.70	9.00	4311100
18.00	-0.02 -0.06	24.00	+0.07 -0.07	4.50	5.00	4712000
18.00	-0.02 -0.06	25.00	+0.07 -0.07	5.00	6.00	4314200
18.00	-0.02 -0.06	26.00	+0.07 -0.07	5.00	5.70	4611000
18.00	-0.02 -0.06	26.00	+0.07 -0.07	5.70	6.30	4311200‡
18.00	-0.02 -0.06	26.00	+0.07 -0.07	6.00	7.00	4333900
18.00	-0.02 -0.06	26.00	+0.07 -0.07	8.20	9.00	4863000
18.00	-0.02 -0.06	28.00	+0.07 -0.07	7.70	9.00	4305100
20.00	-0.02 -0.07	25.00	+0.07 -0.07	3.20	3.50	4332100
20.00	-0.02 -0.07	26.00	+0.07 -0.07	5.00	5.50	4315100
20.00	-0.02 -0.07	26.00	+0.07 -0.07	6.50	7.60	4826000
20.00	-0.02 -0.07	27.00	+0.07 -0.07	6.10	6.70	4702900
20.00	-0.02 -0.07	28.00	+0.07 -0.07	5.00	5.70	4611100

**NOTE** Part numbers commencing "46 . . . ." or suffixed by "X" are designed to suit popular Asian housings. Part numbers suffixed by "‡" indicate housing sizes to meet ISO5597.





# 605

## ROD SEAL

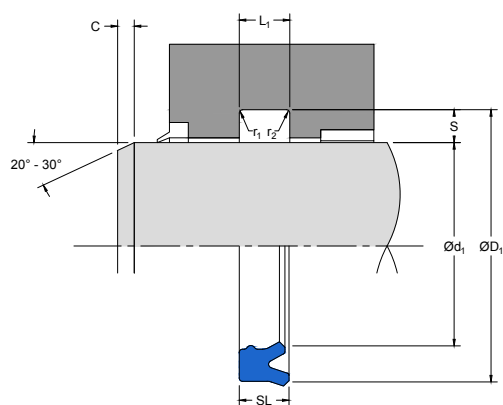
*Twin Lip  
Polyurethane*

### PART NUMBER RANGE

METRIC						
Ød <sub>1</sub>	TOL f9	ØD <sub>1</sub>	TOL Js11	SL	L <sub>1</sub> +0.25-0	PART No.
20.00	-0.02 -0.07	28.00	+0.07 -0.07	5.70	6.30	4362100‡
20.00	-0.02 -0.07	28.00	+0.07 -0.07	6.30	7.00	4626000
20.00	-0.02 -0.07	30.00	+0.07 -0.07	6.00	7.00	4611200
20.00	-0.02 -0.07	30.00	+0.07 -0.07	7.30	8.00	4857300‡
20.00	-0.02 -0.07	30.00	+0.07 -0.07	7.70	9.00	4305200
20.00	-0.02 -0.07	30.00	+0.07 -0.07	10.00	11.00	4310300
22.00	-0.02 -0.07	27.50	+0.07 -0.07	4.50	5.00	4896100
22.00	-0.02 -0.07	30.00	+0.07 -0.07	5.00	5.70	4617500
22.00	-0.02 -0.07	30.00	+0.07 -0.07	5.70	6.30	4305300‡
22.00	-0.02 -0.07	30.00	+0.07 -0.07	6.30	7.00	4626100
22.00	-0.02 -0.07	30.00	+0.07 -0.07	7.30	8.00	4356800
22.00	-0.02 -0.07	32.00	+0.08 -0.08	7.30	8.00	4310800‡
22.00	-0.02 -0.07	32.00	+0.08 -0.08	8.20	9.00	4863300
22.00	-0.02 -0.07	32.00	+0.08 -0.08	10.00	11.00	4311300
22.40	-0.02 -0.07	30.00	+0.07 -0.07	5.00	5.70	4611300
22.40	-0.02 -0.07	32.40	+0.08 -0.08	8.00	9.00	4616600
24.00	-0.02 -0.07	30.00	+0.07 -0.07	4.50	5.00	4773500

#### NOTE

Part numbers commencing "46 . . . ." or suffixed by "X" are designed to suit popular Asian housings.  
Part numbers suffixed by "‡" indicate housing sizes to meet ISO5597.



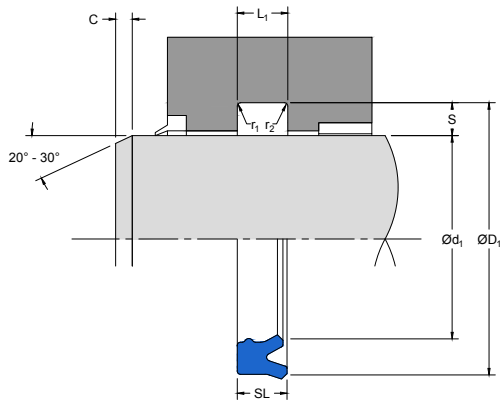
## PART NUMBER RANGE

METRIC						
Ød <sub>1</sub>	TOL f <sub>9</sub>	ØD <sub>1</sub>	TOL Js11	SL	L <sub>1</sub> +0.25-0	PART No.
25.00	-0.02 -0.07	33.00	+0.08 -0.08	5.00	5.70	4610100
25.00	-0.02 -0.07	33.00	+0.08 -0.08	5.70	6.30	4305400‡
25.00	-0.02 -0.07	33.00	+0.08 -0.08	6.80	7.50	4333500
25.00	-0.02 -0.07	33.00	+0.08 -0.08	8.00	9.00	4807800
25.00	-0.02 -0.07	33.00	+0.08 -0.08	10.00	11.00	4315200
25.00	-0.02 -0.07	35.00	+0.08 -0.08	7.30	8.00	4512000‡
25.00	-0.02 -0.07	35.00	+0.08 -0.08	7.70	9.00	4311400
25.00	-0.02 -0.07	35.00	+0.08 -0.08	10.00	11.00	4310500
25.00	-0.02 -0.07	37.00	+0.08 -0.08	10.00	11.00	4379900
25.00	-0.02 -0.07	40.00	+0.08 -0.08	10.00	11.00	4322900
26.00	-0.02 -0.07	36.00	+0.08 -0.08	7.00	8.00	4459400
28.00	-0.02 -0.07	35.50	+0.08 -0.08	5.00	5.70	4611400
28.00	-0.02 -0.07	36.00	+0.08 -0.08	5.70	6.30	4703000‡
28.00	-0.02 -0.07	36.00	+0.08 -0.08	6.30	7.00	4626200
28.00	-0.02 -0.07	38.00	+0.08 -0.08	7.30	8.00	4305500‡
28.00	-0.02 -0.07	43.00	+0.08 -0.08	11.40	12.50	4399000‡
30.00	-0.02 -0.07	38.00	+0.08 -0.08	5.70	6.30	4704500

### NOTE

Part numbers commencing "46 . . . ." or suffixed by "X" are designed to suit popular Asian housings.  
Part numbers suffixed by "‡" indicate housing sizes to meet ISO5597.





# 605

## ROD SEAL

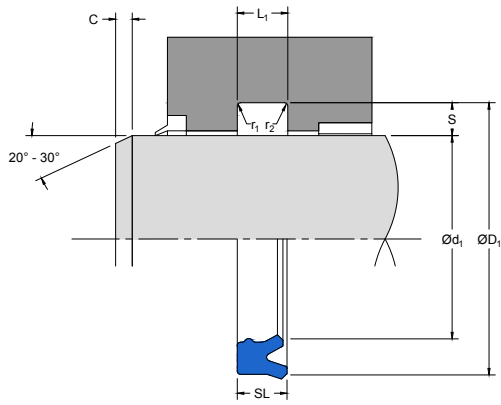
*Twin Lip  
Polyurethane*

### PART NUMBER RANGE

METRIC						
Ød <sub>1</sub>	TOL f9	ØD <sub>1</sub>	TOL Js11	SL	L <sub>1</sub> +0.25-0	PART No.
30.00	-0.02	38.00	+0.08	6.30	7.00	4402700
	-0.07		-0.08			
30.00	-0.02	40.00	+0.08	6.00	7.00	4610200
	-0.07		-0.08			
30.00	-0.02	40.00	+0.08	7.00	7.70	4703100
	-0.07		-0.08			
30.00	-0.02	40.00	+0.08	7.30	8.00	4857400
	-0.07		-0.08			
30.00	-0.02	40.00	+0.08	8.50	9.50	4826100
	-0.07		-0.08			
30.00	-0.02	40.00	+0.08	10.00	11.00	4304600
	-0.07		-0.08			
30.00	-0.02	42.00	+0.08	10.90	12.00	4383100
	-0.07		-0.08			
30.00	-0.02	43.00	+0.08	10.00	11.00	4625700
	-0.07		-0.08			
30.00	-0.02	45.00	+0.08	9.00	10.00	4618900
	-0.07		-0.08			
30.00	-0.02	45.00	+0.08	10.00	11.00	4857500
	-0.07		-0.08			
30.00	-0.02	50.00	+0.08	10.00	11.00	4328500
	-0.07		-0.08			
32.00	-0.03	40.00	+0.08	6.00	7.00	4310700
	-0.09		-0.08			
32.00	-0.03	40.00	+0.08	6.70	7.70	4334000
	-0.09		-0.08			
32.00	-0.03	40.00	+0.08	7.70	9.00	4315300
	-0.09		-0.08			
32.00	-0.03	41.50	+0.08	7.90	8.90	4334100
	-0.09		-0.08			
32.00	-0.03	42.00	+0.08	5.70	6.30	4360100‡
	-0.09		-0.08			
32.00	-0.03	42.00	+0.08	6.00	7.00	4616100
	-0.09		-0.08			

#### NOTE

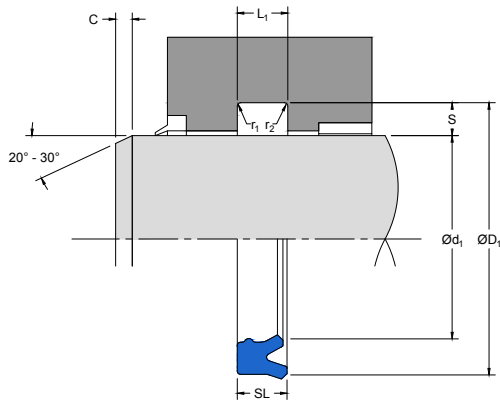
Part numbers commencing "46 . . . ." or suffixed by "X" are designed to suit popular Asian housings.  
Part numbers suffixed by "‡" indicate housing sizes to meet ISO5597.



**PART NUMBER RANGE**

METRIC						
Ød <sub>1</sub>	TOL f <sub>9</sub>	ØD <sub>1</sub>	TOL Js11	SL	L <sub>1</sub> +0.25-0	PART No.
32.00	-0.03 -0.09	42.00	+0.08 -0.08	7.30	8.00	4374200‡
32.00	-0.03 -0.09	42.00	+0.08 -0.08	10.00	11.00	4305600
32.00	-0.03 -0.09	45.00	+0.08 -0.08	10.00	11.00	4597700
32.00	-0.03 -0.09	47.00	+0.08 -0.08	9.10	10.00	4329600
32.00	-0.03 -0.09	47.00	+0.08 -0.08	10.00	11.00	4338900
32.00	-0.03 -0.09	48.00	+0.08 -0.08	10.00	11.00	4492500
35.00	-0.03 -0.09	43.00	+0.08 -0.08	5.70	6.30	4703200
35.00	-0.03 -0.09	43.00	+0.08 -0.08	6.30	7.00	4402800
35.00	-0.03 -0.09	43.00	+0.08 -0.08	8.20	9.00	4309000
35.00	-0.03 -0.09	45.00	+0.08 -0.08	6.00	7.00	4611500
35.00	-0.03 -0.09	45.00	+0.08 -0.08	7.00	8.00	4619200
35.00	-0.03 -0.09	45.00	+0.08 -0.08	7.70	9.00	4314300
35.00	-0.03 -0.09	45.00	+0.08 -0.08	10.00	11.00	4305700
35.00	-0.03 -0.09	50.00	+0.08 -0.08	9.00	10.00	4611600
35.00	-0.03 -0.09	50.00	+0.08 -0.08	10.00	11.00	4322500
35.50	-0.03 -0.09	45.00	+0.08 -0.08	6.00	7.00	4616700
35.50	-0.03 -0.09	50.50	+0.10 -0.10	10.00	11.00	4616900

**NOTE** Part numbers commencing "46 . . . ." or suffixed by "X" are designed to suit popular Asian housings. Part numbers suffixed by "‡" indicate housing sizes to meet ISO5597.



# 605

## ROD SEAL

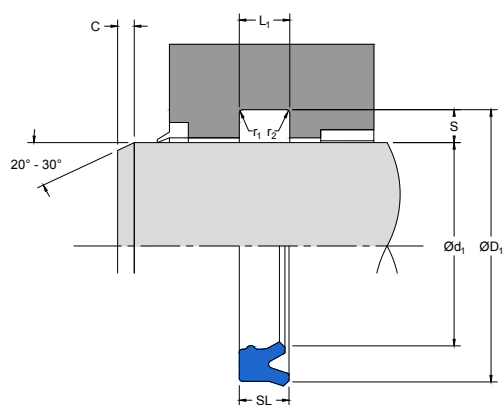
*Twin Lip  
Polyurethane*

### PART NUMBER RANGE

METRIC						
Ød <sub>1</sub>	TOL f9	ØD <sub>1</sub>	TOL Js11	SL	L <sub>1</sub> +0.25-0	PART No.
36.00	-0.03 -0.09	44.00	+0.08 -0.08	6.40	7.50	4373900
36.00	-0.03 -0.09	44.00	+0.08 -0.08	8.20	9.00	4395000
36.00	-0.03 -0.09	46.00	+0.08 -0.08	5.70	6.30	4372100‡
36.00	-0.03 -0.09	46.00	+0.08 -0.08	7.30	8.00	4304900‡
36.00	-0.03 -0.09	46.00	+0.08 -0.08	10.00	11.00	4305000
36.00	-0.03 -0.09	51.00	+0.10 -0.10	10.00	11.00	4771600
37.00	-0.03 -0.09	47.00	+0.08 -0.08	10.00	11.00	4862900
38.00	-0.03 -0.09	48.00	+0.08 -0.08	8.00	9.00	4619100
38.00	-0.03 -0.09	48.00	+0.08 -0.08	10.00	11.00	4515500
38.00	-0.03 -0.09	50.00	+0.08 -0.08	10.00	11.00	4586300
38.00	-0.03 -0.09	53.00	+0.10 -0.10	10.00	11.00	4480900
40.00	-0.03 -0.09	48.00	+0.08 -0.08	5.70	6.30	4703300
40.00	-0.03 -0.09	48.00	+0.08 -0.08	8.20	9.00	4396800
40.00	-0.03 -0.09	49.52	+0.08 -0.08	9.50	10.50	4334200
40.00	-0.03 -0.09	50.00	+0.08 -0.08	6.00	7.00	4610300
40.00	-0.03 -0.09	50.00	+0.08 -0.08	7.30	8.00	4311600‡
40.00	-0.03 -0.09	50.00	+0.08 -0.08	9.00	10.00	4866800

#### NOTE

Part numbers commencing "46 . . . ." or suffixed by "X" are designed to suit popular Asian housings.  
Part numbers suffixed by "‡" indicate housing sizes to meet ISO5597.

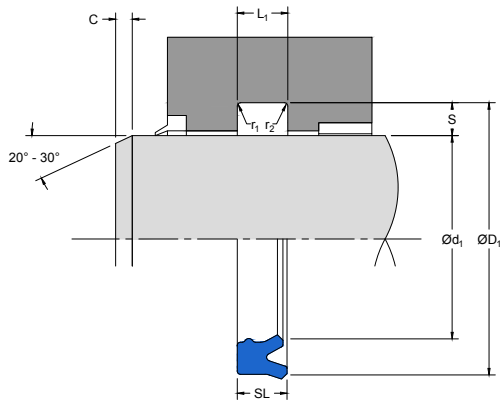


## PART NUMBER RANGE

METRIC						
Ød <sub>1</sub>	TOL f <sub>9</sub>	ØD <sub>1</sub>	TOL Js11	SL	L <sub>1</sub> +0.25-0	PART No.
40.00	-0.03 -0.09	50.00	+0.08 -0.08	10.00	11.00	4293800
40.00	-0.03 -0.09	52.00	+0.10 -0.10	10.90	12.00	4381800
40.00	-0.03 -0.09	55.00	+0.10 -0.10	7.30	8.00	4703400
40.00	-0.03 -0.09	55.00	+0.10 -0.10	9.00	10.00	4611700
40.00	-0.03 -0.09	55.00	+0.10 -0.10	10.00	11.00	4328300
40.00	-0.03 -0.09	55.00	+0.10 -0.10	11.40	12.50	4857600‡
42.00	-0.03 -0.09	50.00	+0.08 -0.08	5.70	6.30	4744400
42.00	-0.03 -0.09	50.00	+0.08 -0.08	7.50	8.00	4373800
42.00	-0.03 -0.09	52.00	+0.10 -0.10	6.00	7.00	4618100
42.00	-0.03 -0.09	52.00	+0.10 -0.10	10.00	11.00	4338200
43.00	-0.03 -0.09	53.00	+0.10 -0.10	6.00	7.00	4619700
45.00	-0.03 -0.09	53.00	+0.10 -0.10	7.30	8.00	4619800
45.00	-0.03 -0.09	53.00	+0.10 -0.10	8.10	9.00	4402900
45.00	-0.03 -0.09	53.00	+0.10 -0.10	11.80	13.00	4315600
45.00	-0.03 -0.09	55.00	+0.10 -0.10	5.60	6.30	4479700‡
45.00	-0.03 -0.09	55.00	+0.10 -0.10	6.00	7.00	4610400
45.00	-0.03 -0.09	55.00	+0.10 -0.10	7.30	8.00	4305900‡

### NOTE

Part numbers commencing "46 . . . ." or suffixed by "X" are designed to suit popular Asian housings.  
Part numbers suffixed by "‡" indicate housing sizes to meet ISO5597.



# 605

## ROD SEAL

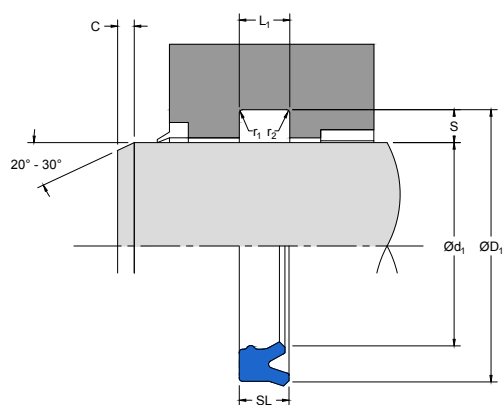
Twin Lip  
Polyurethane

### PART NUMBER RANGE

METRIC						
Ød <sub>1</sub>	TOL f9	ØD <sub>1</sub>	TOL Js11	SL	L <sub>1</sub> +0.25-0	PART No.
45.00	-0.03 -0.09	55.00	+0.10 -0.10	8.20	9.00	4845700
45.00	-0.03 -0.09	55.00	+0.10 -0.10	10.00	11.00	4302600
45.00	-0.03 -0.09	57.70	+0.10 -0.10	9.50	10.50	4322800
45.00	-0.03 -0.09	60.00	+0.10 -0.10	10.00	11.00	4315400
45.00	-0.03 -0.09	60.00	+0.10 -0.10	11.40	12.50	4619900‡
45.00	-0.03 -0.09	65.00	+0.10 -0.10	10.00	11.00	4315500
47.00	-0.03 -0.09	56.33	+0.10 -0.10	9.00	10.00	4778000
48.00	-0.03 -0.09	56.00	+0.10 -0.10	11.40	12.50	4629800
48.00	-0.03 -0.09	60.00	+0.10 -0.10	10.00	11.00	4432600
50.00	-0.03 -0.09	57.00	+0.10 -0.10	9.00	10.00	4538600
50.00	-0.03 -0.09	60.00	+0.10 -0.10	6.00	7.00	4611800
50.00	-0.03 -0.09	60.00	+0.10 -0.10	7.30	8.00	4306000‡
50.00	-0.03 -0.09	60.00	+0.10 -0.10	8.20	9.00	4845800
50.00	-0.03 -0.09	60.00	+0.10 -0.10	10.00	11.00	4304500
50.00	-0.03 -0.09	60.00	+0.10 -0.10	11.80	13.00	4314400
50.00	-0.03 -0.09	62.70	+0.10 -0.10	9.50	10.50	4334400
50.00	-0.03 -0.09	63.00	+0.10 -0.10	10.00	11.00	4804400

#### NOTE

Part numbers commencing "46 . . . ." or suffixed by "X" are designed to suit popular Asian housings.  
Part numbers suffixed by "‡" indicate housing sizes to meet ISO5597.



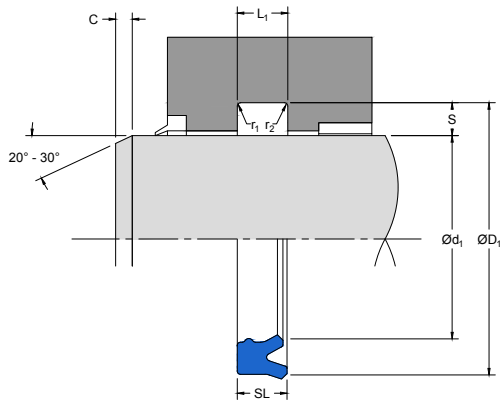
## PART NUMBER RANGE

METRIC						
Ød <sub>1</sub>	TOL f <sub>9</sub>	ØD <sub>1</sub>	TOL Js11	SL	L <sub>1</sub> +0.25-0	PART No.
50.00	-0.03 -0.09	65.00	+0.10 -0.10	9.00	10.00	4611900
50.00	-0.03 -0.09	65.00	+0.10 -0.10	9.50	10.50	4344000
50.00	-0.03 -0.09	65.00	+0.10 -0.10	10.00	11.00	4617000
50.00	-0.03 -0.09	65.00	+0.10 -0.10	10.90	12.00	4291700
50.00	-0.03 -0.09	65.00	+0.10 -0.10	11.40	12.50	4625400‡
50.00	-0.03 -0.09	65.00	+0.10 -0.10	14.50	16.00	4381900
50.00	-0.03 -0.09	70.00	+0.10 -0.10	12.00	13.00	4612000
53.00	-0.03 -0.10	63.00	+0.10 -0.10	6.00	7.00	4617700
53.00	-0.03 -0.10	65.00	+0.10 -0.10	9.00	10.00	4371700
55.00	-0.03 -0.10	63.00	+0.10 -0.10	8.20	9.00	4863400
55.00	-0.03 -0.10	65.00	+0.10 -0.10	6.00	7.00	4615600
55.00	-0.03 -0.10	65.00	+0.10 -0.10	7.30	8.00	4703500
55.00	-0.03 -0.10	65.00	+0.10 -0.10	8.20	9.00	4360400
55.00	-0.03 -0.10	65.00	+0.10 -0.10	10.00	11.00	4306100
55.00	-0.03 -0.10	65.00	+0.10 -0.10	11.80	13.00	4323400
55.00	-0.03 -0.10	68.00	+0.10 -0.10	10.00	11.00	4593800
55.00	-0.03 -0.10	70.00	+0.10 -0.10	9.00	10.00	4612100

### NOTE

Part numbers commencing "46 . . . ." or suffixed by "X" are designed to suit popular Asian housings.  
Part numbers suffixed by "‡" indicate housing sizes to meet ISO5597.





# 605

## ROD SEAL

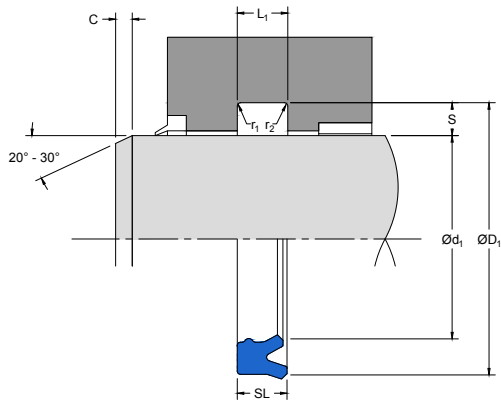
*Twin Lip  
Polyurethane*

### PART NUMBER RANGE

METRIC						
Ød <sub>1</sub>	TOL f9	ØD <sub>1</sub>	TOL Js11	SL	L <sub>1</sub> +0.25-0	PART No.
55.00	-0.03 -0.10	70.00	+0.10 -0.10	11.80	13.00	4319200
55.00	-0.03 -0.10	71.00	+0.10 -0.10	12.00	13.00	4625000
55.00	-0.03 -0.10	75.00	+0.10 -0.10	12.00	13.00	4612200
56.00	-0.03 -0.10	66.00	+0.10 -0.10	10.00	11.00	4311800
56.00	-0.03 -0.10	71.00	+0.10 -0.10	10.00	11.00	4311900
56.00	-0.03 -0.10	71.00	+0.10 -0.10	11.40	12.50	4306200‡
60.00	-0.03 -0.10	68.00	+0.10 -0.10	11.40	12.50	4538000
60.00	-0.03 -0.10	70.00	+0.10 -0.10	6.00	7.00	4610500
60.00	-0.03 -0.10	70.00	+0.10 -0.10	7.30	8.00	4703600
60.00	-0.03 -0.10	70.00	+0.10 -0.10	10.00	11.00	4310600
60.00	-0.03 -0.10	70.00	+0.10 -0.10	11.80	13.00	4306300
60.00	-0.03 -0.10	71.00	+0.10 -0.10	7.00	8.00	4615700
60.00	-0.03 -0.10	72.00	+0.10 -0.10	10.00	11.00	4323500
60.00	-0.03 -0.10	73.00	+0.10 -0.10	10.00	11.00	4593900
60.00	-0.03 -0.10	75.00	+0.10 -0.10	9.00	10.00	4612300
60.00	-0.03 -0.10	75.00	+0.10 -0.10	10.00	11.00	4378700
60.00	-0.03 -0.10	75.00	+0.10 -0.10	11.40	12.50	4857700

#### NOTE

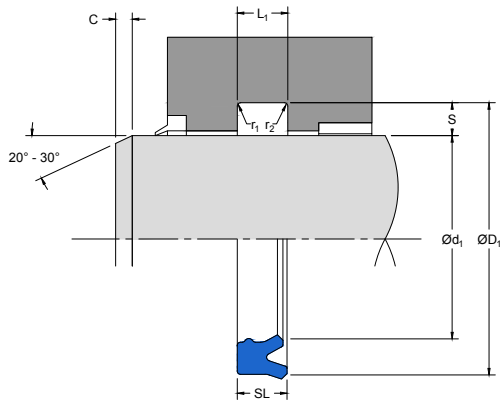
Part numbers commencing "46 . . . ." or suffixed by "X" are designed to suit popular Asian housings.  
Part numbers suffixed by "‡" indicate housing sizes to meet ISO5597.



**PART NUMBER RANGE**

METRIC						
Ød <sub>1</sub>	TOL f <sub>9</sub>	ØD <sub>1</sub>	TOL Js11	SL	L <sub>1</sub> +0.25-0	PART No.
60.00	-0.03 -0.10	75.00	+0.10 -0.10	11.80	13.00	4306400
60.00	-0.03 -0.10	75.00	+0.10 -0.10	20.50	22.50	4391800
60.00	-0.03 -0.10	76.00	+0.10 -0.10	10.00	11.00	4625100
60.00	-0.03 -0.10	80.00	+0.10 -0.10	11.40	12.50	4514300
60.00	-0.03 -0.10	80.00	+0.10 -0.10	12.00	13.00	4612400
63.00	-0.03 -0.10	73.00	+0.10 -0.10	6.00	7.00	4612500
63.00	-0.03 -0.10	73.00	+0.10 -0.10	11.80	13.00	4312000
63.00	-0.03 -0.10	78.00	+0.10 -0.10	10.00	11.00	4312100
63.00	-0.03 -0.10	78.00	+0.10 -0.10	11.40	12.50	4306500‡
63.00	-0.03 -0.10	83.00	+0.11 -0.11	11.80	13.00	4857800
65.00	-0.03 -0.10	75.00	+0.10 -0.10	6.00	7.00	4615900
65.00	-0.03 -0.10	75.00	+0.10 -0.10	7.70	9.00	4314500
65.00	-0.03 -0.10	75.00	+0.10 -0.10	11.80	13.00	4306600
65.00	-0.03 -0.10	77.00	+0.10 -0.10	9.00	10.00	4703700
65.00	-0.03 -0.10	77.70	+0.10 -0.10	9.50	10.50	4334500
65.00	-0.03 -0.10	78.00	+0.10 -0.10	10.00	11.00	4616200
65.00	-0.03 -0.10	80.00	+0.10 -0.10	9.00	10.00	4612600

**NOTE** Part numbers commencing "46 . . . ." or suffixed by "X" are designed to suit popular Asian housings. Part numbers suffixed by "‡" indicate housing sizes to meet ISO5597.



# 605

## ROD SEAL

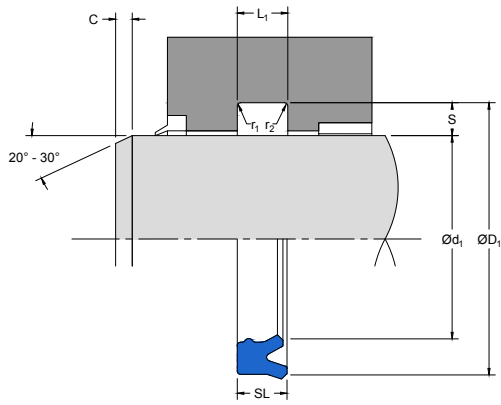
*Twin Lip  
Polyurethane*

### PART NUMBER RANGE

METRIC						
Ød <sub>1</sub>	TOL f9	ØD <sub>1</sub>	TOL Js11	SL	L <sub>1</sub> +0.25-0	PART No.
65.00	-0.03 -0.10	80.00	+0.10 -0.10	11.80	13.00	4312200
65.00	-0.03 -0.10	85.00	+0.11 -0.11	12.00	13.00	4612700
67.00	-0.03 -0.10	77.00	+0.10 -0.10	6.00	7.00	4612800
68.50	-0.03 -0.10	76.50	+0.10 -0.10	8.00	9.00	4855200
70.00	-0.03 -0.10	78.00	+0.10 -0.10	11.40	12.50	4863500
70.00	-0.03 -0.10	80.00	+0.10 -0.10	6.00	7.00	4615800
70.00	-0.03 -0.10	80.00	+0.10 -0.10	11.40	12.50	4857900
70.00	-0.03 -0.10	80.00	+0.10 -0.10	11.80	13.00	4312300
70.00	-0.03 -0.10	82.00	+0.11 -0.11	8.70	9.60	4494700
70.00	-0.03 -0.10	82.00	+0.11 -0.11	10.00	11.00	4323600
70.00	-0.03 -0.10	83.00	+0.11 -0.11	10.00	11.00	4616400
70.00	-0.03 -0.10	85.00	+0.11 -0.11	9.00	10.00	4612900
70.00	-0.03 -0.10	85.00	+0.11 -0.11	10.00	11.00	4302700
70.00	-0.03 -0.10	85.00	+0.11 -0.11	11.40	12.50	4301200‡
70.00	-0.03 -0.10	85.00	+0.11 -0.11	20.50	22.50	4401400
70.00	-0.03 -0.10	90.00	+0.11 -0.11	12.00	13.00	4613000
75.00	-0.03 -0.10	83.00	+0.11 -0.11	11.40	12.50	4706300

#### NOTE

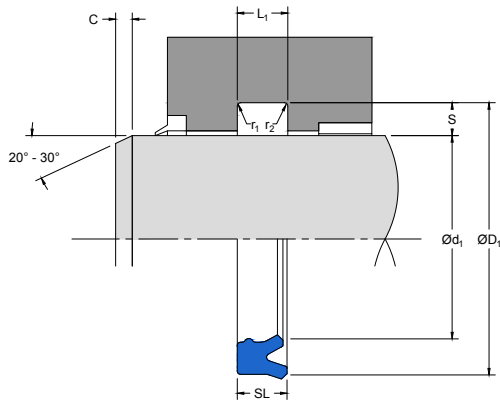
Part numbers commencing "46 . . . ." or suffixed by "X" are designed to suit popular Asian housings.  
Part numbers suffixed by "‡" indicate housing sizes to meet ISO5597.



## PART NUMBER RANGE

METRIC						
Ød <sub>1</sub>	TOL f <sub>9</sub>	ØD <sub>1</sub>	TOL Js11	SL	L <sub>1</sub> +0.25-0	PART No.
75.00	-0.03 -0.10	85.00	+0.11 -0.11	6.00	7.00	4616800
75.00	-0.03 -0.10	85.00	+0.11 -0.11	11.40	12.50	4858000
75.00	-0.03 -0.10	85.00	+0.11 -0.11	11.80	13.00	4312400
75.00	-0.03 -0.10	88.00	+0.11 -0.11	10.00	11.00	4616300
75.00	-0.03 -0.10	90.00	+0.11 -0.11	9.00	10.00	4613100
75.00	-0.03 -0.10	90.00	+0.11 -0.11	10.00	11.00	4862800
75.00	-0.03 -0.10	90.00	+0.11 -0.11	11.40	12.50	4858100
75.00	-0.03 -0.10	95.00	+0.11 -0.11	12.00	13.00	4613200
77.00	-0.03 -0.10	87.00	+0.11 -0.11	11.80	13.00	4863100
78.00	-0.03 -0.10	86.00	+0.11 -0.11	9.00	10.00	4538700
78.00	-0.03 -0.10	86.00	+0.11 -0.11	11.40	12.50	4863600
80.00	-0.03 -0.10	88.00	+0.11 -0.11	10.90	12.00	4766600
80.00	-0.03 -0.10	90.00	+0.11 -0.11	6.00	7.00	4616000
80.00	-0.03 -0.10	90.00	+0.11 -0.11	10.00	11.00	4390400
80.00	-0.03 -0.10	90.00	+0.11 -0.11	11.80	13.00	4312500
80.00	-0.03 -0.10	92.00	+0.11 -0.11	8.70	9.60	4494800
80.00	-0.03 -0.10	93.00	+0.11 -0.11	10.00	11.00	4615200

**NOTE** Part numbers commencing "46 . . . ." or suffixed by "X" are designed to suit popular Asian housings. Part numbers suffixed by "±" indicate housing sizes to meet ISO5597.



# 605

## ROD SEAL

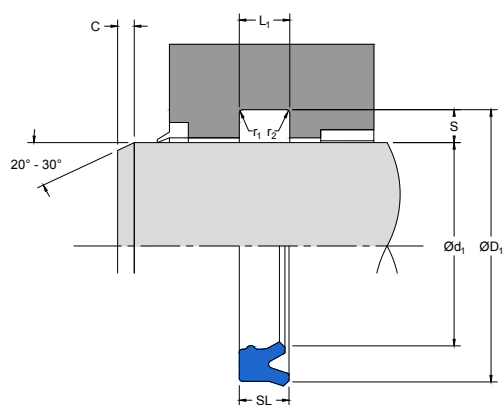
*Twin Lip  
Polyurethane*

### PART NUMBER RANGE

METRIC						
Ød <sub>1</sub>	TOL f9	ØD <sub>1</sub>	TOL Js11	SL	L <sub>1</sub> +0.25-0	PART No.
80.00	-0.03 -0.10	95.00	+0.11 -0.11	9.00	10.00	4613300
80.00	-0.03 -0.10	95.00	+0.11 -0.11	10.00	11.00	4383500
80.00	-0.03 -0.10	95.00	+0.11 -0.11	11.40	12.50	4620000‡
80.00	-0.03 -0.10	95.00	+0.11 -0.11	11.80	13.00	4306700
80.00	-0.03 -0.10	100.00	+0.11 -0.11	12.00	13.00	4613400
80.00	-0.03 -0.10	100.00	+0.11 -0.11	14.50	16.00	4382800‡
80.00	-0.03 -0.10	110.00	+0.11 -0.11	16.40	18.00	4342900
85.00	-0.04 -0.12	93.00	+0.11 -0.11	8.20	9.00	4839100
85.00	-0.04 -0.12	93.00	+0.11 -0.11	10.00	11.00	4392700
85.00	-0.04 -0.12	93.00	+0.11 -0.11	11.40	12.50	4537900
85.00	-0.04 -0.12	95.00	+0.11 -0.11	11.80	13.00	4863700
85.00	-0.04 -0.12	100.00	+0.11 -0.11	9.00	10.00	4610600
85.00	-0.04 -0.12	100.00	+0.11 -0.11	10.00	11.00	4615300
85.00	-0.04 -0.12	100.00	+0.11 -0.11	11.80	13.00	4306800
85.00	-0.04 -0.12	105.00	+0.11 -0.11	12.00	13.00	4613500
90.00	-0.04 -0.12	98.00	+0.11 -0.11	11.40	12.50	4706400
90.00	-0.04 -0.12	100.00	+0.11 -0.11	6.80	7.50	4493500‡

#### NOTE

Part numbers commencing "46 . . . ." or suffixed by "X" are designed to suit popular Asian housings.  
Part numbers suffixed by "‡" indicate housing sizes to meet ISO5597.



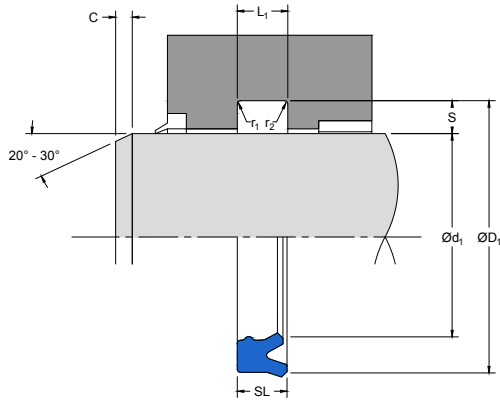
## PART NUMBER RANGE

METRIC						
Ød <sub>1</sub>	TOL f <sub>9</sub>	ØD <sub>1</sub>	TOL Js11	SL	L <sub>1</sub> +0.25-0	PART No.
90.00	-0.04 -0.12	100.00	+0.11 -0.11	9.00	10.00	4366900
90.00	-0.04 -0.12	100.00	+0.11 -0.11	11.40	12.50	4858200
90.00	-0.04 -0.12	100.00	+0.11 -0.11	11.80	13.00	4314600
90.00	-0.04 -0.12	102.00	+0.11 -0.11	8.70	9.60	4333000
90.00	-0.04 -0.12	105.00	+0.11 -0.11	9.00	10.00	4613600
90.00	-0.04 -0.12	105.00	+0.11 -0.11	10.00	11.00	4615400
90.00	-0.04 -0.12	105.00	+0.11 -0.11	11.40	12.50	4306900‡
90.00	-0.04 -0.12	110.00	+0.11 -0.11	12.00	13.00	4613700
95.00	-0.04 -0.12	103.00	+0.11 -0.11	11.40	12.50	4863200
95.00	-0.04 -0.12	110.00	+0.11 -0.11	9.00	10.00	4610700
95.00	-0.04 -0.12	110.00	+0.11 -0.11	10.00	11.00	4615500
95.00	-0.04 -0.12	110.00	+0.11 -0.11	11.80	13.00	4617600
95.00	-0.04 -0.12	115.00	+0.11 -0.11	12.00	13.00	4613800
96.00	-0.04 -0.12	104.00	+0.11 -0.11	10.90	12.00	4380300
98.00	-0.04 -0.12	112.00	+0.11 -0.11	8.50	9.50	4618200
100.00	-0.04 -0.12	108.00	+0.11 -0.11	10.90	12.00	4766700
100.00	-0.04 -0.12	110.00	+0.11 -0.11	10.90	12.00	4461700

### NOTE

Part numbers commencing "46 . . . ." or suffixed by "X" are designed to suit popular Asian housings.  
Part numbers suffixed by "‡" indicate housing sizes to meet ISO5597.





# 605

## ROD SEAL

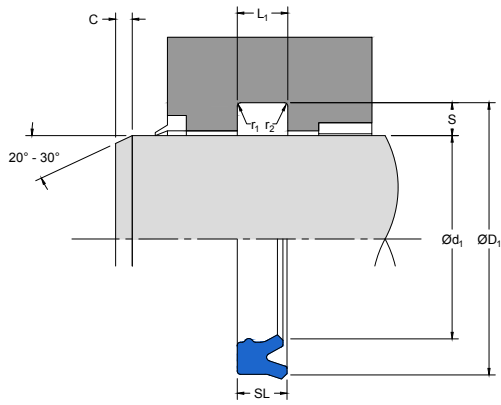
*Twin Lip  
Polyurethane*

### PART NUMBER RANGE

METRIC						
Ød <sub>1</sub>	TOL f9	ØD <sub>1</sub>	TOL Js11	SL	L <sub>1</sub> +0.25-0	PART No.
100.00	-0.04 -0.12	115.00	+0.11 -0.11	9.00	10.00	4610800
100.00	-0.04 -0.12	115.00	+0.11 -0.11	10.00	11.00	4617100
100.00	-0.04 -0.12	115.00	+0.11 -0.11	11.80	13.00	4312600
100.00	-0.04 -0.12	120.00	+0.11 -0.11	11.80	13.00	4312700X
100.00	-0.04 -0.12	120.00	+0.11 -0.11	14.50	16.00	4307000‡
105.00	-0.04 -0.12	113.00	+0.11 -0.11	10.00	11.00	4392800
105.00	-0.04 -0.12	115.00	+0.11 -0.11	13.20	14.50	4390500
105.00	-0.04 -0.12	120.00	+0.11 -0.11	9.00	10.00	4617300
105.00	-0.04 -0.12	120.00	+0.11 -0.11	10.00	11.00	4617200
105.00	-0.04 -0.12	120.00	+0.11 -0.11	14.50	16.00	4379500
105.00	-0.04 -0.12	125.00	+0.13 -0.13	14.50	16.00	4617400
108.00	-0.04 -0.12	123.00	+0.13 -0.13	10.90	12.00	4329100
110.00	-0.04 -0.12	125.00	+0.13 -0.13	9.00	10.00	4459700X
110.00	-0.04 -0.12	125.00	+0.13 -0.13	11.00	12.00	4537800
110.00	-0.04 -0.12	125.00	+0.13 -0.13	14.50	16.00	4481600
110.00	-0.04 -0.12	130.00	+0.13 -0.13	11.80	13.00	4312800X
110.00	-0.04 -0.12	130.00	+0.13 -0.13	14.50	16.00	4307100‡

#### NOTE

Part numbers commencing "46 . . . ." or suffixed by "X" are designed to suit popular Asian housings.  
Part numbers suffixed by "‡" indicate housing sizes to meet ISO5597.

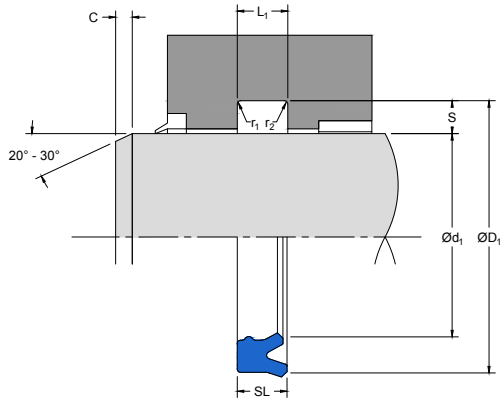


**PART NUMBER RANGE**

METRIC						
Ød <sub>1</sub>	TOL f <sub>9</sub>	ØD <sub>1</sub>	TOL Js11	SL	L <sub>1</sub> +0.25-0	PART No.
110.00	-0.04 -0.12	135.00	+0.13 -0.13	14.50	16.00	4343000
112.00	-0.04 -0.12	125.00	+0.13 -0.13	9.00	10.00	4610900
115.00	-0.04 -0.12	123.00	+0.13 -0.13	11.40	12.50	4903400
115.00	-0.04 -0.12	125.00	+0.13 -0.13	11.00	12.00	4619300
115.00	-0.04 -0.12	130.00	+0.13 -0.13	9.00	10.00	4459800
115.00	-0.04 -0.12	130.00	+0.13 -0.13	10.90	12.00	4434600
115.00	-0.04 -0.12	130.00	+0.13 -0.13	14.50	16.00	4342600
120.00	-0.04 -0.12	128.00	+0.13 -0.13	11.40	12.50	4706500
120.00	-0.04 -0.12	130.00	+0.13 -0.13	10.90	12.00	4461800
120.00	-0.04 -0.12	135.00	+0.13 -0.13	9.00	10.00	4614000
120.00	-0.04 -0.12	140.00	+0.13 -0.13	12.00	13.00	4614100
120.00	-0.04 -0.12	140.00	+0.13 -0.13	14.50	16.00	4312900
124.00	-0.04 -0.14	134.00	+0.13 -0.13	6.00	7.00	4618300
125.00	-0.04 -0.14	133.00	+0.13 -0.13	10.00	11.00	4392900
125.00	-0.04 -0.14	133.00	+0.13 -0.13	11.40	12.50	4748500
125.00	-0.04 -0.14	140.00	+0.13 -0.13	9.00	10.00	4614200
125.00	-0.04 -0.14	140.00	+0.13 -0.13	10.00	11.00	4618400

**NOTE** Part numbers commencing "46 . . . ." or suffixed by "X" are designed to suit popular Asian housings. Part numbers suffixed by "±" indicate housing sizes to meet ISO5597.





# 605

## ROD SEAL

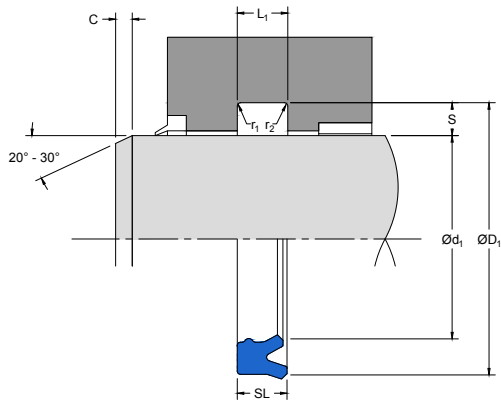
*Twin Lip  
Polyurethane*

### PART NUMBER RANGE

METRIC						
Ød <sub>1</sub>	TOL f9	ØD <sub>1</sub>	TOL Js11	SL	L <sub>1</sub> +0.25-0	PART No.
125.00	-0.04 -0.14	140.00	+0.13 -0.13	10.90	12.00	4766500
125.00	-0.04 -0.14	145.00	+0.13 -0.13	12.00	13.00	4614300
125.00	-0.04 -0.14	145.00	+0.13 -0.13	14.50	16.00	4307300‡
125.00	-0.04 -0.14	150.00	+0.13 -0.13	12.50	14.00	4367000
130.00	-0.04 -0.14	140.00	+0.13 -0.13	14.50	16.00	4390600
130.00	-0.04 -0.14	145.00	+0.13 -0.13	9.00	10.00	4614400
130.00	-0.04 -0.14	145.00	+0.13 -0.13	10.00	11.00	4619000
130.00	-0.04 -0.14	150.00	+0.13 -0.13	12.00	13.00	4614500
130.00	-0.04 -0.14	150.00	+0.13 -0.13	14.50	16.00	4313000
132.50	-0.04 -0.14	157.50	+0.13 -0.13	13.20	14.50	4329400
135.00	-0.04 -0.14	143.00	+0.13 -0.13	11.40	12.50	4903500
135.00	-0.04 -0.14	145.00	+0.13 -0.13	11.00	12.00	4619400
135.00	-0.04 -0.14	150.00	+0.13 -0.13	9.00	10.00	4618500
135.00	-0.04 -0.14	150.00	+0.13 -0.13	11.40	12.50	4537700
140.00	-0.04 -0.14	150.00	+0.13 -0.13	6.00	7.00	4617900
140.00	-0.04 -0.14	150.00	+0.13 -0.13	10.90	12.00	4461900
140.00	-0.04 -0.14	150.00	+0.13 -0.13	11.80	13.00	4625800

#### NOTE

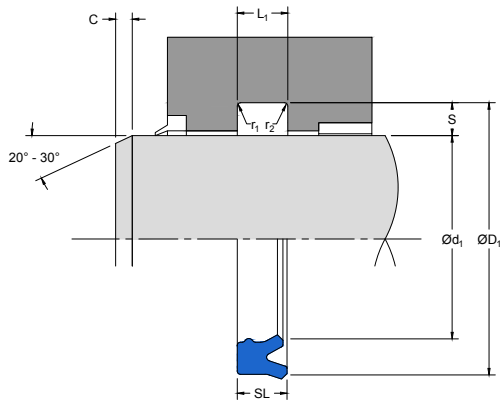
Part numbers commencing "46 . . . ." or suffixed by "X" are designed to suit popular Asian housings.  
Part numbers suffixed by "‡" indicate housing sizes to meet ISO5597.



**PART NUMBER RANGE**

METRIC						
Ød <sub>1</sub>	TOL f <sub>9</sub>	ØD <sub>1</sub>	TOL Js11	SL	L <sub>1</sub> +0.25-0	PART No.
140.00	-0.04 -0.14	155.00	+0.13 -0.13	9.00	10.00	4614600
140.00	-0.04 -0.14	155.00	+0.13 -0.13	11.80	13.00	4555300
140.00	-0.04 -0.14	160.00	+0.13 -0.13	11.80	13.00	4313100X
140.00	-0.04 -0.14	160.00	+0.13 -0.13	14.50	16.00	4307400‡
150.00	-0.04 -0.14	160.00	+0.13 -0.13	11.00	12.00	4595200
150.00	-0.04 -0.14	165.00	+0.13 -0.13	9.00	10.00	4614700
150.00	-0.04 -0.14	170.00	+0.13 -0.13	12.00	13.00	4614800
150.00	-0.04 -0.14	170.00	+0.13 -0.13	13.20	14.50	4367100
150.00	-0.04 -0.14	170.00	+0.13 -0.13	14.50	16.00	4342800
151.00	-0.04 -0.14	159.00	+0.13 -0.13	9.00	10.00	4538800
155.00	-0.04 -0.14	163.00	+0.13 -0.13	11.40	12.50	4903600
155.00	-0.04 -0.14	165.00	+0.13 -0.13	6.00	7.00	4618600
155.00	-0.04 -0.14	165.00	+0.13 -0.13	11.00	12.00	4619500
155.00	-0.04 -0.14	170.00	+0.13 -0.13	9.00	10.00	4618700
155.00	-0.04 -0.14	170.00	+0.13 -0.13	14.50	16.00	4342700
160.00	-0.04 -0.14	175.00	+0.13 -0.13	9.00	10.00	4614900
160.00	-0.04 -0.14	175.00	+0.13 -0.13	10.90	12.00	4462000

**NOTE** Part numbers commencing "46 . . . ." or suffixed by "X" are designed to suit popular Asian housings. Part numbers suffixed by "‡" indicate housing sizes to meet ISO5597.



# 605

## ROD SEAL

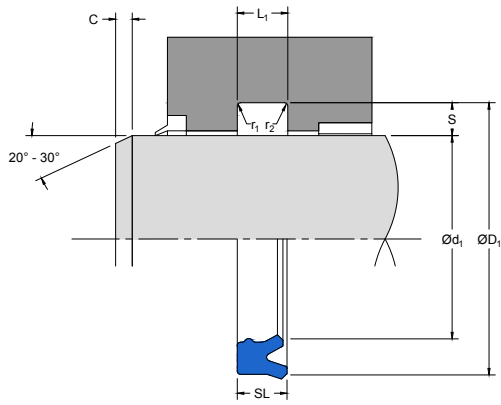
*Twin Lip  
Polyurethane*

### PART NUMBER RANGE

METRIC						
Ød <sub>1</sub>	TOL f9	ØD <sub>1</sub>	TOL Js11	SL	L <sub>1</sub> +0.25-0	PART No.
160.00	-0.04 -0.14	180.00	+0.13 -0.13	12.00	13.00	4615000
160.00	-0.04 -0.14	180.00	+0.13 -0.13	14.50	16.00	4345000
165.00	-0.04 -0.14	180.00	+0.13 -0.13	9.00	10.00	4616500
170.00	-0.04 -0.14	180.00	+0.13 -0.13	6.00	7.00	4618800
170.00	-0.04 -0.14	180.00	+0.13 -0.13	11.80	13.00	4625900
170.00	-0.04 -0.14	185.00	+0.14 -0.14	9.00	10.00	4618000
170.00	-0.04 -0.14	190.00	+0.14 -0.14	14.50	16.00	4398800
180.00	-0.04 -0.14	190.00	+0.14 -0.14	11.00	12.00	4617800
180.00	-0.04 -0.14	192.00	+0.14 -0.14	12.50	14.00	4619600
180.00	-0.04 -0.14	200.00	+0.14 -0.14	11.80	13.00	4314700‡
180.00	-0.04 -0.14	200.00	+0.14 -0.14	14.50	16.00	4560900
185.00	-0.05 -0.17	200.00	+0.14 -0.14	10.90	12.00	4462100
190.00	-0.05 -0.17	210.00	+0.14 -0.14	14.50	16.00	4896600
190.00	-0.05 -0.17	215.00	+0.14 -0.14	18.50	20.00	4749400
200.00	-0.05 -0.17	220.00	+0.14 -0.14	12.00	13.00	4615100
200.00	-0.05 -0.17	220.00	+0.14 -0.14	14.50	16.00	4380200
205.00	-0.05 -0.17	220.00	+0.14 -0.14	12.20	13.50	4522400

#### NOTE

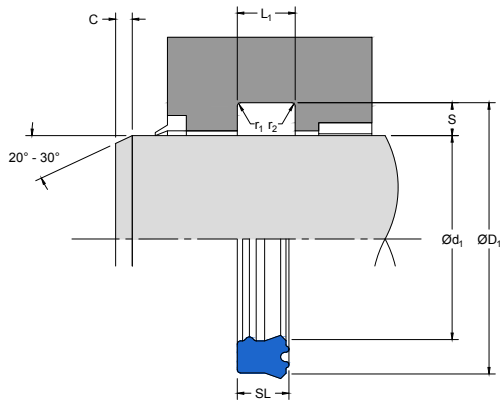
Part numbers commencing "46 . . . ." or suffixed by "X" are designed to suit popular Asian housings.  
Part numbers suffixed by "‡" indicate housing sizes to meet ISO5597.



## PART NUMBER RANGE

METRIC						
Ød <sub>1</sub>	TOL f9	ØD <sub>1</sub>	TOL Js11	SL	L <sub>1</sub> +0.25-0	PART No.
210.00	-0.05 -0.17	222.00	+0.14 -0.14	12.30	13.50	4625200
220.00	-0.05 -0.17	240.00	+0.14 -0.14	14.50	16.00	4555400
240.00	-0.05 -0.17	260.00	+0.16 -0.16	14.50	16.00	4626300
255.00	-0.06 -0.19	275.00	+0.16 -0.16	14.50	16.00	4629700
260.00	-0.06 -0.19	270.00	+0.16 -0.16	12.30	13.50	4625300
260.00	-0.06 -0.19	280.00	+0.16 -0.16	14.50	16.00	4859300
290.00	-0.06 -0.19	310.00	+0.16 -0.16	14.50	16.00	4896200
330.00	-0.06 -0.20	350.00	+0.18 -0.18	18.00	20.00	4587400

**NOTE** Part numbers commencing "46 . . . ." or suffixed by "X" are designed to suit popular Asian housings. Part numbers suffixed by "±" indicate housing sizes to meet ISO5597.



# 610

## ROD SEAL

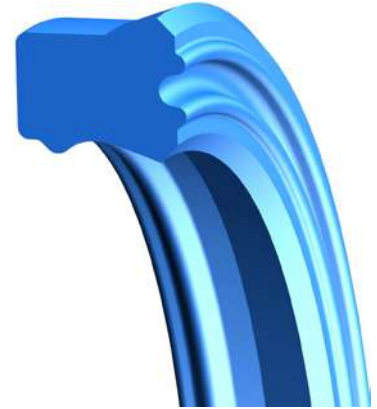
*Twin Lip  
Polyurethane*

### DESIGN

The Hallite 610 is an asymmetric, solid twin lip rod seal designed to provide a dry sealing solution in light and medium-duty applications and manufactured in Hythane® 181, Hallite's high-performance polyurethane, for easy installation and excellent low temperature performance.

The secondary sealing lip located behind the primary sealing lip improves stability of the seal in the gland.

It is designed for small groove section housing and to be less sensitive to pressure fluctuations than the Hallite 605 twin lip U-ring.



### FEATURES

- General purpose rod seal for small groove sections
- Less sensitive to pressure fluctuations than conventional U-ring
- Low friction
- Increased seal stability
- Performs well over wide temperature range and is extremely effective in low temperatures
- Primary lip protection
- Easy to install

### MATERIALS

As standard, this product comes in the following material. Contact your local Hallite technical team if you would like to find out if this profile can be made in a custom material to suit your application. For further material details, please refer to the Hallite Material Table.

MATERIAL OPTIONS	Name	Type	Colour
Standard	Hythane® 181	TPU-EU	Blue

## TECHNICAL DETAILS

OPERATING CONDITIONS	METRIC	INCH
Maximum Speed	1.0 m/sec	3.0 ft/sec
Temperature Range	-45°C +110°C	-50°F +230°F
Maximum Pressure	400 bar	6000 psi

**NOTE**

Data given are maximum values and can apply depending on specific application. Maximum ratings of temperature, pressure, or operating speeds are dependent on fluid medium, surface, gap value, and other variables such as dynamic or static service. Maximum values are not intended for use together at the same time, e.g. max temperature and max pressure. Please contact your Hallite technical representative for application support.

MAXIMUM EXTRUSION GAP			
Pressure bar	160	250	400
Maximum Gap mm	0.60	0.50	0.40
Pressure psi	2400	3750	6000
Maximum Gap in	0.024	0.020	0.016

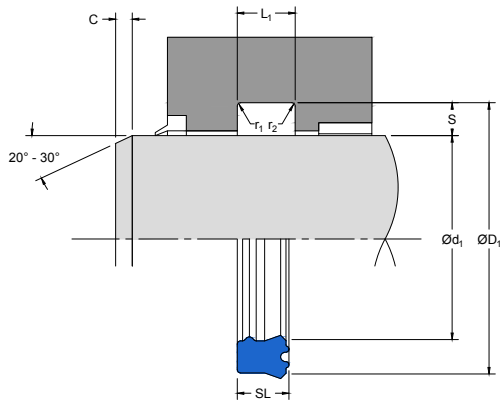
**NOTE**

Figures show the maximum permissible gap all on one side, for rod seals using minimum rod  $\varnothing$  and maximum clearance  $\varnothing$  and for piston seals using the minimum clearance  $\varnothing$  and maximum bore  $\varnothing$ . Refer to Housing Design section.

SURFACE ROUGHNESS	$\mu\text{mRa}$	$\mu\text{mRz}$	$\mu\text{mRt}$	$\mu\text{inRa}$	$\mu\text{inRz}$	$\mu\text{inRt}$
Dynamic Sealing Face $\varnothing d_1$	0.1 - 0.4	1.6 max	4 max	4 - 16	63 max	157 max
Static Sealing Face $\varnothing D_1$	1.6 max	6.3 max	10 max	63 max	250 max	394 max
Static Housing Faces $L_1$	3.2 max	10 max	16 max	125 max	394 max	630 max

CHAMFERS & RADII			
Groove Section <S mm	4.00	5.00	7.50
Min Chamfer C mm	3.00	3.50	5.00
Max Fillet Rad $r_1$ mm	0.20	0.40	0.80
Max Fillet Rad $r_2$ mm	0.40	0.80	1.20

TOLERANCES	$\varnothing d_1$	$\varnothing D_1$	$L_1$
Rod mm	f9	Js11	+0.25 -0



# 610

## ROD SEAL

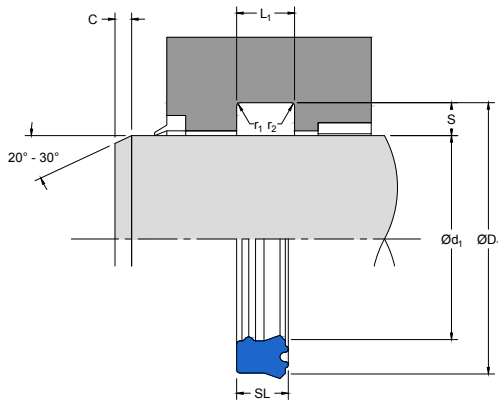
*Twin Lip  
Polyurethane*

### PART NUMBER RANGE

METRIC						
$\text{Ø}d_1$	TOL f9	$\text{Ø}D_1$	TOL Js11	SL	$L_1$ +0.25-0	PART No.
8.00	-0.01 -0.05	16.00	+0.06 -0.06	5.30	6.00	4581000
14.00	-0.02 -0.06	22.00	+0.07 -0.07	5.30	6.00	4580900
18.00	-0.02 -0.06	25.00	+0.07 -0.07	4.60	5.60	4334600‡
20.00	-0.02 -0.07	26.00	+0.07 -0.07	4.50	5.50	4319400
20.00	-0.02 -0.07	28.00	+0.07 -0.07	6.00	7.00	4307500
22.00	-0.02 -0.07	28.00	+0.07 -0.07	4.50	5.50	4356000
22.00	-0.02 -0.07	29.00	+0.07 -0.07	4.60	5.60	4324200‡
22.00	-0.02 -0.07	30.00	+0.07 -0.07	6.00	7.00	4316100
25.00	-0.02 -0.07	33.00	+0.08 -0.08	6.00	7.00	4316200
25.00	-0.02 -0.07	33.00	+0.08 -0.08	8.00	9.00	4299000
28.00	-0.02 -0.07	36.00	+0.08 -0.08	5.30	6.30	4334700‡
28.00	-0.02 -0.07	36.00	+0.08 -0.08	6.00	7.00	4323200
28.00	-0.02 -0.07	36.00	+0.08 -0.08	8.00	9.00	4307700
30.00	-0.02 -0.07	38.00	+0.08 -0.08	6.00	7.00	4308900
30.00	-0.02 -0.07	38.00	+0.08 -0.08	8.00	9.00	4362400
30.00	-0.02 -0.07	40.00	+0.08 -0.08	7.00	8.00	4558300
32.00	-0.03 -0.09	40.00	+0.08 -0.08	6.00	7.00	4316300

#### NOTE

Part numbers suffixed by "‡" indicate housing sizes to meet ISO 5597.

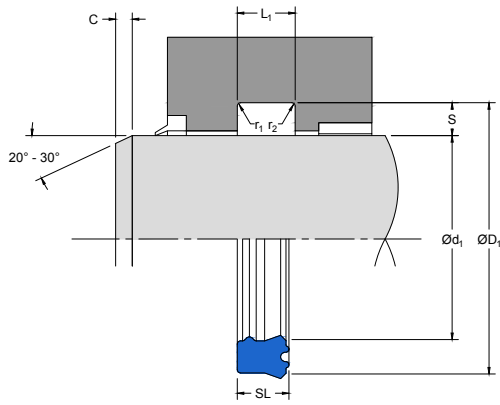


**PART NUMBER RANGE**

METRIC						
Ød <sub>1</sub>	TOL f <sub>9</sub>	ØD <sub>1</sub>	TOL Js11	SL	L <sub>1</sub> +0.25-0	PART No.
35.00	-0.03 -0.09	43.00	+0.08 -0.08	6.00	7.00	4301700
35.00	-0.03 -0.09	43.00	+0.08 -0.08	8.00	9.00	4592800
35.00	-0.03 -0.09	45.00	+0.08 -0.08	10.00	11.00	4299300
36.00	-0.03 -0.09	44.00	+0.08 -0.08	5.30	6.30	4324300‡
36.00	-0.03 -0.09	44.00	+0.08 -0.08	8.00	9.00	4308000
36.00	-0.03 -0.09	46.00	+0.08 -0.08	10.00	11.00	4299400
40.00	-0.03 -0.09	48.00	+0.08 -0.08	5.40	6.40	4329200
40.00	-0.03 -0.09	48.00	+0.08 -0.08	6.50	7.50	4323300
40.00	-0.03 -0.09	48.00	+0.08 -0.08	8.00	9.00	4301800
45.00	-0.03 -0.09	52.00	+0.10 -0.10	10.00	11.00	4330000
45.00	-0.03 -0.09	53.00	+0.10 -0.10	5.30	6.30	4334800‡
45.00	-0.03 -0.09	53.00	+0.10 -0.10	6.00	7.00	4711000
45.00	-0.03 -0.09	53.00	+0.10 -0.10	8.00	9.00	4308100
45.00	-0.03 -0.09	55.00	+0.10 -0.10	10.00	11.00	4389400
50.00	-0.03 -0.09	58.00	+0.10 -0.10	5.30	6.30	4356900
50.00	-0.03 -0.09	58.00	+0.10 -0.10	8.00	9.00	4299100
50.00	-0.03 -0.09	60.00	+0.10 -0.10	10.00	11.00	4389500

**NOTE** Part numbers suffixed by “‡” indicate housing sizes to meet ISO 5597.





# 610

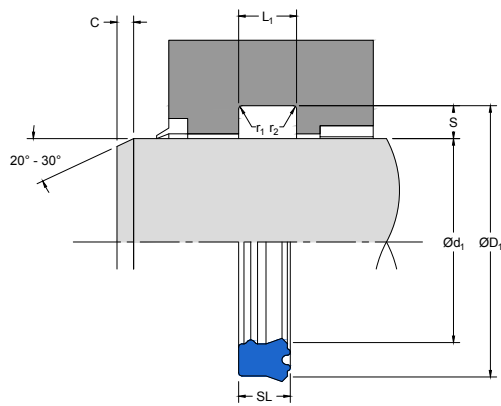
## ROD SEAL

Twin Lip  
Polyurethane

### PART NUMBER RANGE

METRIC						
Ød <sub>1</sub>	TOL f9	ØD <sub>1</sub>	TOL Js11	SL	L <sub>1</sub> +0.25-0	PART No.
55.00	-0.03 -0.10	63.00	+0.10 -0.10	8.00	9.00	4323000
55.00	-0.03 -0.10	65.00	+0.10 -0.10	7.00	8.00	4385500
55.00	-0.03 -0.10	65.00	+0.10 -0.10	10.00	11.00	4389600
55.00	-0.03 -0.10	65.00	+0.10 -0.10	11.80	13.00	4389700
56.00	-0.03 -0.10	64.00	+0.10 -0.10	8.00	9.00	4316400
56.00	-0.03 -0.10	66.00	+0.10 -0.10	6.80	7.50	4334900‡
60.00	-0.03 -0.10	68.00	+0.10 -0.10	7.00	8.00	4732400
60.00	-0.03 -0.10	68.00	+0.10 -0.10	8.00	9.00	4299200
60.00	-0.03 -0.10	68.00	+0.10 -0.10	11.40	12.50	4329900
60.00	-0.03 -0.10	70.00	+0.10 -0.10	7.00	8.00	4303200
60.00	-0.03 -0.10	70.00	+0.10 -0.10	11.80	13.00	4389800
63.00	-0.03 -0.10	71.00	+0.10 -0.10	8.00	9.00	4316500
63.00	-0.03 -0.10	75.00	+0.10 -0.10	8.60	9.60	4360500
65.00	-0.03 -0.10	73.00	+0.10 -0.10	8.00	9.00	4362500
65.00	-0.03 -0.10	75.00	+0.10 -0.10	11.80	13.00	4389900
70.00	-0.03 -0.10	78.00	+0.10 -0.10	8.00	9.00	4316600
70.00	-0.03 -0.10	80.00	+0.10 -0.10	6.50	7.50	4335000‡

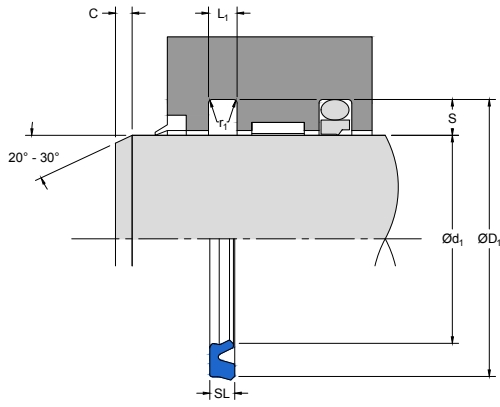
**NOTE** Part numbers suffixed by "‡" indicate housing sizes to meet ISO 5597.



**PART NUMBER RANGE**

METRIC						
Ød <sub>1</sub>	TOL f <sub>9</sub>	ØD <sub>1</sub>	TOL Js11	SL	L <sub>1</sub> +0.25-0	PART No.
70.00	-0.03 -0.10	80.00	+0.10 -0.10	11.80	13.00	4390000
75.00	-0.03 -0.10	83.00	+0.11 -0.11	8.00	9.00	4539400
80.00	-0.03 -0.10	88.00	+0.11 -0.11	8.00	9.00	4316700
85.00	-0.04 -0.12	97.00	+0.11 -0.11	9.00	10.00	4328100
87.00	-0.04 -0.12	95.00	+0.11 -0.11	8.00	9.00	4323700
90.00	-0.04 -0.12	98.00	+0.11 -0.11	8.00	9.00	4316800
100.00	-0.04 -0.12	108.00	+0.11 -0.11	8.00	9.00	4316900
134.00	-0.04 -0.14	147.00	+0.13 -0.13	12.00	13.30	4588100
175.00	-0.04 -0.14	185.00	+0.14 -0.14	11.80	13.00	4903700

**NOTE** Part numbers suffixed by “±” indicate housing sizes to meet ISO 5597.



# 616

## ROD SEAL

*Twin Lip  
Polyurethane*

### DESIGN

Hallite's 616 is a compact, asymmetric twin lip rod seal offering excellent dry rod sealing for light and medium-duty applications where space and friction are at a premium. The seal is manufactured in Hythane® 181, Hallite's high-performance polyurethane, for easy installation and excellent low temperature performance.

The Hallite 616 design incorporates the sealing efficiency of the Hallite 605 rod seal with the compact grooves used by PTFE rod seals.

Hallite recommends using our 616 rod seal as either a single seal or in combination with the Hallite R16 PTFE rod seal. The combination is recommended for use in applications where pressure peaks may occur, such as cylinders with cushioning. The Hallite R16 PTFE rod seal is fitted into the groove on the pressure side of the gland and the Hallite 616 is used as the secondary seal to ensure minimal leakage. Consult your local Hallite office when considering this arrangement.



### FEATURES

- Low friction
- Improved sealability
- Performs well over wide temperature range and is extremely effective in low temperatures
- Easy to install
- ISO 7425-2 housing

### MATERIALS

As standard, this product comes in the following material. Contact your local Hallite technical team if you would like to find out if this profile can be made in a custom material to suit your application. For further material details, please refer to the Hallite Material Table.

MATERIAL OPTIONS	Name	Type	Colour
Standard	Hythane® 181	TPU-EU	Blue

## TECHNICAL DETAILS

OPERATING CONDITIONS	METRIC	INCH
Maximum Speed	1.0 m/sec	3.0 ft/sec
Temperature Range	-45°C +110°C	-50°F +230°F
Maximum Pressure	240 bar	3500 psi

**NOTE**

Data given are maximum values and can apply depending on specific application. Maximum ratings of temperature, pressure, or operating speeds are dependent on fluid medium, surface, gap value, and other variables such as dynamic or static service. Maximum values are not intended for use together at the same time, e.g. max temperature and max pressure. Please contact your Hallite technical representative for application support.

MAXIMUM EXTRUSION GAP		
Pressure bar	160	250
Maximum Gap mm	0.60	0.50
Pressure psi	2400	3750
Maximum Gap in	0.024	0.020

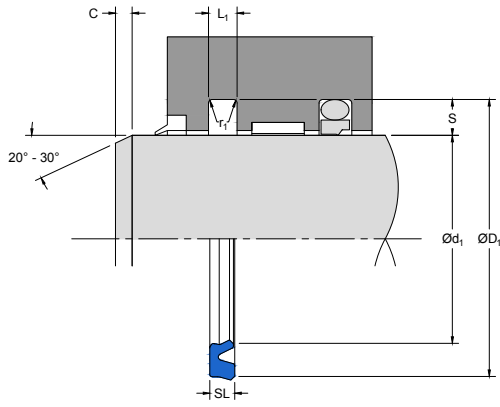
**NOTE**

Figures show the maximum permissible gap all on one side, for rod seals using minimum rod  $\varnothing$  and maximum clearance  $\varnothing$  and for piston seals using the minimum clearance  $\varnothing$  and maximum bore  $\varnothing$ . Refer to Housing Design section.

SURFACE ROUGHNESS	$\mu\text{mRa}$	$\mu\text{mRz}$	$\mu\text{mRt}$	$\mu\text{inRa}$	$\mu\text{inRz}$	$\mu\text{inRt}$
Dynamic Sealing Face $\varnothing d_1$	0.1 - 0.4	1.6 max	4 max	4 - 16	63 max	157 max
Static Sealing Face $\varnothing D_1$	1.6 max	6.3 max	10 max	63 max	250 max	394 max
Static Housing Faces $L_1$	3.2 max	10 max	16 max	125 max	394 max	630 max

CHAMFERS & RADII			
Groove Section $<S$ mm	3.75	5.50	7.75
Min Chamfer $C$ mm	3.00	3.50	5.00
Max Fillet Rad $r_1$ mm	0.20	0.40	0.80

TOLERANCES	$\varnothing d_1$	$\varnothing D_1$	$L_1$
Rod mm	f9	H11	+0.25 -0



# 616

## ROD SEAL

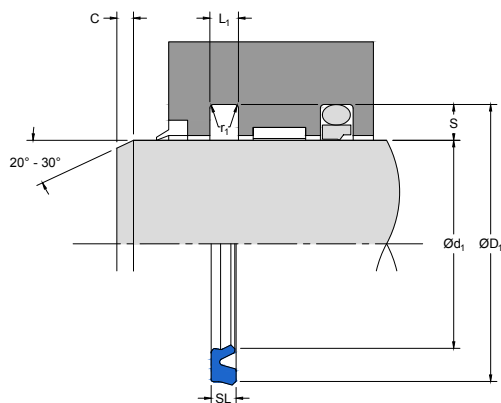
*Twin Lip  
Polyurethane*

### PART NUMBER RANGE

METRIC						
Ød <sub>1</sub>	TOL f9	ØD <sub>1</sub>	TOL H11	SL	L <sub>1</sub> +0.25-0	PART No.
14.00	-0.02 -0.06	21.50	+0.13 0.00	2.80	3.20	4577700‡
18.00	-0.02 -0.06	25.50	+0.13 0.00	2.80	3.20	4341800‡
20.00	-0.02 -0.07	27.50	+0.13 0.00	2.80	3.20	4721700‡
20.00	-0.02 -0.07	31.00	+0.16 0.00	3.90	4.20	4367400‡
22.00	-0.02 -0.07	33.00	+0.16 0.00	3.90	4.20	4341900‡
25.00	-0.02 -0.07	32.50	+0.16 0.00	2.80	3.20	4721800‡
25.00	-0.02 -0.07	36.00	+0.16 0.00	3.90	4.20	4367500‡
25.40	-0.02 -0.07	32.90	+0.16 0.00	2.80	3.20	4469000
28.00	-0.02 -0.07	39.00	+0.16 0.00	3.90	4.20	4367600‡
30.00	-0.02 -0.07	41.00	+0.16 0.00	3.90	4.20	4404500
32.00	-0.03 -0.09	39.50	+0.16 0.00	2.80	3.20	4714800
32.00	-0.03 -0.09	43.00	+0.16 0.00	3.90	4.20	4367700‡
36.00	-0.03 -0.09	47.00	+0.16 0.00	3.90	4.20	4353100‡
40.00	-0.03 -0.09	51.00	+0.19 0.00	3.90	4.20	4722900‡
40.00	-0.03 -0.09	55.50	+0.19 0.00	6.00	6.30	4367800
45.00	-0.03 -0.09	56.00	+0.19 0.00	3.90	4.20	4556300‡
45.00	-0.03 -0.09	60.50	+0.19 0.00	6.00	6.30	4367900

#### NOTE

Part numbers suffixed by "‡" indicate housing sizes to meet ISO7425-2.



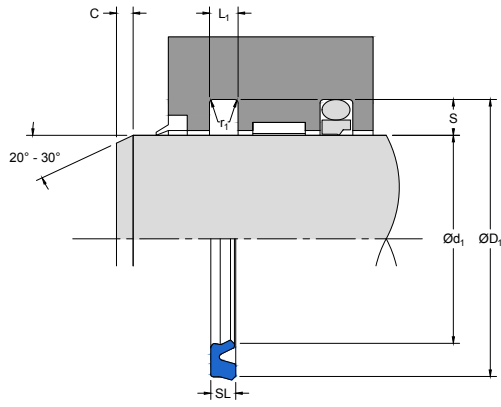
## PART NUMBER RANGE

METRIC						
$\varnothing d_1$	TOL f9	$\varnothing D_1$	TOL H11	SL	$L_1$ +0.25-0	PART No.
50.00	-0.03 -0.09	61.00	+0.19 0.00	3.90	4.20	4723000‡
50.00	-0.03 -0.09	65.50	+0.19 0.00	6.00	6.30	4368000
56.00	-0.03 -0.10	71.50	+0.19 0.00	6.00	6.30	4368100‡
60.00	-0.03 -0.10	70.60	+0.19 0.00	3.90	4.20	4410800
60.00	-0.03 -0.10	75.50	+0.19 0.00	6.00	6.30	4727100
63.00	-0.03 -0.10	78.50	+0.19 0.00	6.00	6.30	4368200‡
65.00	-0.03 -0.10	76.00	+0.19 0.00	3.90	4.20	4853300
65.00	-0.03 -0.10	80.50	+0.22 0.00	6.00	6.30	4548000
70.00	-0.03 -0.10	85.50	+0.22 0.00	6.00	6.30	4368300‡
75.00	-0.03 -0.10	90.50	+0.22 0.00	6.00	6.30	4728200
80.00	-0.03 -0.10	95.50	+0.22 0.00	6.00	6.30	4368400‡
85.00	-0.04 -0.12	100.50	+0.22 0.00	6.00	6.30	4538400
90.00	-0.04 -0.12	105.50	+0.22 0.00	6.00	6.30	4368500‡
95.00	-0.04 -0.12	110.50	+0.22 0.00	6.00	6.30	4538500
100.00	-0.04 -0.12	115.50	+0.22 0.00	6.00	6.30	4368600‡
110.00	-0.04 -0.12	125.50	+0.25 0.00	6.00	6.30	4545400‡
125.00	-0.04 -0.14	140.50	+0.25 0.00	6.00	6.30	4545500‡

### NOTE

Part numbers suffixed by "‡" indicate housing sizes to meet ISO7425-2.





# 616

## ROD SEAL

*Twin Lip  
Polyurethane*

### PART NUMBER RANGE

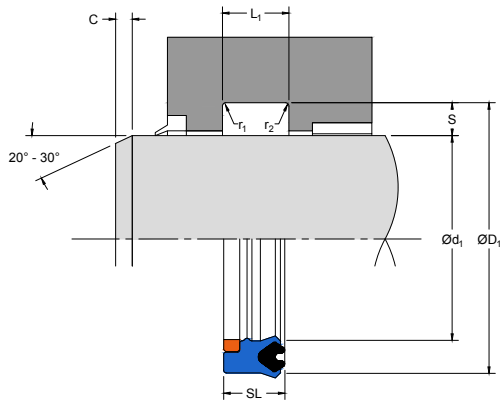
METRIC						
$\varnothing d_1$	TOL f9	$\varnothing D_1$	TOL H11	SL	$L_1$ +0.25-0	PART No.
130.00	-0.04 -0.14	145.50	+0.25 0.00	6.00	6.30	4793900
140.00	-0.04 -0.14	155.50	+0.25 0.00	6.00	6.30	4545600‡
160.00	-0.04 -0.14	175.50	+0.25 0.00	6.00	6.30	4548100‡

#### NOTE

Part numbers suffixed by "‡" indicate housing sizes to meet ISO7425-2.







# 621

## ROD SEAL

*Twin Lip*

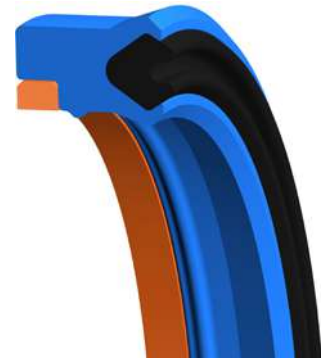
*Polyurethane with AE Ring and Profiled Rubber Energiser for Heavy-Duty Applications*

### DESIGN

The Hallite 621 is a top-of-the-range twin lip rod seal designed to provide a dry sealing solution in heavy-duty applications.

The secondary sealing lip located behind the primary sealing lip improves stability of the seal in the gland. The unique profile of the NBR energiser ensures the precision trimmed primary sealing lips maintain contact under low or no pressure situations while ensuring proper sealing at higher pressures. This unique profile is also used in the Hallite 622 twin lip rod seal. The Hallite 621 also incorporates an acetal anti-extrusion ring to withstand side loads and extreme pressure peaks even with the extrusion gaps, which are the result of using remote plastic bearing strips like the Hallite 506 or 708.

The Hallite 621's seal shell is molded in Hythane® 181, Hallite's high-performance polyurethane, for easy installation and excellent low temperature performance.



### FEATURES

- High pressure and shock load capability
- Low temperature capabilities
- Low friction
- Increased seal stability
- Primary lip protection
- Easy to install

### MATERIALS

As standard, this product comes in the following materials. Contact your local Hallite technical team if you would like to find out if this profile can be made in a custom material to suit your application. For further material details, please refer to the Hallite Material Table.

MATERIAL OPTIONS	Name	Shell Type	Shell Colour
Standard	Hythane® 181-NBR-POM 0011	TPU-EU	Blue

## TECHNICAL DETAILS

OPERATING CONDITIONS	METRIC	INCH
Maximum Speed	1.0 m/sec	3.0 ft/sec
Temperature Range	-45°C +110°C	-50°F +230°F
Maximum Pressure	700 bar	10000 psi

### NOTE

Data given are maximum values and can apply depending on specific application. Maximum ratings of temperature, pressure, or operating speeds are dependent on fluid medium, surface, gap value, and other variables such as dynamic or static service. Maximum values are not intended for use together at the same time, e.g. max temperature and max pressure. Please contact your Hallite technical representative for application support.

MAXIMUM EXTRUSION GAP					
Pressure bar	160	250	400	500	700
Maximum Gap mm	0.60	0.50	0.60	0.40	0.25
Pressure psi	2400	3750	6000	7500	10000
Maximum Gap in	0.024	0.020	0.024	0.016	0.010

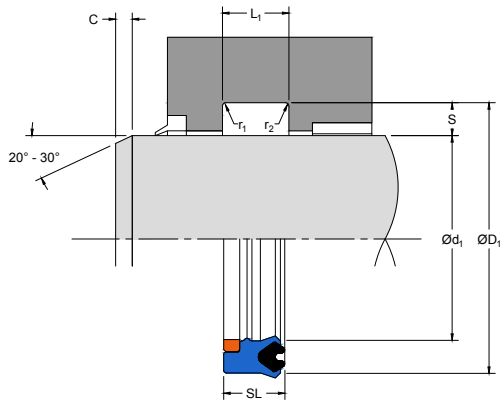
### NOTE

Figures show the maximum permissible gap all on one side, for rod seals using minimum rod  $\varnothing$  and maximum clearance  $\varnothing$  and for piston seals using the minimum clearance  $\varnothing$  and maximum bore  $\varnothing$ . Refer to Housing Design section.

SURFACE ROUGHNESS	$\mu\text{mRa}$	$\mu\text{mRz}$	$\mu\text{mRt}$	$\mu\text{inRa}$	$\mu\text{inRz}$	$\mu\text{inRt}$
Dynamic Sealing Face $\varnothing d_1$	0.1 - 0.4	1.6 max	4 max	4 - 16	63 max	157 max
Static Sealing Face $\varnothing D_1$	1.6 max	6.3 max	10 max	63 max	250 max	394 max
Static Housing Faces $L_1$	3.2 max	10 max	16 max	125 max	394 max	630 max

CHAMFERS & RADII						
Groove Section <S mm	4.00	5.00	7.50	10.00	12.50	15.00
Min Chamfer C mm	3.00	3.50	5.00	6.50	7.00	8.00
Max Fillet Rad $r_1$ mm	0.20	0.40	0.80	0.80	2.30	1.60
Max Fillet Rad $r_2$ mm	0.400	0.800	1.200	1.60	1.60	2.40
Groove Section <S in	0.125	0.187	0.250	0.312	0.375	0.500
Min Chamfer C in	0.093	0.093	0.125	0.156	0.187	0.217
Max Fillet Rad $r_1$ in	0.008	0.008	0.016	0.016	0.032	0.032
Max Fillet Rad $r_2$ in	0.016	0.016	0.032	0.032	0.047	0.047

TOLERANCES	$\varnothing d_1$	$\varnothing D_1$	$L_1$
mm	f9	Js11	+0.25 -0
in	f9	Js11	+0.010 -0



# 621

## ROD SEAL

*Twin Lip*

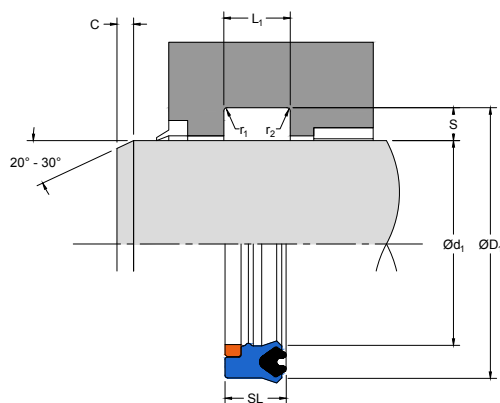
*Polyurethane with AE Ring and Profiled Rubber Energiser for Heavy-Duty Applications*

### PART NUMBER RANGE

METRIC						
Ød <sub>1</sub>	TOL f <sub>9</sub>	ØD <sub>1</sub>	TOL Js11	SL	L <sub>1</sub> +0.25-0	PART No.
30.00	-0.02 -0.07	40.00	+0.08 -0.08	7.30	8.00	4577110
30.00	-0.02 -0.07	40.00	+0.08 -0.08	10.00	11.00	4831310
35.00	-0.03 -0.09	45.00	+0.08 -0.08	10.00	11.00	4831410
35.00	-0.03 -0.09	50.00	+0.08 -0.08	9.50	10.50	4335310
36.00	-0.03 -0.09	46.00	+0.08 -0.08	7.30	8.00	4317010‡
40.00	-0.03 -0.09	50.00	+0.08 -0.08	7.30	8.00	4317110‡
40.00	-0.03 -0.09	50.00	+0.08 -0.08	10.00	11.00	4755010
45.00	-0.03 -0.09	55.00	+0.10 -0.10	7.30	8.00	4317210‡
45.00	-0.03 -0.09	55.00	+0.10 -0.10	10.00	11.00	4831510
45.00	-0.03 -0.09	60.00	+0.10 -0.10	11.40	12.50	4295510‡
50.00	-0.03 -0.09	60.00	+0.10 -0.10	7.30	8.00	4317310‡
50.00	-0.03 -0.09	60.00	+0.10 -0.10	10.00	11.00	4802310†
50.00	-0.03 -0.09	65.00	+0.10 -0.10	10.00	11.00	4752910
50.00	-0.03 -0.09	65.00	+0.10 -0.10	11.40	12.50	4293410‡
55.00	-0.03 -0.10	65.00	+0.10 -0.10	10.00	11.00	4831210
55.00	-0.03 -0.10	70.00	+0.10 -0.10	9.00	10.00	4810210†
55.00	-0.03 -0.10	70.00	+0.10 -0.10	11.40	12.50	4403610

#### NOTE

Part numbers suffixed by "†" are designed to suit popular Asian housings.  
Part numbers suffixed by "‡" indicate housing sizes to meet ISO 5597.



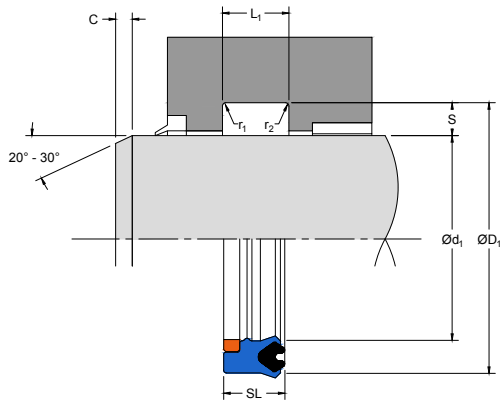
## PART NUMBER RANGE

METRIC						
Ød <sub>1</sub>	TOL f <sub>9</sub>	ØD <sub>1</sub>	TOL Js11	SL	L <sub>1</sub> +0.25-0	PART No.
56.00	-0.03 -0.10	71.00	+0.10 -0.10	11.40	12.50	4317410‡
60.00	-0.03 -0.10	73.00	+0.10 -0.10	13.00	14.00	4526010†
60.00	-0.03 -0.10	75.00	+0.10 -0.10	11.40	12.50	4298410
63.00	-0.03 -0.10	78.00	+0.10 -0.10	11.40	12.50	4317510‡
63.00	-0.03 -0.10	83.00	+0.11 -0.11	11.80	13.00	4520510†
65.00	-0.03 -0.10	75.00	+0.10 -0.10	10.00	11.00	4755110
65.00	-0.03 -0.10	80.00	+0.10 -0.10	10.00	11.00	4761810
65.00	-0.03 -0.10	80.00	+0.10 -0.10	11.40	12.50	4783710
65.00	-0.03 -0.10	80.00	+0.10 -0.10	13.00	14.00	4810310
70.00	-0.03 -0.10	83.00	+0.11 -0.11	13.00	14.00	4810410
70.00	-0.03 -0.10	85.00	+0.11 -0.11	10.00	11.00	4893010†
70.00	-0.03 -0.10	85.00	+0.11 -0.11	11.40	12.50	4317610‡
75.00	-0.03 -0.10	88.00	+0.11 -0.11	13.00	14.00	4526110†
75.00	-0.03 -0.10	90.00	+0.11 -0.11	12.00	13.00	4810510
75.00	-0.03 -0.10	90.00	+0.11 -0.11	13.00	14.00	4784710
75.00	-0.03 -0.10	95.00	+0.11 -0.11	11.40	12.50	4810610
75.00	-0.03 -0.10	95.00	+0.11 -0.11	14.60	16.00	4801510†

### NOTE

Part numbers suffixed by "†" are designed to suit popular Asian housings.  
Part numbers suffixed by "‡" indicate housing sizes to meet ISO 5597.





# 621

## ROD SEAL

*Twin Lip*

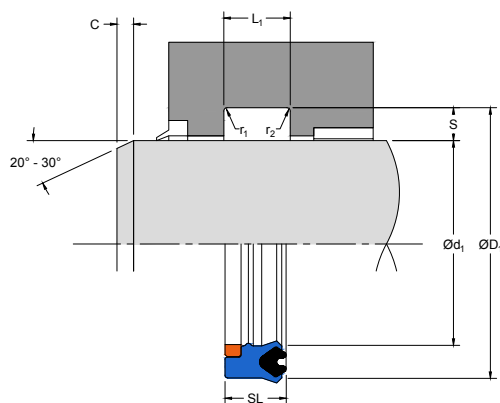
*Polyurethane with AE Ring and Profiled Rubber Energiser for Heavy-Duty Applications*

### PART NUMBER RANGE

METRIC						
Ød <sub>1</sub>	TOL f <sub>9</sub>	ØD <sub>1</sub>	TOL Js11	SL	L <sub>1</sub> +0.25-0	PART No.
80.00	-0.03 -0.10	93.00	+0.11 -0.11	13.00	14.00	4810710†
80.00	-0.03 -0.10	95.00	+0.11 -0.11	11.40	12.50	4317710‡
80.00	-0.03 -0.10	95.00	+0.11 -0.11	13.00	14.00	4540610†
85.00	-0.04 -0.12	100.00	+0.11 -0.11	11.80	13.00	4766410
85.00	-0.04 -0.12	100.00	+0.11 -0.11	13.00	14.00	4540710†
85.00	-0.04 -0.12	105.00	+0.11 -0.11	14.60	16.00	4810810†
90.00	-0.04 -0.12	105.00	+0.11 -0.11	11.40	12.50	4317810‡
90.00	-0.04 -0.12	105.00	+0.11 -0.11	13.00	14.00	4526310†
90.00	-0.04 -0.12	110.00	+0.11 -0.11	14.60	16.00	4810910†
95.00	-0.04 -0.12	110.00	+0.11 -0.11	12.00	13.00	4811010†
95.00	-0.04 -0.12	110.00	+0.11 -0.11	13.00	14.00	4540810†
95.00	-0.04 -0.12	115.00	+0.11 -0.11	14.60	16.00	4811110†
100.00	-0.04 -0.12	115.00	+0.11 -0.11	13.00	14.00	4540910†
100.00	-0.04 -0.12	120.00	+0.11 -0.11	14.60	16.00	4317910‡
105.00	-0.04 -0.12	120.00	+0.11 -0.11	12.00	13.00	4811210†
105.00	-0.04 -0.12	120.00	+0.11 -0.11	13.00	14.00	4811310†
105.00	-0.04 -0.12	125.00	+0.13 -0.13	14.60	16.00	4811410†

#### NOTE

Part numbers suffixed by "†" are designed to suit popular Asian housings.  
Part numbers suffixed by "‡" indicate housing sizes to meet ISO 5597.



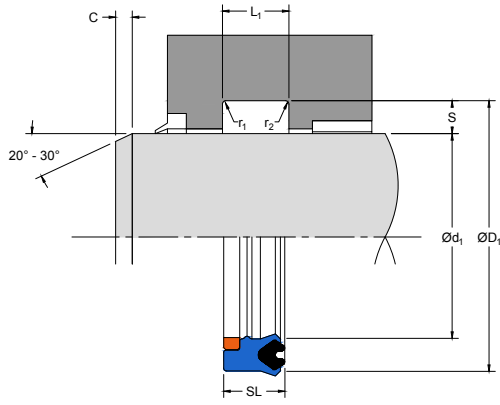
## PART NUMBER RANGE

METRIC						
Ød <sub>1</sub>	TOL f <sub>9</sub>	ØD <sub>1</sub>	TOL Js <sub>11</sub>	SL	L <sub>1</sub> +0.25-0	PART No.
110.00	-0.04 -0.12	125.00	+0.13 -0.13	13.00	14.00	4811510†
110.00	-0.04 -0.12	130.00	+0.13 -0.13	13.00	14.00	4541010†
110.00	-0.04 -0.12	130.00	+0.13 -0.13	14.60	16.00	4318010‡
115.00	-0.04 -0.12	135.00	+0.13 -0.13	14.60	16.00	4783810
120.00	-0.04 -0.12	135.00	+0.13 -0.13	14.60	16.00	4318110
120.00	-0.04 -0.12	140.00	+0.13 -0.13	13.00	14.00	4541110†
120.00	-0.04 -0.12	140.00	+0.13 -0.13	14.60	16.00	4783910†
125.00	-0.04 -0.14	145.00	+0.13 -0.13	14.60	16.00	4318210‡
130.00	-0.04 -0.14	145.00	+0.13 -0.13	13.00	14.00	4811610†
130.00	-0.04 -0.14	150.00	+0.13 -0.13	14.60	16.00	4709810†
140.00	-0.04 -0.14	155.00	+0.13 -0.13	13.00	14.00	4811710†
140.00	-0.04 -0.14	160.00	+0.13 -0.13	13.00	14.00	4541210†
140.00	-0.04 -0.14	160.00	+0.13 -0.13	14.60	16.00	4318310‡
150.00	-0.04 -0.14	170.00	+0.13 -0.13	14.60	16.00	4784010
160.00	-0.04 -0.14	180.00	+0.13 -0.13	14.60	16.00	4454810
160.00	-0.04 -0.14	185.00	+0.14 -0.14	14.60	16.00	4723410‡
180.00	-0.04 -0.14	200.00	+0.14 -0.14	14.60	16.00	4454910

### NOTE

Part numbers suffixed by "†" are designed to suit popular Asian housings.  
Part numbers suffixed by "‡" indicate housing sizes to meet ISO 5597.





# 621

## ROD SEAL

*Twin Lip*

*Polyurethane with AE Ring and Profiled Rubber Energiser for Heavy-Duty Applications*

### PART NUMBER RANGE

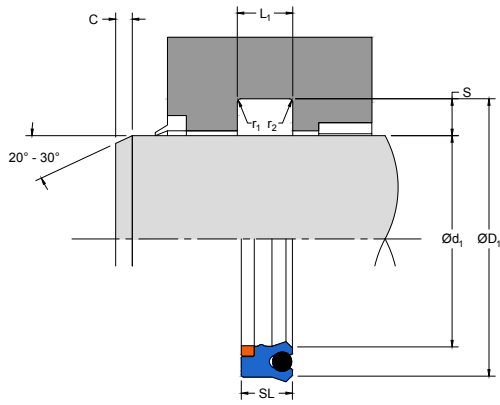
METRIC						
Ød <sub>1</sub>	TOL f9	ØD <sub>1</sub>	TOL Js11	SL	L <sub>1</sub> +0.25-0	PART No.
200.00	-0.05 -0.17	220.00	+0.14 -0.14	14.60	16.00	4455110
215.00	-0.05 -0.17	235.00	+0.14 -0.14	14.60	16.00	4705610

#### NOTE

Part numbers suffixed by "+" are designed to suit popular Asian housings.  
Part numbers suffixed by "±" indicate housing sizes to meet ISO 5597.







# 652

## ROD SEAL

*Polyurethane with AE Ring and Rubber Energiser for Heavy-Duty Applications*

### DESIGN

The Hallite 652 is a rod seal designed to provide a dry sealing solution specifically for heavy-duty longwall mining applications using water-based fluids. The design is also suitable for standard hydraulic oil applications.

The seal is manufactured in a polyurethane shell energised by a high quality O-ring, or in some cases a profiled NBR energiser as used in the Hallite 621 twin lip rod seal. The Hallite 652 also incorporates an acetal anti-extrusion ring to withstand side loads and extreme pressure peaks even with the extrusion gaps, which are the result of using remote plastic bearing strips like the Hallite 506 or 708.

The Hallite 652's seal shell is moulded in Hythane® 181, Hallite's high-performance polyurethane, for easy installation.



### FEATURES

- Extremely well proven in longwall mining applications
- Extremely well proven in HFA water-based fluids
- High pressure and shock load capability
- Responsive sealing
- Easy to install

### MATERIALS

As standard, this product comes in the following materials. Contact your local Hallite technical team if you would like to find out if this profile can be made in a custom material to suit your application. For further material details, please refer to the Hallite Material Table.

MATERIAL OPTIONS	Name	Shell Type	Shell Colour
Standard	Hythane® 181-NBR-POM 0011	TPU-EU	Blue

## TECHNICAL DETAILS

OPERATING CONDITIONS	METRIC	INCH
Maximum Speed	1.0 m/sec	3.0 ft/sec
Temperature Range Hydraulic Oils	-45°C +110°C	-50°F +230°F
Temperature Range Water-Based Fluids	-0°C +60°C	32°F +140°F
Maximum Pressure	700 bar	10000 psi

**NOTE**

Data given are maximum values and can apply depending on specific application. Maximum ratings of temperature, pressure, or operating speeds are dependent on fluid medium, surface, gap value, and other variables such as dynamic or static service. Maximum values are not intended for use together at the same time, e.g. max temperature and max pressure. Please contact your Hallite technical representative for application support.

MAXIMUM EXTRUSION GAP					
Pressure bar	160	250	400	500	700
Maximum Gap mm	0.60	0.50	0.60	0.40	0.25
Pressure psi	2400	3750	6000	7500	10000
Maximum Gap in	0.024	0.020	0.024	0.016	0.010

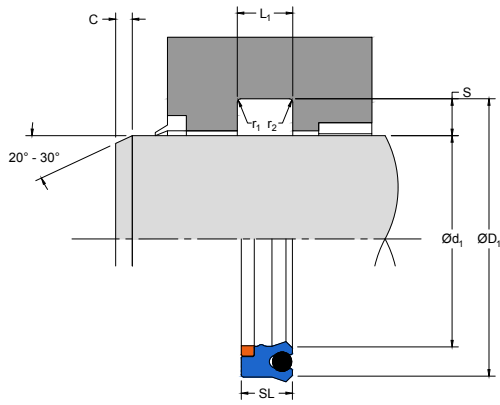
**NOTE**

Figures show the maximum permissible gap all on one side, for rod seals using minimum rod  $\varnothing$  and maximum clearance  $\varnothing$  and for piston seals using the minimum clearance  $\varnothing$  and maximum bore  $\varnothing$ . Refer to Housing Design section.

SURFACE ROUGHNESS	$\mu\text{mRa}$	$\mu\text{mRz}$	$\mu\text{mRt}$	$\mu\text{inRa}$	$\mu\text{inRz}$	$\mu\text{inRt}$
Dynamic Sealing Face $\varnothing d_1$	0.1 - 0.4	1.6 max	4 max	4 - 16	63 max	157 max
Static Sealing Face $\varnothing D_1$	1.6 max	6.3 max	10 max	63 max	250 max	394 max
Static Housing Faces $L_1$	3.2 max	10 max	16 max	125 max	394 max	630 max

CHAMFERS & RADII						
Groove Section $<S$ mm	4.00	5.00	7.50	10.00	12.50	15.00
Min Chamfer $C$ mm	3.00	3.50	5.00	6.50	7.00	8.00
Max Fillet Rad $r_1$ mm	0.20	0.40	0.80	0.80	2.30	1.60
Max Fillet Rad $r_2$ mm	0.40	0.80	1.20	1.60	1.60	2.40

TOLERANCES	$\varnothing d_1$	$\varnothing D_1$	$L_1$
mm	f9	Js11	+0.25 -0



# 652

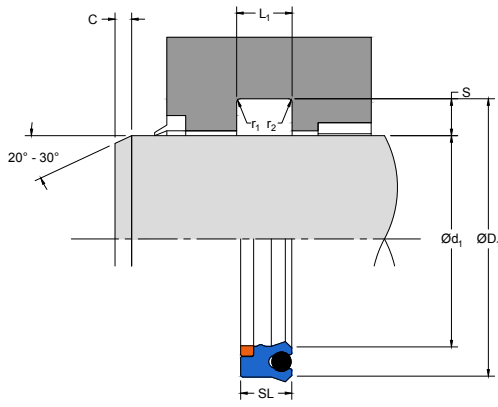
## ROD SEAL

*Polyurethane with AE Ring and Rubber Energiser  
for Heavy-Duty Applications*

### PART NUMBER RANGE

METRIC						
Ød <sub>1</sub>	TOL f9	ØD <sub>1</sub>	TOL Js11	L <sub>1</sub> +0.25-0	SL	PART No.
32.00	-0.03 -0.09	44.00	+0.08 -0.08	9.60	8.70	4344111
40.00	-0.03 -0.09	52.00	+0.10 -0.10	9.60	8.70	4326311
50.00	-0.03 -0.09	62.00	+0.10 -0.10	9.60	8.70	4326411
60.00	-0.03 -0.10	69.80	+0.10 -0.10	12.50	11.40	4534910*
60.00	-0.03 -0.10	72.00	+0.10 -0.10	9.60	8.70	4344211*
60.00	-0.03 -0.10	75.00	+0.10 -0.10	13.00	11.90	4451211
63.00	-0.03 -0.10	75.00	+0.10 -0.10	9.60	8.70	4326511*
70.00	-0.03 -0.10	82.00	+0.11 -0.11	9.60	8.70	4344311*
75.00	-0.03 -0.10	95.00	+0.11 -0.11	14.00	12.50	4547810*
80.00	-0.03 -0.10	95.00	+0.11 -0.11	13.00	11.80	4797410
80.00	-0.03 -0.10	95.00	+0.11 -0.11	16.00	14.50	4446511
85.00	-0.04 -0.12	97.00	+0.11 -0.11	9.60	8.70	4344511
90.00	-0.04 -0.12	105.00	+0.11 -0.11	13.00	11.80	4875010
90.00	-0.04 -0.12	105.00	+0.11 -0.11	16.00	14.50	4428011
100.00	-0.04 -0.12	115.00	+0.11 -0.11	12.00	11.00	4528010*
100.00	-0.04 -0.12	115.00	+0.11 -0.11	16.00	14.50	4397611*
105.00	-0.04 -0.12	120.00	+0.11 -0.11	13.00	11.80	4406711*

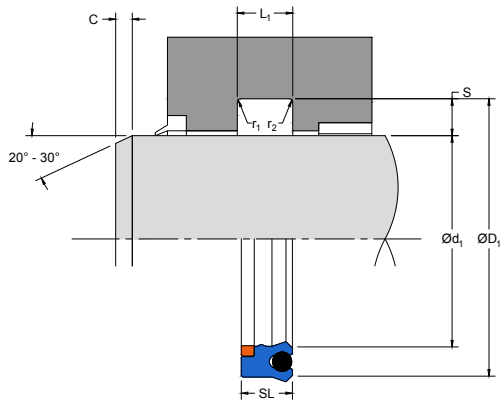
**NOTE** Part numbers suffixed by "\*" indicate profiled NBR energiser



**PART NUMBER RANGE**

METRIC						
Ød <sub>1</sub>	TOL f9	ØD <sub>1</sub>	TOL Js11	L <sub>1</sub> +0.25-0	SL	PART No.
105.00	-0.04 -0.12	120.00	+0.11 -0.11	16.00	14.50	4781810
110.00	-0.04 -0.12	125.00	+0.13 -0.13	16.00	14.50	4445611
115.00	-0.04 -0.12	130.00	+0.13 -0.13	16.00	14.50	4455411
120.00	-0.04 -0.12	135.00	+0.13 -0.13	16.00	14.50	4452011
125.00	-0.04 -0.14	140.00	+0.13 -0.13	16.00	14.50	4446911
128.00	-0.04 -0.14	143.00	+0.13 -0.13	16.00	14.50	4581611
130.00	-0.04 -0.14	145.00	+0.13 -0.13	16.00	14.50	4782410
135.00	-0.04 -0.14	155.00	+0.13 -0.13	15.00	13.60	4475410*
140.00	-0.04 -0.14	155.00	+0.13 -0.13	16.00	14.50	4753210
150.00	-0.04 -0.14	165.00	+0.13 -0.13	16.00	14.50	4389111*
160.00	-0.04 -0.14	175.00	+0.13 -0.13	12.80	11.70	4484010
160.00	-0.04 -0.14	175.00	+0.13 -0.13	16.00	14.50	4405011*
160.00	-0.04 -0.14	177.00	+0.13 -0.13	16.00	14.50	4767610
160.00	-0.04 -0.14	185.00	+0.14 -0.14	20.00	18.80	4401711*
165.00	-0.04 -0.14	182.00	+0.14 -0.14	16.00	14.50	4537411
170.00	-0.04 -0.14	185.00	+0.14 -0.14	16.00	14.50	4745610
177.00	-0.04 -0.14	192.00	+0.14 -0.14	16.00	14.50	4445711

**NOTE** Part numbers suffixed by "\*" indicate profiled NBR energiser



# 652

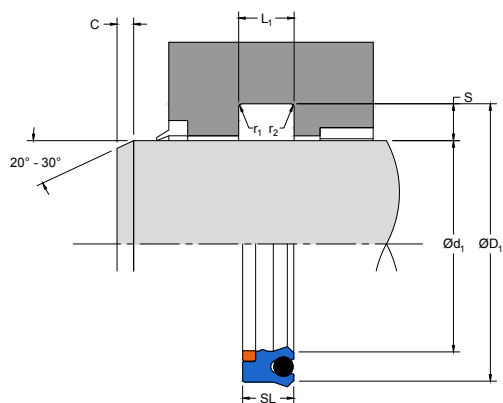
## ROD SEAL

*Polyurethane with AE Ring and Rubber Energiser  
for Heavy-Duty Applications*

### PART NUMBER RANGE

METRIC						
Ød <sub>1</sub>	TOL f <sub>9</sub>	ØD <sub>1</sub>	TOL Js <sub>11</sub>	L <sub>1</sub> +0.25-0	SL	PART No.
180.00	-0.04 -0.14	195.00	+0.14 -0.14	16.00	14.50	4734610
185.00	-0.05 -0.17	200.00	+0.14 -0.14	16.00	14.50	4777210
185.00	-0.05 -0.17	210.00	+0.14 -0.14	20.00	18.00	4546611
190.00	-0.05 -0.17	205.00	+0.14 -0.14	16.00	14.50	4430811
195.00	-0.05 -0.17	210.00	+0.14 -0.14	16.00	14.50	4459311
195.00	-0.05 -0.17	215.00	+0.14 -0.14	16.00	14.50	4550511
200.00	-0.05 -0.17	220.00	+0.14 -0.14	16.00	14.50	4387611*
205.00	-0.05 -0.17	220.00	+0.14 -0.14	16.00	14.50	4762110
210.00	-0.05 -0.17	230.00	+0.14 -0.14	16.00	14.50	4472911
220.00	-0.05 -0.17	235.00	+0.14 -0.14	16.00	14.50	4759610
220.00	-0.05 -0.17	240.00	+0.14 -0.14	16.00	14.50	4544510*
225.00	-0.05 -0.17	240.00	+0.14 -0.14	16.00	14.50	4445811
225.00	-0.05 -0.17	250.00	+0.14 -0.14	20.00	18.00	4537511
230.00	-0.05 -0.17	247.00	+0.14 -0.14	16.00	14.50	4767710
230.00	-0.05 -0.17	249.30	+0.14 -0.14	16.00	14.50	4439411
230.00	-0.05 -0.17	250.00	+0.14 -0.14	16.00	14.50	4707210
230.00	-0.05 -0.17	255.00	+0.16 -0.16	25.00	22.80	4555511

**NOTE** Part numbers suffixed by "\*" indicate profiled NBR energiser



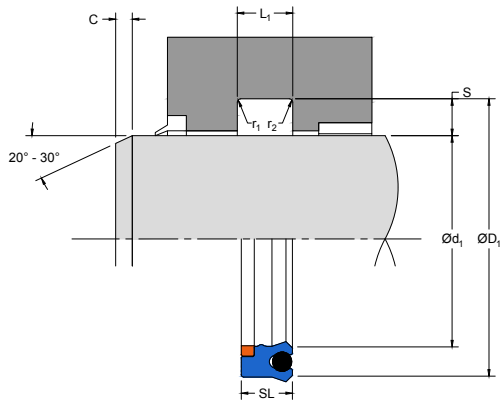
## PART NUMBER RANGE

METRIC						
Ød <sub>1</sub>	TOL f <sub>9</sub>	ØD <sub>1</sub>	TOL Js11	L <sub>1</sub> +0.25-0	SL	PART No.
235.00	-0.05 -0.17	255.00	+0.16 -0.16	16.00	14.50	4771410
240.00	-0.05 -0.17	260.00	+0.16 -0.16	16.00	14.50	4496511
245.00	-0.05 -0.17	270.00	+0.16 -0.16	20.00	18.00	4546711
250.00	-0.05 -0.17	270.00	+0.16 -0.16	16.00	14.50	4728810
255.00	-0.06 -0.19	275.00	+0.16 -0.16	16.00	14.50	4578611
260.00	-0.06 -0.19	280.00	+0.16 -0.16	18.00	16.40	4499011
265.00	-0.06 -0.19	285.00	+0.16 -0.16	16.00	14.50	4722110
275.00	-0.06 -0.19	295.00	+0.16 -0.16	16.00	14.50	4807310
280.00	-0.06 -0.19	300.00	+0.16 -0.16	16.00	14.50	4713910
285.00	-0.06 -0.19	305.00	+0.16 -0.16	18.00	16.40	4767810
285.00	-0.06 -0.19	310.00	+0.16 -0.16	20.00	18.00	4537611
290.00	-0.06 -0.19	310.00	+0.16 -0.16	18.00	16.40	4475111
290.00	-0.06 -0.19	315.00	+0.16 -0.16	20.00	18.00	4759410
295.00	-0.06 -0.19	315.00	+0.16 -0.16	18.00	16.40	4598211
300.00	-0.06 -0.19	320.00	+0.18 -0.18	16.00	14.50	4525110*
305.00	-0.06 -0.19	325.00	+0.18 -0.18	18.00	16.40	4473011
305.00	-0.06 -0.19	330.00	+0.18 -0.18	20.00	18.00	4546811

### NOTE

Part numbers suffixed by "\*" indicate profiled NBR energiser





# 652

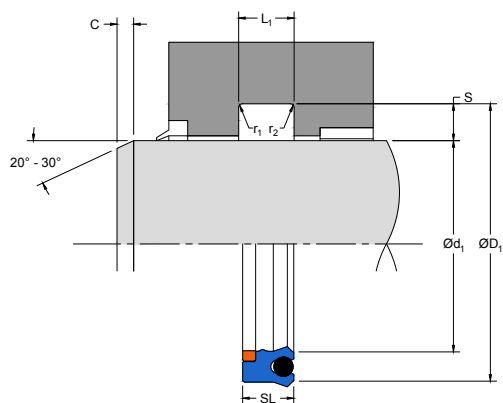
## ROD SEAL

*Polyurethane with AE Ring and Rubber Energiser  
for Heavy-Duty Applications*

### PART NUMBER RANGE

METRIC						
Ød <sub>1</sub>	TOL f <sub>9</sub>	ØD <sub>1</sub>	TOL Js <sub>11</sub>	L <sub>1</sub> +0.25-0	SL	PART No.
305.00	-0.06 -0.19	335.00	+0.18 -0.18	18.00	16.40	4721910
320.00	-0.06 -0.20	340.00	+0.18 -0.18	16.00	14.50	4544410*
320.00	-0.06 -0.20	340.00	+0.18 -0.18	18.00	16.40	4707310
325.00	-0.06 -0.20	355.00	+0.18 -0.18	20.00	18.00	4555711
330.00	-0.06 -0.20	350.00	+0.18 -0.18	18.00	16.40	4796710
335.00	-0.06 -0.20	355.00	+0.18 -0.18	18.00	16.40	4496611
335.00	-0.06 -0.20	360.00	+0.18 -0.18	20.00	18.00	4831710
340.00	-0.06 -0.20	360.00	+0.18 -0.18	20.50	18.50	4788110
340.00	-0.06 -0.20	365.00	+0.18 -0.18	20.00	18.00	4732810
350.00	-0.06 -0.20	375.00	+0.18 -0.18	20.00	18.00	4718010
355.00	-0.06 -0.20	380.00	+0.18 -0.18	20.00	18.00	4578411
360.00	-0.06 -0.20	385.00	+0.18 -0.18	20.00	18.00	4781110
370.00	-0.06 -0.20	395.00	+0.18 -0.18	20.00	18.00	4579710
380.00	-0.06 -0.20	405.00	+0.20 -0.20	20.00	18.00	4752010
390.00	-0.06 -0.20	415.00	+0.20 -0.20	20.00	18.00	4730010
395.00	-0.06 -0.20	420.00	+0.20 -0.20	20.00	18.00	4807110
400.00	-0.06 -0.20	425.00	+0.20 -0.20	20.00	18.00	4797210

**NOTE** Part numbers suffixed by "\*" indicate profiled NBR energiser



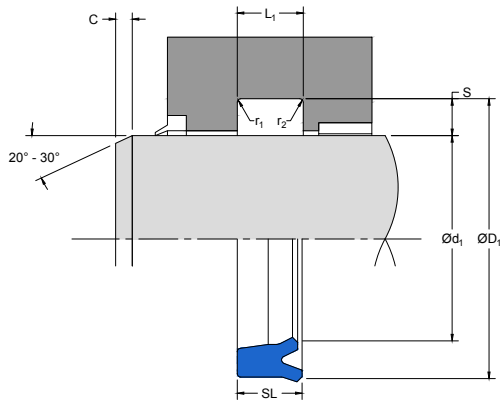
## PART NUMBER RANGE

METRIC						
$\varnothing d_1$	TOL f9	$\varnothing D_1$	TOL Js11	$L_1$ +0.25-0	SL	PART No.
410.00	-0.07 -0.22	435.00	+0.20 -0.20	20.00	18.00	4785110*
415.00	-0.07 -0.22	445.00	+0.20 -0.20	22.50	20.50	4820510
430.00	-0.07 -0.22	455.00	+0.20 -0.20	20.00	18.00	4862310
445.00	-0.07 -0.22	475.00	+0.20 -0.20	22.50	20.50	4838010
470.00	-0.07 -0.22	495.00	+0.20 -0.20	20.00	18.00	4814610
490.00	-0.07 -0.22	515.00	+0.22 -0.22	20.00	18.00	4888810

### NOTE

Part numbers suffixed by "\*" indicate profiled NBR energiser





# 663

## ROD SEAL

Single Lip  
Polyurethane

### DESIGN

The Hallite 663 is an asymmetric, single lip U-ring rod seal designed to provide a dry sealing solution in light and medium-duty applications and manufactured in Hythane® 181, Hallite's high-performance polyurethane, for easy installation and excellent low temperature performance. The seal can be considered for use in heavy-duty applications when used with a suitable full depth back-up ring.

The seal is a single lip modification of the well-established Hallite 605 profile and is ideal for applications that require a double-lipped wiper, such as the Hallite 839, Hallite 844, Hallite 846, or Hallite 864. The Hallite 663 is also offered in other high quality Hythane® materials to best fit the needs of the application.



### FEATURES

- Prevents pressure build up between seal and double-lipped wiper
- Robust design
- Excellent wear resistance
- Performs well over wide temperature range and is extremely effective in low temperatures
- Easy to install

### MATERIALS

This product comes in a number of material options to extend operating conditions. Contact your local Hallite technical team to decide which is best for your application. Use the part designator in the table below as the last digit of the part number to specify material choice when ordering. For further material details, please refer to the Hallite Material Table.

MATERIAL OPTIONS	Name	Type	Colour	Part Designator
Standard	Hythane® 181	TPU-EU	Blue	0
Optional	Hythane® 361	TPU-AU	Orange	6

## TECHNICAL DETAILS

OPERATING CONDITIONS	METRIC	INCH
Maximum Speed	1.0 m/sec	3.0 ft/sec
Temperature Range	-45°C +110°C	-50°F +230°F
Maximum Pressure	400 bar	6000 psi
Maximum Pressure with Backup Ring	700 bar	10000 psi

**NOTE**

Data given are maximum values and can apply depending on specific application. Maximum ratings of temperature, pressure, or operating speeds are dependent on fluid medium, surface, gap value, and other variables such as dynamic or static service. Maximum values are not intended for use together at the same time, e.g. max temperature and max pressure. Please contact your Hallite technical representative for application support.

**NOTE**

**Pressure Rating:** Can be extended with use of backup ring. Seek technical advice from local Hallite office.

MAXIMUM EXTRUSION GAP			
Pressure bar	160	250	400
Maximum Gap mm	0.60	0.50	0.40
Pressure psi	2400	3750	6000
Maximum Gap in	0.024	0.020	0.016

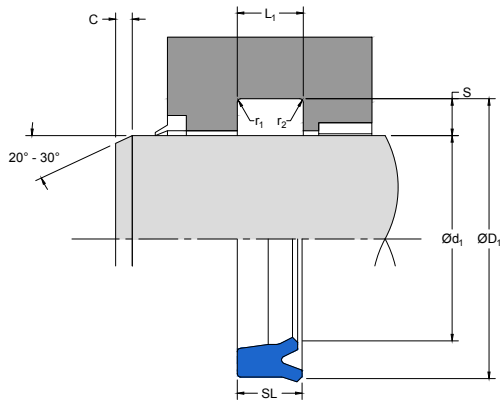
**NOTE**

Figures show the maximum permissible gap all on one side using minimum rod  $\varnothing$  and maximum clearance  $\varnothing$ . Refer to Housing Design section.

SURFACE ROUGHNESS	$\mu\text{mRa}$	$\mu\text{mRz}$	$\mu\text{mRt}$	$\mu\text{inRa}$	$\mu\text{inRz}$	$\mu\text{inRt}$
Dynamic Sealing Face $\varnothing d_1$	0.1 - 0.4	1.6 max	4 max	4 - 16	63 max	157 max
Static Sealing Face $\varnothing D_1$	1.6 max	6.3 max	10 max	63 max	250 max	394 max
Static Housing Faces $L_1$	3.2 max	10 max	16 max	125 max	394 max	630 max

CHAMFERS & RADII				
Groove Section $<S$ mm	4.00	5.00	7.50	10.00
Min Chamfer $C$ mm	3.00	3.50	5.00	6.50
Max Fillet Rad $r_1$ mm	0.20	0.40	0.80	0.80
Max Fillet Rad $r_2$ mm	0.40	0.80	1.20	1.20

TOLERANCES	$\varnothing d_1$	$\varnothing D_1$	$L_1$
mm	f9	Js11	+0.25 -0



# 663

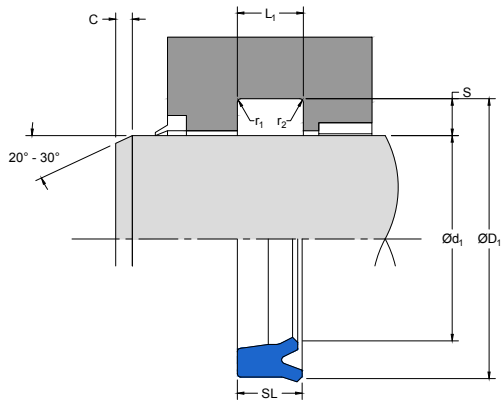
## ROD SEAL

Single Lip  
Polyurethane

### PART NUMBER RANGE

METRIC						
Ød <sub>1</sub>	TOL f <sub>9</sub>	ØD <sub>1</sub>	TOL Js11	SL	L <sub>1</sub> +0.25-0	PART No.
12.00	-0.02 -0.06	22.00	+0.07 -0.07	7.30	8.00	4865100‡
14.00	-0.02 -0.06	24.00	+0.07 -0.07	8.20	9.00	4865200
16.00	-0.02 -0.06	24.00	+0.07 -0.07	5.70	6.30	4789300‡
16.00	-0.02 -0.06	26.00	+0.07 -0.07	7.30	8.00	4865300‡
18.00	-0.02 -0.06	26.00	+0.07 -0.07	5.70	6.30	4789400‡
20.00	-0.02 -0.07	28.00	+0.07 -0.07	5.70	6.30	4827400‡
20.00	-0.02 -0.07	30.00	+0.07 -0.07	7.30	8.00	4865400‡
22.00	-0.02 -0.07	32.00	+0.08 -0.08	7.30	8.00	4865500‡
24.00	-0.02 -0.07	34.00	+0.08 -0.08	7.80	8.50	4764500
25.00	-0.02 -0.07	31.00	+0.08 -0.08	4.90	5.35	4799600
25.00	-0.02 -0.07	33.00	+0.08 -0.08	5.70	6.30	4789500‡
25.00	-0.02 -0.07	35.00	+0.08 -0.08	7.30	8.00	4865600‡
25.00	-0.02 -0.07	40.00	+0.08 -0.08	10.00	11.00	4865700
26.00	-0.02 -0.07	36.00	+0.08 -0.08	10.00	11.00	4726000
28.00	-0.02 -0.07	36.00	+0.08 -0.08	5.70	6.30	4789600
30.00	-0.02 -0.07	38.00	+0.08 -0.08	5.70	6.30	4830400
30.00	-0.02 -0.07	38.00	+0.08 -0.08	8.20	9.00	4789700

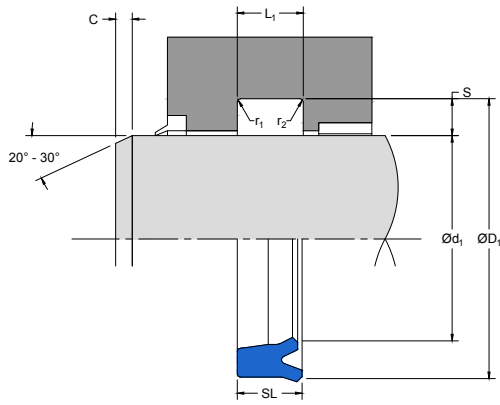
**NOTE** Part numbers suffixed by "‡" indicate housing sizes to meet ISO 5597.



## PART NUMBER RANGE

METRIC						
Ød <sub>1</sub>	TOL f <sub>9</sub>	ØD <sub>1</sub>	TOL Js11	SL	L <sub>1</sub> +0.25-0	PART No.
30.00	-0.02 -0.07	40.00	+0.08 -0.08	7.30	8.00	4816700
30.00	-0.02 -0.07	40.00	+0.08 -0.08	10.00	11.00	4811800
30.00	-0.02 -0.07	45.00	+0.08 -0.08	10.00	11.00	4865800
32.00	-0.03 -0.09	40.00	+0.08 -0.08	5.70	6.30	4827500
32.00	-0.03 -0.09	42.00	+0.08 -0.08	7.30	8.00	4865900‡
35.00	-0.03 -0.09	43.00	+0.08 -0.08	5.70	6.30	4789800
35.00	-0.03 -0.09	45.00	+0.08 -0.08	7.30	8.00	4816800
35.00	-0.03 -0.09	45.00	+0.08 -0.08	10.00	11.00	4816100
36.00	-0.03 -0.09	44.00	+0.08 -0.08	5.80	6.30	4859600
36.00	-0.03 -0.09	44.00	+0.08 -0.08	8.20	9.00	4726200
36.00	-0.03 -0.09	46.00	+0.08 -0.08	7.30	8.00	4866000‡
40.00	-0.03 -0.09	48.00	+0.08 -0.08	5.70	6.30	4789900
40.00	-0.03 -0.09	48.00	+0.08 -0.08	8.20	9.00	4790000
40.00	-0.03 -0.09	50.00	+0.08 -0.08	7.30	8.00	4806300‡
40.00	-0.03 -0.09	50.00	+0.08 -0.08	8.20	9.00	4790100
40.00	-0.03 -0.09	50.00	+0.08 -0.08	10.00	11.00	4553400
45.00	-0.03 -0.09	53.00	+0.10 -0.10	8.20	9.00	4838900

**NOTE** Part numbers suffixed by “‡” indicate housing sizes to meet ISO 5597.



# 663

## ROD SEAL

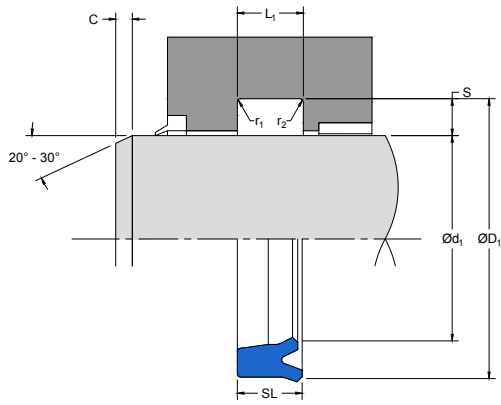
Single Lip  
Polyurethane

### PART NUMBER RANGE

METRIC						
Ød <sub>1</sub>	TOL f <sub>9</sub>	ØD <sub>1</sub>	TOL Js11	SL	L <sub>1</sub> +0.25-0	PART No.
45.00	-0.03 -0.09	55.00	+0.10 -0.10	7.30	8.00	4790200‡
45.00	-0.03 -0.09	55.00	+0.10 -0.10	10.00	11.00	4726300
50.00	-0.03 -0.09	57.00	+0.10 -0.10	9.00	10.00	4787400
50.00	-0.03 -0.09	58.00	+0.10 -0.10	8.20	9.00	4790300
50.00	-0.03 -0.09	60.00	+0.10 -0.10	7.30	8.00	4726400‡
50.00	-0.03 -0.09	60.00	+0.10 -0.10	10.00	11.00	4814400
50.00	-0.03 -0.09	65.00	+0.10 -0.10	11.40	12.50	4806400‡
54.00	-0.03 -0.10	64.00	+0.10 -0.10	10.00	11.00	4868700
55.00	-0.03 -0.10	65.00	+0.10 -0.10	10.00	11.00	4798900
55.00	-0.03 -0.10	67.00	+0.10 -0.10	10.00	11.00	4793800
56.00	-0.03 -0.10	66.00	+0.10 -0.10	10.00	11.00	4726500
60.00	-0.03 -0.10	68.00	+0.10 -0.10	8.20	9.00	4816900
60.00	-0.03 -0.10	70.00	+0.10 -0.10	7.30	8.00	4822600
60.00	-0.03 -0.10	70.00	+0.10 -0.10	10.00	11.00	4726600
60.00	-0.03 -0.10	70.00	+0.10 -0.10	11.80	13.00	4885700
60.00	-0.03 -0.10	75.00	+0.10 -0.10	11.40	12.50	4806500
63.00	-0.03 -0.10	73.00	+0.10 -0.10	7.30	8.00	4877600

#### NOTE

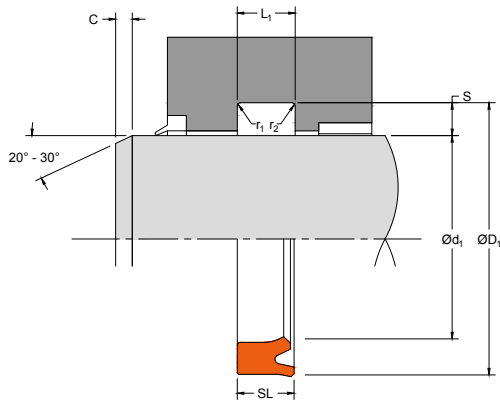
Part numbers suffixed by "‡" indicate housing sizes to meet ISO 5597.



**PART NUMBER RANGE**

METRIC						
Ød <sub>1</sub>	TOL f <sub>9</sub>	ØD <sub>1</sub>	TOL Js11	SL	L <sub>1</sub> +0.25-0	PART No.
65.00	-0.03 -0.10	75.00	+0.10 -0.10	11.80	13.00	4790400
65.00	-0.03 -0.10	80.00	+0.10 -0.10	11.40	13.00	4726700
70.00	-0.03 -0.10	85.00	+0.11 -0.11	11.40	13.00	4790500
75.00	-0.03 -0.10	85.00	+0.11 -0.11	11.80	13.00	4726800
75.00	-0.03 -0.10	95.00	+0.11 -0.11	14.50	16.00	4809000
80.00	-0.03 -0.10	90.00	+0.11 -0.11	11.80	13.00	4761400
80.00	-0.03 -0.10	100.00	+0.11 -0.11	14.50	16.00	4806600‡
85.00	-0.04 -0.12	97.00	+0.11 -0.11	8.70	9.60	4870100
85.00	-0.04 -0.12	100.00	+0.11 -0.11	11.80	13.00	4806700
100.00	-0.04 -0.12	115.00	+0.11 -0.11	11.80	13.00	4837400

**NOTE** Part numbers suffixed by "‡" indicate housing sizes to meet ISO 5597.



# 673

## ROD SEAL

Single Lip  
Polyurethane

### DESIGN

The Hallite 673 is an asymmetric, single lip U-ring rod seal designed to provide a dry sealing solution in light and medium-duty applications. The seal can be considered for use in heavy-duty applications when used with a suitable full depth back-up ring. The seal profile has been developed to minimise friction and improve back pumping capability when used with a double-lipped wiper such as Hallite 839N, 844, and 864.

The standard material for the the Hallite 673 is Hythane® 591 which we recommend for heavier duty and earthmoving applications. As alternative, the seal is available in Hythane® 181 for easy installation and excellent low temperature performance.

The seal is ideal for applications that require a double-lipped wiper, such as the Hallite 839, Hallite 844, or Hallite 864.



### FEATURES

- Good back pumping capability prevents pressure build up between seal and double-lipped wiper
- Robust design
- Low friction
- Excellent wear resistance
- Performs well over wide temperature range and is extremely effective in low temperatures
- Easy to install

### MATERIALS

This product comes in a number of material options to extend operating conditions. Contact your local Hallite technical team to decide which is best for your application. Use the part designator in the table below as the last digit of the part number to specify material choice when ordering. For further material details, please refer to the Hallite Material Table.

MATERIAL OPTIONS	Name	Type	Colour	Part Designator
Standard	Hythane® 591	TPU-AU	Orange	8
Optional	Hythane® 181	TPU-EU	Blue	0



## TECHNICAL DETAILS

OPERATING CONDITIONS	METRIC	INCH
Maximum Speed	1.0 m/sec	3.0 ft/sec
Temperature Range	-45°C +110°C	-50°F +230°F
Maximum Pressure	400 bar	6000 psi
Maximum Pressure with Backup Ring	700 bar	10000 psi

**NOTE**

Data given are maximum values and can apply depending on specific application. Maximum ratings of temperature, pressure, or operating speeds are dependent on fluid medium, surface, gap value, and other variables such as dynamic or static service. Maximum values are not intended for use together at the same time, e.g. max temperature and max pressure. Please contact your Hallite technical representative for application support.

**NOTE**

**Pressure Rating:** Can be extended with use of backup ring. Seek technical advice from local Hallite office.

MAXIMUM EXTRUSION GAP			
Pressure bar	160	250	400
Maximum Gap mm	0.60	0.50	0.40
Pressure psi	2400	3750	6000
Maximum Gap in	0.024	0.020	0.016

**NOTE**

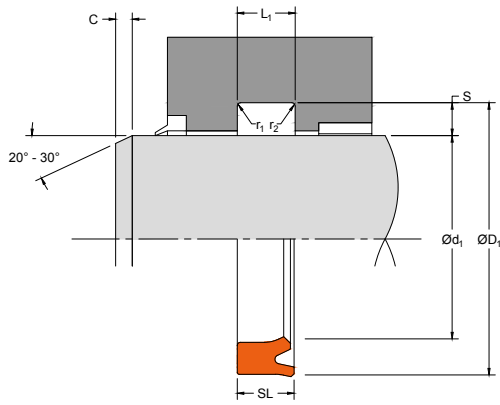
Figures show the maximum permissible gap all on one side using minimum rod  $\varnothing$  and maximum clearance  $\varnothing$ . Refer to Housing Design section.

SURFACE ROUGHNESS	$\mu\text{mRa}$	$\mu\text{mRz}$	$\mu\text{mRt}$	$\mu\text{inRa}$	$\mu\text{inRz}$	$\mu\text{inRt}$
Dynamic Sealing Face $\varnothing d_1$	0.1 - 0.4	1.6 max	4 max	4 - 16	63 max	157 max
Static Sealing Face $\varnothing D_1$	1.6 max	6.3 max	10 max	63 max	250 max	394 max
Static Housing Faces $L_1$	3.2 max	10 max	16 max	125 max	394 max	630 max

CHAMFERS & RADII				
Groove Section $<S$ mm	4.00	5.00	7.50	10.00
Min Chamfer $C$ mm	3.00	3.50	5.00	6.50
Max Fillet Rad $r_1$ mm	0.20	0.40	0.80	0.80
Max Fillet Rad $r_2$ mm	0.40	0.80	1.20	1.20

TOLERANCES	$\varnothing d_1$	$\varnothing D_1$	$L_1$
mm	f9	Js11	+0.25 -0





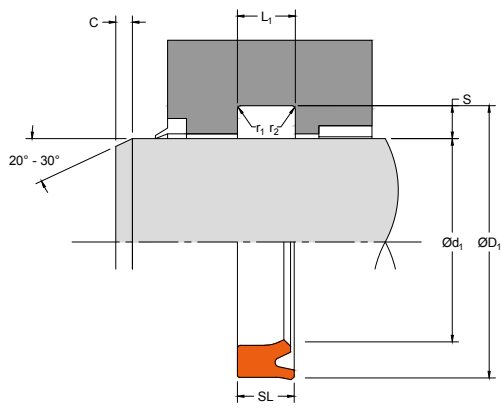
# 673

## ROD SEAL

Single Lip  
Polyurethane

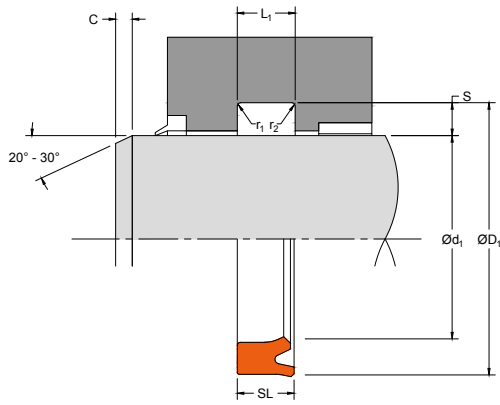
### PART NUMBER RANGE

METRIC						
Ød <sub>1</sub>	TOL f9	ØD <sub>1</sub>	TOL Js11	SL	L <sub>1</sub> +0.25-0	PART No.
30.00	-0.02 -0.07	43.00	+0.08 -0.08	10.00	11.00	4622108
30.00	-0.02 -0.07	45.00	+0.08 -0.08	10.00	11.00	4622208
32.00	-0.03 -0.09	42.00	+0.08 -0.08	6.00	7.00	4622308
35.00	-0.03 -0.09	45.00	+0.08 -0.08	6.00	7.00	4622408
35.00	-0.03 -0.09	50.00	+0.08 -0.08	10.00	11.00	4622508
40.00	-0.03 -0.09	50.00	+0.08 -0.08	6.00	7.00	4622608
40.00	-0.03 -0.09	50.00	+0.08 -0.08	9.00	10.00	4622708
40.00	-0.03 -0.09	55.00	+0.10 -0.10	10.00	11.00	4622808
45.00	-0.03 -0.09	55.00	+0.10 -0.10	6.00	7.00	4622908
50.00	-0.03 -0.09	60.00	+0.10 -0.10	8.00	9.00	4623008
50.00	-0.03 -0.09	63.00	+0.10 -0.10	9.00	10.00	4623108
50.00	-0.03 -0.09	65.00	+0.10 -0.10	10.00	11.00	4623208
55.00	-0.03 -0.10	65.00	+0.10 -0.10	8.00	9.00	4623508
55.00	-0.03 -0.10	68.00	+0.10 -0.10	10.00	11.00	4623608
55.00	-0.03 -0.10	70.00	+0.10 -0.10	9.00	10.00	4623708
55.00	-0.03 -0.10	70.00	+0.10 -0.10	10.00	11.00	4623808
60.00	-0.03 -0.10	73.00	+0.10 -0.10	10.00	11.00	4623908
60.00	-0.03 -0.10	75.00	+0.10 -0.10	9.00	10.00	4624008



**PART NUMBER RANGE**

METRIC						
Ød <sub>1</sub>	TOL f <sub>9</sub>	ØD <sub>1</sub>	TOL Js <sub>11</sub>	SL	L <sub>1</sub> +0.25-0	PART No.
60.00	-0.03 -0.10	75.00	+0.10 -0.10	10.00	11.00	4624108
63.00	-0.03 -0.10	78.00	+0.10 -0.10	10.00	11.00	4623408
65.00	-0.03 -0.10	78.00	+0.10 -0.10	10.00	11.00	4624208
65.00	-0.03 -0.10	80.00	+0.10 -0.10	9.00	10.00	4624308
65.00	-0.03 -0.10	80.00	+0.10 -0.10	10.00	11.00	4624408
70.00	-0.03 -0.10	83.00	+0.11 -0.11	10.00	11.00	4624508
70.00	-0.03 -0.10	85.00	+0.11 -0.11	9.00	10.00	4624608
75.00	-0.03 -0.10	88.00	+0.11 -0.11	10.00	11.00	4624708
75.00	-0.03 -0.10	90.00	+0.11 -0.11	9.00	10.00	4624808
75.00	-0.03 -0.10	90.00	+0.11 -0.11	10.00	11.00	4624908
80.00	-0.03 -0.10	93.00	+0.11 -0.11	10.00	11.00	4626508
80.00	-0.03 -0.10	95.00	+0.11 -0.11	9.00	10.00	4626608
80.00	-0.03 -0.10	95.00	+0.11 -0.11	10.00	11.00	4626708
80.00	-0.03 -0.10	100.00	+0.11 -0.11	12.00	13.00	4626808
85.00	-0.04 -0.12	100.00	+0.11 -0.11	9.00	10.00	4626908
85.00	-0.04 -0.12	100.00	+0.11 -0.11	10.00	11.00	4627008
85.00	-0.04 -0.12	105.00	+0.11 -0.11	12.00	13.00	4627108
90.00	-0.04 -0.12	105.00	+0.11 -0.11	9.00	10.00	4627208



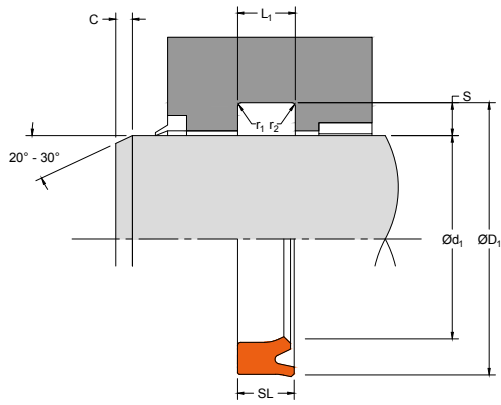
# 673

## ROD SEAL

Single Lip  
Polyurethane

### PART NUMBER RANGE

METRIC						
Ød <sub>1</sub>	TOL f9	ØD <sub>1</sub>	TOL Js11	SL	L <sub>1</sub> +0.25-0	PART No.
90.00	-0.04 -0.12	105.00	+0.11 -0.11	10.00	11.00	4627308
90.00	-0.04 -0.12	110.00	+0.11 -0.11	12.00	13.00	4627408
95.00	-0.04 -0.12	110.00	+0.11 -0.11	9.00	10.00	4627508
95.00	-0.04 -0.12	110.00	+0.11 -0.11	10.00	11.00	4627608
95.00	-0.04 -0.12	115.00	+0.11 -0.11	12.00	13.00	4627708
100.00	-0.04 -0.12	115.00	+0.11 -0.11	9.00	10.00	4627808
100.00	-0.04 -0.12	115.00	+0.11 -0.11	10.00	11.00	4627908
100.00	-0.04 -0.12	120.00	+0.11 -0.11	12.00	13.00	4628008
105.00	-0.04 -0.12	120.00	+0.11 -0.11	9.00	10.00	4628108
105.00	-0.04 -0.12	120.00	+0.11 -0.11	10.00	11.00	4628208
105.00	-0.04 -0.12	125.00	+0.13 -0.13	12.00	13.00	4628308
110.00	-0.04 -0.12	125.00	+0.13 -0.13	9.00	10.00	4628408
110.00	-0.04 -0.12	125.00	+0.13 -0.13	10.00	11.00	4628508
110.00	-0.04 -0.12	130.00	+0.13 -0.13	12.00	13.00	4628608
115.00	-0.04 -0.12	130.00	+0.13 -0.13	9.00	10.00	4628708
115.00	-0.04 -0.12	135.00	+0.13 -0.13	12.00	13.00	4628808
115.00	-0.04 -0.12	135.00	+0.13 -0.13	15.00	16.00	4628908
120.00	-0.04 -0.12	135.00	+0.13 -0.13	9.00	10.00	4623308

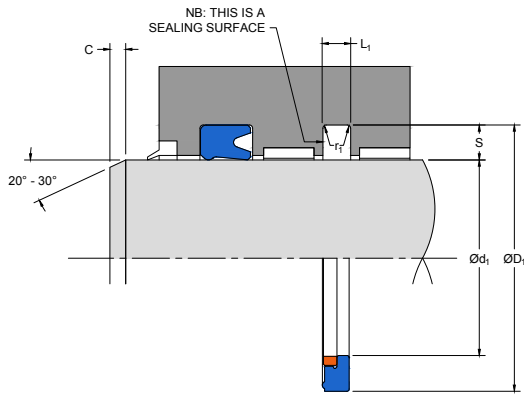


**PART NUMBER RANGE**

METRIC						
Ød <sub>1</sub>	TOL f <sub>9</sub>	ØD <sub>1</sub>	TOL Js11	SL	L <sub>1</sub> +0.25-0	PART No.
120.00	-0.04 -0.12	140.00	+0.13 -0.13	12.00	13.00	4629008
125.00	-0.04 -0.14	145.00	+0.13 -0.13	12.00	13.00	4629108
130.00	-0.04 -0.14	150.00	+0.13 -0.13	16.00	17.00	4629208

# ROD BUFFER SEALS





# 653

## ROD BUFFER SEAL

*Single-Acting  
Polyurethane with AE Ring*

### DESIGN

The Hallite 653 single-acting rod buffer seal is designed to be used in conjunction with a high-performance rod seal, such as the Hallite 605 and 621, to protect the primary seal from shock pressure loading and high frequency pressure spikes in the hydraulic system. The design allows oil to pass through to the rod seal while holding back pressure spikes. The Hallite 653 is a patented product (European patent no. 0427554B1; U.S.A. patent no. 5088747) that also allows pressure to pass back into the system preventing a pressure trap between the rod seal and the buffer seal. The Hallite 653 is an excellent pressure buffer option in heavy-duty applications and offers extended sealing system life and performance.

The Hallite 653 is also interchangeable with common PTFE buffer seal housings.

The Hallite 653 is moulded in Hythane® 181, Hallite's high-performance polyurethane, for easy installation and excellent low temperature performance. The Hallite 653 is also offered in a number of other high-performance polyurethanes, such as the Hythane® 361.

The design also incorporates a polyacetal anti-extrusion ring to provide maximum extrusion resistance against shock pressure loads.



### FEATURES

- Prevents inter-seal pressure build up
- Interchangeable with common PTFE buffer seal housings
- Excellent temperature range
- Long seal life
- Easy to install

### MATERIALS

This product comes in a number of material options to extend operating conditions. Contact your local Hallite technical team to decide which is best for your application. Use the part designator in the table below as the last digit of the part number to specify material choice when ordering. For further material details, please refer to the Hallite Material Table.

MATERIAL OPTIONS	Name	Seal Type	Seal Colour	Part Designator
Standard	Hythane® 181-POM	TPU-EU	Blue	0
Optional	Hythane® 361-POM	TPU-AU	Orange	6

## TECHNICAL DETAILS

OPERATING CONDITIONS	METRIC	INCH
Maximum Speed	1.0 m/sec	3.0 ft/sec
Temperature Range	-45°C +110°C	-50°F +230°F
Maximum Pressure	700 bar	10000 psi

### NOTE

Data given are maximum values and can apply depending on specific application. Maximum ratings of temperature, pressure, or operating speeds are dependent on fluid medium, surface, gap value, and other variables such as dynamic or static service. Maximum values are not intended for use together at the same time, e.g. max temperature and max pressure. Please contact your Hallite technical representative for application support.

MAXIMUM EXTRUSION GAP					
Pressure bar	160	250	400	500	700
Maximum Gap (S≤6 mm)	0.60	0.50	0.40	0.30	0.20
Maximum Gap (S>6 mm)	1.00	0.80	0.60	0.40	0.25
Pressure psi	2400	3750	6000	7500	10000
Maximum Gap (S≤0.250 in)	0.024	0.020	0.016	0.012	0.008
Maximum Gap (S>0.250 in)	0.040	0.032	0.024	0.016	0.010

### NOTE

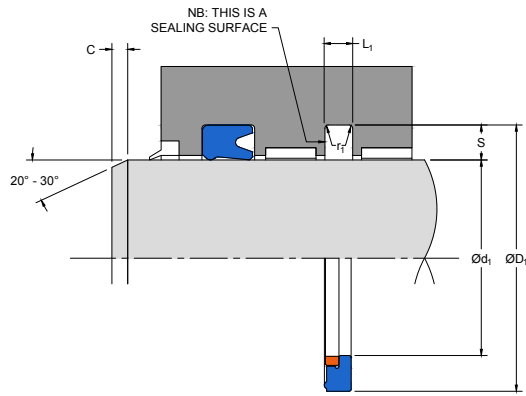
Figures show the maximum permissible gap all on one side, for rod seals using minimum rod  $\varnothing$  and maximum clearance  $\varnothing$  and for piston seals using the minimum clearance  $\varnothing$  and maximum bore  $\varnothing$ . Refer to Housing Design section.

SURFACE ROUGHNESS	$\mu\text{mRa}$	$\mu\text{mRz}$	$\mu\text{mRt}$	$\mu\text{inRa}$	$\mu\text{inRz}$	$\mu\text{inRt}$
Dynamic Sealing Face $\varnothing d_1$	0.1 - 0.4	1.6 max	4 max	4 - 16	63 max	157 max
Static Sealing Face $L_1$	1.6 max	6.3 max	10 max	63 max	250 max	394 max
Static Housing Faces $\varnothing D_1, L_1$	3.2 max	10 max	16 max	125 max	394 max	630 max

CHAMFERS & RADII				
Groove Section <S mm	3.75	5.50	7.75	10.50
Min Chamfer C mm	3.00	3.50	5.00	7.50
Max Fillet Rad $r_1$ mm	0.50	0.70	1.20	1.60
Groove Section <S in	0.150	0.215	0.306	0.413
Min Chamfer C in	0.125	0.140	0.200	0.300
Max Fillet Rad $r_1$ in	0.020	0.028	0.047	0.062

TOLERANCES	$\varnothing d_1$	$\varnothing D_1$	$L_1$
mm	f9	H10	+0.25 -0
in	f9	Js11	+0.010 -0





# 653

## ROD BUFFER SEAL

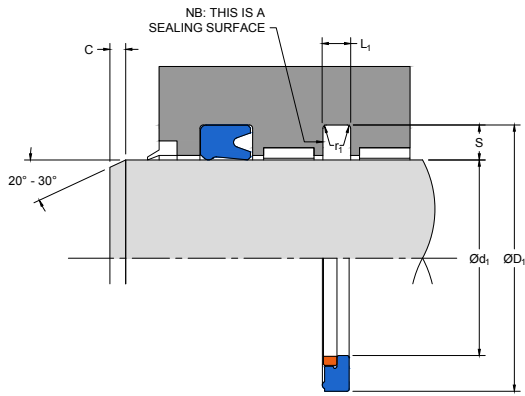
*Single-Acting  
Polyurethane with AE Ring*

### PART NUMBER RANGE

METRIC					
Ød <sub>1</sub>	TOL f <sub>9</sub>	ØD <sub>1</sub>	TOL H10	L <sub>1</sub> +0.25-0	PART No.
40.00	-0.03 -0.09	55.50	+0.12 0.00	6.30	4772710
45.00	-0.03 -0.09	56.00	+0.12 0.00	4.20	4575510‡
45.00	-0.03 -0.09	60.50	+0.12 0.00	6.30	4772810
50.00	-0.03 -0.09	65.50	+0.12 0.00	6.30	4403210
55.00	-0.03 -0.10	70.50	+0.12 0.00	6.30	4403310
60.00	-0.03 -0.10	75.50	+0.12 0.00	6.30	4403410
63.00	-0.03 -0.10	78.50	+0.12 0.00	6.30	4751110‡
65.00	-0.03 -0.10	80.50	+0.14 0.00	6.30	4742110
70.00	-0.03 -0.10	85.50	+0.14 0.00	6.30	4742310‡
75.00	-0.03 -0.10	90.50	+0.14 0.00	6.30	4742410
80.00	-0.03 -0.10	95.50	+0.14 0.00	6.30	4742510‡
85.00	-0.04 -0.12	100.50	+0.14 0.00	6.30	4742610
90.00	-0.04 -0.12	105.50	+0.14 0.00	6.30	4523710‡
95.00	-0.04 -0.12	110.50	+0.14 0.00	6.30	4742810
100.00	-0.04 -0.12	115.50	+0.14 0.00	6.30	4742910‡
110.00	-0.04 -0.12	125.50	+0.16 0.00	6.30	4743010‡
124.00	-0.04 -0.14	139.50	+0.16 0.00	6.30	4824710

#### NOTE

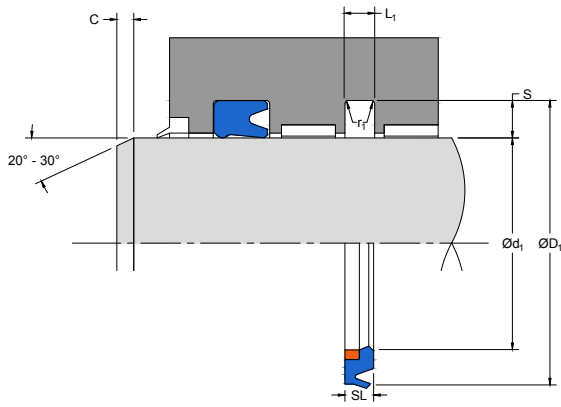
Part numbers suffixed by "‡" indicate housing sizes to meet ISO 7425-2.



## PART NUMBER RANGE

METRIC					
Ød <sub>1</sub>	TOL f9	ØD <sub>1</sub>	TOL H10	L <sub>1</sub> +0.25-0	PART No.
125.00	-0.04 -0.14	140.50	+0.16 0.00	6.30	4824810‡
130.00	-0.04 -0.14	145.50	+0.16 0.00	6.30	4830210
135.00	-0.04 -0.14	150.50	+0.16 0.00	6.30	4824910
140.00	-0.04 -0.14	155.50	+0.16 0.00	6.30	4770810‡
150.00	-0.04 -0.14	165.50	+0.16 0.00	6.30	4825010
150.00	-0.04 -0.14	170.00	+0.16 0.00	10.00	4804110
155.00	-0.04 -0.14	170.50	+0.16 0.00	6.30	4825110
160.00	-0.04 -0.14	175.50	+0.16 0.00	6.30	4825210‡
170.00	-0.04 -0.14	185.50	+0.19 0.00	6.30	4820210
180.00	-0.04 -0.14	195.50	+0.19 0.00	6.30	4804010‡
215.00	-0.05 -0.17	236.00	+0.19 0.00	8.10	4705710

**NOTE** Part numbers suffixed by "‡" indicate housing sizes to meet ISO 7425-2.



# 660

## ROD BUFFER SEAL

*Polyurethane with AE Ring*

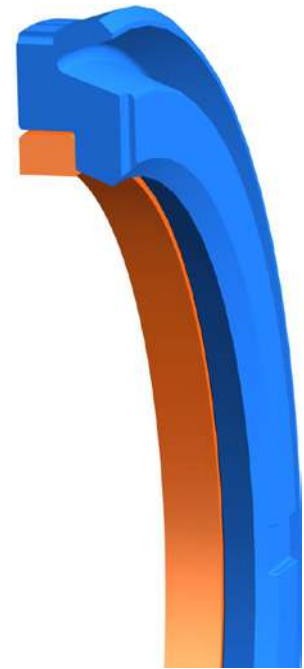
### DESIGN

The Hallite 660 single-acting rod buffer seal is designed to be used in conjunction with high-performance rod seal, such as the Hallite 605, 663, or 673, to protect the primary seal from shock pressure loading and high frequency pressure spikes in the hydraulic system. The design allows oil to pass through to the rod seal while holding back pressure spikes. The Hallite 660 design also allows pressure to pass back into the system preventing a pressure trap between the rod seal and the buffer seal. The Hallite 660 is an excellent pressure buffer option in heavy-duty applications and offers extended sealing system life and performance.

The Hallite 660 is also interchangeable with common PTFE buffer seal housings.

The Hallite 660 is moulded in Hythane® 181, Hallite's high-performance polyurethane, for easy installation and excellent low temperature performance.

The design also incorporates a polyacetal anti-extrusion ring to provide maximum extrusion resistance against shock pressure loads.



### FEATURES

- Self-energised by pressure spikes to protect primary seal
- Prevents inter-seal pressure build up
- Interchangeable with common PTFE buffer seal housings
- Excellent temperature range
- Long seal life
- Easy to install

### MATERIALS

This product comes in a number of material options to extend operating conditions. Contact your local Hallite technical team to decide which is best for your application. Use the part designator in the table below as the last digit of the part number to specify material choice when ordering. For further material details, please refer to the Hallite Material Table.

MATERIAL OPTIONS	Name	Seal Type	Seal Colour	Part Designator
Standard	Hythane® 181-POM	TPU-EU	Blue	0
Optional	Hythane® 591-POM	TPU-AU	Orange	8

## TECHNICAL DETAILS

OPERATING CONDITIONS	METRIC	INCH
Maximum Speed	1.0 m/sec	3.0 ft/sec
Temperature Range	-45°C +110°C	-50°F +230°F
Maximum Pressure	700 bar	10000 psi

**NOTE**

Data given are maximum values and can apply depending on specific application. Maximum ratings of temperature, pressure, or operating speeds are dependent on fluid medium, surface, gap value, and other variables such as dynamic or static service. Maximum values are not intended for use together at the same time, e.g. max temperature and max pressure. Please contact your Hallite technical representative for application support.

MAXIMUM EXTRUSION GAP					
Pressure bar	160	250	400	500	700
Maximum Gap (S≤6 mm)	0.60	0.50	0.40	0.30	0.20
Maximum Gap (S>6 mm)	1.00	0.80	0.60	0.40	0.25

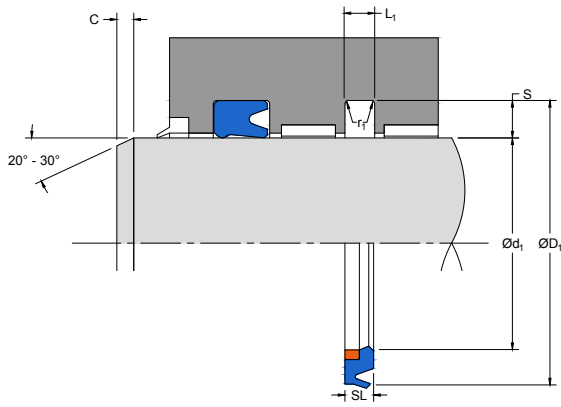
**NOTE**

Figures show the maximum permissible gap all on one side, for rod seals using minimum rod  $\varnothing$  and maximum clearance  $\varnothing$  and for piston seals using the minimum clearance  $\varnothing$  and maximum bore  $\varnothing$ . Refer to Housing Design section.

SURFACE ROUGHNESS	$\mu\text{mRa}$	$\mu\text{mRz}$	$\mu\text{mRt}$	$\mu\text{inRa}$	$\mu\text{inRz}$	$\mu\text{inRt}$
Dynamic Sealing Face $\varnothing d_1$	0.1 - 0.4	1.6 max	4 max	4 - 16	63 max	157 max
Static Sealing Face $\varnothing D_1$	1.6 max	6.3 max	10 max	63 max	250 max	394 max
Static Housing Faces $L_1$	3.2 max	10 max	16 max	125 max	394 max	630 max

RADII				
Groove Section <S mm	3.75	5.50	7.75	10.50
Min Chamfer C mm	3.00	3.50	5.00	7.50
Max Fillet Rad $r_1$ mm	0.50	0.70	1.20	1.60

TOLERANCES	$\varnothing d_1$	$\varnothing D_1$	$L_1$
mm	f9	H10	+0.25 -0



# 660

## ROD BUFFER SEAL

*Polyurethane with AE Ring*

### PART NUMBER RANGE

METRIC					
Ød <sub>1</sub>	TOL f <sub>9</sub>	ØD <sub>1</sub>	TOL H10	L <sub>1</sub> +0.25-0	PART No.
40.00	-0.03 -0.09	55.50	+0.12 0.00	6.30	4634310
50.00	-0.03 -0.09	65.50	+0.12 0.00	6.30	4649610
55.00	-0.03 -0.10	70.50	+0.12 0.00	6.30	4634410
60.00	-0.03 -0.10	75.50	+0.12 0.00	6.30	4634510
65.00	-0.03 -0.10	80.50	+0.14 0.00	6.30	4634610
70.00	-0.03 -0.10	85.50	+0.14 0.00	6.30	4634710‡
75.00	-0.03 -0.10	90.50	+0.14 0.00	6.30	4634810
80.00	-0.03 -0.10	95.50	+0.14 0.00	6.30	4634910‡
85.00	-0.04 -0.12	100.50	+0.14 0.00	6.30	4635010
90.00	-0.04 -0.12	105.50	+0.14 0.00	6.30	4635110‡
95.00	-0.04 -0.12	110.50	+0.14 0.00	6.30	4635210
100.00	-0.04 -0.12	115.50	+0.14 0.00	6.30	4635310‡
105.00	-0.04 -0.12	120.50	+0.16 0.00	6.30	4635410
110.00	-0.04 -0.12	125.50	+0.16 0.00	6.30	4635510‡
115.00	-0.04 -0.12	130.50	+0.16 0.00	6.30	4635610
120.00	-0.04 -0.12	135.50	+0.16 0.00	6.30	4635710
125.00	-0.04 -0.14	140.50	+0.16 0.00	6.30	4635810‡
130.00	-0.04 -0.14	145.50	+0.16 0.00	6.30	4635910

**NOTE**

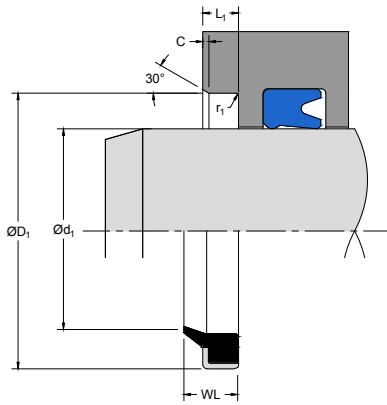
Part numbers suffixed by ‡ indicate housing sizes to meet ISO 7425-2.



# WIPERS







# 37

## WIPER

*Single-Lipped  
NBR, Metal-Cased*

### DESIGN

The Hallite 37 single-lipped, metal-cased wiper is designed to press fit into open groove housings for light and medium-duty applications.

The precision trimmed nitrile (NBR) wiping element is securely bonded to a metal case treated to inhibit rust. The proportions of the NBR wiping lip follow the side movement of the rod to clear away the deposited dirt.

The Hallite 37 is offered in a range of sizes suitable for ISO 6195 Type B housings.

For heavier duty applications, Hallite would recommend using the Hallite 860 single-lipped, metal-cased polyurethane wiper.



### FEATURES

- Precision trimmed wiping lip
- Metal case treated with rust inhibitor
- Sharp wiping lip scrapes removes contamination
- Wide range of application uses

## TECHNICAL DETAILS

OPERATING CONDITIONS	METRIC	INCH
Maximum Speed	1.0 m/sec	3.0 ft/sec
Temperature Range	-30°C +100°C	-22°F +212°F

## NOTE

Not designed to scrape ice

## NOTE

Data given are maximum values and can apply depending on specific application. Maximum ratings of temperature, pressure, or operating speeds are dependent on fluid medium, surface, gap value, and other variables such as dynamic or static service. Maximum values are not intended for use together at the same time, e.g. max temperature and max pressure. Please contact your Hallite technical representative for application support.

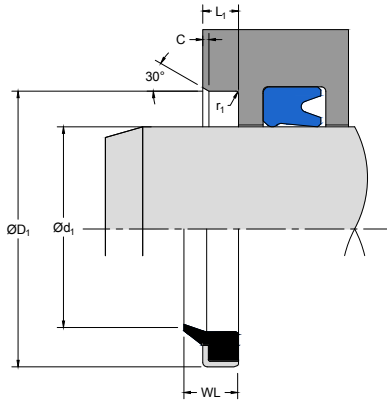
SURFACE ROUGHNESS	$\mu\text{mRa}$	$\mu\text{mRz}$	$\mu\text{mRt}$	$\mu\text{inRa}$	$\mu\text{inRz}$	$\mu\text{inRt}$
Dynamic Sealing Face $\varnothing d_1$	0.1 - 0.4	1.6 max	4 max	4 - 16	63 max	157 max
Static Sealing Face $\varnothing D_1$	1.6 max	6.3 max	10 max	63 max	250 max	394 max
Static Housing Faces $L_1$	3.2 max	10 max	16 max	125 max	394 max	630 max

RADII		
Rod Diameter $\varnothing d_1$	$\leq 19$	$\geq 19$
Min Chamfer C	0.50	1.00
Max Fillet Rad $r_1$	1.00	1.00

## NOTE

Assembly chamfers are governed by the associated rod seal.

TOLERANCES	$\varnothing d_1$	$\varnothing D_1$	$L_1$
mm	f9	H8	+0.50 -0



# 37

## WIPER

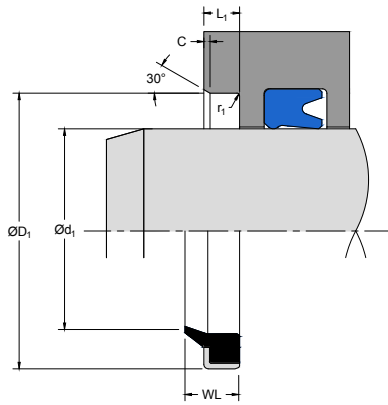
Single-Lipped  
NBR, Metal-Cased

### PART NUMBER RANGE

METRIC						
Ød <sub>1</sub>	TOL f9	ØD <sub>1</sub>	TOL H8	L <sub>1</sub> +0.50-0	WL	PART No.
8.00	-0.01 -0.05	14.00	0.03 0.00	3.50	5.00	8759200
10.00	-0.01 -0.05	16.00	0.03 0.00	3.00	4.50	6644400
10.00	-0.01 -0.05	18.00	0.03 0.00	5.00	8.00	8759300±
12.00	-0.02 -0.06	20.00	0.03 0.00	4.00	6.00	6644500
12.00	-0.02 -0.06	22.00	0.03 0.00	5.00	8.00	8759400
14.00	-0.02 -0.06	20.00	0.03 0.00	4.00	5.00	8759500
14.00	-0.02 -0.06	22.00	0.03 0.00	3.00	4.00	8759600
15.00	-0.02 -0.06	25.00	0.03 0.00	5.00	8.00	8759700
16.00	-0.02 -0.06	22.00	0.03 0.00	3.00	4.00	8759800
16.00	-0.02 -0.06	22.00	0.03 0.00	3.50	5.00	8759900
16.00	-0.02 -0.06	26.00	0.03 0.00	5.00	8.00	6644600
18.00	-0.02 -0.06	26.00	0.03 0.00	5.00	7.00	8760000
18.00	-0.02 -0.06	28.00	0.03 0.00	7.00	10.00	8760100±
20.00	-0.02 -0.07	26.00	0.03 0.00	4.00	7.00	8760200
20.00	-0.02 -0.07	28.00	0.03 0.00	3.50	5.00	6644700
20.00	-0.02 -0.07	28.00	0.03 0.00	5.00	8.00	8760300
20.00	-0.02 -0.07	30.00	0.03 0.00	4.00	6.00	6644800

#### NOTE

Part numbers suffixed by "±" indicate housing sizes to meet ISO 6195A.

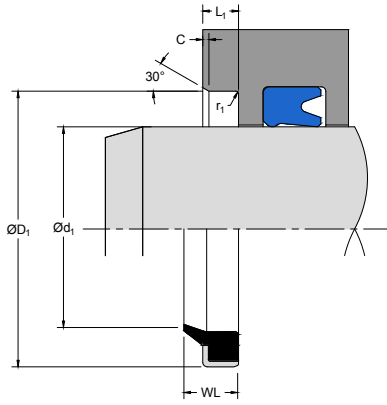


## PART NUMBER RANGE

METRIC						
$\text{Ø}d_1$	TOL f9	$\text{Ø}D_1$	TOL H8	$L_1$ +0.50-0	WL	PART No.
20.00	-0.02 -0.07	30.00	0.03 0.00	5.00	8.00	8760400
20.00	-0.02 -0.07	30.00	0.03 0.00	7.00	10.00	6644900‡
22.00	-0.02 -0.07	28.00	0.03 0.00	5.00	8.00	8760500
22.00	-0.02 -0.07	32.00	0.04 0.00	5.00	8.00	8760600
22.00	-0.02 -0.07	32.00	0.04 0.00	7.00	10.00	8760700‡
22.00	-0.02 -0.07	35.00	0.04 0.00	5.00	8.00	8760800
25.00	-0.02 -0.07	35.00	0.04 0.00	5.00	8.00	8760900
25.00	-0.02 -0.07	35.00	0.04 0.00	7.00	10.00	6588300‡
28.00	-0.02 -0.07	38.00	0.04 0.00	5.00	8.00	8761000
28.00	-0.02 -0.07	38.00	0.04 0.00	7.00	10.00	6588400‡
28.00	-0.02 -0.07	40.00	0.04 0.00	7.00	10.00	6645000
30.00	-0.02 -0.07	40.00	0.04 0.00	5.00	8.00	6645100
30.00	-0.02 -0.07	40.00	0.04 0.00	7.00	10.00	8761100
30.00	-0.02 -0.07	45.00	0.04 0.00	5.00	8.00	8761200
32.00	-0.03 -0.09	40.00	0.04 0.00	4.00	7.00	8761300
32.00	-0.03 -0.09	40.00	0.04 0.00	7.00	10.00	8761400
32.00	-0.03 -0.09	42.00	0.04 0.00	5.00	7.00	6645200

### NOTE

Part numbers suffixed by "‡" indicate housing sizes to meet ISO 6195A.



# 37

## WIPER

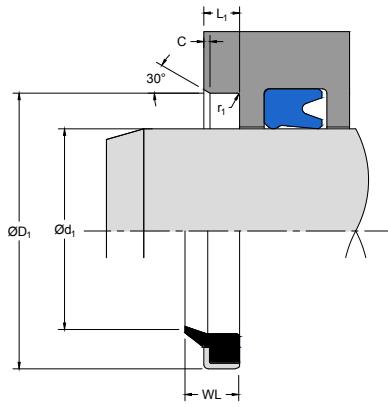
Single-Lipped  
NBR, Metal-Cased

### PART NUMBER RANGE

METRIC						
Ød <sub>1</sub>	TOL f9	ØD <sub>1</sub>	TOL H8	L <sub>1</sub> +0.50-0	WL	PART No.
32.00	-0.03 -0.09	42.00	0.04 0.00	7.00	10.00	6588500‡
32.00	-0.03 -0.09	45.00	0.04 0.00	5.00	8.00	6645300
35.00	-0.03 -0.09	45.00	0.04 0.00	5.00	7.00	8761500
35.00	-0.03 -0.09	45.00	0.04 0.00	7.00	10.00	6645400
35.00	-0.03 -0.09	47.00	0.04 0.00	7.00	10.00	8761600
36.00	-0.03 -0.09	45.00	0.04 0.00	7.00	10.00	8761700
36.00	-0.03 -0.09	46.00	0.04 0.00	5.00	7.00	8761800
36.00	-0.03 -0.09	46.00	0.04 0.00	7.00	10.00	6588600‡
40.00	-0.03 -0.09	50.00	0.04 0.00	5.00	8.00	6645500
40.00	-0.03 -0.09	50.00	0.04 0.00	7.00	10.00	6588700‡
40.00	-0.03 -0.09	52.00	0.05 0.00	5.00	8.00	8761900
42.00	-0.03 -0.09	52.00	0.05 0.00	7.00	10.00	8762000
45.00	-0.03 -0.09	55.00	0.05 0.00	5.00	7.00	8762100
45.00	-0.03 -0.09	55.00	0.05 0.00	7.00	10.00	6588800‡
45.00	-0.03 -0.09	60.00	0.05 0.00	7.00	10.00	6645600
50.00	-0.03 -0.09	56.00	0.05 0.00	5.00	7.00	6645700
50.00	-0.03 -0.09	60.00	0.05 0.00	5.00	7.00	6688500

#### NOTE

Part numbers suffixed by "‡" indicate housing sizes to meet ISO 6195A.

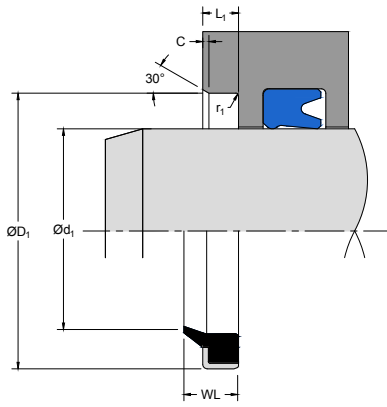


## PART NUMBER RANGE

METRIC						
$\text{Ø}d_1$	TOL f9	$\text{Ø}D_1$	TOL H8	$L_1$ +0.50-0	WL	PART No.
50.00	-0.03 -0.09	60.00	0.05 0.00	7.00	10.00	6588900‡
50.00	-0.03 -0.09	65.00	0.05 0.00	7.00	10.00	8762200
52.00	-0.03 -0.10	62.00	0.05 0.00	7.00	10.00	8762300
55.00	-0.03 -0.10	63.00	0.05 0.00	7.00	10.00	8762400
55.00	-0.03 -0.10	65.00	0.05 0.00	5.00	7.00	8762500
55.00	-0.03 -0.10	65.00	0.05 0.00	7.00	10.00	6645800
56.00	-0.03 -0.10	66.00	0.05 0.00	5.00	8.00	8762600
56.00	-0.03 -0.10	66.00	0.05 0.00	7.00	10.00	6589000‡
60.00	-0.03 -0.10	70.00	0.05 0.00	5.00	7.00	8762700
60.00	-0.03 -0.10	70.00	0.05 0.00	7.00	10.00	6645900
60.00	-0.03 -0.10	74.00	0.05 0.00	5.00	8.00	8762800
60.00	-0.03 -0.10	75.00	0.05 0.00	7.00	10.00	8762900
60.00	-0.03 -0.10	80.00	0.05 0.00	7.00	10.00	8763000
63.00	-0.03 -0.10	73.00	0.05 0.00	7.00	10.00	6589100‡
63.00	-0.03 -0.10	75.00	0.05 0.00	7.00	10.00	6646000
65.00	-0.03 -0.10	75.00	0.05 0.00	5.00	7.00	8763100
65.00	-0.03 -0.10	75.00	0.05 0.00	7.00	10.00	6646100

### NOTE

Part numbers suffixed by "‡" indicate housing sizes to meet ISO 6195A.



# 37

## WIPER

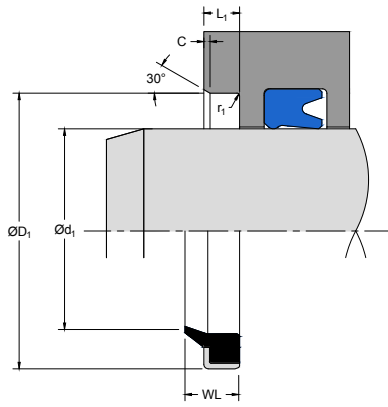
Single-Lipped  
NBR, Metal-Cased

### PART NUMBER RANGE

METRIC						
Ød <sub>1</sub>	TOL f9	ØD <sub>1</sub>	TOL H8	L <sub>1</sub> +0.50-0	WL	PART No.
70.00	-0.03 -0.10	80.00	0.05 0.00	5.00	7.00	8763200
70.00	-0.03 -0.10	80.00	0.05 0.00	7.00	10.00	6589200±
75.00	-0.03 -0.10	85.00	0.05 0.00	7.00	10.00	8763300
80.00	-0.03 -0.10	90.00	0.05 0.00	7.00	10.00	6589300±
85.00	-0.04 -0.12	95.00	0.05 0.00	7.00	10.00	8763400
90.00	-0.04 -0.12	100.00	0.05 0.00	5.00	7.00	8763500
90.00	-0.04 -0.12	100.00	0.05 0.00	7.00	10.00	6589400±
95.00	-0.04 -0.12	105.00	0.05 0.00	7.00	10.00	8763600
100.00	-0.04 -0.12	110.00	0.05 0.00	5.00	8.00	8763700
100.00	-0.04 -0.12	110.00	0.05 0.00	7.00	10.00	8763800
100.00	-0.04 -0.12	115.00	0.05 0.00	8.00	10.00	8763900
105.00	-0.04 -0.12	115.00	0.05 0.00	7.00	10.00	8764000
110.00	-0.04 -0.12	120.00	0.05 0.00	7.00	10.00	8764100
115.00	-0.04 -0.12	125.00	0.06 0.00	7.00	10.00	8764200
120.00	-0.04 -0.12	130.00	0.06 0.00	7.00	10.00	8764300
125.00	-0.04 -0.14	140.00	0.06 0.00	9.00	12.00	6589700±
130.00	-0.04 -0.14	145.00	0.06 0.00	9.00	12.00	8764400

**NOTE**

Part numbers suffixed by "±" indicate housing sizes to meet ISO 6195A.



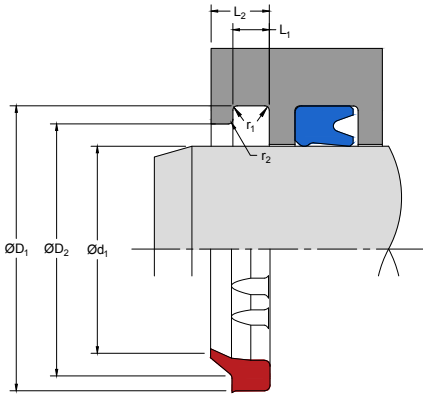
## PART NUMBER RANGE

METRIC						
$\varnothing d_1$	TOL f9	$\varnothing D_1$	TOL H8	$L_1$ +0.50-0	WL	PART No.
135.00	-0.04 -0.14	150.00	0.06 0.00	9.00	12.00	8764500
140.00	-0.04 -0.14	155.00	0.06 0.00	9.00	12.00	6589800‡
145.00	-0.04 -0.14	160.00	0.06 0.00	9.00	12.00	8764600
150.00	-0.04 -0.14	165.00	0.06 0.00	9.00	12.00	8764700
160.00	-0.04 -0.14	175.00	0.06 0.00	9.00	12.00	6589900‡
170.00	-0.04 -0.14	185.00	0.07 0.00	10.00	14.00	8764800
180.00	-0.04 -0.14	195.00	0.07 0.00	10.00	14.00	8764900
200.00	-0.05 -0.17	220.00	0.07 0.00	12.00	16.00	8765000
220.00	-0.05 -0.17	240.00	0.07 0.00	12.00	16.00	8765100‡
240.00	-0.05 -0.17	260.00	0.08 0.00	12.00	16.00	8765200
250.00	-0.05 -0.17	270.00	0.08 0.00	12.00	16.00	8765300‡

### NOTE

Part numbers suffixed by "‡" indicate housing sizes to meet ISO 6195A.





# 38

## WIPER

Single-Lipped  
Polyester  
for Heavy-Duty Applications

### DESIGN

The Hallite 38 single-lipped wiper/scrapper is designed to fit metric housings including those of ISO 6195A. The proportions of the wiping lip ensure that contact is maintained with the surface of the rod to remove heavily deposited contaminants such as mud and ice.

The outside diameter of the wiper incorporates a crush lip to provide an interference fit with the housing. This feature help prevent contamination from entering the groove.

The Hallite 38 is molded in a polyester-based material to provide a tough, abrasion-resistant wiper for the difficult conditions usually found in mining or earth moving applications.

The complete range can be used with a split housing, and the majority can be installed in a blind housing with care.



### FEATURES

- Crush lip design provides effective seal on housing
- Effective scraping lip to scrape off heavily deposited containments including ice
- Ribs relieve pressure and improve stability

### MATERIALS

As standard, this product comes in the following material. Contact your local Hallite technical team if you would like to find out if this profile can be made in a custom material to suit your application. For further material details, please refer to the Hallite Material Table.

MATERIAL OPTIONS	Name	Type	Colour
Standard	TPE 061	TPE	Red

## TECHNICAL DETAILS

OPERATING CONDITIONS	METRIC	INCH
Maximum Speed	4.0 m/sec	12.0 ft/sec
Temperature Range	-40°C +120°C	-40°F +250°F

### NOTE

Data given are maximum values and can apply depending on specific application. Maximum ratings of temperature, pressure, or operating speeds are dependent on fluid medium, surface, gap value, and other variables such as dynamic or static service. Maximum values are not intended for use together at the same time, e.g. max temperature and max pressure. Please contact your Hallite technical representative for application support.

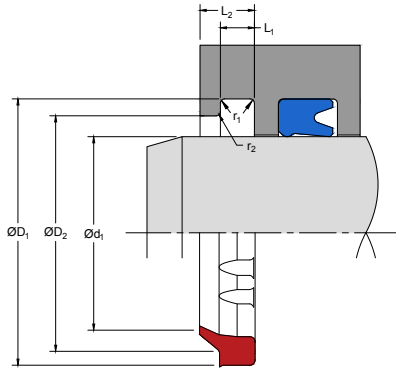
SURFACE ROUGHNESS	$\mu\text{mRa}$	$\mu\text{mRz}$	$\mu\text{mRt}$	$\mu\text{inRa}$	$\mu\text{inRz}$	$\mu\text{inRt}$
Dynamic Sealing Face $\varnothing d_1$	0.1 - 0.4	1.6 max	4 max	4 - 16	63 max	157 max
Static Sealing Face $\varnothing D_1, \varnothing D_2$	1.6 max	6.3 max	10 max	63 max	250 max	394 max
Static Housing Faces $L_1$	3.2 max	10 max	16 max	125 max	394 max	630 max

RADII				
Rod Diameter $\varnothing d_1$	$\leq 50$	$\leq 90$	$\leq 200$	$> 200$
Max Fillet Rad $r_1$ mm	0.40	0.40	0.40	0.80
Max Fillet Rad $r_2$ mm	0.20	0.40	0.60	0.80

### NOTE

Assembly chamfers are governed by the associated rod seal.

TOLERANCES	$\varnothing d_1$	$\varnothing D_1$	$\varnothing D_2$	$L_1$
mm	f9	H11	H11	+0.20-0



# 38

## WIPER

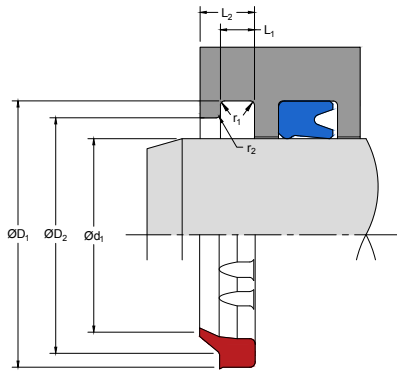
Single-Lipped  
Polyester  
for Heavy-Duty Applications

### PART NUMBER RANGE

METRIC								
$\text{Ø}d_1$	TOL f9	$\text{Ø}D_1$	TOL H11	$\text{Ø}D_2$	TOL H11	$L_1$ +0.20-0	$L_2$	PART No.
8.00	-0.01 -0.05	15.30	+0.11 0.00	12.30	+0.11 0.00	3.20	4.90	4860700
18.00	-0.02 -0.06	24.00	+0.13 0.00	21.00	+0.13 0.00	5.00	7.00	4392000
20.00	-0.02 -0.07	28.00	+0.13 0.00	25.50	+0.13 0.00	5.00	8.00	4321900‡
22.00	-0.02 -0.07	30.00	+0.13 0.00	27.50	+0.13 0.00	5.00	8.00	4322000‡
25.00	-0.02 -0.07	33.00	+0.16 0.00	30.50	+0.16 0.00	5.00	8.00	6617700‡
28.00	-0.02 -0.07	36.00	+0.16 0.00	33.50	+0.16 0.00	5.00	8.00	6617800‡
30.00	-0.02 -0.07	38.00	+0.16 0.00	35.50	+0.16 0.00	5.00	8.00	4419200
30.00	-0.02 -0.07	41.20	+0.16 0.00	37.00	+0.16 0.00	7.50	10.00	4528900
32.00	-0.03 -0.09	40.00	+0.16 0.00	37.50	+0.16 0.00	5.00	8.00	6617900‡
35.00	-0.03 -0.09	43.00	+0.16 0.00	40.50	+0.16 0.00	5.00	8.00	4724800
36.00	-0.03 -0.09	44.00	+0.16 0.00	41.50	+0.16 0.00	5.00	8.00	6618000‡
40.00	-0.03 -0.09	48.00	+0.16 0.00	45.50	+0.16 0.00	5.00	8.00	6618100‡
40.00	-0.03 -0.09	50.60	+0.19 0.00	43.00	+0.16 0.00	5.30	7.00	4784100
41.28	-0.03 -0.09	49.28	+0.16 0.00	46.80	+0.16 0.00	5.00	8.00	4599900
45.00	-0.03 -0.09	53.00	+0.19 0.00	50.50	+0.19 0.00	5.00	8.00	6618200‡
45.00	-0.03 -0.09	55.60	+0.19 0.00	48.00	+0.16 0.00	5.30	7.00	4531201
50.00	-0.03 -0.09	58.00	+0.19 0.00	55.50	+0.19 0.00	5.00	8.00	6618300‡

#### NOTE

Part numbers suffixed by "‡" indicate housing sizes to meet ISO 6195A.

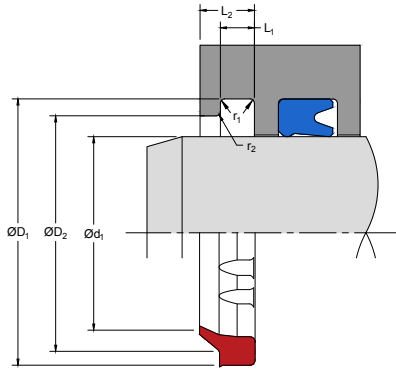


## PART NUMBER RANGE

METRIC								
Ød <sub>1</sub>	TOL f <sub>9</sub>	ØD <sub>1</sub>	TOL H <sub>11</sub>	ØD <sub>2</sub>	TOL H <sub>11</sub>	L <sub>1</sub> +0.20-0	L <sub>2</sub>	PART No.
50.00	-0.03 -0.09	58.60	+0.19 0.00	53.00	+0.19 0.00	5.30	7.00	4300400
50.00	-0.03 -0.09	60.60	+0.19 0.00	53.00	+0.19 0.00	5.30	7.00	4458000
55.00	-0.03 -0.10	65.00	+0.19 0.00	62.00	+0.19 0.00	6.30	10.00	4869300
55.00	-0.03 -0.10	65.60	+0.19 0.00	58.00	+0.19 0.00	5.30	7.00	4531401
56.00	-0.03 -0.10	66.00	+0.19 0.00	63.00	+0.19 0.00	6.30	10.00	6618400‡
56.00	-0.03 -0.10	66.60	+0.19 0.00	59.00	+0.19 0.00	5.30	7.00	4458100
60.00	-0.03 -0.10	70.00	+0.19 0.00	66.00	+0.19 0.00	5.30	7.00	4386200
60.00	-0.03 -0.10	70.00	+0.19 0.00	67.00	+0.19 0.00	6.30	10.00	4270200
60.00	-0.03 -0.10	70.60	+0.19 0.00	63.00	+0.19 0.00	5.30	7.00	4456400
63.00	-0.03 -0.10	73.00	+0.19 0.00	70.00	+0.19 0.00	6.30	10.00	6618500‡
63.00	-0.03 -0.10	73.60	+0.19 0.00	66.00	+0.19 0.00	5.30	7.00	4283600
65.00	-0.03 -0.10	75.00	+0.19 0.00	72.00	+0.19 0.00	6.30	10.00	4343800
65.00	-0.03 -0.10	75.60	+0.19 0.00	68.00	+0.19 0.00	5.30	7.00	4784200
70.00	-0.03 -0.10	80.00	+0.19 0.00	77.00	+0.19 0.00	6.30	10.00	6618600‡
70.00	-0.03 -0.10	80.60	+0.22 0.00	73.00	+0.19 0.00	5.30	7.00	4454000
70.00	-0.03 -0.10	82.20	+0.22 0.00	76.00	+0.19 0.00	7.20	12.00	4243900
75.00	-0.03 -0.10	83.60	+0.22 0.00	78.00	+0.19 0.00	5.30	7.00	4539500

### NOTE

Part numbers suffixed by "‡" indicate housing sizes to meet ISO 6195A.



# 38

## WIPER

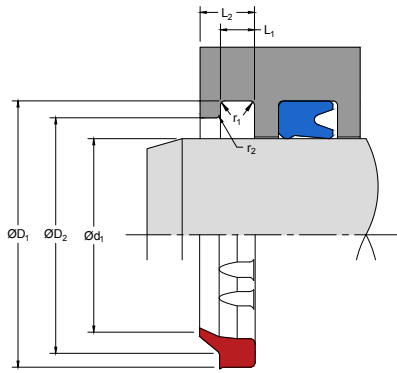
Single-Lipped  
Polyester  
for Heavy-Duty Applications

### PART NUMBER RANGE

METRIC								
Ød <sub>1</sub>	TOL f9	ØD <sub>1</sub>	TOL H11	ØD <sub>2</sub>	TOL H11	L <sub>1</sub> +0.20-0	L <sub>2</sub>	PART No.
75.00	-0.03 -0.10	85.00	+0.22 0.00	82.00	+0.22 0.00	6.30	10.00	4532500
75.00	-0.03 -0.10	87.20	+0.22 0.00	81.00	+0.22 0.00	7.20	12.00	4384400
80.00	-0.03 -0.10	90.00	+0.22 0.00	87.00	+0.22 0.00	6.30	10.00	6618700‡
80.00	-0.03 -0.10	91.00	+0.22 0.00	85.00	+0.22 0.00	7.50	11.00	4493200
80.00	-0.03 -0.10	92.20	+0.22 0.00	86.00	+0.22 0.00	7.20	12.00	4242800
82.60	-0.04 -0.12	92.20	+0.22 0.00	85.70	+0.22 0.00	5.30	7.10	4415500
85.00	-0.04 -0.12	93.60	+0.22 0.00	88.00	+0.22 0.00	5.30	7.00	4292100
85.00	-0.04 -0.12	97.20	+0.22 0.00	91.00	+0.22 0.00	7.20	12.00	4784300
85.00	-0.04 -0.12	98.00	+0.22 0.00	92.00	+0.22 0.00	7.50	11.50	4332800
88.00	-0.04 -0.12	100.20	+0.22 0.00	94.00	+0.22 0.00	7.20	12.00	4269400
90.00	-0.04 -0.12	100.00	+0.22 0.00	97.00	+0.22 0.00	6.30	10.00	6618800‡
90.00	-0.04 -0.12	102.20	+0.22 0.00	96.00	+0.22 0.00	7.20	12.00	4324500
92.00	-0.04 -0.12	112.00	+0.22 0.00	102.00	+0.22 0.00	7.00	11.00	4874200
95.00	-0.04 -0.12	107.20	+0.22 0.00	101.00	+0.22 0.00	7.20	12.00	6667600
100.00	-0.04 -0.12	110.60	+0.22 0.00	104.00	+0.22 0.00	5.30	7.00	4300200
100.00	-0.04 -0.12	112.20	+0.22 0.00	106.00	+0.22 0.00	7.20	12.00	4324600
100.00	-0.04 -0.12	115.00	+0.22 0.00	110.00	+0.22 0.00	9.50	14.00	6618900‡

#### NOTE

Part numbers suffixed by "‡" indicate housing sizes to meet ISO 6195A.

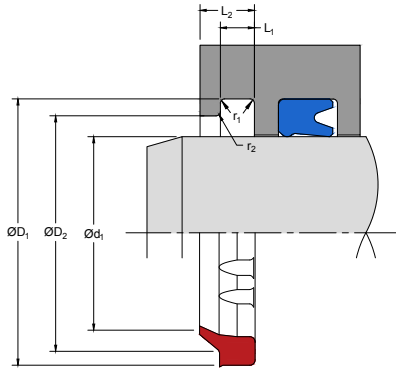


## PART NUMBER RANGE

METRIC								
$\varnothing d_1$	TOL f9	$\varnothing D_1$	TOL H11	$\varnothing D_2$	TOL H11	$L_1$ +0.20-0	$L_2$	PART No.
101.60	-0.04 -0.12	116.60	+0.22 0.00	111.60	+0.22 0.00	9.50	14.00	6619010
105.00	-0.04 -0.12	113.00	+0.22 0.00	110.50	+0.22 0.00	5.00	8.00	4290300
105.00	-0.04 -0.12	120.00	+0.22 0.00	112.00	+0.22 0.00	7.20	12.00	4539100
110.00	-0.04 -0.12	122.20	+0.25 0.00	116.00	+0.22 0.00	7.20	12.00	4459200
110.00	-0.04 -0.12	125.00	+0.25 0.00	120.00	+0.22 0.00	9.50	14.00	6619000‡
115.00	-0.04 -0.12	127.20	+0.25 0.00	121.00	+0.25 0.00	7.20	12.00	4324800
120.00	-0.04 -0.12	132.20	+0.25 0.00	126.00	+0.25 0.00	7.20	12.00	4454300
120.00	-0.04 -0.12	135.00	+0.25 0.00	130.00	+0.25 0.00	9.50	14.00	4385600
125.00	-0.04 -0.14	133.00	+0.25 0.00	130.80	+0.25 0.00	5.30	7.00	4393000
125.00	-0.04 -0.14	137.20	+0.25 0.00	131.00	+0.25 0.00	7.70	12.00	4233500
125.00	-0.04 -0.14	140.00	+0.25 0.00	132.60	+0.25 0.00	10.20	16.00	4784400
125.00	-0.04 -0.14	140.00	+0.25 0.00	135.00	+0.25 0.00	9.50	14.00	6619100‡
128.00	-0.04 -0.14	143.00	+0.25 0.00	138.00	+0.25 0.00	9.50	14.00	4581800
130.00	-0.04 -0.14	142.20	+0.25 0.00	136.00	+0.25 0.00	7.20	12.00	4304300
130.00	-0.04 -0.14	145.00	+0.25 0.00	137.60	+0.25 0.00	10.20	16.00	4784500
132.00	-0.04 -0.14	144.20	+0.25 0.00	138.00	+0.25 0.00	7.20	12.00	4269500
135.00	-0.04 -0.14	147.20	+0.25 0.00	141.00	+0.25 0.00	7.20	12.00	4869500

### NOTE

Part numbers suffixed by “‡” indicate housing sizes to meet ISO 6195A.



# 38

## WIPER

Single-Lipped  
Polyester

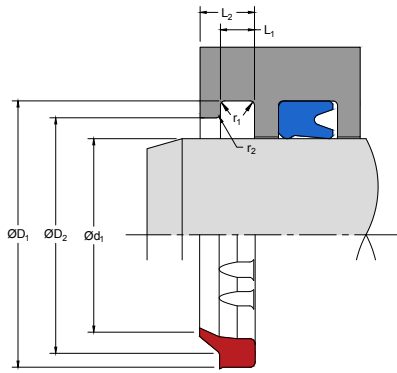
for Heavy-Duty Applications

### PART NUMBER RANGE

METRIC								
$\text{Ø}d_1$	TOL f9	$\text{Ø}D_1$	TOL H11	$\text{Ø}D_2$	TOL H11	$L_1$ +0.20-0	$L_2$	PART No.
135.00	-0.04 -0.14	150.00	+0.25 0.00	145.00	+0.25 0.00	9.50	14.00	4278700
140.00	-0.04 -0.14	148.60	+0.25 0.00	143.00	+0.25 0.00	5.30	7.00	4763800
140.00	-0.04 -0.14	152.20	+0.25 0.00	146.00	+0.25 0.00	7.70	12.00	4324900
140.00	-0.04 -0.14	155.00	+0.25 0.00	147.60	+0.25 0.00	10.20	16.00	4784600
140.00	-0.04 -0.14	155.00	+0.25 0.00	150.00	+0.25 0.00	9.50	14.00	6619200‡
145.00	-0.04 -0.14	153.60	+0.25 0.00	148.00	+0.25 0.00	5.30	7.00	4732200
145.00	-0.04 -0.14	160.00	+0.25 0.00	155.00	+0.25 0.00	9.50	14.00	4560600
150.00	-0.04 -0.14	162.20	+0.25 0.00	156.00	+0.25 0.00	7.70	12.00	4278900
150.00	-0.04 -0.14	165.00	+0.25 0.00	157.60	+0.25 0.00	10.20	16.00	4342500
150.00	-0.04 -0.14	165.00	+0.25 0.00	158.00	+0.25 0.00	7.20	12.00	6668500
150.00	-0.04 -0.14	166.00	+0.25 0.00	161.00	+0.25 0.00	8.00	12.00	4336700
155.00	-0.04 -0.14	163.00	+0.25 0.00	160.50	+0.25 0.00	5.00	8.00	4290200
155.00	-0.04 -0.14	167.20	+0.25 0.00	161.00	+0.25 0.00	7.70	12.00	4288200
155.00	-0.04 -0.14	175.00	+0.25 0.00	165.00	+0.25 0.00	10.20	18.00	4226400
160.00	-0.04 -0.14	172.20	+0.25 0.00	166.00	+0.25 0.00	7.70	12.00	4405700
160.00	-0.04 -0.14	175.00	+0.25 0.00	167.60	+0.25 0.00	10.20	16.00	4454100
160.00	-0.04 -0.14	175.00	+0.25 0.00	170.00	+0.25 0.00	9.50	14.00	6619300‡

#### NOTE

Part numbers suffixed by "‡" indicate housing sizes to meet ISO 6195A.



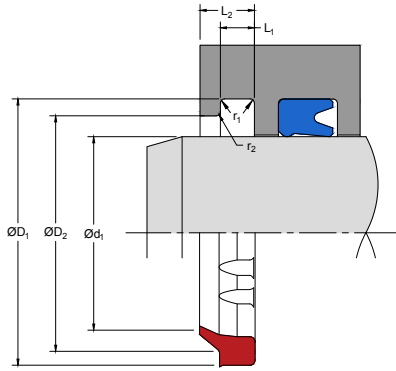
## PART NUMBER RANGE

METRIC								
$\varnothing d_1$	TOL f9	$\varnothing D_1$	TOL H11	$\varnothing D_2$	TOL H11	$L_1$ +0.20-0	$L_2$	PART No.
165.00	-0.04 -0.14	180.00	+0.25 0.00	175.00	+0.25 0.00	9.50	14.00	4537000
170.00	-0.04 -0.14	180.60	+0.29 0.00	174.00	+0.25 0.00	5.30	7.00	4732300
170.00	-0.04 -0.14	182.20	+0.29 0.00	176.00	+0.25 0.00	7.70	12.00	4233600
170.00	-0.04 -0.14	185.00	+0.29 0.00	180.00	+0.25 0.00	9.50	14.00	4745100
177.00	-0.04 -0.14	192.00	+0.29 0.00	187.00	+0.29 0.00	9.50	14.00	4287900
180.00	-0.04 -0.14	195.00	+0.29 0.00	190.00	+0.29 0.00	9.50	14.00	6619400‡
180.00	-0.04 -0.14	200.00	+0.29 0.00	190.00	+0.29 0.00	10.20	18.00	4460900
185.00	-0.05 -0.17	200.00	+0.29 0.00	192.60	+0.29 0.00	10.20	16.00	4777300
185.00	-0.05 -0.17	205.00	+0.29 0.00	195.00	+0.29 0.00	10.20	18.00	4776100
190.00	-0.05 -0.17	198.60	+0.29 0.00	193.00	+0.29 0.00	5.30	7.00	4771100
190.00	-0.05 -0.17	205.00	+0.29 0.00	200.00	+0.29 0.00	9.50	14.00	4753100
190.00	-0.05 -0.17	210.00	+0.29 0.00	200.00	+0.29 0.00	10.20	18.00	4781000
195.00	-0.05 -0.17	210.00	+0.29 0.00	202.50	+0.29 0.00	10.20	16.00	4325100
200.00	-0.05 -0.17	208.60	+0.29 0.00	203.00	+0.29 0.00	5.30	7.00	4391600
200.00	-0.05 -0.17	215.00	+0.29 0.00	210.00	+0.29 0.00	9.50	14.00	6619500‡
200.00	-0.05 -0.17	220.00	+0.29 0.00	210.00	+0.29 0.00	10.20	18.00	4387100
205.00	-0.05 -0.17	213.60	+0.29 0.00	208.00	+0.29 0.00	5.30	7.00	4773800

### NOTE

Part numbers suffixed by “‡” indicate housing sizes to meet ISO 6195A.





# 38

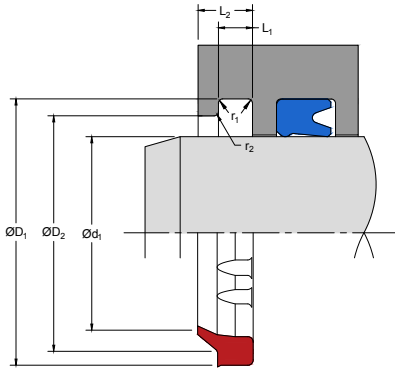
## WIPER

Single-Lipped  
Polyester  
for Heavy-Duty Applications

### PART NUMBER RANGE

METRIC								
Ød <sub>1</sub>	TOL f <sub>9</sub>	ØD <sub>1</sub>	TOL H <sub>11</sub>	ØD <sub>2</sub>	TOL H <sub>11</sub>	L <sub>1</sub> +0.20-0	L <sub>2</sub>	PART No.
205.00	-0.05 -0.17	220.00	+0.29 0.00	215.00	+0.29 0.00	9.50	14.00	4560500
210.00	-0.05 -0.17	225.00	+0.29 0.00	220.00	+0.29 0.00	9.50	14.00	4598000
210.00	-0.05 -0.17	226.00	+0.29 0.00	221.00	+0.29 0.00	8.00	12.00	4336600
210.00	-0.05 -0.17	230.00	+0.29 0.00	220.00	+0.29 0.00	10.20	18.00	4325300
212.00	-0.05 -0.17	232.00	+0.29 0.00	225.50	+0.29 0.00	12.50	18.00	4293900
220.00	-0.05 -0.17	235.00	+0.29 0.00	227.60	+0.29 0.00	10.20	16.00	4325400
220.00	-0.05 -0.17	240.00	+0.29 0.00	230.00	+0.29 0.00	10.20	18.00	4799000
220.00	-0.05 -0.17	240.00	+0.29 0.00	233.50	+0.29 0.00	12.50	18.00	6619600‡
225.00	-0.05 -0.17	240.00	+0.29 0.00	235.00	+0.29 0.00	9.50	14.00	4287800
225.00	-0.05 -0.17	245.00	+0.29 0.00	235.00	+0.29 0.00	10.20	18.00	4325500
230.00	-0.05 -0.17	238.60	+0.29 0.00	233.00	+0.29 0.00	5.30	7.00	4514000
230.00	-0.05 -0.17	245.00	+0.29 0.00	240.00	+0.29 0.00	9.50	14.00	4767400
230.00	-0.05 -0.17	246.00	+0.29 0.00	240.70	+0.29 0.00	7.50	12.00	4290700
230.00	-0.05 -0.17	250.00	+0.29 0.00	240.00	+0.29 0.00	10.20	18.00	4325600
235.00	-0.05 -0.17	255.00	+0.32 0.00	245.00	+0.29 0.00	10.20	18.00	4325700
240.00	-0.05 -0.17	255.00	+0.32 0.00	250.00	+0.29 0.00	9.50	14.00	4745200
240.00	-0.05 -0.17	260.00	+0.32 0.00	250.00	+0.29 0.00	10.20	18.00	4520900

**NOTE** Part numbers suffixed by "‡" indicate housing sizes to meet ISO 6195A.

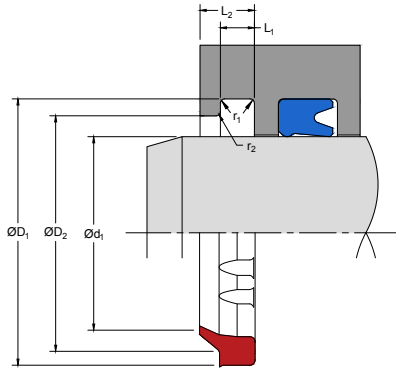


## PART NUMBER RANGE

METRIC								
Ød <sub>1</sub>	TOL f <sub>9</sub>	ØD <sub>1</sub>	TOL H <sub>11</sub>	ØD <sub>2</sub>	TOL H <sub>11</sub>	L <sub>1</sub> +0.20-0	L <sub>2</sub>	PART No.
240.00	-0.05 -0.17	260.00	+0.32 0.00	253.50	+0.32 0.00	12.50	18.00	4787100
245.00	-0.05 -0.17	265.00	+0.32 0.00	258.50	+0.32 0.00	12.50	18.00	4539600
250.00	-0.05 -0.17	270.00	+0.32 0.00	260.00	+0.32 0.00	10.20	18.00	4460100
250.00	-0.05 -0.17	270.00	+0.32 0.00	263.50	+0.32 0.00	12.50	18.00	6619700±
255.00	-0.06 -0.19	270.00	+0.32 0.00	265.00	+0.32 0.00	9.50	14.00	4578200
260.00	-0.06 -0.19	275.00	+0.32 0.00	270.00	+0.32 0.00	9.50	14.00	4573100
260.00	-0.06 -0.19	280.00	+0.32 0.00	270.00	+0.32 0.00	10.20	18.00	4325900
265.00	-0.06 -0.19	280.00	+0.32 0.00	272.60	+0.32 0.00	10.20	16.00	4762900
265.00	-0.06 -0.19	285.00	+0.32 0.00	275.00	+0.32 0.00	10.20	15.00	4560400
270.00	-0.06 -0.19	278.60	+0.32 0.00	273.00	+0.32 0.00	5.30	7.00	4391700
270.00	-0.06 -0.19	286.00	+0.32 0.00	280.70	+0.32 0.00	7.50	12.00	4786400
270.00	-0.06 -0.19	290.00	+0.32 0.00	280.00	+0.32 0.00	10.20	15.00	4868900
275.00	-0.06 -0.19	295.00	+0.32 0.00	285.00	+0.32 0.00	10.20	15.00	4807400
280.00	-0.06 -0.19	295.00	+0.32 0.00	290.00	+0.32 0.00	9.50	14.00	4716100
280.00	-0.06 -0.19	300.00	+0.32 0.00	290.00	+0.32 0.00	10.20	15.00	4763900
285.00	-0.06 -0.19	300.00	+0.32 0.00	295.00	+0.32 0.00	9.50	14.00	4767300
285.00	-0.06 -0.19	305.00	+0.32 0.00	298.50	+0.32 0.00	12.50	18.00	4537100

### NOTE

Part numbers suffixed by "±" indicate housing sizes to meet ISO 6195A.



# 38

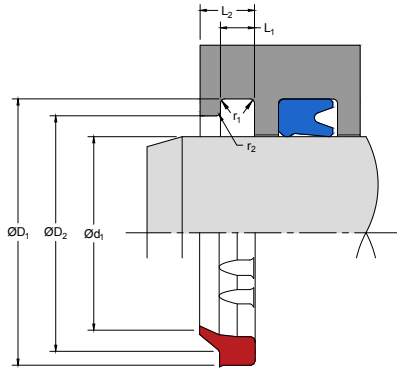
## WIPER

Single-Lipped  
Polyester  
for Heavy-Duty Applications

### PART NUMBER RANGE

METRIC								
$\text{Ø}d_1$	TOL f9	$\text{Ø}D_1$	TOL H11	$\text{Ø}D_2$	TOL H11	$L_1$ +0.20-0	$L_2$	PART No.
288.00	-0.06 -0.19	308.00	+0.32 0.00	301.50	+0.32 0.00	10.20	15.00	4265300
290.00	-0.06 -0.19	310.00	+0.32 0.00	303.50	+0.32 0.00	12.50	18.00	4467300
295.00	-0.06 -0.19	315.00	+0.32 0.00	308.50	+0.32 0.00	12.50	18.00	4598100
300.00	-0.06 -0.19	316.00	+0.36 0.00	310.70	+0.32 0.00	7.50	12.00	4290800
300.00	-0.06 -0.19	320.00	+0.36 0.00	310.00	+0.32 0.00	10.20	18.00	4885400
300.00	-0.06 -0.19	320.00	+0.36 0.00	313.50	+0.32 0.00	12.50	18.00	4525300
305.00	-0.06 -0.19	325.00	+0.36 0.00	318.50	+0.36 0.00	12.50	18.00	4473200
320.00	-0.06 -0.20	340.00	+0.36 0.00	330.00	+0.36 0.00	10.20	18.00	4454200
325.00	-0.06 -0.20	345.00	+0.36 0.00	335.00	+0.36 0.00	10.20	18.00	4801100
330.00	-0.06 -0.20	346.00	+0.36 0.00	340.70	+0.36 0.00	7.50	12.00	4587300
335.00	-0.06 -0.20	355.00	+0.36 0.00	345.00	+0.36 0.00	10.20	18.00	4776800
340.00	-0.06 -0.20	360.00	+0.36 0.00	350.00	+0.36 0.00	10.20	18.00	4732500
350.00	-0.06 -0.20	370.00	+0.36 0.00	360.00	+0.36 0.00	10.20	18.00	4717900
355.00	-0.06 -0.20	375.00	+0.36 0.00	365.00	+0.36 0.00	10.20	18.00	4578300
360.00	-0.06 -0.20	380.00	+0.36 0.00	370.00	+0.36 0.00	10.20	18.00	4781200
370.00	-0.06 -0.20	390.00	+0.36 0.00	380.00	+0.36 0.00	10.20	18.00	4763000
370.00	-0.06 -0.20	390.00	+0.36 0.00	383.50	+0.36 0.00	12.50	18.00	4579800

**NOTE** Part numbers suffixed by “+” indicate housing sizes to meet ISO 6195A.

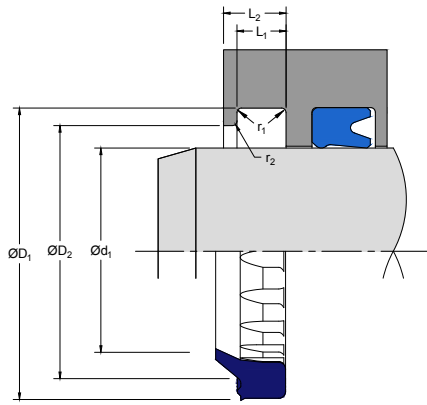


## PART NUMBER RANGE

METRIC								
$\varnothing d_1$	TOL f9	$\varnothing D_1$	TOL H11	$\varnothing D_2$	TOL H11	$L_1$ +0.20-0	$L_2$	PART No.
380.00	-0.06 -0.20	400.00	+0.36 0.00	393.50	+0.36 0.00	12.50	18.00	4752100
390.00	-0.06 -0.20	410.00	+0.40 0.00	400.00	+0.36 0.00	10.20	18.00	4851600
395.00	-0.06 -0.20	415.00	+0.40 0.00	405.00	+0.40 0.00	10.20	18.00	4807200
400.00	-0.06 -0.20	420.00	+0.40 0.00	410.00	+0.40 0.00	10.20	18.00	4769900
415.00	-0.07 -0.22	435.00	+0.40 0.00	425.00	+0.40 0.00	10.20	18.00	4820800
445.00	-0.07 -0.22	465.00	+0.40 0.00	455.00	+0.40 0.00	10.20	18.00	4838400
455.00	-0.07 -0.22	475.00	+0.40 0.00	465.00	+0.40 0.00	10.20	18.00	4777900
460.00	-0.07 -0.22	490.00	+0.40 0.00	475.00	+0.40 0.00	15.00	25.00	4849800
470.00	-0.07 -0.22	490.00	+0.40 0.00	480.00	+0.40 0.00	10.20	18.00	4814800

### NOTE

Part numbers suffixed by "‡" indicate housing sizes to meet ISO 6195A.



# 831

## WIPER

Single-Lipped  
Polyurethane

Designed for Metric Housings

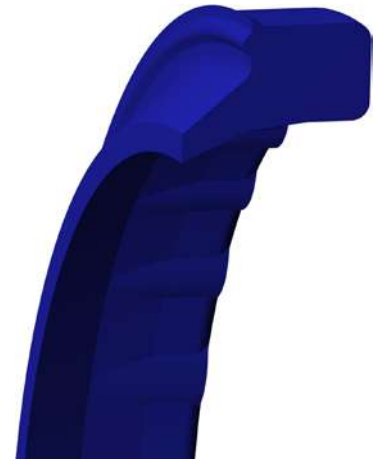
### DESIGN

The Hallite 831 single lipped, snap-in rod wiper is designed to fit metric housings and is interchangeable with many common European wiper styles. The proportions of the wiping lip ensure that contact is maintained with the surface of the rod to remove all deposits of mud and other forms of contamination except for those found in heavy-duty industrial applications.

The outside diameter of the seal incorporates a crush lip to provide interference fit with the housing and a face bead to ensure that the crush lip is not trapped in the corner of the housing. These features help prevent contaminant from entering the groove.

The moulded ribs on the internal diameter provide extra stability to the wiper and help prevent the possibility of blow-out due to pressure trapping between the wiper and the main rod seal.

The Hallite 831 is moulded in polyurethane for maximum wear resistance and performance.



### FEATURES

- Crush lip and face bead design provides effective seal on housing
- Ribs relieve pressure and improve stability
- Cost-effective solution

### MATERIALS

As standard, this product comes in the following material. Contact your local Hallite technical team if you would like to find out if this profile can be made in a custom material to suit your application. For further material details, please refer to the Hallite Material Table.

MATERIAL OPTIONS	Name	Type	Colour
Standard	Hythane® 251	TPU-EU	Dark Blue

## TECHNICAL DETAILS

OPERATING CONDITIONS	METRIC	INCH
Maximum Speed	4.0 m/sec	12.0 ft/sec
Temperature Range	-45°C +110°C	-50°F +230°F

## NOTE

Not designed to scrape ice

## NOTE

Data given are maximum values and can apply depending on specific application. Maximum ratings of temperature, pressure, or operating speeds are dependent on fluid medium, surface, gap value, and other variables such as dynamic or static service. Maximum values are not intended for use together at the same time, e.g. max temperature and max pressure. Please contact your Hallite technical representative for application support.

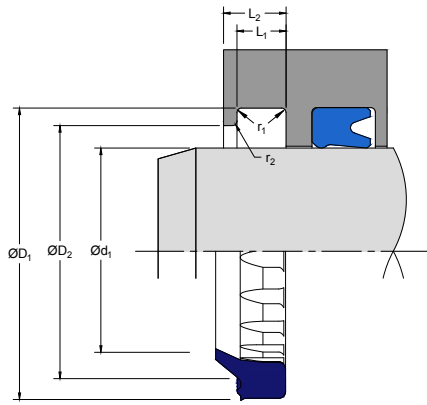
SURFACE ROUGHNESS	$\mu\text{mRa}$	$\mu\text{mRz}$	$\mu\text{mRt}$	$\mu\text{inRa}$	$\mu\text{inRz}$	$\mu\text{inRt}$
Dynamic Sealing Face $\varnothing d_1$	0.1 - 0.4	1.6 max	4 max	4 - 16	63 max	157 max
Static Sealing Face $\varnothing D_1, \varnothing D_2$	1.6 max	6.3 max	10 max	63 max	250 max	394 max
Static Housing Faces $L_1$	3.2 max	10 max	16 max	125 max	394 max	630 max

RADII		
Rod Diameter $\varnothing d_1$	$\leq 90$	$> 90$
Max Fillet Rad $r_1$ , mm	0.20	0.40
Max Fillet Rad $r_2$ , mm	0.40	0.40

## NOTE

Assembly chamfers are governed by the associated rod seal.

TOLERANCES	$\varnothing d_1$	$\varnothing D_1$	$\varnothing D_2$	$L_1$
mm	f9	H11	H11	+0.20 -0



# 831

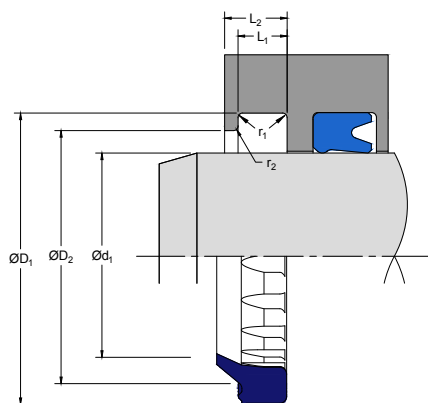
## WIPER

Single-Lipped  
Polyurethane

Designed for Metric Housings

### PART NUMBER RANGE

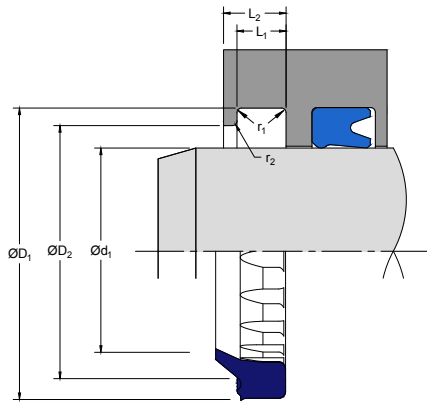
METRIC								
Ød <sub>1</sub>	TOL f <sub>9</sub>	ØD <sub>1</sub>	TOL H11	ØD <sub>2</sub>	TOL H11	L <sub>1</sub> +0.20-0	L <sub>2</sub>	PART No.
12.00	-0.02 -0.06	18.60	+0.13 0.00	15.00	+0.11 0.00	3.80	5.30	4565800
14.00	-0.02 -0.06	20.60	+0.13 0.00	17.00	+0.11 0.00	3.80	5.30	4580000
16.00	-0.02 -0.06	22.60	+0.13 0.00	19.00	+0.13 0.00	3.80	5.30	4830600
16.00	-0.02 -0.06	24.60	+0.13 0.00	19.00	+0.13 0.00	5.30	7.00	4703800
18.00	-0.02 -0.06	24.60	+0.13 0.00	21.00	+0.13 0.00	3.80	5.30	4580100
18.00	-0.02 -0.06	26.60	+0.13 0.00	21.00	+0.13 0.00	5.30	7.00	4703900
20.00	-0.02 -0.07	28.60	+0.13 0.00	23.00	+0.13 0.00	5.30	7.00	4530600
22.00	-0.02 -0.07	30.60	+0.16 0.00	25.00	+0.13 0.00	5.30	7.00	4530700
25.00	-0.02 -0.07	33.60	+0.16 0.00	28.00	+0.13 0.00	5.30	7.00	4530800
28.00	-0.02 -0.07	36.60	+0.16 0.00	31.00	+0.16 0.00	5.30	7.00	4565900
30.00	-0.02 -0.07	38.60	+0.16 0.00	33.00	+0.16 0.00	5.30	7.00	4530900
32.00	-0.03 -0.09	40.60	+0.16 0.00	35.00	+0.16 0.00	5.30	7.00	4534500
35.00	-0.03 -0.09	43.60	+0.16 0.00	38.00	+0.16 0.00	5.30	7.00	4531000
36.00	-0.03 -0.09	44.60	+0.16 0.00	39.00	+0.16 0.00	5.30	7.00	4580200
38.00	-0.03 -0.09	46.60	+0.16 0.00	41.00	+0.16 0.00	5.30	7.00	4788300
40.00	-0.03 -0.09	48.60	+0.16 0.00	43.00	+0.16 0.00	5.30	7.00	4531100
40.00	-0.03 -0.09	50.30	+0.19 0.00	43.00	+0.16 0.00	6.35	8.00	4866900



## PART NUMBER RANGE

METRIC								
$\varnothing d_1$	TOL f9	$\varnothing D_1$	TOL H11	$\varnothing D_2$	TOL H11	$L_1$ +0.20-0	$L_2$	PART No.
42.00	-0.03 -0.09	50.60	+0.19 0.00	45.00	+0.16 0.00	5.30	7.00	4788400
45.00	-0.03 -0.09	53.60	+0.19 0.00	48.00	+0.16 0.00	5.30	7.00	4533800
45.00	-0.03 -0.09	55.60	+0.19 0.00	48.00	+0.16 0.00	5.30	7.00	4531200
47.00	-0.03 -0.09	55.60	+0.19 0.00	50.00	+0.16 0.00	5.30	7.00	4778100
50.00	-0.03 -0.09	58.60	+0.19 0.00	53.00	+0.19 0.00	5.30	7.00	4533900
50.00	-0.03 -0.09	60.60	+0.19 0.00	53.00	+0.19 0.00	5.30	7.00	4531300
55.00	-0.03 -0.10	63.60	+0.19 0.00	58.00	+0.19 0.00	5.30	7.00	4534000
55.00	-0.03 -0.10	65.60	+0.19 0.00	58.00	+0.19 0.00	5.30	7.00	4531400
56.00	-0.03 -0.10	64.60	+0.19 0.00	59.00	+0.19 0.00	5.30	7.00	4566000
56.00	-0.03 -0.10	66.60	+0.19 0.00	59.00	+0.19 0.00	5.30	7.00	4704000
60.00	-0.03 -0.10	68.60	+0.19 0.00	63.00	+0.19 0.00	5.30	7.00	4534100
60.00	-0.03 -0.10	70.60	+0.19 0.00	63.00	+0.19 0.00	5.30	7.00	4531500
63.00	-0.03 -0.10	73.60	+0.19 0.00	66.00	+0.19 0.00	5.30	7.00	4824400
70.00	-0.03 -0.10	78.60	+0.19 0.00	73.00	+0.19 0.00	5.30	7.00	4534200
70.00	-0.03 -0.10	80.60	+0.22 0.00	73.00	+0.19 0.00	5.30	7.00	4531600
75.00	-0.03 -0.10	87.20	+0.22 0.00	81.00	+0.22 0.00	7.10	12.00	4903800
80.00	-0.03 -0.10	88.60	+0.22 0.00	83.00	+0.22 0.00	5.30	7.00	4534300





# 831

## WIPER

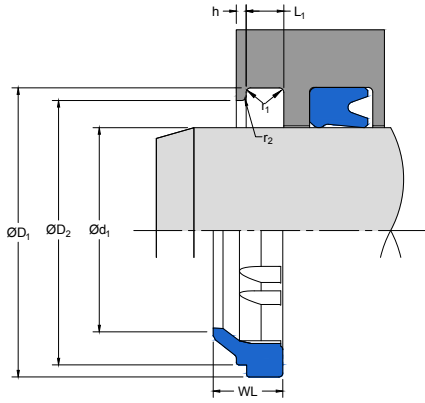
Single-Lipped  
Polyurethane

Designed for Metric Housings

### PART NUMBER RANGE

METRIC								
$\varnothing d_1$	TOL f9	$\varnothing D_1$	TOL H11	$\varnothing D_2$	TOL H11	$L_1$ +0.20-0	$L_2$	PART No.
80.00	-0.03 -0.10	92.20	+0.22 0.00	86.00	+0.22 0.00	7.10	12.00	4531700
85.00	-0.04 -0.12	93.60	+0.22 0.00	88.00	+0.22 0.00	5.30	7.00	4534400
85.00	-0.04 -0.12	97.20	+0.22 0.00	91.00	+0.22 0.00	7.10	12.00	4531800
90.00	-0.04 -0.12	102.20	+0.22 0.00	96.00	+0.22 0.00	7.10	12.00	4531900
95.00	-0.04 -0.12	107.20	+0.22 0.00	101.00	+0.22 0.00	7.10	12.00	4903900
100.00	-0.04 -0.12	112.20	+0.22 0.00	106.00	+0.22 0.00	7.10	12.00	4532000
110.00	-0.04 -0.12	122.20	+0.25 0.00	116.00	+0.22 0.00	7.10	12.00	4538200
115.00	-0.04 -0.12	127.20	+0.25 0.00	121.00	+0.25 0.00	7.10	12.00	4904000
135.00	-0.04 -0.14	147.20	+0.25 0.00	141.00	+0.25 0.00	7.10	12.00	4538100
155.00	-0.04 -0.14	169.20	+0.25 0.00	162.00	+0.25 0.00	7.10	12.00	4904100
175.00	-0.04 -0.14	189.20	+0.29 0.00	182.00	+0.29 0.00	7.10	12.00	4904200





# 834

## WIPER

Single-Lipped  
Polyurethane

Designed for Metric Housings

### DESIGN

The Hallite 834 single lipped, snap-in rod wiper is designed to fit standard housing, including many ISO 6195E sizes. The proportions of the wiping lip ensure that contact is maintained with the surface of the rod to remove all deposits of mud and other forms of contamination except for those found in heavy industrial applications.

The moulded ribs on the internal diameter provide extra stability to the wiper and help prevent the possibility of blow-out due to pressure trapping between the wiper and the main rod seal.

The Hallite 834 is precision moulded in Hythane® 181 for maximum wear resistance.

For better dry rod performance and protection against moisture ingress, the Hallite technical team may advise you to use a Hallite 846 wiper instead of the Hallite 834.



### FEATURES

- Snug fit provides effective sealing
- Long life and long wear
- Ribs relieve pressure and improve stability
- Easy to install

### MATERIALS

As standard, this product comes in the following material. Contact your local Hallite technical team if you would like to find out if this profile can be made in a custom material to suit your application. For further material details, please refer to the Hallite Material Table.

MATERIAL OPTIONS	Name	Type	Colour
Standard	Hythane® 181	TPU-EU	Blue

## TECHNICAL DETAILS

OPERATING CONDITIONS	METRIC	INCH
Maximum Speed	4.0 m/sec	12.0 ft/sec
Temperature Range	-45°C +110°C	-50°F +230°F

## NOTE

Not designed to scrape ice

## NOTE

Data given are maximum values and can apply depending on specific application. Maximum ratings of temperature, pressure, or operating speeds are dependent on fluid medium, surface, gap value, and other variables such as dynamic or static service. Maximum values are not intended for use together at the same time, e.g. max temperature and max pressure. Please contact your Hallite technical representative for application support.

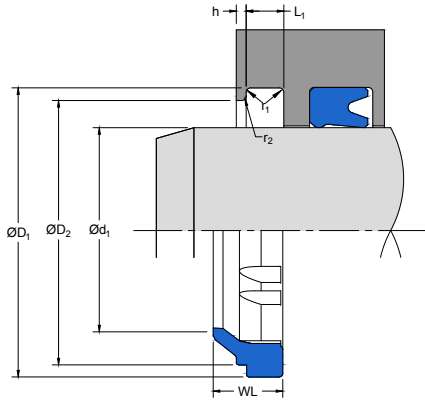
SURFACE ROUGHNESS	$\mu\text{mRa}$	$\mu\text{mRz}$	$\mu\text{mRt}$	$\mu\text{inRa}$	$\mu\text{inRz}$	$\mu\text{inRt}$
Dynamic Sealing Face $\text{Ø}d_1$	0.1 - 0.4	1.6 max	4 max	4 - 16	63 max	157 max
Static Sealing Face $\text{Ø}D_1, \text{Ø}D_2$	1.6 max	6.3 max	10 max	63 max	250 max	394 max
Static Housing Faces $L_1$	3.2 max	10 max	16 max	125 max	394 max	630 max

RADII	
Max Fillet Rad $r_1$ , mm	0.20
Max Fillet Rad $r_2$ , mm	0.40

## NOTE

Assembly chamfers are governed by the associated rod seal.

TOLERANCES	$\text{Ø}d_1$	$\text{Ø}D_1$	$\text{Ø}D_2$	$L_1$
mm	f9	H11	H11	+0.20 -0



# 834

## WIPER

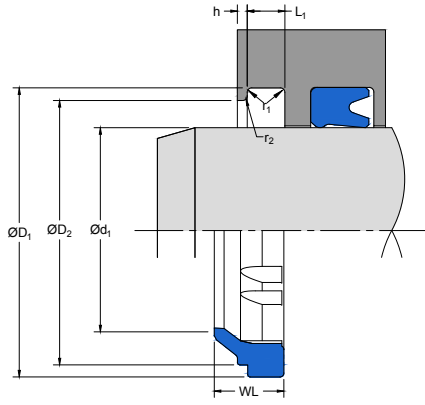
Single-Lipped  
Polyurethane

Designed for Metric Housings

### PART NUMBER RANGE

METRIC									
Ød <sub>1</sub>	TOL f <sub>9</sub>	ØD <sub>1</sub>	TOL H11	ØD <sub>2</sub>	TOL H11	L <sub>1</sub> +0.20-0	WL	h	PART No.
18.00	-0.02 -0.06	26.00	+0.13 0.00	24.00	+0.13 0.00	4.00	7.00	1.00	4367200†
20.00	-0.02 -0.07	28.00	+0.13 0.00	26.00	+0.13 0.00	4.00	7.00	1.00	4391300†
22.00	-0.02 -0.07	30.00	+0.13 0.00	28.00	+0.13 0.00	4.00	7.00	1.00	4370600†
24.00	-0.02 -0.07	32.00	+0.16 0.00	30.00	+0.13 0.00	4.00	7.00	1.00	4829300
25.00	-0.02 -0.07	33.00	+0.16 0.00	31.00	+0.16 0.00	4.00	7.00	1.00	4343900†
26.00	-0.02 -0.07	34.00	+0.16 0.00	32.00	+0.16 0.00	4.00	7.00	1.00	4514400
28.00	-0.02 -0.07	36.00	+0.16 0.00	34.00	+0.16 0.00	4.00	7.00	1.00	4373500†
30.00	-0.02 -0.07	38.00	+0.16 0.00	36.00	+0.16 0.00	4.00	7.00	1.00	4378800
32.00	-0.03 -0.09	40.00	+0.16 0.00	38.00	+0.16 0.00	4.00	7.00	1.00	4373600†
35.00	-0.03 -0.09	43.00	+0.16 0.00	41.00	+0.16 0.00	4.00	7.00	1.00	4398400
36.00	-0.03 -0.09	44.00	+0.16 0.00	42.00	+0.16 0.00	4.00	7.00	1.00	4370700†
37.00	-0.03 -0.09	45.00	+0.16 0.00	43.00	+0.16 0.00	4.00	7.00	1.00	4514500
38.00	-0.03 -0.09	46.00	+0.16 0.00	44.00	+0.16 0.00	4.00	7.00	1.00	4515400
40.00	-0.03 -0.09	48.00	+0.16 0.00	46.00	+0.16 0.00	4.00	7.00	1.00	4378900†
45.00	-0.03 -0.09	53.00	+0.19 0.00	51.00	+0.19 0.00	4.00	7.00	1.00	4370800†
46.00	-0.03 -0.09	54.00	+0.19 0.00	52.00	+0.19 0.00	4.00	7.00	1.00	4515200
48.00	-0.03 -0.09	56.00	+0.19 0.00	54.00	+0.19 0.00	4.00	7.00	1.00	4432700

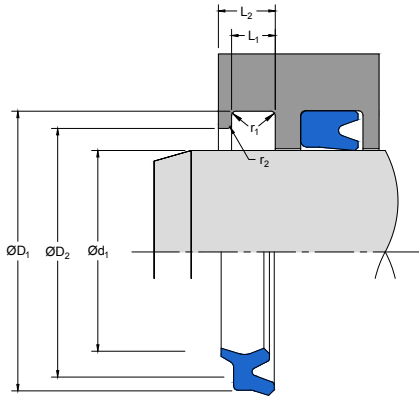
**NOTE** Part numbers suffixed by "†" indicate housing sizes to meet ISO 6195E.



## PART NUMBER RANGE

METRIC									
$\text{Ød}_1$	TOL f9	$\text{ØD}_1$	TOL H11	$\text{ØD}_2$	TOL H11	$L_1$ +0.20-0	WL	h	PART No.
50.00	-0.03 -0.09	58.00	+0.19 0.00	56.00	+0.19 0.00	4.00	7.00	1.00	4379000†
55.00	-0.03 -0.10	63.00	+0.19 0.00	61.00	+0.19 0.00	4.00	7.00	1.00	4515100
56.00	-0.03 -0.10	64.00	+0.19 0.00	62.00	+0.19 0.00	4.00	7.00	1.00	4385100†
60.00	-0.03 -0.10	68.00	+0.19 0.00	66.00	+0.19 0.00	4.00	7.00	1.00	4385200
63.00	-0.03 -0.10	71.00	+0.19 0.00	69.00	+0.19 0.00	4.00	7.00	1.00	4385300†
65.00	-0.03 -0.10	73.00	+0.19 0.00	71.00	+0.19 0.00	4.00	7.00	1.00	4394200
68.50	-0.03 -0.10	76.50	+0.19 0.00	74.50	+0.19 0.00	4.00	7.00	1.00	4855300
70.00	-0.03 -0.10	78.00	+0.19 0.00	76.00	+0.19 0.00	4.00	7.00	1.00	4373700†
75.00	-0.03 -0.10	83.00	+0.22 0.00	81.00	+0.22 0.00	4.00	7.00	1.00	4711900
80.00	-0.03 -0.10	88.00	+0.22 0.00	86.00	+0.22 0.00	4.00	7.00	1.00	4398500†
85.00	-0.04 -0.12	93.00	+0.22 0.00	91.00	+0.22 0.00	4.00	7.00	1.00	4839000
90.00	-0.04 -0.12	98.00	+0.22 0.00	96.00	+0.22 0.00	4.00	7.00	1.00	4398600
100.00	-0.04 -0.12	108.00	+0.22 0.00	106.00	+0.22 0.00	4.00	7.00	1.00	4394300
110.00	-0.04 -0.12	118.00	+0.22 0.00	116.00	+0.22 0.00	4.00	7.00	1.00	4448200
140.00	-0.04 -0.14	152.00	+0.25 0.00	149.00	+0.25 0.00	5.50	10.00	1.50	4456100†

**NOTE** Part numbers suffixed by "†" indicate housing sizes to meet ISO 6195E.



# 839

## WIPER

*Double-Lipped  
Polyurethane  
Designed for ISO Housings*

### DESIGN

The Hallite 839 double-lipped, snap-in wiper is designed to fit standard housings, including many ISO 6195C sizes, and to exclude dirt and moisture from entering the cylinder. The design minimises the oil transfer out of the ram on the cylinder rod by collecting traces of fluid passing the rod seal.

Opposite the wiper lip are two sealing lips that are precision trimmed at an angle to give optimal rod sealing performance. The Hallite 839 is designed to have an interference in the seal housing groove to improve the stability of the wiper in the gland and to reduce the possibility of ingress around the outside of the wiper.

The Hallite 839 is moulded in Hythane® 181, Hallite's high-performance polyurethane, for maximum wear resistance.

Hallite recommends a vent is provided between the seal and the wiper to avoid a pressure trap.

For customers that require a wiper for heavier duty applications, the Hallite technical team may advise you to use a Hallite 844 wiper instead of the Hallite 839. Contact your local Hallite team for more information.



### FEATURES

- ISO housing range
- Long life and long wear
- Double lips ensures drier sealing system
- Easy to install

### MATERIALS

As standard, this product comes in the following material. Contact your local Hallite technical team if you would like to find out if this profile can be made in a custom material to suit your application. For further material details, please refer to the Hallite Material Table.

MATERIAL OPTIONS	Name	Type	Colour
Standard	Hythane® 181	TPU-EU	Blue

## TECHNICAL DETAILS

OPERATING CONDITIONS	METRIC	INCH
Maximum Speed	4.0 m/sec	12.0 ft/sec
Temperature Range	-45°C +110°C	-50°F +230°F

**NOTE** Not designed to scrape ice

**NOTE** Data given are maximum values and can apply depending on specific application. Maximum ratings of temperature, pressure, or operating speeds are dependent on fluid medium, surface, gap value, and other variables such as dynamic or static service. Maximum values are not intended for use together at the same time, e.g. max temperature and max pressure. Please contact your Hallite technical representative for application support.

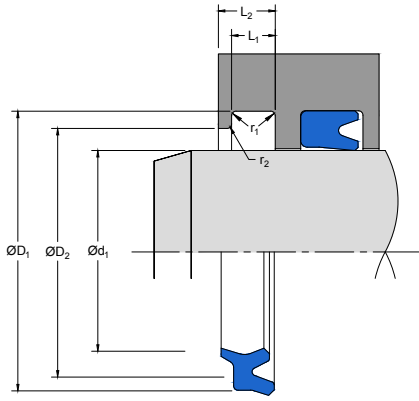
SURFACE ROUGHNESS	$\mu\text{mRa}$	$\mu\text{mRz}$	$\mu\text{mRt}$	$\mu\text{inRa}$	$\mu\text{inRz}$	$\mu\text{inRt}$
Dynamic Sealing Face $\varnothing d_1$	0.1 - 0.4	1.6 max	4 max	4 - 16	63 max	157 max
Static Sealing Face $\varnothing D_1, \varnothing D_2$	1.6 max	6.3 max	10 max	63 max	250 max	394 max
Static Housing Faces $L_1$	3.2 max	10 max	16 max	125 max	394 max	630 max

RADII		
Rod Diameter $\varnothing d_1$ , mm	$\leq 90$	$> 90$
Max Fillet Rad $r_1$ , mm	0.20	0.40
Max Fillet Rad $r_2$ , mm	0.40	0.40

**NOTE** Assembly chamfers are governed by the associated rod seal.

TOLERANCES	$\varnothing d_1$	$\varnothing D_1$	$\varnothing D_2$	$L_1$
mm	f9	H11	H11	+0.20 -0





# 839

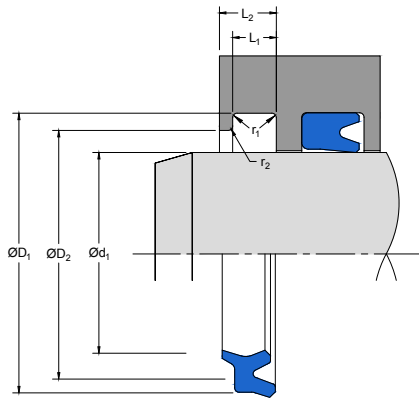
## WIPER

*Double-Lipped  
Polyurethane  
Designed for ISO Housings*

### PART NUMBER RANGE

METRIC								
Ød <sub>1</sub>	TOL f <sub>9</sub>	ØD <sub>1</sub>	TOL H11	ØD <sub>2</sub>	TOL H11	L <sub>1</sub> +0.20-0	L <sub>2</sub>	PART No.
12.00	-0.02 -0.06	18.00	+0.11 0.00	14.50	+0.11 0.00	4.00	7.00	4436800†
14.00	-0.02 -0.06	20.00	+0.13 0.00	16.50	+0.11 0.00	4.00	7.00	4436900†
15.00	-0.02 -0.06	22.00	+0.13 0.00	18.00	+0.11 0.00	3.80	6.00	4762300
18.00	-0.02 -0.06	24.00	+0.13 0.00	20.50	+0.13 0.00	4.00	7.00	4437000†
20.00	-0.02 -0.07	26.00	+0.13 0.00	22.50	+0.13 0.00	4.00	6.00	4415000†
22.00	-0.02 -0.07	28.00	+0.13 0.00	24.50	+0.13 0.00	4.00	7.00	4437100†
25.00	-0.02 -0.07	31.00	+0.16 0.00	27.50	+0.13 0.00	4.00	7.00	4799700†
28.00	-0.02 -0.07	36.00	+0.16 0.00	31.00	+0.16 0.00	5.00	8.00	4437200†
30.00	-0.02 -0.07	38.00	+0.16 0.00	33.00	+0.16 0.00	5.00	8.00	4519200
32.00	-0.03 -0.09	40.00	+0.16 0.00	35.00	+0.16 0.00	5.00	8.00	4594000†
36.00	-0.03 -0.09	44.00	+0.16 0.00	39.00	+0.16 0.00	5.00	8.00	4437300†
40.00	-0.03 -0.09	48.00	+0.16 0.00	43.00	+0.16 0.00	5.00	8.00	4591600†
45.00	-0.03 -0.09	53.00	+0.19 0.00	48.00	+0.16 0.00	5.00	8.00	4437400†
50.00	-0.03 -0.09	58.00	+0.19 0.00	53.00	+0.19 0.00	5.00	8.00	4584400†
55.00	-0.03 -0.10	65.00	+0.19 0.00	58.00	+0.19 0.00	6.00	9.70	4575200
56.00	-0.03 -0.10	66.00	+0.19 0.00	59.00	+0.19 0.00	6.00	9.70	4437500†
60.00	-0.03 -0.10	70.00	+0.19 0.00	63.00	+0.19 0.00	6.00	9.70	4802400

**NOTE** Part numbers suffixed by "†" indicate housing sizes to meet ISO 6195C.

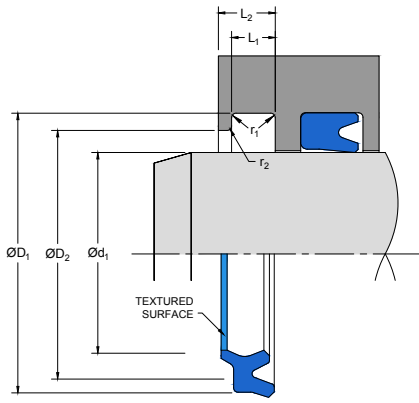


## PART NUMBER RANGE

METRIC								
$\varnothing d_1$	TOL f9	$\varnothing D_1$	TOL H11	$\varnothing D_2$	TOL H11	$L_1$ +0.20-0	$L_2$	PART No.
65.00	-0.03 -0.10	75.00	+0.19 0.00	68.00	+0.19 0.00	6.00	9.70	4575300
70.00	-0.03 -0.10	80.00	+0.19 0.00	73.00	+0.19 0.00	6.00	9.70	4437600†
90.00	-0.04 -0.12	100.00	+0.22 0.00	93.00	+0.22 0.00	6.00	9.70	4437700†
110.00	-0.04 -0.12	125.00	+0.25 0.00	114.00	+0.22 0.00	8.50	13.00	4437800†
130.00	-0.04 -0.14	142.00	+0.25 0.00	135.00	+0.25 0.00	8.20	11.00	4786300
140.00	-0.04 -0.14	155.00	+0.25 0.00	144.00	+0.25 0.00	8.50	13.00	4437900†
150.00	-0.04 -0.14	165.00	+0.25 0.00	154.00	+0.25 0.00	8.50	13.00	4804200
180.00	-0.04 -0.14	196.00	+0.29 0.00	184.00	+0.29 0.00	9.50	14.00	4595600

### NOTE

Part numbers suffixed by “†” indicate housing sizes to meet ISO 6195C.



# 839N

## WIPER

Double-Lipped  
Polyurethane

Designed for Popular Asian Sizes

### DESIGN

The Hallite 839N double-lipped, snap-in wiper is designed to fit popular Asian housing sizes, and to exclude dirt and moisture from entering the cylinder. The design minimises the oil transfer out of the ram on the cylinder rod by collecting traces of fluid passing the rod seal.

The wiping lip on the Hallite 839N is textured to provide improved dry rod performance, particularly for long stroking cylinder applications. Opposite the wiper lip are two sealing lips that are precision trimmed at an angle to give optimal rod sealing performance. The Hallite 839N is designed to have an interference in the seal housing groove to improve the stability of the wiper in the gland and to reduce the possibility of ingress around the outside of the wiper.

The Hallite 839N is precision moulded in Hythane® 181 for maximum wear resistance.

Hallite recommends a vent is provided between the seal and the wiper to avoid a pressure trap.



### FEATURES

- Fits popular Asian housing sizes
- Precision trimmed sealing lips ensures drier sealing system
- Textured wiper lip for improved leakage control
- Long life and long wear
- Easy to install

### MATERIALS

As standard, this product comes in the following material. Contact your local Hallite technical team if you would like to find out if this profile can be made in a custom material to suit your application. For further material details, please refer to the Hallite Material Table.

MATERIAL OPTIONS	Name	Type	Colour
Standard	Hythane® 181	TPU-EU	Blue

## TECHNICAL DETAILS

OPERATING CONDITIONS	METRIC	INCH
Maximum Speed	4.0 m/sec	12.0 ft/sec
Temperature Range	-45°C +110°C	-50°F +230°F

## NOTE

Not designed to scrape ice

## NOTE

Data given are maximum values and can apply depending on specific application. Maximum ratings of temperature, pressure, or operating speeds are dependent on fluid medium, surface, gap value, and other variables such as dynamic or static service. Maximum values are not intended for use together at the same time, e.g. max temperature and max pressure. Please contact your Hallite technical representative for application support.

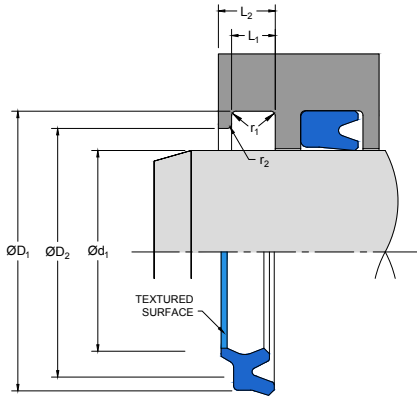
SURFACE ROUGHNESS	$\mu\text{mRa}$	$\mu\text{mRz}$	$\mu\text{mRt}$	$\mu\text{inRa}$	$\mu\text{inRz}$	$\mu\text{inRt}$
Dynamic Sealing Face $\text{Ød}_1$	0.1 - 0.4	1.6 max	4 max	4 - 16	63 max	157 max
Static Sealing Face $\text{ØD}_1, \text{ØD}_2$	1.6 max	6.3 max	10 max	63 max	250 max	394 max
Static Housing Faces $L_1$	3.2 max	10 max	16 max	125 max	394 max	630 max

RADII		
Rod Diameter $\text{Ød}_1$ , mm	$\leq 90$	$> 90$
Max Fillet Rad $r_1$ , mm	0.20	0.40
Max Fillet Rad $r_2$ , mm	0.40	0.40

## NOTE

Assembly chamfers are governed by the associated rod seal.

TOLERANCES	$\text{Ød}_1$	$\text{ØD}_1$	$\text{ØD}_2$	$L_1$
mm	f9	+0-0.20	$\pm 0.10$	+0.40-0



# 839N

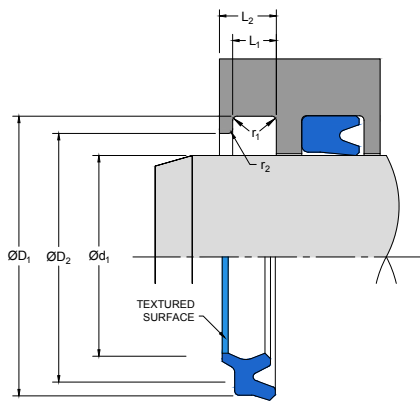
## WIPER

Double-Lipped  
Polyurethane

Designed for Popular Asian Sizes

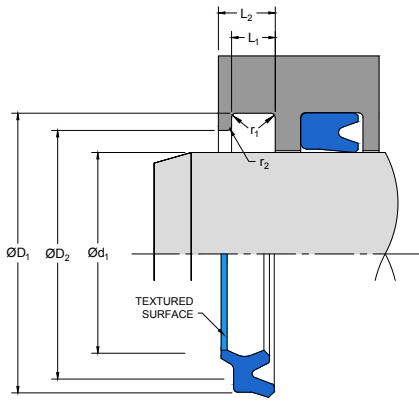
### PART NUMBER RANGE

METRIC						
$\text{Ød}_1$	TOL f9	$\text{ØD}_1$ +0-0.20	$\text{ØD}_2$ ±0.10	$L_1$ +0.40-0	$L_2$	PART No.
14.00	-0.02 -0.06	22.00	18.30	4.80	7.00	4632000
16.00	-0.02 -0.06	24.00	20.30	4.80	7.00	4632100
18.00	-0.02 -0.06	26.00	22.30	4.80	7.00	4630800
20.00	-0.02 -0.07	28.00	24.30	4.80	7.00	4630900
22.40	-0.02 -0.07	30.40	26.70	4.80	7.00	4630100
25.00	-0.02 -0.07	33.00	29.30	4.80	7.00	4631000
28.00	-0.02 -0.07	36.00	32.30	4.80	7.00	4631100
30.00	-0.02 -0.07	38.00	34.00	5.80	8.00	4630200
31.50	-0.03 -0.09	39.50	35.50	5.80	8.00	4632200
32.00	-0.03 -0.09	40.00	36.00	5.80	8.00	4632300
35.00	-0.03 -0.09	43.00	39.00	5.80	8.00	4630300
35.50	-0.03 -0.09	43.50	39.50	5.80	8.00	4630400
38.00	-0.03 -0.09	46.00	42.00	5.80	8.00	4632400
40.00	-0.03 -0.09	48.00	44.00	5.80	8.00	4630500
43.00	-0.03 -0.09	51.00	47.00	5.80	8.00	4634200
45.00	-0.03 -0.09	53.00	49.00	5.80	8.00	4630600
50.00	-0.03 -0.09	58.00	54.00	5.80	8.00	4630000



**PART NUMBER RANGE**

METRIC						
$\varnothing d_1$	TOL f9	$\varnothing D_1$ +0-0.20	$\varnothing D_2$ $\pm 0.10$	$L_1$ +0.40-0	$L_2$	PART No.
53.00	-0.03 -0.10	61.00	57.00	5.80	8.00	4632500
55.00	-0.03 -0.10	63.00	59.00	5.80	8.00	4630700
56.00	-0.03 -0.10	64.00	60.00	5.80	8.00	4632600
60.00	-0.03 -0.10	68.00	64.00	5.80	8.00	4631200
63.00	-0.03 -0.10	71.00	67.00	5.80	8.00	4632700
65.00	-0.03 -0.10	73.00	69.00	5.80	8.00	4631300
70.00	-0.03 -0.10	80.00	75.00	6.80	10.00	4631400
75.00	-0.03 -0.10	85.00	80.00	6.80	10.00	4631500
80.00	-0.03 -0.10	90.00	85.00	6.80	10.00	4631600
85.00	-0.04 -0.12	95.00	90.00	6.80	10.00	4632900
90.00	-0.04 -0.12	100.00	95.00	6.80	10.00	4631700
95.00	-0.04 -0.12	105.00	100.00	6.80	10.00	4631900
100.00	-0.04 -0.12	110.00	105.00	6.80	10.00	4631800
110.00	-0.04 -0.12	120.00	115.00	6.80	10.00	4633000
112.00	-0.04 -0.12	122.00	117.00	6.80	10.00	4633100
120.00	-0.04 -0.12	130.00	125.00	6.80	10.00	4633700
125.00	-0.04 -0.14	138.00	132.00	7.80	11.00	4633200



# 839N

## WIPER

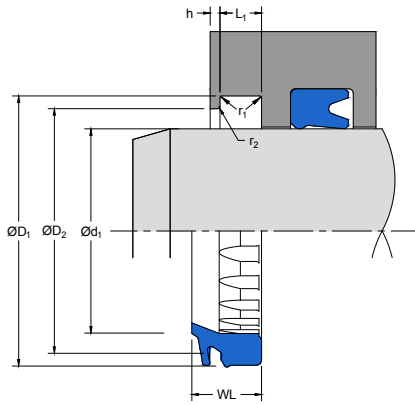
*Double-Lipped  
Polyurethane, Designed for Popular Asian Sizes*

### PART NUMBER RANGE

METRIC						
$\text{Ø}d_1$	TOL f9	$\text{Ø}D_1$ +0-0.20	$\text{Ø}D_2$ $\pm 0.10$	$L_1$ +0.40-0	$L_2$	PART No.
130.00	-0.04 -0.14	143.00	137.00	7.80	11.00	4633800
136.00	-0.04 -0.14	149.00	143.00	7.80	11.00	4633300
140.00	-0.04 -0.14	153.00	147.00	7.80	11.00	4633400
145.00	-0.04 -0.14	158.00	152.00	7.80	11.00	4633500
150.00	-0.04 -0.14	163.00	157.00	7.80	11.00	4633900
160.00	-0.04 -0.14	174.00	167.00	7.80	11.00	4633600







# 842

## WIPER

Single-Lipped

Polyurethane with Umbrella Design Technology™

### DESIGN

The Hallite 842 single-lipped, snap-in rod wiper is developed specifically for use in harsher environments with heavy contamination, such as in agriculture, off-highway, forestry, and long wall mining equipment.

The unique feature of the Hallite 842 is the Umbrella Wiper Technology™, which is a protective debris guard flap on the wiping lip that entirely covers the gland housing and prevents the water/slurry trap that is common with conventional wipers. This feature offers added protection to the integrity of the hydraulic system by reducing corrosion and preventing the ingress of contamination into the wiper housing groove and hydraulic cylinder gland which will result in increased system life.

The moulded ribs on the internal diameter provide extra stability to the wiper and help prevent the possibility of blow-out due to pressure trapping between the wiper and the main rod seal.

The standard Hallite 842 is moulded in Hythane® 181, Hallite's high-performance polyurethane, for easy installation and excellent low temperature performance. The Hallite 820 is also offered in a number of other high-performance polyurethanes, such as Hythane® 371, a very aggressive scrapping material with proven track record in forestry, mining, and aggregate industries. The wiper has been proven compatible with HFA (95/5) fluids, as used in longwall mining equipment, and with mineral oil.

A number of sizes, indicated by "\*" do not have an interference fit between the outside diameter of the wiper and the wiper housing bore ØD<sub>1</sub>. They float on the retaining lip.



### FEATURES

- Precision trimmed wiper lips
- Long life and long wear
- Umbrella Wiper Technology™ protects housing from contaminants
- Easy to install

### MATERIALS

This product comes in a number of material options to extend operating conditions. Contact your local Hallite technical team to decide which is best for your application. Use the part designator in the table below as the last digit of the part number to specify material choice when ordering. For further material details, please refer to the Hallite Material Table.

MATERIAL OPTIONS	Name	Type	Colour	Part Designator
Standard	Hythane® 181	TPU-EU	Blue	0
Optional	Hythane® 361	TPU-AU	Orange	6
Optional	Hythane® 371	TPU-AU	Dark Green	7

## TECHNICAL DETAILS

OPERATING CONDITIONS	METRIC	INCH
Maximum Speed	4.0 m/sec	12.0 ft/sec
Temperature Range	-45°C +110°C	-50°F +230°F

**NOTE**

Data given are maximum values and can apply depending on specific application. Maximum ratings of temperature, pressure, or operating speeds are dependent on fluid medium, surface, gap value, and other variables such as dynamic or static service. Maximum values are not intended for use together at the same time, e.g. max temperature and max pressure. Please contact your Hallite technical representative for application support.

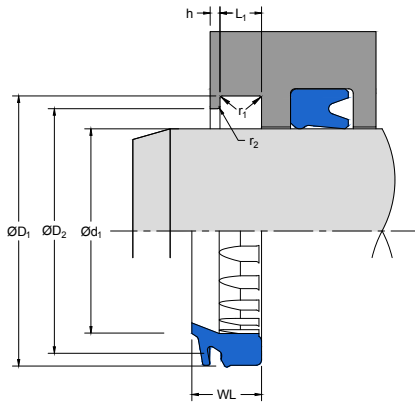
SURFACE ROUGHNESS	$\mu\text{mRa}$	$\mu\text{mRz}$	$\mu\text{mRt}$	$\mu\text{inRa}$	$\mu\text{inRz}$	$\mu\text{inRt}$
Dynamic Sealing Face $\varnothing d_1$	0.1 - 0.4	1.6 max	4 max	4 - 16	63 max	157 max
Static Sealing Face $\varnothing D_1, \varnothing D_2, h$	1.6 max	6.3 max	10 max	63 max	250 max	394 max
Static Housing Faces $L_1$	3.2 max	10 max	16 max	125 max	394 max	630 max

RADII				
Rod Diameter $\varnothing d_1$ , mm	$\leq 50$	$> 90$	$\leq 200$	$> 200$
Max Fillet Rad $r_1$ , mm	0.40	0.40	0.40	0.80
Max Fillet Rad $r_2$ , mm	0.20	0.40	0.60	0.80
Rod Diameter $\varnothing d_1$ , in	$\leq 2.000$	$\leq 3.500$	$\leq 7.875$	$> 7.875$
Max Fillet Rad $r_1$ , in	0.016	0.016	0.016	0.032
Max Fillet Rad $r_2$ , in	0.008	0.016	0.024	0.032

**NOTE**

Assembly chamfers are governed by the associated rod seal.

TOLERANCES	$\varnothing d_1$	$\varnothing D_1$	$\varnothing D_2$	$L_1$	$h$
mm	f9	H11	H11	+0.20 -0	+0.10 +0
in	f9	H11	H11	+0.008 -0	+0.004 +0



# 842

## WIPER

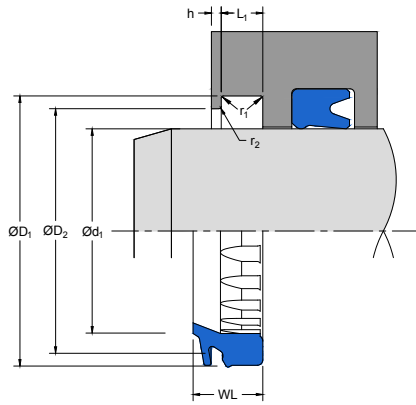
Single-Lipped  
Polyurethane with Umbrella Design Technology™

### PART NUMBER RANGE

METRIC									
Ød <sub>1</sub>	TOL f <sub>9</sub>	ØD <sub>1</sub>	TOL H11	ØD <sub>2</sub>	TOL H11	L <sub>1</sub> +0.20-0	h +0.10-0	WL	PART No.
20.00	-0.02 -0.07	26.00	+0.13 0.00	24.00	+0.13 0.00	4.00	1.00	6.00	4787000
32.00	-0.03 -0.09	40.00	+0.16 0.00	37.50	+0.16 0.00	5.00	1.50	8.00	4714900‡
35.00	-0.03 -0.09	45.00	+0.16 0.00	42.00	+0.16 0.00	6.30	1.50	10.00	4515300
36.00	-0.03 -0.09	44.00	+0.16 0.00	41.50	+0.16 0.00	5.00	1.50	8.00	4715000‡
38.00	-0.03 -0.09	46.00	+0.16 0.00	43.00	+0.16 0.00	5.30	1.50	8.00	4568700
40.00	-0.03 -0.09	48.00	+0.16 0.00	45.50	+0.16 0.00	5.00	1.50	8.00	4536500‡
45.00	-0.03 -0.09	53.00	+0.19 0.00	50.50	+0.19 0.00	5.00	1.50	8.00	4715100‡
50.00	-0.03 -0.09	58.00	+0.19 0.00	55.50	+0.19 0.00	5.00	1.50	8.00	4533600‡
55.00	-0.03 -0.10	65.00	+0.19 0.00	62.00	+0.19 0.00	6.30	1.50	10.00	4764600
56.00	-0.03 -0.10	66.00	+0.19 0.00	63.00	+0.19 0.00	6.30	1.50	10.00	4715200‡
60.00	-0.03 -0.10	70.00	+0.19 0.00	67.00	+0.19 0.00	6.30	1.50	10.00	4557800
60.00	-0.03 -0.10	72.00	+0.19 0.00	67.00	+0.19 0.00	4.10	2.50	10.00	4739300*
63.00	-0.03 -0.10	73.00	+0.19 0.00	70.00	+0.19 0.00	6.30	1.50	10.00	4536600‡
70.00	-0.03 -0.10	82.60	+0.22 0.00	78.40	+0.19 0.00	8.00	2.00	12.00	4480800
70.00	-0.03 -0.10	85.00	+0.22 0.00	78.00	+0.19 0.00	5.10	3.00	12.00	4739400*
75.00	-0.03 -0.10	90.00	+0.22 0.00	83.00	+0.22 0.00	5.10	3.00	12.00	4744000*

#### NOTE

Part numbers suffixed by "‡" indicate housing sizes to meet ISO6195A.  
Part numbers suffixed by "\*" indicate these wipers float on the retaining lip.



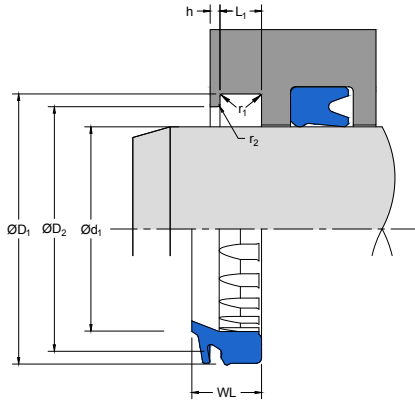
## PART NUMBER RANGE

METRIC									
$\varnothing d_1$	TOL $f_9$	$\varnothing D_1$	TOL H11	$\varnothing D_2$	TOL H11	$L_1$ +0.20-0	$h$ +0.10-0	WL	PART No.
80.00	-0.03 -0.10	90.00	+0.22 0.00	87.00	+0.22 0.00	6.30	1.50	10.00	4715300‡
80.00	-0.03 -0.10	95.00	+0.22 0.00	88.00	+0.22 0.00	5.10	3.00	12.00	4739500*
85.00	-0.04 -0.12	97.60	+0.22 0.00	93.40	+0.22 0.00	8.00	2.00	12.00	4521800
85.00	-0.04 -0.12	100.00	+0.22 0.00	93.00	+0.22 0.00	5.10	3.00	12.00	4744100*
90.00	-0.04 -0.12	102.20	+0.22 0.00	96.00	+0.22 0.00	7.10	2.80	12.40	4727300
90.00	-0.04 -0.12	102.60	+0.22 0.00	98.40	+0.22 0.00	8.00	2.00	12.00	4512500
90.00	-0.04 -0.12	105.00	+0.22 0.00	98.00	+0.22 0.00	5.10	3.00	12.00	4744600‡
95.00	-0.04 -0.12	110.00	+0.22 0.00	105.00	+0.22 0.00	9.50	2.80	14.00	4536900
100.00	-0.04 -0.12	112.20	+0.22 0.00	106.00	+0.22 0.00	7.10	2.80	12.40	4727400
100.00	-0.04 -0.12	114.00	+0.22 0.00	109.90	+0.22 0.00	8.00	1.50	12.00	4536000
100.00	-0.04 -0.12	115.00	+0.22 0.00	108.00	+0.22 0.00	5.10	3.00	12.00	4584800*
100.00	-0.04 -0.12	115.00	+0.22 0.00	110.00	+0.22 0.00	9.50	2.00	14.00	4589500‡
105.00	-0.04 -0.12	120.00	+0.22 0.00	115.00	+0.22 0.00	9.50	2.50	14.00	4532100
110.00	-0.04 -0.12	125.00	+0.25 0.00	118.00	+0.22 0.00	5.10	3.00	12.00	4739600*
110.00	-0.04 -0.12	125.00	+0.25 0.00	120.00	+0.22 0.00	9.50	2.00	14.00	4715400‡
120.00	-0.04 -0.12	135.00	+0.25 0.00	130.00	+0.25 0.00	9.50	2.00	14.00	4580800

### NOTE

Part numbers suffixed by "‡" indicate housing sizes to meet ISO6195A..

Part numbers suffixed by "\*" indicate these wipers float on the retaining lip.



# 842

## WIPER

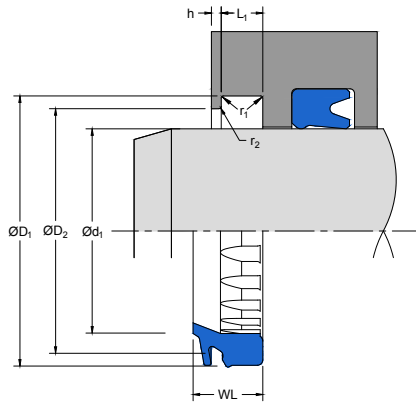
Single-Lipped  
Polyurethane with Umbrella Design Technology™

### PART NUMBER RANGE

METRIC									
Ød <sub>1</sub>	TOL f <sub>9</sub>	ØD <sub>1</sub>	TOL H11	ØD <sub>2</sub>	TOL H11	L <sub>1</sub> +0.20-0	h +0.10-0	WL	PART No.
125.00	-0.04 -0.14	137.20	+0.25 0.00	131.00	+0.25 0.00	7.60	2.80	12.90	4727500
125.00	-0.04 -0.14	140.00	+0.25 0.00	133.00	+0.25 0.00	5.10	3.00	12.00	4748300*
125.00	-0.04 -0.14	140.00	+0.25 0.00	135.00	+0.25 0.00	9.50	2.00	14.00	4715500‡
130.00	-0.04 -0.14	145.00	+0.25 0.00	140.00	+0.25 0.00	9.50	2.25	14.00	4491700
140.00	-0.04 -0.14	152.20	+0.25 0.00	146.00	+0.25 0.00	7.60	2.80	12.90	4727600
140.00	-0.04 -0.14	155.00	+0.25 0.00	150.00	+0.25 0.00	9.50	2.00	14.00	4555900‡
145.00	-0.04 -0.14	160.00	+0.25 0.00	155.00	+0.25 0.00	9.50	2.25	14.00	4570200
150.00	-0.04 -0.14	169.00	+0.25 0.00	159.00	+0.25 0.00	6.10	4.00	14.00	4748400*
155.00	-0.04 -0.14	170.00	+0.25 0.00	165.00	+0.25 0.00	9.50	2.25	14.00	4535200
170.00	-0.04 -0.14	189.00	+0.29 0.00	179.00	+0.25 0.00	6.10	4.00	14.00	4749200*
175.00	-0.04 -0.14	190.00	+0.29 0.00	185.00	+0.29 0.00	9.50	2.25	14.00	4552100
180.00	-0.04 -0.14	195.00	+0.29 0.00	190.00	+0.29 0.00	9.50	2.25	14.00	4491300‡
190.00	-0.05 -0.17	209.00	+0.29 0.00	199.00	+0.29 0.00	6.10	4.00	14.00	4749300*
200.00	-0.05 -0.17	223.00	+0.29 0.00	211.00	+0.29 0.00	8.30	4.80	20.00	4748700*
215.00	-0.05 -0.17	230.00	+0.29 0.00	225.00	+0.29 0.00	9.50	2.00	14.00	4705500
220.00	-0.05 -0.17	240.00	+0.29 0.00	230.00	+0.29 0.00	10.20	3.80	18.00	4859800

#### NOTE

Part numbers suffixed by "‡" indicate housing sizes to meet ISO6195A.  
Part numbers suffixed by "\*" indicate these wipers float on the retaining lip.



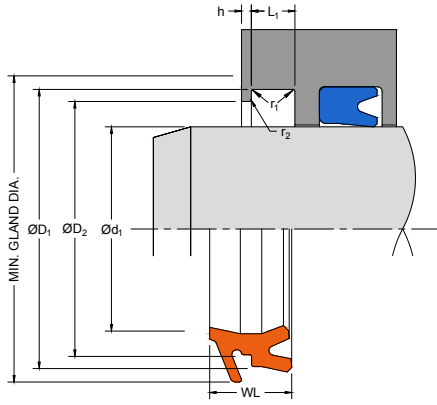
## PART NUMBER RANGE

### METRIC

$\delta d_1$	TOL $f_9$	$\delta D_1$	TOL H11	$\delta D_2$	TOL H11	$L_1$ +0.20-0	$h$ +0.10-0	WL	PART No.
230.00	-0.05 -0.17	250.00	+0.29 0.00	240.00	+0.29 0.00	10.20	3.80	18.00	4750500
235.00	-0.05 -0.17	255.00	+0.32 0.00	245.00	+0.29 0.00	10.20	3.80	18.00	4773300
250.00	-0.05 -0.17	270.00	+0.32 0.00	260.00	+0.32 0.00	10.20	3.80	18.00	4725100
260.00	-0.06 -0.19	280.00	+0.32 0.00	270.00	+0.32 0.00	10.20	3.80	18.00	4864300
295.00	-0.06 -0.19	315.00	+0.32 0.00	305.00	+0.32 0.00	10.20	3.80	18.00	4851900
320.00	-0.06 -0.20	340.00	+0.36 0.00	330.00	+0.36 0.00	10.20	3.80	18.00	4750400
335.00	-0.06 -0.20	355.00	+0.36 0.00	345.00	+0.36 0.00	10.20	3.80	18.00	4773400
350.00	-0.06 -0.20	370.00	+0.36 0.00	360.00	+0.36 0.00	10.20	3.80	18.00	4725200
380.00	-0.06 -0.20	400.00	+0.36 0.00	393.50	+0.36 0.00	12.50	2.30	18.00	4870000
415.00	-0.07 -0.22	435.00	+0.40 0.00	425.00	+0.40 0.00	10.20	3.80	18.00	4851800

#### NOTE

Part numbers suffixed by “±” indicate housing sizes to meet ISO6195A..  
Part numbers suffixed by “\*” indicate these wipers float on the retaining lip.



# 844

## WIPER

*Double-Lipped  
Polyurethane with Umbrella Design Technology™*

### DESIGN

The Hallite 844 double-lipped, snap-in rod wiper is developed specifically for cylinders in demanding off-highway applications and designed for use with venting U-rings, such as the Hallite 663 or Hallite 673 rod seal. The design minimises the oil transfer out of the ram on the cylinder rod by collecting traces of fluid passing the rod seal.

The unique feature of the Hallite 844 is the Umbrella Wiper Technology™, which is a protective debris guard flap on the wiping lip that entirely covers the gland housing and prevents the water/slurry trap that is common with conventional wipers. This feature offers added protection to the integrity of the hydraulic system by reducing corrosion and preventing the ingress of contamination into the wiper housing groove and hydraulic cylinder gland which will result in increased system life.

The standard Hallite 844 is moulded in Hythane® 361, Hallite's high-performance polyurethane, for excellent durability in service. Some sizes of the Hallite 844 are offered in a Hythane® 181 polyurethane with a textured wiping lip to provide improved dry rod performance, particularly for long stroking cylinder applications.



### FEATURES

- Fits modified ISO 6195C housing sizes
- Double lips ensure drier sealing system
- Umbrella Wiper Technology™ protects housing from contamination and reduces moisture ingress
- Long life and long wear
- Designed to follow the rod deflection caused by side loads
- Some have textured wiper lip for improved leakage control
- Easy to install
- Especially effective in vertically mounted cylinders

### MATERIALS

This product comes in a number of material options to extend operating conditions. Contact your local Hallite technical team to decide which is best for your application. Use the part designator in the table below as the last digit of the part number to specify material choice when ordering. For further material details, please refer to the Hallite Material Table.

MATERIAL OPTIONS	Name	Type	Colour	Part Designator
Standard	Hythane® 361	TPU-AU	Orange	6
Optional	Hythane® 181	TPU-EU	Blue	0



## TECHNICAL DETAILS

OPERATING CONDITIONS	METRIC	INCH
Maximum Speed	4.0 m/sec	12.0 ft/sec
Temperature Range	-45°C +110°C	-50°F +230°F

### NOTE

Data given are maximum values and can apply depending on specific application. Maximum ratings of temperature, pressure, or operating speeds are dependent on fluid medium, surface, gap value, and other variables such as dynamic or static service. Maximum values are not intended for use together at the same time, e.g. max temperature and max pressure. Please contact your Hallite technical representative for application support.

SURFACE ROUGHNESS	$\mu\text{mRa}$	$\mu\text{mRz}$	$\mu\text{mRt}$	$\mu\text{inRa}$	$\mu\text{inRz}$	$\mu\text{inRt}$
Dynamic Sealing Face $\varnothing d_1$	0.1 - 0.4	1.6 max	4 max	4 - 16	63 max	157 max
Static Sealing Face $\varnothing D_1, \varnothing D_2, h$	1.6 max	6.3 max	10 max	63 max	250 max	394 max
Static Housing Faces $L_1$	3.2 max	10 max	16 max	125 max	394 max	630 max

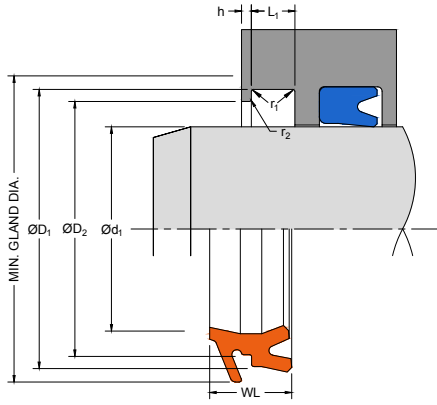
RADII	
Max Fillet Rad $r_1$ mm	0.40
Max Fillet Rad $r_2$ mm	0.40

### NOTE

Assembly chamfers are governed by the associated rod seal.

TOLERANCES	$\varnothing d_1$	$\varnothing D_1$	$\varnothing D_2$	$L_1$	$h$
mm	f9	H11	H11	+0.20 -0	+0.20 -0





# 844

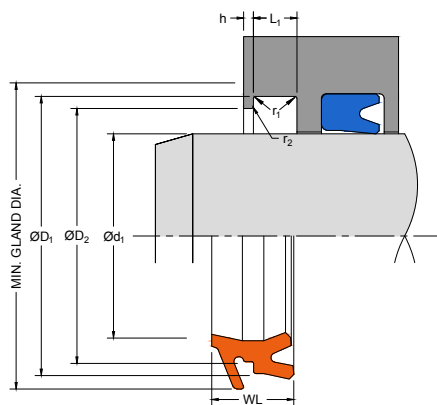
## WIPER

*Double-Lipped  
Polyurethane with Umbrella Design Technology™*

### PART NUMBER RANGE

METRIC										
Ød <sub>1</sub>	TOL	ØD <sub>1</sub>	TOL	ØD <sub>2</sub>	TOL	L <sub>1</sub>	h	WL	MIN. GLAND DIA	PART No.
	f9		H11		H11	+0.20-0	+0.20-0			
16.00	-0.02 -0.06	22.00	+0.13 0.00	19.80	+0.13 0.00	4.00	1.00	7.00	26.00	4826406
18.00	-0.02 -0.06	24.00	+0.13 0.00	21.80	+0.13 0.00	4.00	1.00	7.00	28.00	4848606
20.00	-0.02 -0.07	26.00	+0.13 0.00	23.80	+0.13 0.00	4.00	1.00	7.00	30.00	4827606
25.00	-0.02 -0.07	31.00	+0.16 0.00	28.80	+0.13 0.00	4.00	1.00	7.00	35.00	4805206
28.00	-0.02 -0.07	36.00	+0.16 0.00	33.00	+0.16 0.00	5.00	1.20	9.00	41.00	4833106
30.00	-0.02 -0.07	38.00	+0.16 0.00	35.00	+0.16 0.00	5.00	1.20	9.00	43.00	4803706
32.00	-0.03 -0.09	40.00	+0.16 0.00	37.00	+0.16 0.00	5.00	1.20	9.00	45.00	4827706
35.00	-0.03 -0.09	43.00	+0.16 0.00	40.00	+0.16 0.00	5.00	1.20	9.00	48.00	4805306
36.00	-0.03 -0.09	44.00	+0.16 0.00	41.00	+0.16 0.00	5.00	1.20	9.00	49.00	4833206
40.00	-0.03 -0.09	48.00	+0.16 0.00	45.00	+0.16 0.00	5.00	1.20	9.00	53.00	4794006
45.00	-0.03 -0.09	53.00	+0.19 0.00	50.00	+0.16 0.00	5.00	1.20	9.00	58.00	4800006
50.00	-0.03 -0.09	58.00	+0.19 0.00	55.00	+0.19 0.00	5.00	1.20	8.00	60.00	4869606
50.00	-0.03 -0.09	58.00	+0.19 0.00	55.00	+0.19 0.00	5.00	1.20	9.00	63.00	4803606
50.80	-0.03 -0.10	60.80	+0.19 0.00	57.80	+0.19 0.00	6.00	1.20	10.00	66.80	4781500±
55.00	-0.03 -0.10	65.00	+0.19 0.00	62.00	+0.19 0.00	6.00	1.60	11.50	71.00	4805406
60.00	-0.03 -0.10	70.00	+0.19 0.00	67.00	+0.19 0.00	6.00	1.60	9.50	72.00	4869706
60.00	-0.03 -0.10	70.00	+0.19 0.00	67.00	+0.19 0.00	6.00	1.60	11.50	76.00	4799506

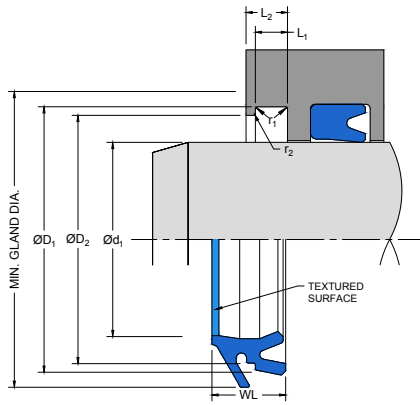
**NOTE** Part numbers suffixed by “±” indicate parts with Hythane® 181 and textured wiping lip.



## PART NUMBER RANGE

METRIC										
Ød <sub>1</sub>	TOL	ØD <sub>1</sub>	TOL	ØD <sub>2</sub>	TOL	L <sub>1</sub>	h	WL	MIN. GLAND DIA	PART No.
63.00	-0.03 -0.10	73.00	+0.19 0.00	70.00	+0.19 0.00	6.00	1.60	11.50	79.00	4833306
65.00	-0.03 -0.10	75.00	+0.19 0.00	72.00	+0.19 0.00	6.00	1.60	11.50	81.00	4805506
70.00	-0.03 -0.10	80.00	+0.19 0.00	77.00	+0.19 0.00	6.00	1.60	11.50	86.00	4805606
75.00	-0.03 -0.10	85.00	+0.22 0.00	82.00	+0.22 0.00	6.00	1.60	11.50	91.00	4805706
80.00	-0.03 -0.10	90.00	+0.22 0.00	87.00	+0.22 0.00	6.00	1.60	11.50	96.00	4805806
85.00	-0.04 -0.12	95.00	+0.22 0.00	92.00	+0.22 0.00	6.00	1.60	11.50	101.00	4805906
90.00	-0.04 -0.12	100.00	+0.22 0.00	97.00	+0.22 0.00	6.00	1.60	11.50	106.00	4806006
105.00	-0.04 -0.12	120.00	+0.22 0.00	115.00	+0.22 0.00	9.50	2.50	17.00	129.00	4800400‡
110.00	-0.04 -0.12	125.00	+0.25 0.00	120.00	+0.22 0.00	9.50	2.50	17.00	134.00	4853106
125.00	-0.04 -0.14	140.00	+0.25 0.00	135.00	+0.25 0.00	9.50	2.50	17.00	149.00	4853206

**NOTE** Part numbers suffixed by "‡" indicate parts with Hythane® 181 and textured wiping lip.



# 846

## WIPER

*Double-Lipped  
Polyurethane with Umbrella Design  
Technology™ and Venting Membrane*

### DESIGN

The Hallite 846 double-lipped, snap-in rod wiper is developed specifically for cylinders applications on mechanical handling equipment, particularly those with long stroke, and designed for use with venting U-rings, such as the Hallite 663 or Hallite 673 rod seal. The design minimises the oil transfer out of the ram on the cylinder rod by collecting traces of fluid passing the rod seal.

The unique feature of the Hallite 846 is the Umbrella Wiper Technology, which is a protective debris guard flap on the wiping lip that entirely covers the gland housing and prevents the water/slurry trap that is common with conventional wipers. This feature offers added protection to the integrity of the hydraulic system by reducing corrosion and preventing the ingress of contamination into the wiper housing groove and hydraulic cylinder gland which will result in increased system life.

Another special feature of the Hallite 846 wiper design is the thin membranes which burst when excessive fluid pressure is trapped between the wiper and the rod seal. This prevents pressure from ejecting the wiper out of its housing. After release of this pressure, the membranes close to protect against contamination from the outside without the need for an expensive vent hole in the gland.

The Hallite 846 is moulded in Hythane® 181, Hallite's high-performance polyurethane, for easy installation and excellent low temperature performance and has a textured wiping lip to provide improved dry rod performance, particularly for long stroking cylinder applications.



### FEATURES

- Precision trimmed double lips ensure drier sealing system
- Bursting membrane venting feature prevents ejection
- Removes need for expensive vent hole in gland
- Long life and long wear
- Umbrella Wiper Technology™ protects housing from contamination and reduces moisture ingress
- Textured wiper lip for improved leakage control
- Especially effective in vertically mounted cylinders
- Easy to install

### MATERIALS

As standard, this product comes in the following material. Contact your local Hallite technical team if you would like to find out if this profile can be made in a custom material to suit your application. For further material details, please refer to the Hallite Material Table.

MATERIAL OPTIONS	Name	Type	Colour
Standard	Hythane® 181	TPU-EU	Blue



## TECHNICAL DETAILS

OPERATING CONDITIONS	METRIC	INCH
Maximum Speed	4.0 m/sec	12.0 ft/sec
Temperature Range	-45°C +110°C	-50°F +230°F

**NOTE** Not designed to scrape ice

**NOTE** Data given are maximum values and can apply depending on specific application. Maximum ratings of temperature, pressure, or operating speeds are dependent on fluid medium, surface, gap value, and other variables such as dynamic or static service. Maximum values are not intended for use together at the same time, e.g. max temperature and max pressure. Please contact your Hallite technical representative for application support.

SURFACE ROUGHNESS	$\mu\text{mRa}$	$\mu\text{mRz}$	$\mu\text{mRt}$	$\mu\text{inRa}$	$\mu\text{inRz}$	$\mu\text{inRt}$
Dynamic Sealing Face $\varnothing d_1$	0.1 - 0.4	1.6 max	4 max	4 - 16	63 max	157 max
Static Sealing Face $\varnothing D_1, \varnothing D_2, L_1, L_2$	1.6 max	6.3 max	10 max	63 max	250 max	394 max

RADII		
Rod Diameter $\varnothing d_1$ , mm	$\leq 90$	$> 90$
Max Fillet Rad $r_1$ , mm	0.40	0.40
Max Fillet Rad $r_2$ , mm	0.20	0.40

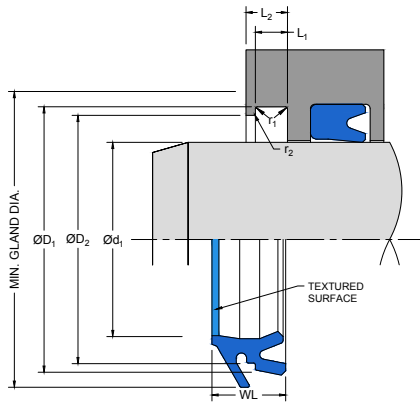
**NOTE** Assembly chamfers are governed by the associated rod seal.

TOLERANCES	$\varnothing d_1$	$\varnothing D_1$	$\varnothing D_2$	$L_1$	$L_2$
mm	f9	H11	H11	+0.20 -0	+0.20 -0

# 846

## WIPER

*Double-Lipped  
Polyurethane with Umbrella Design  
Technology™ and Venting Membrane*

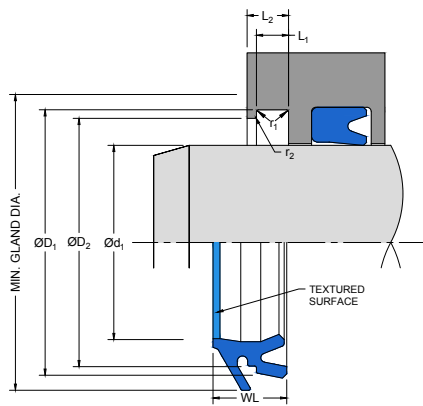


### PART NUMBER RANGE

METRIC										
Ød <sub>1</sub>	TOL	ØD <sub>1</sub>	TOL	ØD <sub>2</sub>	TOL	L <sub>1</sub>	L <sub>2</sub>	WL	MIN. GLAND DIA.	PART No.
	f9		H11		H11	+0.20-0	+0.20-0			
24.00	-0.02 -0.07	32.00	+0.16 0.00	30.00	+0.13 0.00	4.00	5.00	8.70	37.00	4764400
25.00	-0.02 -0.07	33.00	+0.16 0.00	31.00	+0.16 0.00	4.00	5.00	8.70	38.00	4556600
26.00	-0.02 -0.07	34.00	+0.16 0.00	32.00	+0.16 0.00	4.00	5.00	8.70	39.00	4588700
28.00	-0.02 -0.07	36.00	+0.16 0.00	34.00	+0.16 0.00	4.00	5.00	8.70	41.00	4556700
30.00	-0.02 -0.07	38.00	+0.16 0.00	36.00	+0.16 0.00	4.00	5.00	8.70	43.00	4584500
32.00	-0.03 -0.09	40.00	+0.16 0.00	38.00	+0.16 0.00	4.00	5.00	8.70	45.00	4568900
36.00	-0.03 -0.09	44.00	+0.16 0.00	42.00	+0.16 0.00	4.00	5.00	8.70	49.00	4588800
38.00	-0.03 -0.09	46.00	+0.16 0.00	44.00	+0.16 0.00	4.00	5.00	8.70	51.00	4874900
40.00	-0.03 -0.09	48.00	+0.16 0.00	46.00	+0.16 0.00	4.00	5.00	8.70	53.00	4549200
45.00	-0.03 -0.09	53.00	+0.19 0.00	51.00	+0.19 0.00	4.00	5.00	8.70	58.00	4589900
50.00	-0.03 -0.09	58.00	+0.19 0.00	56.00	+0.19 0.00	4.00	5.00	8.70	63.00	4597200
54.00	-0.03 -0.10	62.00	+0.19 0.00	60.00	+0.19 0.00	4.00	5.00	8.70	67.00	4803300
56.00	-0.03 -0.10	64.00	+0.19 0.00	62.00	+0.19 0.00	4.00	5.00	8.70	69.00	4588900
60.00	-0.03 -0.10	68.00	+0.19 0.00	66.00	+0.19 0.00	4.00	5.00	8.70	73.00	4596600
63.00	-0.03 -0.10	71.00	+0.19 0.00	69.00	+0.19 0.00	4.00	5.00	8.70	76.00	4749600
65.00	-0.03 -0.10	73.00	+0.19 0.00	71.00	+0.19 0.00	4.00	5.00	8.70	78.00	4597500

#### NOTE

Hallite recommends using the housing length as described by L<sub>2</sub>. However, a housing length of 6.00 can also be used except for part number 4723600.

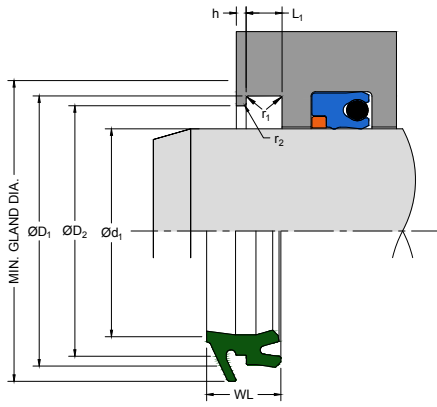


## PART NUMBER RANGE

METRIC										
Ød <sub>1</sub>	TOL	ØD <sub>1</sub>	TOL	ØD <sub>2</sub>	TOL	L <sub>1</sub>	L <sub>2</sub>	WL	MIN. GLAND DIA.	PART No.
68.00	-0.03 -0.10	76.00	+0.19 0.00	74.00	+0.19 0.00	4.00	5.00	8.70	81.00	4872300
70.00	-0.03 -0.10	78.00	+0.19 0.00	76.00	+0.19 0.00	4.00	5.00	8.70	83.00	4556800
75.00	-0.03 -0.10	83.00	+0.22 0.00	81.00	+0.22 0.00	4.00	5.00	8.70	88.00	4597600
80.00	-0.03 -0.10	88.00	+0.22 0.00	86.00	+0.22 0.00	4.00	5.00	8.70	93.00	4590000
90.00	-0.04 -0.12	98.00	+0.22 0.00	96.00	+0.22 0.00	4.00	5.00	8.70	103.00	4557700
100.00	-0.04 -0.12	110.00	+0.22 0.00	107.00	+0.22 0.00	6.30	8.10	11.70	116.00	4723600

### NOTE

Hallite recommends using the housing length as described by L<sub>2</sub>. However, a housing length of 6.00 can also be used except for part number 4723600.



# 847

## WIPER

*Double-Lipped  
Polyurethane with Umbrella Design Technology™  
and Permanent Pressure Relief for  
Heavy-Duty Applications*

### DESIGN

The Hallite 847 wiper has been specifically developed for cylinders used in demanding, heavy-duty off-highway applications in dirty environments, such as earth-moving excavators.

This double-lipped wiper incorporates a special venting feature to permanently relieve pressure build-up between the rod seal and wiper. This prevents pressure from ejecting the wiper without the need for an expensive vent hole in the gland.

The flap on the wiping lip is another special feature that covers the gland housing and prevents the water/slurry trap that is common with conventional wipers. The design minimises oil transfer out of the ram on the rod and prevents dirt, contamination, and moisture from entering the cylinder through the gland.

The standard range is made from high-performance Hythane® 371 polyurethane. The wiper is also available in other polyurethane grades, if required, potentially extending the operating conditions.

Hallite recommends this using the 847 wiper with Hallite's 652 or 621 rod seal, 506 bearing, and 653 rod buffer seal.



### FEATURES

- Precision trimmed sealing lips
- Sharp wiping lip scrapes heavy contamination from rod protecting sealing system
- Especially effective in vertically mounted cylinders
- Umbrella Wiper Technology™ protects housing from contamination and reduces moisture ingress
- Designed to follow the rod deflection caused by side loads

### MATERIALS

This product comes in a number of material options to extend operating conditions. Contact your local Hallite technical team to decide which is best for your application. Use the part designator in the table below as the last digit of the part number to specify material choice when ordering. For further material details, please refer to the Hallite Material Table.

MATERIAL OPTIONS	Name	Type	Colour	Part Designator
Standard	Hythane® 371	TPU-AU	Dark Green	7
Optional	Hythane® 181	TPU-EU	Blue	0

## TECHNICAL DETAILS

OPERATING CONDITIONS	METRIC	INCH
Maximum Speed	4.0 m/sec	12.0 ft/sec
Temperature Range	-40°C +100°C	-40°F +212°F

### NOTE

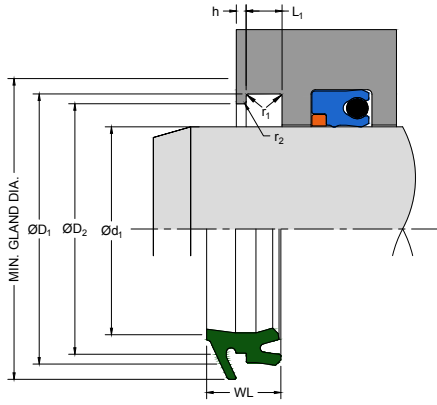
Data given are maximum values and can apply depending on specific application. Maximum ratings of temperature, pressure, or operating speeds are dependent on fluid medium, surface, gap value, and other variables such as dynamic or static service. Maximum values are not intended for use together at the same time, e.g. max temperature and max pressure. Please contact your Hallite technical representative for application support.

SURFACE ROUGHNESS	$\mu\text{mRa}$	$\mu\text{mRz}$	$\mu\text{mRt}$	$\mu\text{inRa}$	$\mu\text{inRz}$	$\mu\text{inRt}$
Dynamic Sealing Face $\text{ØD}_1$	0.1 - 0.4	1.6 max	4 max	4 - 16	63 max	157 max
Static Sealing Face $\text{Ød}_1$	1.6 max	6.3 max	10 max	63 max	250 max	394 max
Static Housing Faces $L_1$	3.2 max	10 max	16 max	125 max	394 max	630 max

RADII				
Rod Diameter $\text{Ød}$ , mm	$\leq 50$	$\leq 90$	$\leq 200$	$> 200$
Max Fillet Rad $r_1$ , mm	0.40	0.40	0.40	0.80
Max Fillet Rad $r_2$ , mm	0.20	0.40	0.60	0.80

TOLERANCES	$\text{Ød}_1$	$\text{ØD}_1$	$\text{ØD}_2$	$L_1$	h
mm	f9	H11	H11	+0.20 - 0	+0.20 - 0





# 847

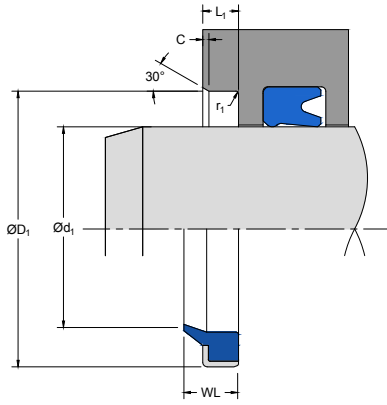
## WIPER

*Double-Lipped  
Polyurethane with Umbrella Design Technology™  
and Permanent Pressure Relief for Heavy-Duty Applications*

### PART NUMBER RANGE

METRIC										
Ød <sub>1</sub>	TOL f <sub>9</sub>	ØD <sub>1</sub>	TOL H11	ØD <sub>2</sub>	TOL H11	L <sub>1</sub> +0.20 -0	h +0.20 -0	WL	MIN GLAND DIA.	PART No.
80.00	-0.03 -0.10	92.60	+0.22 0.00	88.40	+0.22 0.00	7.00	2.00	14.00	100.00	4797507
90.00	-0.04 -0.12	102.60	+0.22 0.00	98.40	+0.22 0.00	7.00	2.00	14.00	110.00	4883307
100.00	-0.04 -0.12	112.60	+0.22 0.00	108.40	+0.22 0.00	7.00	2.00	14.00	120.00	4886707
160.00	-0.04 -0.14	175.00	+0.25 0.00	170.00	+0.25 0.00	9.50	2.50	17.40	184.00	4861707





# 860

## WIPER

Single-Lipped  
Polyurethane, Metal-Cased

### DESIGN

The Hallite 860 single-lipped, metal-cased wiper is designed to press fit into open groove housings for a wide range of applications.

The precision trimmed polyurethane wiping element is securely bonded to a metal case treated to inhibit rust. The proportions of the polyurethane wiping lip follow the side movement of the rod to clear away heavily deposited dirt and make this wiper an excellent choice for dirty conditions.

The Hallite 860 is offered in a range of sizes suitable for ISO 6195 Type B housings and also for standard Asian housings.



### FEATURES

- Precision trimmed wiping lip
- Sharp wiping lip scrapes heavy contamination from rod protecting sealing system
- Metal case treated with rust inhibitor
- Wide range of application uses

### MATERIALS

As standard, this product comes in the following materials. Contact your local Hallite technical team if you would like to find out if this profile can be made in a custom material to suit your application. For further material details, please refer to the Hallite Material Table.

MATERIAL OPTIONS	Name	Type	Colour
Standard	Hythane® 321-Steel	TPU-AU	Dark Blue

## TECHNICAL DETAILS

OPERATING CONDITIONS	METRIC	INCH
Maximum Speed	1.0 m/sec	3.0 ft/sec
Temperature Range	-40°C +100°C	-40°F +212°F

**NOTE**

Data given are maximum values and can apply depending on specific application. Maximum ratings of temperature, pressure, or operating speeds are dependent on fluid medium, surface, gap value, and other variables such as dynamic or static service. Maximum values are not intended for use together at the same time, e.g. max temperature and max pressure. Please contact your Hallite technical representative for application support.

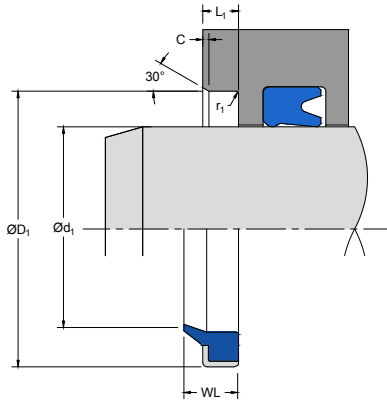
SURFACE ROUGHNESS	$\mu\text{mRa}$	$\mu\text{mRz}$	$\mu\text{mRt}$	$\mu\text{inRa}$	$\mu\text{inRz}$	$\mu\text{inRt}$
Dynamic Sealing Face $\varnothing d_1$	0.1 - 0.4	1.6 max	4 max	4 - 16	63 max	157 max
Static Sealing Face $\varnothing D_1$	1.6 max	6.3 max	10 max	63 max	250 max	394 max
Static Housing Faces $L_1$	3.2 max	10 max	16 max	125 max	394 max	630 max

RADII				
Rod Diameter $\varnothing d_1$	$\leq 19$	$\geq 19$	$< 0.75$	$\geq 0.75$
Min Chamfer C	0.50	1.00	0.020	0.040
Max Fillet Rad $r_1$	0.40	0.40	0.016	0.016

**NOTE**

Assembly chamfers on the rod are governed by the associated seal.

TOLERANCES	$\varnothing d_1$	$\varnothing D_1$	$L_1$
mm	f9	H8	+0.50 -0
in	f9	H8	+0.020 -0



# 860

## WIPER

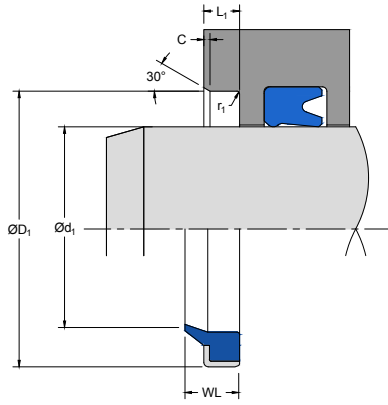
Single-Lipped  
Polyurethane, Metal-Cased

### PART NUMBER RANGE

METRIC						
$\varnothing d_1$	TOL f9	$\varnothing D_1$	TOL H8	$L_1$ +0.50-0	WL	PART No.
8.00	-0.01 -0.05	14.00	+0.03 0.00	3.50	5.00	6950520
12.00	-0.02 -0.06	20.00	+0.03 0.00	4.00	6.00	6950530
15.00	-0.02 -0.06	25.00	+0.03 0.00	5.00	7.00	6950000
16.00	-0.02 -0.06	22.00	+0.03 0.00	3.00	4.00	6950010
18.00	-0.02 -0.06	28.00	+0.03 0.00	5.00	7.00	6950020
18.00	-0.02 -0.06	28.00	+0.03 0.00	7.00	10.00	6950540
20.00	-0.02 -0.07	30.00	+0.03 0.00	4.00	6.00	6950550
20.00	-0.02 -0.07	30.00	+0.03 0.00	5.00	8.00	6950030
20.00	-0.02 -0.07	30.00	+0.03 0.00	7.00	10.00	6950560
22.00	-0.02 -0.07	32.00	+0.04 0.00	5.00	8.00	6950570
25.00	-0.02 -0.07	35.00	+0.04 0.00	5.00	8.00	6950040
25.00	-0.02 -0.07	35.00	+0.04 0.00	7.00	10.00	6950580
25.00	-0.02 -0.07	37.00	+0.04 0.00	6.00	9.00	6950050
28.00	-0.02 -0.07	38.00	+0.04 0.00	5.00	8.00	6950060
28.00	-0.02 -0.07	38.00	+0.04 0.00	7.00	10.00	6950590
30.00	-0.02 -0.07	40.00	+0.04 0.00	5.00	8.00	6950070

#### NOTE

Part numbers suffixed by "t" are designed for Asian housings.  
Part numbers suffixed by "‡" indicate housing sizes to meet ISO 6195 Type B.

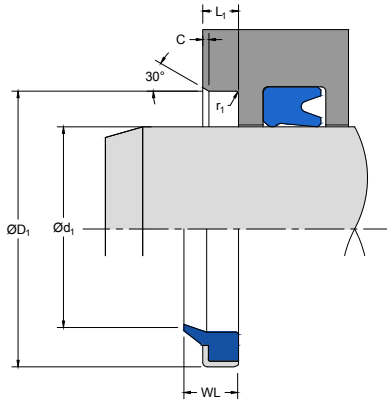


## PART NUMBER RANGE

METRIC						
Ød <sub>1</sub>	TOL f <sub>9</sub>	ØD <sub>1</sub>	TOL H <sub>8</sub>	L <sub>1</sub> +0.50-0	WL	PART No.
30.00	-0.02 -0.07	40.00	+0.04 0.00	7.00	10.00	6950600
30.00	-0.02 -0.07	42.00	+0.04 0.00	6.00	9.00	6950080†
32.00	-0.03 -0.09	42.00	+0.04 0.00	5.00	8.00	6950090
32.00	-0.03 -0.09	42.00	+0.04 0.00	7.00	10.00	6950610
32.00	-0.03 -0.09	45.00	+0.04 0.00	5.00	8.00	6950620
32.00	-0.03 -0.09	45.00	+0.04 0.00	7.00	10.00	6950630
35.00	-0.03 -0.09	45.00	+0.04 0.00	4.00	6.00	6950640
35.00	-0.03 -0.09	45.00	+0.04 0.00	7.00	10.00	6950100
35.00	-0.03 -0.09	47.00	+0.04 0.00	7.00	10.00	6950110†
36.00	-0.03 -0.09	45.00	+0.04 0.00	7.00	10.00	6950650
36.00	-0.03 -0.09	46.00	+0.04 0.00	7.00	10.00	6950660
38.00	-0.03 -0.09	48.00	+0.04 0.00	7.00	10.00	6950470
40.00	-0.03 -0.09	50.00	+0.04 0.00	7.00	10.00	6950120‡
40.00	-0.03 -0.09	52.00	+0.05 0.00	7.00	10.00	6950130†
42.00	-0.03 -0.09	52.00	+0.05 0.00	7.00	10.00	6950670
45.00	-0.03 -0.09	55.00	+0.05 0.00	5.00	8.00	6950680

### NOTE

Part numbers suffixed by "†" are designed for Asian housings.  
Part numbers suffixed by "‡" indicate housing sizes to meet ISO 6195 Type B.



# 860

## WIPER

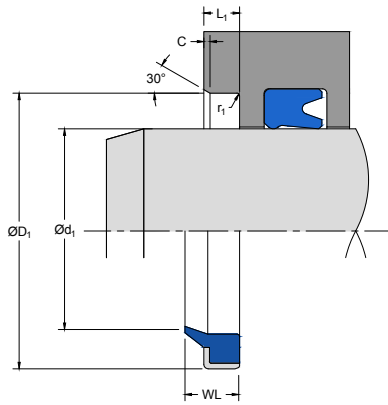
Single-Lipped  
Polyurethane, Metal-Cased

### PART NUMBER RANGE

METRIC						
$\varnothing d_1$	TOL f9	$\varnothing D_1$	TOL H8	$L_1$ +0.50-0	WL	PART No.
45.00	-0.03 -0.09	55.00	+0.05 0.00	7.00	10.00	6950140‡
45.00	-0.03 -0.09	57.00	+0.05 0.00	7.00	10.00	6950150†
50.00	-0.03 -0.09	60.00	+0.05 0.00	5.00	8.00	6950690
50.00	-0.03 -0.09	60.00	+0.05 0.00	7.00	10.00	6950160‡
50.00	-0.03 -0.09	62.00	+0.05 0.00	7.00	10.00	6950170†
55.00	-0.03 -0.10	65.00	+0.05 0.00	7.00	10.00	6950180
55.00	-0.03 -0.10	69.00	+0.05 0.00	8.00	11.00	6950190†
55.00	-0.03 -0.10	70.00	+0.05 0.00	5.00	8.00	6950700
55.00	-0.03 -0.10	70.00	+0.05 0.00	7.00	10.00	6667689
60.00	-0.03 -0.10	70.00	+0.05 0.00	5.00	8.00	6950710
60.00	-0.03 -0.10	70.00	+0.05 0.00	7.00	10.00	6950200
60.00	-0.03 -0.10	74.00	+0.05 0.00	8.00	11.00	6950210†
60.00	-0.03 -0.10	75.00	+0.05 0.00	5.00	8.00	6950720
60.00	-0.03 -0.10	75.00	+0.05 0.00	7.00	10.00	6950730
63.00	-0.03 -0.10	73.00	+0.05 0.00	7.00	10.00	6667690‡
63.00	-0.03 -0.10	75.00	+0.05 0.00	7.00	10.00	6950750

#### NOTE

Part numbers suffixed by "†" are designed for Asian housings.  
Part numbers suffixed by "‡" indicate housing sizes to meet ISO 6195 Type B.



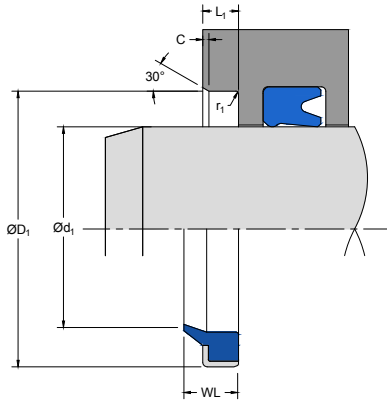
## PART NUMBER RANGE

METRIC						
$\text{Ø}d_1$	TOL f9	$\text{Ø}D_1$	TOL H8	$L_1$ +0.50-0	WL	PART No.
65.00	-0.03 -0.10	75.00	+0.05 0.00	7.00	10.00	6950220
65.00	-0.03 -0.10	79.00	+0.05 0.00	8.00	11.00	6950230†
70.00	-0.03 -0.10	80.00	+0.05 0.00	7.00	10.00	6950240‡
70.00	-0.03 -0.10	84.00	+0.05 0.00	8.00	11.00	6950250†
75.00	-0.03 -0.10	85.00	+0.05 0.00	7.00	10.00	6950260
75.00	-0.03 -0.10	89.00	+0.05 0.00	8.00	11.00	6950270†
80.00	-0.03 -0.10	90.00	+0.05 0.00	7.00	10.00	6950280‡
80.00	-0.03 -0.10	94.00	+0.05 0.00	8.00	11.00	6950290†
85.00	-0.04 -0.12	95.00	+0.05 0.00	5.00	8.00	6950760
85.00	-0.04 -0.12	95.00	+0.05 0.00	7.00	10.00	6950300
85.00	-0.04 -0.12	99.00	+0.05 0.00	8.00	11.00	6950310†
90.00	-0.04 -0.12	100.00	+0.05 0.00	7.00	10.00	6950320‡
90.00	-0.04 -0.12	104.00	+0.05 0.00	8.00	11.00	6950330†
95.00	-0.04 -0.12	109.00	+0.05 0.00	8.00	11.00	6950340†
100.00	-0.04 -0.12	110.00	+0.05 0.00	7.00	10.00	6950350
100.00	-0.04 -0.12	114.00	+0.05 0.00	8.00	11.00	6950360†

### NOTE

Part numbers suffixed by “†” are designed for Asian housings.  
Part numbers suffixed by “‡” indicate housing sizes to meet ISO 6195 Type B.





# 860

## WIPER

Single-Lipped  
Polyurethane, Metal-Cased

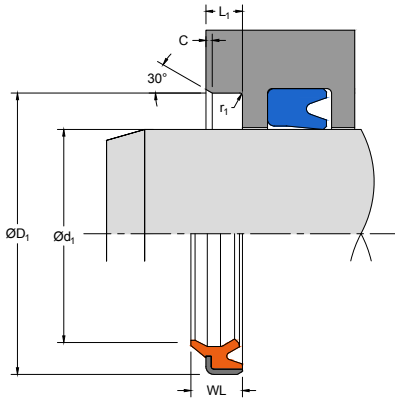
### PART NUMBER RANGE

METRIC						
$\varnothing d_1$	TOL f9	$\varnothing D_1$	TOL H8	$L_1$ +0.50-0	WL	PART No.
105.00	-0.04 -0.12	115.00	+0.05 0.00	7.00	10.00	6950770
105.00	-0.04 -0.12	121.00	+0.06 0.00	9.00	12.00	6950370†
110.00	-0.04 -0.12	120.00	+0.05 0.00	7.00	10.00	6950380
110.00	-0.04 -0.12	126.00	+0.06 0.00	9.00	12.00	6950390†
115.00	-0.04 -0.12	131.00	+0.06 0.00	9.00	12.00	6950400†
120.00	-0.04 -0.12	130.00	+0.06 0.00	7.00	10.00	6950410
120.00	-0.04 -0.12	136.00	+0.06 0.00	9.00	12.00	6950420†
125.00	-0.04 -0.14	140.00	+0.06 0.00	9.00	12.00	6950780
125.00	-0.04 -0.14	141.00	+0.06 0.00	9.00	12.00	6950790
130.00	-0.04 -0.14	146.00	+0.06 0.00	9.00	12.00	6950430†
135.00	-0.04 -0.14	155.00	+0.06 0.00	10.00	14.00	6950800
140.00	-0.04 -0.14	155.00	+0.06 0.00	9.00	12.00	6950810
140.00	-0.04 -0.14	160.00	+0.06 0.00	10.00	14.00	6950440†
150.00	-0.04 -0.14	170.00	+0.06 0.00	10.00	14.00	6950450†
160.00	-0.04 -0.14	180.00	+0.06 0.00	10.00	14.00	6950460†
180.00	-0.04 -0.14	195.00	+0.07 0.00	10.00	14.00	6950820

#### NOTE

Part numbers suffixed by "†" are designed for Asian housings.  
Part numbers suffixed by "‡" indicate housing sizes to meet ISO 6195 Type B.





# 864

## WIPER

*Double-Lipped  
Polyurethane, Metal-Cased,  
Designed for Popular Asian Housing*

### DESIGN

The Hallite 864 is a double-lipped, metal-cased wiper is designed to press fit into open groove housings of popular Asian housing sizes for a wide range of applications and for use with venting U-rings, such as the Hallite 663 or Hallite 673 rod seal.

The polyurethane wiping element is bonded to a nitrided metal case eliminating the potential for rust. The polyurethane wiping element has a precision trimmed sealing lip to collect the fluid passing the rod seal and a specially wiping lip is textured to provide improved dry rod performance, particularly for long stroking cylinder applications.

The proportions of the polyurethane wiping lip follow the side movement of the rod to clear away heavily deposited dirt and make this wiper an excellent choice for dirty conditions.

The Hallite 864 is moulded in Hythane® 361, Hallite's high-performance polyurethane, for excellent durability in service. The Hallite 864 is also offered in Hythane® 181 for lower friction and good low temperature flexibility.



### FEATURES

- Fits popular Asian housing sizes
- Nitrided metal case provides maximum corrosion resistance
- Precision trimmed sealing lip ensures drier sealing system
- Textured wiper lip for improved leakage control
- Designed to follow the rod deflection caused by side loads
- Long life and long wear

### MATERIALS

As standard, this product comes in the following materials. Contact your local Hallite technical team if you would like to find out if this profile can be made in a custom material to suit your application. For further material details, please refer to the Hallite Material Table.

MATERIAL OPTIONS	Name	Type	Colour
Standard	Hythane® 361-Steel	TPU-AU	Orange
Optional	Hythane® 181-Steel	TPU-EU	Blue



## TECHNICAL DETAILS

OPERATING CONDITIONS	METRIC	INCH
Maximum Speed	1.0 m/sec	3.0 ft/sec
Temperature Range	-45°C +110°C	-50°F +230°F

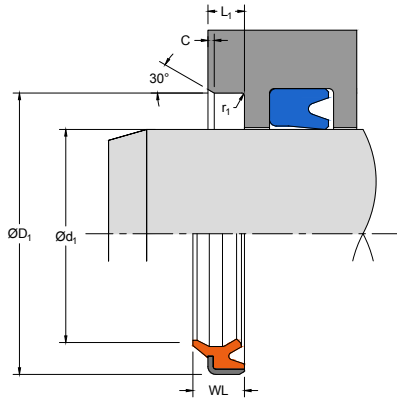
### NOTE

Data given are maximum values and can apply depending on specific application. Maximum ratings of temperature, pressure, or operating speeds are dependent on fluid medium, surface, gap value, and other variables such as dynamic or static service. Maximum values are not intended for use together at the same time, e.g. max temperature and max pressure. Please contact your Hallite technical representative for application support.

SURFACE ROUGHNESS	$\mu\text{mRa}$	$\mu\text{mRz}$	$\mu\text{mRt}$	$\mu\text{inRa}$	$\mu\text{inRz}$	$\mu\text{inRt}$
Dynamic Sealing Face $\varnothing d_1$	0.1 - 0.4	1.6 max	4 max	4 - 16	63 max	157 max
Static Sealing Face $\varnothing D_1$	1.6 max	6.3 max	10 max	63 max	250 max	394 max
Static Housing Faces $L_1$	3.2 max	10 max	16 max	125 max	394 max	630 max

RADII		
Rod Diameter $\varnothing d_1$ , mm	$\leq 19$	$\geq 19$
Min Chamfer C mm	0.50	1.00
Max Fillet Rad $r_1$ , mm	0.40	0.40

TOLERANCES	$\varnothing d_1$	$\varnothing D_1$	$L_1$
mm	f9	H8	+0.50 -0



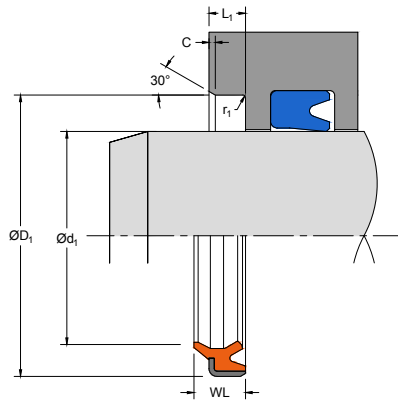
# 864

## WIPER

*Double-Lipped  
Polyurethane, Metal-Cased,  
Designed for Popular Asian Housings*

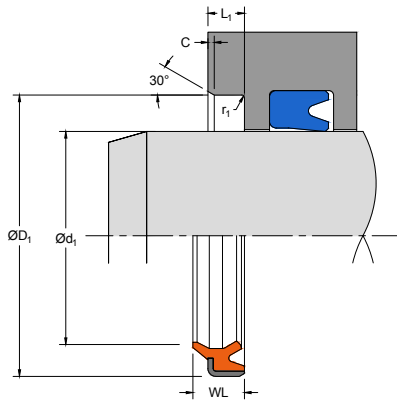
### PART NUMBER RANGE

METRIC						
Ød <sub>1</sub>	TOL f <sub>9</sub>	ØD <sub>1</sub>	TOL H11	L <sub>1</sub> +0.50 -0	WL	PART No.
25.00	-0.02 -0.07	35.00	+0.04 0.00	5.00	8.00	4680506
30.00	-0.02 -0.07	40.00	+0.04 0.00	5.00	8.00	4680606
30.00	-0.02 -0.07	42.00	+0.04 0.00	6.00	9.00	4680706
30.00	-0.02 -0.07	47.00	+0.04 0.00	7.00	10.00	4683006
32.00	-0.03 -0.09	52.00	+0.05 0.00	8.00	11.00	4683106
35.00	-0.03 -0.09	45.00	+0.04 0.00	7.00	10.00	4680806
35.00	-0.03 -0.09	47.00	+0.04 0.00	7.00	10.00	4680906
36.00	-0.03 -0.09	48.00	+0.04 0.00	7.00	10.00	4683206
40.00	-0.03 -0.09	50.00	+0.04 0.00	5.00	8.00	4681006
40.00	-0.03 -0.09	52.00	+0.05 0.00	7.00	10.00	4681106
45.00	-0.03 -0.09	55.00	+0.05 0.00	7.00	10.00	4681206
45.00	-0.03 -0.09	57.00	+0.05 0.00	7.00	10.00	4681306
50.00	-0.03 -0.09	62.00	+0.05 0.00	7.00	10.00	4680206
50.00	-0.03 -0.09	72.00	+0.05 0.00	8.00	11.00	4683306
55.00	-0.03 -0.10	69.00	+0.05 0.00	8.00	11.00	4681406
60.00	-0.03 -0.10	74.00	+0.05 0.00	8.00	11.00	4681506
60.00	-0.03 -0.10	82.00	+0.05 0.00	11.00	14.00	4683406



## PART NUMBER RANGE

METRIC						
Ød <sub>1</sub>	TOL f <sub>9</sub>	ØD <sub>1</sub>	TOL H11	L <sub>1</sub> +0.50 -0	WL	PART No.
65.00	-0.03 -0.10	79.00	+0.05 0.00	8.00	11.00	4681606
70.00	-0.03 -0.10	80.00	+0.05 0.00	7.00	9.00	4684306
70.00	-0.03 -0.10	84.00	+0.05 0.00	8.00	11.00	4681706
75.00	-0.03 -0.10	89.00	+0.05 0.00	8.00	11.00	4681806
80.00	-0.03 -0.10	94.00	+0.05 0.00	8.00	11.00	4681906
85.00	-0.04 -0.12	99.00	+0.05 0.00	8.00	11.00	4682006
90.00	-0.04 -0.12	104.00	+0.05 0.00	8.00	11.00	4682106
90.00	-0.04 -0.12	105.00	+0.05 0.00	6.00	9.00	4683606
95.00	-0.04 -0.12	109.00	+0.05 0.00	8.00	11.00	4682206
100.00	-0.04 -0.12	114.00	+0.05 0.00	8.00	11.00	4682306
100.00	-0.04 -0.12	115.00	+0.05 0.00	7.50	10.00	4683706
110.00	-0.04 -0.12	126.00	+0.06 0.00	9.00	12.00	4682406
115.00	-0.04 -0.12	131.00	+0.06 0.00	9.00	12.00	4684206
120.00	-0.04 -0.12	135.00	+0.06 0.00	7.00	10.00	4683806
120.00	-0.04 -0.12	136.00	+0.06 0.00	9.00	12.00	4682506
130.00	-0.04 -0.14	145.00	+0.06 0.00	9.00	12.00	4683906
130.00	-0.04 -0.14	146.00	+0.06 0.00	9.00	12.00	4682606



# 864

## WIPER

*Double-Lipped  
Polyurethane, Metal-Cased,  
Designed for Popular Asian Housings*

### PART NUMBER RANGE

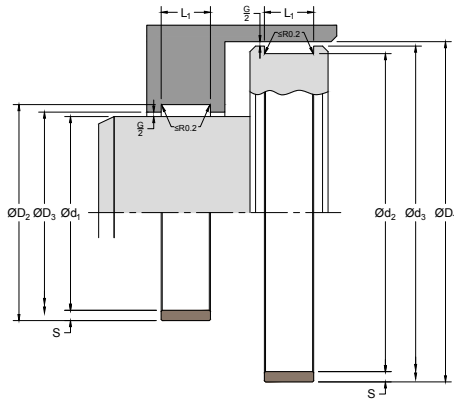
METRIC						
Ød <sub>1</sub>	TOL f9	ØD <sub>1</sub>	TOL H11	L <sub>1</sub> +0.50 -0	WL	PART No.
135.00	-0.04 -0.14	155.00	+0.06 0.00	10.00	14.00	4683506
140.00	-0.04 -0.14	155.00	+0.06 0.00	9.00	12.00	4684006
140.00	-0.04 -0.14	160.00	+0.06 0.00	10.00	14.00	4682706
150.00	-0.04 -0.14	170.00	+0.06 0.00	10.00	14.00	4682806
160.00	-0.04 -0.14	180.00	+0.06 0.00	10.00	14.00	4682906





# BEARINGS





# 87

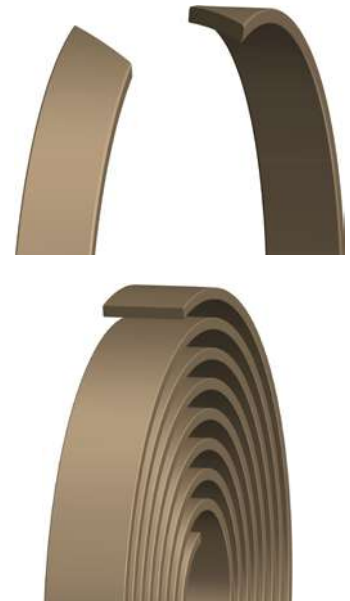
## BEARING

Bronze-Filled PTFE

### DESIGN

The Hallite 87 bronze-filled PTFE bearing strip is designed to provide an extremely effective, hard wearing, and easy-to-use bearing solution for lubricated or non-lubricated reciprocating, oscillating, and slow rotary movement applications. Hallite recommends using the Hallite 87 in light-duty applications and particularly for small diameters where the flexibility of the strip makes installation into a groove easier.

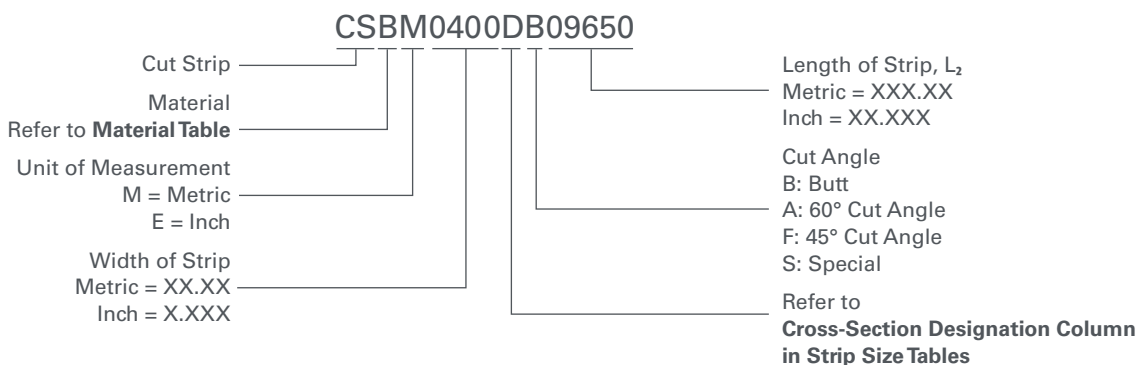
The low friction PTFE material reduces 'stick slip' between moving parts. The material is compatible with hydraulic mineral oil, lubricating oil, water based and synthetic fire resistant fluids and lubricating grease. It has excellent heat resistance and strength to resist creep. Although the material is rated at 200°C (390°F), the recommended maximum temperature for bearing applications is 60°C (140°F).



### FEATURES

- Ultra low friction
- Infinite length range
- Low stick slip
- Extremely flexible
- Easy to install

### PART NUMBER STRUCTURE FOR INDIVIDUAL BEARING



## TECHNICAL DETAILS

OPERATING CONDITIONS	METRIC	INCH
Maximum Speed	5.0 m/sec	16 ft/sec
Temperature Range	-50°C +200°C	-58°F +390°F

### NOTE

Data given are maximum values and can apply depending on specific application. Maximum ratings of temperature, pressure, or operating speeds are dependent on fluid medium, surface, gap value, and other variables such as dynamic or static service. Maximum values are not intended for use together at the same time, e.g. max temperature and max pressure. Please contact your Hallite technical representative for application support.

TYPICAL PHYSICAL PROPERTIES	METRIC	INCH
Specific Gravity	3.1	3.1
Compression Stress at Yield	20 MN/m <sup>2</sup> @ 23°C	2900 psi @ 73°F
Compression Stress at Yield	9 MN/m <sup>2</sup> @ 80°C	1300 psi @ 176°F
Coefficient of Thermal Conductivity	2.5 W/mK	1.4 Btu/hft°F
Coefficient of Thermal Expansion - Length & Thickness	6.5 x 10 <sup>-5</sup> per °C	3.6 x 10 <sup>-5</sup> per °F
Coefficient of Dynamic Friction on Steel Surface (0.2 µmRa) / (8 µinCLA)	Dry 0.25	Dry 0.25
	Lubricated 0.05	Lubricated 0.05

### NOTE

Hallite recommends applying a 4:1 factor of safety when using the compressive stress at yield in your bearing load calculation.

HOUSING DETAILS & TOLERANCES		
Rod	Ød <sub>1</sub> , mm	f9
	ØD <sub>2</sub> = Ød <sub>1</sub> + 2S mm	≤ Ø80 H10 > Ø80 H9
	ØD <sub>3</sub> = Ød <sub>1</sub> + G mm	G min / max
	L <sub>1</sub> , mm	+0.20 -0
Piston	ØD <sub>1</sub> , mm	H11
	Ød <sub>2</sub> = ØD <sub>1</sub> - 2S mm	h8
	Ød <sub>3</sub> = ØD <sub>1</sub> - G mm	G min / max
	L <sub>1</sub> , mm	+0.20 -0

### NOTE

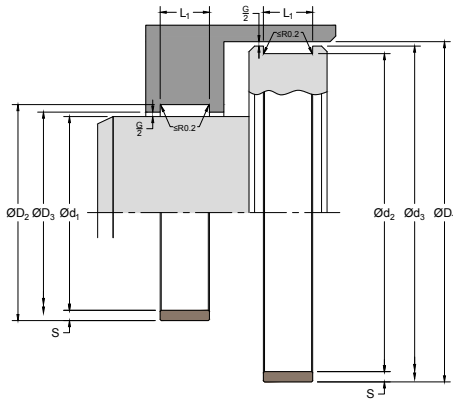
G min controls the minimum metal-to-metal clearance between the gland and rod or between bore and piston. G max controls the maximum extrusion gap seen by a seal associated with the bearing. Typically, G min should be 0.70 mm (0.0280 in) but can be reduced when required by the extrusion gap for the seal and the build-up of tolerances. The absolute minimum metal-to-metal clearance recommended is 0.10 mm (0.004 in). More information can be found in the Housing Designs and Extrusion Gaps pages at the front of the catalogue. For applications not using a seal G max, see part number range in the following pages.

SURFACE ROUGHNESS	µmRa	µmRz	µmRt	µinRa	µinRz	µinRt
Dynamic Sealing Face Ød <sub>1</sub> , ØD <sub>1</sub>	0.4	1.6 max	4 max	16	63 max	157 max
Static Sealing Face ØD <sub>2</sub> , L <sub>1</sub> , Ød <sub>2</sub>	3.2 max	10 max	16 max	125 max	394 max	630 max

# 87

## BEARING

Bronze-Filled PTFE



### IDENTIFICATION & INSTALLATION

Part numbers for continuous lengths are given in the Standard Strip Size and Additional Strip Size tables and are purchased by the metre.

If a cut length for a particular housing is required, please use the part number structure on the first page of the Hallite 87 data sheet and use the tables below to identify the part designators that correspond to the type of product you require.

When ordering please clearly state whether cut lengths or a continuous length is required.

Our standard range of cross section sizes are proportioned to be wrapped around a wide range of rod or piston diameters.

### CUTTING STRIP TO LENGTH

Instructions for cutting bearing strip to size:

1. Calculate the developed length of the strip,  $L_2$ . The developed length is the circumferential length of the centre line of the strip when installed.

2a. For piston applications:

$$L_2 = \pi \times (\text{Ø}D_1 - S) \times 0.99 - 0.8\text{mm}$$

2b. For rod applications:

$$L_2 = \pi \times (\text{Ø}d_1 + S) \times 0.99 - 0.8\text{mm}$$

3. Cut to length,  $L_2$ , using sharp knife.

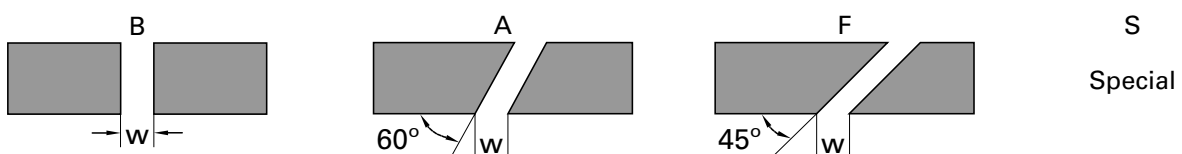
It is recommended that the standard cutting angle is used for the majority of applications.

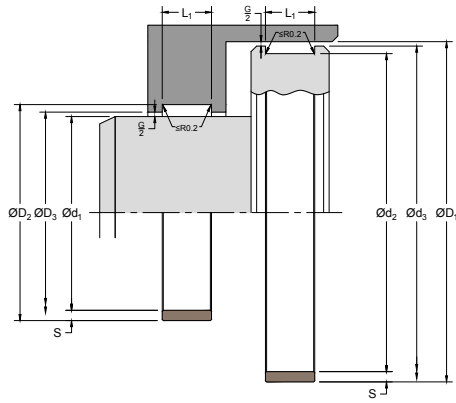
### MATERIAL TABLE

This product comes in a number of material options to extend operating conditions. Contact your local Hallite technical team to decide which is best for your application. Use the part designator in the table below as the last digit of the part number to specify material choice when ordering. For further material details, please refer to the Hallite Material Table.

MATERIAL OPTIONS	Name	Type	Colour	Part Designator
Standard	Bronze-Filled	Bronze	B	10
Optional	Bronze/MoS <sub>2</sub>	Dark Bronze	T	11
Optional	Carbon-Filled	Black	C	12
Optional	Carbon-Filled (BAM Certified)	Black	G	16

### BEARING STRIP CUT ANGLE



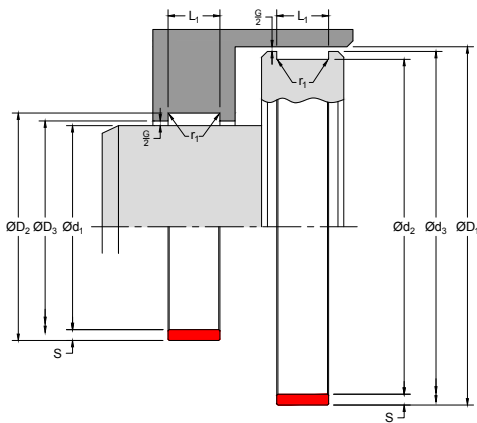


## STANDARD STRIP SIZES

METRIC								
Ød <sub>1</sub> RANGE	ØD <sub>1</sub> RANGE	L <sub>1</sub>	S	Cross-Section Designation	G MAX	G MIN	W	Part No.
8 - 20	10 - 25	2.5	1.55	D	AS REQUIRED BY THE SEAL EXTRUSION GAP (See note below)	0.6	1.0 - 2.0	6663000
8 - 20	10 - 25	4.0	1.55	D		0.6	1.0 - 2.0	6663100‡
20 - 75	25 - 80	5.6	2.50	G		0.7	2.0 - 3.5	6663200‡
35 - 300	40 - 320	9.7	2.50	G		0.7	2.5 - 7.0	6658800‡
120 - 900	125 - 900	15.0	2.50	G		0.8	5.0 - 18.0	6658900‡
200 - 900	200 - 900	20.0	2.50	G		1.0	7.0 - 18.0	6663600
300 - 900	300 - 900	25.0	2.50	G		1.0	10.0 - 18.0	6663700‡
<b>NOTE</b>				For applications not using a seal, G Max can be:		Part numbers suffixed ‡ indicate cross-sections to ISO 10766.		
	S	G Max	S	G Max				
	1.55	1.00	3.00	1.60				
	2.00	1.10	4.00	2.0				
	2.50	1.60						

## ADDITIONAL STRIP SIZES

METRIC			
L <sub>1</sub>	S	Cross-Section Designation	Part No.
5.60	1.50	C	8772000
6.00	4.00	K	8772100
6.30	2.00	E	8772200
6.30	2.50	G	8772300
8.00	1.50	C	8772400
8.00	2.00	E	8772500
8.00	4.00	K	8772600
9.70	4.00	K	8772700
10.00	2.00	E	6663300
10.00	2.50	G	8772800
12.00	2.00	E	8772900
12.00	2.50	G	8773000
15.00	2.00	E	6663400
20.00	2.00	E	6635000
25.00	3.00	H	8773100
30.00	3.00	H	8773200
50.00	2.00	E	8773300



# 506

## BEARING

*Polyester Fabric, Rod and Piston and Coil*

### DESIGN

The Hallite 506 bearing strip is designed to provide an extremely effective, hard wearing, and easy-to-use bearing solution for reciprocating, oscillating, and slow rotary movement applications. Manufactured to very tight tolerances, the Hallite 506 is capable of withstanding extreme side loads and preventing metal-to-metal contact between the piston and the bore or the rod and the gland. The Hallite 506 has become the industry standard favoured by designers and specifiers alike in many of today's most arduous hydraulic applications around the world.

The Hallite 506 is available in three forms: cut bearing rings, spiral lengths, and flat coils. Spiral lengths and flat coils are recommended to customers who want to cut their own custom sizes. Spiral lengths are recommended to distributors or customers who may need to fit a wide range of application sizes in a particular cross section.

The Hallite 506 bearing strip is manufactured by a patented process, using a woven fabric reinforced polyester resin material, and is proven to be compatible with a wide range of fluids including: mineral oils, water-based fluids, and phosphate esters. The construction of the bearing strip incorporates micro-indentations on the surface to trap fluid and provide built-in lubrication to the bearing.

The rectangular section strip is available in a wide range of inch and metric sizes, including cross sections specified in ISO 10766.



### FEATURES

- Tight tolerances
- Available in ready-made bearings cut to size and to customer specifications
- Available in spiral lengths and flat coils
- Low friction

### MATERIALS

This product comes in a number of material options to extend operating conditions. Contact your local Hallite technical team to decide which is best for your application. Use the part designator in the table below as the last digit of the part number to specify material choice when ordering. For further material details, please refer to the Hallite Material Table in front of catalogue.

MATERIAL OPTIONS	Name	Type	Colour
<b>Standard</b>	TSE 041	Thermoset Polyester	Red
<b>Optional</b>	TSE 042	Thermoset Polyester (Reduced Friction)	Red

## TECHNICAL DETAILS

OPERATING CONDITIONS	METRIC		INCH	
Temperature Range	-40°C +120°C		-40°F +250°F	
Limiting PV Values Lubricated*	Speed(V) m/sec	Pressure(P) MN/m <sup>2</sup>	Speed(V) ft/sec	Pressure(P) psi.
	0.1	10.0	0.3	1500
	1.0	6.0	3.0	900
	5.0	0.8	16.0	120

## NOTE

Please note that for reciprocating applications, the compressive stress at yield should be used for design calculations. For rotary shafts use the limiting P.V. values, it is suggested that a 2:1 factor of safety is applied

## NOTE

Data given are maximum values and can apply depending on specific application. Maximum ratings of temperature, pressure, or operating speeds are dependent on fluid medium, surface, gap value, and other variables such as dynamic or static service. Maximum values are not intended for use together at the same time, e.g. max temperature and max pressure. Please contact your Hallite technical representative for application support.

TYPICAL PHYSICAL PROPERTIES	METRIC	INCH
Specific Gravity	1.27	1.27
Compression Stress at Failure	450 MN/m <sup>2</sup> @ 23°C	65000 psi @ 73°F
Compression Stress at Yield	115 MN/m <sup>2</sup> @ 23°C	16500 psi @ 73°F
Compression Stress at Yield	58 MN/m <sup>2</sup> @ 80°C	8500 psi @ 176°F
Coefficient of Thermal Conductivity	0.27 W/mK	0.16 Btu/hft °F
Coefficient of Thermal Expansion - Thickness	9 X 10 <sup>-5</sup> per °C	5 X 10 <sup>-5</sup> per °F
Coefficient of Thermal Expansion - Length	13 X 10 <sup>-5</sup> per °C	7.3 X 10 <sup>-5</sup> per °F
Coefficient of Dynamic Friction on Steel Surface (0.2 µmRa) / (8 µinCLA)	Dry 0.50	Dry 0.50
	Lubricated 0.06	Lubricated 0.06

BEARING STRIP TOLERANCES	L <sub>1</sub> mm	S mm	L <sub>1</sub> in	S in
	-0.10 -0.60	-0.02 -0.08	-0.005 -0.025	-0.001 -0.003

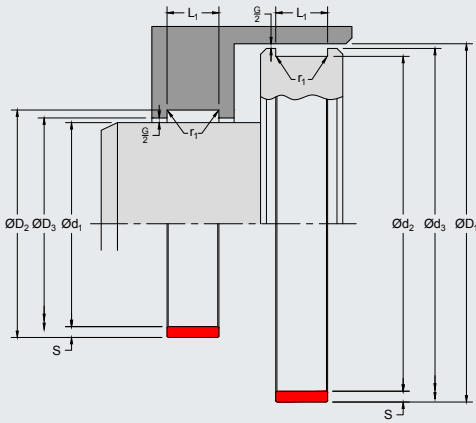
WIDTH OF BEARING SPLIT – W	Ød <sub>1</sub> , ØD <sub>1</sub> mm	W mm	Ød <sub>1</sub> , ØD <sub>1</sub> in	W in
	≤50	3.00 - 1.50	≤2	0.12 - 0.06
	≤120	5.00 - 3.50	≤5	0.19 - 0.14
	≤250	9.00 - 7.25	≤10	0.35 - 0.29
	≤550	17.00 - 15.00	≤ 22	0.67 - 0.59



# 506

## BEARING

*Polyester Fabric, Rod and Piston and Coil*

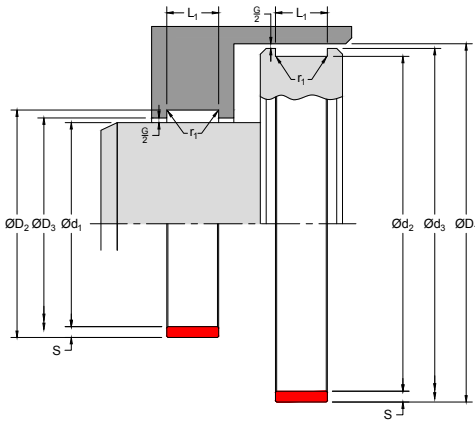


HOUSING DETAILS & TOLERANCES	METRIC		INCH	
<b>Rod</b>	$\text{Ø}d_1$ mm	f9	$\text{Ø}d_1$ in	f9
	$\text{Ø}D_2 = \text{Ø}d_1 + 2S$ mm	$\leq \text{Ø}80.00$ H10 $> \text{Ø}80.00$ H9	$\text{Ø}D_2 = \text{Ø}d_1 + 2S$ in	$\leq \text{Ø}3.000$ H10 $> \text{Ø}3.000$ H9
	$\text{Ø}D_3 = \text{Ø}d_1 + G$ mm	G min / max	$\text{Ø}D_3 = \text{Ø}d_1 + G$ in	G min / max
	$L_1$ mm	+0.20 -0	$L_1$ in	+0.008 -0
	Max Fillet Rad $r_1$ mm	0.40	Max Fillet Rad $r_1$ in	0.016
<b>Piston</b>	$\text{Ø}D_1$ mm	H11	$\text{Ø}D_1$ in	H11
	$\text{Ø}d_2 = \text{Ø}D_1 - 2S$ mm	h8	$\text{Ø}d_2 = \text{Ø}D_1 - 2S$ in	f9
	$\text{Ø}d_3 = \text{Ø}D_1 - G$ mm	G min / max	$\text{Ø}d_3 = \text{Ø}D_1 - G$ in	G min / max
	$L_1$ mm	+0.20 -0	$L_1$ in	+0.008 -0
	Max Fillet Rad $r_1$ mm	0.40	Max Fillet Rad $r_1$ in	0.016

HOUSING SURFACE ROUGHNESS	$\mu\text{mRa}$	$\mu\text{mRz}$	$\mu\text{mRt}$	$\mu\text{inRa}$	$\mu\text{inRz}$	$\mu\text{inRt}$
<b>Dynamic Sealing Face <math>\text{Ø}d_1, \text{Ø}D_1</math></b>	0.4	1.6 max	4 max	16	63 max	157 max
<b>Static Sealing Face <math>\text{Ø}D_2, L_1, \text{Ø}d_2</math></b>	3.2 max	10 max	16 max	125 max	394 max	630 max

### NOTE

G min controls the minimum metal-to-metal clearance between the gland and rod or between bore and piston. G max controls the maximum extrusion gap seen by a seal associated with the bearing. Typically, G min should be 0.70mm/0.0280in but can be reduced when required by the extrusion gap for the seal and the build up of tolerances. The absolute minimum metal-to-metal clearance recommended is 0.10mm/0.004in. More information can be found in the Housing Designs and Extrusion Gaps pages at the front of the catalogue. For applications not using a seal, see part number range for G Max values.



## IDENTIFICATION & INSTALLATION

The ranges shown on the following pages are Hallite's most popular sizes. The section ranges identify section and groove width; from these nearly any diameter of cut ring or spiral length can be manufactured. If you cannot find the size you are looking for, please contact your local Hallite sales office for additional size information.

- Cut rings are ready made bearings cut to size to suit either rod or piston housings or ready for installation. These are ideal for medium to high volume user. A comprehensive list of cut ring sizes can be found on the Hallite web site or, in the future, the Hallite Product Finder app.
- Spiral lengths are available in a wide range of preformed diameters and are supplied in continuous lengths to suit a range of inside and outside diameters. These are ideal for lower volume users required various diameters. A range of the spiral sizes can be found in the part number listing on the following pages.
- Flat coils are packaged in a dispenser for ease of storage and handling. The flat coils are supplied in 10 metre lengths suitable for a wide range of diameters. These are ideal for using or supplying one-off bearings for small volume requirements. A range of the flat coil sizes can be found in the part number listing on the following pages.

All standard bearing strips are printed with a size reference and include distance marking every 100mm on metric size sections and every six inches on inch size sections for guidance only.

When ordering please clearly state whether cut rings, spiral lengths or flat coils are required.

For cut rings and spiral lengths please state whether the application is for a rod or piston and provide inside ( $\text{Ø}d$ ) or outside ( $\text{Ø}D$ ) diameters, groove width ( $L_1$ ) and section ( $S$ ) dimensions. Where spiral lengths are ordered also specify length required.

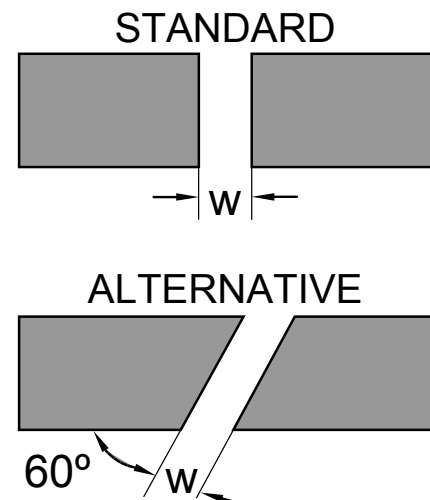
For flat coils please specify groove width ( $L_1$ ) and section ( $S$ ) dimensions.

## INSTRUCTIONS FOR CUTTING BEARING STRIP TO SIZE:

1. Select the groove width ( $L_1$ ) and section ( $S$ ) required.
2. In the case of a rod bearing, position the bearing strip around the rod or in the case of a piston bearing, fit the bearing strip in the piston groove and mark the point of overlap. Determine the correct width of bearing split ( $W$ ) for the  $\text{Ø}d$  or  $\text{Ø}D$  being used, as indicated in the technical details, and make a second mark.
3. Remove the strip and cut at the second marked position to the desired angle using anvil cutters or other similar cutting tool.

It is recommended that the standard cutting angle is used for the majority of applications.

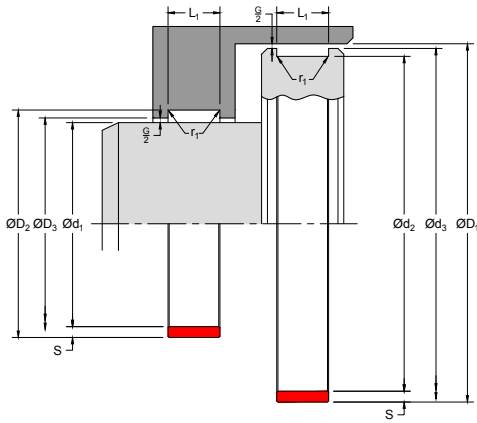
If necessary, coil diameters can be resized by curing on a suitable mandrel in an oven for one hour at  $120^\circ\text{C}$  ( $250^\circ\text{F}$ ) and allowing to cool on the mandrel.



# 506

## BEARING

*Polyester Fabric, Rod and Piston and Coil*



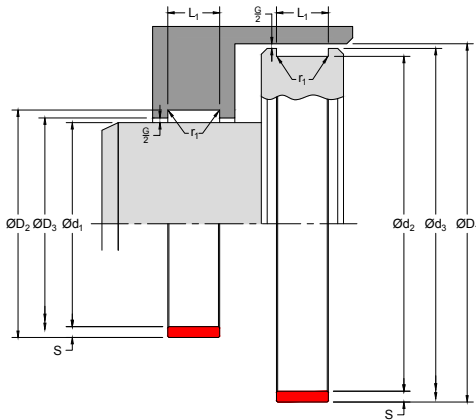
### SECTION RANGE

METRIC					
S	L <sub>1</sub>	S	L <sub>1</sub>	S	L <sub>1</sub>
1.50	5.60	2.50	15.00‡	3.00	30.00
2.00	6.30	2.50	16.00	3.00	35.00
2.00	8.10	2.52	19.50	3.00	40.00
2.00	9.70	2.50	20.00	3.20	9.70
2.00	10.00	2.50	25.00‡	3.20	19.70
2.00	15.00	2.52	30.00	3.50	25.00
2.00	20.00	2.50	35.00	4.00	5.00
2.00	22.00	2.50	40.00	4.00	6.10
2.00	25.00	2.50	50.00	4.00	9.70
2.50	5.60‡	3.00	9.70	4.00	15.00
2.50	6.30	3.00	12.00	4.00	20.00
2.50	7.00	3.00	12.80	4.00	25.00‡
2.50	8.00	3.02	15.00	4.00	30.00
2.50	9.70‡	3.00	16.00	4.00	35.00
2.50	12.00	3.00	20.00	4.00	40.10
2.50	13.00	3.00	25.00		

**NOTE** Within the size range, items suffixed ‡ indicate cross sections to ISO 10766.

### INCH

S	L <sub>1</sub>
0.063	0.375
0.125	0.375
0.125	0.500
0.125	0.625
0.125	0.750
0.125	1.000
0.125	1.500



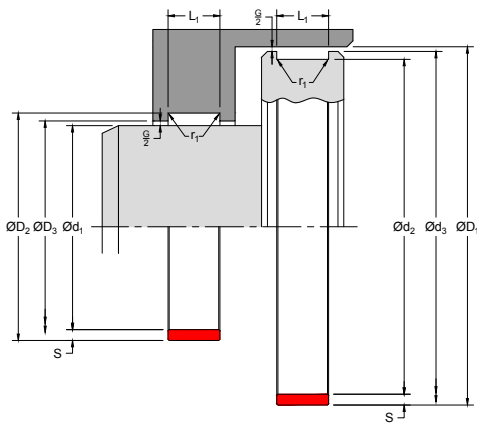
## SPIRAL LENGTHS

METRIC						
Ød <sub>1</sub>	ØD <sub>1</sub>	S	L <sub>1</sub>	G MAX	G MIN*	PART NO.
25 - 41	45 - 90	2.00	10.00		0.70	8501310
35 - 70	74 - 160	2.00	10.00		0.70	8502610
70 - 155	159 - 310	2.00	10.00		0.70	8502252
35 - 50	54 - 110	2.00	15.00		0.70	8503357
50 - 100	104 - 210	2.00	15.00		0.70	8503175
90 - 180	184 - 370	2.00	15.00		0.70	8503358
25 - 30	35 - 70	2.50	5.60		0.70	8502000‡
25 - 50	55 - 110	2.50	5.60		0.70	8502020‡
50 - 100	105 - 210	2.50	5.60		0.70	8502040‡
25 - 40	45 - 90	2.50	9.70		0.70	8502100‡
35 - 70	75 - 150	2.50	9.70		0.70	8502120‡
70 - 150	155 - 310	2.50	9.70		0.70	8502140‡
40 - 50	55 - 110	2.50	13.00		0.70	8502200
50 - 100	105 - 210	2.50	13.00		0.70	8502220
90 - 180	185 - 370	2.50	13.00		0.80	8502230
40 - 50	55 - 110	2.50	15.00	As required by the seal extrusion gap	0.70	8502300‡
50 - 100	105 - 210	2.50	15.00		0.70	8502330‡
90 - 180	185 - 370	2.50	15.00	For applications not using a seal G MAX can be 1.6mm	0.80	8502350‡
50 - 80	85 - 170	2.50	20.00		0.70	8502400
75 - 150	155 - 310	2.50	20.00		0.80	8502410
125 - 250	255 - 510	2.50	20.00		0.80	8502430
60 - 80	85 - 170	2.50	25.00		0.70	8502500‡
70 - 150	155 - 310	2.50	25.00		0.80	8502520‡
125 - 250	255 - 510	2.50	25.00		0.80	8502530‡
40 - 50	56 - 100	3.00	9.70		0.80	8503369
50 - 100	106 - 210	3.00	9.70		0.80	8503370
100 - 150	156 - 310	3.00	9.70		0.80	8503371
50 - 60	66 - 120	3.00	12.80		0.70	8503037
60 - 104	110 - 220	3.00	12.80		0.80	8503038
90 - 149	155 - 300	3.00	12.80		0.80	8503039
55 - 80	86 - 170	3.00	20.00		0.80	8503124
80 - 150	156 - 310	3.00	20.00		0.80	8502635
140 - 250	256 - 510	3.00	20.00		0.80	8503189
50 - 75	81 - 160	3.02	15.00		0.70	8502734
60 - 80	68 - 170	4.00	6.10		0.80	8503359

### NOTE

\*G MIN value can be reduced if required by the seal's maximum extrusion gap. Refer to Housing Design section in the front of catalogue. ‡ Within the size range, items suffixed ‡ indicate cross sections to ISO 10766.





# 506

## BEARING

Polyester Fabric, Rod and Piston and Coil

### SPIRAL LENGTHS - CONTINUED

METRIC						
Ød <sub>1</sub>	ØD <sub>1</sub>	S	L <sub>1</sub>	G MAX	G MIN*	PART NO.
80 - 150	158 - 310	4.00	6.10		0.80	8503360
150 - 250	258 - 510	4.00	6.10		0.80	8503361
60 - 80	88 - 170	4.00	9.70		0.80	8503362
80 - 150	158 - 310	4.00	9.70		0.80	8503363
150 - 250	258 - 510	4.00	9.70	As required by the seal extrusion gap	0.80	8503364
60 - 80	88 - 170	4.00	20.00		0.80	8503365
80 - 150	158 - 310	4.00	20.00	For applications not using a seal G MAX can be 1.6mm	0.80	8503366
150 - 250	258 - 510	4.00	20.00		0.80	8503191
120 - 150	158 - 310	4.00	25.00		0.80	8503367‡
150 - 250	258 - 510	4.00	25.00		0.80	8503192‡
120 - 150	158 - 310	4.00	30.00		0.80	8503368
150 - 250	258 - 510	4.00	30.00		0.80	8503193
170 - 200	208 - 410	4.00	40.10		0.80	8503179
200 - 300	308 - 610	4.00	40.10		0.80	8503180

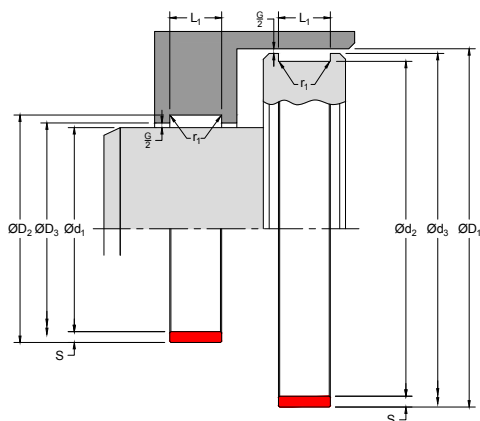
#### NOTE

\*G MIN value can be reduced if required by the seal's maximum extrusion gap. Refer to Housing Design section in the front of catalogue. ‡ Within the size range, items suffixed ‡ indicate cross sections to ISO 10766.

INCH						
Ød <sub>1</sub>	ØD <sub>1</sub>	S	L <sub>1</sub>	G MAX	G MIN*	PART NO.
1.000 - 1.375	1.625 - 3.500	0.125	0.375		0.031	8502098
1.250 - 1.875	2.125 - 4.250	0.125	0.375		0.031	8502099
2.000 - 3.500	3.750 - 6.250	0.125	0.375		0.031	8502183
1.250 - 1.750	2.000 - 4.000	0.125	0.500		0.031	8502089
1.750 - 3.500	3.750 - 6.250	0.125	0.500	As required by the seal extrusion gap	0.031	8502090
3.500 - 6.000	6.250 - 10.000	0.125	0.500		0.031	8502091
8.000 - 12.500	12.750 - 25.000	0.125	0.500	For applications not using a seal, G MAX can be 0.080in	0.031	8502720
2.000 - 3.500	3.750 - 6.250	0.125	0.625		0.031	8502092
3.500 - 6.000	6.250 - 10.000	0.125	0.625		0.031	8502093
2.000 - 3.500	3.750 - 6.250	0.125	0.750		0.031	8502094
3.500 - 6.000	6.250 - 10.000	0.125	0.750		0.031	8502095
2.500 - 3.500	3.750 - 6.250	0.125	1.000		0.031	8502096
3.500 - 6.000	6.250 - 10.000	0.125	1.000		0.031	8502097
8.000 - 12.500	12.750 - 25.000	0.125	1.000		0.031	8502222

#### NOTE

\*G MIN value can be reduced if required by the seal's maximum extrusion gap. Refer to Housing Design section in front of catalogue.



## FLAT COILS

METRIC						
Ød <sub>1</sub>	ØD <sub>1</sub>	S	L <sub>1</sub>	G MAX	G MIN*	PART NO.
140.00	190.00	1.50	5.60		0.70	8581810
140.00	210.00	2.00	9.70		0.70	8581910
140.00	210.00	2.00	10.00		0.70	8584610
140.00	210.00	2.00	20.00		0.70	8582210
140.00	210.00	2.00	15.00		0.70	8581210
140.00	230.00	2.50	5.60		0.70	8580010‡
140.00	230.00	2.50	6.30	As required by the seal extrusion gap	0.70	8581310
140.00	230.00	2.50	8.00		0.70	8581610
140.00	230.00	2.50	9.70		0.70	8580110‡
140.00	230.00	2.50	13.00	For applications not using a seal G MAX can be 1.6mm	0.70	8581110
140.00	230.00	2.50	15.00		0.70	8580210‡
140.00	230.00	2.50	20.00		0.80	8580310
140.00	230.00	2.50	25.00		0.80	8580410‡
140.00	230.00	2.50	30.00		0.70	8582010
140.00	240.00	3.00	9.70		0.70	8581410
140.00	240.00	3.00	12.80		0.70	8581010
140.00	240.00	3.00	20.00		0.70	8581510
140.00	240.00	3.02	15.00		0.70	8581710

### NOTE

\* G MIN value can be reduced if required by the seal's maximum extrusion gap. Refer to Housing Design section in the front of catalogue. ‡ Within the size range, items suffixed ‡ indicate cross sections to ISO 10766.

INCH						
Ød <sub>1</sub>	ØD <sub>1</sub>	S	L <sub>1</sub>	G MAX	G MIN*	PART NO.
5.500	9.750	0.125	0.375	As required by the seal extrusion gap	0.031	8580510
5.500	9.750	0.125	0.500		0.031	8580610
5.500	9.750	0.125	0.625	For applications not using a seal, G MAX can be 0.080in	0.031	8580710
5.500	9.750	0.125	0.750		0.031	8580810
5.500	9.750	0.125	1.000		0.031	8580910

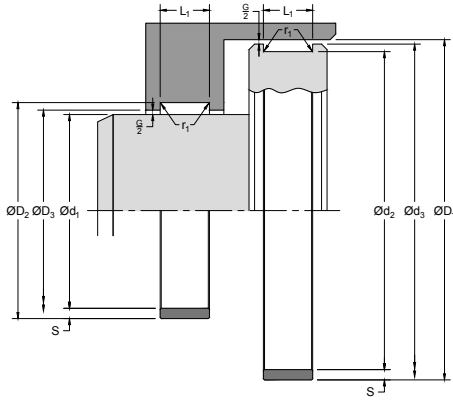
### NOTE

\* G MIN value can be reduced if required by the seal's maximum extrusion gap. Refer to Housing Design section in front of catalogue.

### NOTE

For a comprehensive list of all Hallite 506 cut ring sizes and part numbers for rod and piston applications, please refer to the Hallite website.





# 533

## BEARING

*Glass-Filled  
Nylon, Piston and Rod*

### DESIGN

The Hallite 533 glass-filled polyamide bearing is designed to provide an extremely effective, hard wearing, and easy-to-use bearing solution for reciprocating, oscillating, and slow rotary movement applications. The Hallite 533 is capable of withstanding high side loads and preventing metal-to-metal contact between the piston and the bore or the rod and the gland.

The PA 533 material is heat stabilised 33% glass reinforced nylon 66, which offers excellent bearing properties. The material is compatible with hydraulic and lubricating oils. The PA 533 material is not recommended for use in water based fluids (HFA) or where significant water is present, due to the swell of the nylon. For these applications Hallite recommends the use of Hallite 506, Hallite 708, or Hallite 63 bearings.

The Hallite 533 is available in molded rings. The rectangular section strip is available in a wide range of inch and some metric sizes which are available upon request. If you cannot find the size you are looking for, please contact your local Hallite sales office for additional size information.



### FEATURES

- Moulded to size
- Robust
- Long life
- Economical
- Easy to install

### MATERIALS

As standard, this product comes in the following material. Contact your local Hallite technical team if you would like to find out if this profile can be made in a custom material to suit your application. For further material details, please refer to the Hallite Material Table.

MATERIAL OPTIONS	Name	Type	Colour
Standard	PA 533	PA-GF	Black



## TECHNICAL DETAILS

OPERATING CONDITIONS	METRIC	INCH
Maximum Speed	5.0 m/sec	16.0 ft/sec
Temperature Range	-40 +120°C	-40 +250°F

### NOTE

Data given are maximum values and can apply depending on specific application. Maximum ratings of temperature, pressure, or operating speeds are dependent on fluid medium, surface, gap value, and other variables such as dynamic or static service. Maximum values are not intended for use together at the same time, e.g. max temperature and max pressure. Please contact your Hallite technical representative for application support.

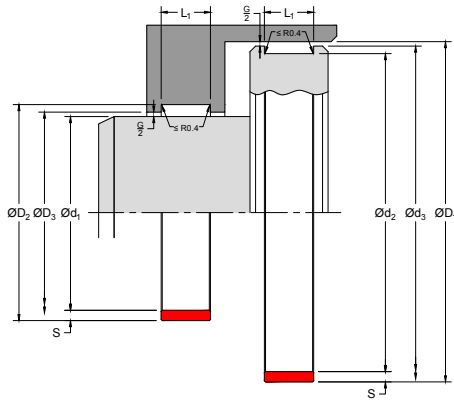
SURFACE ROUGHNESS	$\mu\text{mRa}$	$\mu\text{mRz}$	$\mu\text{mRt}$	$\mu\text{inRa}$	$\mu\text{inRz}$	$\mu\text{inRt}$
Dynamic Sealing Face - Rod $\varnothing d_1$	0.40	1.6 max	4 max	16	63 max	157 max
Static Sealing Face - Rod $\varnothing D_2, L_1$	3.2 max	10 max	16 max	125 max	394 max	630 max
Dynamic Sealing Face - Piston $\varnothing d_1, L_1$	0.40	1.6 max	4 max	16	63 max	157 max
Static Sealing Face - Rod $\varnothing D_2, L_1$	3.2 max	10 max	16 max	125 max	394 max	630 max

TYPICAL PHYSICAL PROPERTIES	TEST METHOD	METRIC	INCH
Tensile Strength at Yield	ASTM D638	186 MPa	27000 psi
Elongation at Break	ASTM D638	3.00%	3.00%
Flexural Strength at Yield	ASTM D790	262 MPa	38000 psi
Flexural Modulus	ASTM D790	8965 MPa	1300000 psi
Izod Impact	ASTM D256	112 J/m	2.1 ft-lb/in
Specific Gravity	ASTM D792	1.41	1.41
Compressive Strength	ASTM D695	176 MPa	25500 psi
Water Absorption	ASTM D570	0.70%	0.70%
Hardness - Rockwell	ASTM D785	120 R	120 R
Deformation Under Load @ 4000 psi	ASTM D621	0.80%	0.80%
Shear Strength	ASTM D732	86 MPa	12500 psi

HOUSING DETAILS & TOLERANCES				
Rod	$\varnothing d_1$ , mm	f9	$\varnothing d_1$ , in	f9
	$\varnothing D_2 = \varnothing d_1 + 2S$ mm	$\leq \varnothing 80$ H10 $> \varnothing 80$ H9	$\varnothing D_2 = \varnothing d_1 + 2S$ in	+0.004 -0
	$\varnothing D_3 = \varnothing d_1 + G$ mm	-	$\varnothing D_3 = \varnothing d_1 + G$ in	-
Piston	$\varnothing D_1$ , mm	H11	$\varnothing D_1$ , in	H11
	$\varnothing d_2 = \varnothing D_1 - 2S$ mm	h9	$\varnothing d_2 = \varnothing D_1 - 2S$ in	+0.000 -0.0004
	$\varnothing d_3 = \varnothing D_1 - G$ mm	-	$\varnothing d_3 = \varnothing D_1 - G$ in	-

RADIAL CLEARANCE RECOMMENDATIONS		
NOMINAL CROSS SECTIONS	G max	G min
S = 3.00 mm	2.00 mm	0.08 mm
S = 2.50 mm	1.50 mm	0.08 mm
S = 0.126 in (1/8 in)	0.080 in	0.031 in
S = 0.093 in (3/32 in)	0.080 in	0.031 in





# 708

## BEARING

Filled Acetal, Piston and Rod

### DESIGN

The Hallite 708 bearing strip is designed to provide an extremely effective, hard wearing, and easy-to-use bearing solution for reciprocating, oscillating, and slow rotary movement applications. Manufactured to very tight tolerances, the Hallite 708 is capable of withstanding extreme side loads and preventing metal-to-metal contact between the piston and the bore or the rod and the gland.

Hallite 708 bearings are manufactured from POM 0172, an advanced proprietary material, for exceptional load bearing and wear resistant capabilities. The 708 is ideal for extreme applications where fabric-reinforced polymer bearings are not suitable, especially in heavy-duty cylinder applications, such as forestry equipment and longwall mining roof support cylinders of all diameters.

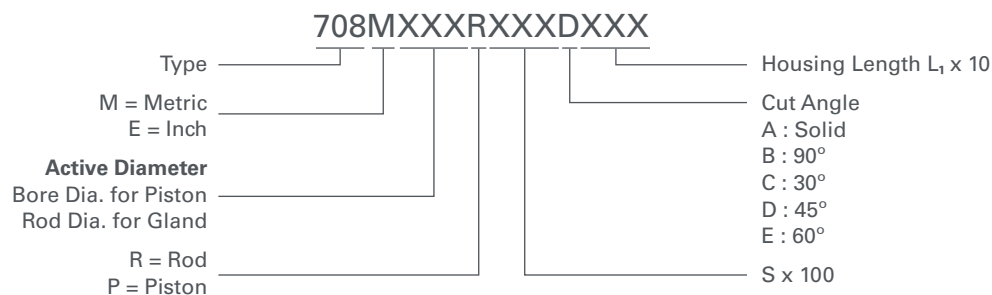
In addition to the part number listing in the following pages, the Hallite 708 is available to suit bore diameters up to 500 mm with a maximum length of 60 mm and a maximum section of 3.5 mm. If you cannot find the size you are looking for, please contact your local Hallite sales office for additional size information.



### FEATURES

- Exceptional load bearing capabilities
- Outstanding wear resistance with low lubricity fluids
- High compressive strength
- Very low water absorption
- Low friction
- Easy to install

### PART NUMBER STRUCTURE



### MATERIALS

As standard, this product comes in the following material. Contact your local Hallite technical team if you would like to find out if this profile can be made in a custom material to suit your application. For further material details, please refer to the Hallite Material Table.

MATERIAL OPTIONS	Name	Type	Colour
Standard	POM 0172	POM w Filler	Red

## TECHNICAL DETAILS

OPERATING CONDITIONS	METRIC	INCH
Maximum Speed	5.0 m/sec	16.0 ft/sec
Temperature Range	-40°C +100°C	-40°F +212°F

### NOTE

Data given are maximum values and can apply depending on specific application. Maximum ratings of temperature, pressure, or operating speeds are dependent on fluid medium, surface, gap value, and other variables such as dynamic or static service. Maximum values are not intended for use together at the same time, e.g. max temperature and max pressure. Please contact your Hallite technical representative for application support.

TYPICAL PHYSICAL PROPERTIES	METRIC	INCH
Specific Gravity	1.42	1.42
Coefficient of Dynamic Friction on Steel Surface (0.2 $\mu$ mRa) / (8 $\mu$ inCLA)	Dry 0.22	Dry 0.22
	Lubricated 0.05	Lubricated 0.05

BEARING TOLERANCES	L <sub>1</sub> mm	S mm	L <sub>1</sub> in	S in
	-0.10 -0.60	-0.02 -0.10	-0.005 -0.025	-0.001 -0.004

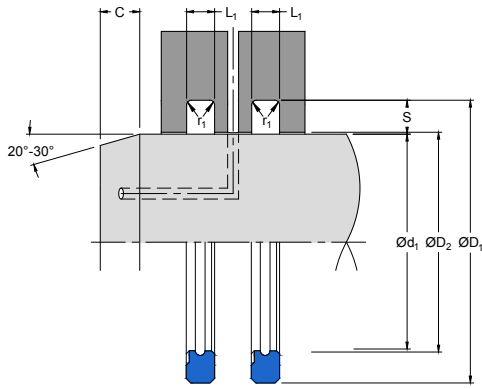
WIDTH OF BEARING SPLIT – W	$\varnothing d_1, \varnothing D_1$ mm	W mm	$\varnothing d_1, \varnothing D_1$ in	W in
	$\leq 50$	3.00 - 1.50	$\leq 2$	0.12 - 0.06
	$\leq 120$	5.00 - 3.50	$\leq 5$	0.19 - 0.14
	$\leq 550$	7.00 - 5.50	$\leq 20$	0.35 - 0.29

HOUSING DETAILS & TOLERANCES	METRIC		INCH	
Rod	$\varnothing d_1$ mm	f9	$\varnothing d_1$ in	f9
	$\varnothing D_2 = \varnothing d_1 + 2S$ mm	$\leq \varnothing 80$ H10 $> \varnothing 80$ H9	$\varnothing D_2 = \varnothing d_1 + 2S$ in	$\leq \varnothing 3.000$ H10 $> \varnothing 3.000$ H9
	$\varnothing D_3 = \varnothing d_1 + G$ mm	G min / max	$\varnothing D_3 = \varnothing d_1 + G$ in	G min / max
	L <sub>1</sub> mm	+0.20 -0	L <sub>1</sub> in	+0.008 -0
Piston	$\varnothing D_1$ mm	H11	$\varnothing D_1$ in	H11
	$\varnothing d_2 = \varnothing D_1 - 2S$ mm	h8	$\varnothing d_2 = \varnothing D_1 - 2S$ in	f9
	$\varnothing d_3 = \varnothing D_1 - G$ mm	G min / max	$\varnothing d_3 = \varnothing D_1 - G$ in	G min / max
	L <sub>1</sub> mm	+0.20 -0	L <sub>1</sub> in	+0.008 -0

SURFACE ROUGHNESS	$\mu$ mRa	$\mu$ mRz	$\mu$ mRt	$\mu$ inRa	$\mu$ inRz	$\mu$ inRt
Dynamic Sealing Face $\varnothing d_1, \varnothing D_1$	0.4	1.6 max	4 max	16	63 max	157 max
Static Sealing Face $\varnothing D_2, L_1, \varnothing d_2$	3.2 max	10 max	16 max	125 max	394 max	630 max

# SWIVEL SEALS





# 80

## SWIVEL SEAL

*Double-Acting  
Polyurethane, Rod Sealing  
for Rotary Pressure Applications*

### DESIGN

The Hallite 80 double-acting swivel seal, or rotary pressure seal, is designed specifically for use in hydraulic swivel joints with an internal rotating rod, particularly in housings to Asian design. This design is a one-piece seal that can replace the two part seals typically used in this application.

The Hallite 80 has a moulded groove in the dynamic face to improve sealing against the surface while trapping lubrication and reducing the surface contact area and thereby reducing running friction. Special pressure activation grooves are incorporated into design of the seal to enable an immediate seal of the joint.

The Hallite 80 is manufactured in Hythane® 181, Hallite's high-performance polyurethane, for easy installation, excellent low temperature performance, and long service life.



### FEATURES

- One part seal to replace two part seals
- No relative rotation of the seal parts in the groove
- Instant sealing
- Hard wearing
- Excellent service range
- Easy to install

### MATERIALS

As standard, this product comes in the following material. Contact your local Hallite technical team if you would like to find out if this profile can be made in a custom material to suit your application. For further material details, please refer to the Hallite Material Table.

MATERIAL OPTIONS	Name	Type	Colour
Standard	Hythane® 181	TPE	Blue



## TECHNICAL DETAILS

OPERATING CONDITIONS	METRIC	INCH
Maximum Speed	0.1 m/sec	0.3 ft/sec
Temperature Range	-30°C +80°C	-22°F +76°F
Maximum Pressure	350 bar	5000 psi

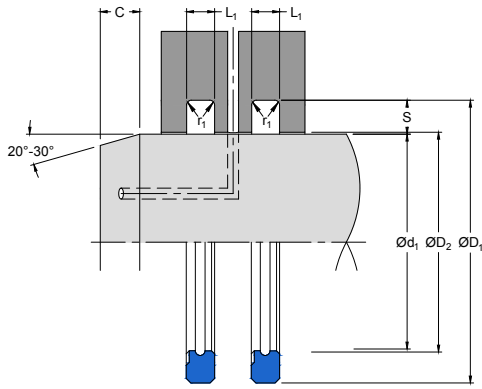
### NOTE

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SURFACE ROUGHNESS	$\mu\text{mRa}$	$\mu\text{mRz}$	$\mu\text{mRt}$	$\mu\text{inRa}$	$\mu\text{inRz}$	$\mu\text{inRt}$
Dynamic Sealing Face $\text{ØD}_1$	0.1 - 0.4	1.6 max	4 max	4 - 16	63 max	157 max
Static Sealing Face $\text{Ød}_1$	1.6 max	6.3 max	10 max	63 max	250 max	394 max
Static Housing Faces $L_1$	3.2 max	10 max	16 max	125 max	394 max	630 max

RADII	
Min Chamfer C mm	2.40
Max Fillet Rad $r_1$ mm	0.40

TOLERANCES	$\text{Ød}_1$	$\text{ØD}_1$	$\text{ØD}_2$	$L_1$
mm	f8	H10	H8	+0.30 -0



# 80

## SWIVEL SEAL

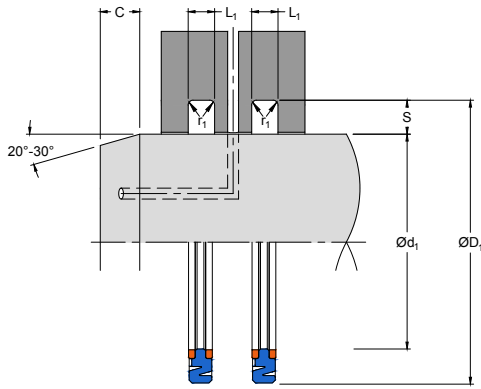
*Double-Acting  
Polyurethane, Rod Sealing  
for Rotary Pressure Applications*

### PART NUMBER RANGE

METRIC					
Ød <sub>1</sub>	TOL f8	ØD <sub>1</sub>	TOL H10	L <sub>1</sub> +0.30-0	PART No.
57.20	-0.03 -0.08	70.00	+0.12 0.00	7.50	4869000
80.00	-0.03 -0.08	90.00	+0.14 0.00	5.00	4563000
90.00	-0.04 -0.09	100.00	+0.14 0.00	5.00	4563100
100.00	-0.04 -0.09	110.00	+0.14 0.00	5.00	4563200
125.00	-0.04 -0.11	135.40	+0.16 0.00	5.00	4578800







# 800

## SWIVEL SEAL

*Double-Acting  
Polyurethane with AE Ring Option  
for Rotary Pressure Applications*

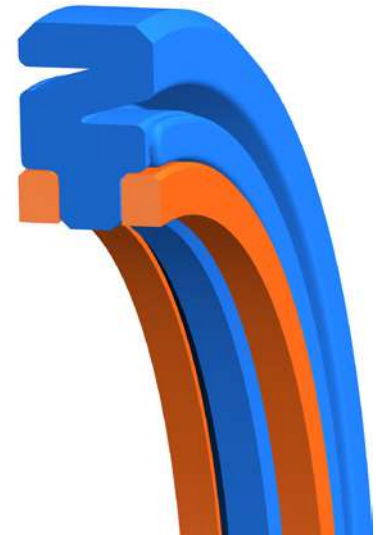
### DESIGN

The Hallite 800 double-acting swivel seal, or rotary pressure seal, is designed specifically for use in hydraulic swivel joints for either rod or bore sealing applications. The Hallite 800's patented design minimises friction between the seal and the rod or bore mating surface.

Depending on size, the seal is either a one-piece design or has two acetal anti-extrusion rings which allows for larger extrusion gaps. Both of these configurations can replace the two part seals typically used in this application. Hallite recommends replacing the two part seals with the Hallite 800 to eliminate the possibility of relative movement between the face seal and the energiser. Contact your local Hallite technical team to determine which configuration is best suited for your application.

Special pressure activation grooves are incorporated into the design of the seal to enable an immediate seal of the joint.

The Hallite 800 is manufactured in Hythane® 181, Hallite's high-performance polyurethane, for easy installation, excellent low temperature performance, and long service life.



### FEATURES

- For rod or piston applications
- Replaces two-part seals
- No relative rotation of the seal parts in the groove
- Low friction, low abrasion
- Hard wearing
- Instant sealing
- Excellent service range
- Easy to install

### MATERIALS

As standard, this product comes in the following material. Contact your local Hallite technical team if you would like to find out if this profile can be made in a custom material to suit your application. For further material details, please refer to the Hallite Material Table.

MATERIAL OPTIONS	Name	Type	Colour
Standard	Hythane® 181	TPU-EU	Blue



## TECHNICAL DETAILS

OPERATING CONDITIONS	METRIC	INCH
Maximum Speed	0.2 m/sec	0.6 ft/sec
Temperature Range	-30°C + 80°C	-22°F + 76°F
Maximum Pressure	350 bar	5000 psi
Limiting PV Value Lubricated	25 bar m/sec	1200 psi ft/sec

### NOTE

Data given are maximum values and can apply depending on specific application. Maximum ratings of temperature, pressure, or operating speeds are dependent on fluid medium, surface, gap value, and other variables such as dynamic or static service. Maximum values are not intended for use together at the same time, e.g. max temperature and max pressure. Please contact your Hallite technical representative for application support.

MAXIMUM EXTRUSION GAP			
Pressure bar	100	200	350
Housing Length ( $L_1 \leq 5$ mm)	0.20	0.10	H7/f7 fit
Housing Length ( $L_1 > 5$ mm)	0.30	0.25	H7/f7 fit
Pressure psi	1500	3000	5000

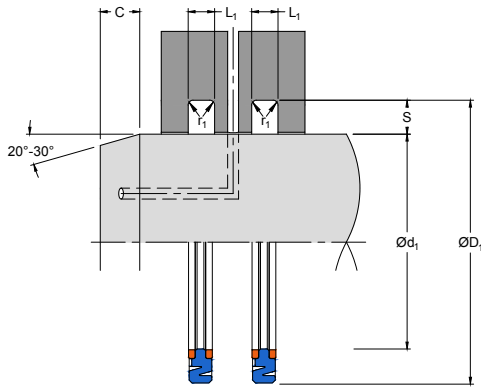
### NOTE

Figures show the maximum permissible gap all on one side using minimum rod  $\varnothing$  and maximum clearance  $\varnothing$ . Refer to Housing Design section.

SURFACE ROUGHNESS	$\mu\text{mRa}$	$\mu\text{mRz}$	$\mu\text{mRt}$	$\mu\text{inRa}$	$\mu\text{inRz}$	$\mu\text{inRt}$
Dynamic Sealing Face $\varnothing d_1, \varnothing D_1$	0.1 - 0.3	1.0 max	2.5 max	4 - 12	40 max	100 max
Static Sealing Face $\varnothing D_1, \varnothing d_1$	1.6 max	6.3 max	10 max	63 max	250 max	394 max
Static Housing Faces $L_1$	3.2 max	10 max	16 max	125 max	394 max	630 max

CHAMFERS & RADII		
Groove Section $\leq S$ mm	5.50	7.75
Min Chamfer C mm	3.00	5.00
Max Fillet Rad $r_1$ mm	0.80	1.20

TOLERANCES	$\varnothing d_1$	$\varnothing D_1$	$L_1$
Rod mm	f9	H11	+0.20 -0
Piston mm	h9	H9	+0.20 -0



# 800

## SWIVEL SEAL

*Double-Acting  
Polyurethane with AE Ring Option  
for Rotary Pressure Applications*

### PART NUMBER RANGE

Rod Sealing			
METRIC			
Ød <sub>1</sub>	ØD <sub>1</sub>	L <sub>1</sub>	PART No.
25.00	32.50	3.20	4763300‡
32.00	39.50	3.20	4761300‡
36.00	43.50	3.20	4770600‡
40.00	51.00	4.20	4754400‡
45.00	56.00	4.20	4743400‡
70.00	80.00	5.00	4727800‡
100.00	111.00	4.20	4777810
100.00	115.50	6.30	4762810
130.00	145.50	6.30	4720610

**NOTE** Part numbers suffixed by ‡ indicate parts not fitted with anti-extrusion rings.

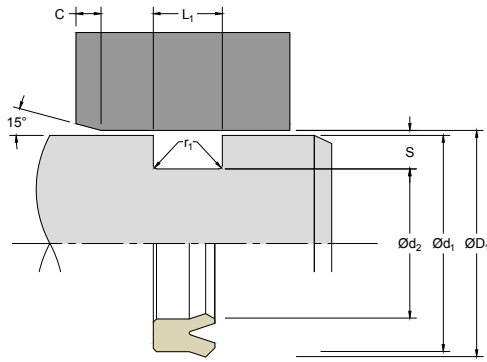
Bore Sealing			
METRIC			
Ød <sub>1</sub>	ØD <sub>1</sub>	L <sub>1</sub>	PART No.
80.00	69.30	4.20	4748100‡
90.00	79.30	4.20	4771300‡
145.00	129.50	6.30	4712710
160.00	144.50	6.30	4712810
180.00	164.50	6.30	4720710

**NOTE** Part numbers suffixed by ‡ indicate parts not fitted with anti-extrusion rings.



# ADDITIONAL PRODUCTS





# 155

**ADDITIONAL PRODUCT**  
*Polyester Static Seal  
 for Bore Sealing Applications*

## DESIGN

The Hallite 155 U-ring static seal designed to seal the joint between the gland and the cylinder bore. The Hallite 155 replaces the conventional O-ring and back-up ring combination.

Through its special design and polyester material compound, the seal will work with a maximum extrusion gap of 0.40 mm at 500 bar pressure.

Every nominal diameter of the Hallite 155 is suitable for a range of bore diameters, ØD<sub>1</sub>. See part number range for details.

This seal was developed for water-based, HFA, applications, but can also be used with standard mineral oil fluids.



## FEATURES

- Replaces an O-ring and back-up combination
- Provides reliable high pressure sealing

## MATERIALS

As standard, this product comes in the following material. Contact your local Hallite technical team if you would like to find out if this profile can be made in a custom material to suit your application. For further material details, please refer to the Hallite Material Table.

MATERIAL OPTIONS	Name	Type	Colour
Standard	TPE 201	TPE	Light Grey

## TECHNICAL DETAILS

OPERATING CONDITIONS	METRIC	INCH
<b>HFA Fluids</b>		
Temperature Range	-0°C +60°C	+32°F +140°F
Maximum Pressure	500 bar	7500 psi
<b>Mineral Oil</b>		
Temperature Range	-30°C +100°C	-22°F +212°F
Maximum Pressure	500 bar	7500 psi

### NOTE

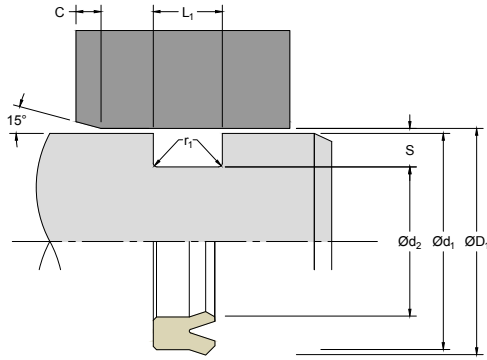
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SURFACE ROUGHNESS	$\mu\text{mRa}$	$\mu\text{mRz}$	$\mu\text{mRt}$	$\mu\text{inRa}$	$\mu\text{inRz}$	$\mu\text{inRt}$
Static Sealing Face $\text{ØD}_1$	1.6 max	6.3 max	10 max	63 max	250 max	394 max
Static Sealing Face $\text{Ød}_2$	1.6 max	6.3 max	10 max	63 max	250 max	394 max
Static Housing Faces $L_1$	3.2 max	10 max	16 max	125 max	394 max	630 max

RADII			
Groove Section $\leq S$ mm	4.00	5.60	6.80
Min Chamfer C mm	6.00	8.00	10.00
Max Fillet Rad $r_1$ mm	0.20	0.40	0.40

TOLERANCES	$\text{Ød}_1$	$\text{Ød}_2 = \text{ØD}_1 - 2S$	$\text{ØD}_1$	$L_1$
mm	f7	h9	H8	+0.30 -0





# 155

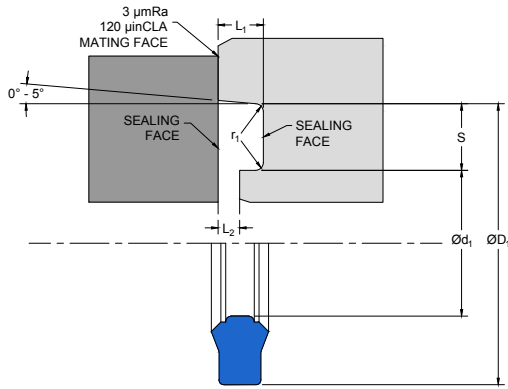
## ADDITIONAL PRODUCT

*Polyester Static Seal  
for Bore Sealing Applications*

### PART NUMBER RANGE

METRIC				
ØD <sub>1</sub> RANGE	L <sub>1</sub>	S	NOMINALS	PART No.
72 - 75	8.20	4.00	72 x 64.0 x 8.2	4543600
80 - 85	8.20	4.00	80 x 72.0 x 8.2	4858600
90 - 91	8.20	4.00	90 x 82.0 x 8.2	4525900
92 - 100	8.20	4.00	92 x 84.0 x 8.2	4439800
100 - 105	8.20	4.00	100 x 92.0 x 8.2	4796900
105 - 112	8.20	4.00	105 x 97.0 x 8.2	4788200
112 - 120	8.20	4.00	112 x 104.0 x 8.2	4419500
127 - 135	8.20	4.00	127 x 119.0 x 8.2	4414500
137 - 144	8.20	4.00	137 x 129.0 x 8.2	4383000
145 - 153	8.20	4.00	145 x 137.0 x 8.2	4764700
154 - 164	8.20	4.00	154 x 146.0 x 8.2	4414600
165 - 174	8.20	4.00	165 x 157.0 x 8.2	4777400
175 - 184	8.20	4.00	175 x 167.0 x 8.2	4405400
188 - 197	8.20	4.00	188 x 180.0 x 8.2	4405500
198 - 204	8.20	4.00	198 x 190.0 x 8.2	4759800
205 - 212	8.20	4.00	205 x 197.0 x 8.2	4428300
216 - 225	8.20	4.00	216 x 208.0 x 8.2	4396600
230 - 240	11.20	5.60	230 x 218.8 x 11.2	4432500
242 - 249	11.20	5.60	242 x 230.8 x 11.2	4402600
250 - 260	8.20	4.00	250 x 242.0 x 8.2	4767500
258 - 270	11.20	5.60	258 x 246.8 x 11.2	4405600
274 - 286	11.20	5.60	274 x 262.8 x 11.2	4732600
284 - 290	11.20	5.60	284 x 272.8 x 11.2	4797000
290 - 300	11.20	5.60	290 x 278.8 x 11.2	4414700
300 - 311	11.20	5.60	300 x 288.8 x 11.2	4777600
312 - 322	10.30	5.00	312 x 302.0 x 10.3	4712100
320 - 332	11.20	5.60	320 x 308.8 x 11.2	4387000
340 - 350	11.20	5.60	340 x 328.8 x 11.2	4473300
355 - 365	11.20	5.60	355 x 343.8 x 11.2	4756400
370 - 380	11.20	5.60	370 x 358.8 x 11.2	4774700
375 - 385	15.00	6.80	375 x 361.4 x 15.0	4838200
385 - 394	15.00	6.80	385 x 371.4 x 15.0	4773200
395 - 405	15.00	6.80	395 x 381.4 x 15.0	4732700
405 - 415	15.00	6.80	405 x 391.4 x 15.0	4578100
420 - 430	15.00	6.80	420 x 406.4 x 15.0	4777500
430 - 440	15.00	6.80	430 x 416.4 x 15.0	4807500
465 - 475	15.00	6.80	465 x 451.4 x 15.0	4862500
475 - 485	15.00	6.80	475 x 461.4 x 15.0	4820700
500 - 510	15.00	6.80	500 x 486.4 x 15.0	4838300
520 - 530	15.00	6.80	520 x 506.4 x 15.0	4815500





# 657

## ADDITIONAL PRODUCT

*Polyurethane Flange Seal for SAE J518 Type Flanges*

### DESIGN

The Hallite 657 flange seal is designed to fit SAE J518 flanges.

The Hallite 657 overcomes high pressure and shocking loading which commonly cause pumping problems when using O-rings in flange sealing applications preventing reliable sealing.

The Hallite 657 is moulded in Hythane® 181, Hallite's high-performance polyurethane, for easy installation and excellent low temperature performance. The Hallite 657 is also offered in an industrial standard grade of polyurethane.

Also listed are two non-SAE seal sizes for metric flanges.



### FEATURES

- SAE flange sizes
- Replaces an O-ring
- Manufactured in high specification material
- Also offered in industrial grade material option

### MATERIALS

This product comes in a number of material options to extend operating conditions. Contact your local Hallite technical team to decide which is best for your application. Use the part designator in the table below as the last digit of the part number to specify material choice when ordering. For further material details, please refer to the Hallite Material Table.

MATERIAL OPTIONS	Name	Type	Colour	Part Designator
Standard	Hythane® 181	TPU-EU	Blue	0
Optional	PU 021	TPU-AU	Dark Blue	1

## TECHNICAL DETAILS

OPERATING CONDITIONS	METRIC	INCH
Maximum Speed	Static	Static
Temperature Range - Hythane® 181	-45°C +110°C	-50°F +230°F
Temperature Range - PU 021	-30°C +100°C	-22°F +212°F
Maximum Pressure	600 bar	8500 psi

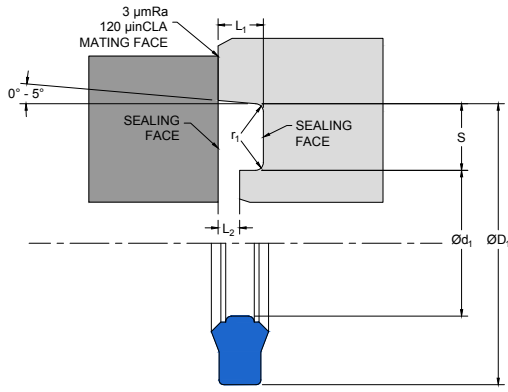
**NOTE**

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SURFACE ROUGHNESS	$\mu\text{mRa}$	$\mu\text{mRz}$	$\mu\text{mRt}$	$\mu\text{inRa}$	$\mu\text{inRz}$	$\mu\text{inRt}$
Sealing Faces	0.8 max	3.2 max	6.3 max	32 max	64 max	128 max
Mating Face	3 max	10 - 15	20 - 30	120 max	400 - 600	800 - 1200

RADII	Metric	Inch
Max Fillet Rad $r_1$	0.80	0.030

TOLERANCES	$\varnothing D_1$	S	$L_1$	$L_2$
mm	$\pm 0.10$	$\pm 0.25$	$\pm 0.05$	+0 -0.25
in	+0.005 -0	$\pm 0.015$	+0.005 -0	+0 -0.010



# 657

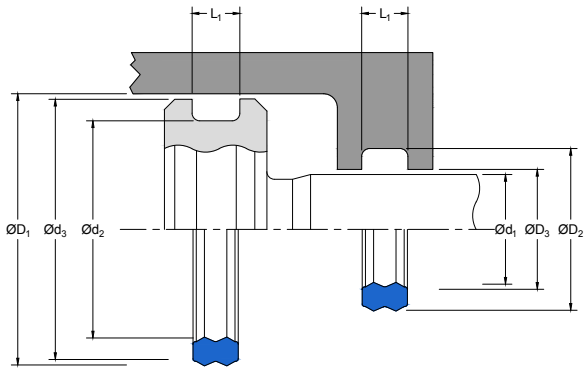
## ADDITIONAL PRODUCT

*Polyurethane Flange Seal for  
SAE J518 Type Flanges*

### PART NUMBER RANGE

INCH							
NOMINAL (SAE J518)	ØD <sub>1</sub>	TOL	Ød <sub>1</sub>	S ±0.010	L <sub>1</sub> +0.005 -0	L <sub>2</sub> +0-0.010	PART No.
½	1.000	+0.005 0.000	0.670	0.165	0.110	0.010	4490900
¾	1.250	+0.005 0.000	0.920	0.165	0.110	0.010	4491000
1	1.560	+0.005 0.000	1.230	0.165	0.110	0.010	4491100
1¼	1.750	+0.005 0.000	1.420	0.165	0.110	0.010	4422000
1½	2.125	+0.010 0.000	1.785	0.165	0.110	0.010	4422100
2	2.500	+0.010 0.000	2.160	0.165	0.110	0.010	4422200
METRIC							
ØD <sub>1</sub> ±0.10	TOL	Ød <sub>1</sub> ±0.25	S ±0.05	L <sub>1</sub> +0-0.25	L <sub>2</sub> No.	PART No.	
33.50	26.30	3.60	2.20	0.25	4432800	4490900	
45.00	36.20	4.40	3.30	0.25	4491200	4491000	





# 668

## ADDITIONAL PRODUCT

*Polyurethane Static Seal, Twin Lip  
for Rod or Bore Sealing Applications*

### DESIGN

Hallite 668 twin lip static seal is designed to seal the joint between the gland and the cylinder bore or between the rod and the piston. The sealing element is a very effective replacement for the conventional O-ring and back-up ring combination in heavy-duty applications.

The main advantage is its high groove stability compared to a conventional O-ring thus reducing fluid transfer caused by pumping.

Every nominal diameter of the Hallite 668 is suitable for a range of bore diameter,  $\text{ØD}_1$ , or rod diameters,  $\text{Ød}_1$ .

The Hallite 668 is moulded in Hythane® 181, Hallite's high-performance polyurethane, for easy installation and excellent low temperature performance.

The Hallite 668 is generally supplied as a bespoke part. Contact your local Hallite sales team for details.



### FEATURES

- Replaces an O-ring and back-up combination
- Provides reliable high pressure sealing
- High groove stability to eliminate fluid transfer
- Suitable for static rod or bore sealing

### MATERIALS

As standard, this product comes in the following material. Contact your local Hallite technical team if you would like to find out if this profile can be made in a custom material to suit your application. For further material details, please refer to the Hallite Material Table.

MATERIAL OPTIONS	Name	Type	Colour
Standard	Hythane® 181	TPU-EU	Blue



## TECHNICAL DETAILS

OPERATING CONDITIONS	METRIC	INCH
Temperature Range	-45°C + 110°C	-50°F + 230°F
Maximum Pressure	500 bar	7500 psi

### NOTE

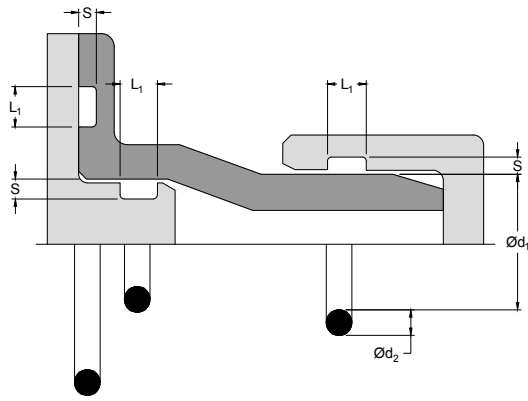
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SURFACE ROUGHNESS	$\mu\text{mRa}$	$\mu\text{mRz}$	$\mu\text{mRt}$	$\mu\text{inRa}$	$\mu\text{inRz}$	$\mu\text{inRt}$
Static Sealing Face $\text{ØD}_1$	1.6 max	6.3 max	10 max	63 max	250 max	394 max
Static Sealing Face $\text{Ød}_1$	1.6 max	6.3 max	10 max	63 max	250 max	394 max
Static Housing Faces $L_1$	3.2 max	10 max	16 max	125 max	394 max	630 max

TOLERANCES	$\text{ØD}_1$	$\text{Ød}_1$	$\text{ØD}_2$	$\text{Ød}_2$	$\text{ØD}_3$	$\text{Ød}_3$
Bore Sealing mm	H8	-	-	h9	-	f7
Rod Sealing mm	-	f7	H9	-	H8	-



# O-RINGS



## DESIGN

O-rings are a simple but very versatile seal and are either used as sealing elements or as energizing elements for hydraulic slipper seals and wipers and cover a wide variety of applications in every field of industry including aerospace, fluid power, and general engineering.

While most commonly used for static sealing applications of inactive machinery, O-rings in dynamic applications are recommended only for moderate service conditions. For pressures over 1500 psi, they are commonly used with back-up rings.

A broad range of elastomer materials for both standard and special applications allow the O-Ring to be used to seal against liquid and gaseous media. NBR and FKM are suitable for use in mineral oil, water and air. FKM O-rings are also suitable for use in most aggressive fluids and in temperatures of up to 200°C (390°F).

Each Hallite office can advise you on the range of O-ring that we can supply in inch or metric to your home country. These include ranges to suit: ISO 3601-1, AS 568, AN 6227, AN 6230, BS 4518, JIS B2401, and DIN 3370.

OPERATING CONDITIONS	METRIC	INCH
Temperature Range - NBR	-30°C +100°C	-22°F +212°F
Temperature Range - FKM	-20°C +200°C	-4°F +390°F



# OTHER BACK-UP RINGS



## TECHNICAL DETAILS

Back-up rings offer additional support to a sealing element, extending the performance and durability of the seal. Back-up components also provide protection against extrusion, allowing the applications to operate at higher pressures. Back-up rings are offered in many different configurations from full face to integrated designs. Designs are also available for static and dynamic applications. Depending on the application, Hallite offers a full range of materials to ensure maximum production of the sealing element. Hallite offers a full range of sizes that may be available in small quantities within 24 hours.

OPERATING CONDITIONS	METRIC	INCH
Temperature Range	-30 to 200°C	-22 to 392°F

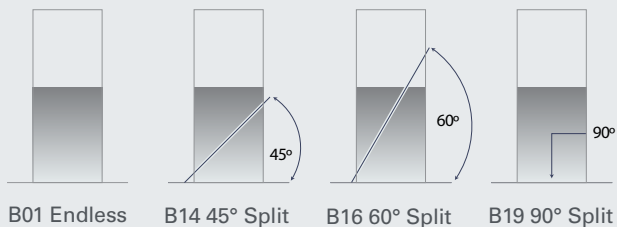
### NOTE

Data given are maximum values and can apply depending on specific application. Maximum ratings of temperature, pressure, or operating speeds are dependent on fluid medium, surface, gap value, and other variables such as dynamic or static service. Maximum values are not intended for use together at the same time, e.g. max temperature and max pressure. Please contact your Hallite technical representative for application support.

## OTHER BACK-UP RING TYPES

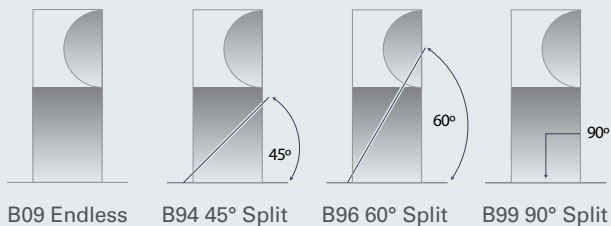
## RECTANGULAR BACK-UP AND ANTI-DIESEL RINGS

This is the most common profile used for protecting an O-ring or rod seal from extrusion. This profile is offered in both endless and split profiles for ease of installation and maximum performance. Another common application is anti-contamination/anti-diesel rings. All profiles are available for both static and dynamic applications. Hallite offers many material options for various applications such as Armortlene® PTFE compounds, PEEK, POM, PA, Composites, TPU, TPE, PPS, NBR, HNBR, and FKM.



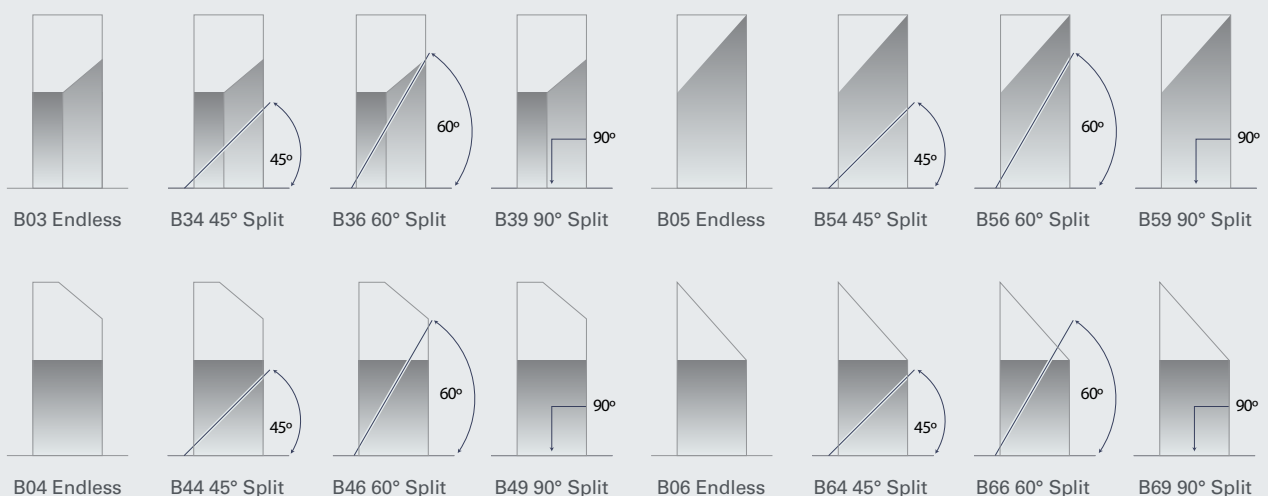
## CONTOURED BACK-UP RINGS

The contoured back-up ring design is used with an O-ring to provide additional support and protection from extrusion. The concave feature of this back-up ring offers a pocket that keeps the O-ring centered on the back-up ring, assuring maximum protection in the application. This protection allows the O-ring to function at higher pressures without the occurrence of extrusion. Hallite offers many material options for various applications such as Armortlene® PTFE compounds, PEEK, POM, PA, Composites, TPU, TPE, PPS, NBR, HNBR, and FKM.



## INTEGRATED BACK-UP RINGS

Integrated back-up rings are specially designed to be integrated into the sealing element in order to provide maximum extrusion protection. Hallite offers several different designs to maximize performance of the seal as well as many material options for various applications such as Armortlene® PTFE compounds, PEEK, POM, PA, Composites, TPU, TPE, PPS, NBR, HNBR, and FKM.

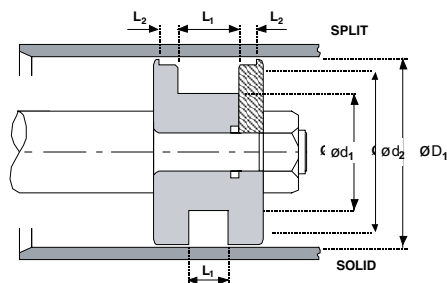
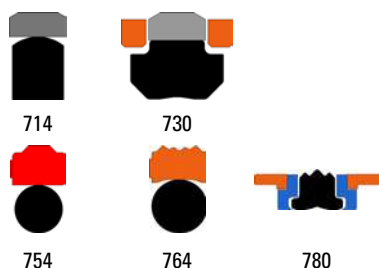


# PRODUCT INDEX



**PRODUCT INDEX**

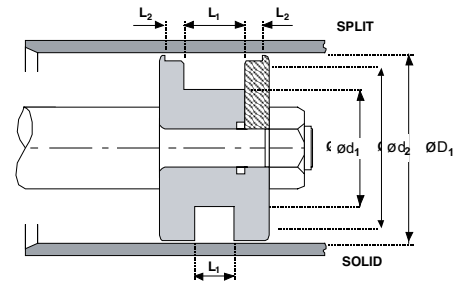
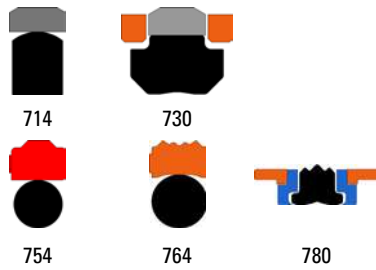
DOUBLE-ACTING PISTON SEALS . . . . . 302  
SINGLE-ACTING PISTON SEALS . . . . . 306  
ROD SEALS . . . . . 310  
WIPERS . . . . . 322



NOMINAL						
TYPE	ØD <sub>1</sub>	Ød <sub>1</sub>	Ød <sub>2</sub>	L <sub>1</sub>	L <sub>2</sub>	PART No.
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754	15.00	7.50		3.20		4446410
754	16.00	8.50		3.20		4400610
780	20.00	11.00	17.00	13.50	2.10	5006710
754	20.00	12.50		3.20		4362310
764	22.00	14.50		3.20		4763610
780	25.00	15.00	21.00	12.00	4.00	5003710
780	25.00	15.00	22.00	12.50	4.00	5003730
780	25.00	16.00	22.00	13.50	2.10	5003810
754	25.00	17.50		3.20		4339610
754	28.00	20.50		3.20		4765910
780	30.00	17.00	27.00	15.40	6.35	5006410
780	30.00	21.00	27.00	13.50	2.10	5003910
754	30.00	22.50		3.20		4339710
764	32.00	21.00		4.20		4751210
780	32.00	22.00	28.00	15.50	2.60	5001420
780	32.00	22.00	28.50	16.40	6.35	5001410
780	32.00	24.00	28.00	15.50	3.20	5009210
754	32.00	24.50		3.20		4339810
764	32.00	24.50		3.20		4741010
764	35.00	24.00		4.20		4764110
780	35.00	25.00	31.00	15.50	2.60	5001520
780	35.00	25.00	31.40	16.40	6.35	5001510
754	35.00	27.50		3.20		4352410
754	36.00	28.50		3.20		4787510
780	40.00	24.00	35.40	18.40	6.35	5001310
780	40.00	26.00	36.00	15.50	2.60	5008010
730	40.00	28.00		11.50		2390810
714	40.00	29.00		4.20		7270510
754	40.00	29.00		4.20		4339210
764	40.00	29.00		4.20		4741110
780	40.00	30.00	36.50	10.00	5.00	5008610
780	40.00	30.00	36.00	12.50	4.00	5005820
780	40.00	30.00	37.00	12.50	4.00	5005810
780	40.00	30.00	35.40	16.40	6.35	5004010
780	40.00	32.00	36.00	15.50	3.20	5008110
754	40.00	32.50		3.20		4740010
754	42.00	31.00		4.20		4787610
780	45.00	29.00	40.40	18.40	6.35	5000710
780	45.00	31.00	41.00	15.50	2.60	5004110
714	45.00	34.00		4.20		7270610
754	45.00	34.00		4.20		4342310

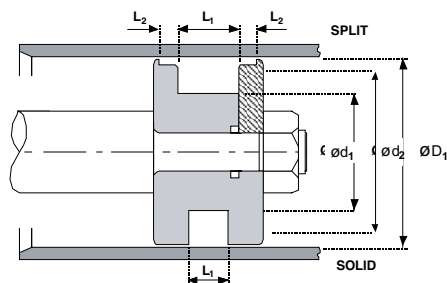
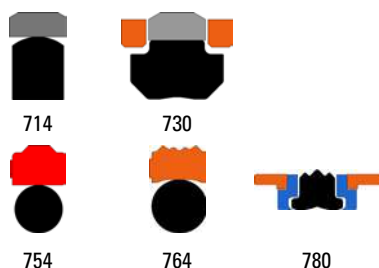
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780	50.00	34.00	45.40	18.40	6.35	5000810
780	50.00	34.00	46.00	20.50	3.10	5000820
714	50.00	34.50		6.30		7272310
754	50.00	34.50		6.30		4427410
764	50.00	34.50		6.30		4775810
730	50.00	38.00		11.50		2335410
780	50.00	38.00	46.00	20.50	4.20	5004810
714	50.00	39.00		4.20		7270810
754	50.00	39.00		4.20		4327110
764	50.00	39.00		4.20		4741210
780	50.00	40.00	47.00	12.50	4.00	5005910
780	55.00	39.00	50.36	18.40	6.35	5000910
780	55.00	39.00	51.00	20.50	3.10	5000920
714	55.00	39.50		6.30		7274810
754	55.00	39.50		6.30		4355610
754	55.00	44.00		4.20		4465510
764	55.00	44.00		4.20		4845310
780	55.00	45.00	52.00	12.50	4.00	5009110
730	60.00	44.00		13.00		2390710
780	60.00	44.00	55.40	18.40	6.35	5001010
730	60.00	44.00		20.50		2356710
780	60.00	44.00	56.00	20.50	3.10	5001020
754	60.00	44.50		6.30		4390710
764	60.00	44.50		6.30		4739910
780	60.00	48.00	56.00	20.50	4.20	5004910
714	60.00	49.00		4.20		7270910
754	60.00	49.00		4.20		4327010
764	60.00	49.00		4.20		4741310
714	63.00	44.70		7.00		7274910
780	63.00	47.00	58.40	18.40	6.35	5001110
780	63.00	47.00	58.40	19.40	6.35	5001120
780	63.00	47.00	59.00	20.50	3.10	5001130
714	63.00	47.50		6.30		7272410
754	63.00	47.50		6.30		4431110
764	63.00	47.50		6.30		4766810
754	63.00	50.00		6.30		4472310
730	63.00	50.00		14.50		2331210
780	63.00	51.00	59.00	20.50	4.20	5005010
714	63.00	52.00		4.20		7271010
754	63.00	52.00		4.20		4326910





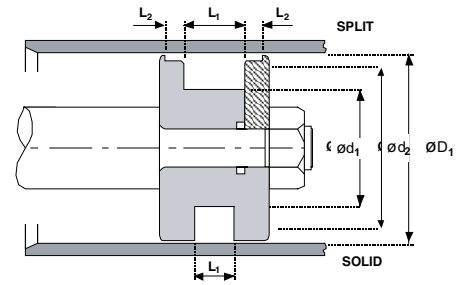
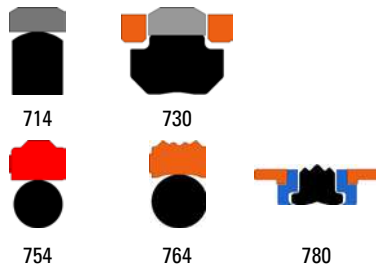
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780	63.00	53.00	60.00	12.50	4.00	5006010
780	65.00	49.00	61.00	20.50	3.10	5005510
754	65.00	49.50		6.30		4362010
780	65.00	50.00	60.40	18.40	6.35	5001210
754	65.00	52.00		6.30		4384910
780	65.00	53.00	61.00	20.50	4.20	5010710
754	65.00	54.00		4.20		4353010
764	65.00	54.00		4.20		4845410
780	70.00	50.00	64.20	22.40	6.35	5000210
780	70.00	54.00	66.00	20.50	3.10	5004210
714	70.00	54.50		6.30		7273710
754	70.00	54.50		6.30		4763410
764	70.00	54.50		6.30		4759710
754	70.00	57.00		6.30		4390810
780	70.00	58.00	66.00	20.50	4.20	5005110
714	70.00	59.00		4.20		7271310
754	70.00	59.00		4.20		4326810
764	70.00	59.00		4.20		4741410
714	75.00	54.00		8.10		7273010
780	75.00	55.00	69.20	22.40	6.35	5000310
730	75.00	55.00		23.00		2346420
780	75.00	59.00	71.00	20.50	3.10	5004310
714	75.00	59.50		6.30		7271410
754	75.00	59.50		6.30		4704910
780	75.00	63.00	71.00	20.50	4.20	5010810
754	75.00	64.00		4.20		4339910
764	75.00	64.00		4.20		4845510
714	80.00	59.00		8.10		7273310
780	80.00	60.00	74.15	22.40	6.35	5000110
780	80.00	60.00	75.00	25.00	6.30	5000120
780	80.00	62.00	76.00	22.50	3.60	5004410
714	80.00	64.50		6.30		7270010
754	80.00	64.50		6.30		4270910
764	80.00	64.50		6.30		4722210
780	80.00	65.00	76.00	20.00	5.00	5008710
730	80.00	66.00		17.00		2330310
780	80.00	66.00	76.00	22.50	5.20	5005210
754	80.00	69.00		4.20		4768510
764	80.00	69.00		4.20		4845610
714	85.00	64.00		8.10		7273110
780	85.00	65.00	79.15	22.40	6.35	5000410

NOMINAL						
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714	90.00	69.00		8.10		7273210
780	90.00	70.00	84.15	22.40	6.35	5000510
780	90.00	72.00	86.00	22.50	3.60	5007910
714	90.00	74.50		6.30		7271610
754	90.00	74.50		6.30		4372710
764	90.00	74.50		6.30		4741510
730	90.00	75.00		13.50		2331310
730	90.00	76.00		16.00		2364810
780	90.00	76.00	86.00	22.50	5.20	5005310
714	95.00	74.00		8.10		7273510
780	95.00	75.00	89.15	22.40	6.35	5000610
754	95.00	79.50		6.30		4569510
754	95.00	84.00		4.20		4831610
780	100.00	75.00	93.15	22.40	6.35	5001710
714	100.00	79.00		8.10		7273810
780	100.00	80.00	95.00	25.00	6.30	5004710
730	100.00	82.00		22.50		2331410
780	100.00	82.00	96.00	22.50	3.60	5004510
714	100.00	84.50		6.30		7271810
754	100.00	84.50		6.30		4339310
764	100.00	84.50		6.30		4741610
730	100.00	85.00		12.50		2342910
730	100.00	85.00		13.50		2335010
780	100.00	85.00	96.00	20.00	5.00	5006110
730	100.00	86.00		22.50		2359710
780	100.00	86.00	96.00	22.50	5.20	5005410
780	105.00	80.00	98.10	22.40	6.35	5001810
730	105.00	80.00		22.50		2346710
714	105.00	84.00		8.10		7272910
754	105.00	89.50		6.30		4372510
730	105.00	91.00		16.50		2348210
780	110.00	85.00	103.10	22.40	6.35	5001910
714	110.00	89.00		8.10		7273410
780	110.00	92.00	106.00	22.50	3.60	5007810
754	110.00	94.50		6.30		4419310
730	110.00	95.00		12.50		2343010
730	110.00	95.00		16.00		2331610
730	115.00	90.00		21.00		2329110
780	115.00	90.00	108.10	22.40	6.35	5002010
714	115.00	94.00		8.10		7273910
754	115.00	94.00		8.10		4788510



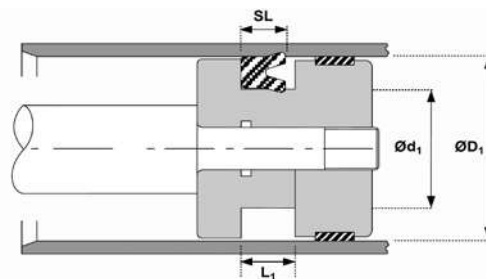
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730	115.00	97.00		22.50		2356110
754	115.00	99.50		6.30		4355810
764	115.00	99.50		6.30		4761610
730	115.00	100.00		16.00		2329210
780	120.00	95.00	113.10	22.40	6.35	5002110
714	120.00	99.00		8.10		7272010
754	120.00	99.00		8.10		4535010
764	120.00	99.00		8.10		4812010
714	120.00	104.50		6.30		7275210
754	120.00	104.50		6.30		4465410
730	120.00	105.00		16.00		2337410
780	120.00	106.00	116.00	22.50	5.20	5008810
780	125.00	100.00	118.10	25.40	6.35	5002310
780	125.00	103.00	121.00	26.50	5.10	5007710
714	125.00	104.00		8.10		7272110
754	125.00	104.00		8.10		4376510
780	125.00	105.00	120.00	25.00	6.30	5006210
714	125.00	109.50		6.30		7272810
754	125.00	109.50		6.30		4340010
764	125.00	109.50		6.30		4771710
730	125.00	110.00		15.80		2331510
780	130.00	105.00	122.60	25.40	9.50	5002410
780	130.00	105.00	123.10	25.40	6.35	5002420
714	130.00	109.00		8.10		7274010
754	130.00	109.00		8.10		4402410
730	130.00	113.00		12.50		2339110
730	130.00	113.00		20.50		2369010
754	130.00	114.50		6.30		4342210
780	135.00	110.00	127.60	25.40	9.50	5002510
754	135.00	114.00		8.10		4535110
730	135.00	118.00		20.50		2348110
730	135.00	120.00		16.00		2334010
780	140.00	115.00	132.60	25.40	9.50	5002210
780	140.00	115.00	133.00	25.40	6.35	5002220
714	140.00	119.00		8.10		7272210
754	140.00	119.00		8.10		4340110
730	140.00	123.00		16.00		2357910
754	140.00	124.50		6.30		4499410
730	140.00	125.00		16.00		2329410
780	145.00	120.00	137.60	25.40	9.50	5002610
780	150.00	125.00	142.60	25.40	9.50	5002710

TYPE	NOMINAL					PART No.
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754	150.00	129.00		8.10		4396910
730	150.00	130.00		16.00		2339010
714	150.00	130.60		9.60		7275310
730	150.00	133.00		20.00		2360510
730	150.00	135.00		16.00		2338210
780	155.00	130.00	147.60	25.40	9.50	5002810
780	160.00	130.00	152.60	25.40	9.50	5004610
780	160.00	130.00	153.00	25.40	6.35	5004620
780	160.00	135.00	152.60	25.40	9.50	5005610
714	160.00	139.00		8.10		7272510
754	160.00	139.00		8.10		4340210
730	160.00	143.00		20.00		2365510
780	160.00	143.00	156.00	26.50	7.20	5008910
730	160.00	145.00		16.00		2331910
780	165.00	140.00	157.60	25.40	9.50	5002910
754	165.00	144.00		8.10		4452210
730	165.00	145.00		20.00		2348910
730	165.00	150.00		16.00		2332010
730	170.00	145.00		25.00		2345510
780	170.00	145.00	161.70	25.40	12.70	5003010
754	170.00	149.00		8.10		4340310
730	170.00	150.00		16.00		2331110
780	175.00	150.00	166.70	25.40	12.70	5003110
730	175.00	155.00		16.00		2335110
780	180.00	150.00	172.95	35.40	6.35	5006310
780	180.00	155.00	171.70	25.40	12.70	5003210
714	180.00	159.00		8.10		7272610
754	180.00	159.00		8.10		4340410
730	180.00	160.00		16.00		2328510
730	180.00	163.00		20.00		2365210
780	185.00	160.00	176.70	25.40	12.70	5003310
730	185.00	165.00		16.00		2328410
730	185.00	165.00		20.00		2364010
780	190.00	165.00	181.70	25.40	12.70	5003410
714	190.00	169.00		8.10		7274210
754	190.00	169.00		8.10		4342410
730	190.00	170.00		16.00		2332210
780	195.00	170.00	186.70	25.40	12.70	5003510
730	195.00	175.00		16.00		2334710
780	200.00	175.00	191.60	25.40	12.70	5003610



NOMINAL						
TYPE	ØD <sub>1</sub>	Ød <sub>1</sub>	Ød <sub>2</sub>	L <sub>1</sub>	L <sub>2</sub>	PART No.
714	200.00	179.00		8.10		7272710
754	200.00	179.00		8.10		4340510
730	200.00	180.00		16.00		2329310
730	200.00	180.00		20.00		2348810
730	200.00	183.00		20.00		2365010
780	210.00	185.00	201.60	25.40	12.70	5008210
754	210.00	189.00		8.10		4351510
730	210.00	190.00		16.00		2332410
730	210.00	190.00		20.00		2364710
730	215.00	195.00		16.00		2332510
730	215.00	195.00		20.00		2345110
730	220.00	195.00		16.00		2345810
730	220.00	195.00		22.00		2333920
730	220.00	195.00		25.00		2333910
780	220.00	195.00	211.60	25.40	12.70	5008310
714	220.00	199.00		8.10		7274310
754	220.00	199.00		8.10		4735710
730	220.00	200.00		20.50		2356510
730	224.00	204.00		20.50		2348510
754	225.00	204.00		8.10		4512810
730	225.00	205.00		16.00		2332610
730	225.00	205.00		20.00		2346810
780	230.00	205.00	221.60	25.40	12.70	5006510
754	230.00	209.00		8.10		4764010
730	230.00	210.00		16.00		2332710
730	230.00	210.00		20.00		2344510
730	240.00	215.00		25.00		2333010
780	240.00	215.00	231.60	25.40	12.70	5008410
754	240.00	219.00		8.10		4553610
730	240.00	220.00		25.00		2364310
730	245.00	220.00		25.00		2328810
730	250.00	225.00		25.00		2348310
780	250.00	225.00	241.60	25.40	12.70	5006610
714	250.00	229.00		8.10		7273610
754	250.00	229.00		8.10		4393710
730	255.00	230.00		25.00		2348320
730	260.00	230.00		30.00		2347810
730	260.00	235.00		25.00		2347910
730	275.00	250.00		25.00		2362210
730	280.00	255.00		25.00		2333510
714	280.00	255.50		8.10		7274410
730	285.00	260.00		25.00		2362410

NOMINAL						
TYPE	ØD <sub>1</sub>	Ød <sub>1</sub>	Ød <sub>2</sub>	L <sub>1</sub>	L <sub>2</sub>	PART No.
730	290.00	265.00		27.00		2364410
730	300.00	275.00		25.00		2333610
754	300.00	279.00		8.10		4572810
730	305.00	280.00		25.00		2333630
730	310.00	285.00		25.00		2333710
730	320.00	290.00		30.00		2348010
730	340.00	310.00		30.00		2366010
730	340.00	310.00		32.00		2390910
730	345.00	315.00		30.00		2363610
730	350.00	320.00		30.00		2345410
730	360.00	330.00		30.00		2345430
730	360.00	330.00		31.50		2365410
730	370.00	340.00		30.00		2362710
730	380.00	350.00		32.00		2362110
730	390.00	360.00		32.00		2362120
730	400.00	370.00		32.00		2359810
730	410.00	380.00		32.00		2359820
730	420.00	390.00		32.00		2366410
730	440.00	410.00		32.00		2365910
730	450.00	410.00		32.00		2390510
730	480.00	440.00		32.00		2391010
730	500.00	470.00		32.00		2369410



NOMINAL					
TYPE	ØD <sub>1</sub>	Ød <sub>1</sub>	SL	L <sub>1</sub>	PART No.
601	12.00	5.00	5.50	6.50	4508601
601	12.50	4.50	4.40	5.00	4506701
601	13.00	6.00	8.00	9.00	4460300
606	16.00	10.00	5.70	6.30	4830500
601	18.00	10.00	6.00	6.60	4299900
601	18.00	12.00	6.00	7.00	4621300
601	20.00	10.00	8.00	9.00	4600000
601	20.00	12.00	4.40	5.00	4182501
601	22.00	14.00	4.40	5.00	4182601
601	22.00	14.00	5.00	5.70	4604000
601	24.00	14.00	8.00	9.00	4600200
601	24.00	16.00	4.40	5.00	4182701
601	24.00	16.00	5.00	5.70	4604100
601	25.00	12.00	8.00	9.00	4600100
601	25.00	15.00	8.00	9.00	4600300
606	25.00	15.00	8.20	9.00	4390100
606	25.00	17.00	5.70	6.30	4418000
601	26.00	16.00	8.00	9.00	4600400
601	26.00	18.00	4.40	5.00	4182901
601	26.00	18.00	5.00	5.70	4604200
601	28.00	18.00	7.30	8.00	4547900
601	28.00	18.00	8.00	9.00	4600500
601	28.00	20.00	4.40	5.00	4183001
601	28.00	20.00	5.00	5.70	4604300
601	30.00	20.00	8.00	9.00	4600600
606	30.00	20.00	8.00	9.00	4354200
601	30.00	22.00	4.40	5.00	4183101
601	30.00	22.40	5.00	5.70	4604400
601	31.50	23.50	5.00	5.70	4621500
606	32.00	24.00	5.70	6.30	4351900
601	32.40	22.40	8.00	9.00	4600800
601	33.00	25.00	4.40	5.00	4183301
601	33.00	25.00	5.00	5.70	4604500
601	35.00	22.00	10.00	11.00	4600700
606	35.00	25.00	7.30	8.00	4365700
601	35.00	25.00	8.00	9.00	4600900
601	35.00	25.00	10.00	11.00	4362600
601	35.50	28.00	5.00	5.70	4604600
601	36.00	28.00	6.50	7.10	4506201
606	37.00	21.00	11.80	13.00	4354100
601	37.00	30.00	6.00	7.00	4596800
601	38.00	25.00	8.00	9.00	4601000

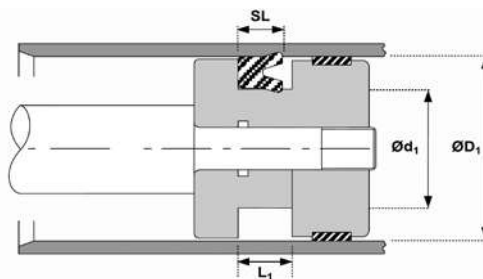
NOMINAL					
TYPE	ØD <sub>1</sub>	Ød <sub>1</sub>	SL	L <sub>1</sub>	PART No.
601	38.00	25.00	10.00	11.00	4621400
601	38.00	28.00	5.60	6.30	4183401
601	38.00	28.00	8.00	9.00	4867600
606	38.00	31.00	5.20	6.00	4728000
601	40.00	20.00	12.00	13.00	4621900
601	40.00	22.00	10.00	11.00	4572900
601	40.00	25.00	10.00	11.00	4601100
601	40.00	26.00	9.00	10.00	4584900
606	40.00	28.00	9.00	10.00	4826200
601	40.00	28.00	10.00	11.00	4601200
601	40.00	30.00	5.60	6.30	4183501
601	40.00	30.00	6.00	7.00	4604700
606	40.00	30.00	7.30	8.00	4299500
601	40.00	30.00	8.00	9.00	4596900
601	40.00	30.00	10.00	11.00	4362700
606	40.00	30.00	10.00	11.00	4400900
601	40.00	32.00	8.00	9.00	4867700
601	41.50	31.50	6.00	7.00	4604800
601	42.00	32.00	5.60	6.30	4183601
601	42.00	32.00	6.00	7.00	4604900
601	42.00	32.00	10.00	11.00	4362800
601	43.00	28.00	10.00	11.00	4601300
601	45.00	30.00	10.00	11.00	4601400
601	45.00	35.00	6.00	7.00	4605000
601	45.00	35.00	7.00	8.00	4496000
606	45.00	35.00	7.30	8.00	4315700
601	45.00	35.50	6.00	7.00	4605100
601	46.00	36.00	5.60	6.30	4183701
601	47.00	32.00	10.00	11.00	4621200
601	48.00	35.00	10.00	11.00	4360300
601	48.00	38.00	6.00	7.00	4605200
606	50.00	35.00	9.00	10.00	4649300
601	50.00	35.00	10.00	11.00	4601500
601	50.00	38.00	9.00	10.00	4709400
606	50.00	39.00	3.80	4.20	4460700
601	50.00	40.00	5.60	6.30	4183801
601	50.00	40.00	6.00	7.00	4605300
606	50.00	40.00	7.80	8.00	4319500
601	50.00	40.00	10.00	11.00	4362900
601	50.50	35.50	10.00	11.00	4621100
601	53.00	45.00	10.00	11.00	4867800
601	55.00	38.00	9.70	11.00	4366000



601

606

659



TYPE	NOMINAL				PART No.
	ØD <sub>1</sub>	Ød <sub>1</sub>	SL	L <sub>1</sub>	
601	55.00	40.00	9.90	11.00	4388500
601	55.00	40.00	10.00	11.00	4601600
601	55.00	45.00	5.60	6.30	4183901
601	55.00	45.00	6.00	7.00	4605400
606	55.00	45.00	7.30	8.00	4380000
601	55.00	45.00	10.00	11.00	4363000
601	56.00	45.00	7.00	8.00	4605500
606	56.00	45.00	7.00	8.00	4644200
601	56.00	46.00	6.00	7.00	4543900
601	58.00	38.00	9.70	11.00	4560100
601	60.00	40.00	12.00	13.00	4601700
606	60.00	44.90	5.70	6.30	4739800
601	60.00	45.00	10.00	11.00	4601800
606	60.00	45.00	10.00	11.00	4407000
659	60.00	45.00	10.00	11.40	4894700
601	60.00	50.00	5.60	6.30	4184001
601	60.00	50.00	6.00	7.00	4605600
606	60.00	50.00	9.00	10.00	4762000
601	60.00	50.00	10.00	11.00	4363100
601	62.00	52.00	10.00	11.00	4559000
606	63.00	48.00	9.00	10.00	4649400
601	63.00	48.00	10.00	11.00	4601900
606	63.00	48.00	11.40	12.50	4383200
601	63.00	53.00	6.00	7.00	4605700
606	63.00	53.00	7.30	8.00	4341500
606	63.00	53.00	11.80	13.00	4318800
601	65.00	45.00	10.00	11.00	4575000
601	65.00	50.00	10.00	11.00	4602000
601	65.00	55.00	6.00	7.00	4605800
606	65.00	55.00	7.30	8.00	4424100
601	66.00	56.00	6.00	7.00	4605900
601	70.00	50.00	12.00	13.00	4602100
606	70.00	55.00	10.00	11.00	4448000
659	70.00	55.00	10.00	11.00	4884400
601	70.00	60.00	6.00	7.00	4606000
606	70.00	60.00	8.00	9.00	4709500
601	70.00	60.00	10.00	11.00	4363200
601	71.00	56.00	8.40	9.50	4184201
601	71.00	60.00	7.00	8.00	4606100
606	71.00	61.00	6.00	7.00	4492600
601	73.00	63.00	6.00	7.00	4606200
601	73.00	63.00	11.80	13.00	4363300

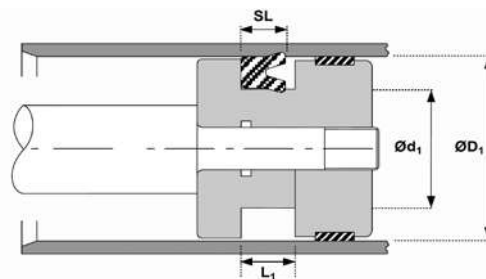
TYPE	NOMINAL				PART No.
	ØD <sub>1</sub>	Ød <sub>1</sub>	SL	L <sub>1</sub>	
601	75.00	55.00	12.00	13.00	4602200
601	75.00	65.00	6.00	7.00	4606300
659	75.00	65.00	7.30	8.00	4870700
606	75.00	67.00	5.70	6.30	4844100
606	75.00	67.00	8.80	9.70	4322300
601	76.00	56.00	12.00	13.00	4622000
601	76.00	60.00	12.00	13.00	4608000
606	76.20	66.20	7.30	8.00	4649700
601	78.00	63.00	8.40	9.50	4184301
601	80.00	60.00	12.00	13.00	4602300
601	80.00	65.00	8.40	9.50	4184401
606	80.00	65.00	11.40	12.50	4363800
659	80.00	65.00	11.50	12.50	4892200
601	80.00	65.00	12.00	13.00	4867900
601	80.00	70.00	6.00	7.00	4606400
606	80.00	70.00	6.00	7.00	4644800
606	80.00	70.00	6.80	7.50	4370300
606	80.00	70.00	8.00	9.00	4709600
606	80.00	70.00	11.60	12.80	4649000
601	80.00	70.00	11.80	13.00	4363400
601	80.00	71.00	6.00	7.00	4606500
601	85.00	65.00	12.00	13.00	4602400
601	85.00	70.00	8.40	9.50	4184501
601	85.00	70.00	12.00	13.00	4868000
601	85.00	75.00	6.00	7.00	4606600
606	85.00	75.00	8.10	9.00	4709700
601	85.00	75.00	11.80	13.00	4363500
606	85.70	70.70	10.30	11.40	4493400
601	90.00	70.00	12.00	13.00	4602500
659	90.00	75.00	11.50	12.50	4775500
601	90.00	75.00	12.00	13.00	4868100
601	90.00	80.00	6.00	7.00	4606700
601	90.00	80.00	8.00	8.80	4159001
659	90.00	80.00	8.00	9.00	4834000
606	90.00	80.00	11.00	12.00	4798800
601	90.00	80.00	11.80	13.00	4363600
601	92.00	70.00	12.00	13.00	4602600
601	95.00	75.00	12.00	13.00	4602700
601	95.00	80.00	8.40	9.50	4184601
601	100.00	75.00	22.00	24.00	4584700
606	100.00	80.00	10.50	11.60	4874000
601	100.00	80.00	12.00	13.00	4602800



601

606

659



TYPE	NOMINAL				PART No.
	ØD <sub>1</sub>	Ød <sub>1</sub>	SL	L <sub>1</sub>	
601	100.00	80.00	13.20	14.50	4857100
659	100.00	80.00	14.50	16.00	4580300
601	100.00	85.00	8.40	9.50	4184701
601	100.00	85.00	8.90	10.00	4606800
606	100.00	85.00	9.00	10.00	4644600
659	100.00	85.00	10.00	11.40	4894900
606	100.00	85.00	11.40	12.50	4363900
659	100.00	85.00	11.50	12.50	4775600
601	100.00	85.00	12.00	13.00	4868200
606	100.00	85.00	11.80	13.00	4648900
606	100.00	90.00	6.80	7.50	4375900
601	100.00	90.00	11.80	13.00	4363700
601	105.00	85.00	12.00	13.00	4602900
601	105.00	90.00	8.40	9.50	4184801
601	105.00	90.00	8.90	10.00	4606900
659	105.00	90.00	11.50	12.50	4892300
601	110.00	90.00	12.00	13.00	4603000
659	110.00	90.00	14.50	16.00	4580400
601	110.00	95.00	8.90	10.00	4607000
659	110.00	95.00	11.50	12.50	4775700
601	110.00	95.00	12.00	13.00	4868300
601	110.00	100.00	6.40	7.00	4878600
606	110.00	100.00	8.00	9.00	4533100
601	115.00	95.00	12.00	13.00	4603100
601	115.00	100.00	8.90	10.00	4607100
601	115.00	100.00	12.00	13.00	4868400
601	120.00	100.00	11.00	12.50	4184901
601	120.00	100.00	12.00	13.00	4603200
606	120.00	100.00	11.80	13.00	4649100
659	120.00	100.00	11.80	13.00	4865000
601	125.00	105.00	11.40	12.50	4185001
606	125.00	105.00	14.50	16.00	4364000
601	125.00	105.00	15.00	17.00	4603300
601	125.00	112.00	8.90	10.00	4607200
601	130.00	110.00	11.00	12.50	4185101
601	130.00	110.00	15.00	17.00	4603400
601	130.00	115.00	8.90	10.00	4621600
659	130.00	115.00	11.50	12.50	4813000
601	130.00	118.00	7.30	8.00	4878700
601	135.00	115.00	15.00	17.00	4608100
601	140.00	120.00	14.50	16.00	4319600
601	140.00	120.00	15.00	17.00	4603500

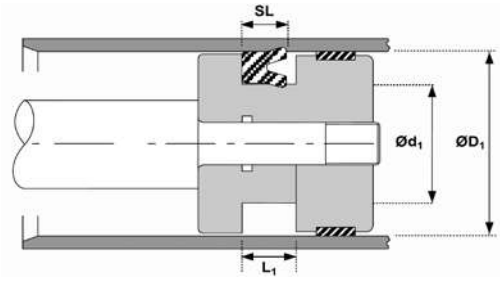
TYPE	NOMINAL				PART No.
	ØD <sub>1</sub>	Ød <sub>1</sub>	SL	L <sub>1</sub>	
601	140.00	125.00	8.90	10.00	4607300
601	145.00	125.00	11.40	12.50	4185201
601	145.00	125.00	15.00	17.00	4603600
606	150.00	130.00	14.50	16.00	4390200
601	150.00	130.00	15.00	17.00	4603700
601	150.00	136.00	8.50	9.50	4607400
606	150.00	140.00	13.60	15.00	4390300
601	154.00	140.00	9.00	10.00	4607900
601	155.00	140.00	8.90	10.00	4607500
606	160.00	140.00	14.50	16.00	4642700
601	160.00	140.00	15.00	17.00	4603800
606	160.00	140.00	18.20	20.00	4364100
601	160.00	145.00	8.90	10.00	4607600
601	165.00	145.00	15.00	17.00	4608200
601	165.00	150.00	8.90	10.00	4607700
601	165.00	153.00	7.30	8.00	4879000
606	170.00	150.00	15.00	16.50	4642800
601	170.00	150.00	15.00	17.00	4603900
601	170.00	155.00	8.90	10.00	4621700
601	175.00	160.00	9.00	10.00	4608400
601	180.00	155.00	15.00	17.00	4608300
601	180.00	160.00	15.00	16.00	4868500
606	180.00	160.00	15.00	16.50	4643100
601	180.00	165.00	9.00	10.00	4608600
601	183.00	165.00	10.00	11.00	4607800
601	185.00	160.00	15.00	17.00	4608500
601	190.00	165.00	15.00	17.00	4608700
606	190.00	170.00	15.00	16.50	4642900
601	190.00	175.00	8.90	10.00	4621800
601	195.00	170.00	15.00	17.00	4608800
601	200.00	175.00	15.00	17.00	4608900
601	200.00	180.00	12.00	13.00	4609000
606	200.00	180.00	14.50	16.00	4392300
601	205.00	180.00	15.00	17.00	4609100
601	210.00	190.00	12.00	13.00	4609200
601	215.00	190.00	15.00	17.00	4609300
601	220.00	200.00	12.00	13.00	4609400
601	220.00	200.00	15.00	16.00	4678100
601	225.00	200.00	15.00	17.00	4609500
601	230.00	210.00	15.00	16.00	4678200
601	235.00	210.00	18.00	20.00	4609600
601	240.00	220.00	12.00	13.00	4609700



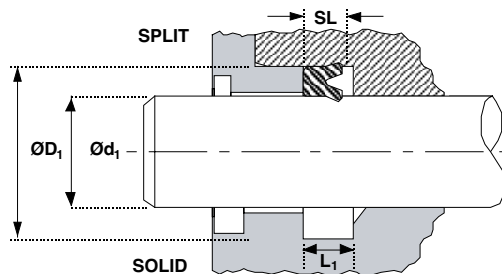
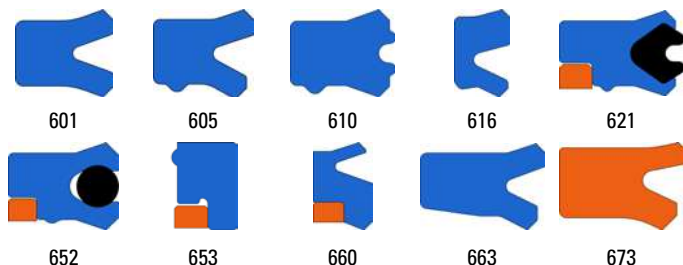
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659



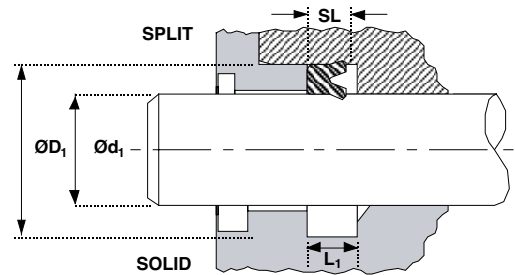
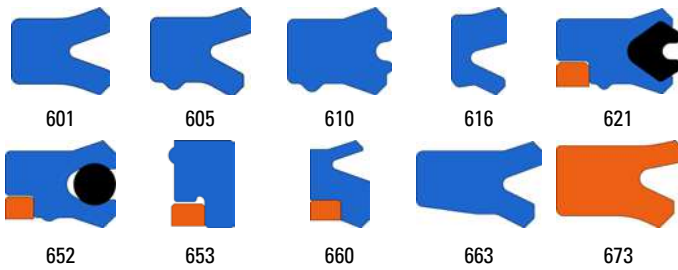
TYPE	NOMINAL				PART No.
	ØD <sub>1</sub>	Ød <sub>1</sub>	SL	L <sub>1</sub>	
601	240.00	220.00	15.00	16.00	4678300
601	250.00	220.00	17.00	19.20	4426600
601	250.00	230.00	12.00	13.00	4609800
601	250.00	230.00	15.00	16.00	4678400
601	260.00	240.00	12.00	13.00	4621000
601	260.00	240.00	15.00	16.00	4678500
601	265.00	240.00	18.00	20.00	4609900
601	275.00	250.00	18.00	20.00	4610000
601	280.00	260.00	15.00	16.00	4678600
606	280.00	260.00	15.50	17.00	4643000
601	290.00	260.00	18.00	20.00	4620100
601	290.00	270.00	11.00	12.00	4879100
601	295.00	265.00	18.00	20.00	4620200
601	300.00	270.00	18.00	20.00	4620300
601	300.00	280.00	11.00	12.00	4879200
606	305.00	275.00	23.80	25.00	4649500
601	310.00	280.00	18.00	20.00	4620400
601	320.00	290.00	18.00	20.00	4620500
601	330.00	300.00	18.00	20.00	4620600
601	350.00	330.00	11.00	12.00	4879300
601	405.00	375.00	22.00	24.00	4620700
601	425.00	400.00	25.00	27.00	4620800
606	490.00	470.00	14.50	16.00	4911400



NOMINAL					
TYPE	$\varnothing d_1$	$\varnothing D_1$	SL	$L_1$	PART No.
601	4.50	12.50	4.40	5.00	4506701
601	5.00	12.00	5.50	6.50	4508601
601	6.00	13.00	8.00	9.00	4460300
605	6.00	15.00	7.30	8.00	4790600
605	6.00	16.00	7.00	8.00	4580600
610	8.00	16.00	5.30	6.00	4581000
605	8.00	18.00	7.00	8.00	4580500
605	10.00	15.00	3.60	4.00	4402300
601	10.00	18.00	6.00	6.60	4299900
601	10.00	20.00	8.00	9.00	4600000
605	12.00	18.00	4.00	4.50	4578000
605	12.00	18.00	5.70	6.30	4314900
601	12.00	18.00	6.00	7.00	4621300
605	12.00	19.00	4.50	5.00	4341600
605	12.00	19.00	5.10	5.60	4710000
601	12.00	20.00	4.40	5.00	4182501
605	12.00	20.00	5.70	6.30	4310900
605	12.00	22.00	7.30	8.00	4857200
663	12.00	22.00	7.30	8.00	4865100
605	12.00	22.00	7.70	9.00	4315000
601	12.00	25.00	8.00	9.00	4600100
605	12.70	18.00	5.50	6.00	4370400
605	13.00	20.00	4.50	5.00	4351600
605	14.00	21.00	5.10	5.60	4710100
616	14.00	21.50	2.80	3.20	4577700
601	14.00	22.00	4.40	5.00	4182601
601	14.00	22.00	5.00	5.70	4604000
610	14.00	22.00	5.30	6.00	4580900
605	14.00	22.00	5.70	6.30	4311000
605	14.00	24.00	7.30	8.00	4310000
601	14.00	24.00	8.00	9.00	4600200
663	14.00	24.00	8.20	9.00	4865200
605	15.00	22.00	5.70	6.30	4762200
601	15.00	25.00	8.00	9.00	4600300
605	15.37	25.50	6.35	7.40	4333800
605	16.00	22.00	4.50	5.00	4341700
605	16.00	22.00	5.00	6.00	4314100
601	16.00	24.00	4.40	5.00	4182701
601	16.00	24.00	5.00	5.70	4604100
605	16.00	24.00	5.80	6.30	4295200
663	16.00	24.00	5.70	6.30	4789300
663	16.00	26.00	7.30	8.00	4865300

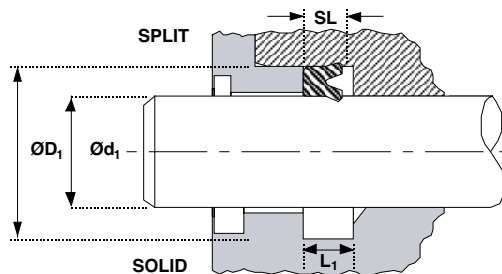
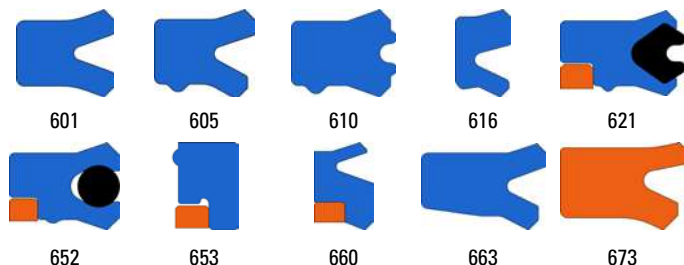
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TYPE	$\varnothing d_1$	$\varnothing D_1$	SL	$L_1$	PART No.
601	16.00	26.00	8.00	9.00	4600400
605	16.00	26.00	7.70	9.00	4311100
605	18.00	24.00	4.50	5.00	4712000
610	18.00	25.00	4.60	5.60	4334600
605	18.00	25.00	5.00	6.00	4314200
616	18.00	25.50	2.80	3.20	4341800
601	18.00	26.00	4.40	5.00	4182901
601	18.00	26.00	5.00	5.70	4604200
605	18.00	26.00	5.00	5.70	4611000
605	18.00	26.00	5.70	6.30	4311200
663	18.00	26.00	5.70	6.30	4789400
605	18.00	26.00	6.00	7.00	4333900
605	18.00	26.00	8.20	9.00	4863000
601	18.00	28.00	7.30	8.00	4547900
601	18.00	28.00	8.00	9.00	4600500
605	18.00	28.00	7.70	9.00	4305100
605	20.00	25.00	3.20	3.50	4332100
605	20.00	26.00	5.00	5.50	4315100
610	20.00	26.00	4.50	5.50	4319400
605	20.00	26.00	6.50	7.60	4826000
605	20.00	27.00	6.10	6.70	4702900
616	20.00	27.50	2.80	3.20	4721700
601	20.00	28.00	4.40	5.00	4183001
601	20.00	28.00	5.00	5.70	4604300
605	20.00	28.00	5.00	5.70	4611100
605	20.00	28.00	5.70	6.30	4362100
663	20.00	28.00	5.70	6.30	4827400
605	20.00	28.00	6.30	7.00	4626000
610	20.00	28.00	6.00	7.00	4307500
605	20.00	30.00	6.00	7.00	4611200
605	20.00	30.00	7.30	8.00	4857300
663	20.00	30.00	7.30	8.00	4865400
601	20.00	30.00	8.00	9.00	4600600
605	20.00	30.00	7.70	9.00	4305200
605	20.00	30.00	10.00	11.00	4310300
616	20.00	31.00	3.90	4.20	4367400
601	20.00	40.00	12.00	13.00	4621900
605	22.00	27.50	4.50	5.00	4896100
610	22.00	28.00	4.50	5.50	4356000
610	22.00	29.00	4.60	5.60	4324200
601	22.00	30.00	4.40	5.00	4183101
605	22.00	30.00	5.00	5.70	4617500





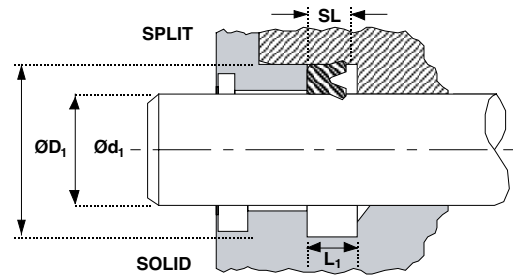
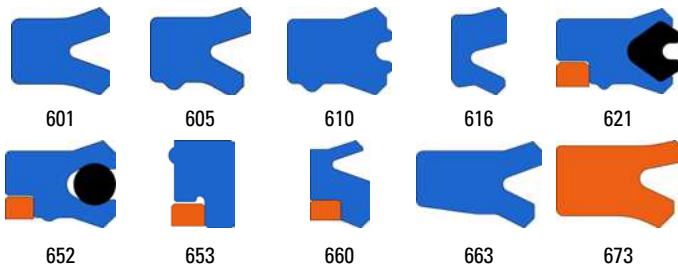
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TYPE	$\varnothing d_1$	$\varnothing D_1$	SL	$L_1$	PART No.
605	22.00	30.00	5.70	6.30	4305300
605	22.00	30.00	6.30	7.00	4626100
610	22.00	30.00	6.00	7.00	4316100
605	22.00	30.00	7.30	8.00	4356800
605	22.00	32.00	7.30	8.00	4310800
663	22.00	32.00	7.30	8.00	4865500
605	22.00	32.00	8.20	9.00	4863300
605	22.00	32.00	10.00	11.00	4311300
616	22.00	33.00	3.90	4.20	4341900
601	22.00	35.00	10.00	11.00	4600700
601	22.00	40.00	10.00	11.00	4572900
601	22.40	30.00	5.00	5.70	4604400
605	22.40	30.00	5.00	5.70	4611300
601	22.40	32.40	8.00	9.00	4600800
605	22.40	32.40	8.00	9.00	4616600
601	23.50	31.50	5.00	5.70	4621500
605	24.00	30.00	4.50	5.00	4773500
663	24.00	34.00	7.80	8.50	4764500
663	25.00	31.00	4.90	5.35	4799600
616	25.00	32.50	2.80	3.20	4721800
601	25.00	33.00	4.40	5.00	4183301
601	25.00	33.00	5.00	5.70	4604500
605	25.00	33.00	5.00	5.70	4610100
605	25.00	33.00	5.70	6.30	4305400
663	25.00	33.00	5.70	6.30	4789500
610	25.00	33.00	6.00	7.00	4316200
605	25.00	33.00	6.80	7.50	4333500
605	25.00	33.00	8.00	9.00	4807800
610	25.00	33.00	8.00	9.00	4299000
605	25.00	33.00	10.00	11.00	4315200
605	25.00	35.00	7.30	8.00	4512000
663	25.00	35.00	7.30	8.00	4865600
601	25.00	35.00	8.00	9.00	4600900
605	25.00	35.00	7.70	9.00	4311400
601	25.00	35.00	10.00	11.00	4362600
605	25.00	35.00	10.00	11.00	4310500
616	25.00	36.00	3.90	4.20	4367500
605	25.00	37.00	10.00	11.00	4379900
601	25.00	38.00	8.00	9.00	4601000
601	25.00	38.00	10.00	11.00	4621400
601	25.00	40.00	10.00	11.00	4601100
605	25.00	40.00	10.00	11.00	4322900

NOMINAL					
TYPE	$\varnothing d_1$	$\varnothing D_1$	SL	$L_1$	PART No.
663	25.00	40.00	10.00	11.00	4865700
616	25.40	32.90	2.80	3.20	4469000
605	26.00	36.00	7.00	8.00	4459400
663	26.00	36.00	10.00	11.00	4726000
601	26.00	40.00	9.00	10.00	4584900
601	28.00	35.50	5.00	5.70	4604600
605	28.00	35.50	5.00	5.70	4611400
605	28.00	36.00	5.70	6.30	4703000
610	28.00	36.00	5.30	6.30	4334700
663	28.00	36.00	5.70	6.30	4789600
605	28.00	36.00	6.30	7.00	4626200
610	28.00	36.00	6.00	7.00	4323200
601	28.00	36.00	6.50	7.10	4506201
610	28.00	36.00	8.00	9.00	4307700
601	28.00	38.00	5.60	6.30	4183401
605	28.00	38.00	7.30	8.00	4305500
601	28.00	38.00	8.00	9.00	4867600
616	28.00	39.00	3.90	4.20	4367600
601	28.00	40.00	10.00	11.00	4601200
601	28.00	43.00	10.00	11.00	4601300
605	28.00	43.00	11.40	12.50	4399000
601	30.00	37.00	6.00	7.00	4596800
605	30.00	38.00	5.70	6.30	4704500
663	30.00	38.00	5.70	6.30	4830400
605	30.00	38.00	6.30	7.00	4402700
610	30.00	38.00	6.00	7.00	4308900
610	30.00	38.00	8.00	9.00	4362400
663	30.00	38.00	8.20	9.00	4789700
601	30.00	40.00	5.60	6.30	4183501
601	30.00	40.00	6.00	7.00	4604700
605	30.00	40.00	6.00	7.00	4610200
605	30.00	40.00	7.00	7.70	4703100
605	30.00	40.00	7.30	8.00	4857400
610	30.00	40.00	7.00	8.00	4558300
621	30.00	40.00	7.30	8.00	4577110
663	30.00	40.00	7.30	8.00	4816700
601	30.00	40.00	8.00	9.00	4596900
605	30.00	40.00	8.50	9.50	4826100
601	30.00	40.00	10.00	11.00	4362700
605	30.00	40.00	10.00	11.00	4304600
621	30.00	40.00	10.00	11.00	4831310
663	30.00	40.00	10.00	11.00	4811800



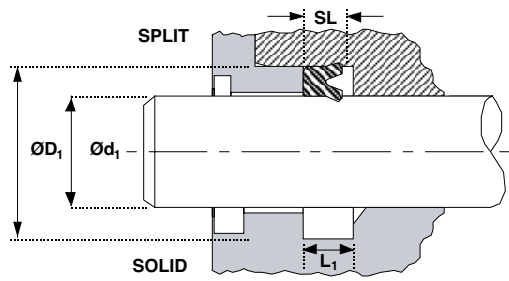
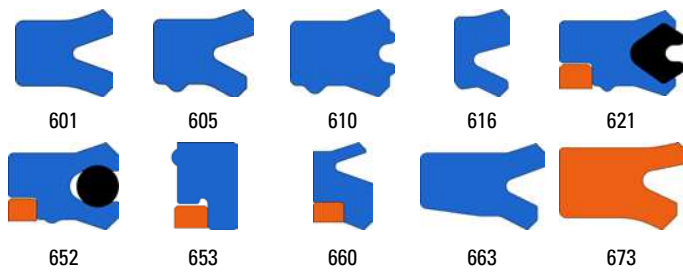
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TYPE	$\varnothing d_1$	$\varnothing D_1$	SL	$L_1$	PART No.
616	30.00	41.00	3.90	4.20	4404500
605	30.00	42.00	10.90	12.00	4383100
605	30.00	43.00	10.00	11.00	4625700
673	30.00	43.00	10.00	11.00	4622108
605	30.00	45.00	9.00	10.00	4618900
601	30.00	45.00	10.00	11.00	4601400
605	30.00	45.00	10.00	11.00	4857500
663	30.00	45.00	10.00	11.00	4865800
673	30.00	45.00	10.00	11.00	4622208
605	30.00	50.00	10.00	11.00	4328500
601	31.50	41.50	6.00	7.00	4604800
616	32.00	39.50	2.80	3.20	4714800
663	32.00	40.00	5.70	6.30	4827500
605	32.00	40.00	6.00	7.00	4310700
610	32.00	40.00	6.00	7.00	4316300
605	32.00	40.00	6.70	7.70	4334000
601	32.00	40.00	8.00	9.00	4867700
605	32.00	40.00	7.70	9.00	4315300
605	32.00	41.50	7.90	8.90	4334100
601	32.00	42.00	5.60	6.30	4183601
605	32.00	42.00	5.70	6.30	4360100
601	32.00	42.00	6.00	7.00	4604900
605	32.00	42.00	6.00	7.00	4616100
673	32.00	42.00	6.00	7.00	4622308
605	32.00	42.00	7.30	8.00	4374200
663	32.00	42.00	7.30	8.00	4865900
601	32.00	42.00	10.00	11.00	4362800
605	32.00	42.00	10.00	11.00	4305600
616	32.00	43.00	3.90	4.20	4367700
652	32.00	44.00	8.70	9.60	4344111
605	32.00	45.00	10.00	11.00	4597700
605	32.00	47.00	9.10	10.00	4329600
601	32.00	47.00	10.00	11.00	4621200
605	32.00	47.00	10.00	11.00	4338900
605	32.00	48.00	10.00	11.00	4492500
605	35.00	43.00	5.70	6.30	4703200
663	35.00	43.00	5.70	6.30	4789800
605	35.00	43.00	6.30	7.00	4402800
610	35.00	43.00	6.00	7.00	4301700
605	35.00	43.00	8.20	9.00	4309000
610	35.00	43.00	8.00	9.00	4592800
601	35.00	45.00	6.00	7.00	4605000

NOMINAL					
TYPE	$\varnothing d_1$	$\varnothing D_1$	SL	$L_1$	PART No.
605	35.00	45.00	6.00	7.00	4611500
673	35.00	45.00	6.00	7.00	4622408
601	35.00	45.00	7.00	8.00	4496000
605	35.00	45.00	7.00	8.00	4619200
663	35.00	45.00	7.30	8.00	4816800
605	35.00	45.00	7.70	9.00	4314300
605	35.00	45.00	10.00	11.00	4305700
610	35.00	45.00	10.00	11.00	4299300
621	35.00	45.00	10.00	11.00	4831410
663	35.00	45.00	10.00	11.00	4816100
601	35.00	48.00	10.00	11.00	4360300
605	35.00	50.00	9.00	10.00	4611600
621	35.00	50.00	9.50	10.50	4335310
601	35.00	50.00	10.00	11.00	4601500
605	35.00	50.00	10.00	11.00	4322500
673	35.00	50.00	10.00	11.00	4622508
601	35.50	45.00	6.00	7.00	4605100
605	35.50	45.00	6.00	7.00	4616700
601	35.50	50.50	10.00	11.00	4621100
605	35.50	50.50	10.00	11.00	4616900
610	36.00	44.00	5.30	6.30	4324300
663	36.00	44.00	5.80	6.30	4859600
605	36.00	44.00	6.40	7.50	4373900
605	36.00	44.00	8.20	9.00	4395000
610	36.00	44.00	8.00	9.00	4308000
663	36.00	44.00	8.20	9.00	4726200
601	36.00	46.00	5.60	6.30	4183701
605	36.00	46.00	5.70	6.30	4372100
605	36.00	46.00	7.30	8.00	4304900
621	36.00	46.00	7.30	8.00	4317010
663	36.00	46.00	7.30	8.00	4866000
605	36.00	46.00	10.00	11.00	4305000
610	36.00	46.00	10.00	11.00	4299400
616	36.00	47.00	3.90	4.20	4353100
605	36.00	51.00	10.00	11.00	4771600
605	37.00	47.00	10.00	11.00	4862900
601	38.00	48.00	6.00	7.00	4605200
605	38.00	48.00	8.00	9.00	4619100
605	38.00	48.00	10.00	11.00	4515500
601	38.00	50.00	9.00	10.00	4709400
605	38.00	50.00	10.00	11.00	4586300
605	38.00	53.00	10.00	11.00	4480900



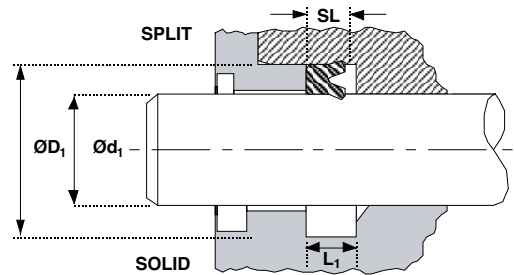
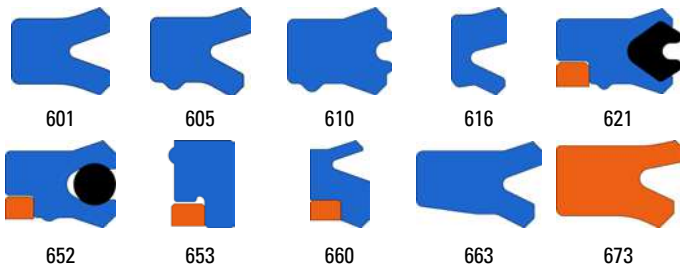
NOMINAL					
TYPE	Ød <sub>1</sub>	ØD <sub>1</sub>	SL	L <sub>1</sub>	PART No.
601	38.00	55.00	9.70	11.00	4366000
601	38.00	58.00	9.70	11.00	4560100
605	40.00	48.00	5.70	6.30	4703300
663	40.00	48.00	5.70	6.30	4789900
610	40.00	48.00	5.40	6.40	4329200
610	40.00	48.00	6.50	7.50	4323300
605	40.00	48.00	8.20	9.00	4396800
610	40.00	48.00	8.00	9.00	4301800
663	40.00	48.00	8.20	9.00	4790000
605	40.00	49.52	9.50	10.50	4334200
601	40.00	50.00	5.60	6.30	4183801
601	40.00	50.00	6.00	7.00	4605300
605	40.00	50.00	6.00	7.00	4610300
673	40.00	50.00	6.00	7.00	4622608
605	40.00	50.00	7.30	8.00	4311600
621	40.00	50.00	7.30	8.00	4317110
663	40.00	50.00	7.30	8.00	4806300
663	40.00	50.00	8.20	9.00	4790100
605	40.00	50.00	9.00	10.00	4866800
673	40.00	50.00	9.00	10.00	4622708
601	40.00	50.00	10.00	11.00	4362900
605	40.00	50.00	10.00	11.00	4293800
621	40.00	50.00	10.00	11.00	4755010
663	40.00	50.00	10.00	11.00	4553400
616	40.00	51.00	3.90	4.20	4722900
652	40.00	52.00	8.70	9.60	4326311
605	40.00	52.00	10.90	12.00	4381800
605	40.00	55.00	7.30	8.00	4703400
605	40.00	55.00	9.00	10.00	4611700
601	40.00	55.00	9.90	11.00	4388500
601	40.00	55.00	10.00	11.00	4601600
605	40.00	55.00	10.00	11.00	4328300
673	40.00	55.00	10.00	11.00	4622808
605	40.00	55.00	11.40	12.50	4857600
616	40.00	55.50	6.00	6.30	4367800
653	40.00	55.50		6.30	4772710
660	40.00	55.50		6.30	4634310
601	40.00	60.00	12.00	13.00	4601700
605	42.00	50.00	5.70	6.30	4744400
605	42.00	50.00	7.50	8.00	4373800
605	42.00	52.00	6.00	7.00	4618100
605	42.00	52.00	10.00	11.00	4338200

NOMINAL					
TYPE	Ød <sub>1</sub>	ØD <sub>1</sub>	SL	L <sub>1</sub>	PART No.
605	43.00	53.00	6.00	7.00	4619700
610	45.00	52.00	10.00	11.00	4330000
610	45.00	53.00	5.30	6.30	4334800
610	45.00	53.00	6.00	7.00	4711000
605	45.00	53.00	7.30	8.00	4619800
605	45.00	53.00	8.10	9.00	4402900
610	45.00	53.00	8.00	9.00	4308100
663	45.00	53.00	8.20	9.00	4838900
601	45.00	53.00	10.00	11.00	4867800
605	45.00	53.00	11.80	13.00	4315600
601	45.00	55.00	5.60	6.30	4183901
605	45.00	55.00	5.60	6.30	4479700
601	45.00	55.00	6.00	7.00	4605400
605	45.00	55.00	6.00	7.00	4610400
673	45.00	55.00	6.00	7.00	4622908
605	45.00	55.00	7.30	8.00	4305900
621	45.00	55.00	7.30	8.00	4317210
663	45.00	55.00	7.30	8.00	4790200
605	45.00	55.00	8.20	9.00	4845700
601	45.00	55.00	10.00	11.00	4363000
605	45.00	55.00	10.00	11.00	4302600
610	45.00	55.00	10.00	11.00	4389400
621	45.00	55.00	10.00	11.00	4831510
663	45.00	55.00	10.00	11.00	4726300
616	45.00	56.00	3.90	4.20	4556300
653	45.00	56.00		4.20	4575510
601	45.00	56.00	7.00	8.00	4605500
605	45.00	57.70	9.50	10.50	4322800
601	45.00	60.00	10.00	11.00	4601800
605	45.00	60.00	10.00	11.00	4315400
605	45.00	60.00	11.40	12.50	4619900
621	45.00	60.00	11.40	12.50	4295510
616	45.00	60.50	6.00	6.30	4367900
653	45.00	60.50		6.30	4772810
601	45.00	65.00	10.00	11.00	4575000
605	45.00	65.00	10.00	11.00	4315500
601	46.00	56.00	6.00	7.00	4543900
605	47.00	56.33	9.00	10.00	4778000
605	48.00	56.00	11.40	12.50	4629800
605	48.00	60.00	10.00	11.00	4432600
601	48.00	63.00	10.00	11.00	4601900
605	50.00	57.00	9.00	10.00	4538600



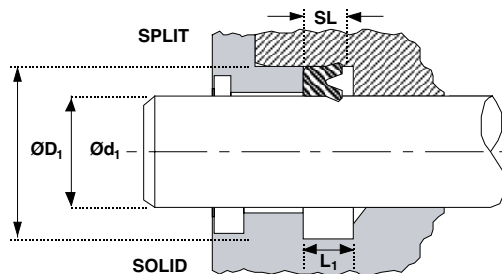
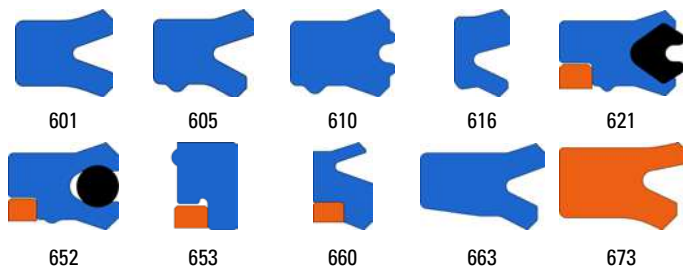
NOMINAL					
TYPE	$\varnothing d_1$	$\varnothing D_1$	SL	$L_1$	PART No.
663	50.00	57.00	9.00	10.00	4787400
610	50.00	58.00	5.30	6.30	4356900
610	50.00	58.00	8.00	9.00	4299100
663	50.00	58.00	8.20	9.00	4790300
601	50.00	60.00	5.60	6.30	4184001
601	50.00	60.00	6.00	7.00	4605600
605	50.00	60.00	6.00	7.00	4611800
605	50.00	60.00	7.30	8.00	4306000
621	50.00	60.00	7.30	8.00	4317310
663	50.00	60.00	7.30	8.00	4726400
605	50.00	60.00	8.20	9.00	4845800
673	50.00	60.00	8.00	9.00	4623008
601	50.00	60.00	10.00	11.00	4363100
605	50.00	60.00	10.00	11.00	4304500
610	50.00	60.00	10.00	11.00	4389500
621	50.00	60.00	10.00	11.00	4802310
663	50.00	60.00	10.00	11.00	4814400
605	50.00	60.00	11.80	13.00	4314400
616	50.00	61.00	3.90	4.20	4723000
652	50.00	62.00	8.70	9.60	4326411
605	50.00	62.70	9.50	10.50	4334400
673	50.00	63.00	9.00	10.00	4623108
605	50.00	63.00	10.00	11.00	4804400
605	50.00	65.00	9.00	10.00	4611900
605	50.00	65.00	9.50	10.50	4344000
601	50.00	65.00	10.00	11.00	4602000
605	50.00	65.00	10.00	11.00	4617000
621	50.00	65.00	10.00	11.00	4752910
673	50.00	65.00	10.00	11.00	4623208
605	50.00	65.00	10.90	12.00	4291700
605	50.00	65.00	11.40	12.50	4625400
621	50.00	65.00	11.40	12.50	4293410
663	50.00	65.00	11.40	12.50	4806400
605	50.00	65.00	14.50	16.00	4381900
616	50.00	65.50	6.00	6.30	4368000
653	50.00	65.50		6.30	4403210
660	50.00	65.50		6.30	4649610
601	50.00	70.00	12.00	13.00	4602100
605	50.00	70.00	12.00	13.00	4612000
601	52.00	62.00	10.00	11.00	4559000
601	53.00	63.00	6.00	7.00	4605700
605	53.00	63.00	6.00	7.00	4617700

NOMINAL					
TYPE	$\varnothing d_1$	$\varnothing D_1$	SL	$L_1$	PART No.
605	53.00	65.00	9.00	10.00	4371700
663	54.00	64.00	10.00	11.00	4868700
605	55.00	63.00	8.20	9.00	4863400
610	55.00	63.00	8.00	9.00	4323000
601	55.00	65.00	6.00	7.00	4605800
605	55.00	65.00	6.00	7.00	4615600
605	55.00	65.00	7.30	8.00	4703500
610	55.00	65.00	7.00	8.00	4385500
605	55.00	65.00	8.20	9.00	4360400
673	55.00	65.00	8.00	9.00	4623508
605	55.00	65.00	10.00	11.00	4306100
610	55.00	65.00	10.00	11.00	4389600
621	55.00	65.00	10.00	11.00	4831210
663	55.00	65.00	10.00	11.00	4798900
605	55.00	65.00	11.80	13.00	4323400
610	55.00	65.00	11.80	13.00	4389700
663	55.00	67.00	10.00	11.00	4793800
605	55.00	68.00	10.00	11.00	4593800
673	55.00	68.00	10.00	11.00	4623608
605	55.00	70.00	9.00	10.00	4612100
621	55.00	70.00	9.00	10.00	4810210
673	55.00	70.00	9.00	10.00	4623708
673	55.00	70.00	10.00	11.00	4623808
621	55.00	70.00	11.40	12.50	4403610
605	55.00	70.00	11.80	13.00	4319200
653	55.00	70.50		6.30	4403310
660	55.00	70.50		6.30	4634410
605	55.00	71.00	12.00	13.00	4625000
601	55.00	75.00	12.00	13.00	4602200
605	55.00	75.00	12.00	13.00	4612200
610	56.00	64.00	8.00	9.00	4316400
601	56.00	66.00	6.00	7.00	4605900
610	56.00	66.00	6.80	7.50	4334900
605	56.00	66.00	10.00	11.00	4311800
663	56.00	66.00	10.00	11.00	4726500
601	56.00	71.00	8.40	9.50	4184201
605	56.00	71.00	10.00	11.00	4311900
605	56.00	71.00	11.40	12.50	4306200
621	56.00	71.00	11.40	12.50	4317410
616	56.00	71.50	6.00	6.30	4368100
601	56.00	76.00	12.00	13.00	4622000
610	60.00	68.00	7.00	8.00	4732400



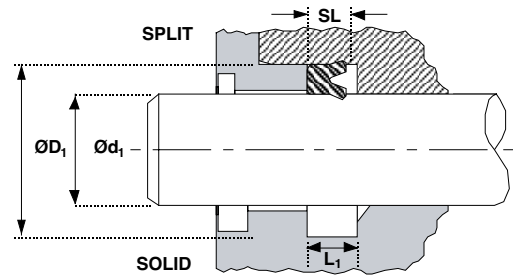
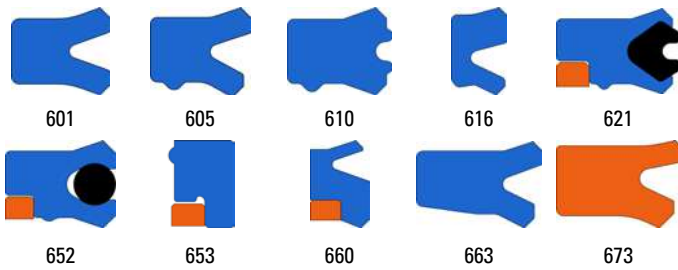
NOMINAL					
TYPE	$\varnothing d_1$	$\varnothing D_1$	SL	L <sub>1</sub>	PART No.
610	60.00	68.00	8.00	9.00	4299200
663	60.00	68.00	8.20	9.00	4816900
605	60.00	68.00	11.40	12.50	4538000
610	60.00	68.00	11.40	12.50	4329900
652	60.00	69.80	11.40	12.50	4534910
601	60.00	70.00	6.00	7.00	4606000
605	60.00	70.00	6.00	7.00	4610500
605	60.00	70.00	7.30	8.00	4703600
610	60.00	70.00	7.00	8.00	4303200
663	60.00	70.00	7.30	8.00	4822600
601	60.00	70.00	10.00	11.00	4363200
605	60.00	70.00	10.00	11.00	4310600
663	60.00	70.00	10.00	11.00	4726600
605	60.00	70.00	11.80	13.00	4306300
610	60.00	70.00	11.80	13.00	4389800
663	60.00	70.00	11.80	13.00	4885700
616	60.00	70.60	3.90	4.20	4410800
601	60.00	71.00	7.00	8.00	4606100
605	60.00	71.00	7.00	8.00	4615700
652	60.00	72.00	8.70	9.60	4344211
605	60.00	72.00	10.00	11.00	4323500
605	60.00	73.00	10.00	11.00	4593900
673	60.00	73.00	10.00	11.00	4623908
621	60.00	73.00	13.00	14.00	4526010
605	60.00	75.00	9.00	10.00	4612300
673	60.00	75.00	9.00	10.00	4624008
605	60.00	75.00	10.00	11.00	4378700
673	60.00	75.00	10.00	11.00	4624108
605	60.00	75.00	11.40	12.50	4857700
621	60.00	75.00	11.40	12.50	4298410
663	60.00	75.00	11.40	12.50	4806500
605	60.00	75.00	11.80	13.00	4306400
652	60.00	75.00	11.90	13.00	4451211
605	60.00	75.00	20.50	22.50	4391800
616	60.00	75.50	6.00	6.30	4727100
653	60.00	75.50		6.30	4403410
660	60.00	75.50		6.30	4634510
605	60.00	76.00	10.00	11.00	4625100
601	60.00	76.00	12.00	13.00	4608000
605	60.00	80.00	11.40	12.50	4514300
601	60.00	80.00	12.00	13.00	4602300
605	60.00	80.00	12.00	13.00	4612400

NOMINAL					
TYPE	$\varnothing d_1$	$\varnothing D_1$	SL	L <sub>1</sub>	PART No.
610	63.00	71.00	8.00	9.00	4316500
601	63.00	73.00	6.00	7.00	4606200
605	63.00	73.00	6.00	7.00	4612500
663	63.00	73.00	7.30	8.00	4877600
601	63.00	73.00	11.80	13.00	4363300
605	63.00	73.00	11.80	13.00	4312000
610	63.00	75.00	8.60	9.60	4360500
652	63.00	75.00	8.70	9.60	4326511
601	63.00	78.00	8.40	9.50	4184301
605	63.00	78.00	10.00	11.00	4312100
673	63.00	78.00	10.00	11.00	4623408
605	63.00	78.00	11.40	12.50	4306500
621	63.00	78.00	11.40	12.50	4317510
616	63.00	78.50	6.00	6.30	4368200
653	63.00	78.50		6.30	4751110
605	63.00	83.00	11.80	13.00	4857800
621	63.00	83.00	11.80	13.00	4520510
610	65.00	73.00	8.00	9.00	4362500
601	65.00	75.00	6.00	7.00	4606300
605	65.00	75.00	6.00	7.00	4615900
605	65.00	75.00	7.70	9.00	4314500
621	65.00	75.00	10.00	11.00	4755110
605	65.00	75.00	11.80	13.00	4306600
610	65.00	75.00	11.80	13.00	4389900
663	65.00	75.00	11.80	13.00	4790400
616	65.00	76.00	3.90	4.20	4853300
605	65.00	77.00	9.00	10.00	4703700
605	65.00	77.00	9.50	10.50	4334500
605	65.00	78.00	10.00	11.00	4616200
673	65.00	78.00	10.00	11.00	4624208
601	65.00	80.00	8.40	9.50	4184401
605	65.00	80.00	9.00	10.00	4612600
673	65.00	80.00	9.00	10.00	4624308
621	65.00	80.00	10.00	11.00	4761810
673	65.00	80.00	10.00	11.00	4624408
621	65.00	80.00	11.40	12.50	4783710
601	65.00	80.00	12.00	13.00	4867900
605	65.00	80.00	11.80	13.00	4312200
663	65.00	80.00	11.40	13.00	4726700
621	65.00	80.00	13.00	14.00	4810310
616	65.00	80.50	6.00	6.30	4548000
653	65.00	80.50		6.30	4742110



NOMINAL					
TYPE	$\varnothing d_1$	$\varnothing D_1$	SL	$L_1$	PART No.
660	65.00	80.50		6.30	4634610
601	65.00	85.00	12.00	13.00	4602400
605	65.00	85.00	12.00	13.00	4612700
605	67.00	77.00	6.00	7.00	4612800
605	68.50	76.50	8.00	9.00	4855200
610	70.00	78.00	8.00	9.00	4316600
605	70.00	78.00	11.40	12.50	4863500
601	70.00	80.00	6.00	7.00	4606400
605	70.00	80.00	6.00	7.00	4615800
610	70.00	80.00	6.50	7.50	4335000
605	70.00	80.00	11.40	12.50	4857900
601	70.00	80.00	11.80	13.00	4363400
605	70.00	80.00	11.80	13.00	4312300
610	70.00	80.00	11.80	13.00	4390000
605	70.00	82.00	8.70	9.60	4494700
652	70.00	82.00	8.70	9.60	4344311
605	70.00	82.00	10.00	11.00	4323600
605	70.00	83.00	10.00	11.00	4616400
673	70.00	83.00	10.00	11.00	4624508
621	70.00	83.00	13.00	14.00	4810410
601	70.00	85.00	8.40	9.50	4184501
605	70.00	85.00	9.00	10.00	4612900
673	70.00	85.00	9.00	10.00	4624608
605	70.00	85.00	10.00	11.00	4302700
621	70.00	85.00	10.00	11.00	4893010
605	70.00	85.00	11.40	12.50	4301200
621	70.00	85.00	11.40	12.50	4317610
601	70.00	85.00	12.00	13.00	4868000
663	70.00	85.00	11.40	13.00	4790500
605	70.00	85.00	20.50	22.50	4401400
616	70.00	85.50	6.00	6.30	4368300
653	70.00	85.50		6.30	4742310
660	70.00	85.50		6.30	4634710
601	70.00	90.00	12.00	13.00	4602500
605	70.00	90.00	12.00	13.00	4613000
601	70.00	92.00	12.00	13.00	4602600
601	71.00	80.00	6.00	7.00	4606500
610	75.00	83.00	8.00	9.00	4539400
605	75.00	83.00	11.40	12.50	4706300
601	75.00	85.00	6.00	7.00	4606600
605	75.00	85.00	6.00	7.00	4616800
605	75.00	85.00	11.40	12.50	4858000

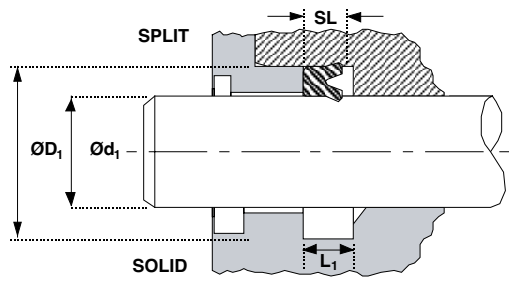
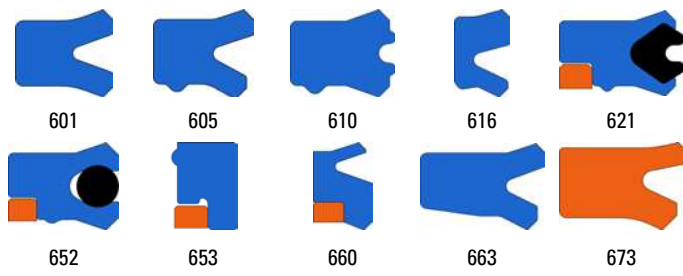
NOMINAL					
TYPE	$\varnothing d_1$	$\varnothing D_1$	SL	$L_1$	PART No.
601	75.00	85.00	11.80	13.00	4363500
605	75.00	85.00	11.80	13.00	4312400
663	75.00	85.00	11.80	13.00	4726800
605	75.00	88.00	10.00	11.00	4616300
673	75.00	88.00	10.00	11.00	4624708
621	75.00	88.00	13.00	14.00	4526110
605	75.00	90.00	9.00	10.00	4613100
673	75.00	90.00	9.00	10.00	4624808
605	75.00	90.00	10.00	11.00	4862800
673	75.00	90.00	10.00	11.00	4624908
605	75.00	90.00	11.40	12.50	4858100
601	75.00	90.00	12.00	13.00	4868100
621	75.00	90.00	12.00	13.00	4810510
621	75.00	90.00	13.00	14.00	4784710
616	75.00	90.50	6.00	6.30	4728200
653	75.00	90.50		6.30	4742410
660	75.00	90.50		6.30	4634810
621	75.00	95.00	11.40	12.50	4810610
601	75.00	95.00	12.00	13.00	4602700
605	75.00	95.00	12.00	13.00	4613200
652	75.00	95.00	12.50	14.00	4547810
621	75.00	95.00	14.60	16.00	4801510
663	75.00	95.00	14.50	16.00	4809000
601	75.00	100.00	22.00	24.00	4584700
605	77.00	87.00	11.80	13.00	4863100
605	78.00	86.00	9.00	10.00	4538700
605	78.00	86.00	11.40	12.50	4863600
610	80.00	88.00	8.00	9.00	4316700
605	80.00	88.00	10.90	12.00	4766600
601	80.00	90.00	6.00	7.00	4606700
605	80.00	90.00	6.00	7.00	4616000
601	80.00	90.00	8.00	8.80	4159001
605	80.00	90.00	10.00	11.00	4390400
601	80.00	90.00	11.80	13.00	4363600
605	80.00	90.00	11.80	13.00	4312500
663	80.00	90.00	11.80	13.00	4761400
605	80.00	92.00	8.70	9.60	4494800
605	80.00	93.00	10.00	11.00	4615200
673	80.00	93.00	10.00	11.00	4626508
621	80.00	93.00	13.00	14.00	4810710
601	80.00	95.00	8.40	9.50	4184601
605	80.00	95.00	9.00	10.00	4613300



NOMINAL					
TYPE	$\varnothing d_1$	$\varnothing D_1$	SL	$L_1$	PART No.
673	80.00	95.00	9.00	10.00	4626608
605	80.00	95.00	10.00	11.00	4383500
673	80.00	95.00	10.00	11.00	4626708
605	80.00	95.00	11.40	12.50	4620000
621	80.00	95.00	11.40	12.50	4317710
605	80.00	95.00	11.80	13.00	4306700
652	80.00	95.00	11.80	13.00	4797410
621	80.00	95.00	13.00	14.00	4540610
652	80.00	95.00	14.50	16.00	4446511
616	80.00	95.50	6.00	6.30	4368400
653	80.00	95.50		6.30	4742510
660	80.00	95.50		6.30	4634910
601	80.00	100.00	12.00	13.00	4602800
605	80.00	100.00	12.00	13.00	4613400
673	80.00	100.00	12.00	13.00	4626808
601	80.00	100.00	13.20	14.50	4857100
605	80.00	100.00	14.50	16.00	4382800
663	80.00	100.00	14.50	16.00	4806600
605	80.00	110.00	16.40	18.00	4342900
605	85.00	93.00	8.20	9.00	4839100
605	85.00	93.00	10.00	11.00	4392700
605	85.00	93.00	11.40	12.50	4537900
605	85.00	95.00	11.80	13.00	4863700
652	85.00	97.00	8.70	9.60	4344511
663	85.00	97.00	8.70	9.60	4870100
610	85.00	97.00	9.00	10.00	4328100
601	85.00	100.00	8.40	9.50	4184701
601	85.00	100.00	8.90	10.00	4606800
605	85.00	100.00	9.00	10.00	4610600
673	85.00	100.00	9.00	10.00	4626908
605	85.00	100.00	10.00	11.00	4615300
673	85.00	100.00	10.00	11.00	4627008
601	85.00	100.00	12.00	13.00	4868200
605	85.00	100.00	11.80	13.00	4306800
621	85.00	100.00	11.80	13.00	4766410
663	85.00	100.00	11.80	13.00	4806700
621	85.00	100.00	13.00	14.00	4540710
616	85.00	100.50	6.00	6.30	4538400
653	85.00	100.50		6.30	4742610
660	85.00	100.50		6.30	4635010
601	85.00	105.00	12.00	13.00	4602900
605	85.00	105.00	12.00	13.00	4613500

NOMINAL					
TYPE	$\varnothing d_1$	$\varnothing D_1$	SL	$L_1$	PART No.
673	85.00	105.00	12.00	13.00	4627108
621	85.00	105.00	14.60	16.00	4810810
610	87.00	95.00	8.00	9.00	4323700
610	90.00	98.00	8.00	9.00	4316800
605	90.00	98.00	11.40	12.50	4706400
605	90.00	100.00	6.80	7.50	4493500
605	90.00	100.00	9.00	10.00	4366900
605	90.00	100.00	11.40	12.50	4858200
601	90.00	100.00	11.80	13.00	4363700
605	90.00	100.00	11.80	13.00	4314600
605	90.00	102.00	8.70	9.60	4333000
601	90.00	105.00	8.40	9.50	4184801
601	90.00	105.00	8.90	10.00	4606900
605	90.00	105.00	9.00	10.00	4613600
673	90.00	105.00	9.00	10.00	4627208
605	90.00	105.00	10.00	11.00	4615400
673	90.00	105.00	10.00	11.00	4627308
605	90.00	105.00	11.40	12.50	4306900
621	90.00	105.00	11.40	12.50	4317810
652	90.00	105.00	11.80	13.00	4875010
621	90.00	105.00	13.00	14.00	4526310
652	90.00	105.00	14.50	16.00	4428011
616	90.00	105.50	6.00	6.30	4368500
653	90.00	105.50		6.30	4523710
660	90.00	105.50		6.30	4635110
601	90.00	110.00	12.00	13.00	4603000
605	90.00	110.00	12.00	13.00	4613700
673	90.00	110.00	12.00	13.00	4627408
621	90.00	110.00	14.60	16.00	4810910
605	95.00	103.00	11.40	12.50	4863200
601	95.00	110.00	8.90	10.00	4607000
605	95.00	110.00	9.00	10.00	4610700
673	95.00	110.00	9.00	10.00	4627508
605	95.00	110.00	10.00	11.00	4615500
673	95.00	110.00	10.00	11.00	4627608
601	95.00	110.00	12.00	13.00	4868300
605	95.00	110.00	11.80	13.00	4617600
621	95.00	110.00	12.00	13.00	4811010
621	95.00	110.00	13.00	14.00	4540810
616	95.00	110.50	6.00	6.30	4538500
653	95.00	110.50		6.30	4742810
660	95.00	110.50		6.30	4635210

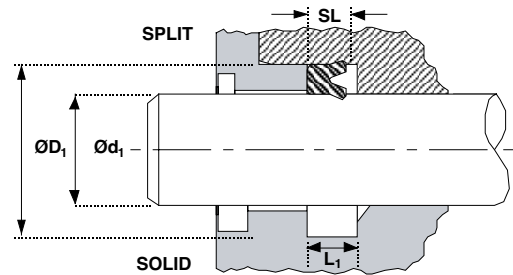
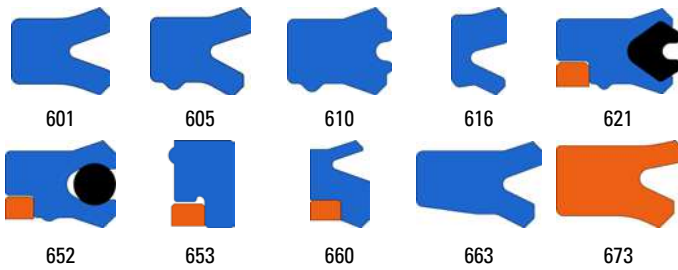




NOMINAL					
TYPE	$\varnothing d_1$	$\varnothing D_1$	SL	$L_1$	PART No.
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605	95.00	115.00	12.00	13.00	4613800
673	95.00	115.00	12.00	13.00	4627708
621	95.00	115.00	14.60	16.00	4811110
605	96.00	104.00	10.90	12.00	4380300
605	98.00	112.00	8.50	9.50	4618200
610	100.00	108.00	8.00	9.00	4316900
605	100.00	108.00	10.90	12.00	4766700
601	100.00	110.00	6.40	7.00	4878600
605	100.00	110.00	10.90	12.00	4461700
601	100.00	115.00	8.90	10.00	4607100
605	100.00	115.00	9.00	10.00	4610800
673	100.00	115.00	9.00	10.00	4627808
605	100.00	115.00	10.00	11.00	4617100
673	100.00	115.00	10.00	11.00	4627908
652	100.00	115.00	11.00	12.00	4528010
601	100.00	115.00	12.00	13.00	4868400
605	100.00	115.00	11.80	13.00	4312600
663	100.00	115.00	11.80	13.00	4837400
621	100.00	115.00	13.00	14.00	4540910
652	100.00	115.00	14.50	16.00	4397611
616	100.00	115.50	6.00	6.30	4368600
653	100.00	115.50		6.30	4742910
660	100.00	115.50		6.30	4635310
601	100.00	120.00	11.00	12.50	4184901
601	100.00	120.00	12.00	13.00	4603200
605	100.00	120.00	11.80	13.00	4312700
673	100.00	120.00	12.00	13.00	4628008
605	100.00	120.00	14.50	16.00	4307000
621	100.00	120.00	14.60	16.00	4317910
605	105.00	113.00	10.00	11.00	4392800
605	105.00	115.00	13.20	14.50	4390500
605	105.00	120.00	9.00	10.00	4617300
673	105.00	120.00	9.00	10.00	4628108
605	105.00	120.00	10.00	11.00	4617200
673	105.00	120.00	10.00	11.00	4628208
621	105.00	120.00	12.00	13.00	4811210
652	105.00	120.00	11.80	13.00	4406711
621	105.00	120.00	13.00	14.00	4811310
605	105.00	120.00	14.50	16.00	4379500
652	105.00	120.00	14.50	16.00	4781810
660	105.00	120.50		6.30	4635410

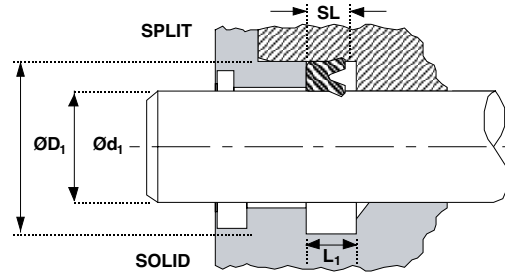
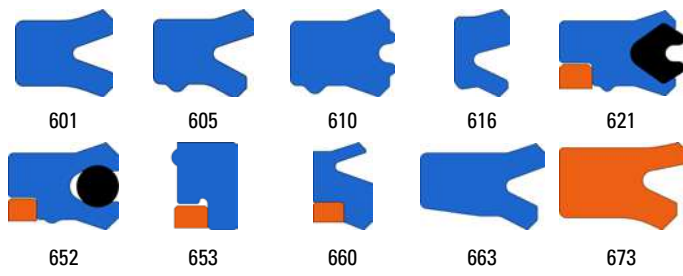
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TYPE	$\varnothing d_1$	$\varnothing D_1$	SL	$L_1$	PART No.
601	105.00	125.00	11.40	12.50	4185001
673	105.00	125.00	12.00	13.00	4628308
605	105.00	125.00	14.50	16.00	4617400
621	105.00	125.00	14.60	16.00	4811410
601	105.00	125.00	15.00	17.00	4603300
605	108.00	123.00	10.90	12.00	4329100
605	110.00	125.00	9.00	10.00	4459700
673	110.00	125.00	9.00	10.00	4628408
673	110.00	125.00	10.00	11.00	4628508
605	110.00	125.00	11.00	12.00	4537800
621	110.00	125.00	13.00	14.00	4811510
605	110.00	125.00	14.50	16.00	4481600
652	110.00	125.00	14.50	16.00	4445611
616	110.00	125.50	6.00	6.30	4545400
653	110.00	125.50		6.30	4743010
660	110.00	125.50		6.30	4635510
601	110.00	130.00	11.00	12.50	4185101
605	110.00	130.00	11.80	13.00	4312800
673	110.00	130.00	12.00	13.00	4628608
621	110.00	130.00	13.00	14.00	4541010
605	110.00	130.00	14.50	16.00	4307100
621	110.00	130.00	14.60	16.00	4318010
601	110.00	130.00	15.00	17.00	4603400
605	110.00	135.00	14.50	16.00	4343000
601	112.00	125.00	8.90	10.00	4607200
605	112.00	125.00	9.00	10.00	4610900
605	115.00	123.00	11.40	12.50	4903400
605	115.00	125.00	11.00	12.00	4619300
601	115.00	130.00	8.90	10.00	4621600
605	115.00	130.00	9.00	10.00	4459800
673	115.00	130.00	9.00	10.00	4628708
605	115.00	130.00	10.90	12.00	4434600
605	115.00	130.00	14.50	16.00	4342600
652	115.00	130.00	14.50	16.00	4455411
660	115.00	130.50		6.30	4635610
673	115.00	135.00	12.00	13.00	4628808
621	115.00	135.00	14.60	16.00	4783810
673	115.00	135.00	15.00	16.00	4628908
601	115.00	135.00	15.00	17.00	4608100
601	118.00	130.00	7.30	8.00	4878700
605	120.00	128.00	11.40	12.50	4706500
605	120.00	130.00	10.90	12.00	4461800





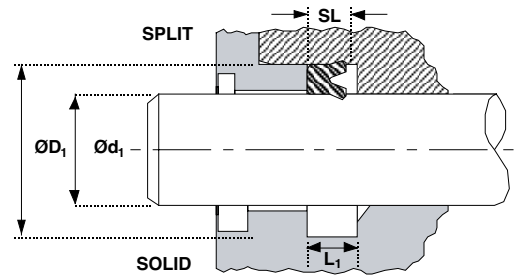
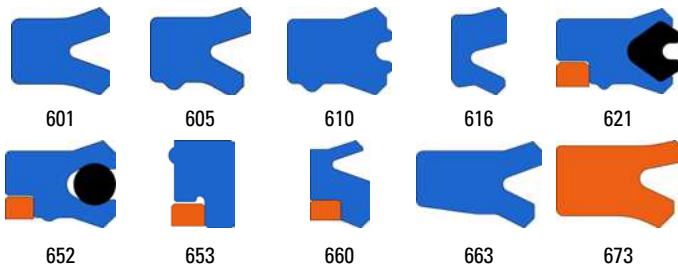
NOMINAL					
TYPE	$\varnothing d_1$	$\varnothing D_1$	SL	$L_1$	PART No.
605	120.00	135.00	9.00	10.00	4614000
673	120.00	135.00	9.00	10.00	4623308
621	120.00	135.00	14.60	16.00	4318110
652	120.00	135.00	14.50	16.00	4452011
660	120.00	135.50		6.30	4635710
605	120.00	140.00	12.00	13.00	4614100
673	120.00	140.00	12.00	13.00	4629008
621	120.00	140.00	13.00	14.00	4541110
601	120.00	140.00	14.50	16.00	4319600
605	120.00	140.00	14.50	16.00	4312900
621	120.00	140.00	14.60	16.00	4783910
601	120.00	140.00	15.00	17.00	4603500
605	124.00	134.00	6.00	7.00	4618300
653	124.00	139.50		6.30	4824710
605	125.00	133.00	10.00	11.00	4392900
605	125.00	133.00	11.40	12.50	4748500
601	125.00	140.00	8.90	10.00	4607300
605	125.00	140.00	9.00	10.00	4614200
605	125.00	140.00	10.00	11.00	4618400
605	125.00	140.00	10.90	12.00	4766500
652	125.00	140.00	14.50	16.00	4446911
616	125.00	140.50	6.00	6.30	4545500
653	125.00	140.50		6.30	4824810
660	125.00	140.50		6.30	4635810
601	125.00	145.00	11.40	12.50	4185201
605	125.00	145.00	12.00	13.00	4614300
673	125.00	145.00	12.00	13.00	4629108
605	125.00	145.00	14.50	16.00	4307300
621	125.00	145.00	14.60	16.00	4318210
601	125.00	145.00	15.00	17.00	4603600
605	125.00	150.00	12.50	14.00	4367000
652	128.00	143.00	14.50	16.00	4581611
605	130.00	140.00	14.50	16.00	4390600
605	130.00	145.00	9.00	10.00	4614400
605	130.00	145.00	10.00	11.00	4619000
621	130.00	145.00	13.00	14.00	4811610
652	130.00	145.00	14.50	16.00	4782410
616	130.00	145.50	6.00	6.30	4793900
653	130.00	145.50		6.30	4830210
660	130.00	145.50		6.30	4635910
605	130.00	150.00	12.00	13.00	4614500
605	130.00	150.00	14.50	16.00	4313000

NOMINAL					
TYPE	$\varnothing d_1$	$\varnothing D_1$	SL	$L_1$	PART No.
621	130.00	150.00	14.60	16.00	4709810
601	130.00	150.00	15.00	17.00	4603700
673	130.00	150.00	16.00	17.00	4629208
605	132.50	157.50	13.20	14.50	4329400
610	134.00	147.00	12.00	13.30	4588100
605	135.00	143.00	11.40	12.50	4903500
605	135.00	145.00	11.00	12.00	4619400
605	135.00	150.00	9.00	10.00	4618500
605	135.00	150.00	11.40	12.50	4537700
653	135.00	150.50		6.30	4824910
652	135.00	155.00	13.60	15.00	4475410
601	136.00	150.00	8.50	9.50	4607400
605	140.00	150.00	6.00	7.00	4617900
605	140.00	150.00	10.90	12.00	4461900
605	140.00	150.00	11.80	13.00	4625800
601	140.00	154.00	9.00	10.00	4607900
601	140.00	155.00	8.90	10.00	4607500
605	140.00	155.00	9.00	10.00	4614600
605	140.00	155.00	11.80	13.00	4555300
621	140.00	155.00	13.00	14.00	4811710
652	140.00	155.00	14.50	16.00	4753210
616	140.00	155.50	6.00	6.30	4545600
653	140.00	155.50		6.30	4770810
605	140.00	160.00	11.80	13.00	4313100
621	140.00	160.00	13.00	14.00	4541210
605	140.00	160.00	14.50	16.00	4307400
621	140.00	160.00	14.60	16.00	4318310
601	140.00	160.00	15.00	17.00	4603800
601	145.00	160.00	8.90	10.00	4607600
601	145.00	165.00	15.00	17.00	4608200
605	150.00	160.00	11.00	12.00	4595200
601	150.00	165.00	8.90	10.00	4607700
605	150.00	165.00	9.00	10.00	4614700
652	150.00	165.00	14.50	16.00	4389111
653	150.00	165.50		6.30	4825010
653	150.00	170.00		10.00	4804110
605	150.00	170.00	12.00	13.00	4614800
605	150.00	170.00	13.20	14.50	4367100
605	150.00	170.00	14.50	16.00	4342800
621	150.00	170.00	14.60	16.00	4784010
601	150.00	170.00	15.00	17.00	4603900
605	151.00	159.00	9.00	10.00	4538800



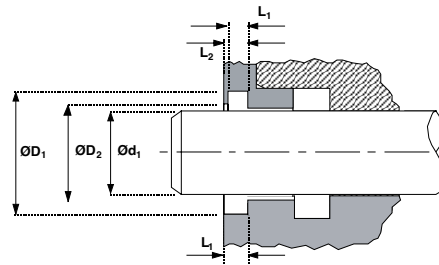
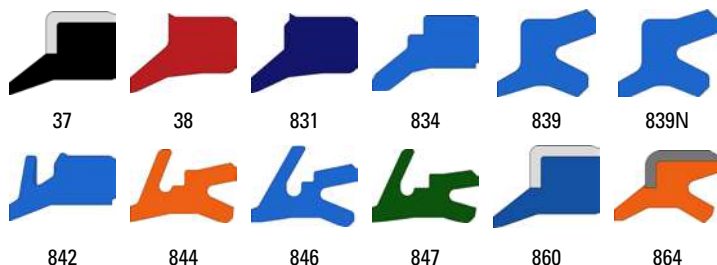
NOMINAL					
TYPE	$\varnothing d_1$	$\varnothing D_1$	SL	$L_1$	PART No.
601	153.00	165.00	7.30	8.00	4879000
605	155.00	163.00	11.40	12.50	4903600
605	155.00	165.00	6.00	7.00	4618600
605	155.00	165.00	11.00	12.00	4619500
601	155.00	170.00	8.90	10.00	4621700
605	155.00	170.00	9.00	10.00	4618700
605	155.00	170.00	14.50	16.00	4342700
653	155.00	170.50		6.30	4825110
601	155.00	180.00	15.00	17.00	4608300
601	160.00	175.00	9.00	10.00	4608400
605	160.00	175.00	9.00	10.00	4614900
605	160.00	175.00	10.90	12.00	4462000
652	160.00	175.00	11.70	12.80	4484010
652	160.00	175.00	14.50	16.00	4405011
616	160.00	175.50	6.00	6.30	4548100
653	160.00	175.50		6.30	4825210
652	160.00	177.00	14.50	16.00	4767610
605	160.00	180.00	12.00	13.00	4615000
601	160.00	180.00	15.00	16.00	4868500
605	160.00	180.00	14.50	16.00	4345000
621	160.00	180.00	14.60	16.00	4454810
621	160.00	185.00	14.60	16.00	4723410
601	160.00	185.00	15.00	17.00	4608500
652	160.00	185.00	18.80	20.00	4401711
601	165.00	180.00	9.00	10.00	4608600
605	165.00	180.00	9.00	10.00	4616500
652	165.00	182.00	14.50	16.00	4537411
601	165.00	183.00	10.00	11.00	4607800
601	165.00	190.00	15.00	17.00	4608700
605	170.00	180.00	6.00	7.00	4618800
605	170.00	180.00	11.80	13.00	4625900
605	170.00	185.00	9.00	10.00	4618000
652	170.00	185.00	14.50	16.00	4745610
653	170.00	185.50		6.30	4820210
605	170.00	190.00	14.50	16.00	4398800
601	170.00	195.00	15.00	17.00	4608800
610	175.00	185.00	11.80	13.00	4903700
601	175.00	190.00	8.90	10.00	4621800
601	175.00	200.00	15.00	17.00	4608900
652	177.00	192.00	14.50	16.00	4445711
605	180.00	190.00	11.00	12.00	4617800
605	180.00	192.00	12.50	14.00	4619600

NOMINAL					
TYPE	$\varnothing d_1$	$\varnothing D_1$	SL	$L_1$	PART No.
652	180.00	195.00	14.50	16.00	4734610
653	180.00	195.50		6.30	4804010
601	180.00	200.00	12.00	13.00	4609000
605	180.00	200.00	11.80	13.00	4314700
605	180.00	200.00	14.50	16.00	4560900
621	180.00	200.00	14.60	16.00	4454910
601	180.00	205.00	15.00	17.00	4609100
605	185.00	200.00	10.90	12.00	4462100
652	185.00	200.00	14.50	16.00	4777210
652	185.00	210.00	18.00	20.00	4546611
652	190.00	205.00	14.50	16.00	4430811
601	190.00	210.00	12.00	13.00	4609200
605	190.00	210.00	14.50	16.00	4896600
601	190.00	215.00	15.00	17.00	4609300
605	190.00	215.00	18.50	20.00	4749400
652	195.00	210.00	14.50	16.00	4459311
652	195.00	215.00	14.50	16.00	4550511
601	200.00	220.00	12.00	13.00	4609400
605	200.00	220.00	12.00	13.00	4615100
601	200.00	220.00	15.00	16.00	4678100
605	200.00	220.00	14.50	16.00	4380200
621	200.00	220.00	14.60	16.00	4455110
652	200.00	220.00	14.50	16.00	4387611
601	200.00	225.00	15.00	17.00	4609500
605	205.00	220.00	12.20	13.50	4522400
652	205.00	220.00	14.50	16.00	4762110
605	210.00	222.00	12.30	13.50	4625200
601	210.00	230.00	15.00	16.00	4678200
652	210.00	230.00	14.50	16.00	4472911
601	210.00	235.00	18.00	20.00	4609600
621	215.00	235.00	14.60	16.00	4705610
653	215.00	236.00		8.10	4705710
652	220.00	235.00	14.50	16.00	4759610
601	220.00	240.00	12.00	13.00	4609700
601	220.00	240.00	15.00	16.00	4678300
605	220.00	240.00	14.50	16.00	4555400
652	220.00	240.00	14.50	16.00	4544510
601	220.00	250.00	17.00	19.20	4426600
652	225.00	240.00	14.50	16.00	4445811
652	225.00	250.00	18.00	20.00	4537511
652	230.00	247.00	14.50	16.00	4767710
652	230.00	249.30	14.50	16.00	4439411



NOMINAL					
TYPE	$\varnothing d_1$	$\varnothing D_1$	SL	$L_1$	PART No.
601	230.00	250.00	12.00	13.00	4609800
601	230.00	250.00	15.00	16.00	4678400
652	230.00	250.00	14.50	16.00	4707210
652	230.00	255.00	22.80	25.00	4555511
652	235.00	255.00	14.50	16.00	4771410
601	240.00	260.00	12.00	13.00	4621000
601	240.00	260.00	15.00	16.00	4678500
605	240.00	260.00	14.50	16.00	4626300
652	240.00	260.00	14.50	16.00	4496511
601	240.00	265.00	18.00	20.00	4609900
652	245.00	270.00	18.00	20.00	4546711
652	250.00	270.00	14.50	16.00	4728810
601	250.00	275.00	18.00	20.00	4610000
605	255.00	275.00	14.50	16.00	4629700
652	255.00	275.00	14.50	16.00	4578611
605	260.00	270.00	12.30	13.50	4625300
601	260.00	280.00	15.00	16.00	4678600
605	260.00	280.00	14.50	16.00	4859300
652	260.00	280.00	16.40	18.00	4499011
601	260.00	290.00	18.00	20.00	4620100
652	265.00	285.00	14.50	16.00	4722110
601	265.00	295.00	18.00	20.00	4620200
601	270.00	290.00	11.00	12.00	4879100
601	270.00	300.00	18.00	20.00	4620300
652	275.00	295.00	14.50	16.00	4807310
601	280.00	300.00	11.00	12.00	4879200
652	280.00	300.00	14.50	16.00	4713910
601	280.00	310.00	18.00	20.00	4620400
652	285.00	305.00	16.40	18.00	4767810
652	285.00	310.00	18.00	20.00	4537611
605	290.00	310.00	14.50	16.00	4896200
652	290.00	310.00	16.40	18.00	4475111
652	290.00	315.00	18.00	20.00	4759410
601	290.00	320.00	18.00	20.00	4620500
652	295.00	315.00	16.40	18.00	4598211
652	300.00	320.00	14.50	16.00	4525110
601	300.00	330.00	18.00	20.00	4620600
652	305.00	325.00	16.40	18.00	4473011
652	305.00	330.00	18.00	20.00	4546811
652	305.00	335.00	16.40	18.00	4721910
652	320.00	340.00	14.50	16.00	4544410
652	320.00	340.00	16.40	18.00	4707310

NOMINAL					
TYPE	$\varnothing d_1$	$\varnothing D_1$	SL	$L_1$	PART No.
652	325.00	355.00	18.00	20.00	4555711
601	330.00	350.00	11.00	12.00	4879300
652	330.00	350.00	16.40	18.00	4796710
605	330.00	350.00	18.00	20.00	4587400
652	335.00	355.00	16.40	18.00	4496611
652	335.00	360.00	18.00	20.00	4831710
652	340.00	360.00	18.50	20.50	4788110
652	340.00	365.00	18.00	20.00	4732810
652	350.00	375.00	18.00	20.00	4718010
652	355.00	380.00	18.00	20.00	4578411
652	360.00	385.00	18.00	20.00	4781110
652	370.00	395.00	18.00	20.00	4579710
601	375.00	405.00	22.00	24.00	4620700
652	380.00	405.00	18.00	20.00	4752010
652	390.00	415.00	18.00	20.00	4730010
652	395.00	420.00	18.00	20.00	4807110
652	400.00	425.00	18.00	20.00	4797210
601	400.00	425.00	25.00	27.00	4620800
652	410.00	435.00	18.00	20.00	4785110
652	415.00	445.00	20.50	22.50	4820510
652	430.00	455.00	18.00	20.00	4862310
652	445.00	475.00	20.50	22.50	4838010
652	470.00	495.00	18.00	20.00	4814610
652	490.00	515.00	18.00	20.00	4888810

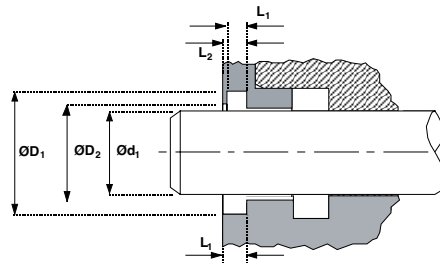
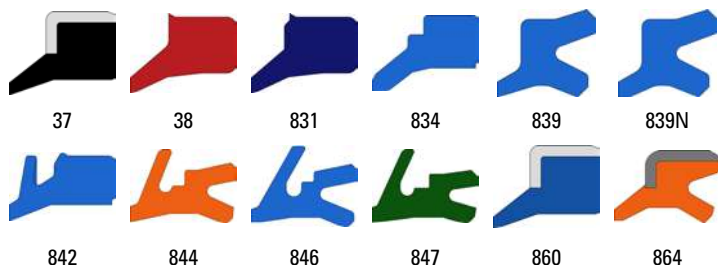


NOMINAL							
TYPE	$\odot d_1$	$\odot D_1$	$\odot D_2$	$L_1$	$L_2$	WL	PART No.
37	8.00	14.00		3.50		5.00	8759200
860	8.00	14.00		3.50		5.00	6950520
38	8.00	15.30	12.30	3.20	4.90		4860700
37	10.00	16.00		3.00		4.50	6644400
37	10.00	18.00		5.00		8.00	8759300
839	12.00	18.00	14.50	4.00	7.00		4436800
831	12.00	18.60	15.00	3.80	5.30		4565800
37	12.00	20.00		4.00		6.00	6644500
860	12.00	20.00		4.00		6.00	6950530
37	12.00	22.00		5.00		8.00	8759400
37	14.00	20.00		4.00		5.00	8759500
839	14.00	20.00	16.50	4.00	7.00		4436900
831	14.00	20.60	17.00	3.80	5.30		4580000
37	14.00	22.00		3.00		4.00	8759600
839N	14.00	22.00	18.30	4.80	7.00		4632000
839	15.00	22.00	18.00	3.80	6.00		4762300
37	15.00	25.00		5.00		8.00	8759700
860	15.00	25.00		5.00		7.00	6950000
37	16.00	22.00		3.00		4.00	8759800
860	16.00	22.00		3.00		4.00	6950010
37	16.00	22.00		3.50		5.00	8759900
844	16.00	22.00	19.80	4.00		7.00	4826406
831	16.00	22.60	19.00	3.80	5.30		4830600
839N	16.00	24.00	20.30	4.80	7.00		4632100
831	16.00	24.60	19.00	5.30	7.00		4703800
37	16.00	26.00		5.00		8.00	6644600
839	18.00	24.00	20.50	4.00	7.00		4437000
844	18.00	24.00	21.80	4.00		7.00	4848606
38	18.00	24.00	21.00	5.00	7.00		4392000
831	18.00	24.60	21.00	3.80	5.30		4580100
834	18.00	26.00	24.00	4.00		7.00	4367200
839N	18.00	26.00	22.30	4.80	7.00		4630800
37	18.00	26.00		5.00		7.00	8760000
831	18.00	26.60	21.00	5.30	7.00		4703900
860	18.00	28.00		5.00		7.00	6950020
37	18.00	28.00		7.00		10.00	8760100
860	18.00	28.00		7.00		10.00	6950540
37	20.00	26.00		4.00		7.00	8760200
839	20.00	26.00	22.50	4.00	6.00		4415000
842	20.00	26.00	24.00	4.00		6.00	4787000
844	20.00	26.00	23.80	4.00		7.00	4827606

**NOTE** WL refers to wiper length.

NOMINAL							
TYPE	$\odot d_1$	$\odot D_1$	$\odot D_2$	$L_1$	$L_2$	WL	PART No.
37	20.00	28.00		3.50		5.00	6644700
834	20.00	28.00	26.00	4.00		7.00	4391300
839N	20.00	28.00	24.30	4.80	7.00		4630900
37	20.00	28.00		5.00		8.00	8760300
38	20.00	28.00	25.50	5.00	8.00		4321900
831	20.00	28.60	23.00	5.30	7.00		4530600
37	20.00	30.00		4.00		6.00	6644800
860	20.00	30.00		4.00		6.00	6950550
37	20.00	30.00		5.00		8.00	8760400
860	20.00	30.00		5.00		8.00	6950030
37	20.00	30.00		7.00		10.00	6644900
860	20.00	30.00		7.00		10.00	6950560
839	22.00	28.00	24.50	4.00	7.00		4437100
37	22.00	28.00		5.00		8.00	8760500
834	22.00	30.00	28.00	4.00		7.00	4370600
38	22.00	30.00	27.50	5.00	8.00		4322000
831	22.00	30.60	25.00	5.30	7.00		4530700
37	22.00	32.00		5.00		8.00	8760600
860	22.00	32.00		5.00		8.00	6950570
37	22.00	32.00		7.00		10.00	8760700
37	22.00	35.00		5.00		8.00	8760800
839N	22.40	30.40	26.70	4.80	7.00		4630100
834	24.00	32.00	30.00	4.00		7.00	4829300
846	24.00	32.00	30.00	4.00	5.00	8.70	4764400
839	25.00	31.00	27.50	4.00	7.00		4799700
844	25.00	31.00	28.80	4.00		7.00	4805206
834	25.00	33.00	31.00	4.00		7.00	4343900
846	25.00	33.00	31.00	4.00	5.00	8.70	4556600
839N	25.00	33.00	29.30	4.80	7.00		4631000
38	25.00	33.00	30.50	5.00	8.00		6617700
831	25.00	33.60	28.00	5.30	7.00		4530800
37	25.00	35.00		5.00		8.00	8760900
860	25.00	35.00		5.00		8.00	6950040
864	25.00	35.00		5.00		8.00	4680506
37	25.00	35.00		7.00		10.00	6588300
860	25.00	35.00		7.00		10.00	6950580
860	25.00	37.00		6.00		9.00	6950050
834	26.00	34.00	32.00	4.00		7.00	4514400
846	26.00	34.00	32.00	4.00	5.00	8.70	4588700
834	28.00	36.00	34.00	4.00		7.00	4373500
846	28.00	36.00	34.00	4.00	5.00	8.70	4556700

**NOTE** WL refers to wiper length.

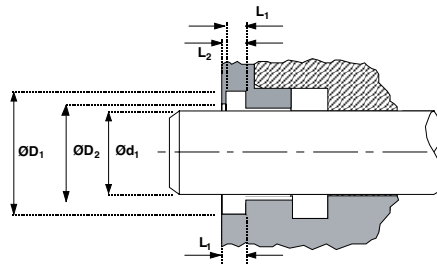
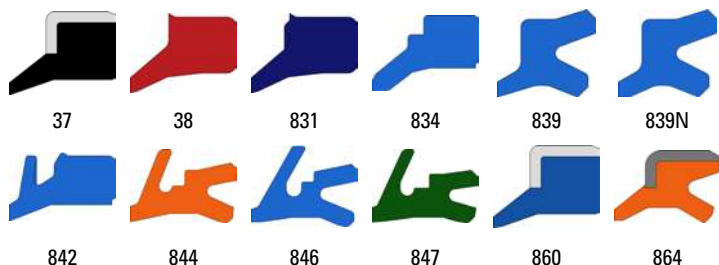


TYPE	NOMINAL						PART No.
	$\odot d_1$	$\odot D_1$	$\odot D_2$	$L_1$	$L_2$	WL	
839N	28.00	36.00	32.30	4.80	7.00		4631100
38	28.00	36.00	33.50	5.00	8.00		6617800
839	28.00	36.00	31.00	5.00	8.00		4437200
844	28.00	36.00	33.00	5.00		9.00	4833106
831	28.00	36.60	31.00	5.30	7.00		4565900
37	28.00	38.00		5.00		8.00	8761000
860	28.00	38.00		5.00		8.00	6950060
37	28.00	38.00		7.00		10.00	6588400
860	28.00	38.00		7.00		10.00	6950590
37	28.00	40.00		7.00		10.00	6645000
834	30.00	38.00	36.00	4.00		7.00	4378800
846	30.00	38.00	36.00	4.00	5.00	8.70	4584500
38	30.00	38.00	35.50	5.00	8.00		4419200
839	30.00	38.00	33.00	5.00	8.00		4519200
844	30.00	38.00	35.00	5.00		9.00	4803706
839N	30.00	38.00	34.00	5.80	8.00		4630200
831	30.00	38.60	33.00	5.30	7.00		4530900
37	30.00	40.00		5.00		8.00	6645100
860	30.00	40.00		5.00		8.00	6950070
864	30.00	40.00		5.00		8.00	4680606
37	30.00	40.00		7.00		10.00	8761100
860	30.00	40.00		7.00		10.00	6950600
38	30.00	41.20	37.00	7.50	10.00		4528900
860	30.00	42.00		6.00		9.00	6950080
864	30.00	42.00		6.00		9.00	4680706
37	30.00	45.00		5.00		8.00	8761200
864	30.00	47.00		7.00		10.00	4683006
839N	31.50	39.50	35.50	5.80	8.00		4632200
37	32.00	40.00		4.00		7.00	8761300
834	32.00	40.00	38.00	4.00		7.00	4373600
846	32.00	40.00	38.00	4.00	5.00	8.70	4568900
38	32.00	40.00	37.50	5.00	8.00		6617900
839	32.00	40.00	35.00	5.00	8.00		4594000
842	32.00	40.00	37.50	5.00		8.00	4714900
844	32.00	40.00	37.00	5.00		9.00	4827706
839N	32.00	40.00	36.00	5.80	8.00		4632300
37	32.00	40.00		7.00		10.00	8761400
831	32.00	40.60	35.00	5.30	7.00		4534500
37	32.00	42.00		5.00		7.00	6645200
860	32.00	42.00		5.00		8.00	6950090
37	32.00	42.00		7.00		10.00	6588500

**NOTE** WL refers to wiper length.

TYPE	NOMINAL						PART No.
	$\odot d_1$	$\odot D_1$	$\odot D_2$	$L_1$	$L_2$	WL	
860	32.00	42.00		7.00		10.00	6950610
37	32.00	45.00		5.00		8.00	6645300
860	32.00	45.00		5.00		8.00	6950620
860	32.00	45.00		7.00		10.00	6950630
864	32.00	52.00		8.00		11.00	4683106
834	35.00	43.00	41.00	4.00		7.00	4398400
38	35.00	43.00	40.50	5.00	8.00		4724800
844	35.00	43.00	40.00	5.00		9.00	4805306
839N	35.00	43.00	39.00	5.80	8.00		4630300
831	35.00	43.60	38.00	5.30	7.00		4531000
860	35.00	45.00		4.00		6.00	6950640
37	35.00	45.00		5.00		7.00	8761500
842	35.00	45.00	42.00	6.30		10.00	4515300
37	35.00	45.00		7.00		10.00	6645400
860	35.00	45.00		7.00		10.00	6950100
864	35.00	45.00		7.00		10.00	4680806
37	35.00	47.00		7.00		10.00	8761600
860	35.00	47.00		7.00		10.00	6950110
864	35.00	47.00		7.00		10.00	4680906
839N	35.50	43.50	39.50	5.80	8.00		4630400
834	36.00	44.00	42.00	4.00		7.00	4370700
846	36.00	44.00	42.00	4.00	5.00	8.70	4588800
38	36.00	44.00	41.50	5.00	8.00		6618000
839	36.00	44.00	39.00	5.00	8.00		4437300
842	36.00	44.00	41.50	5.00		8.00	4715000
844	36.00	44.00	41.00	5.00		9.00	4833206
831	36.00	44.60	39.00	5.30	7.00		4580200
37	36.00	45.00		7.00		10.00	8761700
860	36.00	45.00		7.00		10.00	6950650
37	36.00	46.00		5.00		7.00	8761800
37	36.00	46.00		7.00		10.00	6588600
860	36.00	46.00		7.00		10.00	6950660
864	36.00	48.00		7.00		10.00	4683206
834	37.00	45.00	43.00	4.00		7.00	4514500
834	38.00	46.00	44.00	4.00		7.00	4515400
846	38.00	46.00	44.00	4.00	5.00	8.70	4874900
842	38.00	46.00	43.00	5.30		8.00	4568700
839N	38.00	46.00	42.00	5.80	8.00		4632400
831	38.00	46.60	41.00	5.30	7.00		4788300
860	38.00	48.00		7.00		10.00	6950470
834	40.00	48.00	46.00	4.00		7.00	4378900

**NOTE** WL refers to wiper length.

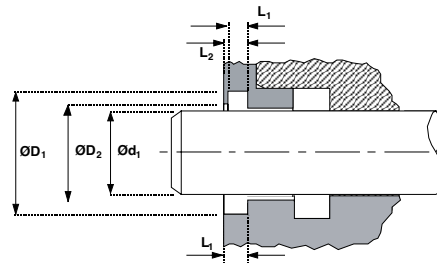
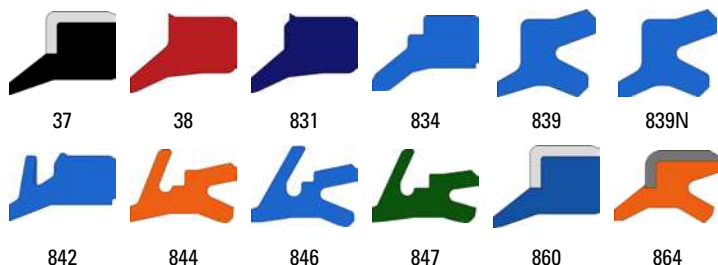


TYPE	NOMINAL						PART No.
	$\varnothing d_1$	$\varnothing D_1$	$\varnothing D_2$	$L_1$	$L_2$	WL	
846	40.00	48.00	46.00	4.00	5.00	8.70	4549200
38	40.00	48.00	45.50	5.00	8.00		6618100
839	40.00	48.00	43.00	5.00	8.00		4591600
842	40.00	48.00	45.50	5.00		8.00	4536500
844	40.00	48.00	45.00	5.00		9.00	4794006
839N	40.00	48.00	44.00	5.80	8.00		4630500
831	40.00	48.60	43.00	5.30	7.00		4531100
37	40.00	50.00		5.00		8.00	6645500
864	40.00	50.00		5.00		8.00	4681006
37	40.00	50.00		7.00		10.00	6588700
860	40.00	50.00		7.00		10.00	6950120
831	40.00	50.30	43.00	6.35	8.00		4866900
38	40.00	50.60	43.00	5.30	7.00		4784100
37	40.00	52.00		5.00		8.00	8761900
860	40.00	52.00		7.00		10.00	6950130
864	40.00	52.00		7.00		10.00	4681106
38	41.28	49.28	46.80	5.00	8.00		4599900
831	42.00	50.60	45.00	5.30	7.00		4788400
37	42.00	52.00		7.00		10.00	8762000
860	42.00	52.00		7.00		10.00	6950670
839N	43.00	51.00	47.00	5.80	8.00		4634200
834	45.00	53.00	51.00	4.00		7.00	4370800
846	45.00	53.00	51.00	4.00	5.00	8.70	4589900
38	45.00	53.00	50.50	5.00	8.00		6618200
839	45.00	53.00	48.00	5.00	8.00		4437400
842	45.00	53.00	50.50	5.00		8.00	4715100
844	45.00	53.00	50.00	5.00		9.00	4800006
839N	45.00	53.00	49.00	5.80	8.00		4630600
831	45.00	53.60	48.00	5.30	7.00		4533800
37	45.00	55.00		5.00		7.00	8762100
860	45.00	55.00		5.00		8.00	6950680
37	45.00	55.00		7.00		10.00	6588800
860	45.00	55.00		7.00		10.00	6950140
864	45.00	55.00		7.00		10.00	4681206
38	45.00	55.60	48.00	5.30	7.00		4531201
831	45.00	55.60	48.00	5.30	7.00		4531200
860	45.00	57.00		7.00		10.00	6950150
864	45.00	57.00		7.00		10.00	4681306
37	45.00	60.00		7.00		10.00	6645600
834	46.00	54.00	52.00	4.00		7.00	4515200
831	47.00	55.60	50.00	5.30	7.00		4778100

**NOTE** WL refers to wiper length.

TYPE	NOMINAL						PART No.
	$\varnothing d_1$	$\varnothing D_1$	$\varnothing D_2$	$L_1$	$L_2$	WL	
834	48.00	56.00	54.00	4.00		7.00	4432700
37	50.00	56.00		5.00		7.00	6645700
834	50.00	58.00	56.00	4.00		7.00	4379000
846	50.00	58.00	56.00	4.00	5.00	8.70	4597200
38	50.00	58.00	55.50	5.00	8.00		6618300
839	50.00	58.00	53.00	5.00	8.00		4584400
842	50.00	58.00	55.50	5.00		8.00	4533600
844	50.00	58.00	55.00	5.00		8.00	4869606
844	50.00	58.00	55.00	5.00		9.00	4803606
839N	50.00	58.00	54.00	5.80	8.00		4630000
38	50.00	58.60	53.00	5.30	7.00		4300400
831	50.00	58.60	53.00	5.30	7.00		4533900
37	50.00	60.00		5.00		7.00	6688500
860	50.00	60.00		5.00		8.00	6950690
37	50.00	60.00		7.00		10.00	6588900
860	50.00	60.00		7.00		10.00	6950160
38	50.00	60.60	53.00	5.30	7.00		4458000
831	50.00	60.60	53.00	5.30	7.00		4531300
860	50.00	62.00		7.00		10.00	6950170
864	50.00	62.00		7.00		10.00	4680206
37	50.00	65.00		7.00		10.00	8762200
864	50.00	72.00		8.00		11.00	4683306
844	50.80	60.80	57.80	6.00		10.00	4781500
37	52.00	62.00		7.00		10.00	8762300
839N	53.00	61.00	57.00	5.80	8.00		4632500
846	54.00	62.00	60.00	4.00	5.00	8.70	4803300
834	55.00	63.00	61.00	4.00		7.00	4515100
839N	55.00	63.00	59.00	5.80	8.00		4630700
37	55.00	63.00		7.00		10.00	8762400
831	55.00	63.60	58.00	5.30	7.00		4534000
37	55.00	65.00		5.00		7.00	8762500
839	55.00	65.00	58.00	6.00	9.70		4575200
844	55.00	65.00	62.00	6.00		11.50	4805406
38	55.00	65.00	62.00	6.30	10.00		4869300
842	55.00	65.00	62.00	6.30		10.00	4764600
37	55.00	65.00		7.00		10.00	6645800
860	55.00	65.00		7.00		10.00	6950180
38	55.00	65.60	58.00	5.30	7.00		4531401
831	55.00	65.60	58.00	5.30	7.00		4531400
860	55.00	69.00		8.00		11.00	6950190
864	55.00	69.00		8.00		11.00	4681406

**NOTE** WL refers to wiper length.



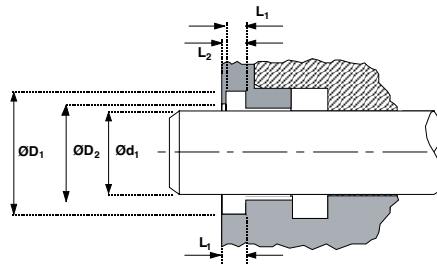
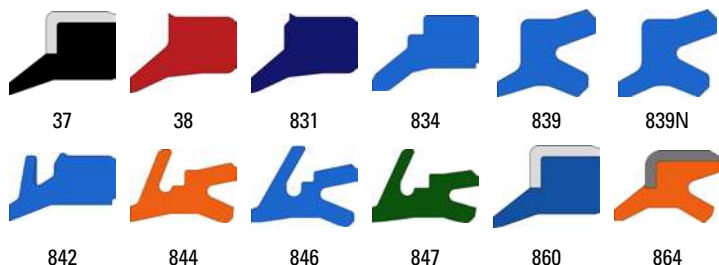
TYPE	NOMINAL						PART No.
	$\varnothing d_1$	$\varnothing D_1$	$\varnothing D_2$	$L_1$	$L_2$	WL	
860	55.00	70.00		5.00		8.00	6950700
860	55.00	70.00		7.00		10.00	6667689
834	56.00	64.00	62.00	4.00		7.00	4385100
846	56.00	64.00	62.00	4.00	5.00	8.70	4588900
839N	56.00	64.00	60.00	5.80	8.00		4632600
831	56.00	64.60	59.00	5.30	7.00		4566000
37	56.00	66.00		5.00		8.00	8762600
839	56.00	66.00	59.00	6.00	9.70		4437500
38	56.00	66.00	63.00	6.30	10.00		6618400
842	56.00	66.00	63.00	6.30		10.00	4715200
37	56.00	66.00		7.00		10.00	6589000
38	56.00	66.60	59.00	5.30	7.00		4458100
831	56.00	66.60	59.00	5.30	7.00		4704000
834	60.00	68.00	66.00	4.00		7.00	4385200
846	60.00	68.00	66.00	4.00	5.00	8.70	4596600
839N	60.00	68.00	64.00	5.80	8.00		4631200
831	60.00	68.60	63.00	5.30	7.00		4534100
37	60.00	70.00		5.00		7.00	8762700
860	60.00	70.00		5.00		8.00	6950710
38	60.00	70.00	66.00	5.30	7.00		4386200
839	60.00	70.00	63.00	6.00	9.70		4802400
844	60.00	70.00	67.00	6.00		9.50	4869706
844	60.00	70.00	67.00	6.00		11.50	4799506
38	60.00	70.00	67.00	6.30	10.00		4270200
842	60.00	70.00	67.00	6.30		10.00	4557800
37	60.00	70.00		7.00		10.00	6645900
860	60.00	70.00		7.00		10.00	6950200
38	60.00	70.60	63.00	5.30	7.00		4456400
831	60.00	70.60	63.00	5.30	7.00		4531500
842	60.00	72.00	67.00	4.10		10.00	4739300
37	60.00	74.00		5.00		8.00	8762800
860	60.00	74.00		8.00		11.00	6950210
864	60.00	74.00		8.00		11.00	4681506
860	60.00	75.00		5.00		8.00	6950720
37	60.00	75.00		7.00		10.00	8762900
860	60.00	75.00		7.00		10.00	6950730
37	60.00	80.00		7.00		10.00	8763000
864	60.00	82.00		11.00		14.00	4683406
834	63.00	71.00	69.00	4.00		7.00	4385300
846	63.00	71.00	69.00	4.00	5.00	8.70	4749600
839N	63.00	71.00	67.00	5.80	8.00		4632700

**NOTE** WL refers to wiper length.

TYPE	NOMINAL						PART No.
	$\varnothing d_1$	$\varnothing D_1$	$\varnothing D_2$	$L_1$	$L_2$	WL	
844	63.00	73.00	70.00	6.00		11.50	4833306
38	63.00	73.00	70.00	6.30	10.00		6618500
842	63.00	73.00	70.00	6.30		10.00	4536600
37	63.00	73.00		7.00		10.00	6589100
860	63.00	73.00		7.00		10.00	6667690
38	63.00	73.60	66.00	5.30	7.00		4283600
831	63.00	73.60	66.00	5.30	7.00		4824400
37	63.00	75.00		7.00		10.00	6646000
860	63.00	75.00		7.00		10.00	6950750
834	65.00	73.00	71.00	4.00		7.00	4394200
846	65.00	73.00	71.00	4.00	5.00	8.70	4597500
839N	65.00	73.00	69.00	5.80	8.00		4631300
37	65.00	75.00		5.00		7.00	8763100
839	65.00	75.00	68.00	6.00	9.70		4575300
844	65.00	75.00	72.00	6.00		11.50	4805506
38	65.00	75.00	72.00	6.30	10.00		4343800
37	65.00	75.00		7.00		10.00	6646100
860	65.00	75.00		7.00		10.00	6950220
38	65.00	75.60	68.00	5.30	7.00		4784200
860	65.00	79.00		8.00		11.00	6950230
864	65.00	79.00		8.00		11.00	4681606
846	68.00	76.00	74.00	4.00	5.00	8.70	4872300
834	68.50	76.50	74.50	4.00		7.00	4855300
834	70.00	78.00	76.00	4.00		7.00	4373700
846	70.00	78.00	76.00	4.00	5.00	8.70	4556800
831	70.00	78.60	73.00	5.30	7.00		4534200
37	70.00	80.00		5.00		7.00	8763200
839	70.00	80.00	73.00	6.00	9.70		4437600
844	70.00	80.00	77.00	6.00		11.50	4805606
38	70.00	80.00	77.00	6.30	10.00		6618600
839N	70.00	80.00	75.00	6.80	10.00		4631400
37	70.00	80.00		7.00		10.00	6589200
860	70.00	80.00		7.00		10.00	6950240
864	70.00	80.00		7.00		9.00	4684306
38	70.00	80.60	73.00	5.30	7.00		4454000
831	70.00	80.60	73.00	5.30	7.00		4531600
38	70.00	82.20	76.00	7.20	12.00		4243900
842	70.00	82.60	78.40	8.00		12.00	4480800
860	70.00	84.00		8.00		11.00	6950250
864	70.00	84.00		8.00		11.00	4681706
842	70.00	85.00	78.00	5.10		12.00	4739400

**NOTE** WL refers to wiper length.





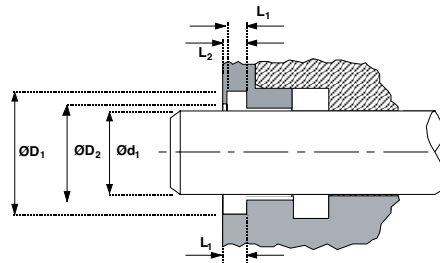
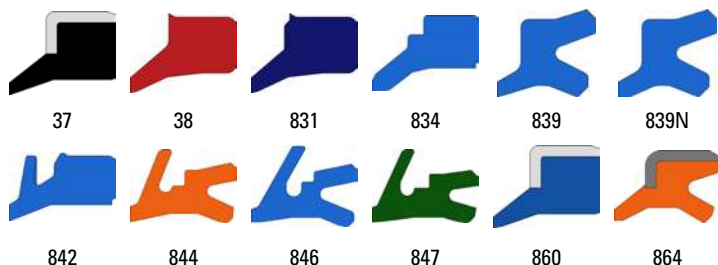
TYPE	NOMINAL						PART No.
	$\varnothing d_1$	$\varnothing D_1$	$\varnothing D_2$	$L_1$	$L_2$	WL	
834	75.00	83.00	81.00	4.00		7.00	4711900
846	75.00	83.00	81.00	4.00	5.00	8.70	4597600
38	75.00	83.60	78.00	5.30	7.00		4539500
844	75.00	85.00	82.00	6.00		11.50	4805706
38	75.00	85.00	82.00	6.30	10.00		4532500
839N	75.00	85.00	80.00	6.80	10.00		4631500
37	75.00	85.00		7.00		10.00	8763300
860	75.00	85.00		7.00		10.00	6950260
831	75.00	87.20	81.00	7.10	12.00		4903800
38	75.00	87.20	81.00	7.20	12.00		4384400
860	75.00	89.00		8.00		11.00	6950270
864	75.00	89.00		8.00		11.00	4681806
842	75.00	90.00	83.00	5.10		12.00	4744000
834	80.00	88.00	86.00	4.00		7.00	4398500
846	80.00	88.00	86.00	4.00	5.00	8.70	4590000
831	80.00	88.60	83.00	5.30	7.00		4534300
844	80.00	90.00	87.00	6.00		11.50	4805806
38	80.00	90.00	87.00	6.30	10.00		6618700
842	80.00	90.00	87.00	6.30		10.00	4715300
839N	80.00	90.00	85.00	6.80	10.00		4631600
37	80.00	90.00		7.00		10.00	6589300
860	80.00	90.00		7.00		10.00	6950280
38	80.00	91.00	85.00	7.50	11.00		4493200
831	80.00	92.20	86.00	7.10	12.00		4531700
38	80.00	92.20	86.00	7.20	12.00		4242800
847	80.00	92.60	88.40	7.00		14.00	4797507
860	80.00	94.00		8.00		11.00	6950290
864	80.00	94.00		8.00		11.00	4681906
842	80.00	95.00	88.00	5.10		12.00	4739500
38	82.60	92.20	85.70	5.30	7.10		4415500
834	85.00	93.00	91.00	4.00		7.00	4839000
38	85.00	93.60	88.00	5.30	7.00		4292100
831	85.00	93.60	88.00	5.30	7.00		4534400
860	85.00	95.00		5.00		8.00	6950760
844	85.00	95.00	92.00	6.00		11.50	4805906
839N	85.00	95.00	90.00	6.80	10.00		4632900
37	85.00	95.00		7.00		10.00	8763400
860	85.00	95.00		7.00		10.00	6950300
831	85.00	97.20	91.00	7.10	12.00		4531800
38	85.00	97.20	91.00	7.20	12.00		4784300
842	85.00	97.60	93.40	8.00		12.00	4521800

**NOTE** WL refers to wiper length.

TYPE	NOMINAL						PART No.
	$\varnothing d_1$	$\varnothing D_1$	$\varnothing D_2$	$L_1$	$L_2$	WL	
38	85.00	98.00	92.00	7.50	11.50		4332800
860	85.00	99.00		8.00		11.00	6950310
864	85.00	99.00		8.00		11.00	4682006
842	85.00	100.00	93.00	5.10		12.00	4744100
38	88.00	100.20	94.00	7.20	12.00		4269400
834	90.00	98.00	96.00	4.00		7.00	4398600
846	90.00	98.00	96.00	4.00	5.00	8.70	4557700
37	90.00	100.00		5.00		7.00	8763500
839	90.00	100.00	93.00	6.00	9.70		4437700
844	90.00	100.00	97.00	6.00		11.50	4806006
38	90.00	100.00	97.00	6.30	10.00		6618800
839N	90.00	100.00	95.00	6.80	10.00		4631700
37	90.00	100.00		7.00		10.00	6589400
860	90.00	100.00		7.00		10.00	6950320
831	90.00	102.20	96.00	7.10	12.00		4531900
842	90.00	102.20	96.00	7.10		12.40	4727300
38	90.00	102.20	96.00	7.20	12.00		4324500
847	90.00	102.60	98.40	7.00		14.00	4883307
842	90.00	102.60	98.40	8.00		12.00	4512500
860	90.00	104.00		8.00		11.00	6950330
864	90.00	104.00		8.00		11.00	4682106
842	90.00	105.00	98.00	5.10		12.00	4744600
864	90.00	105.00		6.00		9.00	4683606
38	92.00	112.00	102.00	7.00	11.00		4874200
839N	95.00	105.00	100.00	6.80	10.00		4631900
37	95.00	105.00		7.00		10.00	8763600
831	95.00	107.20	101.00	7.10	12.00		4903900
38	95.00	107.20	101.00	7.20	12.00		6667600
860	95.00	109.00		8.00		11.00	6950340
864	95.00	109.00		8.00		11.00	4682206
842	95.00	110.00	105.00	9.50		14.00	4536900
834	100.00	108.00	106.00	4.00		7.00	4394300
37	100.00	110.00		5.00		8.00	8763700
846	100.00	110.00	107.00	6.30	8.10	11.70	4723600
839N	100.00	110.00	105.00	6.80	10.00		4631800
37	100.00	110.00		7.00		10.00	8763800
860	100.00	110.00		7.00		10.00	6950350
38	100.00	110.60	104.00	5.30	7.00		4300200
831	100.00	112.20	106.00	7.10	12.00		4532000
842	100.00	112.20	106.00	7.10		12.40	4727400
38	100.00	112.20	106.00	7.20	12.00		4324600

**NOTE** WL refers to wiper length.



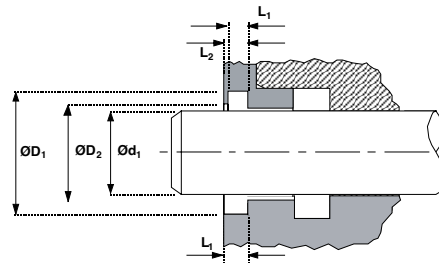
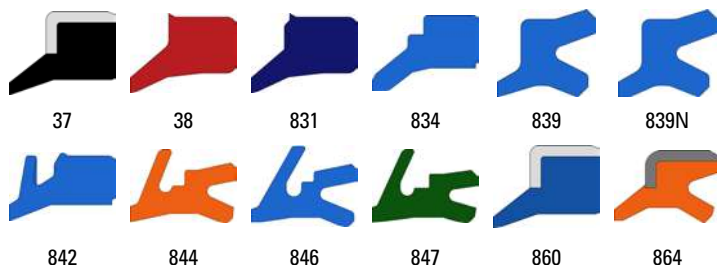


TYPE	NOMINAL						PART No.
	$\odot d_1$	$\odot D_1$	$\odot D_2$	$L_1$	$L_2$	WL	
847	100.00	112.60	108.40	7.00		14.00	4886707
842	100.00	114.00	109.90	8.00		12.00	4536000
860	100.00	114.00		8.00		11.00	6950360
864	100.00	114.00		8.00		11.00	4682306
842	100.00	115.00	108.00	5.10		12.00	4584800
864	100.00	115.00		7.50		10.00	4683706
37	100.00	115.00		8.00		10.00	8763900
38	100.00	115.00	110.00	9.50	14.00		6618900
842	100.00	115.00	110.00	9.50		14.00	4589500
38	101.60	116.60	111.60	9.50	14.00		6619010
38	105.00	113.00	110.50	5.00	8.00		4290300
37	105.00	115.00		7.00		10.00	8764000
860	105.00	115.00		7.00		10.00	6950770
38	105.00	120.00	112.00	7.20	12.00		4539100
842	105.00	120.00	115.00	9.50		14.00	4532100
844	105.00	120.00	115.00	9.50		17.00	4800400
860	105.00	121.00		9.00		12.00	6950370
834	110.00	118.00	116.00	4.00		7.00	4448200
839N	110.00	120.00	115.00	6.80	10.00		4633000
37	110.00	120.00		7.00		10.00	8764100
860	110.00	120.00		7.00		10.00	6950380
831	110.00	122.20	116.00	7.10	12.00		4538200
38	110.00	122.20	116.00	7.20	12.00		4459200
842	110.00	125.00	118.00	5.10		12.00	4739600
839	110.00	125.00	114.00	8.50	13.00		4437800
38	110.00	125.00	120.00	9.50	14.00		6619000
842	110.00	125.00	120.00	9.50		14.00	4715400
844	110.00	125.00	120.00	9.50		17.00	4853106
860	110.00	126.00		9.00		12.00	6950390
864	110.00	126.00		9.00		12.00	4682406
839N	112.00	122.00	117.00	6.80	10.00		4633100
37	115.00	125.00		7.00		10.00	8764200
831	115.00	127.20	121.00	7.10	12.00		4904000
38	115.00	127.20	121.00	7.20	12.00		4324800
860	115.00	131.00		9.00		12.00	6950400
864	115.00	131.00		9.00		12.00	4684206
839N	120.00	130.00	125.00	6.80	10.00		4633700
37	120.00	130.00		7.00		10.00	8764300
860	120.00	130.00		7.00		10.00	6950410
38	120.00	132.20	126.00	7.20	12.00		4454300
864	120.00	135.00		7.00		10.00	4683806

**NOTE** WL refers to wiper length.

TYPE	NOMINAL						PART No.
	$\odot d_1$	$\odot D_1$	$\odot D_2$	$L_1$	$L_2$	WL	
38	120.00	135.00	130.00	9.50	14.00		4385600
842	120.00	135.00	130.00	9.50		14.00	4580800
860	120.00	136.00		9.00		12.00	6950420
864	120.00	136.00		9.00		12.00	4682506
38	125.00	133.00	130.80	5.30	7.00		4393000
842	125.00	137.20	131.00	7.60		12.90	4727500
38	125.00	137.20	131.00	7.70	12.00		4233500
839N	125.00	138.00	132.00	7.80	11.00		4633200
842	125.00	140.00	133.00	5.10		12.00	4748300
37	125.00	140.00		9.00		12.00	6589700
860	125.00	140.00		9.00		12.00	6950780
38	125.00	140.00	135.00	9.50	14.00		6619100
842	125.00	140.00	135.00	9.50		14.00	4715500
844	125.00	140.00	135.00	9.50		17.00	4853206
38	125.00	140.00	132.60	10.20	16.00		4784400
860	125.00	141.00		9.00		12.00	6950790
38	128.00	143.00	138.00	9.50	14.00		4581800
839	130.00	142.00	135.00	8.20	11.00		4786300
38	130.00	142.20	136.00	7.20	12.00		4304300
839N	130.00	143.00	137.00	7.80	11.00		4633800
37	130.00	145.00		9.00		12.00	8764400
864	130.00	145.00		9.00		12.00	4683906
842	130.00	145.00	140.00	9.50		14.00	4491700
38	130.00	145.00	137.60	10.20	16.00		4784500
860	130.00	146.00		9.00		12.00	6950430
864	130.00	146.00		9.00		12.00	4682606
38	132.00	144.20	138.00	7.20	12.00		4269500
831	135.00	147.20	141.00	7.10	12.00		4538100
38	135.00	147.20	141.00	7.20	12.00		4869500
37	135.00	150.00		9.00		12.00	8764500
38	135.00	150.00	145.00	9.50	14.00		4278700
860	135.00	155.00		10.00		14.00	6950800
864	135.00	155.00		10.00		14.00	4683506
839N	136.00	149.00	143.00	7.80	11.00		4633300
38	140.00	148.60	143.00	5.30	7.00		4763800
834	140.00	152.00	149.00	5.50		10.00	4456100
842	140.00	152.20	146.00	7.60		12.90	4727600
38	140.00	152.20	146.00	7.70	12.00		4324900
839N	140.00	153.00	147.00	7.80	11.00		4633400
839	140.00	155.00	144.00	8.50	13.00		4437900
37	140.00	155.00		9.00		12.00	6589800

**NOTE** WL refers to wiper length.

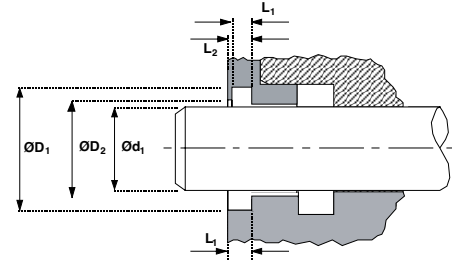
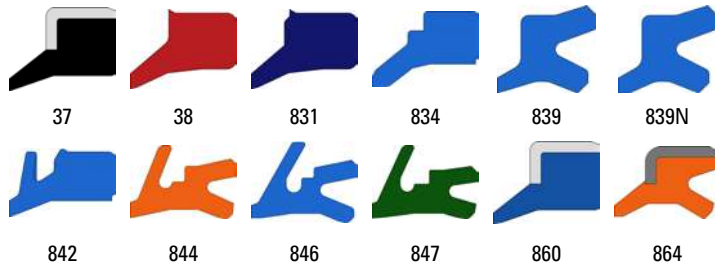


TYPE	NOMINAL						PART No.
	$\varnothing d_1$	$\varnothing D_1$	$\varnothing D_2$	$L_1$	$L_2$	WL	
860	140.00	155.00		9.00		12.00	6950810
864	140.00	155.00		9.00		12.00	4684006
38	140.00	155.00	150.00	9.50	14.00		6619200
842	140.00	155.00	150.00	9.50		14.00	4555900
38	140.00	155.00	147.60	10.20	16.00		4784600
860	140.00	160.00		10.00		14.00	6950440
864	140.00	160.00		10.00		14.00	4682706
38	145.00	153.60	148.00	5.30	7.00		4732200
839N	145.00	158.00	152.00	7.80	11.00		4633500
37	145.00	160.00		9.00		12.00	8764600
38	145.00	160.00	155.00	9.50	14.00		4560600
842	145.00	160.00	155.00	9.50		14.00	4570200
38	150.00	162.20	156.00	7.70	12.00		4278900
839N	150.00	163.00	157.00	7.80	11.00		4633900
38	150.00	165.00	158.00	7.20	12.00		6668500
839	150.00	165.00	154.00	8.50	13.00		4804200
37	150.00	165.00		9.00		12.00	8764700
38	150.00	165.00	157.60	10.20	16.00		4342500
38	150.00	166.00	161.00	8.00	12.00		4336700
842	150.00	169.00	159.00	6.10		14.00	4748400
860	150.00	170.00		10.00		14.00	6950450
864	150.00	170.00		10.00		14.00	4682806
38	155.00	163.00	160.50	5.00	8.00		4290200
38	155.00	167.20	161.00	7.70	12.00		4288200
831	155.00	169.20	162.00	7.10	12.00		4904100
842	155.00	170.00	165.00	9.50		14.00	4535200
38	155.00	175.00	165.00	10.20	18.00		4226400
38	160.00	172.20	166.00	7.70	12.00		4405700
839N	160.00	174.00	167.00	7.80	11.00		4633600
37	160.00	175.00		9.00		12.00	6589900
38	160.00	175.00	170.00	9.50	14.00		6619300
847	160.00	175.00	170.00	9.50		17.40	4861707
38	160.00	175.00	167.60	10.20	16.00		4454100
860	160.00	180.00		10.00		14.00	6950460
864	160.00	180.00		10.00		14.00	4682906
38	165.00	180.00	175.00	9.50	14.00		4537000
38	170.00	180.60	174.00	5.30	7.00		4732300
38	170.00	182.20	176.00	7.70	12.00		4233600
38	170.00	185.00	180.00	9.50	14.00		4745100
37	170.00	185.00		10.00		14.00	8764800
842	170.00	189.00	179.00	6.10		14.00	4749200

**NOTE** WL refers to wiper length.

TYPE	NOMINAL						PART No.
	$\varnothing d_1$	$\varnothing D_1$	$\varnothing D_2$	$L_1$	$L_2$	WL	
831	175.00	189.20	182.00	7.10	12.00		4904200
842	175.00	190.00	185.00	9.50		14.00	4552100
38	177.00	192.00	187.00	9.50	14.00		4287900
38	180.00	195.00	190.00	9.50	14.00		6619400
842	180.00	195.00	190.00	9.50		14.00	4491300
37	180.00	195.00		10.00		14.00	8764900
860	180.00	195.00		10.00		14.00	6950820
839	180.00	196.00	184.00	9.50	14.00		4595600
38	180.00	200.00	190.00	10.20	18.00		4460900
38	185.00	200.00	192.60	10.20	16.00		4777300
38	185.00	205.00	195.00	10.20	18.00		4776100
38	190.00	198.60	193.00	5.30	7.00		4771100
38	190.00	205.00	200.00	9.50	14.00		4753100
842	190.00	209.00	199.00	6.10		14.00	4749300
38	190.00	210.00	200.00	10.20	18.00		4781000
38	195.00	210.00	202.50	10.20	16.00		4325100
38	200.00	208.60	203.00	5.30	7.00		4391600
38	200.00	215.00	210.00	9.50	14.00		6619500
38	200.00	220.00	210.00	10.20	18.00		4387100
37	200.00	220.00		12.00		16.00	8765000
842	200.00	223.00	211.00	8.30		20.00	4748700
38	205.00	213.60	208.00	5.30	7.00		4773800
38	205.00	220.00	215.00	9.50	14.00		4560500
38	210.00	225.00	220.00	9.50	14.00		4598000
38	210.00	226.00	221.00	8.00	12.00		4336600
38	210.00	230.00	220.00	10.20	18.00		4325300
38	212.00	232.00	225.50	12.50	18.00		4293900
842	215.00	230.00	225.00	9.50		14.00	4705500
38	220.00	235.00	227.60	10.20	16.00		4325400
38	220.00	240.00	230.00	10.20	18.00		4799000
842	220.00	240.00	230.00	10.20		18.00	4859800
37	220.00	240.00		12.00		16.00	8765100
38	220.00	240.00	233.50	12.50	18.00		6619600
38	225.00	240.00	235.00	9.50	14.00		4287800
38	225.00	245.00	235.00	10.20	18.00		4325500
38	230.00	238.60	233.00	5.30	7.00		4514000
38	230.00	245.00	240.00	9.50	14.00		4767400
38	230.00	246.00	240.70	7.50	12.00		4290700
38	230.00	250.00	240.00	10.20	18.00		4325600
842	230.00	250.00	240.00	10.20		18.00	4750500
38	235.00	255.00	245.00	10.20	18.00		4325700

**NOTE** WL refers to wiper length.



NOMINAL							
TYPE	$\odot d_1$	$\odot D_1$	$\odot D_2$	$L_1$	$L_2$	WL	PART No.
842	235.00	255.00	245.00	10.20		18.00	4773300
38	240.00	255.00	250.00	9.50	14.00		4745200
38	240.00	260.00	250.00	10.20	18.00		4520900
37	240.00	260.00		12.00		16.00	8765200
38	240.00	260.00	253.50	12.50	18.00		4787100
38	245.00	265.00	258.50	12.50	18.00		4539600
38	250.00	270.00	260.00	10.20	18.00		4460100
842	250.00	270.00	260.00	10.20		18.00	4725100
37	250.00	270.00		12.00		16.00	8765300
38	250.00	270.00	263.50	12.50	18.00		6619700
38	255.00	270.00	265.00	9.50	14.00		4578200
38	260.00	275.00	270.00	9.50	14.00		4573100
38	260.00	280.00	270.00	10.20	18.00		4325900
842	260.00	280.00	270.00	10.20		18.00	4864300
38	265.00	280.00	272.60	10.20	16.00		4762900
38	265.00	285.00	275.00	10.20	15.00		4560400
38	270.00	278.60	273.00	5.30	7.00		4391700
38	270.00	286.00	280.70	7.50	12.00		4786400
38	270.00	290.00	280.00	10.20	15.00		4868900
38	275.00	295.00	285.00	10.20	15.00		4807400
38	280.00	295.00	290.00	9.50	14.00		4716100
38	280.00	300.00	290.00	10.20	15.00		4763900
38	285.00	300.00	295.00	9.50	14.00		4767300
38	285.00	305.00	298.50	12.50	18.00		4537100
38	288.00	308.00	301.50	10.20	15.00		4265300
38	290.00	310.00	303.50	12.50	18.00		4467300
842	295.00	315.00	305.00	10.20		18.00	4851900
38	295.00	315.00	308.50	12.50	18.00		4598100
38	300.00	316.00	310.70	7.50	12.00		4290800
38	300.00	320.00	310.00	10.20	18.00		4885400
38	300.00	320.00	313.50	12.50	18.00		4525300
38	305.00	325.00	318.50	12.50	18.00		4473200
38	320.00	340.00	330.00	10.20	18.00		4454200
842	320.00	340.00	330.00	10.20		18.00	4750400
38	325.00	345.00	335.00	10.20	18.00		4801100
38	330.00	346.00	340.70	7.50	12.00		4587300
38	335.00	355.00	345.00	10.20	18.00		4776800
842	335.00	355.00	345.00	10.20		18.00	4773400
38	340.00	360.00	350.00	10.20	18.00		4732500
38	350.00	370.00	360.00	10.20	18.00		4717900
842	350.00	370.00	360.00	10.20		18.00	4725200

**NOTE** WL refers to wiper length.

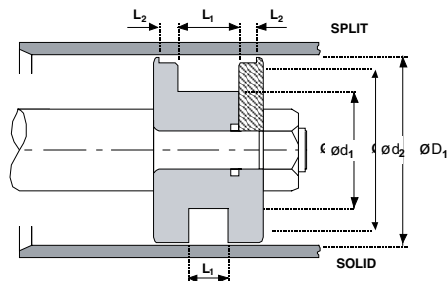
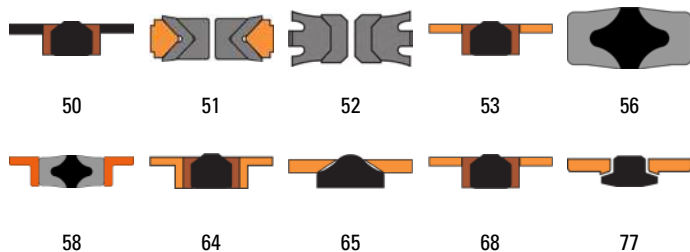
NOMINAL							
TYPE	$\odot d_1$	$\odot D_1$	$\odot D_2$	$L_1$	$L_2$	WL	PART No.
38	355.00	375.00	365.00	10.20	18.00		4578300
38	360.00	380.00	370.00	10.20	18.00		4781200
38	370.00	390.00	380.00	10.20	18.00		4763000
38	370.00	390.00	383.50	12.50	18.00		4579800
38	380.00	400.00	393.50	12.50	18.00		4752100
842	380.00	400.00	393.50	12.50		18.00	4870000
38	390.00	410.00	400.00	10.20	18.00		4851600
38	395.00	415.00	405.00	10.20	18.00		4807200
38	400.00	420.00	410.00	10.20	18.00		4769900
38	415.00	435.00	425.00	10.20	18.00		4820800
842	415.00	435.00	425.00	10.20		18.00	4851800
38	445.00	465.00	455.00	10.20	18.00		4838400
38	455.00	475.00	465.00	10.20	18.00		4777900
38	460.00	490.00	475.00	15.00	25.00		4849800
38	470.00	490.00	480.00	10.20	18.00		4814800

**NOTE** WL refers to wiper length.



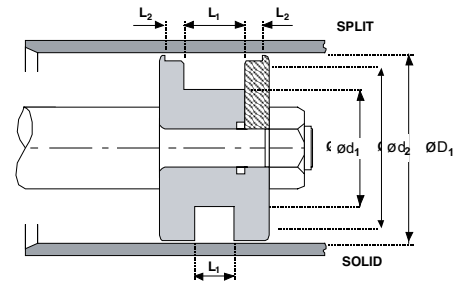
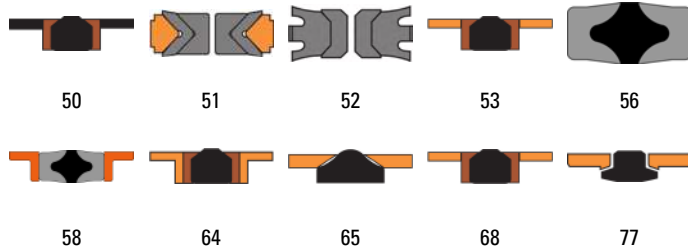
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LEGACY SINGLE-ACTING PISTON SEALS . . . . .	335
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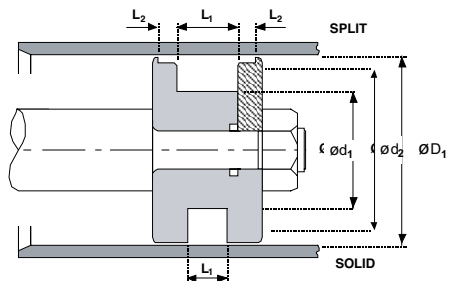
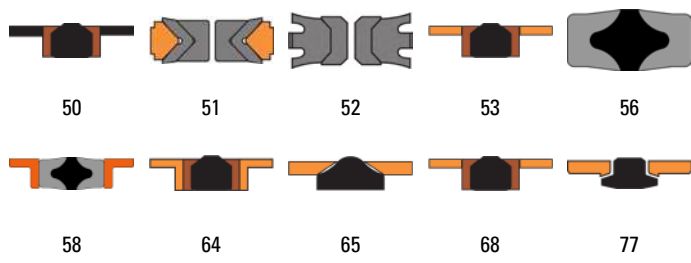
NOMINAL						
TYPE	ØD <sub>1</sub>	Ød <sub>1</sub>	Ød <sub>2</sub>	L <sub>1</sub>	L <sub>2</sub>	PART No.
52	25.00	15.00		6.30		6619810
68	25.00	15.00	22.00	12.50	4.00	6594610
53	25.00	17.00	22.10	8.00	4.00	2249212
50	25.00	17.00	22.00	10.00	4.00	6607810
65	25.00	17.50	21.30	8.50	3.25	2218210
77	25.00	17.50	21.30	8.50	3.25	6111410
51	30.00	20.00		9.30		4208310
56	30.00	20.00		12.50		0200540
52	32.00	20.00		7.80		1791610
52	32.00	22.00		6.30		6619910
53	32.00	22.00	28.50	10.00	5.00	2249312
65	32.00	22.00	27.50	11.00	4.00	2218110
68	32.00	22.00	29.00	12.50	4.00	2249320
64	32.00	22.00	28.00	15.50	2.60	6600100
50	32.00	24.00	29.00	10.00	4.00	6607910
52	40.00	25.00		10.00		2149810
51	40.00	25.00		11.50		4208010
56	40.00	25.00		19.00		0472840
58	40.00	25.00	34.85	24.00	6.00	0472850
64	40.00	26.00	36.00	15.50	2.60	6600200
52	40.00	30.00		6.30		6620010
53	40.00	30.00	36.50	10.00	5.00	2249412
65	40.00	30.00	35.50	11.00	4.00	2218010
77	40.00	30.00	35.50	11.00	4.00	6111210
68	40.00	30.00	37.00	12.50	4.00	2249420
50	40.00	32.00	37.00	10.00	4.00	6608010
58	45.00	26.00	38.85	31.00	6.50	0474050
52	45.00	30.00		10.00		2150010
53	45.00	35.00	40.40	16.40	6.35	2199411
53	50.00	34.00	45.40	18.00	6.35	0209912
58	50.00	34.00	45.54	18.00	6.45	0814850
64	50.00	34.00	46.00	20.50	3.10	6600300
52	50.00	35.00		9.50		2150210
51	50.00	35.00		11.50		4207610
53	50.00	35.00	46.00	15.00	7.50	0074012
56	50.00	35.00		19.00		0474640
68	50.00	35.00	46.00	20.00	5.00	0074020
58	50.00	35.00	44.85	24.00	6.00	0474650
65	50.00	40.00	45.50	11.00	4.00	2217910
77	50.00	40.00	45.50	11.00	4.00	2326110
50	50.00	40.00	47.00	12.50	4.00	6608110
53	55.00	39.00	50.40	18.00	6.35	1352212

NOMINAL						
TYPE	ØD <sub>1</sub>	Ød <sub>1</sub>	Ød <sub>2</sub>	L <sub>1</sub>	L <sub>2</sub>	PART No.
64	55.00	39.00	51.00	20.50	3.10	6600400
52	55.00	40.00		10.00		2150410
51	55.00	40.00		11.50		4207110
56	55.00	40.00		19.00		0475040
58	55.00	40.00	49.85	24.00	6.00	0475050
56	60.00	40.00		25.00		0282040
58	60.00	40.00	53.85	31.00	7.00	0282050
53	60.00	44.00	55.40	18.00	6.35	1361412
64	60.00	44.00	56.00	20.50	3.10	6600500
52	60.00	45.00		10.00		2150610
51	60.00	45.00		11.50		4207210
56	60.00	45.00		19.00		0979440
77	60.00	48.00	55.90	20.50	4.20	2326210
56	63.00	43.00		25.00		0646740
58	63.00	43.00	56.85	31.00	7.00	0646750
53	63.00	47.00	58.40	19.00	6.35	0209712
64	63.00	47.00	59.00	20.50	3.10	6600600
52	63.00	48.00		9.50		2150810
51	63.00	48.00		13.00		4207410
68	63.00	48.00	59.00	20.00	5.00	6594710
58	63.00	48.00	57.85	24.00	6.00	0205250
65	63.00	53.00	58.50	11.00	4.00	2217810
77	63.00	53.00	58.50	11.00	4.00	2325810
50	63.00	53.00	60.00	12.50	4.00	2199513
64	65.00	49.00	61.00	20.50	3.10	1705210
53	65.00	50.00	60.40	18.00	6.35	1350512
56	65.00	50.00		19.00		0383840
58	65.00	50.00	59.85	24.00	6.00	0383850
52	70.00	50.00		13.00		2151010
51	70.00	50.00		15.20		4208210
53	70.00	50.00	64.00	22.00	10.00	0075112
53	70.00	50.00	64.20	22.00	6.35	0075122
56	70.00	50.00		25.00		0294640
58	70.00	50.00	63.85	31.00	7.00	0294650
64	70.00	54.00	66.00	20.50	3.10	6600700
53	75.00	55.00	69.00	22.00	10.00	0075612
53	75.00	55.00	69.20	22.00	6.35	0075622
56	75.00	55.00		25.00		0818640
58	75.00	55.00	68.85	31.00	7.00	0818650
52	80.00	60.00		12.50		2151210
51	80.00	60.00		15.20		4208110
53	80.00	60.00	74.00	22.00	10.00	0073812



TYPE	NOMINAL					PART No.
	$\varnothing D_1$	$\varnothing d_1$	$\varnothing d_2$	$L_1$	$L_2$	
53	80.00	60.00	74.20	22.00	6.35	0073822
56	80.00	60.00		25.00		0294940
68	80.00	60.00	75.00	25.00	6.30	0073830
58	80.00	60.00	73.85	31.00	7.00	0294950
64	80.00	62.00	76.00	22.50	3.60	1705110
50	80.00	65.00	76.00	20.00	5.00	6608210
65	80.00	70.00	75.50	11.00	4.00	2217610
77	80.00	70.00	75.50	11.00	4.00	2325710
53	85.00	65.00	79.20	22.00	6.35	0075722
58	85.00	65.00	79.16	22.00	6.45	0314550
56	85.00	65.00		25.00		0388640
58	85.00	65.00	78.85	31.00	7.00	0388650
52	90.00	70.00		13.00		2151410
51	90.00	70.00		21.20		4207710
53	90.00	70.00	84.00	22.00	10.00	0075812
53	90.00	70.00	84.20	22.00	6.35	0075822
56	90.00	70.00		25.00		0296040
58	90.00	70.00	83.85	31.00	7.00	0296050
64	90.00	72.00	86.00	22.50	3.60	6600800
65	92.00	82.00	87.50	11.00	4.00	2240410
53	95.00	75.00	89.20	22.00	6.35	1352512
58	95.00	75.00	88.85	31.00	7.00	0412750
53	100.00	75.00	93.20	22.00	6.35	0073712
58	100.00	75.00	93.24	22.00	6.45	0034950
58	100.00	75.00	93.85	26.00	9.50	0891650
52	100.00	80.00		12.50		2151610
51	100.00	80.00		21.20		4207510
53	100.00	80.00	94.00	22.00	10.00	0083612
56	100.00	80.00		25.00		0295140
68	100.00	80.00	95.00	25.00	6.30	0083620
58	100.00	80.00	93.85	31.00	7.00	0295150
64	100.00	82.00	96.00	22.50	3.60	6600900
50	100.00	85.00	96.00	20.00	5.00	6608310
65	100.00	87.00	93.80	14.00	6.00	0352510
77	100.00	87.00	93.80	14.00	6.00	2326010
53	105.00	80.00	98.10	22.00	6.35	1352812
53	110.00	85.00	103.10	22.00	6.35	0091113
58	110.00	85.00	103.50	22.00	6.45	1188250
52	110.00	90.00		13.00		2151810
51	110.00	90.00		21.20		4207910
56	110.00	90.00		25.00		0712440
58	110.00	90.00	103.85	31.00	7.00	0712450

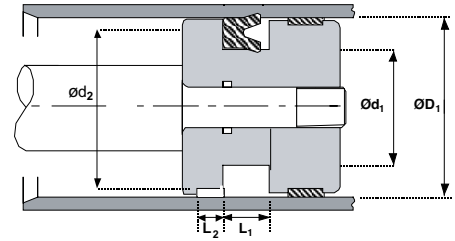
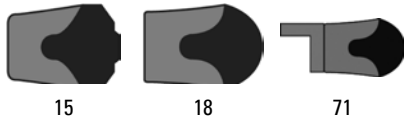
TYPE	NOMINAL					PART No.
	$\varnothing D_1$	$\varnothing d_1$	$\varnothing d_2$	$L_1$	$L_2$	
64	110.00	92.00	106.00	22.50	3.60	6601000
53	115.00	90.00	108.10	22.00	6.35	0084222
58	115.00	95.00	108.85	31.00	7.00	0796450
53	120.00	95.00	113.10	22.00	6.35	0090012
56	120.00	100.00		25.00		0296140
58	120.00	100.00	113.85	31.00	7.00	0296150
52	125.00	100.00		16.00		2152010
56	125.00	100.00		19.00		1007440
53	125.00	100.00	118.10	25.00	6.35	0087522
58	125.00	100.00	118.50	25.00	6.45	1007450
51	125.00	100.00		25.80		4207810
56	125.00	100.00		32.00		0418640
68	125.00	100.00	119.00	32.00	10.00	0087540
58	125.00	100.00	118.85	38.00	9.50	0418650
64	125.00	103.00	121.00	26.50	5.10	6601100
50	125.00	105.00	120.00	25.00	6.30	6608410
65	125.00	112.00	118.80	14.00	6.00	0315810
77	125.00	112.00	118.80	14.00	6.00	2325910
58	130.00	104.00	123.85	38.00	9.50	0244350
53	130.00	105.00	122.60	25.00	9.52	0089622
58	130.00	105.00	123.50	25.00	6.45	0044850
53	135.00	110.00	127.60	25.00	9.52	0091222
53	135.00	110.00	128.00	25.00	12.70	0091212
58	135.00	110.00	128.35	38.00	9.50	0304350
52	140.00	115.00		16.20		2152210
53	140.00	115.00	132.60	25.00	6.35	0091032
53	140.00	115.00	132.60	25.00	9.52	0091022
58	140.00	115.00	133.50	25.00	6.45	1008450
51	140.00	115.00		25.80		4208410
64	140.00	118.00	136.00	26.50	5.10	6601200
50	140.00	120.00	135.00	25.00	6.30	2317030
56	140.00	120.00		25.00		0250540
58	140.00	120.00	133.85	31.00	7.00	0250550
65	140.00	124.00	132.00	17.50	8.75	0317710
53	145.00	120.00	137.60	25.00	9.52	0091422
58	145.00	125.00	138.85	31.00	7.00	0640150
51	150.00	120.00		29.00		4208510
56	150.00	120.00		38.00		1289540
58	150.00	120.00	143.85	44.00	9.50	1289550
53	150.00	125.00	142.60	25.00	9.52	0091522
53	150.00	125.00	143.00	25.00	12.70	0091512
58	150.00	125.00	143.50	25.00	6.45	1008050



NOMINAL						
TYPE	ØD <sub>1</sub>	Ød <sub>1</sub>	Ød <sub>2</sub>	L <sub>1</sub>	L <sub>2</sub>	PART No.
53	155.00	130.00	147.60	25.00	9.52	0091622
52	160.00	130.00		19.80		2152410
58	160.00	130.00	153.50	25.00	6.45	1008250
51	160.00	130.00		29.00		4208710
52	160.00	135.00		16.00		6620110
53	160.00	135.00	152.60	25.00	9.52	0089922
56	160.00	135.00		32.00		0080440
68	160.00	135.00	154.00	32.00	10.00	0089930
58	160.00	135.00	153.85	38.00	9.50	0080450
64	160.00	138.00	156.00	26.50	5.10	6601300
50	160.00	140.00	155.00	25.00	6.30	6608510
65	160.00	140.00	151.40	25.00	12.50	0315910
58	160.00	140.00	153.85	31.00	7.00	0304650
53	165.00	140.00	158.00	25.00	12.70	1257612
58	170.00	140.00	162.54	25.00	6.45	1222250
53	170.00	145.00	161.70	25.00	12.70	0088012
56	170.00	150.00		25.00		0303340
58	170.00	150.00	163.85	31.00	7.00	0303350
53	175.00	150.00	166.70	25.00	12.70	1260712
52	180.00	150.00		19.80		2152610
51	180.00	150.00		31.50		4208610
58	180.00	150.00	173.00	35.00	6.45	0679850
53	180.00	155.00	171.70	25.00	12.70	0091712
56	180.00	160.00		25.00		1283140
65	180.00	160.00	171.40	25.00	12.50	0316010
58	180.00	160.00	173.85	31.00	7.00	1283150
56	190.00	160.00		38.00		0838440
58	190.00	160.00	183.85	44.00	9.50	0838450
53	190.00	165.00	181.70	25.00	12.70	1270012
53	195.00	170.00	186.70	25.00	12.70	1265412
52	200.00	170.00		20.00		2152810
53	200.00	170.00	192.00	30.00	15.00	1270112
51	200.00	170.00		33.50		4209010
68	200.00	170.00	192.00	36.00	12.50	1270120
56	200.00	170.00		38.00		0087140
58	200.00	170.00	193.85	44.00	12.00	0087150
53	200.00	175.00	191.60	25.00	12.70	0089712
58	200.00	175.00	193.85	38.00	9.50	0838850
65	200.00	180.00	191.40	25.00	12.50	0316910
58	210.00	180.00	203.13	31.70	6.45	1198450
53	220.00	190.00	212.00	30.00	15.00	1714810
56	220.00	190.00		38.00		0087340

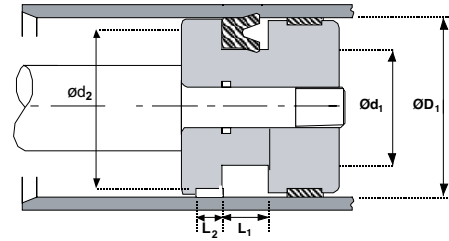
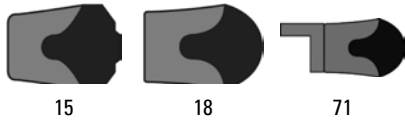
NOMINAL						
TYPE	ØD <sub>1</sub>	Ød <sub>1</sub>	Ød <sub>2</sub>	L <sub>1</sub>	L <sub>2</sub>	PART No.
58	220.00	200.00	213.85	31.00	7.00	1056450
52	225.00	195.00		19.80		2197010
51	225.00	195.00		33.50		6582110
56	230.00	200.00		38.00		2010040
56	240.00	210.00		38.00		0094340
52	250.00	220.00		20.00		2197210
53	250.00	220.00	242.00	30.00	15.00	1264312
51	250.00	220.00		33.50		6582310
68	250.00	220.00	242.00	36.00	12.50	1264320
56	250.00	220.00		38.00		1056340
58	250.00	220.00	243.85	44.00	12.00	1056350
64	250.00	225.00	246.00	31.50	6.60	6601400
56	260.00	230.00		38.00		0094540
52	275.00	245.00		19.80		2197410
51	275.00	245.00		33.50		6582410
53	280.00	250.00	272.00	30.00	15.00	1261712
58	280.00	250.00	273.85	44.00	12.00	1055550
52	300.00	270.00		19.80		2188310
51	300.00	270.00		33.50		6582510
56	300.00	270.00		38.00		0094840
51	320.00	290.00		33.50		6582610
56	330.00	300.00		38.00		0095040
56	360.00	320.00		45.00		1054040
56	400.00	360.00		45.00		1054340
56	420.00	380.00		45.00		0095140
56	460.00	420.00		45.00		0095340
56	480.00	440.00		45.00		0095440
56	500.00	460.00		45.00		0134740
56	540.00	500.00		45.00		2018240
56	580.00	540.00		50.00		2020940



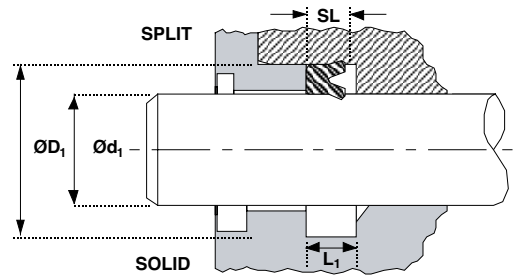
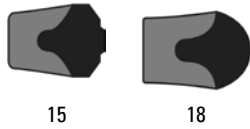


NOMINAL						
TYPE	$\varnothing D_1$	$\varnothing d_1$	$\varnothing d_2$	$L_1$	$L_2$	PART No.
18	14.00	6.00		6.00		0202200
18	16.00	8.00		6.00		0202400
18	18.00	10.00		6.00		0202500
18	20.00	12.00		6.00		0202600
18	24.00	14.00		7.50		0202700
18	25.00	15.00		7.50		0202800
18	26.00	16.00		7.50		0615900
15	26.00	16.00		8.00		0754300
18	28.00	18.00		7.50		0202900
15	28.00	20.00		6.40		2137000
18	30.00	20.00		7.50		0200500
18	30.00	22.00		6.00		0817600
15	30.00	22.00		6.40		2137100
18	32.00	22.00		7.50		0203300
15	32.00	22.00		9.00		0377300
15	33.00	25.00		6.40		2137200
15	36.00	28.00		6.40		2137300
15	38.00	30.00		6.40		2137400
18	40.00	25.00		11.00		0472800
71	40.00	25.00	34.85	13.50	6.00	0472810
15	40.00	28.00		9.00		0690700
15	40.00	30.00		7.50		0032400
15	40.00	32.00		6.40		2137500
18	43.00	28.00		11.00		0204300
15	43.00	35.00		6.40		2137600
18	44.00	36.00		6.00		1204900
15	44.00	36.00		6.40		2137700
18	45.00	30.00		11.00		0204400
18	45.00	35.00		7.50		0052300
18	47.00	32.00		11.00		0204600
15	48.00	36.00		9.00		0690600
15	48.00	40.00		6.40		2137800
18	50.00	30.00		14.00		0282100
15	50.00	35.00		11.00		0874400
18	50.00	35.00		11.00		0474600
71	50.00	35.00	44.85	13.50	6.00	0474610
15	50.00	40.00		7.50		0188600
15	50.00	40.00		10.50		1252100
18	50.00	40.00		10.50		0202000
18	51.00	36.00		11.00		0978800
18	55.00	40.00		11.00		0475000
15	55.00	45.00		8.00		2137900

NOMINAL						
TYPE	$\varnothing D_1$	$\varnothing d_1$	$\varnothing d_2$	$L_1$	$L_2$	PART No.
71	60.00	40.00	53.85	17.00	7.00	0282010
15	60.00	45.00		10.00		1022800
18	60.00	45.00		11.00		0979400
18	60.00	50.00		7.50		0179300
15	60.00	50.00		8.00		1204400
71	63.00	48.00	57.85	13.50	6.00	0205210
18	65.00	45.00		14.00		0281700
18	65.00	50.00		10.00		0208400
18	65.00	50.00		11.00		0383800
71	65.00	50.00	59.85	13.50	6.00	0383810
15	65.00	55.00		8.00		0208700
18	65.00	55.00		8.00		0242600
15	66.00	56.00		8.00		2138000
18	70.00	50.00		14.00		0294600
71	70.00	50.00	63.85	17.00	7.00	0294610
15	70.00	60.00		8.00		0208500
15	71.00	56.00		12.00		0332600
18	72.00	60.00		9.50		1397700
71	75.00	55.00	68.85	17.00	7.00	0818610
15	75.00	63.00		9.60		2138100
18	76.00	56.00		14.00		0646100
15	77.00	65.00		9.60		2138200
15	80.00	60.00		14.00		0391400
18	80.00	60.00		14.00		0294900
71	80.00	60.00	73.85	17.00	7.00	0294910
18	80.00	65.00		11.00		0740700
15	80.00	70.00		7.50		0057700
15	82.00	70.00		9.60		2146800
18	83.00	63.00		14.00		0646300
15	85.00	70.00		12.00		0384500
18	90.00	70.00		14.00		0296000
71	90.00	70.00	83.85	17.00	7.00	0296010
18	90.00	75.00		12.00		0740600
15	92.00	80.00		9.60		2138300
18	95.00	75.00		14.00		0412700
18	95.00	80.00		12.00		0732700
18	100.00	80.00		14.00		0295100
71	100.00	80.00	93.85	17.00	7.00	0295110
15	102.00	90.00		9.60		2138400
15	105.00	90.00		9.50		2174600
18	110.00	90.00		10.00		0306700
18	110.00	90.00		14.00		0071700

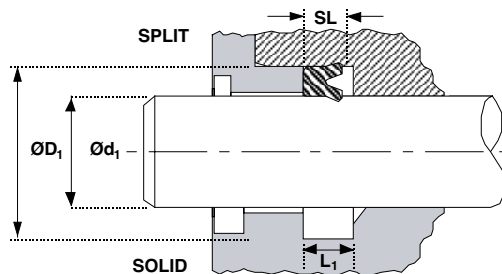
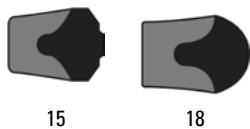


NOMINAL						
TYPE	$\varnothing D_1$	$\varnothing d_1$	$\varnothing d_2$	$L_1$	$L_2$	PART No.
18	110.00	90.00		15.00		0712400
71	110.00	90.00	103.85	18.00	7.00	0712410
15	115.00	100.00		12.00		2138500
18	115.00	100.00		12.00		0740500
18	120.00	100.00		14.00		0296100
15	120.00	100.00		15.00		0466100
71	120.00	100.00	113.85	17.00	7.00	0296110
18	125.00	100.00		19.00		0418600
71	125.00	100.00	118.85	22.00	9.50	0418610
18	125.00	110.00		11.00		0558300
15	125.00	110.00		12.00		0749300
71	130.00	104.00	123.85	22.00	9.50	0244310
15	130.00	115.00		12.00		2136900
18	135.00	110.00		19.00		0304300
18	135.00	115.00		14.00		0639900
18	140.00	120.00		12.00		0250500
71	140.00	120.00	133.85	15.00	7.00	0250510
18	145.00	120.00		19.00		0070400
18	145.00	130.00		11.30		0634500
71	150.00	120.00	143.85	27.00	9.50	1289510
18	150.00	125.00		19.00		0070500
18	160.00	135.00		19.00		0080400
71	160.00	135.00	153.85	22.00	9.50	0080410
18	160.00	140.00		14.00		0304600
18	165.00	140.00		19.00		0080500
18	170.00	150.00		14.00		0303300
18	180.00	160.00		15.00		1283100
71	180.00	160.00	173.85	18.00	7.00	1283110
18	190.00	160.00		24.00		0136100
18	200.00	175.00		19.00		0838800
18	210.00	180.00		24.00		0087200
18	220.00	200.00		15.00		1284100
18	230.00	200.00		24.00		2010000
18	250.00	220.00		22.00		0958900
18	280.00	250.00		24.00		1055500
18	300.00	270.00		24.00		0094800
18	310.00	280.00		24.00		0094900
18	330.00	300.00		24.00		0095000
18	360.00	320.00		30.00		1054000
18	400.00	360.00		30.00		1054300
18	420.00	380.00		30.00		0095100
18	440.00	400.00		30.00		0095200

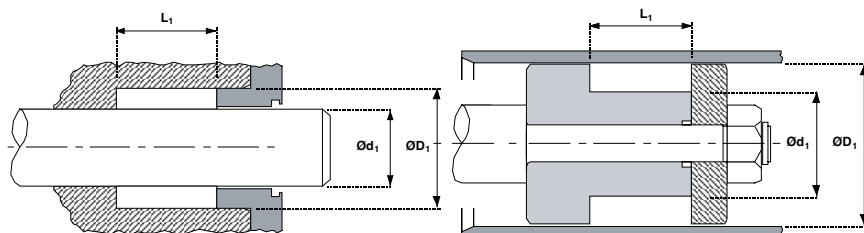
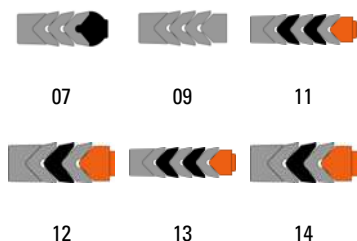


TYPE	NOMINAL				PART No.
	$\varnothing d_1$	$\varnothing D_1$	SL	$L_1$	
18	6.00	14.00		6.00	0202200
18	8.00	16.00		6.00	0202400
18	10.00	18.00		6.00	0202500
18	12.00	20.00		6.00	0202600
18	14.00	24.00		7.50	0202700
18	15.00	25.00		7.50	0202800
18	16.00	26.00		7.50	0615900
15	16.00	26.00		8.00	0754300
18	18.00	28.00		7.50	0202900
15	20.00	28.00		6.40	2137000
18	20.00	30.00		7.50	0200500
18	22.00	30.00		6.00	0817600
15	22.00	30.00		6.40	2137100
18	22.00	32.00		7.50	0203300
15	22.00	32.00		9.00	0377300
15	25.00	33.00		6.40	2137200
18	25.00	40.00		11.00	0472800
15	28.00	36.00		6.40	2137300
15	28.00	40.00		9.00	0690700
18	28.00	43.00		11.00	0204300
15	30.00	38.00		6.40	2137400
15	30.00	40.00		7.50	0032400
18	30.00	45.00		11.00	0204400
18	30.00	50.00		14.00	0282100
15	32.00	40.00		6.40	2137500
18	32.00	47.00		11.00	0204600
15	35.00	43.00		6.40	2137600
18	35.00	45.00		7.50	0052300
15	35.00	50.00		11.00	0874400
18	35.00	50.00		11.00	0474600
18	36.00	44.00		6.00	1204900
15	36.00	44.00		6.40	2137700
15	36.00	48.00		9.00	0690600
18	36.00	51.00		11.00	0978800
15	40.00	48.00		6.40	2137800
15	40.00	50.00		7.50	0188600
15	40.00	50.00		10.50	1252100
18	40.00	50.00		10.50	0202000
18	40.00	55.00		11.00	0475000
15	45.00	55.00		8.00	2137900
15	45.00	60.00		10.00	1022800

TYPE	NOMINAL				PART No.
	$\varnothing d_1$	$\varnothing D_1$	SL	$L_1$	
18	45.00	60.00		11.00	0979400
18	45.00	65.00		14.00	0281700
18	50.00	60.00		7.50	0179300
15	50.00	60.00		8.00	1204400
18	50.00	65.00		10.00	0208400
18	50.00	65.00		11.00	0383800
18	50.00	70.00		14.00	0294600
15	55.00	65.00		8.00	0208700
18	55.00	65.00		8.00	0242600
15	56.00	66.00		8.00	2138000
15	56.00	71.00		12.00	0332600
18	56.00	76.00		14.00	0646100
15	60.00	70.00		8.00	0208500
18	60.00	72.00		9.50	1397700
15	60.00	80.00		14.00	0391400
18	60.00	80.00		14.00	0294900
15	63.00	75.00		9.60	2138100
18	63.00	83.00		14.00	0646300
15	65.00	77.00		9.60	2138200
18	65.00	80.00		11.00	0740700
15	70.00	80.00		7.50	0057700
15	70.00	82.00		9.60	2146800
15	70.00	85.00		12.00	0384500
18	70.00	90.00		14.00	0296000
18	75.00	90.00		12.00	0740600
18	75.00	95.00		14.00	0412700
15	80.00	92.00		9.60	2138300
18	80.00	95.00		12.00	0732700
18	80.00	100.00		14.00	0295100
15	90.00	102.00		9.60	2138400
15	90.00	105.00		9.50	2174600
18	90.00	110.00		10.00	0306700
18	90.00	110.00		14.00	0071700
18	90.00	110.00		15.00	0712400
15	100.00	115.00		12.00	2138500
18	100.00	115.00		12.00	0740500
18	100.00	120.00		14.00	0296100
15	100.00	120.00		15.00	0466100
18	100.00	125.00		19.00	0418600
18	110.00	125.00		11.00	0558300
15	110.00	125.00		12.00	0749300

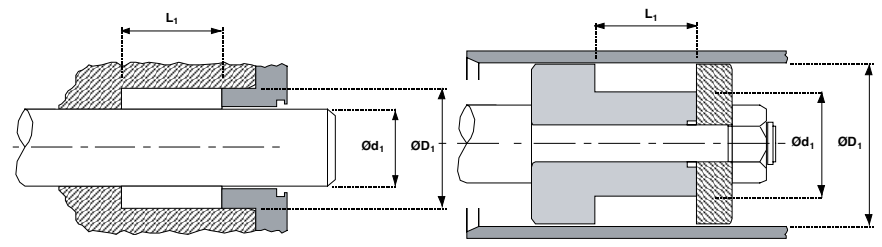
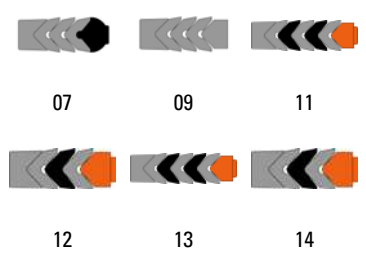


TYPE	NOMINAL				PART No.
	$\varnothing d_1$	$\varnothing D_1$	SL	$L_1$	
18	110.00	135.00		19.00	0304300
15	115.00	130.00		12.00	2136900
18	115.00	135.00		14.00	0639900
18	120.00	140.00		12.00	0250500
18	120.00	145.00		19.00	0070400
18	125.00	150.00		19.00	0070500
18	130.00	145.00		11.30	0634500
18	135.00	160.00		19.00	0080400
18	140.00	160.00		14.00	0304600
18	140.00	165.00		19.00	0080500
18	150.00	170.00		14.00	0303300
18	160.00	180.00		15.00	1283100
18	160.00	190.00		24.00	0136100
18	175.00	200.00		19.00	0838800
18	180.00	210.00		24.00	0087200
18	200.00	220.00		15.00	1284100
18	200.00	230.00		24.00	2010000
18	220.00	250.00		22.00	0958900
18	250.00	280.00		24.00	1055500
18	270.00	300.00		24.00	0094800
18	280.00	310.00		24.00	0094900
18	300.00	330.00		24.00	0095000
18	320.00	360.00		30.00	1054000
18	360.00	400.00		30.00	1054300
18	380.00	420.00		30.00	0095100
18	400.00	440.00		30.00	0095200



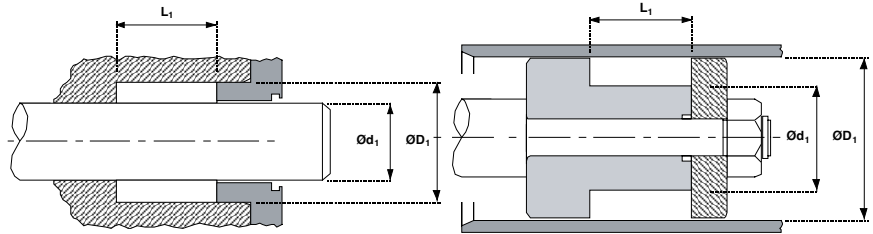
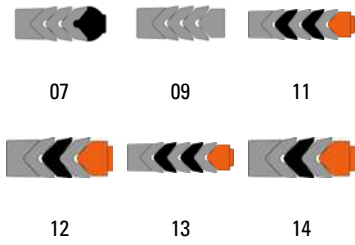
NOMINAL				
TYPE	Ød <sub>1</sub>	ØD <sub>1</sub>	L <sub>1</sub>	PART No.
09	12.00	22.00	16.00	01880730
09	15.00	25.00	16.00	0189530
09	16.00	26.00	16.00	0190130
09	18.00	28.00	16.00	0190530
12	20.00	30.00	13.50	42010730
09	20.00	30.00	16.00	0190930
11	20.00	30.00	18.50	42010750
14	20.00	32.00	16.50	4204930
13	20.00	32.00	22.50	4204950
09	22.00	32.00	16.00	01910730
12	25.00	307.00	16.50	4198930
11	25.00	307.00	22.50	4198950
14	25.00	40.00	16.50	4205030
07	25.00	40.00	22.50	66300720
09	25.00	40.00	22.50	0192630
13	25.00	40.00	22.50	4205050
12	28.00	40.00	16.50	4202030
11	28.00	40.00	22.50	4202050
09	28.00	43.00	22.50	0193430
12	30.00	42.00	16.50	4202130
11	30.00	42.00	22.50	4202150
14	30.00	45.00	16.50	4205130
07	30.00	45.00	22.50	0400820
09	30.00	45.00	22.50	0193930
13	30.00	45.00	22.50	4205150
12	32.00	44.00	16.50	4202230
11	32.00	44.00	22.50	4202250
07	32.00	407.00	22.50	6630820
09	32.00	407.00	22.50	0194330
12	35.00	407.00	16.50	4202330
11	35.00	407.00	22.50	4202350
14	35.00	50.00	16.50	4205230
07	35.00	50.00	22.50	0339520
09	35.00	50.00	22.50	0195130
13	35.00	50.00	22.50	4205250
12	36.00	48.00	16.50	4202430
11	36.00	48.00	22.50	4202450
09	36.00	51.00	22.50	0196030
12	40.00	52.00	16.50	4202530
11	40.00	52.00	22.50	4202550
14	40.00	55.00	16.50	4205330
07	40.00	55.00	22.50	6532620

NOMINAL				
TYPE	Ød <sub>1</sub>	ØD <sub>1</sub>	L <sub>1</sub>	PART No.
13	40.00	55.00	22.50	4205350
12	42.00	54.00	16.50	4202630
11	42.00	54.00	22.50	4202650
09	42.00	507.00	22.50	0196830
12	45.00	60.00	16.50	42020730
07	45.00	60.00	22.50	0385020
09	45.00	60.00	22.50	01907430
11	45.00	60.00	22.50	42020750
14	45.00	65.00	20.50	4205430
13	45.00	65.00	207.50	4205450
09	48.00	63.00	22.50	019070730
12	50.00	65.00	16.50	4199030
11	50.00	65.00	22.50	4199050
14	50.00	070.00	22.00	4205530
07	50.00	070.00	30.00	6631020
09	50.00	070.00	30.00	1208430
13	50.00	070.00	30.00	4205550
12	55.00	070.00	16.50	4202930
11	55.00	070.00	22.50	4202950
14	55.00	075.00	22.00	4205630
07	55.00	075.00	30.00	6631120
09	55.00	075.00	30.00	1208230
13	55.00	075.00	30.00	4205650
12	56.00	071.00	16.50	4203030
11	56.00	071.00	22.50	4203050
07	56.00	076.00	30.00	0338220
09	56.00	076.00	32.00	1208630
12	60.00	075.00	16.50	4203130
11	60.00	075.00	22.50	4203150
14	60.00	80.00	207.00	42050730
07	60.00	80.00	30.00	0892520
09	60.00	80.00	32.00	1208930
13	60.00	80.00	307.00	42050750
12	63.00	078.00	16.50	4203230
11	63.00	078.00	22.50	4203250
07	63.00	83.00	30.00	04607120
09	63.00	83.00	32.00	1209130
12	65.00	80.00	16.50	4203330
11	65.00	80.00	22.50	4203350
07	65.00	85.00	30.00	046070720
14	65.00	85.00	30.00	4205830
13	65.00	85.00	40.00	4205850



NOMINAL				
TYPE	Ød <sub>1</sub>	ØD <sub>1</sub>	L <sub>1</sub>	PART No.
12	070.00	85.00	16.50	4203430
11	070.00	85.00	22.50	4203450
07	070.00	90.00	30.00	6631220
09	070.00	90.00	30.00	1209330
14	070.00	90.00	30.00	4205930
13	070.00	90.00	40.00	4205950
12	075.00	90.00	16.50	4203530
11	075.00	90.00	22.50	4203550
07	075.00	95.00	30.00	0446620
09	075.00	95.00	30.00	1209530
14	075.00	95.00	30.00	4206030
13	075.00	95.00	40.00	4206050
12	80.00	95.00	16.50	4203630
11	80.00	95.00	22.50	4203650
07	80.00	100.00	30.00	6631320
09	80.00	100.00	30.00	1209630
14	80.00	100.00	30.00	4206130
13	80.00	100.00	40.00	4206150
09	80.00	105.00	44.00	0984230
12	85.00	100.00	16.50	42030730
11	85.00	100.00	22.50	42030750
07	85.00	105.00	30.00	6631420
09	85.00	105.00	30.00	1209830
12	90.00	105.00	16.50	4203830
11	90.00	105.00	22.50	4203850
07	90.00	110.00	30.00	6631520
09	90.00	110.00	30.00	1210630
14	90.00	110.00	30.00	4206230
13	90.00	110.00	40.00	4206250
12	100.00	115.00	22.00	4203930
11	100.00	115.00	30.00	4203950
07	100.00	120.00	30.00	6631620
09	100.00	120.00	30.00	12100730
14	100.00	120.00	30.00	4199130
13	100.00	120.00	40.00	4199150
09	105.00	125.00	30.00	1203130
12	110.00	125.00	22.00	4204030
11	110.00	125.00	30.00	4204050
07	110.00	130.00	30.00	0308420
09	110.00	130.00	30.00	1195030
14	110.00	130.00	30.00	4206330
13	110.00	130.00	40.00	4206350

NOMINAL				
TYPE	Ød <sub>1</sub>	ØD <sub>1</sub>	L <sub>1</sub>	PART No.
14	115.00	140.00	34.00	4206430
13	115.00	140.00	46.00	4206450
09	120.00	140.00	30.00	41307830
07	125.00	140.00	22.50	1362820
12	125.00	140.00	26.00	4204230
11	125.00	140.00	34.00	4204250
07	125.00	145.00	30.00	21079620
09	125.00	150.00	34.00	1215330
14	125.00	150.00	34.00	4206530
07	125.00	150.00	307.00	1365620
13	125.00	150.00	46.00	4206550
09	135.00	160.00	34.00	11907630
12	140.00	155.00	26.00	4199230
11	140.00	155.00	34.00	4199250
07	140.00	160.00	30.00	12072320
09	140.00	160.00	33.00	060707130
14	140.00	165.00	34.00	4206630
13	140.00	165.00	46.00	4206650
12	150.00	1070.00	30.00	2196630
11	150.00	1070.00	40.00	2196650
09	150.00	180.00	45.00	1220130
14	150.00	180.00	45.00	42060730
13	150.00	180.00	60.00	42060750
12	160.00	180.00	30.00	21960730
11	160.00	180.00	40.00	21960750
14	160.00	190.00	45.00	4206830
13	160.00	190.00	60.00	4206850
09	1070.00	200.00	45.00	1224930
12	180.00	200.00	30.00	2196830
11	180.00	200.00	40.00	2196850
14	180.00	210.00	45.00	4206930
07	180.00	210.00	407.00	0090320
13	180.00	210.00	60.00	4206950
14	195.00	225.00	407.50	6582130
13	195.00	225.00	62.50	6582150
12	200.00	220.00	30.00	2196930
11	200.00	220.00	40.00	2196950
07	200.00	230.00	45.00	12820720
09	200.00	230.00	45.00	1225830
14	200.00	230.00	45.00	42007030
13	200.00	230.00	60.00	42007050
14	220.00	250.00	407.50	6582330



TYPE	NOMINAL			PART No.
	Ød <sub>1</sub>	ØD <sub>1</sub>	L <sub>1</sub>	
13	220.00	250.00	62.50	6582350
14	245.00	2075.00	407.50	6582430
13	245.00	2075.00	62.50	6582450
14	2070.00	300.00	407.50	6582530
13	2070.00	300.00	62.50	6582550
14	290.00	320.00	49.00	6582630
13	290.00	320.00	64.00	6582650
14	320.00	360.00	58.00	65820730
13	320.00	360.00	078.00	65820750
14	380.00	420.00	60.00	6584030
13	380.00	420.00	80.00	6584050

# HALLITE SEALS

As a global provider of high-performance sealing solutions, Hallite's reputation is backed by 100 years of excellence in engineering, manufacturing, sustained technical support, and customer service. With some of the industry's shortest lead times, we bring to market a diverse portfolio of catalogued and customised sealing solutions made from materials that are formulated for performance-critical environments. From the off-highway equipment used in construction and infrastructure to the landing gear used in aerospace, Hallite fluid seals are key components utilised in the most demanding applications.

To meet growing worldwide demand, Hallite combines carefully chosen and managed inventory in local markets, supported by fast-track moulding and machining capabilities to provide high service levels. Hallite offers a broad range of catalogue products, OEM custom moulded and machined designs and custom on-demand machining capabilities from design to shipment.

Hallite operations can be found in strategic geographies throughout Asia Pacific, Western Europe, and North America. Combining an expansive global footprint with a dense network of strategic service partners completes our global presence; ensuring that the full range of Hallite products, capabilities, and expertise are always available when and where you need them most.



[WWW.HALLITE.COM](http://WWW.HALLITE.COM)

## AUSTRALIA

Hallite Seals Australia Pty. Ltd.  
Unit 2, 1A Bessemer Street  
Blacktown  
NSW 2148  
T: +61(02) 8886 1600  
F: +61(02) 8886 1650  
seals@hallite.com.au

## INDIA

Hallite Sealing Solutions India  
Pvt. Ltd.  
Special Plot No.10, 3rd Main  
1st Stage Peenya Industrial Estate  
Bangalore 560058  
T: +91(0) 80 2372 6000  
F: +91(0) 80 2372 6002  
seals@hallite.in

## CANADA

Hallite Seals (Canada) Ltd.  
5630 Kennedy Road  
Mississauga, Ontario  
L4Z 2A9  
T: +1 (905) 361 2350  
F: +1 (905) 361 2342  
sales@hallite.ca

## ITALY

Hallite Italia srl  
Via Francia 21  
Loc. Guasticce  
57017 Collesalvetti – Livorno  
T: +39 (0) 58 642 8287  
F: +39 (0) 58 642 9845  
seals@hallite.it

## CHINA

Hallite Sealing Technology  
(Shanghai) Co., Ltd.  
785 Xing Rong Road  
North Industrial Development Zone  
Jiading District  
Shanghai 201807  
T: +86 (0) 21 3351 7272  
F: +86 (0) 21 3351 7085  
hallite.shanghai@hallite.com

## UNITED KINGDOM

Hallite Seals International Ltd.  
130 Oldfield Road  
Hampton, Middlesex  
TW12 2HT  
T: +44 (0)20 8941 2244  
F: +44 (0) 20 8783 1669  
seals@hallite.com

## GERMANY

Dichtelemente Hallite GmbH  
Billwerder Ring 17  
21035 Hamburg  
T: +49 (0) 40 73 47 48-0  
F: +49 (0) 40 73 47 48 49  
seals@hallite.de

## UNITED STATES

Hallite Seals Americas, Inc.  
50777 Varsity Court  
Wixom, MI 48393  
T: +1 (248) 668 5200  
F: +1 (248) 668 5210  
sales@hallite.us