



HALLITE

ARMORLENE® PTFE PRODUCT CATALOG

Including an Introduction to Spring Energized OptiSeal®

THIRD EDITION



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This edition supersedes all previous brochures.

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**SELECT IT
& FORGET IT**

At Hallite, we want to help you forget about your seals. It's not that we don't understand the critical role they play in the performance and productivity of your equipment — quite the contrary. After all, as a leading manufacturer of high-performance sealing solutions, we've been developing and delivering high-quality seals for a wide variety of markets for over a century.

Now, with our new PTFE fluid seals offering, we've expanded our portfolio again, continuing to offer our customers around the world the reliable products and services they depend upon from Hallite.

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 technical services to help provide the advice necessary in developing tailored product solutions.

And that's precisely the point: when you partner with Hallite, you CAN forget about your seals. Because you're purchasing more than our proven products; You're buying into a relationship that you can trust will deliver the peace of mind you deserve.

MAJOR INDUSTRIES



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



TRIED & TRUSTED

For over 100 years, Hallite Seals has been a leading supplier and pioneer of high-quality fluid sealing technologies and engineered sealing solutions. As a global organization with a keen focus on worldwide delivery through regional manufacturing sites and fabrication centers, 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 cataloged and fit-for-purpose, quality products that offer cost-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 housing. Please review the product catalog 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 cataloged 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.

HALLITE ARMORLENE® PTFE PORTFOLIO

PTFE is the most chemical-resistant thermoplastic polymer available. PTFE offers low friction, exceptional chemical resistance, and sealability not found in most plastic materials.

The Hallite PTFE material and product portfolio is a fit-for-purpose solution designed for dynamic and static sealing applications, where high speeds up to 15 m/s (50 ft/s), low friction, temperatures ranging from -200 to 260°C (-328 to 500°F), strong wear performance,

broad fluid compatibility and high pressure capabilities up to 600 bar (8700 psi) are required. Our material technology, enhanced by the company's deep technical and testing expertise, enables Hallite to engineer unique, custom sealing solutions. Hallite engineers can help you select which high-performance compounds made from filler combinations of glass, bronze or other metals, PPS, graphite, MoS₂, carbon, mineral, carbon fiber, and other fillers will optimize performance in your application.

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

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

MATERIALS

Proper material selection and compatibility rank high among the factors that contribute to good sealability. In seal design, materials are chosen for the physical attributes, performance properties, and performance characteristics required by the application.

The application environment, including temperature, pressure, and dynamic conditions, as well as design factors such as squeeze and seal geometry and energizer selection, are essential in material selection. The materials used with Hallite seal profiles perform exceptionally well in applications with variations in temperature, pressure and media. The result is a sealing solution capable of performing in dynamic, hostile environments where standard elastomeric seals fail.

COMMON MATERIALS

PTFE	<ul style="list-style-type: none"> Thermal stability across broad temperature range Low coefficient of friction Inherent lubricating properties Excellent chemical and corrosion capabilities 	<ul style="list-style-type: none"> Reduced stick-slip Unlimited shelf life No swelling due to moisture absorption Safe for vacuum conditions Excellent dielectrical properties
UHMWPE	<ul style="list-style-type: none"> High toughness High abrasion resistance Self-lubricating 	<ul style="list-style-type: none"> Low coefficient of friction Broad chemical resistance
ELASTOMER	<ul style="list-style-type: none"> Great sealability High toughness Very flexible 	<ul style="list-style-type: none"> Broad selection of polymer types with unique properties Available in both thermoset and thermoplastic

FILLERS AND THEIR RELATIVE EFFECTS ON PTFE	WEAR RESISTANCE	FRICTION	CREEP RESISTANCE	THERMAL CONDUCTIVITY	MATING METAL WEAR	ELECTRICAL RESISTANCE
GLASS FIBERS	▲▲▲	▲▲	▲▲	▲	▲▲▲	▲
CARBON	▲▲▲	▲	▲▲▲	▲▲	▲	▼
GRAPHITE	▲▲	◆	▲▲	▲▲	◆	▼▼
MOS ₂	▲	◆	◆	▲	◆	▼
BRONZE	▲▲▲	▲▲	▲▲	▲▲▲	▲	▼▼
CARBON FIBERS	▲▲▲	▲	▲▲	▲▲	▲	▼
MINERAL	▲▲▲	▲▲	▲▲	▲▲	▲▲	◆
HIGH-TEMPERATURE POLYMERS	▲▲▲	▲	▲▲▲	◆	◆	◆

KEY	▲ = Slight Increase	▼ = Slight Decrease
◆ = No Effect	▲▲ = Moderate Increase	▼▼ = Moderate Decrease
	▲▲▲ = Significant Increase	▼▼▼ = Significant Decrease

FILLED PTFE

In spite of its remarkable properties, pure unmixed PTFE has limited use for applications where high mechanical loading is required, due to its tendency towards cold extrusion (creep). While maintaining its inherent properties and characteristics in material compounds, PTFE can benefit from the improved mechanical strength, stability, and wear resistance provided by an additive. Hallite uses various fillers to optimize PTFE characteristics such as glass, carbon, graphite, MoS₂, bronze, and mineral.

Hallite's experienced team of engineers can help you carefully select fillers based on the application media and seal geometry. We can also custom blend if you need material properties that go beyond the limits of our listed materials. Give us a call and we can partner with you to find the best material choice for your application.

IDEAL FOR	Filled PTFE has improved mechanical properties and is excellent for dynamic applications and high pressures (up to 6000 psi). Different fillers provide different properties.
ADVANTAGES	<ul style="list-style-type: none"> Improved wear resistance Improved heat transfer Increase in mechanical strength Improved extrusion resistance Decreased friction Increase in thermal conductivity
DISADVANTAGES	<ul style="list-style-type: none"> Less flexibility in processing (requires machining)
COMMON FILLERS	<p>Glass Fibers The most common filler. Minor effect on electrical properties. Increased abrasion on mating metal surfaces.</p> <p>Carbon/Carbon Fibers Low abrasion and wear. Good deformation and extrusion resistance.</p> <p>Graphite Non-abrasive. Low friction. Minor effect on deformation properties.</p> <p>MoS₂ Lowers break-in wear and starting friction.</p> <p>Bronze Very high wear resistance and load-bearing capability. Poor chemical resistance.</p> <p>Mineral Properties similar to glass, but less abrasive.</p>
TEMPERATURE RANGE (DRY HEAT)	-200 to 260°C -328 to 500°F



HALLITE HIGH-PERFORMANCE ARMORLENE® MATERIALS

MATERIAL FEATURES AND APPLICATIONS	FILLER	MATERIAL DESIGNATOR	COLOR	TEMPERATURE RANGE°C	TEMPERATURE RANGE°F
ARMORLENE® HLX <ul style="list-style-type: none"> Standard material for hydraulic applications High compressive strength Excellent extrusion resistance Extended wear resistance 	Special Bronze Compound	HLX	Gold	-73 to 288°C	-100 to 550°F
ARMORLENE® HLA <ul style="list-style-type: none"> Excellent in all hydraulic fluids Excellent wear resistance Excellent low-friction properties Good extrusion resistance 	Special Mineral Compound	HLA	Gray	-73 to 260°C	-100 to 500°F
ARMORLENE® 702 <ul style="list-style-type: none"> Excellent in lubricating and non-lubricating hydraulic fluids Good low-friction properties Excellent extrusion resistance Good chemical resistance 	Glass Molybdenum Disulfide	702	Gray	-73 to 260°C	-100 to 500°F
ARMORLENE® HCF <ul style="list-style-type: none"> Excellent in lubricating and non-lubricating hydraulic fluids (includes water) w/o zinc content Not recommended for gas sealing applications Not recommended for electrical conductive fluids 	Carbon Fiber Filled	HCF	Gray/Black	-73 to 260°C	-100 to 500°F
ARMORLENE® HCV <ul style="list-style-type: none"> Recommended for lubricating and non-lubricating fluids Excellent for high-frequency and short-stroke applications Not recommended for gas sealing applications Not recommended for electrical conductive fluids 	High Carbon Fiber Filled	HCV	Gray/Black	-73 to 260°C	-100 to 500°F
ARMORLENE® 700 <ul style="list-style-type: none"> Excellent in all hydraulic fluids Recommended for hard mating surfaces only Low friction and no stick-slip 	Unfilled	700	White	-184 to 204°C	-300 to 400°F
ARMORLENE® 780 <ul style="list-style-type: none"> Excellent in all hydraulic fluids Recommended for hard mating surfaces only Low friction and no stick-slip 	Unfilled	780	Turquoise	-184 to 232°C	-300 to 450°F
ARMORLENE® 706 <ul style="list-style-type: none"> Excellent in lubricating and non-lubricating hydraulic fluids Excellent extrusion resistance Good chemical resistance Good dielectrical properties 	15% Glass	706	Off-White	-73 to 260°C	-100 to 500°F



HALLITE HIGH-PERFORMANCE ARMORLENE® MATERIALS

MATERIAL FEATURES AND APPLICATIONS	FILLER	MATERIAL DESIGNATOR	COLOR	TEMPERATURE RANGE°C	TEMPERATURE RANGE°F
ARMORLENE® 701 <ul style="list-style-type: none"> Excellent in lubricating and non-lubricating hydraulic fluids Excellent extrusion resistance Good chemical resistance Good dielectrical properties 	25% Glass	701	Off-White	-73 to 260°C	-100 to 500°F
ARMORLENE® 711 <ul style="list-style-type: none"> Excellent in all lubricating fluids and pneumatic applications High chemical resistance Excellent extrusion resistance Excellent wear properties 	25% Carbon/Graphite	711	Black	-73 to 288°C	-100 to 550°F
ARMORLENE® 734 <ul style="list-style-type: none"> Excellent in all lubricating fluids and pneumatic applications High chemical resistance Excellent extrusion resistance 	10% Carbon/Graphite	734	Black	-73 to 260°C	-100 to 500°F
ARMORLENE® 716 <ul style="list-style-type: none"> Excellent in all lubricating fluids and pneumatic applications High chemical resistance 	Graphite	716	Black	-73 to 260°C	-100 to 500°F
ARMORLENE® 713 <ul style="list-style-type: none"> High compressive strength Excellent extrusion resistance Excellent wear properties 	60% Bronze Content	713	Bronze	-73 to 288°C	-100 to 550°F
ARMORLENE® HQ6 <ul style="list-style-type: none"> Standard material for G16 and G54 profiles Excellent in lubricating and non-lubricating hydraulic fluids Excellent extrusion resistance Excellent chemical resistance 	Special Glass Compound	HQ6	White	-73 to 288°C	-100 to 550°F
ARMORLENE® 782 <ul style="list-style-type: none"> Good abrasion resistance Recommended for lubricating and non-lubricating fluids Recommended for high frequency and short-stroke applications Not recommended for electrical conductive fluids 	Modified Carbon Fiber Filled	782	Black	-73 to 260°C	-100 to 500°F
ARMORLENE® H1G <ul style="list-style-type: none"> Excellent in lubricating and non-lubricating fluids Excellent extrusion resistance Good chemical resistance Good dielectrical properties 	15% Glass	H1G	Gold	-73 to 260°C	-100 to 500°F
ARMORLENE® H2B <ul style="list-style-type: none"> Excellent in lubricating and non-lubricating fluids Excellent extrusion resistance Good chemical resistance Good dielectrical properties 	25% Glass	H2B	Blue	-73 to 260°C	-100 to 500°F
ARMORLENE® PME <ul style="list-style-type: none"> Special formulated PTFE for PME back up rings Does not require resizing after assembly Provides excellent extrusion resistance 	Unfilled	PME	White	-184 to 204°C	-300 to 400°F

HALLITE HIGH-PERFORMANCE HYTHANE® MATERIALS

MATERIAL FEATURES AND APPLICATIONS	FILLER	MATERIAL DESIGNATOR	COLOR	TEMPERATURE RANGE°C	TEMPERATURE RANGE°F
HYTHANE® 9270061 - POLYESTER, 55D <ul style="list-style-type: none"> • Positive position load holding • High chemical resistance • Excellent extrusion resistance • Excellent wear properties 	Standard	061	Red	-40 to 120°C	-40 to 250°F
HYTHANE® 9270111 - POLYESTER, 55D <ul style="list-style-type: none"> • Positive position load holding • Hydrolysis stabilized • Strong chemical resistance • Excellent extrusion resistance • Excellent wear properties 	Hydrolysis Stabilized	111	Gray	-40 to 120°C	-40 to 250°F
HYTHANE® 9270261 - POLYESTER, 55D <ul style="list-style-type: none"> • Positive position load holding • Internal lubrication provides extended wear in high-speed applications • Excellent extrusion resistance • Excellent wear resistance 	Internally Lubricated	261	Off-White	-40 to 120°C	-40 to 250°F
HU5 - POLYURETHANE, 55D <ul style="list-style-type: none"> • Positive position load holding • Excellent extrusion resistance • Excellent wear resistance 	Standard	HU5	Yellow	-20 to 115°C	-4 to 240°F
HU9 - POLYURETHANE, 95A <ul style="list-style-type: none"> • Positive position load holding • Excellent extrusion resistance • Excellent wear resistance 	Standard	HU9	Red	-20 to 115°C	-4 to 240°F
HE5 - POLYESTER, 55D <ul style="list-style-type: none"> • Positive position load holding • Excellent extrusion resistance • Excellent wear resistance 	Standard	HE5	Gray/Black	-20 to 115°C	-20 to 240°F
748 - UHMWPE <ul style="list-style-type: none"> • Excellent impact resistance • Good dielectrical properties • Excellent abrasion resistance • Low coefficient of friction 	Standard	748	Translucent	-184 to 82°C	-300 to 180°F
7HP - UHMWPE <ul style="list-style-type: none"> • High temperature resistance • Good dielectrical properties • Excellent abrasion and impact resistance • Low coefficient of friction 	Modified	7HP	Translucent	-30 to 135°C	-22 to 275°F

NOTE

The above data provides guidance to maximum operating values of the profile. Both values are not to be used at the same time. Maximum speeds and pressures are dependent upon type of material being used, gap, and operating temperature of the application. If you do not find the material that you require, please contact your local Hallite sales office.

MASTER ENERGIZER MATERIALS

Often PTFE seals utilize an elastomeric energizer to provide proper contact load on initial sealing. The choice of elastomer depends on the operating temperature and media. Please refer to the Master Energizer Index below for elastomer type and service temperature limits. For most hydraulic applications, bronze-filled PTFE with 70A NBR O-ring is commonly used throughout this catalog.

ENERGIZER MATERIAL (SHORE A)	ENERGIZER TYPE	ENERGIZER DESIGNATION	ENERGIZER OPERATING TEMPERATURE°C	ENERGIZER OPERATING TEMPERATURE°F
NBR - 70A	O-ring	N	-30 to 100°C	-22 to 212°F
NBR - 70A Low temp.	O-ring	L	-45 to 80°C	-49 to 176°F
FKM - 75A	O-ring	F	-10 to 200°C	14 to 392°F
EPDM - 70A	O-ring	E	-45 to 145°C	-49 to 293°F
HNBR - 70A	O-ring	H	-25 to 150°C	-13 to 302°F
NBR - 90A	O-ring	Q	-30 to 100°C	-22 to 212°F
HNBR - 90A	O-ring	U	-25 to 150°C	-13 to 302°F
NBR - 70A (GPS Inch, PCA and PFR only)	Square	R	-30 to 100°C	-22 to 212°F
FKM - 75A NBR - 70A (GPS Inch and PCA)	Square	K	-10 to 200°C	14 to 392°F
No Energizer*	None	X	-	-
NBR - 80A	Capped T	N	-30 to 100°C	-22 to 212°F
NBR - 80A Low temp.	Capped T	L	-45 to 80°C	-50 to 175°F
HNBR - 80A	Capped T	H	-25 to 150°C	-13 to 300°F
FKM - 85A	Capped T	F	-10 to 200°C	15 to 400°F

OTHER OPTIONS

NBR - 85A	O-ring	A	-30 to 110°C	-22 to 230°F
NBR - 80A Low temp.	O-ring	C	-50 to 110°C	-58 to 230°F
FKM - 85A	O-ring	G	-20 to 200°C	-4 to 392°F
EPDM - 85A	O-ring	M	-45 to 130°C	-49 to 266°F
HNBR - 90A	O-ring	T	-20 to 150°C	-4 to 302°F
NBR - 85A	Square/Capped T	B	-30 to 110°C	-22 to 230°F
NBR - 80A Low temp.	Square/Capped T	D	-50 to 110°C	-58 to 230°F
FKM - 85A	Square/Capped T	J	-20 to 210°C	-4 to 392°F
EPDM - 85A	Square	P	-45 to 130°C	-49 to 266°F
HNBR - 90A	Square/Capped T	S	-20 to 150°C	-4 to 302°F

*Seal ratings are based upon capabilities of its matched material components. Hallite cannot rate seal performance when the seal is mixed with other manufacturers' energizers/components.

MATERIALS & FLUID COMPATIBILITY

MATERIAL FEATURES AND APPLICATIONS	FILLER	COLOR	ABRASION RESISTANCE	METAL MATING WEAR	RELATIVE SEALABILITY	RELATIVE EXTRUSION RESISTANCE	HYDROCARBONS	OXYGENATED SOLVENTS	STEAM	ACIDS	BASES
Armortene® HLX	Special Bronze Compound	Gold	E	M	A	G	E	E	E	NR	W
Armortene® HLA	Special Mineral Compound	Gray	G	M	G	G	E	E	E	W	S
Armortene® 702	Glass Molybdenum Disulfide	Gray	E	H	G	G	E	E	E	S	S
Armortene® HCF	Carbon Fiber Filled	Gray/Black	G	M	G	G	E	E	E	S	S
Armortene® HCV	High Carbon Fiber Filled	Gray/Black	G	M	G	G	E	E	E	S	S
Armortene® 700	Unfilled	White	P	L	E	P	E	E	E	S	S
Armortene® 780	Unfilled	Turquoise	A	L	E	A	E	E	E	S	S
Armortene® 706	15% Glass	Off-White	E	H	G	G	E	E	E	S	S
Armortene® 701	25% Glass	Off-White	E	H	G	G	E	E	E	S	S
Armortene® 711	25% Carbon/Graphite	Black	G	M	G	E	E	E	E	S	S
Armortene® 734	10% Carbon/Graphite	Black	G	M	G	G	E	E	E	S	S

KEY

E = Excellent **L** = Low
G = Good **P** = Poor
H = High **NR** = Not Recommended
A = Average **W** = Resistant to weak acid/base
M = Medium **S** = Resistant to strong acid/base






MATERIALS & FLUID COMPATIBILITY

MATERIAL FEATURES AND APPLICATIONS	FILLER	COLOR	ABRASION RESISTANCE	METAL MATING WEAR	RELATIVE SEALABILITY	RELATIVE EXTRUSION RESISTANCE	HYDROCARBONS	OXYGENATED SOLVENTS	STEAM	ACIDS	BASES
Armortene® 716	Graphite	Black	A	M	E	G	E	E	E	S	S
Armortene® 713	60% Bronze Content	Bronze	E	M	A	G	E	E	E	NR	W
Armortene® HQ6	Special Glass Compound	White	E	H	G	G	E	E	E	S	S
Armortene® 782	Modified Carbon Fiber Filled	Black	G	M	G	G	E	E	E	S	S
Armortene® H1G	15% Glass	Gold	E	H	G	G	E	E	E	S	S
Armortene® H2B	25% Glass	Blue	E	H	G	G	E	E	E	S	S
HYTHANE® 9270061 - POLYESTER	Standard	Red	E	E	E	E	E	NR	L	NR	NR
HYTHANE® 9270111 - POLYESTER	Hydrolysis Stabilized	Gray	E	E	E	E	E	NR	L	NR	NR
HYTHANE® 9270261 - POLYESTER	Internally Lubricated	Off-White	E	E	E	E	E	NR	L	NR	NR
HU5 - POLYURETHANE, 55D	Standard	Yellow	E	E	E	E	E	NR	L	NR	NR
HU9 - POLYURETHANE, 95A	Standard	Red	E	E	E	E	E	NR	L	NR	NR
HE5 - POLYESTER	Standard	Gray/Black	E	E	E	E	E	NR	L	NR	NR
748 - UHMWPE	Standard	Translucent	E	L	E	G	E	E	E	S	S
7HP - UHMWPE	Standard	Translucent	E	L	E	G	E	E	E	S	S

HALLITE SEAL DESIGN AND SELECTION INDEX

The Seal Design and Selection Index is designed to aid the customer in narrowing down practical seal design options for common applications. As such, we have used variables such as applications, groove efficiency, seal size, typical industry materials, and cost-effectiveness to create the ratings.

This should not be expressly interpreted as an indication that a seal design will not perform well in an application given an “acceptable” rating, for example. Rather it may be more costly than other seal design choices, and therefore its rating is not noted as preferred. These are general guidelines to help narrow down seal design options and are not intended to replace the specific technical application assistance your Hallite technical representatives can provide.

ROD SEALS	PROFILE DESIGNATION	OPERATING CONDITIONS			MAX DIAMETER	SINGLE OR DOUBLE ACTING	APPLICATION CONSIDERATIONS						PAGE #
		PARAMETER	METRIC	INCH			LIGHT DUTY	MEDIUM DUTY	HEAVY DUTY	HIGH SPEED	HIGH FREQUENCY (DITHER)	PNEUMATIC	
R16		Maximum Speed	Up to 15.0m/sec	Up to 50.0ft/sec	2600mm (103in)	Single	o	+	-	+	+	-	39
		Temperature Range*	-45 to 200°C	-49 to 392°F									
		Maximum Dynamic Pressure**	600 bar	8700 psi									
716SPN		Maximum Speed	Up to 1.0m/sec	Up to 3.3ft/sec	2500mm (98in)	Single	o	+	o	o (+)	o (+)	o	51
		Temperature Range*	-40 to 100°C	-40 to 212°F									
		Maximum Dynamic Pressure**	400 bar	5800 psi									
RDA		Maximum Speed	Up to 15.0m/sec	Up to 50.0ft/sec	2600mm (103in)	Double	o	+	o	o	o	o	55
		Temperature Range*	-45 to 200°C	-49 to 392°F									
		Maximum Dynamic Pressure**	600 bar	8700 psi									
RDS		Maximum Speed	Up to 15.0m/sec	Up to 50.0ft/sec	2600mm (103in)	Double	o	+	-	o	o	-	65
		Temperature Range*	-45 to 200°C	-49 to 392°F									
		Maximum Dynamic Pressure	350 bar	5000 psi									
RCG		Maximum Speed	Up to 15.0m/sec	Up to 50.0ft/sec	2600mm (103in)	Double	+	o	o	o	o	o	73
		Temperature Range*	-45 to 200°C	-49 to 392°F									
		Maximum Dynamic Pressure	200 bar	2900 psi									

*Dependent upon energizer used (NBR, FKM, etc.). **For pressures above the maximum pressure listed, contact Hallite Engineering.

KEY
 + = Preferred
 o = Acceptable
 - = Not Recommended

(+) When working as secondary rod seal

HALLITE SEAL DESIGN AND SELECTION INDEX

ROD SEALS (CONTINUED)	PROFILE DESIGNATION	OPERATING CONDITIONS			MAX DIAMETER	SINGLE OR DOUBLE ACTING	APPLICATION CONSIDERATIONS						PAGE #
		PARAMETER	METRIC	INCH			LIGHT DUTY	MEDIUM DUTY	HEAVY DUTY	HIGH SPEED	HIGH FREQUENCY (DITHER)	PNEUMATIC	
SRB		Maximum Speed	Up to 4.0m/sec	Up to 12.0ft/sec	2600mm (103in)	Single	o	+	o	o	o	o	81
		Temperature Range*	-45 to 200°C	-49 to 392°F									
		Maximum Dynamic Pressure**	400 bar	5800 psi									
SRB		Maximum Speed	Up to 4.0m/sec	Up to 12.0ft/sec	2600mm (103in)	Single	o	o	+	o	o	o	87
		Temperature Range*	-45 to 200°C	-49 to 392°F									
		Maximum Dynamic Pressure**	600 bar	8700 psi									
CT		Maximum Speed	Up to 1.5m/sec	Up to 5.0ft/sec	1270mm (50in)	Double	o	o	+	o	o	o	95
		Temperature Range*	-45 to 200°C	-49 to 392°F									
		Maximum Dynamic Pressure**	600 bar	8700 psi									
P54		Maximum Speed	Up to 15.0m/sec	Up to 50.0ft/sec	2600mm (103in)	Double	o	+	o	o	o	o	105
		Temperature Range*	-45 to 200°C	-49 to 392°F									
		Maximum Dynamic Pressure**	600 bar	8700 psi									
P16		Maximum Speed	Up to 15.0m/sec	Up to 50.0ft/sec	2600mm (103in)	Single	o	+	o	+	o	o	115
		Temperature Range*	-45 to 200°C	-49 to 392°F									
		Maximum Dynamic Pressure**	600 bar	8700 psi									
GPS		Maximum Speed	Up to 2.0m/sec	Up to 6.5ft/sec	1270mm (50in)	Double	o	+	o	+	o	o	127
		Temperature Range*	-45 to 200°C	-49 to 392°F									
		Maximum Dynamic Pressure**	500 bar	7200 psi									

*Dependent upon energizer used (NBR, FKM, etc.). **For pressures above the maximum pressure listed, contact Hallite Engineering.

KEY
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 o = Acceptable
 - = Not Recommended






HALLITE SEAL DESIGN AND SELECTION INDEX

	PROFILE DESIGNATION	OPERATING CONDITIONS			MAX DIAMETER	SINGLE OR DOUBLE ACTING	APPLICATION CONSIDERATIONS						PAGE #
		PARAMETER	METRIC	INCH			LIGHT DUTY	MEDIUM DUTY	HEAVY DUTY	HIGH SPEED	HIGH FREQUENCY (DITHER)	PNEUMATIC	
PISTON SEALS (CONTINUED)	GP2 	Maximum Speed	Up to 3.0m/sec	Up to 10.0ft/sec	1270mm (50in)	Double	0	0	+	+	0	0	137
		Temperature Range*	-45 to 200°C	-49 to 392°F									
		Maximum Dynamic Pressure**	600 bar	8700 psi									
	PFR 	Maximum Speed	Up to 4.0m/sec	Up to 13.0ft/sec	1270mm (50in)	Double	0	+	0	0	0	0	145
		Temperature Range*	-45 to 200°C	-49 to 392°F									
		Maximum Dynamic Pressure	350 bar	5000 psi									
G54 	Maximum Speed	Up to 4.0m/sec	Up to 12.0ft/sec	2600mm (103in)	Double	0	+	0	0	0	0	149	
	Temperature Range*	-45 to 200°C	-49 to 392°F										
	Maximum Dynamic Pressure**	400 bar	5800 psi										
PDS 	Maximum Speed	Up to 15.0m/sec	Up to 50.0ft/sec	2600mm (103in)	Double	0	+	-	0	0	-	157	
	Temperature Range*	-45 to 200°C	-49 to 392°F										
	Maximum Dynamic Pressure	350 bar	5000 psi										
PCG 	Maximum Speed	Up to 15.0m/sec	Up to 50.0ft/sec	2600mm (103in)	Double	0	+	0	0	0	0	165	
	Temperature Range*	-45 to 200°C	-49 to 392°F										
	Maximum Dynamic Pressure	200 bar	2900 psi										
PCA 	Maximum Speed	Up to 4.0m/sec	Up to 13.0ft/sec	1270mm (50in)	Double	0	+	0	0	0	0	173	
	Temperature Range*	-45 to 200°C	-49 to 392°F										
	Maximum Dynamic Pressure**	350 bar	5000 psi										

*Dependent upon energizer used (NBR, FKM, etc.). **For pressures above the maximum pressure listed, contact Hallite Engineering.

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HALLITE SEAL DESIGN AND SELECTION INDEX

	PROFILE DESIGNATION	OPERATING CONDITIONS			MAX DIAMETER	SINGLE OR DOUBLE ACTING	APPLICATION CONSIDERATIONS						PAGE #
		PARAMETER	METRIC	INCH			LIGHT DUTY	MEDIUM DUTY	HEAVY DUTY	HIGH SPEED	HIGH FREQUENCY (DITHER)	PNEUMATIC	
WIPERS	E2W 	MAXIMUM SPEED	Up to 15.0m/sec	Up to 50.0ft/sec	2600mm (103in)	Double	0	+	0	+	+	0	181
		TEMPERATURE RANGE*	-45 to 200°C	-49 to 392°F									
	E5W 	MAXIMUM SPEED	Up to 15.0m/sec	Up to 50.0ft/sec	2600mm (103in)	Double	0	0	+	+	0	0	189
		TEMPERATURE RANGE*	-45 to 200°C	-49 to 392°F									
	ELA 	MAXIMUM SPEED	Up to 4.0m/sec	Up to 13.0ft/sec	2600mm (103in)	Double	0	+	0	+	+	+	197
		TEMPERATURE RANGE*	-45 to 200°C	-49 to 392°F									
EXF 	MAXIMUM SPEED	Up to 15.0m/sec	Up to 50.0ft/sec	2600mm (103in)	Double	0	0	+	+	0	0	203	
	TEMPERATURE RANGE*	-45 to 200°C	-49 to 392°F										
EXG 	MAXIMUM SPEED	Up to 5.0m/sec	Up to 16.4ft/sec	2600mm (103in)	Double	0	0	+	+	0	0	209	
	TEMPERATURE RANGE*	-45 to 200°C	-49 to 392°F										


*Dependent upon energizer used (NBR, FKM, etc.). **For pressures above the maximum pressure listed, contact Hallite Engineering.



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OTHER HALLITE PRODUCTS INDEX

	PROFILE DESIGNATION	OPERATING CONDITIONS	PAGE #		
				PARAMETER	METRIC
SWIVEL SEALS	SSP 	Maximum Speed	Up to 2.0m/sec	Up to 6.5ft/sec	215
		Temperature Range*	-45 to 200°C	-49 to 392°F	
		Maximum Dynamic Pressure**	300 bar	4350 psi	
	SSR 	Maximum Speed	Up to 2.0m/sec	Up to 6.5ft/sec	223
		Temperature Range*	-45 to 200°C	-49 to 392°F	
		Maximum Dynamic Pressure**	300 bar	4350 psi	





Application limit PV ≤ 25 bar m/s (40 bar for interrupted rotary).

PROFILE DESIGNATION	DESCRIPTION	PAGE #
OPTISEAL® 	Complete Range of spring-energized OptiSeal®, designed for application. OptiSeal® is designed using a wide range of jacket materials including filled virgin PEEK, various Armorlene® PTFE compounds, UHMWPE, and POM. Paired with V-springs, J-springs, and canted and helical flat coils made out of a variety of alloys.	233

	PROFILE DESIGNATION	OPERATING CONDITIONS	PAGE #		
				PARAMETER	METRIC
BACK-UP RINGS	PME 	Temperature Range	-30 to 200°C	-22 to 392°F	257
	OTHER BACK-UP RINGS 	Temperature Range	-30 to 200°C	-22 to 392°F	259

*Dependent upon energizer used (NBR, FKM, etc.). **For pressures above the maximum pressure listed, contact Hallite Engineering.

OTHER HALLITE PRODUCTS INDEX


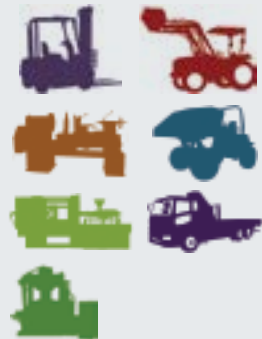

	PROFILE DESIGNATION	OPERATING CONDITIONS	PAGE #		
				PARAMETER	METRIC
BEARINGS AND GUIDE ELEMENTS	T87 	Maximum Speed	Up to 5.0m/sec	Up to 16.4ft/sec	263
		Temperature Range	-50 to 200°C	-58 to 390°F	
	506 	Maximum Speed	Up to 5.0m/sec	Up to 16.4ft/sec	269
		Temperature Range	-40 to 120°C	-40 to 250°F	
	533 	Maximum Speed	Up to 5.0m/sec	Up to 16.4ft/sec	275
		Temperature Range	-40 to 120°C	-40 to 250°F	
G-SERIES 	Maximum Speed	Up to 5.0m/sec	Up to 16.4ft/sec	279	
	Temperature Range	-200 to 300°C	-328 to 572°F		

PROFILE DESIGNATION	DESCRIPTION	PAGE #
ROD SEALS	Hallite offers many less common seal profiles that are often made out of Armorlene® PTFE materials. In addition, Hallite custom designs and manufactures seals developed for specific applications as a standard service. Over the years, this has resulted in accumulating an extensive library of profiles and designs that are purpose-built to suit demanding applications. Custom seals usually can be manufactured in short lead times and often do not require large volume minimums to be met. In this section, we show some common Armorlene® based design variants that are semi-standard for your reference. If you do not see what you need or would like Hallite to purpose-design a seal for your application, please contact your Hallite technical representative.	285
PISTON SEALS		
WIPERS SEALS		
SWIVEL SEALS		

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.

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	160 bar	2300 psi	250 bar	3625 psi	400 bar	5800 psi
	Working	No pressure peaks		Intermittent pressure peaks		Regular pressure peaks	
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	<ul style="list-style-type: none"> Machine tools Lifting equipment Mechanical handling Injection molding machines Control and robot equipment Agricultural machinery Packaging equipment Aircraft equipment Light duty tipplers 		<ul style="list-style-type: none"> Heavy duty lifting equipment Agricultural equipment Light duty off-road vehicles Cranes and lifting platforms Heavy duty machine tools Injection molding machines Some auxiliary mining machinery Aircraft equipment Presses Heavy duty tipplers (telescopic) Heavy duty mechanical handling 		<ul style="list-style-type: none"> Foundry and metal fabrication plant Mining machinery Roof supports Heavy duty earthmoving machinery Heavy duty off-road vehicles Heavy duty presses 		

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.

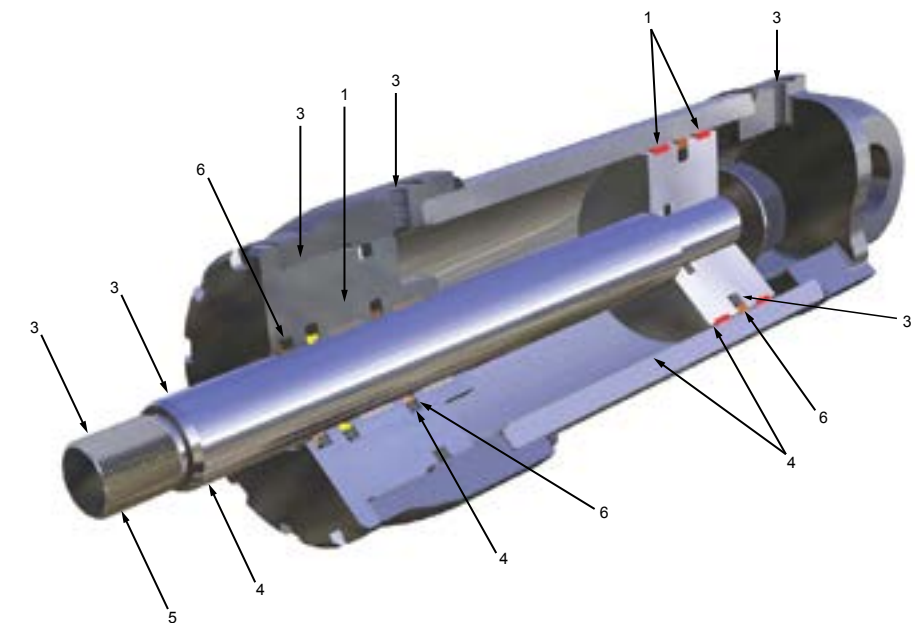
PRESSURE, SPEED, AND TEMPERATURE RANGE

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.

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:

- 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 sidelading, causing damage to the rod or the tube surface and hence the seal, if the bearings are inadequate.
- Ensure that seals are stored distortion free in a cool, dry, and dark place prior to fitting. See “Storage of Seals” directions.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- Flush the hydraulic system thoroughly before connecting the cylinder to it.



FACE RING AND OPTISEAL® INSTALLATION

For OptiSeal® installations, it is highly recommended that the two-piece, step-cut, or snap-ring gland be used. A full one-piece gland should only be used when modification of the existing gland is impossible. The following applies only to one-piece gland installation.

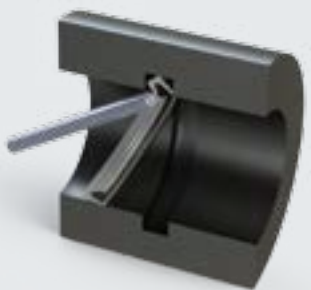
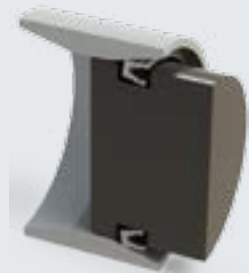
Both PTFE face ring and OptiSeal® are subjected to stretch during installation, and care must be taken to not damage the seal. Avoid the use of any sharp objects to push the seal into the groove. If possible, heating the seal in a conventional oven or soaking in hot water at 100°C for 10 to 15 minutes will make the installation process much easier.



ONE-PIECE PISTON GROOVE

Place the installation cone on the piston. For OptiSeal® place it on the cone so that the spring faces the installed direction on the piston. For an energized face seal assembly, install the energizer into the groove, then place the face ring on the cone. Push seal over the cone and into the groove using the installation expander.

If the seal does not return to its original size, use the resizing sleeve to reshape the seal. The installation cone, expander, and resizing sleeve are all available from Hallite. Additional tooling can be designed and manufactured for step-cut glands. Please contact your sales representative for more information, or submit your inquiry to sales@hallite.com.



ONE-PIECE ROD GROOVE

For OptiSeal®, this type of gland should not be used for rods less than 1.500in (38mm). Below this diameter a two-piece or step-cut gland must be used.

Begin installation by squeezing the seal into an elliptical shape, enabling it to fit onto the gland bore. With fingers or a radiused tool, push approximately 1/3 of the seal into the groove, being careful the seal component does not sustain damage.

Following this step, use a pusher tool the same diameter as the rod to push the remainder of the seal into the groove.



SPECIFIED TOLERANCE TABLES

HALLITE 87, 506 & 533 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.

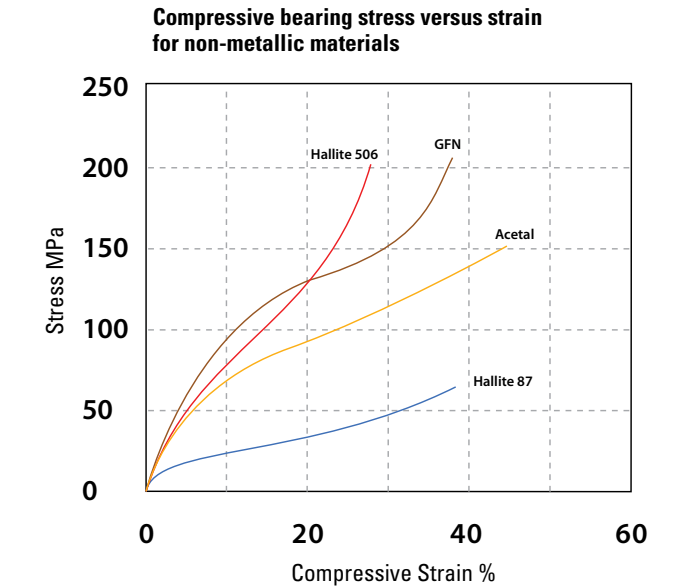
Hallite 506 can be supplied in spiral lengths, generally in 10 meter lengths, as individual cut bearings, and also in 10 meter lengths, packed flat in a box dispenser. Hallite 506 bearing strip is manufactured to extremely accurate thickness tolerances, ensuring reliable cylinder alignment. Other sizes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

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

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

BEARING STRIP HOUSING TOLERANCES

Please refer to the detailed bearing information located at the back of this catalog or in the EMEA catalog.



HALLITE 506 SPECIFIED TOLERANCES	METRIC		INCH	
	BEARING LENGTH	BEARING CROSS SECTION	BEARING LENGTH	BEARING CROSS SECTION
	L_1	S	L_1	S
Tolerances	-0.1 to -0.6	-0.02 to -0.08	-0.005 to -0.025	-0.001 to -0.003

HALLITE 533 SPECIFIED TOLERANCES	BEARING LENGTH	BEARING CROSS SECTION
	L_1	S
Tolerances (in)	-0.000 to -0.010	-0.001 to -0.004

HALLITE 87 SPECIFIED TOLERANCES	BEARING LENGTH	BEARING CROSS SECTION
	L_1	S
Tolerances (mm)	-0.1 to -0.5	+0.03 to -0.05

SPECIFIED TOLERANCE TABLES

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

NOMINAL SIZES mm		SHAFTS (OUTSIDE DIAMETER) UNITS 0.01 mm								BORE (INSIDE DIAMETER) UNITS 0.01 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	-2.5 -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

HOUSING DESIGNS AND EXTRUSION GAPS

HALLITE 87, 506 & 533 BEARING STRIP

Hallite Seals' 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 >0.1mm (0.004").

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") 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:

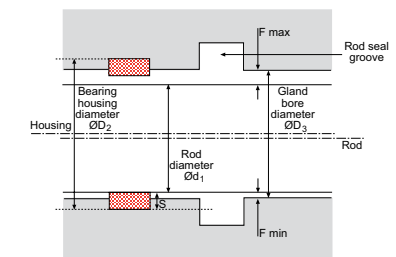
$$\text{Rod} = \text{Ø}D_3 \text{ max} - \text{Ø}d_1 \text{ min}$$

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

F min must be zero.

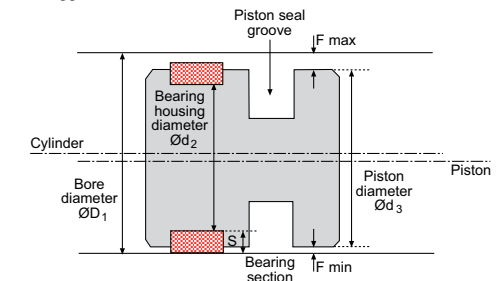
ROD BEARING

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)

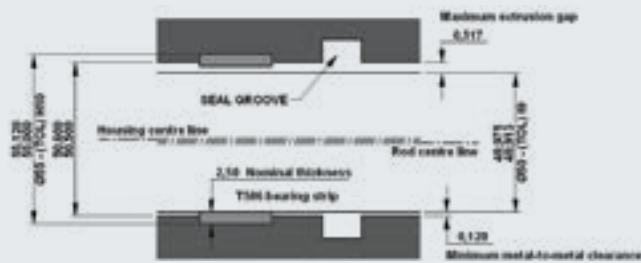


HOUSING DESIGNS

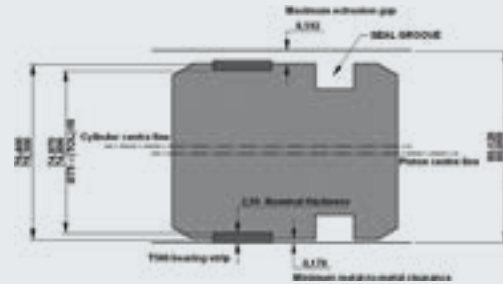
EXTRUSION GAPS AND METAL-TO-METAL CLEARANCE

The use of remote bearing strips, such as Hallite 506, often creates a conflict between maximizing the metal-to-metal clearance, avoiding metal-to-metal contact, and minimizing 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.

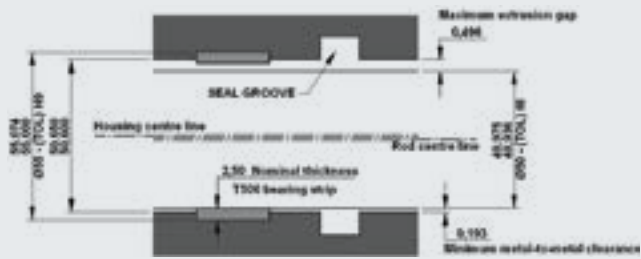
Gland for 50mm rod using 'standard' tolerances.



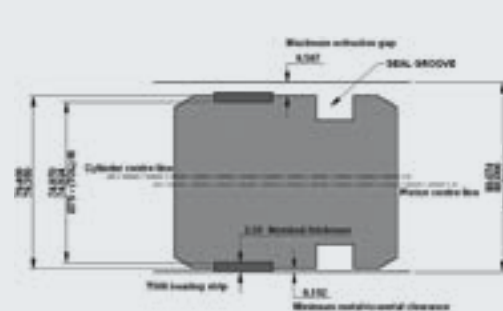
Piston for 80mm bore using 'standard' tolerances.



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 Hallite Seals.

STORAGE OF SEALS

STORAGE CONDITIONS

Most polymeric items, including vulcanized 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.

- Temperature** - Storage temperatures should not exceed 50°C. 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 before they are used.
- Humidity** - Optimum humidity is about 65% in a draft-free atmosphere.
- 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.
- Oxygen and Ozone** - Wrapping, storage in airtight containers, or other suitable means should be used for vulcanized rubber items. Storage in containers that limit exposure to environmental conditions (e.g. sealed plastic bags) should be used for all materials when possible.
- 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 minimizes deformation.
- 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.
- 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.
- Contact with Non-Metals** - Contact with other rubbers or creosotes should be avoided.
- Stock Rotation** - Elastomers should be stored for as short a period as possible, and strict stock rotation should be practiced.
- 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.
- Shelf Life** - The table on the next page 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
- Permanent distortion
- Cracks or surface crazing
- 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.



STORAGE OF SEALS

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) HYTHANE® (EU) HYTHANE (TPE) ARMORLENE®	7	3
POLYURETHANE (AU)	5	2
ENGINEERING THERMOPLASTICS: ACETAL (POM) POLYAMIDE (PA) GLASS FILLED NYLON (PA) PTFE POLYPHENYLENE SULPHIDE (PPS)	UNLIMITED	-
ENGINEERING THERMOSETS: T560 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 maximize seal performance and life.

SURFACE FINISH

DYNAMIC SURFACE FINISHES

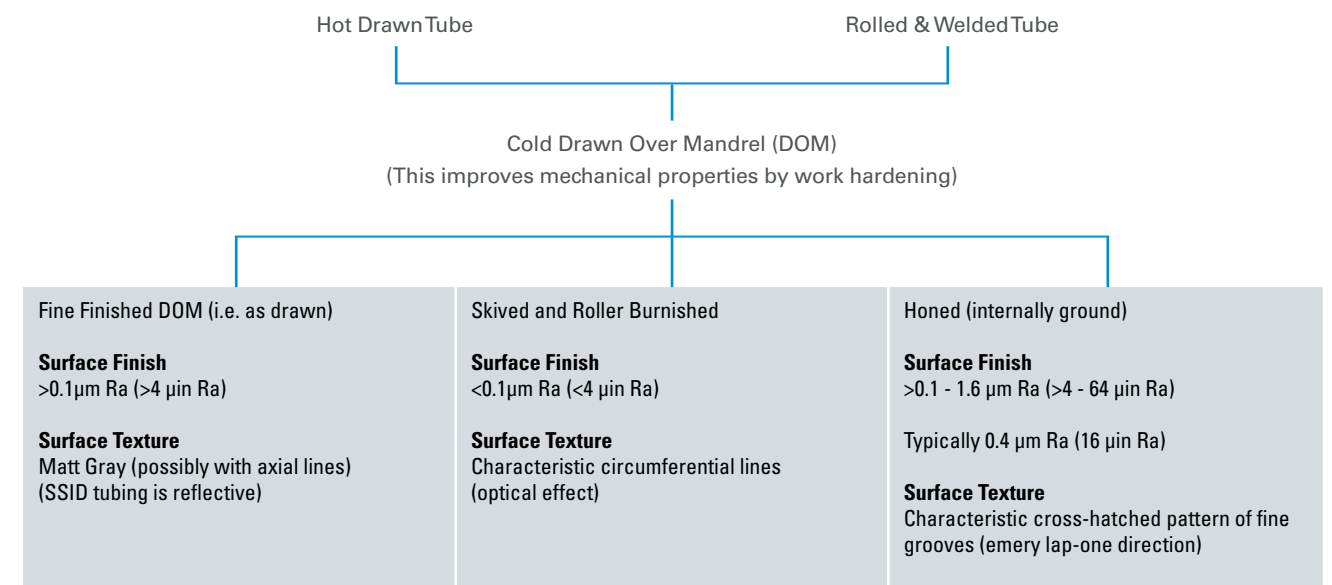
Piston rods are generally hard chrome plated. The hardness target should be at least 67 Rockwell C (900 HV/10). This gives an excellent tribological surface, and provided the rods are produced by an established supplier within a surface finish range of 0.1 to 0.3 $\mu\text{m Ra}$ (4-12 $\mu\text{in Ra}$), 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.
 - o 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.
 - o 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 tuned and should be free from chatter marks.

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

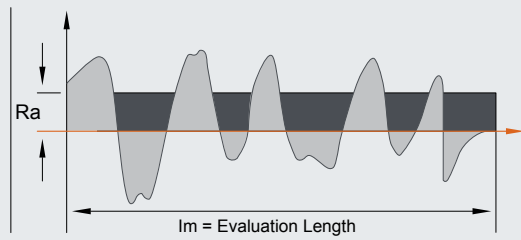


SURFACE FINISH

CRITICAL SURFACE FINISH MEASUREMENTS FOR SEALING

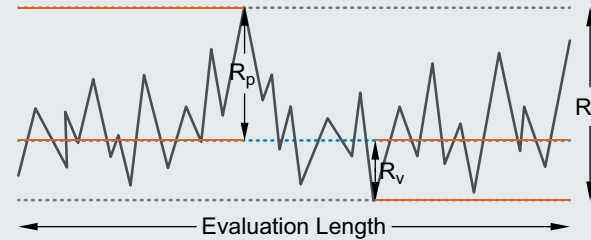
Many parameters can be used to define surface finishes, which are explained in ISO 4287 and ISO 4288. The most commonly used in the fluid power industry include:

Ra – Surface Finish Measurement



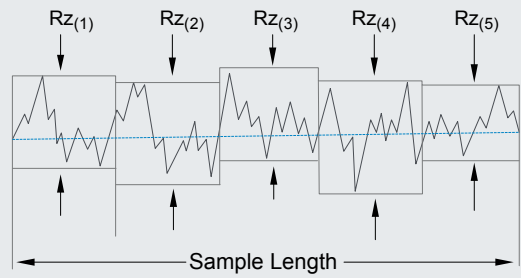
Ra = Arithmetical mean deviation of an absolute ordinate over the evaluation length

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

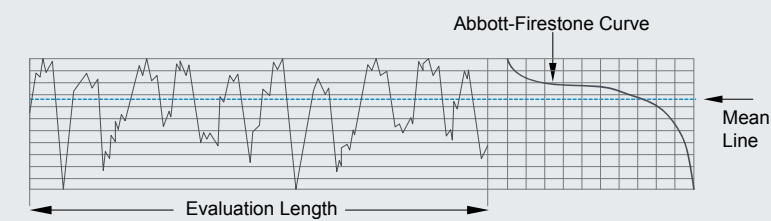
Rz – Surface Finish Measurement



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

Rz_(n) = Sum of height of the largest profile peak height Rp and the largest profile valley Rv within a sampling length

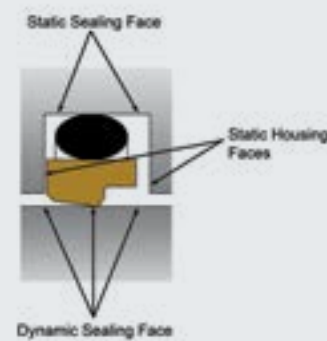
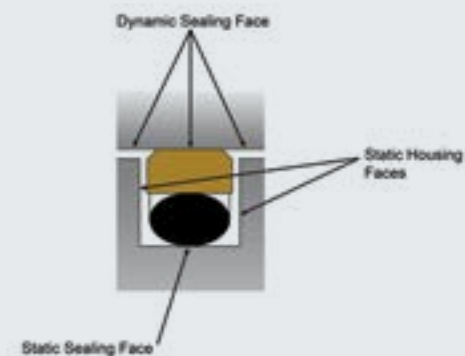
Rmr – Surface Finish Measurement



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%.

Plastic Seals 45-70% | PTFE Seals 60-90% | Rubber 55-85%

SEALING FACE PROFILES



SURFACE FINISH

SURFACE FINISH RECOMMENDATIONS - PTFE MATERIALS

SURFACE ROUGHNESS	METRIC			INCH			Rmr*
	µmRa	µmRz	µmRt	µinRa	µinRz	µinRt	
Dynamic Sealing Face ØD ₁	0.05 - 0.2	1.6 max	2 max	2 - 8	63 max	157 max	60% - 90%
Static Sealing Face 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	

*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 MATERIALS

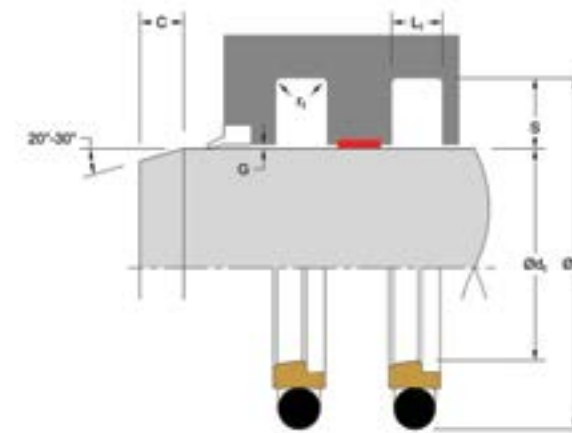
SURFACE ROUGHNESS	METRIC			INCH			Rmr*
	µmRa	µmRz	µmRt	µinRa	µinRz	µinRt	
Dynamic Sealing Face ØD ₁	0.1 - 0.4	1.6 max	4 max	4 - 16	63 max	157 max	45% - 70%
Static Sealing Face ØD ₁	1.6 max	6.3 max	10 max	63 max	250 max	394 max	
Static Housing Faces L ₁	3.2 max	10 max	16 max	125 max	394 max	630 max	

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



ROD SEALS





R16

ROD SEAL

Single-Acting

TECHNICAL DETAILS

The Hallite R16 is a single-acting, O-ring energized, low-friction rod seal proven to be ideal in a variety of applications. The seal is made with our high-quality Armorlene® products combined with an elastomer energizer for superior performance. High performance Armorlene® materials, like HLX, provide outstanding wear and extrusion-resistance properties as well as large range of temperature and media compatibility.

Unlike other designs, the R16 can be used in tandem installations to provide optimum sealing in high-speed applications. The R16 is also commonly used as a pressure buffer seal protecting the primary rod seal from high-frequency pressure spikes that might be found in a system. This design also fits standard ISO 7425-2 grooves and is offered in a wide range of metric and inch options.



FEATURES

- Low break-away force
- Design eliminates occurrence of stick-slip
- Design offers excellent dynamic and static sealing properties
- Long wear and high extrusion resistance
- Able to absorb shock loads created from pressure spikes

Part Number Structure

R16MR00500NHLX _

R16	M	R	00500	N	HLX	_
PROFILE DESIGNATION	UNIT OF MEASUREMENT M = Metric E = Inch	APPLICATION Refer to <i>Installation Recommendations</i> and use designator for desired application	ROD DIAMETER Metric = mm X 10 Inch = inches X 1000	ENERGIZER MATERIAL Refer to <i>Energizer Table</i> for desired energizer material	PTFE MATERIAL Refer to <i>Material Table</i> for desired PTFE (face) material	SPECIAL FEATURE Blank = Std profile

OPERATING CONDITIONS

	METRIC	INCH
Maximum Speed	Up to 15.0m/sec	Up to 50.0ft/sec
Temperature Range*	-45 to 200°C	-49 to 392°F
Maximum Dynamic Pressure**	600 bar	8700 psi
Used as Buffer Seal / Pressure Spikes	800 bar	11000 psi

*Dependent upon energizer used (NBR, FKM, etc.). **For pressures above 400 bar (5800 psi), contact Hallite Engineering.

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 FINISH RECOMMENDATIONS

SURFACE ROUGHNESS	METRIC			INCH			Rmr*
	µmRa	µmRz	µmRt	µinRa	µinRz	µinRt	
Dynamic Sealing Face Ød ₁	0.05 - 0.2	1.6 max	2 max	2 - 8	63 max	157 max	60% - 90%
Static Sealing Face 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	

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

ENERGIZER TABLE

ENERGIZER MATERIAL (SHORE A)	ENERGIZER TYPE	ENERGIZER DESIGNATION	ENERGIZER OPERATING TEMPERATURE°C	ENERGIZER OPERATING TEMPERATURE°F
NBR - 70A	O-ring	N	-30 to 100°C	-22 to 212°F
NBR - 70A Low temp.	O-ring	L	-45 to 80°C	-49 to 176°F
FKM - 75A	O-ring	F	-10 to 200°C	14 to 392°F
EPDM - 70A	O-ring	E	-45 to 145°C	-49 to 293°F
HNBR - 70A	O-ring	H	-25 to 150°C	-13 to 302°F
NBR - 90A	O-ring	Q	-30 to 100°C	-22 to 212°F
HNBR - 90A	O-ring	U	-25 to 150°C	-13 to 302°F
No Energizer*	None	X	-	-

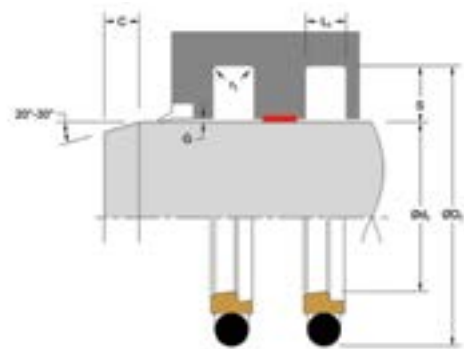
*Seal ratings are based upon capabilities of its matched material components. Hallite cannot rate seal performance when the seal is mixed with other manufacturers' energizers/components.

MATERIALS

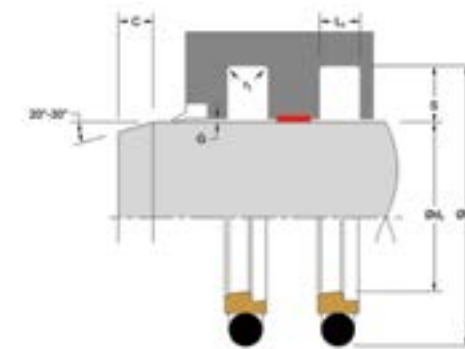
MATERIAL FEATURES AND APPLICATIONS	FILLER	MATERIAL DESIGNATOR	COLOR	TEMPERATURE RANGE°C	TEMPERATURE RANGE°F	MAXIMUM DYNAMIC PRESSURE - BAR	MAXIMUM DYNAMIC PRESSURE - PSI
ARMORLENE® HLX <ul style="list-style-type: none"> Standard material for hydraulic applications High compressive strength Excellent extrusion resistance Extended wear resistance 	Special Bronze Compound	HLX	Gold	-73 to 288°C	-100 to 550°F	500 bar	7250 psi
ARMORLENE® 713 <ul style="list-style-type: none"> High compressive strength Excellent extrusion resistance Excellent wear properties 	60% Bronze Content	713	Bronze	-73 to 288°C	-100 to 550°F	600 bar	8700 psi
ARMORLENE® HCF <ul style="list-style-type: none"> Excellent in lubricating and non-lubricating hydraulic fluids (includes water) w/o zinc content Not recommended for gas sealing applications Not recommended for electrical conductive fluids 	Carbon Fiber Filled	HCF	Gray/Black	-73 to 260°C	-100 to 500°F	250 bar	3600 psi
ARMORLENE® HCV <ul style="list-style-type: none"> Recommended for lubricating and non-lubricating fluids Excellent for high-frequency and short-stroke applications Not recommended for gas sealing applications Not recommended for electrical conductive fluids 	High Carbon Fiber Filled	HCV	Gray/Black	-73 to 260°C	-100 to 500°F	300 bar	4350 psi
ARMORLENE® 700 <ul style="list-style-type: none"> Excellent in all hydraulic fluids Recommended for hard mating surfaces only Low friction and no stick-slip 	Unfilled	700	White	-184 to 204°C	-300 to 400°F	200 bar	2900 psi
ARMORLENE® 706 <ul style="list-style-type: none"> Excellent in lubricating and non-lubricating hydraulic fluids Excellent extrusion resistance Good chemical resistance Good dielectrical properties 	15% Glass	706	Off-White	-73 to 260°C	-100 to 500°F	400 bar	5800 psi
ARMORLENE® 702 <ul style="list-style-type: none"> Excellent in lubricating and non-lubricating hydraulic fluids Good low-friction properties Excellent extrusion resistance Good chemical resistance 	Glass Molybdenum Disulfide	702	Gray	-73 to 260°C	-100 to 500°F	400 bar	5800 psi
ARMORLENE® 711 <ul style="list-style-type: none"> Excellent in all lubricating fluids and pneumatic applications High chemical resistance Excellent extrusion resistance Excellent wear properties 	25% Carbon/Graphite	711	Black	-73 to 288°C	-100 to 550°F	400 bar	5800 psi
ARMORLENE® HLA <ul style="list-style-type: none"> Excellent in all hydraulic fluids Excellent wear resistance Excellent low-friction properties Good extrusion resistance 	Special Mineral Compound	HLA	Gray	-73 to 260°C	-100 to 500°F	500 bar	7250 psi
ARMORLENE® 782 <ul style="list-style-type: none"> Good abrasion resistance Recommended for lubricating and non-lubricating fluids Recommended for high frequency and short-stroke applications Not recommended for electrical and conductive fluids 	Modified Carbon Fiber Filled	782	Black	-73 to 260°C	-100 to 500°F	300 bar	4350 psi
748 - UHMWPE <ul style="list-style-type: none"> Excellent impact resistance Good dielectrical properties Excellent abrasion resistance Low coefficient of friction 	Standard	748	Translucent	-184 to 82°C	-300 to 180°F	350 bar	5000 psi

For other material options consult the Master Materials Index at the front of the catalog. If you do not find the material that you require, please contact your local Hallite sales office.





Applications with maximum radial clearance that are using nylon, phenolic, or PTFE bearings must ensure proper clearance in accordance with the bearing recommendations to avoid metal-to-metal contact. Please refer to Hallite Type 87, Type 506, and Type 533 Specification Sheets for this information.



R16

ROD SEAL
Single-Acting

INSTALLATION RECOMMENDATIONS

METRIC											
ROD DIAMETER Ød ₁ f8/h9			GROOVE DIAMETER	GROOVE WIDTH	RADIUS	CHAMFER	GROOVE SECTION	RADIAL CLEARANCE G MAX*			O-RING CROSS SECTION
DIAMETER RANGE			ØD ₁ H9	L ₁ + 0.2	r ₁	C	S	Up to 100 bar	Up to 200 bar	Up to 400 bar	O-ring
Standard Duty Application - R	Light Duty Application - L	Heavy Duty Application - H	ØD ₁ H9	L ₁ + 0.2	r ₁	C	S	Up to 100 bar	Up to 200 bar	Up to 400 bar	O-ring
3.0 - 7.9	8.0 - 18.9	-	d ₁ + 4.9	2.2	0.4	2.0	2.45	0.30	0.20	0.15	1.78
8.0 - 18.9	19.0 - 37.9	-	d ₁ + 7.5	3.2	0.6	3.0	3.75	0.40	0.25	0.15	2.62
19.0 - 37.9	38.0 - 199.9	8.0 - 18.9	d ₁ + 11.0	4.2	1.0	4.0	5.50	0.50	0.30	0.20	3.53
38.0 - 199.9	200.0 - 255.9	19.0 - 37.9	d ₁ + 15.5	6.3	1.3	6.0	7.75	0.70	0.40	0.25	5.33
200.0 - 255.9	256.0 - 649.9	38.0 - 199.9	d ₁ + 21.0	8.1	1.8	8.0	10.50	0.80	0.60	0.35	6.99
256.0 - 649.9	650.0 - 999.9	200.0 - 255.9	d ₁ + 24.5	8.1	2.5	9.0	12.25	0.90	0.70	0.40	6.99
650.0 - 999.9	-	256.0 - 649.9	d ₁ + 28.0	9.5	3.0	10.0	14.00	1.00	0.80	0.50	8.40
≥ 1000.0	-	650.0 - 999.9	d ₁ + 38.0	13.8	3.0	10.0	19.00	1.20	0.90	0.60	12.00

At pressure >400 bar use diameter tolerance f8/H8.

*Radial Clearance G max. = maximum permissible gap all on one side using min. rod diameter and max. clearance diameter.

INCH											
ROD DIAMETER Ød ₁ f8/h9			GROOVE DIAMETER	GROOVE WIDTH	RADIUS	CHAMFER	GROOVE SECTION	RADIAL CLEARANCE G MAX*			O-RING CROSS SECTION
DIAMETER RANGE			ØD ₁ H9	L ₁ + .008	r ₁	C	S	Up to 1500 PSI	Up to 2900 PSI	Up to 5800 PSI	O-ring
Standard Duty Application - R	Light Duty Application - L	Heavy Duty Application - H	ØD ₁ H9	L ₁ + .008	r ₁	C	S	Up to 1500 PSI	Up to 2900 PSI	Up to 5800 PSI	O-ring
0.125 - 0.311	0.312 - 0.749	-	d ₁ + 0.193	0.087	0.016	0.079	0.097	0.012	0.008	0.006	0.070
0.312 - 0.749	0.750 - 1.500	-	d ₁ + 0.287	0.126	0.024	0.118	0.144	0.016	0.010	0.006	0.103
0.750 - 1.500	1.501 - 7.874	0.312 - 0.749	d ₁ + 0.421	0.165	0.039	0.157	0.211	0.020	0.012	0.008	0.139
1.501 - 7.874	7.875 - 9.999	0.750 - 1.500	d ₁ + 0.594	0.248	0.051	0.236	0.297	0.028	0.016	0.010	0.210
7.875 - 9.999	10.000 - 25.499	1.501 - 7.874	d ₁ + 0.807	0.319	0.071	0.315	0.404	0.031	0.024	0.014	0.275
10.000 - 25.499	25.500 - 39.999	7.875 - 9.999	d ₁ + 0.945	0.319	0.071	0.315	0.473	0.035	0.028	0.016	0.275
25.500 - 39.999	> 40.000	10.000 - 25.499	d ₁ + 1.075	0.374	0.098	0.354	0.538	0.039	0.031	0.020	0.331

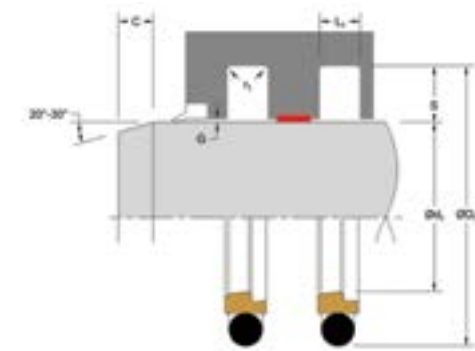
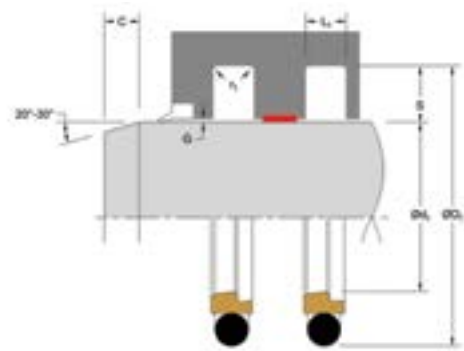
At pressure >5800 psi use diameter tolerance f8/H8.

*Radial Clearance G max. = maximum permissible gap all on one side using min. rod diameter and max. clearance diameter.

PART NUMBER RANGE (METRIC)*

METRIC												
Ød ₁	ØD ₁	L ₁	PART NUMBER	Also Fits	Ød ₁	ØD ₁	L ₁	PART NUMBER	Also Fits	Ød ₁	ØD ₁	L ₁
Tol. f8/h9	Tol. H9	Tol. +0.2			Tol. f8/h9	Tol. H9	Tol. +0.2			Tol. f8/h9	Tol. H9	Tol. +0.2
8.0	15.5	3.2	R16MR00080****	Also Fits	8.0	15.3	3.2	R16MR00360****	Also Fits	36.0	46.7	4.2
8.0	12.9	2.2	R16ML00080****	Also Fits	-	-	-	R16ML00360****	Also Fits	36.0	43.3	3.2
10.0	17.5	3.2	R16MR00100****	Also Fits	10.0	17.3	3.2	R16MR00400****	Also Fits	40.0	55.1	6.3
10.0	14.9	2.2	R16ML00100****	Also Fits	-	-	-	R16ML00400****	Also Fits	40.0	50.7	4.2
12.0	19.5	3.2	R16MR00120****	Also Fits	12.0	19.3	3.2	R16MR00430****	Also Fits	43.0	58.1	6.3
12.0	16.9	2.2	R16ML00120****	Also Fits	-	-	-	R16ML00420****	Also Fits	42.0	52.7	4.2
14.0	21.5	3.2	R16MR00140****	Also Fits	14.0	21.3	3.2	R16MR00450****	Also Fits	45.0	60.1	6.3
14.0	18.9	2.2	R16ML00140****	Also Fits	-	-	-	R16ML00450****	Also Fits	45.0	55.7	4.2
15.0	22.5	3.2	R16MR00150****	Also Fits	15.0	22.3	3.2	R16MR00500****	Also Fits	50.0	65.1	6.3
15.0	19.9	2.2	R16ML00150****	Also Fits	-	-	-	R16ML00500****	Also Fits	50.0	60.7	4.2
16.0	23.5	3.2	R16MR00160****	Also Fits	16.0	23.3	3.2	R16MR00550****	Also Fits	55.0	70.1	6.3
16.0	20.9	2.2	R16ML00160****	Also Fits	-	-	-	R16ML00550****	Also Fits	55.0	65.7	4.2
18.0	25.5	3.2	R16MR00180****	Also Fits	18.0	25.3	3.2	R16MR00560****	Also Fits	56.0	71.1	6.3
18.0	22.9	2.2	R16ML00180****	Also Fits	-	-	-	R16ML00560****	Also Fits	56.0	66.7	4.2
20.0	31.0	4.2	R16MR00200****	Also Fits	20.0	30.7	4.2	R16MR00560****	Also Fits	56.0	76.5	8.1
20.0	27.5	3.2	R16ML00200****	Also Fits	20.0	27.3	3.2	R16MR00600****	Also Fits	60.0	75.1	6.3
22.0	33.0	4.2	R16MR00220****	Also Fits	22.0	32.7	4.2	R16ML00600****	Also Fits	60.0	70.7	4.2
22.0	29.5	3.2	R16ML00220****	Also Fits	22.0	29.3	3.2	R16MH00600****	Also Fits	60.0	80.5	8.1
25.0	36.0	4.2	R16MR00250****	Also Fits	25.0	35.7	4.2	R16MR00630****	Also Fits	63.0	78.1	6.3
25.0	32.5	3.2	R16ML00250****	Also Fits	25.0	32.3	3.2	R16ML00630****	Also Fits	63.0	73.7	4.2
28.0	39.0	4.2	R16MR00280****	Also Fits	28.0	38.7	4.2	R16MH00630****	Also Fits	63.0	83.5	8.1
28.0	35.5	3.2	R16ML00280****	Also Fits	28.0	35.3	3.2	R16MR00650****	Also Fits	65.0	80.1	6.3
30.0	41.0	4.2	R16MR00300****	Also Fits	30.0	40.7	4.2	R16ML00650****	Also Fits	65.0	75.7	4.2
30.0	37.5	3.2	R16ML00300****	Also Fits	30.0	37.3	3.2	R16MH00650****	Also Fits	65.0	85.5	8.1
32.0	43.0	4.2	R16MR00320****	Also Fits	32.0	42.7	4.2	R16MR00700****	Also Fits	70.0	85.1	6.3
32.0	39.5	3.2	R16ML00320****	Also Fits	32.0	39.3	3.2	R16ML00700****	Also Fits	70.0	80.7	4.2
35.0	46.0	4.2	R16MR00350****	Also Fits	35.0	45.7	4.2	R16MH00700****	Also Fits	70.0	90.5	8.1
35.0	42.5	3.2	R16ML00350****	Also Fits	35.0	42.3	3.2	R16MR00750****	Also Fits	75.0	90.1	6.3





PART NUMBER RANGE (METRIC)*

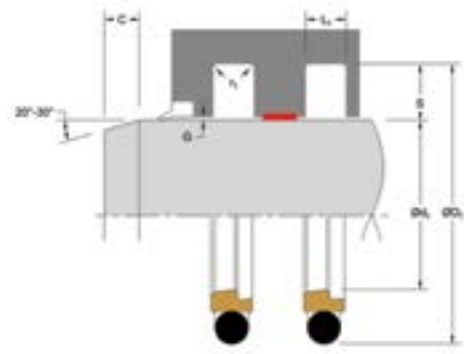
METRIC			PART NUMBER	Also Fits	METRIC		
Ød ₁	ØD ₁	L ₁			Ød ₁	ØD ₁	L ₁
Tol. f8/h9	Tol. H9	Tol. +0.2			Tol. f8/h9	Tol. H9	Tol. +0.2
75.0	96.0	8.1	R16MH00750****	Also Fits	75.0	95.5	8.1
78.0	93.5	6.3	R16MR00780****	Also Fits	78.0	93.1	6.3
78.0	99.0	8.1	R16MH00780****	Also Fits	78.0	98.5	8.1
80.0	95.5	6.3	R16MR00800****	Also Fits	80.0	95.1	6.3
80.0	101.0	8.1	R16MH00800****	Also Fits	80.0	100.5	8.1
85.0	100.5	6.3	R16MR00850****	Also Fits	85.0	100.1	6.3
85.0	106.0	8.1	R16MH00850****	Also Fits	85.0	105.5	8.1
90.0	105.5	6.3	R16MR00900****	Also Fits	90.0	105.1	6.3
90.0	111.0	8.1	R16MH00900****	Also Fits	90.0	110.5	8.1
95.0	110.5	6.3	R16MR00950****	Also Fits	95.0	110.1	6.3
95.0	116.0	8.1	R16MH00950****	Also Fits	95.0	115.5	8.1
97.0	112.5	6.3	R16MR00970****	Also Fits	97.0	112.1	6.3
97.0	118.0	8.1	R16MH00970****	Also Fits	97.0	117.5	8.1
100.0	115.5	6.3	R16MR01000****	Also Fits	100.0	115.1	6.3
100.0	121.0	8.1	R16MH01000****	Also Fits	100.0	120.5	8.1
105.0	120.5	6.3	R16MR01050****	Also Fits	105.0	120.1	6.3
105.0	126.0	8.1	R16MH01050****	Also Fits	105.0	125.5	8.1
110.0	125.5	6.3	R16MR01100****	Also Fits	110.0	125.1	6.3
110.0	131.0	8.1	R16MH01100****	Also Fits	110.0	130.5	8.1
115.0	130.5	6.3	R16MR01150****	Also Fits	115.0	130.1	6.3
115.0	136.0	8.1	R16MH01150****	Also Fits	115.0	135.5	8.1
120.0	135.5	6.3	R16MR01200****	Also Fits	120.0	135.1	6.3
120.0	141.0	8.1	R16MH01200****	Also Fits	120.0	140.5	8.1
125.0	140.5	6.3	R16MR01250****	Also Fits	125.0	140.1	6.3
125.0	146.0	8.1	R16MH01250****	Also Fits	125.0	145.5	8.1
130.0	145.5	6.3	R16MR01300****	Also Fits	130.0	145.1	6.3
130.0	151.0	8.1	R16MH01300****	Also Fits	130.0	150.5	8.1
135.0	150.5	6.3	R16MR01350****	Also Fits	135.0	150.1	6.3

METRIC			PART NUMBER	Also Fits	METRIC		
Ød ₁	ØD ₁	L ₁			Ød ₁	ØD ₁	L ₁
Tol. f8/h9	Tol. H9	Tol. +0.2			Tol. f8/h9	Tol. H9	Tol. +0.2
135.0	156.0	8.1	R16MH01350****	Also Fits	135.0	155.5	8.1
140.0	155.5	6.3	R16MR01400****	Also Fits	140.0	155.1	6.3
140.0	161.0	8.1	R16MH01400****	Also Fits	140.0	160.5	8.1
145.0	160.5	6.3	R16MR01450****	Also Fits	145.0	160.1	6.3
145.0	166.0	8.1	R16MH01450****	Also Fits	145.0	165.5	8.1
150.0	165.5	6.3	R16MR01500****	Also Fits	150.0	165.1	6.3
150.0	171.0	8.1	R16MH01500****	Also Fits	150.0	170.5	8.1
155.0	170.5	6.3	R16MR01550****	Also Fits	155.0	170.1	6.3
155.0	176.0	8.1	R16MH01550****	Also Fits	155.0	175.5	8.1
160.0	175.5	6.3	R16MR01600****	Also Fits	160.0	175.1	6.3
160.0	181.0	8.1	R16MH01600****	Also Fits	160.0	180.5	8.1
170.0	185.5	6.3	R16MR01700****	Also Fits	170.0	185.1	6.3
170.0	191.0	8.1	R16MH01700****	Also Fits	170.0	190.5	8.1
180.0	195.5	6.3	R16MR01800****	Also Fits	180.0	195.1	6.3
180.0	201.0	8.1	R16MH01800****	Also Fits	180.0	200.5	8.1
190.0	205.5	6.3	R16MR01900****	Also Fits	190.0	205.1	6.3
190.0	211.0	8.1	R16MH01900****	Also Fits	190.0	210.5	8.1
200.0	215.5	6.3	R16ML02000****	Also Fits	200.0	215.1	6.3
200.0	221.0	8.1	R16MR02000****	Also Fits	200.0	220.5	8.1
200.0	224.5	8.1	R16MH02000****	Also Fits	200.0	224.0	8.1
210.0	231.0	8.1	R16MR02100****	Also Fits	210.0	230.5	8.1
210.0	234.5	8.1	R16MH02100****	Also Fits	210.0	234.0	8.1
220.0	241.0	8.1	R16MR02200****	Also Fits	220.0	240.5	8.1
220.0	244.5	8.1	R16MH02200****	Also Fits	220.0	244.0	8.1
225.0	246.0	8.1	R16MR02250****	Also Fits	225.0	245.5	8.1
225.0	249.5	8.1	R16MH02250****	Also Fits	225.0	249.0	8.1
240.0	261.0	8.1	R16MR02400****	Also Fits	240.0	260.5	8.1
240.0	264.5	8.1	R16MH02400****	Also Fits	240.0	264.0	8.1

PART NUMBER RANGE (METRIC)*

METRIC			PART NUMBER	Also Fits	METRIC		
Ød ₁	ØD ₁	L ₁			Ød ₁	ØD ₁	L ₁
Tol. f8/h9	Tol. H9	Tol. +0.2			Tol. f8/h9	Tol. H9	Tol. +0.2
250.0	271.0	8.1	R16MR02500****	Also Fits	250.0	270.5	8.1
250.0	274.5	8.1	R16MH02500****	Also Fits	250.0	274.0	8.1
260.0	284.5	8.1	R16MR02600****	Also Fits	260.0	284.0	8.1
260.0	288.0	9.5	R16MH02600****	Also Fits	260.0	287.3	9.5
270.0	294.5	8.1	R16MR02700****	Also Fits	270.0	294.0	8.1
270.0	298.0	9.5	R16MH02700****	Also Fits	270.0	297.3	9.5
280.0	304.5	8.1	R16MR02800****	Also Fits	280.0	304.0	8.1
280.0	308.0	9.5	R16MH02800****	Also Fits	280.0	307.3	9.5
290.0	314.5	8.1	R16MR02900****	Also Fits	290.0	314.0	8.1
290.0	318.0	9.5	R16MH02900****	Also Fits	290.0	317.3	9.5
300.0	324.5	8.1	R16MR03000****	Also Fits	300.0	324.0	8.1
300.0	328.0	9.5	R16MH03000****	Also Fits	300.0	327.3	9.5
320.0	344.5	8.1	R16MR03200****	Also Fits	320.0	344.0	8.1
320.0	348.0	9.5	R16MH03200****	Also Fits	320.0	347.3	9.5
330.0	354.5	8.1	R16MR03300****	Also Fits	330.0	354.0	8.1
330.0	358.0	9.5	R16MH03300****	Also Fits	330.0	357.3	9.5
340.0	364.5	8.1	R16MR03400****	Also Fits	340.0	364.0	8.1
340.0	368.0	9.5	R16MH03400****	Also Fits	340.0	367.3	9.5
350.0	374.5	8.1	R16MR03500****	Also Fits	350.0	374.0	8.1
350.0	378.0	9.5	R16MH03500****	Also Fits	350.0	377.3	9.5
360.0	384.5	8.1	R16MR03600****	Also Fits	360.0	384.0	8.1
360.0	388.0	9.5	R16MH03600****	Also Fits	360.0	387.3	9.5
370.0	394.5	8.1	R16MR03700****	Also Fits	370.0	394.0	8.1
370.0	398.0	9.5	R16MH03700****	Also Fits	370.0	397.3	9.5
380.0	404.5	8.1	R16MR03800****	Also Fits	380.0	404.0	8.1
380.0	408.0	9.5	R16MH03800****	Also Fits	380.0	407.3	9.5
390.0	414.5	8.1	R16MR03900****	Also Fits	390.0	414.0	8.1
390.0	418.0	9.5	R16MH03900****	Also Fits	390.0	417.3	9.5

METRIC			PART NUMBER	Also Fits	METRIC		
Ød ₁	ØD ₁	L ₁			Ød ₁	ØD ₁	L ₁
Tol. f8/h9	Tol. H9	Tol. +0.2			Tol. f8/h9	Tol. H9	Tol. +0.2
400.0	424.5	8.1	R16MR04000****	Also Fits	400.0	424.0	8.1
400.0	428.0	9.5	R16MH04000****	Also Fits	400.0	427.3	9.5
410.0	434.5	8.1	R16MR04100****	Also Fits	410.0	437.3	9.5
410.0	438.0	9.5	R16MH04100****	Also Fits	410.0	437.3	9.5
420.0	444.5	8.1	R16MR04200****	Also Fits	420.0	444.0	8.1
420.0	448.0	9.5	R16MH04200****	Also Fits	420.0	447.3	9.5
450.0	474.5	8.1	R16MR04500****	Also Fits	450.0	474.0	8.1
450.0	478.0	9.5	R16MH04500****	Also Fits	450.0	477.3	9.5
460.0	484.5	8.1	R16MR04600****	Also Fits	460.0	484.0	8.1
460.0	488.0	9.5	R16MH04600****	Also Fits	460.0	487.3	9.5
480.0	504.5	8.1	R16MR04800****	Also Fits	480.0	504.0	8.1
480.0	508.0	9.5	R16MH04800****	Also Fits	480.0	507.3	9.5
500.0	524.5	8.1	R16MR05000****	Also Fits	500.0	524.0	8.1
500.0	528.0	9.5	R16MH05000****	Also Fits	500.0	527.3	9.5
520.0	544.5	8.1	R16MR05200****	Also Fits	520.0	544.0	8.1
520.0	548.0	9.5	R16MH05200****	Also Fits	520.0	547.3	9.5
550.0	574.5	8.1	R16MR05500****	Also Fits	550.0	574.0	8.1
550.0	578.0	9.5	R16MH05500****	Also Fits	550.0	577.3	9.5
560.0	584.5	8.1	R16MR05600****	Also Fits	560.0	584.0	8.1
560.0	588.0	9.5	R16MH05600****	Also Fits	560.0	587.3	9.5
590.0	614.5	8.1	R16MR05900****	Also Fits	590.0	614.0	8.1
590.0	618.0	9.5	R16MH05900****	Also Fits	590.0	617.3	9.5
600.0	624.5	8.1	R16MR06000****	Also Fits	600.0	624.0	8.1
600.0	628.0	9.5	R16MH06000****	Also Fits	600.0	627.3	9.5
625.0	649.5	8.1	R16MR06250****	Also Fits	625.0	649.0	8.1
625.0	653.0	9.5	R16MH06250****	Also Fits	625.0	652.3	9.5
650.0	678.0	9.5	R16MR06500****	Also Fits	650.0	677.3	9.5
700.0	728.0	9.5	R16MR07000****	Also Fits	700.0	727.3	9.5



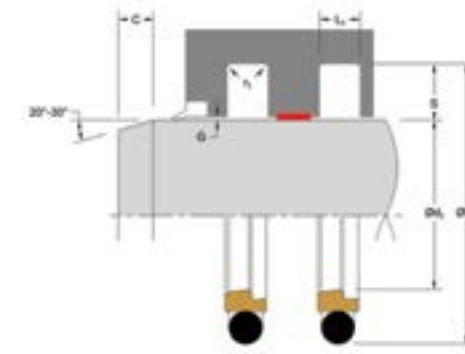
PART NUMBER RANGE (METRIC)*

METRIC			PART NUMBER	Also Fits			
Ød ₁	ØD ₁	L ₁			Ød ₁	ØD ₁	L ₁
Tol. f8/h9	Tol. H9	Tol. +0.2			Tol. f8/h9	Tol. H9	Tol. +0.2
750.0	778.0	9.5	R16MR07500****	Also Fits	750.0	777.3	9.5
800.0	828.0	9.5	R16MR08000****	Also Fits	800.0	827.3	9.5
850.0	878.0	9.5	R16MR08500****	Also Fits	850.0	877.3	9.5
900.0	928.0	9.5	R16MR09000****	Also Fits	900.0	927.3	9.5
950.0	978.0	9.5	R16MR09500****	Also Fits	950.0	977.3	9.5
1000.0	1038.0	13.8	R16MR10000****	Also Fits	-	-	-
1050.0	1088.0	13.8	R16MR10500****	Also Fits	-	-	-
1100.0	1138.0	13.8	R16MR11000****	Also Fits	-	-	-
1150.0	1188.0	13.8	R16MR11500****	Also Fits	-	-	-
1200.0	1238.0	13.8	R16MR12000****	Also Fits	-	-	-
1250.0	1288.0	13.8	R16MR12500****	Also Fits	-	-	-
1300.0	1338.0	13.8	R16MR13000****	Also Fits	-	-	-
1350.0	1388.0	13.8	R16MR13500****	Also Fits	-	-	-

*Please contact Hallite for custom sizes, material selection, or seal design.

PART NUMBER RANGE (INCH)*

INCH			PART NUMBER
Ød ₁	ØD ₁	L ₁	
Tol. f8/h9	Tol. H9	Tol. +0.008	
0.312	0.505	0.087	R16EL00312****
0.312	0.599	0.126	R16ER00312****
0.312	0.733	0.165	R16EH00312****
0.375	0.568	0.087	R16EL00375****
0.375	0.662	0.126	R16ER00375****
0.375	0.796	0.165	R16EH00375****
0.437	0.630	0.087	R16EL00437****
0.437	0.724	0.126	R16ER00437****
0.437	0.858	0.165	R16EH00437****
0.500	0.693	0.087	R16EL00500****
0.500	0.787	0.126	R16ER00500****
0.500	0.921	0.165	R16EH00500****
0.562	0.755	0.087	R16EL00562****
0.562	0.850	0.126	R16ER00562****
0.562	0.983	0.165	R16EH00562****
0.625	0.818	0.087	R16EL00625****
0.625	0.912	0.126	R16ER00625****
0.625	1.046	0.165	R16EH00625****
0.687	0.800	0.087	R16EL00687****
0.687	0.975	0.126	R16ER00687****
0.687	1.108	0.165	R16EH00687****
0.750	1.037	0.126	R16EL00750****
0.750	1.171	0.165	R16ER00750****
0.750	1.344	0.248	R16EH00750****
0.812	1.099	0.126	R16EL00812****
0.812	1.234	0.165	R16ER00812****
0.812	1.406	0.248	R16EH00812****
0.875	1.162	0.126	R16EL00875****



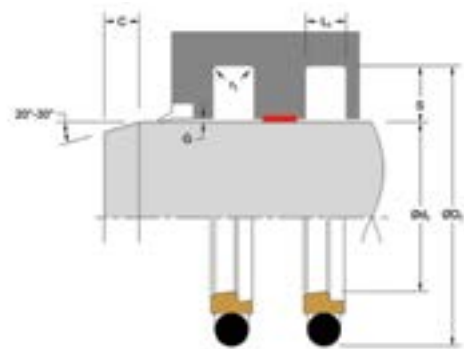
PART NUMBER RANGE (INCH)*

INCH			PART NUMBER
Ød ₁	ØD ₁	L ₁	
Tol. f8/h9	Tol. H9	Tol. +0.008	
0.875	1.296	0.165	R16ER00875****
0.875	1.469	0.248	R16EH00875****
0.937	1.224	0.126	R16EL00937****
0.937	1.359	0.165	R16ER00937****
0.937	1.531	0.248	R16EH00937****
1.000	1.287	0.126	R16EL01000****
1.000	1.421	0.165	R16ER01000****
1.000	1.594	0.248	R16EH01000****
1.062	1.349	0.126	R16EL01062****
1.062	1.484	0.165	R16ER01062****
1.062	1.656	0.248	R16EH01062****
1.125	1.412	0.126	R16EL01125****
1.125	1.546	0.165	R16ER01125****
1.125	1.719	0.248	R16EH01125****
1.187	1.474	0.126	R16EL01187****
1.187	1.608	0.165	R16ER01187****
1.187	1.781	0.248	R16EH01187****
1.250	1.537	0.126	R16EL01250****
1.250	1.671	0.165	R16ER01250****
1.250	1.844	0.248	R16EH01250****
1.312	1.599	0.126	R16EL01312****
1.312	1.733	0.165	R16ER01312****
1.312	1.906	0.248	R16EH01312****
1.375	1.662	0.126	R16EL01375****
1.375	1.796	0.165	R16ER01375****
1.375	1.969	0.248	R16EH01375****
1.437	1.724	0.126	R16EL01437****
1.437	1.858	0.165	R16ER01437****

R16

ROD SEAL
Single-Acting

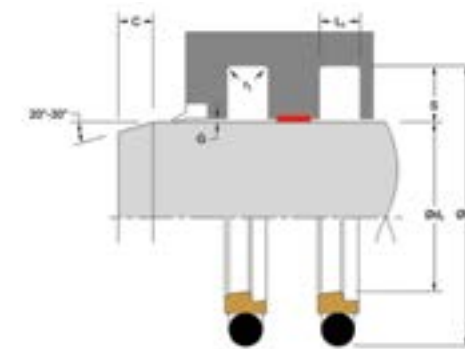
INCH			PART NUMBER
Ød ₁	ØD ₁	L ₁	
Tol. f8/h9	Tol. H9	Tol. +0.008	
1.437	2.031	0.248	R16EH01437****
1.500	1.787	0.126	R16EL01500****
1.500	1.921	0.165	R16ER01500****
1.500	2.094	0.248	R16EH01500****
1.562	1.983	0.165	R16EL01562****
1.562	2.156	0.248	R16ER01562****
1.562	2.369	0.319	R16EH01562****
1.625	2.046	0.165	R16EL01625****
1.625	2.219	0.248	R16ER01625****
1.625	2.432	0.319	R16EH01625****
1.687	2.108	0.165	R16EL01687****
1.687	2.281	0.248	R16ER01687****
1.687	2.494	0.319	R16EH01687****
1.750	2.171	0.165	R16EL01750****
1.750	2.344	0.248	R16ER01750****
1.750	2.557	0.319	R16EH01750****
1.812	2.233	0.165	R16EL01812****
1.812	2.406	0.248	R16ER01812****
1.812	2.619	0.319	R16EH01812****
1.875	2.296	0.165	R16EL01875****
1.875	2.469	0.248	R16ER01875****
1.875	2.682	0.319	R16EH01875****
1.937	2.358	0.165	R16EL01937****
1.937	2.531	0.248	R16ER01937****
1.937	2.744	0.319	R16EH01937****
2.000	2.421	0.165	R16EL02000****
2.000	2.594	0.248	R16ER02000****
2.000	2.807	0.319	R16EH02000****



PART NUMBER RANGE (INCH)*

INCH			PART NUMBER
Ød ₁	ØD ₁	L ₁	
Tol. f8/h9	Tol. H9	Tol. +0.008	
2.125	2.546	0.165	R16EL02125****
2.125	2.719	0.248	R16ER02125****
2.125	2.932	0.319	R16EH02125****
2.250	2.671	0.165	R16EL02250****
2.250	2.844	0.248	R16ER02250****
2.250	3.057	0.319	R16EH02250****
2.375	2.796	0.165	R16EL02375****
2.375	2.969	0.248	R16ER02375****
2.375	3.182	0.319	R16EH02375****
2.500	2.921	0.165	R16EL02500****
2.500	3.094	0.248	R16ER02500****
2.500	3.307	0.319	R16EH02500****
2.625	3.046	0.165	R16EL02625****
2.625	3.219	0.248	R16ER02625****
2.625	3.432	0.319	R16EH02625****
2.750	3.171	0.165	R16EL02750****
2.750	3.344	0.248	R16ER02750****
2.750	3.557	0.319	R16EH02750****
2.875	3.296	0.165	R16EL02875****
2.875	3.469	0.248	R16ER02875****
2.875	3.682	0.319	R16EH02875****
3.000	3.421	0.165	R16EL03000****
3.000	3.594	0.248	R16ER03000****
3.000	3.807	0.319	R16EH03000****
3.125	3.546	0.165	R16EL03125****
3.125	3.719	0.248	R16ER03125****
3.125	3.932	0.319	R16EH03125****
3.250	3.671	0.165	R16EL03250****

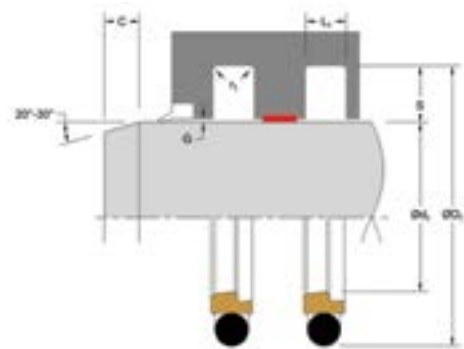
INCH			PART NUMBER
Ød ₁	ØD ₁	L ₁	
Tol. f8/h9	Tol. H9	Tol. +0.008	
3.25	3.844	0.248	R16ER03250****
3.25	4.057	0.319	R16EH03250****
3.375	3.796	0.165	R16EL03375****
3.375	3.969	0.248	R16ER03375****
3.375	4.182	0.319	R16EH03375****
3.500	3.921	0.165	R16EL03500****
3.500	4.094	0.248	R16ER03500****
3.500	4.307	0.319	R16EH03500****
3.625	4.046	0.165	R16EL03625****
3.625	4.219	0.248	R16ER03625****
3.625	4.432	0.319	R16EH03625****
3.750	4.171	0.165	R16EL03750****
3.750	4.344	0.248	R16ER03750****
3.750	4.557	0.319	R16EH03750****
3.875	4.296	0.165	R16EL03875****
3.875	4.469	0.248	R16ER03875****
3.875	4.682	0.319	R16EH03875****
4.000	4.421	0.165	R16EL04000****
4.000	4.594	0.248	R16ER04000****
4.000	4.807	0.319	R16EH04000****
4.125	4.546	0.165	R16EL04125****
4.125	4.719	0.248	R16ER04125****
4.125	4.932	0.319	R16EH04125****
4.250	4.671	0.165	R16EL04250****
4.250	4.844	0.248	R16ER04250****
4.250	5.057	0.319	R16EH04250****
4.375	4.796	0.165	R16EL04375****
4.375	4.969	0.248	R16ER04375****



PART NUMBER RANGE (INCH)*

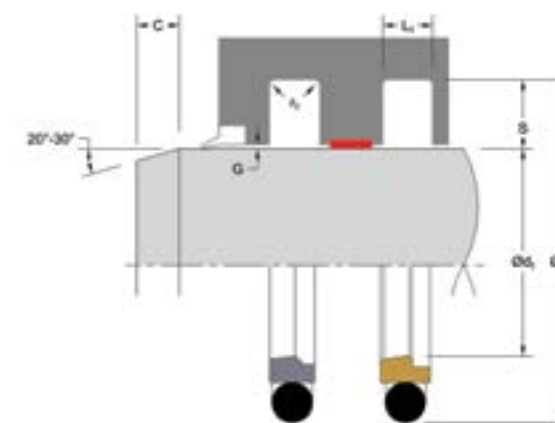
INCH			PART NUMBER
Ød ₁	ØD ₁	L ₁	
Tol. f8/h9	Tol. H9	Tol. +0.008	
4.375	5.182	0.319	R16EH04375****
4.500	4.921	0.165	R16EL04500****
4.500	5.094	0.248	R16ER04500****
4.500	5.307	0.319	R16EH04500****
4.625	5.046	0.165	R16EL04625****
4.625	5.219	0.248	R16ER04625****
4.625	5.432	0.319	R16EH04625****
4.750	5.171	0.165	R16EL04750****
4.750	5.344	0.248	R16ER04750****
4.750	5.557	0.319	R16EH04750****
4.875	5.296	0.165	R16EL04875****
4.875	5.469	0.248	R16ER04875****
4.875	5.682	0.319	R16EH04875****
5.000	5.421	0.165	R16EL05000****
5.000	5.594	0.248	R16ER05000****
5.000	5.807	0.319	R16EH05000****
5.125	5.546	0.165	R16EL05125****
5.125	5.719	0.248	R16ER05125****
5.125	5.932	0.319	R16EH05125****
5.250	5.671	0.165	R16EL05250****
5.250	5.844	0.248	R16ER05250****
5.250	6.057	0.319	R16EH05250****
5.375	5.796	0.165	R16EL05375****
5.375	5.969	0.248	R16ER05375****
5.375	6.182	0.319	R16EH05375****
5.500	5.921	0.165	R16EL05500****
5.500	6.094	0.248	R16ER05500****
5.500	6.307	0.319	R16EH05500****

INCH			PART NUMBER
Ød ₁	ØD ₁	L ₁	
Tol. f8/h9	Tol. H9	Tol. +0.008	
5.625	6.046	0.165	R16EL05625****
5.625	6.219	0.248	R16ER05625****
5.625	6.432	0.319	R16EH05625****
5.750	6.171	0.165	R16EL05750****
5.750	6.344	0.248	R16ER05750****
5.750	6.557	0.319	R16EH05750****
6.000	6.421	0.165	R16EL06000****
6.000	6.594	0.248	R16ER06000****
6.000	6.807	0.319	R16EH06000****
6.250	6.671	0.165	R16EL06250****
6.250	6.844	0.248	R16ER06250****
6.250	7.057	0.319	R16EH06250****
6.500	6.921	0.165	R16EL06500****
6.500	7.094	0.248	R16ER06500****
6.500	7.307	0.319	R16EH06500****
6.750	7.171	0.165	R16EL06750****
6.750	7.344	0.248	R16ER06750****
6.750	7.557	0.319	R16EH06750****
7.000	7.421	0.165	R16EL07000****
7.000	7.594	0.248	R16ER07000****
7.000	7.807	0.319	R16EH07000****
7.250	7.671	0.165	R16EL07250****
7.250	7.844	0.248	R16ER07250****
7.250	8.057	0.319	R16EH07250****
7.500	7.921	0.165	R16EL07500****
7.500	8.094	0.248	R16ER07500****
7.500	8.307	0.319	R16EH07500****
7.750	8.171	0.165	R16EL07750****



716SPN

ROD SEAL
Single-Acting



PART NUMBER RANGE (INCH)*

INCH			PART NUMBER
Ød ₁	ØD ₁	L ₁	
Tol. f8/h9	Tol. H9	Tol. +0.008	
7.750	8.344	0.248	R16ER07750****
7.750	8.557	0.319	R16EH07750****
8.000	8.594	0.248	R16EL08000****
8.000	8.807	0.319	R16ER08000****
8.000	8.945	0.319	R16EH08000****
8.250	8.844	0.248	R16EL08250****
8.250	9.057	0.319	R16ER08250****
8.250	9.195	0.319	R16EH08250****
8.500	9.094	0.248	R16EL08500****
8.500	9.307	0.319	R16ER08500****
8.500	9.445	0.319	R16EH08500****
8.750	9.344	0.248	R16EL08750****
8.750	9.557	0.319	R16ER08750****
8.750	9.695	0.319	R16EH08750****
9.000	9.594	0.248	R16EL09000****
9.000	9.807	0.319	R16ER09000****
9.000	9.945	0.319	R16EH09000****
9.250	9.844	0.248	R16EL09250****
9.250	10.057	0.319	R16ER09250****
9.250	10.195	0.319	R16EH09250****
9.500	10.094	0.248	R16EL09500****
9.500	10.307	0.319	R16ER09500****
9.500	10.445	0.319	R16EH09500****
9.750	10.344	0.248	R16EL09750****
9.750	10.557	0.319	R16ER09750****
9.750	10.695	0.319	R16EH09750****
10.000	10.807	0.319	R16EL10000****
10.000	10.945	0.319	R16ER10000****

INCH			PART NUMBER
Ød ₁	ØD ₁	L ₁	
Tol. f8/h9	Tol. H9	Tol. +0.008	
10.000	11.075	0.374	R16EH10000****
10.500	11.307	0.319	R16EL10500****
10.500	11.445	0.319	R16ER10500****
10.500	11.575	0.374	R16EH10500****
11.000	11.807	0.319	R16EL11000****
11.000	11.945	0.319	R16ER11000****
11.000	12.075	0.374	R16EH11000****
11.500	12.307	0.319	R16EL11500****
11.500	12.445	0.319	R16ER11500****
11.500	12.575	0.374	R16EH11500****
12.000	12.945	0.319	R16ER12000****
12.500	13.445	0.319	R16ER12500****
12.500	13.575	0.374	R16EH12500****
13.000	13.945	0.319	R16ER13000****
13.500	14.445	0.319	R16ER13500****
14.000	14.945	0.319	R16ER14000****
14.500	15.445	0.319	R16ER14500****
15.000	15.945	0.319	R16ER15000****
15.500	16.445	0.319	R16ER15500****
16.000	16.945	0.319	R16ER16000****
16.500	17.445	0.319	R16ER16500****
17.000	17.945	0.319	R16ER17000****
17.500	18.445	0.319	R16ER17500****
18.000	18.945	0.319	R16ER18000****
18.500	19.445	0.319	R16ER18500****
19.000	19.945	0.319	R16ER19000****
19.500	20.445	0.319	R16ER19500****
20.000	20.945	0.319	R16ER20000****

TECHNICAL DETAILS

The Hallite 716SPN is a single-acting, O-ring energized rod seal proven to be ideal for a variety of applications. This seal is typically made out of our high-quality Hythane® materials combined with an elastomer energizer design optimized for superior performance.

The Hallite 716SPN can be used as a single rod seal or incorporated into a rod sealing system as the secondary seal. The 716SPN is paired with an R16 made from an Armormene® PTFE material which becomes the primary seal in the system (see drawing above) with the 716SPN as the secondary seal in the system. This tandem arrangement is ideal for long- stroke and high-speed applications, providing optimum sealing performance.

This design fits standard ISO 7425-2 grooves and is offered in a wide range of metric and inch options.



FEATURES

- Low break-away force
- Design minimizes occurrence of stick-slip
- Design offers excellent dynamic and static sealing properties
- Long wear and high extrusion resistance
- Excellent performance as a single or tandem seal system

Part Number Structure

716MR00500N11_

716	M	R	00500	N	111	—
PROFILE DESIGNATION	UNIT OF MEASUREMENT M = Metric E = Inch	APPLICATION Refer to <i>Installation Recommendations</i> and use designator for desired application	ROD DIAMETER Metric = mm X 10 Inch = inches X 1000	ENERGIZER MATERIAL Refer to <i>Energizer Table</i> for desired energizer material	MATERIAL Refer to <i>Material Table</i> for desired (face) material	SPECIAL FEATURE Blank = Std profile

*Please contact Hallite for custom sizes, material selection, or seal design.

OPERATING CONDITIONS

	METRIC	INCH
Maximum Speed	Up to 1.0m/sec	Up to 3.3ft/sec
Temperature Range*	-40 to 100°C	-40 to 212°F
Maximum Dynamic Pressure**	250 bar	3600 psi
When used in Tandem with R16***	400 bar	5800 psi

*Dependent upon energizer used (NBR, FKM, etc.). **For pressures above 250 bar (3600 psi), contact Hallite Engineering. ***For pressures above 400 bar (5800 psi), contact Hallite Engineering.

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 FINISH RECOMMENDATIONS

SURFACE ROUGHNESS	METRIC			INCH			Rmr*
	µmRa	µmRz	µmRt	µinRa	µinRz	µinRt	
Dynamic Sealing Face Ød ₁	0.1 - 0.4	1.6 max	2.5 max	4 - 16	63 max	157 max	45% - 70%
Static Sealing Face 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	

*Rmr is measured at a depth of 25% of the Rz value based upon a reference level (zero line) at 5% material/bearing area. For sealing systems where a PTFE rod seal is used, please refer to the PTFE rod seal surface finish requirements.

ENERGIZER TABLE

ENERGIZER MATERIAL (SHORE A)	ENERGIZER TYPE	ENERGIZER DESIGNATION	ENERGIZER OPERATING TEMPERATURE°C	ENERGIZER OPERATING TEMPERATURE°F
NBR - 70A	O-ring	N	-30 to 100°C	-22 to 212°F
NBR - 70A Low temp.	O-ring	L	-45 to 80°C	-49 to 176°F
FKM - 75A	O-ring	F	-10 to 200°C	14 to 392°F
EPDM - 70A	O-ring	E	-45 to 145°C	-49 to 293°F
HNBR - 70A	O-ring	H	-25 to 150°C	-13 to 302°F
NBR - 90A	O-ring	Q	-30 to 100°C	-22 to 212°F
HNBR - 90A	O-ring	U	-25 to 150°C	-13 to 302°F
No Energizer*	None	X	-	-

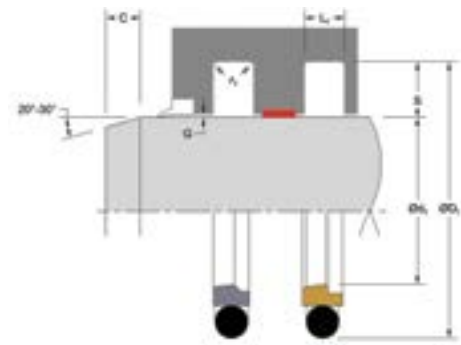
*Seal ratings are based upon capabilities of its matched material components. Hallite cannot rate seal performance when the seal is mixed with other manufacturers' energizers/components.

MATERIALS

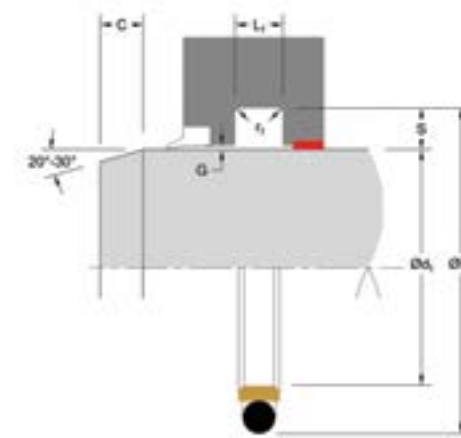
MATERIAL FEATURES AND APPLICATIONS	FILLER	MATERIAL DESIGNATOR	COLOR	TEMPERATURE RANGE°C	TEMPERATURE RANGE°F	MAXIMUM DYNAMIC PRESSURE - BAR	MAXIMUM DYNAMIC PRESSURE - PSI
HYTHANE® 9270111 - POLYESTER, 55D <ul style="list-style-type: none"> Positive position load holding Hydrolysis stabilized Strong chemical resistance Excellent extrusion resistance Excellent wear properties Available up to 1400mm (55 inches) diameter 	Hydrolysis Stabilized	111	Gray	-40 to 120°C	-40 to 250°F	250 bar	3600 psi
HYTHANE® 9270261 - POLYESTER, 55D <ul style="list-style-type: none"> Positive position load holding Internal lubrication provides extended wear in high-speed applications Excellent extrusion resistance Excellent wear resistance Available up to 500mm (19.5 inches) diameter 	Internally Lubricated	261	Off-White	-40 to 120°C	-40 to 250°F	250 bar	3600 psi
HU5 - POLYURETHANE, 55D <ul style="list-style-type: none"> Positive position load holding Excellent extrusion resistance Excellent wear resistance Available up to 2540mm (100 inches) diameter 	Standard	HU5	Yellow	-20 to 115°C	-20 to 240°F	250 bar	3600 psi
HU9 - POLYURETHANE, 95A <ul style="list-style-type: none"> Positive position load holding Excellent extrusion resistance Excellent wear resistance Available up to 2540mm (100 inches) diameter 	Standard	HU9	Red	-20 to 115°C	-20 to 240°F	250 bar	3600 psi
HE5 - POLYESTER, 55D <ul style="list-style-type: none"> Positive position load holding Excellent extrusion resistance Excellent wear resistance Available up to 2540mm (100 inches) diameter 	Standard	HE5	Gray/Black	-20 to 115°C	-20 to 240°F	250 bar	3600 psi
HYTHANE® 9220371 - POLYURETHANE, 55D <ul style="list-style-type: none"> Positive load holding Excellent extrusion resistance Excellent wear resistance Available up to 500mm (19.5 inches) diameter 	Standard	371	Green	-40 to 100°C	-40 to 212°F	250 bar	3600 psi

For other material options consult the Master Materials Index at the front of the catalog. If you do not find the material that you require, please contact your local Hallite sales office.





Applications with maximum radial clearance that are using nylon, phenolic, or PTFE bearings must ensure proper clearance in accordance with the bearing recommendations to avoid metal-to-metal contact. Please refer to Hallite Type 87, Type 506, and Type 533 Specification Sheets for this information.



RDA

ROD SEAL

Double-Acting

INSTALLATION RECOMMENDATIONS

METRIC			GROOVE DIAMETER	GROOVE WIDTH	RADIUS	CHAMFER	GROOVE SECTION	RADIAL CLEARANCE G MAX*			O-RING CROSS SECTION
ROD DIAMETER Ød ₁ f8/h9								Up to 100 bar	Up to 200 bar	Up to 400 bar	
DIAMETER RANGE			ØD ₁ H9	L ₁ + 0.2	r ₁	C	S	Up to 100 bar	Up to 200 bar	Up to 400 bar	O-ring
Standard Duty Application - R	Light Duty Application - L	Heavy Duty Application - H	ØD ₁ H9	L ₁ + 0.2	r ₁	C	S	Up to 100 bar	Up to 200 bar	Up to 400 bar	O-ring
5.0 - 7.9	8.0 - 18.9	-	d ₁ + 4.9	2.2	0.4	2.0	2.45	0.30	0.20	0.15	1.78
8.0 - 18.9	19.0 - 37.9	-	d ₁ + 7.5	3.2	0.6	3.0	3.75	0.40	0.25	0.15	2.62
19.0 - 37.9	38.0 - 199.9	8.0 - 18.9	d ₁ + 11.0	4.2	1.0	4.0	5.50	0.50	0.30	0.20	3.53
38.0 - 199.9	200.0 - 255.9	19.0 - 37.9	d ₁ + 15.5	6.3	1.3	6.0	7.75	0.70	0.40	0.25	5.33
200.0 - 255.9	256.0 - 649.9	38.0 - 199.9	d ₁ + 21.0	8.1	1.8	8.0	10.50	0.80	0.60	0.35	6.99
256.0 - 649.9	650.0 - 999.9	200.0 - 255.9	d ₁ + 24.5	8.1	2.5	9.0	12.25	1.00	0.80	0.50	6.99
650.0 - 999.9	-	256.0 - 649.9	d ₁ + 28.0	9.5	3.0	10.0	14.00	1.20	0.90	0.60	8.40
≥ 1000.0	-	-	d ₁ + 38.0	13.8	3.0	10.0	19.00	1.20	0.90	0.60	12.00

At pressure >250 bar use diameter tolerance f8/H8.

*Radial Clearance G max. = maximum permissible gap all on one side using min. rod diameter and max. clearance diameter.

INCH			GROOVE DIAMETER	GROOVE WIDTH	RADIUS	CHAMFER	GROOVE SECTION	RADIAL CLEARANCE G MAX*			O-RING CROSS SECTION
ROD DIAMETER Ød ₁ f8/h9								Up to 1500 PSI	Up to 2900 PSI	Up to 5800 PSI	
DIAMETER RANGE			ØD ₁ H9	L ₁ + .008	r ₁	C	S	Up to 1500 PSI	Up to 2900 PSI	Up to 5800 PSI	O-ring
Standard Duty Application - R	Light Duty Application - L	Heavy Duty Application - H	ØD ₁ H9	L ₁ + .008	r ₁	C	S	Up to 1500 PSI	Up to 2900 PSI	Up to 5800 PSI	O-ring
0.125 - 0.311	0.312 - 0.749	-	d ₁ + 0.193	0.087	0.016	0.079	0.097	0.012	0.008	0.006	0.070
0.312 - 0.749	0.750 - 1.500	-	d ₁ + 0.287	0.126	0.024	0.118	0.144	0.016	0.010	0.006	0.103
0.750 - 1.500	1.501 - 7.874	0.312 - 0.749	d ₁ + 0.421	0.165	0.039	0.157	0.211	0.020	0.012	0.008	0.139
1.501 - 7.874	7.875 - 9.999	0.750 - 1.500	d ₁ + 0.594	0.248	0.051	0.236	0.297	0.028	0.016	0.010	0.210
7.875 - 9.999	10.000 - 25.499	1.501 - 7.874	d ₁ + 0.807	0.319	0.071	0.315	0.404	0.031	0.024	0.014	0.275
10.000 - 25.499	25.500 - 39.999	7.875 - 9.999	d ₁ + 0.945	0.319	0.071	0.315	0.473	0.035	0.028	0.016	0.275
25.500 - 39.999	> 40.000	10.000 - 25.499	d ₁ + 1.075	0.374	0.098	0.354	0.538	0.039	0.031	0.020	0.331

At pressure >3600 psi use diameter tolerance f8/H8.

*Radial Clearance G max. = maximum permissible gap all on one side using min. rod diameter and max. clearance diameter.

TECHNICAL DETAILS

The Hallite RDA is a double-acting, O-ring energized, low-friction rod seal that performs well in both high-and-low pressure systems. High-performance Armorlene® materials, like HLX, provide outstanding wear and extrusion-resistance properties as well as large range of temperature and media compatibility. The standard RDA seal face includes pressure notches, which makes the seal very responsive to changes in pressure or direction of travel.

Hallite's RDA seal has been used successfully for years in machine tool, injection molding, and many other industrial applications in both single- and double-acting systems. This design also fits standard ISO 7425-2 grooves and is offered in a wide range of metric and inch options. The Hallite RDA, with proper guidance (see Hallite Bearings section), is an excellent long-lasting sealing solution.

This seal is available in a variety of Hallite's high performance Armorlene® and Hythane® materials to suit a wide range of demanding applications.



FEATURES

- Compact design to save metal spacing
- Excellent in high-speed applications
- Low breakout friction and elimination of stick-slip action
- High service temperature, long wear, and high extrusion resistance

Part Number Structure

RDAMR00700NHLX _

RDA	M	R	00700	N	HLX	_
PROFILE DESIGNATION	UNIT OF MEASUREMENT M = Metric E = Inch	APPLICATION Refer to <i>Installation Recommendations</i> and use designator for desired application	ROD DIAMETER Metric = mm X 10 Inch = inches X 1000	ENERGIZER MATERIAL Refer to <i>Energizer Table</i> for desired energizer material	PTFE MATERIAL Refer to <i>Material Table</i> for desired PTFE (face) material	SPECIAL FEATURE Blank = Std profile (with notches) X = No Notches Notches not offered with groove widths (L ₁) of 2.2mm (0.087in) or 3.2mm (0.126in)



OPERATING CONDITIONS

	METRIC	INCH
Maximum Speed	Up to 15.0m/sec	Up to 50.0ft/sec
Temperature Range*	-45 to 200°C	-49 to 392°F
Maximum Dynamic Pressure**	600 bar	8700 psi

*Dependent upon energizer used (NBR, FKM, etc.). **For pressures above 400 bar (5800 psi), contact Hallite Engineering.

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 FINISH RECOMMENDATIONS

SURFACE ROUGHNESS	METRIC			INCH			Rmr*
	µmRa	µmRz	µmRt	µinRa	µinRz	µinRt	
Dynamic Sealing Face Ød ₁	0.05 - 0.2	1.6 max	2 max	2 - 8	63 max	157 max	60% - 90%
Static Sealing Face 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	

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

ENERGIZER TABLE

ENERGIZER MATERIAL (SHORE A)	ENERGIZER TYPE	ENERGIZER DESIGNATION	ENERGIZER OPERATING TEMPERATURE°C	ENERGIZER OPERATING TEMPERATURE°F
NBR - 70A	O-ring	N	-30 to 100°C	-22 to 212°F
NBR - 70A Low temp.	O-ring	L	-45 to 80°C	-49 to 176°F
FKM - 75A	O-ring	F	-10 to 200°C	14 to 392°F
EPDM - 70A	O-ring	E	-45 to 145°C	-49 to 293°F
HNBR - 70A	O-ring	H	-25 to 150°C	-13 to 302°F
NBR - 90A	O-ring	Q	-30 to 100°C	-22 to 212°F
HNBR - 90A	O-ring	U	-25 to 150°C	-13 to 302°F
No Energizer*	None	X	-	-

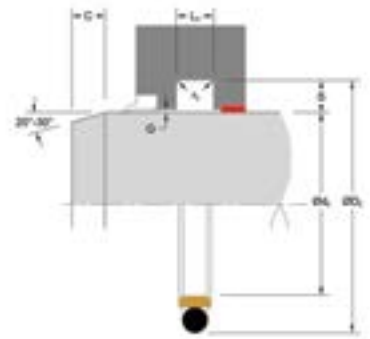
*Seal ratings are based upon capabilities of its matched material components. Hallite cannot rate seal performance when the seal is mixed with other manufacturers' energizers/components.

MATERIALS

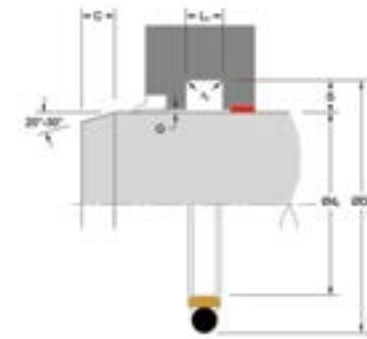
MATERIAL FEATURES AND APPLICATIONS	FILLER	MATERIAL DESIGNATOR	COLOR	TEMPERATURE RANGE°C	TEMPERATURE RANGE°F	MAXIMUM DYNAMIC PRESSURE - BAR	MAXIMUM DYNAMIC PRESSURE - PSI
ARMORLENE® HLX • Standard material for hydraulic applications • High compressive strength • Excellent extrusion resistance • Extended wear resistance	Special Bronze Compound	HLX	Gold	-73 to 288°C	-100 to 550°F	500 bar	7250 psi
ARMORLENE® HLA • Excellent in all hydraulic fluids • Excellent wear resistance • Excellent low-friction properties • Good extrusion resistance	Special Mineral Compound	HLA	Gray	-73 to 260°C	-100 to 500°F	500 bar	7250 psi
ARMORLENE® 702 • Excellent in lubricating and non-lubricating hydraulic fluids • Good low-friction properties • Excellent extrusion resistance • Good chemical resistance	Glass Molybdenum Disulfide	702	Gray	-73 to 260°C	-100 to 500°F	400 bar	5800 psi
ARMORLENE® 706 • Excellent in lubricating and non-lubricating hydraulic fluids • Excellent extrusion resistance • Good chemical resistance • Good dielectrical properties	15% Glass	706	Off-White	-73 to 260°C	-100 to 500°F	400 bar	5800 psi
ARMORLENE® 700 • Excellent in all hydraulic fluids • Recommended for hard mating surfaces only • Low friction and no stick-slip	Unfilled	700	White	-184 to 204°C	-300 to 400°F	200 bar	2900 psi
ARMORLENE® HCF • Excellent in lubricating and non-lubricating hydraulic fluids (includes water) w/o zinc content • Not recommended for gas sealing applications • Not recommended for electrical conductive fluids	Carbon Fiber Filled	HCF	Gray/Black	-73 to 260°C	-100 to 500°F	250 bar	3600 psi
ARMORLENE® HCV • Recommended for lubricating and non-lubricating fluids • Excellent for high-frequency and short-stroke applications • Not recommended for gas sealing applications • Not recommended for electrical conductive fluids	High Carbon Fiber Filled	HCV	Gray/Black	-73 to 260°C	-100 to 500°F	300 bar	4350 psi
ARMORLENE® 711 • Excellent in all lubricating fluids and pneumatic applications • High chemical resistance • Excellent extrusion resistance • Excellent wear properties	25% Carbon/Graphite	711	Black	-73 to 288°C	-100 to 550°F	400 bar	5800 psi
ARMORLENE® 713 • High compressive strength • Excellent extrusion resistance • Excellent wear properties	60% Bronze Content	713	Bronze	-73 to 288°C	-100 to 550°F	600 bar	8700 psi
748 - UHMWPE • Excellent impact resistance • Good dielectrical properties • Excellent abrasion resistance • Low coefficient of friction	Standard	748	Translucent	-184 to 82°C	-300 to 180°F	350 bar	5000 psi
HU5 - POLYURETHANE, 55D • Positive position load holding • Excellent extrusion resistance • Excellent wear resistance	Standard	HU5	Yellow	-20 to 115°C	-20 to 240°F	500 bar	7250 psi
HYTHANE® 9270111 - POLYESTER, 55D • Positive position load holding • Hydrolysis stabilized • Strong chemical resistance • Excellent extrusion resistance • Excellent wear properties • Available up to 1400mm (55 inches) diameter	Hydrolysis Stabilized	111	Gray	-40 to 120°C	-40 to 250°F	500 bar	7250 psi
HYTHANE® 9270261 - POLYESTER, 55D • Positive position load holding • Internal lubrication provides extended wear in high-speed applications • Excellent extrusion resistance • Excellent wear resistance • Available up to 500mm (19.5 inches) diameter	Internally Lubricated	261	Off-White	-40 to 120°C	-40 to 250°F	500 bar	7250 psi
HE5 - POLYESTER, 55D • Positive position load holding • Excellent extrusion resistance • Excellent wear resistance	Standard	HE5	Gray/Black	-20 to 115°C	-20 to 240°F	500 bar	7250 psi

For other material options consult the Master Materials Index at the front of the catalog. If you do not find the material that you require, please contact your local Hallite sales office.





Applications with maximum radial clearance that are using nylon, phenolic, or PTFE bearings must ensure proper clearance in accordance with the bearing recommendations to avoid metal-to-metal contact. Please refer to Hallite Type 87, Type 506, and Type 533 Specification Sheets for this information.



INSTALLATION RECOMMENDATIONS

METRIC											
ROD DIAMETER Ød ₁ f8/h9			GROOVE DIAMETER	GROOVE WIDTH	RADIUS	CHAMFER	GROOVE SECTION	RADIAL CLEARANCE G MAX*			O-RING CROSS SECTION
DIAMETER RANGE			ØD ₁ H9	L ₁ + 0.2	r ₁	C	S	Up to 100 bar	Up to 200 bar	Up to 400 bar	O-ring
Standard Duty Application - R	Light Duty Application - L	Heavy Duty Application - H	ØD ₁ H9	L ₁ + 0.2	r ₁	C	S	Up to 100 bar	Up to 200 bar	Up to 400 bar	O-ring
3.0 - 7.9	8.0 - 18.9	-	d ₁ + 4.9	2.2	0.4	2.0	2.45	0.30	0.20	0.15	1.78
8.0 - 18.9	19.0 - 37.9	-	d ₁ + 7.5	3.2	0.6	3.0	3.75	0.40	0.25	0.15	2.62
19.0 - 37.9	38.0 - 199.9	8.0 - 18.9	d ₁ + 11.0	4.2	1.0	4.0	5.50	0.50	0.30	0.20	3.53
38.0 - 199.9	200.0 - 255.9	19.0 - 37.9	d ₁ + 15.5	6.3	1.3	6.0	7.75	0.70	0.40	0.25	5.33
200.0 - 255.9	256.0 - 649.9	38.0 - 199.9	d ₁ + 21.0	8.1	1.8	8.0	10.50	0.80	0.60	0.35	6.99
256.0 - 649.9	650.0 - 999.9	200.0 - 255.9	d ₁ + 24.5	8.1	2.5	9.0	12.25	1.00	0.80	0.50	6.99
650.0 - 999.9	-	256.0 - 649.9	d ₁ + 28.0	9.5	3.0	10.0	14.00	1.20	0.90	0.60	8.40
≥ 1000.0	-	-	d ₁ + 38.0	13.8	3.0	10.0	19.00	1.20	0.90	0.60	12.00

At pressure >400 bar use diameter tolerance f8/H8.

*Radial Clearance G max. = maximum permissible gap all on one side using min. rod diameter and max. clearance diameter.

INCH											
ROD DIAMETER Ød ₁ f8/h9			GROOVE DIAMETER	GROOVE WIDTH	RADIUS	CHAMFER	GROOVE SECTION	RADIAL CLEARANCE G MAX*			O-RING CROSS SECTION
DIAMETER RANGE			ØD ₁ H9	L ₁ + 0.008	r ₁	C	S	Up to 1500 PSI	Up to 2900 PSI	Up to 5800 PSI	O-ring
Standard Duty Application - R	Light Duty Application - L	Heavy Duty Application - H	ØD ₁ H9	L ₁ + 0.008	r ₁	C	S	Up to 1500 PSI	Up to 2900 PSI	Up to 5800 PSI	O-ring
0.312 - 0.624	0.625 - 1.624	-	d ₁ + 0.193	0.087	0.015	0.079	0.097	0.020	0.012	0.008	0.070
0.625 - 1.624	1.625 - 3.249	-	d ₁ + 0.287	0.126	0.025	0.118	0.144	0.024	0.016	0.008	0.103
1.625 - 3.249	3.250 - 5.374	0.625 - 1.624	d ₁ + 0.421	0.165	0.025	0.157	0.211	0.024	0.016	0.008	0.139
3.250 - 5.374	5.375 - 12.999	1.625 - 3.249	d ₁ + 0.594	0.248	0.035	0.236	0.297	0.031	0.020	0.012	0.210
5.375 - 12.999	13.000 - 26.000	3.250 - 5.374	d ₁ + 0.807	0.319	0.035	0.315	0.404	0.031	0.020	0.012	0.275
13.000 - 26.000	-	5.375 - 13.000	d ₁ + 0.945	0.319	0.035	0.354	0.473	0.035	0.020	0.016	0.275

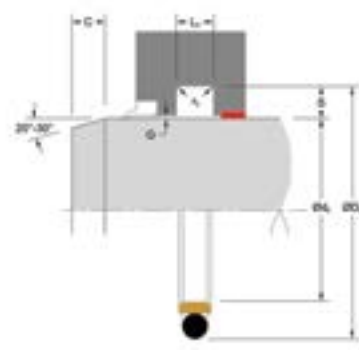
At pressure >5800 psi use diameter tolerance f8/H8.

*Radial Clearance G max. = maximum permissible gap all on one side using min. rod diameter and max. clearance diameter.

PART NUMBER RANGE (METRIC)*

METRIC			
Ød ₁	ØD ₁	L ₁	PART NUMBER
Tol. f8/h9	Tol. H9	Tol. +0.2	
8.0	15.5	3.2	RDAMR00080****
8.0	12.9	2.2	RDAML00080****
10.0	17.5	3.2	RDAMR00100****
10.0	14.9	2.2	RDAML00100****
12.0	19.5	3.2	RDAMR00120****
12.0	16.9	2.2	RDAML00120****
14.0	21.5	3.2	RDAMR00140****
14.0	18.9	2.2	RDAML00140****
15.0	22.5	3.2	RDAMR00150****
15.0	19.9	2.2	RDAML00150****
16.0	23.5	3.2	RDAMR00160****
16.0	20.9	2.2	RDAML00160****
18.0	25.5	3.2	RDAMR00180****
18.0	22.9	2.2	RDAML00180****
20.0	31.0	4.2	RDAMR00200****
20.0	27.5	3.2	RDAML00200****
22.0	33.0	4.2	RDAMR00220****
22.0	29.5	3.2	RDAML00220****
25.0	36.0	4.2	RDAMR00250****
25.0	32.5	3.2	RDAML00250****
28.0	39.0	4.2	RDAMR00280****
28.0	35.5	3.2	RDAML00280****
30.0	41.0	4.2	RDAMR00300****
30.0	37.5	3.2	RDAML00300****
32.0	43.0	4.2	RDAMR00320****
32.0	39.5	3.2	RDAML00320****
35.0	46.0	4.2	RDAMR00350****
35.0	42.5	3.2	RDAML00350****

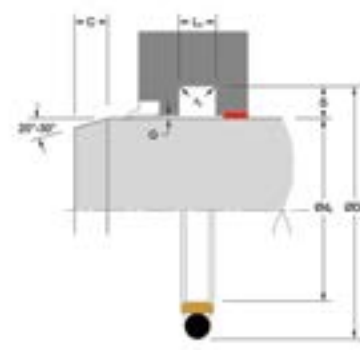
METRIC			
Ød ₁	ØD ₁	L ₁	PART NUMBER
Tol. f8/h9	Tol. H9	Tol. +0.2	
36.0	47.0	4.2	RDAMR00360****
36.0	43.5	3.2	RDAML00360****
40.0	55.5	6.3	RDAMR00400****
40.0	51.0	4.2	RDAML00400****
43.0	58.5	6.3	RDAMR00430****
42.0	53.0	4.2	RDAML00420****
45.0	60.5	6.3	RDAMR00450****
45.0	56.0	4.2	RDAML00450****
50.0	65.5	6.3	RDAMR00500****
50.0	61.0	4.2	RDAML00500****
55.0	70.5	6.3	RDAMR00550****
55.0	66.0	4.2	RDAML00550****
56.0	71.5	6.3	RDAMR00560****
56.0	67.0	4.2	RDAML00560****
56.0	77.0	8.1	RDAMH00560****
60.0	75.5	6.3	RDAMR00600****
60.0	71.0	4.2	RDAML00600****
60.0	81.0	8.1	RDAMH00600****
63.0	78.5	6.3	RDAMR00630****
63.0	74.0	4.2	RDAML00630****
63.0	84.0	8.1	RDAMH00630****
65.0	80.5	6.3	RDAMR00650****
65.0	76.0	4.2	RDAML00650****
65.0	86.0	8.1	RDAMH00650****
70.0	85.5	6.3	RDAMR00700****
70.0	81.0	4.2	RDAML00700****
70.0	91.0	8.1	RDAMH00700****
75.0	90.5	6.3	RDAMR00750****



PART NUMBER RANGE (METRIC)*

METRIC			PART NUMBER
$\varnothing d_1$	$\varnothing D_1$	L_1	
Tol. f8/h9	Tol. H9	Tol. +0.2	
75.0	96.0	8.1	RDAMH00750****
78.0	93.5	6.3	RDAMR00780****
78.0	99.0	8.1	RDAMH00780****
80.0	95.5	6.3	RDAMR00800****
80.0	101.0	8.1	RDAMH00800****
85.0	100.5	6.3	RDAMR00850****
85.0	106.0	8.1	RDAMH00850****
90.0	105.5	6.3	RDAMR00900****
90.0	111.0	8.1	RDAMH00900****
95.0	110.5	6.3	RDAMR00950****
95.0	116.0	8.1	RDAMH00950****
97.0	112.5	6.3	RDAMR00970****
97.0	118.0	8.1	RDAMH00970****
100.0	115.5	6.3	RDAMR01000****
100.0	121.0	8.1	RDAMH01000****
105.0	120.5	6.3	RDAMR01050****
105.0	126.0	8.1	RDAMH01050****
110.0	125.5	6.3	RDAMR01100****
110.0	131.0	8.1	RDAMH01100****
115.0	130.5	6.3	RDAMR01150****
115.0	136.0	8.1	RDAMH01150****
120.0	135.5	6.3	RDAMR01200****
120.0	141.0	8.1	RDAMH01200****
125.0	140.5	6.3	RDAMR01250****
125.0	146.0	8.1	RDAMH01250****
130.0	145.5	6.3	RDAMR01300****
130.0	151.0	8.1	RDAMH01300****
135.0	150.5	6.3	RDAMR01350****

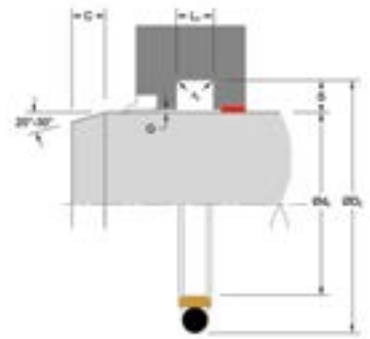
METRIC			PART NUMBER
$\varnothing d_1$	$\varnothing D_1$	L_1	
Tol. f8/h9	Tol. H9	Tol. +0.2	
135.0	156.0	8.1	RDAMH01350****
140.0	155.5	6.3	RDAMR01400****
140.0	161.0	8.1	RDAMH01400****
145.0	160.5	6.3	RDAMR01450****
145.0	166.0	8.1	RDAMH01450****
150.0	165.5	6.3	RDAMR01500****
150.0	171.0	8.1	RDAMH01500****
155.0	170.5	6.3	RDAMR01550****
155.0	176.0	8.1	RDAMH01550****
160.0	175.5	6.3	RDAMR01600****
160.0	181.0	8.1	RDAMH01600****
170.0	185.5	6.3	RDAMR01700****
170.0	191.0	8.1	RDAMH01700****
180.0	195.5	6.3	RDAMR01800****
180.0	201.0	8.1	RDAMH01800****
190.0	205.5	6.3	RDAMR01900****
190.0	211.0	8.1	RDAMH01900****
200.0	215.5	6.3	RDAML02000****
200.0	224.5	8.1	RDAMR02000****
210.0	231.0	8.1	RDAMR02100****
210.0	234.5	8.1	RDAMH02100****
220.0	241.0	8.1	RDAMR02200****
220.0	244.5	8.1	RDAMH02200****
225.0	246.0	8.1	RDAMR02250****
225.0	249.5	8.1	RDAMH02250****
240.0	261.0	8.1	RDAMR02400****
240.0	264.5	8.1	RDAMH02400****
250.0	271.0	8.1	RDAMR02500****



PART NUMBER RANGE (METRIC)*

METRIC			PART NUMBER
$\varnothing d_1$	$\varnothing D_1$	L_1	
Tol. f8/h9	Tol. H9	Tol. +0.2	
250.0	274.5	8.1	RDAMH02500****
260.0	284.5	8.1	RDAMR02600****
260.0	288.0	9.5	RDAMH02600****
270.0	294.5	8.1	RDAMR02700****
270.0	298.0	9.5	RDAMH02700****
280.0	304.5	8.1	RDAMR02800****
280.0	308.0	9.5	RDAMH02800****
290.0	314.5	8.1	RDAMR02900****
290.0	318.0	9.5	RDAMH02900****
300.0	324.5	8.1	RDAMR03000****
300.0	328.0	9.5	RDAMH03000****
320.0	344.5	8.1	RDAMR03200****
320.0	348.0	9.5	RDAMH03200****
330.0	354.5	8.1	RDAMR03300****
330.0	358.0	9.5	RDAMH03300****
340.0	364.5	8.1	RDAMR03400****
340.0	368.0	9.5	RDAMH03400****
350.0	374.5	8.1	RDAMR03500****
350.0	378.0	9.5	RDAMH03500****
360.0	384.5	8.1	RDAMR03600****
360.0	388.0	9.5	RDAMH03600****
370.0	394.5	8.1	RDAMR03700****
370.0	398.0	9.5	RDAMH03700****
380.0	404.5	8.1	RDAMR03800****
380.0	408.0	9.5	RDAMH03800****
390.0	414.5	8.1	RDAMR03900****
390.0	418.0	9.5	RDAMH03900****
400.0	424.5	8.1	RDAMR04000****

METRIC			PART NUMBER
$\varnothing d_1$	$\varnothing D_1$	L_1	
Tol. f8/h9	Tol. H9	Tol. +0.2	
400.0	428.0	9.5	RDAMH04000****
410.0	434.5	8.1	RDAMR04100****
410.0	438.0	9.5	RDAMH04100****
420.0	444.5	8.1	RDAMR04200****
420.0	448.0	9.5	RDAMH04200****
450.0	474.5	8.1	RDAMR04500****
450.0	478.0	9.5	RDAMH04500****
460.0	484.5	8.1	RDAMR04600****
460.0	488.0	9.5	RDAMH04600****
480.0	504.5	8.1	RDAMR04800****
480.0	508.0	9.5	RDAMH04800****
500.0	524.5	8.1	RDAMR05000****
500.0	528.0	9.5	RDAMH05000****
520.0	544.5	8.1	RDAMR05200****
520.0	548.0	9.5	RDAMH05200****
550.0	574.5	8.1	RDAMR05500****
550.0	578.0	9.5	RDAMH05500****
560.0	584.5	8.1	RDAMR05600****
560.0	588.0	9.5	RDAMH05600****
590.0	614.5	8.1	RDAMR05900****
590.0	618.0	9.5	RDAMH05900****
600.0	624.5	8.1	RDAMR06000****
600.0	628.0	9.5	RDAMH06000****
625.0	649.5	8.1	RDAMR06250****
625.0	653.0	9.5	RDAMH06250****
650.0	678.0	9.5	RDAMR06500****
700.0	728.0	9.5	RDAMR07000****
750.0	778.0	9.5	RDAMR07500****



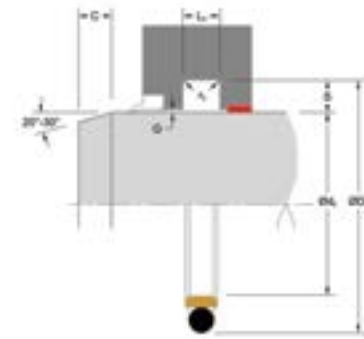
PART NUMBER RANGE (METRIC)*

METRIC			PART NUMBER
Ød ₁	ØD ₁	L ₁	
Tol. f8/h9	Tol. H9	Tol. +0.2	
800.0	828.0	9.5	RDAMR08000****
850.0	878.0	9.5	RDAMR08500****
900.0	928.0	9.5	RDAMR09000****
950.0	978.0	9.5	RDAMR09500****
1000.0	1038.0	13.8	RDAMR10000****
1050.0	1088.0	13.8	RDAMR10500****
1100.0	1138.0	13.8	RDAMR11000****
1150.0	1188.0	13.8	RDAMR11500****
1200.0	1238.0	13.8	RDAMR12000****
1250.0	1288.0	13.8	RDAMR12500****
1300.0	1338.0	13.8	RDAMR13000****
1350.0	1388.0	13.8	RDAMR13500****

*Please contact Hallite for custom sizes, material selection, or seal design.

PART NUMBER RANGE (INCH)*

INCH			PART NUMBER
Ød ₁	ØD ₁	L ₁	
Tol. f8/h9	Tol. H9	Tol. +0.008	
0.500	0.693	0.087	RDAER00500****
0.562	0.755	0.087	RDAER00562****
0.625	0.912	0.126	RDAER00625****
0.687	0.974	0.126	RDAER00687****
0.750	1.037	0.126	RDAER00750****
0.812	1.099	0.126	RDAER00812****
0.875	1.162	0.126	RDAER00875****
0.937	1.224	0.126	RDAER00937****
1.000	1.287	0.126	RDAER01000****
1.062	1.349	0.126	RDAER01062****
1.125	1.412	0.126	RDAER01125****
1.187	1.474	0.126	RDAER01187****
1.250	1.537	0.126	RDAER01250****
1.312	1.599	0.126	RDAER01312****
1.375	1.662	0.126	RDAER01375****
1.437	1.724	0.126	RDAER01437****
1.500	1.787	0.126	RDAER01500****
1.562	1.849	0.126	RDAER01562****
1.625	2.046	0.165	RDAER01625****
1.687	2.108	0.165	RDAER01687****
1.750	2.171	0.165	RDAER01750****
1.812	2.233	0.165	RDAER01812****
1.875	2.296	0.165	RDAER01875****
1.937	2.358	0.165	RDAER01937****
2.000	2.421	0.165	RDAER02000****
2.125	2.546	0.165	RDAER02125****
2.250	2.671	0.165	RDAER02250****
2.375	2.796	0.165	RDAER02375****

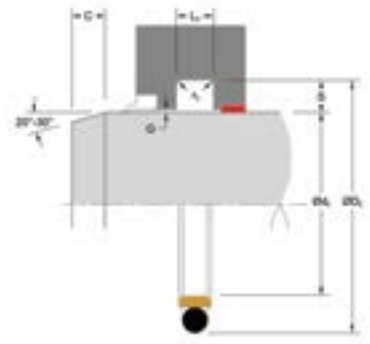


PART NUMBER RANGE (INCH)*

INCH			PART NUMBER
Ød ₁	ØD ₁	L ₁	
Tol. f8/h9	Tol. H9	Tol. +0.008	
2.500	2.921	0.165	RDAER02500****
2.625	3.046	0.165	RDAER02625****
2.750	3.171	0.165	RDAER02750****
2.875	3.296	0.165	RDAER02875****
3.000	3.421	0.165	RDAER03000****
3.125	3.546	0.165	RDAER03125****
3.250	3.844	0.248	RDAER03250****
3.375	3.969	0.248	RDAER03375****
3.500	4.094	0.248	RDAER03500****
3.625	4.219	0.248	RDAER03625****
3.750	4.344	0.248	RDAER03750****
3.875	4.469	0.248	RDAER03875****
4.000	4.594	0.248	RDAER04000****
4.125	4.719	0.248	RDAER04125****
4.250	4.844	0.248	RDAER04250****
4.375	4.969	0.248	RDAER04375****
4.500	5.094	0.248	RDAER04500****
4.625	5.219	0.248	RDAER04625****
4.750	5.344	0.248	RDAER04750****
4.875	5.469	0.248	RDAER04875****
5.000	5.594	0.248	RDAER05000****
5.125	5.719	0.248	RDAER05125****
5.250	5.844	0.248	RDAER05250****
5.375	6.182	0.319	RDAER05375****
5.500	6.307	0.319	RDAER05500****
5.625	6.432	0.319	RDAER05625****
5.750	6.557	0.319	RDAER05750****
6.000	6.807	0.319	RDAER06000****

INCH			PART NUMBER
Ød ₁	ØD ₁	L ₁	
Tol. f8/h9	Tol. H9	Tol. +0.008	
6.250	7.057	0.319	RDAER06250****
6.500	7.307	0.319	RDAER06500****
6.750	7.557	0.319	RDAER06750****
7.000	7.807	0.319	RDAER07000****
7.250	8.057	0.319	RDAER07250****
7.500	8.307	0.319	RDAER07500****
7.750	8.557	0.319	RDAER07750****
8.000	8.807	0.319	RDAER08000****
8.250	9.057	0.319	RDAER08250****
8.500	9.307	0.319	RDAER08500****
8.750	9.557	0.319	RDAER08750****
9.000	9.807	0.319	RDAER09000****
9.250	10.057	0.319	RDAER09250****
9.500	10.307	0.319	RDAER09500****
9.750	10.557	0.319	RDAER09750****
10.000	10.807	0.319	RDAER10000****
10.500	11.307	0.319	RDAER10500****
11.000	11.807	0.319	RDAER11000****
11.500	12.307	0.319	RDAER11500****
12.000	12.945	0.319	RDAEH12000****
12.500	13.445	0.319	RDAEH12500****
13.000	13.945	0.319	RDAER13000****
13.500	14.445	0.319	RDAER13500****
14.000	14.945	0.319	RDAER14000****
14.500	15.445	0.319	RDAER14500****
15.000	15.945	0.319	RDAER15000****
15.500	16.445	0.319	RDAER15500****
16.000	16.945	0.319	RDAER16000****





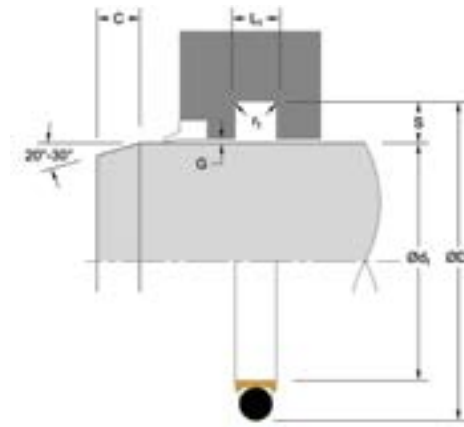
PART NUMBER RANGE (INCH)*

INCH			PART NUMBER
Ød ₁	ØD ₁	L ₁	
Tol. f8/h9	Tol. H9	Tol. +0.008	
16.500	17.445	0.319	RDAER16500****
17.000	17.945	0.319	RDAER17000****
17.500	18.445	0.319	RDAER17500****
18.000	18.945	0.319	RDAER18000****
18.500	19.445	0.319	RDAER18500****
19.000	19.945	0.319	RDAER19000****
19.500	20.445	0.319	RDAER19500****
20.000	20.945	0.319	RDAER20000****

*Please contact Hallite for custom sizes, material selection, or seal design.

RDS

ROD SEAL
Double-Acting



TECHNICAL DETAILS

The Hallite RDS is a double-acting low-friction rod seal solution for compact O-ring grooves, that extends the service range above what an O-ring alone is capable of supporting. The RDS is designed for light-duty applications, is particularly suited for small-diameter installations, and due to its size and design, is easy to install. High-performance Armorlene® materials, like HLX, provide outstanding wear and extrusion-resistance properties as well as large range of temperature and media compatibility.

Hallite's RDS is designed to be used in existing dynamic O-ring grooves and does not require any groove modification. A good choice for pneumatic and hydraulic equipment sealing needs, the RDS is proven to extend the service range and seal longevity over stand-alone O-ring installations.

This seal is available in a variety of Hallite's high-performance Armorlene® materials to suit a wide range of demanding applications.



F E A T U R E S

- Compact design to save metal spacing
- Low breakout friction and elimination of stick-slip action
- Effective in pneumatic cylinder and light-duty hydraulic cylinder
- Can be used in standard AS-568 dynamic O-ring groove
- Fits groove dimensions per MIL-G-5514F
- Recommended for light-duty and smaller-diameter applications

Part Number Structure

RDSMR00700NHLX _

RDS	M	R	00700	N	HLX	_
PROFILE DESIGNATION	UNIT OF MEASUREMENT M = Metric E = Inch	APPLICATION Refer to <i>Installation Recommendations</i> and use designator for desired application	ROD DIAMETER Metric = mm X 10 Inch = inches X 1000	ENERGIZER MATERIAL Refer to <i>Energizer Table</i> for desired energizer material	PTFE MATERIAL Refer to <i>Material Table</i> for desired PTFE (face) material	SPECIAL FEATURE Blank = Std profile N = Notches

OPERATING CONDITIONS

	METRIC	INCH
Maximum Speed	Up to 15.0m/sec	Up to 50.0ft/sec
Temperature Range*	-45 to 200°C	-49 to 392°F
Maximum Dynamic Pressure	350 bar	5000 psi

*Dependent upon energizer used (NBR, FKM, etc.).

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 FINISH RECOMMENDATIONS

SURFACE ROUGHNESS	METRIC			INCH			Rmr*
	µmRa	µmRz	µmRt	µinRa	µinRz	µinRt	
Dynamic Sealing Face Ød ₁	0.05 - 0.2	1.6 max	2 max	2 - 8	63 max	157 max	60% - 90%
Static Sealing Face 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	

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

ENERGIZER TABLE

ENERGIZER MATERIAL (SHORE A)	ENERGIZER TYPE	ENERGIZER DESIGNATION	ENERGIZER OPERATING TEMPERATURE°C	ENERGIZER OPERATING TEMPERATURE°F
NBR - 70A	O-ring	N	-30 to 100°C	-22 to 212°F
NBR - 70A Low temp.	O-ring	L	-45 to 80°C	-49 to 176°F
FKM - 75A	O-ring	F	-10 to 200°C	14 to 392°F
EPDM - 70A	O-ring	E	-45 to 145°C	-49 to 293°F
HNBR - 70A	O-ring	H	-25 to 150°C	-13 to 302°F
NBR - 90A	O-ring	Q	-30 to 100°C	-22 to 212°F
HNBR - 90A	O-ring	U	-25 to 150°C	-13 to 302°F
No Energizer*	None	X	-	-

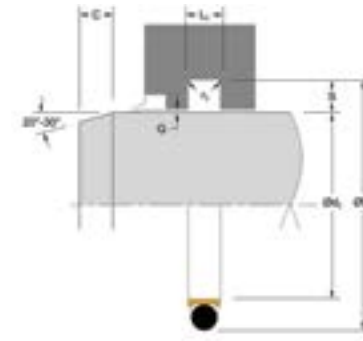
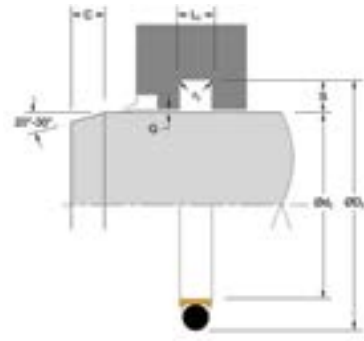
*Seal ratings are based upon capabilities of its matched material components. Hallite cannot rate seal performance when the seal is mixed with other manufacturers' energizers/components.

MATERIALS

MATERIAL FEATURES AND APPLICATIONS	FILLER	MATERIAL DESIGNATOR	COLOR	TEMPERATURE RANGE°C	TEMPERATURE RANGE°F	MAXIMUM DYNAMIC PRESSURE - BAR	MAXIMUM DYNAMIC PRESSURE - PSI
ARMORLENE® HLX <ul style="list-style-type: none"> Standard material for hydraulic applications High compressive strength Excellent extrusion resistance Extended wear resistance 	Special Bronze Compound	HLX	Gold	-73 to 288°C	-100 to 550°F	350 bar	5000 psi
ARMORLENE® 711 <ul style="list-style-type: none"> Excellent in all lubricating fluids and pneumatic applications High chemical resistance Excellent extrusion resistance Excellent wear properties 	25% Carbon/Graphite	711	Black	-73 to 288°C	-100 to 550°F	350 bar	5000 psi
ARMORLENE® 700 <ul style="list-style-type: none"> Excellent in all hydraulic fluids Recommended for use with soft mating surfaces Low friction and no stick-slip 	Unfilled	700	White	-184 to 204°C	-300 to 400°F	200 bar	2900 psi

For other material options consult the Master Materials Index at the front of the catalog. If you do not find the material that you require, please contact your local Hallite sales office.





INSTALLATION RECOMMENDATIONS

METRIC											
ROD DIAMETER Ød ₁ f8/h9			GROOVE DIAMETER	GROOVE WIDTH	RADIUS	CHAMFER	GROOVE SECTION	RADIAL CLEARANCE G MAX*			O-RING CROSS SECTION
DIAMETER RANGE			ØD ₁ H9	L ₁ + 0.2	r ₁	C	S	Up to 100 bar	Up to 200 bar	Up to 350 bar	O-ring
Standard Duty Application - R	Light Duty Application - L										
4.0 - 9.9	10.0 - 19.9		d ₁ + 2.9	2.4	0.4	2.0	1.45	0.10	0.08	0.05	1.78
10.0 - 19.9	20.0 - 39.9		d ₁ + 4.5	3.6	0.4	3.0	2.25	0.15	0.10	0.07	2.62
20.0 - 39.9	40.0 - 119.9		d ₁ + 6.2	4.8	0.6	4.0	3.10	0.20	0.15	0.08	3.53
40.0 - 119.9	120.0 - 649.9		d ₁ + 9.4	7.1	0.8	6.0	4.70	0.25	0.20	0.10	5.33
120.0 - 649.9	650.0 - 999.9		d ₁ + 12.2	9.5	0.8	8.0	6.10	0.30	0.25	0.15	6.99
650.0 - 999.9	-		d ₁ + 15.0	10.0	1.0	1.0	7.50	0.40	0.30	0.20	8.40

*Radial Clearance G max. = maximum permissible gap all on one side using min. rod diameter and max. clearance diameter.

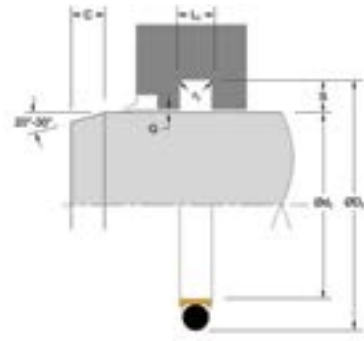
INCH											
ROD DIAMETER Ød ₁ f8/h9			GROOVE DIAMETER	GROOVE WIDTH	RADIUS	CHAMFER	GROOVE SECTION	RADIAL CLEARANCE G MAX*			O-RING CROSS SECTION
DIAMETER RANGE			ØD ₁ H9	L ₁ + .008	r ₁	C	S	Up to 1500 PSI	Up to 2900 PSI	Up to 5000 PSI	O-ring
Standard Duty Application - R	Light Duty Application - L	Heavy Duty Application - H									
0.125 - 0.499	0.500 - 0.874	-	d ₁ + 0.110	0.093	0.005	0.079	0.055	0.004	0.003	0.002	0.070
0.500 - 0.874	0.875 - 1.624	0.125 - 0.499	d ₁ + 0.176	0.140	0.005	0.118	0.088	0.006	0.004	0.003	0.103
0.875 - 1.624	1.625 - 4.499	0.500 - 0.874	d ₁ + 0.242	0.187	0.010	0.157	0.121	0.008	0.006	0.003	0.139
1.625 - 4.499	4.500 - 16.000	0.875 - 1.624	d ₁ + 0.370	0.281	0.020	0.236	0.185	0.010	0.008	0.004	0.210
4.500 - 16.000	-	-	d ₁ + 0.474	0.375	0.020	0.315	0.237	0.012	0.010	0.006	0.275

*Radial Clearance G max. = maximum permissible gap all on one side using min. rod diameter and max. clearance diameter.

PART NUMBER RANGE (METRIC)*

METRIC			
Ød ₁	ØD ₁	L ₁	PART NUMBER
Tol. f8/h9	Tol. H9	Tol. +0.2	
4.0	6.9	2.4	RDSMR00040****
5.0	7.9	2.4	RDSMR00050****
6.0	8.9	2.4	RDSMR00060****
8.0	10.9	2.4	RDSMR00080****
10.0	14.5	3.6	RDSMR00100****
12.0	16.5	3.6	RDSMR00120****
14.0	18.5	3.6	RDSMR00140****
15.0	19.5	3.6	RDSMR00150****
16.0	20.5	3.6	RDSMR00160****
18.0	22.5	3.6	RDSMR00180****
20.0	26.2	4.8	RDSMR00200****
22.0	28.2	4.8	RDSMR00220****
25.0	31.2	4.8	RDSMR00250****
28.0	34.2	4.8	RDSMR00280****
30.0	36.2	4.8	RDSMR00300****
32.0	38.2	4.8	RDSMR00320****
35.0	41.2	4.8	RDSMR00350****
36.0	42.2	4.8	RDSMR00360****
40.0	49.4	7.1	RDSMR00400****
42.0	51.4	7.1	RDSMR00420****
45.0	54.4	7.1	RDSMR00450****
48.0	57.4	7.1	RDSMR00480****
50.0	59.4	7.1	RDSMR00500****
52.0	61.4	7.1	RDSMR00520****
55.0	64.4	7.1	RDSMR00550****
56.0	65.4	7.1	RDSMR00560****
60.0	69.4	7.1	RDSMR00600****
63.0	72.4	7.1	RDSMR00630****

METRIC			
Ød ₁	ØD ₁	L ₁	PART NUMBER
Tol. f8/h9	Tol. H9	Tol. +0.2	
65.0	74.4	7.1	RDSMR00650****
70.0	79.4	7.1	RDSMR00700****
80.0	89.4	7.1	RDSMR00800****
85.0	94.4	7.1	RDSMR00850****
90.0	99.4	7.1	RDSMR00900****
95.0	104.4	7.1	RDSMR00950****
100.0	109.4	7.1	RDSMR01000****
105.0	114.4	7.1	RDSMR01050****
110.0	119.4	7.1	RDSMR01100****
115.0	124.4	7.1	RDSMR01150****
120.0	132.2	9.5	RDSMR01200****
125.0	137.2	9.5	RDSMR01250****
130.0	142.2	9.5	RDSMR01300****
135.0	147.2	9.5	RDSMR01350****
140.0	152.2	9.5	RDSMR01400****
150.0	162.2	9.5	RDSMR01500****
160.0	172.2	9.5	RDSMR01600****
170.0	182.2	9.5	RDSMR01700****
180.0	192.2	9.5	RDSMR01800****
190.0	202.2	9.5	RDSMR01900****
200.0	212.2	9.5	RDSMR02000****
210.0	222.2	9.5	RDSMR02100****
220.0	232.2	9.5	RDSMR02200****
230.0	242.2	9.5	RDSMR02300****
240.0	252.2	9.5	RDSMR02400****
250.0	262.2	9.5	RDSMR02500****
280.0	292.2	9.5	RDSMR02800****
300.0	312.2	9.5	RDSMR03000****



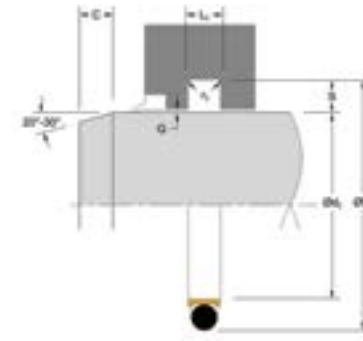
PART NUMBER RANGE (METRIC)*

METRIC			PART NUMBER
ϕd_1	ϕD_1	L_1	
Tol. f8/h9	Tol. H9	Tol. +0.2	
320.0	332.2	9.5	RDSMR03200****
350.0	362.2	9.5	RDSMR03500****
360.0	372.2	9.5	RDSMR03600****
400.0	412.2	9.5	RDSMR04000****
500.0	512.2	9.5	RDSMR05000****
600.0	612.2	9.5	RDSMR06000****
650.0	665.0	10.0	RDSMR06500****
700.0	715.0	10.0	RDSMR07000****
800.0	815.0	10.0	RDSMR08000****
900.0	915.0	10.0	RDSMR09000****
950.0	965.0	10.0	RDSMR09500****

*Please contact Hallite for custom sizes, material selection, or seal design.

PART NUMBER RANGE (INCH)*

INCH			PART NUMBER
ϕd_1	ϕD_1	L_1	
Tol. f8/h9	Tol. H9	Tol. +0.008	
0.500	0.610	0.093	RDSEL00500****
0.562	0.672	0.093	RDSEL00562****
0.625	0.735	0.093	RDSEL00625****
0.687	0.797	0.093	RDSEL00687****
0.750	0.860	0.093	RDSEL00750****
0.812	0.922	0.093	RDSEL00812****
0.875	1.051	0.140	RDSEL00875****
0.937	1.113	0.140	RDSEL00937****
1.000	1.176	0.140	RDSEL01000****
1.062	1.238	0.140	RDSEL01062****
1.125	1.301	0.140	RDSEL01125****
1.187	1.363	0.140	RDSEL01187****
1.250	1.426	0.140	RDSEL01250****
1.312	1.488	0.140	RDSEL01312****
1.375	1.551	0.140	RDSEL01375****
1.437	1.613	0.140	RDSEL01437****
1.500	1.676	0.140	RDSEL01500****
1.562	1.738	0.140	RDSEL01562****
1.625	1.867	0.187	RDSEL01625****
1.687	1.929	0.187	RDSEL01687****
1.750	1.992	0.187	RDSEL01750****
1.812	2.054	0.187	RDSEL01812****
1.875	2.117	0.187	RDSEL01875****
1.937	2.179	0.187	RDSEL01937****
2.000	2.242	0.187	RDSEL02000****
2.062	2.304	0.187	RDSEL02062****
2.125	2.367	0.187	RDSEL02125****
2.187	2.429	0.187	RDSEL02187****

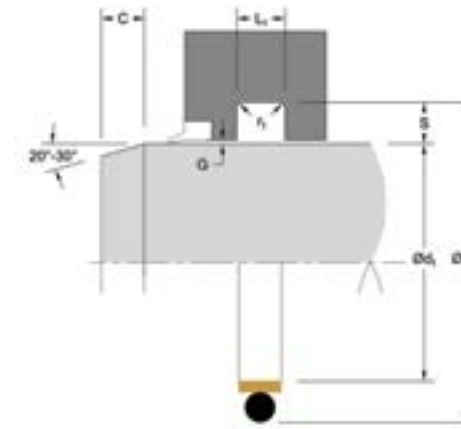


PART NUMBER RANGE (INCH)*

INCH			PART NUMBER
ϕd_1	ϕD_1	L_1	
Tol. f8/h9	Tol. H9	Tol. +0.008	
2.250	2.492	0.187	RDSEL02250****
2.312	2.554	0.187	RDSEL02312****
2.375	2.617	0.187	RDSEL02375****
2.437	2.679	0.187	RDSEL02437****
2.500	2.742	0.187	RDSEL02500****
2.625	2.867	0.187	RDSEL02625****
2.750	2.992	0.187	RDSEL02750****
2.875	3.117	0.187	RDSEL02875****
3.000	3.242	0.187	RDSEL03000****
3.125	3.367	0.187	RDSEL03125****
3.250	3.492	0.187	RDSEL03250****
3.375	3.617	0.187	RDSEL03375****
3.500	3.742	0.187	RDSEL03500****
3.625	3.867	0.187	RDSEL03625****
3.750	3.992	0.187	RDSEL03750****
3.875	4.117	0.187	RDSEL03875****
4.000	4.242	0.187	RDSEL04000****
4.125	4.367	0.187	RDSEL04125****
4.250	4.492	0.187	RDSEL04250****
4.375	4.617	0.187	RDSEL04375****
4.500	4.870	0.281	RDSEL04500****
4.625	4.995	0.281	RDSEL04625****
4.750	5.120	0.281	RDSEL04750****
4.875	5.245	0.281	RDSEL04875****
5.000	5.474	0.375	RDSE05000****
5.125	5.599	0.375	RDSE05125****
5.250	5.724	0.375	RDSE05250****
5.375	5.849	0.375	RDSE05375****

*Please contact Hallite for custom sizes, material selection, or seal design.





RCG

ROD SEAL
Double-Acting

TECHNICAL DETAILS

The Hallite RCG is a double-acting, O-ring energized, low-friction rod seal designed for low- and medium-pressure systems. High-performance Armorlene® materials, like HLX, provide outstanding wear and extrusion-resistance properties as well as large range of temperature and media compatibility.

The compact design of the RCG provides an ideal sealing solution where housing space is limited. This seal is available in a variety of Hallite's high-performance Armorlene® materials to suit a wide range of demanding applications.



FEATURES

- Low breakout friction and elimination of stick-slip action
- Compact design to save metal spacing
- High service temperature, long wear, and high extrusion resistance

Part Number Structure

RCGMR00400NHLX _

RCG	M	R	00400	N	HLX	_
PROFILE DESIGNATION	UNIT OF MEASUREMENT M = Metric E = Inch	APPLICATION Refer to <i>Installation Recommendations</i> and use designator for desired application	ROD DIAMETER Metric = mm X 10 Inch = inches X 1000	ENERGIZER MATERIAL Refer to <i>Energizer Table</i> for desired energizer material	PTFE MATERIAL Refer to <i>Material Table</i> for desired PTFE (face) material	SPECIAL FEATURE Blank = Std profile N = Notches

OPERATING CONDITIONS

	METRIC	INCH
Maximum Speed	Up to 15.0m/sec	Up to 50.0ft/sec
Temperature Range*	-45 to 200°C	-49 to 392°F
Maximum Dynamic Pressure	200 bar	2900 psi

*Dependent upon energizer used (NBR, FKM, etc.).

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 FINISH RECOMMENDATIONS

SURFACE ROUGHNESS	METRIC			INCH			Rmr*
	µmRa	µmRz	µmRt	µinRa	µinRz	µinRt	
Dynamic Sealing Face Ød ₁	0.05 - 0.2	1.6 max	2 max	2 - 8	63 max	157 max	60% - 90%
Static Sealing Face 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	

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

ENERGIZER TABLE

ENERGIZER MATERIAL (SHORE A)	ENERGIZER TYPE	ENERGIZER DESIGNATION	ENERGIZER OPERATING TEMPERATURE°C	ENERGIZER OPERATING TEMPERATURE°F
NBR - 70A	O-ring	N	-30 to 100°C	-22 to 212°F
NBR - 70A Low temp.	O-ring	L	-45 to 80°C	-49 to 176°F
FKM - 75A	O-ring	F	-10 to 200°C	14 to 392°F
EPDM - 70A	O-ring	E	-45 to 145°C	-49 to 293°F
HNBR - 70A	O-ring	H	-25 to 150°C	-13 to 302°F
NBR - 90A	O-ring	Q	-30 to 100°C	-22 to 212°F
HNBR - 90A	O-ring	U	-25 to 150°C	-13 to 302°F
No Energizer*	None	X	-	-

*Seal ratings are based upon capabilities of its matched material components. Hallite cannot rate seal performance when the seal is mixed with other manufacturers' energizers/components.

MATERIALS

MATERIAL FEATURES AND APPLICATIONS	FILLER	MATERIAL DESIGNATOR	COLOR	TEMPERATURE RANGE°C	TEMPERATURE RANGE°F	MAXIMUM DYNAMIC PRESSURE - BAR	MAXIMUM DYNAMIC PRESSURE - PSI
ARMORLENE® HLX <ul style="list-style-type: none"> Standard material for hydraulic applications High compressive strength Excellent extrusion resistance Extended wear resistance 	Special Bronze Compound	HLX	Gold	-73 to 288°C	-100 to 550°F	200 bar	2900 psi
ARMORLENE® HCF <ul style="list-style-type: none"> Excellent in lubricating and non-lubricating hydraulic fluids (includes water) w/o zinc content Not recommended for gas sealing applications Not recommended for electrical conductive fluids 	Carbon Fiber Filled	HCF	Gray/Black	-73 to 260°C	-100 to 500°F	200 bar	2900 psi
ARMORLENE® 700 <ul style="list-style-type: none"> Excellent in all hydraulic fluids Recommended for hard mating surfaces only Low friction and no stick-slip 	Unfilled	700	White	-184 to 204°C	-300 to 400°F	200 bar	2900 psi
ARMORLENE® 711 <ul style="list-style-type: none"> Excellent in all lubricating fluids and pneumatic applications High chemical resistance Excellent extrusion resistance Excellent wear properties 	25% Carbon/Graphite	711	Black	-73 to 288°C	-100 to 550°F	200 bar	2900 psi
748 - UHMWPE <ul style="list-style-type: none"> Excellent impact resistance Good dielectrical properties Excellent abrasion resistance Low coefficient of friction 	Standard	748	Translucent	-184 to 82°C	-300 to 180°F	200 bar	2900 psi

For other material options consult the Master Materials Index at the front of the catalog. If you do not find the material that you require, please contact your local Hallite sales office.

INSTALLATION RECOMMENDATIONS

METRIC						
ROD DIAMETER $\varnothing d_1$, f8/h9	GROOVE DIAMETER	GROOVE WIDTH	RADIUS	GROOVE SECTION	RADIAL CLEARANCE G MAX*	O-RING CROSS SECTION
DIAMETER RANGE	$\varnothing D_1$, H9	$L_1 + 0.2$	r_1	S	Up to 200 bar	O-ring
Standard Duty Application - R						
4.0 - 7.9	$d_1 + 4.0$	2.00	0.5	2.00	0.05	1.78
8.0 - 18.9	$d_1 + 6.0$	2.85	0.5	3.00	0.08	2.62
19.0 - 37.9	$d_1 + 7.5$	3.80	0.5	3.75	0.08	3.53
38.0 - 119.9	$d_1 + 12.5$	5.60	0.9	6.25	0.10	5.33
120.0 - 164.9	$d_1 + 15.0$	7.55	0.9	7.50	0.10	6.99
165.0 - 219.9	$d_1 + 18.0$	7.55	0.9	9.00	0.10	6.99
220.0 - 400.0	$d_1 + 24.0$	7.55	0.9	12.00	0.10	6.99

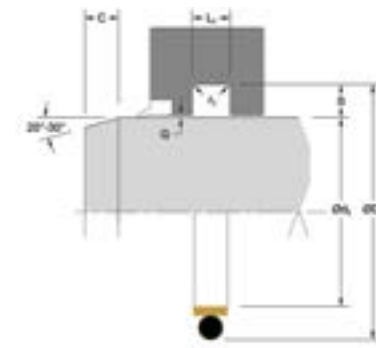
*Radial Clearance G max. = maximum permissible gap all on one side using min. rod diameter and max. clearance diameter.

METRIC						
ROD DIAMETER $\varnothing D_1$, F7/H8	GROOVE DIAMETER	GROOVE WIDTH	RADIUS	GROOVE SECTION	RADIAL CLEARANCE G MAX*	O-RING CROSS SECTION
DIAMETER RANGE	$\varnothing D_1$, H9	$L_1 + 0.2$	r_1	S	Up to 200 bar	O-ring
Standard Duty Application - S						
10.0 - 22.0	$d_1 + 6.2$	3.20	0.5	3.1	0.08	2.40
22.1 - 56.0	$d_1 + 7.2$	4.00	0.5	3.6	0.08	3.00
56.1 - 100.0	$d_1 + 12.2$	7.50	0.9	6.1	0.10	5.70

*Radial Clearance G max. = maximum permissible gap all on one side using min. rod diameter and max. clearance diameter.

INCH						
ROD DIAMETER $\varnothing d_1$, f8/h9	GROOVE DIAMETER	GROOVE WIDTH	RADIUS	RADIAL CLEARANCE G MAX*	O-RING CROSS SECTION	
DIAMETER RANGE	$\varnothing D_1$, H9	$L_1 + 0.008$	r_1	Up to 2900 psi	O-ring	
Standard Duty Application - R	Light Duty Application - L					
0.250 - 0.999	1.000 - 2.499	$d_1 + 0.172$	0.079	0.020	0.002	0.070
1.000 - 2.499	2.500 - 3.499	$d_1 + 0.236$	0.112	0.020	0.003	0.103
2.500 - 3.499	3.500 - 4.499	$d_1 + 0.363$	0.149	0.030	0.003	0.139
3.500 - 4.499	4.500 - 5.999	$d_1 + 0.491$	0.221	0.050	0.004	0.210
4.500 - 5.999	-	$d_1 + 0.593$	0.297	0.060	0.004	0.275
6.000 - 7.999	-	$d_1 + 0.718$	0.297	0.060	0.004	0.275
8.000 - 15.000	-	$d_1 + 0.968$	0.297	0.060	0.004	0.275

*Radial Clearance G max. = maximum permissible gap all on one side using min. rod diameter and max. clearance diameter.

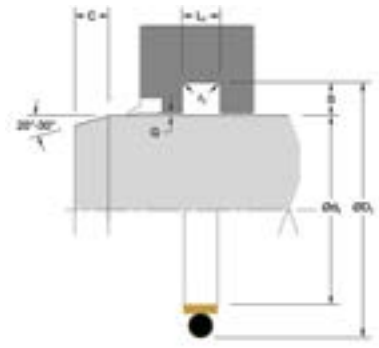


PART NUMBER RANGE (METRIC)*

METRIC			
$\varnothing d_1$	$\varnothing D_1$	L_1	PART NUMBER
Tol. f8/h9	Tol. H9	Tol. +0.2	
7.0	11.0	2.00	RCGMR00070****
9.0	15.0	2.85	RCGMR00090****
10.0	16.0	2.85	RCGMR00100****
10.0	16.2	3.20	RCGMS00100****
12.0	18.0	2.85	RCGMR00120****
12.0	18.2	3.20	RCGMS00120****
14.0	20.0	2.85	RCGMR00140****
14.0	20.2	3.20	RCGMS00140****
15.0	21.2	3.20	RCGMS00150****
16.0	22.0	2.85	RCGMR00160****
16.0	22.2	3.20	RCGMS00160****
18.0	24.0	2.85	RCGMR00180****
18.0	24.2	3.20	RCGMS00180****
20.0	26.2	3.20	RCGMS00200****
20.0	27.5	3.80	RCGMR00200****
22.0	28.2	3.20	RCGMS00220****
22.0	29.5	3.80	RCGMR00220****
25.0	32.5	3.80	RCGMR00250****
25.0	32.2	4.00	RCGMS00250****
28.0	35.5	3.80	RCGMR00280****
28.0	35.2	4.00	RCGMS00280****
30.0	37.5	3.80	RCGMR00300****
30.0	37.2	4.00	RCGMS00300****
32.0	39.5	3.80	RCGMR00320****
32.0	39.2	4.00	RCGMS00320****
35.0	42.5	3.80	RCGMR00350****
35.0	42.2	4.00	RCGMS00350****
36.0	43.5	3.80	RCGMR00360****

METRIC			
$\varnothing d_1$	$\varnothing D_1$	L_1	PART NUMBER
Tol. f8/h9	Tol. H9	Tol. +0.2	
36.0	43.2	4.00	RCGMS00360****
38.0	45.2	4.00	RCGMS00380****
40.0	47.2	4.00	RCGMS00400****
40.0	52.5	5.60	RCGMR00400****
42.0	49.2	4.00	RCGMS00420****
42.0	54.5	5.60	RCGMR00420****
45.0	52.2	4.00	RCGMS00450****
45.0	57.5	5.60	RCGMR00450****
48.0	55.2	4.00	RCGMS00480****
50.0	57.2	4.00	RCGMS00500****
50.0	62.5	5.60	RCGMR00500****
52.0	59.2	4.00	RCGMS00520****
55.0	62.2	4.00	RCGMS00550****
55.0	67.5	5.60	RCGMR00550****
56.0	63.2	4.00	RCGMS00560****
60.0	72.2	7.50	RCGMS00600****
60.0	72.5	5.60	RCGMR00600****
63.0	75.2	7.50	RCGMS00630****
63.0	75.5	5.60	RCGMR00630****
65.0	77.2	7.50	RCGMS00650****
65.0	77.5	5.60	RCGMR00650****
70.0	82.2	7.50	RCGMS00700****
70.0	82.5	5.60	RCGMR00700****
75.0	87.2	7.50	RCGMS00750****
75.0	87.5	5.60	RCGMR00750****
80	92.2	7.50	RCGMS00800****
80	92.5	5.60	RCGMR00800****
85	97.2	7.50	RCGMS00850****





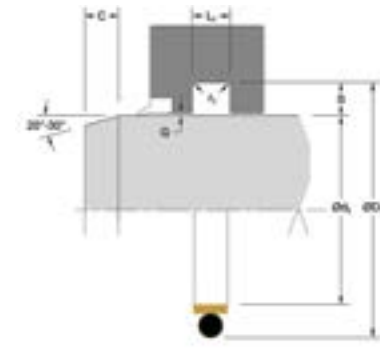
PART NUMBER RANGE (METRIC)*

METRIC			PART NUMBER
Ød ₁	ØD ₁	L ₁	
Tol. f8/h9	Tol. H9	Tol. +0.2	
85.0	97.5	5.60	RCGMR00850****
90.0	102.2	7.50	RCGMS00900****
90.0	102.5	5.60	RCGMR00900****
92.0	104.5	5.60	RCGMR00920****
95.0	107.2	7.50	RCGMS00950****
100.0	112.2	7.50	RCGMS01000****
100.0	112.5	5.60	RCGMR01000****
105.0	117.5	5.60	RCGMR01050****
110.0	122.5	5.60	RCGMR01100****
115.0	127.5	5.60	RCGMR01150****
120.0	135.0	7.55	RCGMR01200****
125.0	140.0	7.55	RCGMR01250****
130.0	145.0	7.55	RCGMR01300****
140.0	155.0	7.55	RCGMR01400****
150.0	165.0	7.55	RCGMR01500****
160.0	175.0	7.55	RCGMR01600****
200.0	218.0	7.55	RCGMR02000****

*Please contact Hallite for custom sizes, material selection, or seal design.

PART NUMBER RANGE (INCH)*

INCH			PART NUMBER
Ød ₁	ØD ₁	L ₁	
Tol. f8/h9	Tol. H9	Tol. +0.008	
0.250	0.422	0.079	RCGER00250****
0.312	0.484	0.079	RCGER00312****
0.375	0.547	0.079	RCGER00375****
0.437	0.609	0.079	RCGER00437****
0.500	0.672	0.079	RCGER00500****
0.562	0.734	0.079	RCGER00562****
0.625	0.797	0.079	RCGER00625****
0.687	0.859	0.079	RCGER00687****
0.750	0.922	0.079	RCGER00750****
0.812	0.984	0.079	RCGER00812****
0.875	1.047	0.079	RCGER00875****
0.937	1.109	0.079	RCGER00937****
1.000	1.236	0.112	RCGER01000****
1.062	1.298	0.112	RCGER01062****
1.125	1.361	0.112	RCGER01125****
1.187	1.423	0.112	RCGER01187****
1.250	1.486	0.112	RCGER01250****
1.312	1.548	0.112	RCGER01312****
1.375	1.611	0.112	RCGER01375****
1.437	1.673	0.112	RCGER01437****
1.500	1.736	0.112	RCGER01500****
1.562	1.798	0.112	RCGER01562****
1.625	1.861	0.112	RCGER01625****
1.687	1.923	0.112	RCGER01687****
1.750	1.986	0.112	RCGER01750****
1.812	2.048	0.112	RCGER01812****
1.875	2.111	0.112	RCGER01875****
1.937	2.173	0.112	RCGER01937****



PART NUMBER RANGE (INCH)*

INCH			PART NUMBER
Ød ₁	ØD ₁	L ₁	
Tol. f8/h9	Tol. H9	Tol. +0.008	
2.000	2.236	0.112	RCGER02000****
2.062	2.298	0.112	RCGER02062****
2.125	2.361	0.112	RCGER02125****
2.187	2.423	0.112	RCGER02187****
2.250	2.486	0.112	RCGER02250****
2.312	2.548	0.112	RCGER02312****
2.375	2.611	0.112	RCGER02375****
2.437	2.673	0.112	RCGER02437****
2.500	2.736	0.112	RCGER02500****
2.625	2.988	0.149	RCGER02625****
2.750	3.113	0.149	RCGER02750****
2.875	3.238	0.149	RCGER02875****
3.000	3.363	0.149	RCGER03000****
3.125	3.488	0.149	RCGER03125****
3.250	3.613	0.149	RCGER03250****
3.375	3.738	0.149	RCGER03375****
3.500	3.991	0.221	RCGER03500****
3.625	4.116	0.221	RCGER03625****
3.750	4.241	0.221	RCGER03750****
3.875	4.366	0.221	RCGER03875****
4.000	4.491	0.221	RCGER04000****
4.125	4.616	0.221	RCGER04125****
4.250	4.741	0.221	RCGER04250****
4.375	4.866	0.221	RCGER04375****
4.500	5.093	0.297	RCGER04500****
4.625	5.218	0.297	RCGER04625****
4.750	5.343	0.297	RCGER04750****
4.875	5.468	0.297	RCGER04875****

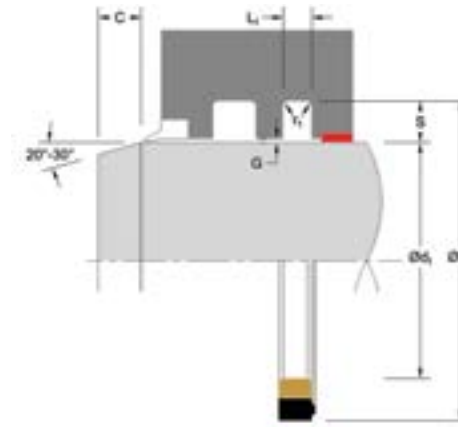
INCH			PART NUMBER
Ød ₁	ØD ₁	L ₁	
Tol. f8/h9	Tol. H9	Tol. +0.008	
5.000	5.593	0.297	RCGER05000****
5.125	5.718	0.297	RCGER05125****
5.250	5.843	0.297	RCGER05250****
5.375	5.968	0.297	RCGER05375****
5.500	6.093	0.297	RCGER05500****
5.625	6.218	0.297	RCGER05625****
5.750	6.343	0.297	RCGER05750****
5.875	6.468	0.297	RCGER05875****
6.000	6.718	0.297	RCGER06000****
6.250	6.968	0.297	RCGER06250****
6.500	7.218	0.297	RCGER06500****
6.750	7.468	0.297	RCGER06750****
7.000	7.718	0.297	RCGER07000****
7.250	7.968	0.297	RCGER07250****
7.500	8.218	0.297	RCGER07500****
7.750	8.468	0.297	RCGER07750****
8.000	8.968	0.297	RCGER08000****
8.500	9.468	0.297	RCGER08500****
9.000	9.968	0.297	RCGER09000****
9.500	10.468	0.297	RCGER09500****
10.000	10.968	0.297	RCGER10000****
10.500	11.468	0.297	RCGER10500****
11.000	11.968	0.297	RCGER11000****
11.500	12.468	0.297	RCGER11500****
12.000	12.968	0.297	RCGER12000****

*Please contact Hallite for custom sizes, material selection, or seal design.



SRS

ROD BUFFER SEAL



TECHNICAL DETAILS

The Hallite SRS is a single-acting, low-friction rod buffer seal, designed to be utilized in conjunction with a primary pressure seal. The buffer is designed from proprietary Armorlene® material face ring paired with a specially profiled energizer. The Armorlene® face ring offers low friction and the elimination of stick-slip. High-performance Armorlene® materials, like HLX, provide outstanding wear and extrusion-resistance properties as well as large range of temperature and media compatibility.

The SRS is a pressure buffer seal that protects the primary rod seal from high-frequency pressure spikes in a system. The design allows oil to pass through to the rod seal while holding back pressure spikes. The Hallite SRS also allows pressure to pass back into the system, preventing a pressure trap situation between the rod seal and the buffer seal. The SRS is an excellent addition to demanding sealing applications, offering extended sealing system life and performance.



FEATURES

- Self-relieving design prevents pressure trapping
- Low breakout friction and elimination of stick-slip action
- Excellent in high-speed applications
- Wide range of materials for both face ring and energizer available for special applications
- High service temperature, long wear, and high extrusion resistance

Part Number Structure

SRSMR00700NHLX _

SRS	M	R	00700	N	HLX	—
PROFILE DESIGNATION	UNIT OF MEASUREMENT M = Metric E = Inch	APPLICATION Refer to <i>Installation Recommendations</i> and use designator for desired application	ROD DIAMETER Metric = mm X 10 Inch = inches X 1000	ENERGIZER MATERIAL Refer to <i>Energizer Table</i> for desired energizer material	PTFE MATERIAL Refer to <i>Material Table</i> for desired PTFE (face) material	SPECIAL FEATURE Blank = Std profile

OPERATING CONDITIONS

	METRIC	INCH
Maximum Speed	Up to 4.0m/sec	Up to 12.0ft/sec
Temperature Range*	-45 to 200°C	-49 to 392°F
Maximum Dynamic Pressure**	400 bar	5800 psi

*Dependent upon energizer used (NBR, FKM, etc.). **For pressures above 400 bar, contact Hallite Engineering.

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 FINISH RECOMMENDATIONS

SURFACE ROUGHNESS	METRIC			INCH			Rmr*
	µmRa	µmRz	µmRt	µinRa	µinRz	µinRt	
Dynamic Sealing Face Ød ₁	0.05 - 0.2	1.6 max	2 max	2 - 8	63 max	157 max	60% - 90%
Static Sealing Face 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	

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

ENERGIZER TABLE*

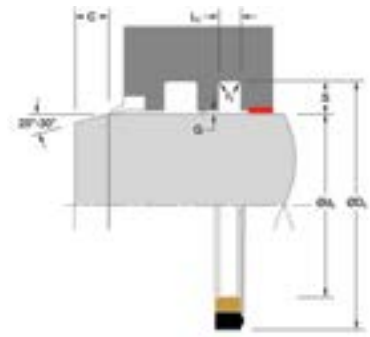
ENERGIZER MATERIAL (SHORE A)	ENERGIZER TYPE	ENERGIZER DESIGNATION	ENERGIZER OPERATING TEMPERATURE °C
NBR - 85A	Square/Profile	N	-30 to 100°C
HNBR - 85A	Square/Profile	H	-20 to 150°C
FKM - 82A	Square/Profile	F	-10 to 200°C
NBR - 80A Low temp.	Square/Profile	B	-45 to 80°C

*Other energizer materials are available. Please contact your local Hallite sales office for further information.

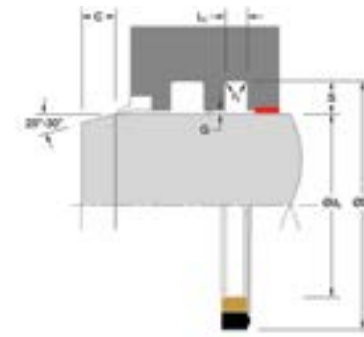
MATERIALS

MATERIAL FEATURES AND APPLICATIONS	FILLER	MATERIAL DESIGNATOR	COLOR	TEMPERATURE RANGE °C	TEMPERATURE RANGE °F	MAXIMUM DYNAMIC PRESSURE - BAR	MAXIMUM DYNAMIC PRESSURE - PSI
ARMORLENE® HLX <ul style="list-style-type: none"> Standard material for hydraulic applications High compressive strength Excellent extrusion resistance Extended wear resistance 	Special Bronze Compound	HLX	Gold	-73 to 288°C	-100 to 550°F	500 bar	7250 psi
ARMORLENE® HLA <ul style="list-style-type: none"> Excellent in all hydraulic fluids Excellent wear resistance Excellent low-friction properties Good extrusion resistance 	Special Mineral Compound	HLA	Gray	-73 to 260°C	-100 to 500°F	500 bar	7250 psi
ARMORLENE® HCF <ul style="list-style-type: none"> Excellent in lubricating and non-lubricating hydraulic fluids (includes water) w/o zinc content Not recommended for gas sealing applications Not recommended for electrical conductive fluids 	Carbon Fiber Filled	HCF	Gray/Black	-73 to 260°C	-100 to 500°F	250 bar	3625 psi
ARMORLENE® 713 <ul style="list-style-type: none"> High compressive strength Excellent extrusion resistance Excellent wear properties 	60% Bronze Content	713	Bronze	-73 to 288°C	-100 to 550°F	500 bar	7250 psi

For other material options consult the Master Materials Index at the front of the catalog. If you do not find the material that you require, please contact your local Hallite sales office.



Applications with maximum radial clearance that are using nylon, phenolic, or PTFE bearings must ensure proper clearance in accordance with the bearing recommendations to avoid metal-to-metal contact. Please refer to Hallite Type 87, Type 506, and Type 533 Specification Sheets for this information.



INSTALLATION RECOMMENDATIONS

METRIC									
ROD DIAMETER Ød ₁ f8/h9		GROOVE DIAMETER	GROOVE WIDTH	RADIUS	CHAMFER	GROOVE SECTION	RADIAL CLEARANCE G _{max} *		
DIAMETER RANGE		ØD ₁ H9	L ₁ + 0.2	r ₁	C	S	Up to 100 bar	Up to 200 bar	Up to 400 bar
Standard Duty Application - R	Light Duty Application - L								
40.0 - 199.9	200.0 - 255.9	d ₁ + 15.1	6.3	0.4	2.0	7.55	0.50	0.30	0.20

At pressure >400 bar use diameter tolerance f8/h8.

*Radial Clearance G_{max} = maximum permissible gap all on one side using min. rod diameter and max. clearance diameter.

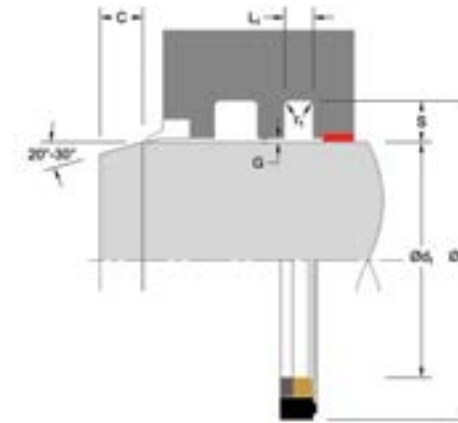
PART NUMBER RANGE (METRIC)*

METRIC			
Ød ₁	ØD ₁	L ₁	PART NUMBER
Tol. f8/h9	Tol. H9	Tol. +0.2 - 0	
40.0	55.1	6.3	SRSMR00400****
45.0	60.1	6.3	SRSMR00450****
50.0	65.1	6.3	SRSMR00500****
55.0	70.1	6.3	SRSMR00550****
60.0	75.1	6.3	SRSMR00600****
65.0	80.1	6.3	SRSMR00650****
70.0	85.1	6.3	SRSMR00700****
75.0	90.1	6.3	SRSMR00750****
80.0	95.1	6.3	SRSMR00800****
85.0	100.1	6.3	SRSMR00850****
90.0	105.1	6.3	SRSMR00900****
95.0	110.1	6.3	SRSMR00950****
100.0	115.1	6.3	SRSMR01000****
105.0	120.1	6.3	SRSMR01050****
110.0	125.1	6.3	SRSMR01100****
115.0	130.1	6.3	SRSMR01150****
120.0	135.1	6.3	SRSMR01200****
125.0	140.1	6.3	SRSMR01250****
130.0	145.1	6.3	SRSMR01300****
135.0	150.1	6.3	SRSMR01350****
140.0	155.1	6.3	SRSMR01400****
145.0	160.1	6.3	SRSMR01450****
150.0	165.1	6.3	SRSMR01500****
155.0	170.1	6.3	SRSMR01550****
160.0	175.1	6.3	SRSMR01600****
165.0	180.1	6.3	SRSMR01650****
170.0	185.1	6.3	SRSMR01700****
175.0	190.1	6.3	SRSMR01750****

METRIC			
Ød ₁	ØD ₁	L ₁	PART NUMBER
Tol. f8/h9	Tol. H9	Tol. +0.2 - 0	
180.0	195.1	6.3	SRSMR01800****
185.0	200.1	6.3	SRSMR01850****
190.0	205.1	6.3	SRSMR01900****
195.0	210.1	6.3	SRSMR01950****
200.0	215.1	6.3	SRSML02000****
205.0	220.1	6.3	SRSML02050****
210.0	225.1	6.3	SRSML02100****
215.0	230.1	6.3	SRSML02150****
220.0	235.1	6.3	SRSML02200****
225.0	240.1	6.3	SRSML02250****
230.0	245.1	6.3	SRSML02300****
235.0	250.1	6.3	SRSML02350****
240.0	255.1	6.3	SRSML02400****
245.0	260.1	6.3	SRSML02450****
250.0	265.1	6.3	SRSML02500****

*Please contact Hallite for custom sizes, material selection, or seal design.





SRB

ROD BUFFER SEAL

With AE Ring

TECHNICAL DETAILS

The Hallite SRB is a single-acting, low-friction rod buffer seal, designed to be utilized in conjunction with a primary pressure seal. The buffer is designed from proprietary Armorlene® material face ring paired with a specially profiled energizer and an integrated anti-extrusion ring. The Armorlene® face ring offers low friction and the elimination of stick-slip. High-performance Armorlene® materials, like HLX, provide outstanding wear and extrusion-resistance properties as well as large range of temperature and media compatibility.

The SRB is a pressure buffer seal that protects the primary rod seal from high-frequency pressure spikes in a system. The design allows oil to pass through to the rod seal while holding back pressure spikes. The Hallite SRB also allows pressure to pass back into the system, preventing a pressure trap situation between the rod seal and the buffer seal. The SRB is an excellent pressure buffer option in heavy-duty applications, offering extended sealing system life and performance.



FEATURES

- Self-relieving design prevents pressure trapping
- Low breakout friction and elimination of stick-slip action
- Wide range of materials for both face ring and energizer available for special applications
- Excellent in high-speed applications
- Extended pressure rating through included high extrusion-resistant anti-extrusion ring
- High service temperature, long wear, and high extrusion resistance

Part Number Structure

SRBMR00700NHLX _

SRB	M	R	00700	N	HLX	—
PROFILE DESIGNATION	UNIT OF MEASUREMENT M = Metric E = Inch	APPLICATION Refer to <i>Installation Recommendations</i> and use designator for desired application	ROD DIAMETER Metric = mm X 10 Inch = inches X 1000	ENERGIZER MATERIAL Refer to <i>Energizer Table</i> for desired energizer material	PTFE MATERIAL Refer to <i>Material Table</i> for desired PTFE (face) material	AE RING MATERIAL Blank = POM A = PA MoS ₂ Filled B = Virgin PEEK

OPERATING CONDITIONS

	METRIC	INCH
Maximum Speed	Up to 4.0m/sec	Up to 12.0ft/sec
Temperature Range*	-45 to 200°C	-49 to 392°F
Maximum Dynamic Pressure**	600 bar	8700 psi
Maximum Pressure Peaks (Spikes)	800 bar	11000 psi

*Dependent upon energizer used (NBR, FKM, etc.) and AE ring material. **For pressures above 600 bar, contact Hallite Engineering.

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 FINISH RECOMMENDATIONS

SURFACE ROUGHNESS	METRIC			INCH			Rmr*
	µmRa	µmRz	µmRt	µinRa	µinRz	µinRt	
Dynamic Sealing Face Ød ₁	0.05 - 0.2	1.6 max	2 max	2 - 8	63 max	157 max	60% - 90%
Static Sealing Face 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	

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

ENERGIZER TABLE*

ENERGIZER MATERIAL (SHORE A)	ENERGIZER TYPE	ENERGIZER DESIGNATION	ENERGIZER OPERATING TEMPERATURE °C
NBR - 85A	Square/Profile	N	-30 to 100°C
HNBR - 85A	Square/Profile	H	-20 to 150°C
FKM - 82A	Square/Profile	F	-10 to 200°C
NBR - 80A Low temp.	Square/Profile	B	-45 to 80°C

*Other energizer materials are available. Please contact your local Hallite sales office for further information.

ANTI-EXTRUSION RING TABLE*

AE RING MATERIAL	AE RING DESIGNATION	AE RING OPERATING TEMPERATURE °C
POM	-	-45 to 100°C
PA - MoS ₂ Filled	A	-45 to 100°C
Virgin PEEK	B	-45 to 200°C

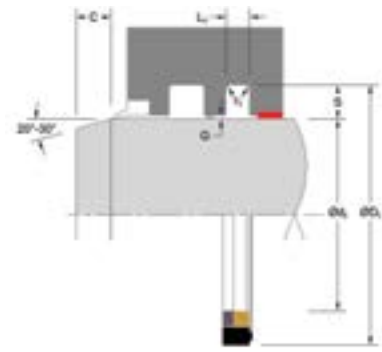
*Other energizer materials are available. Please contact your local Hallite sales office for further information.

MATERIALS

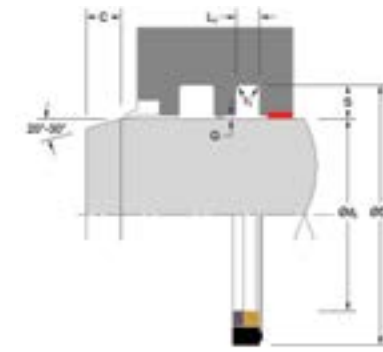
MATERIAL FEATURES AND APPLICATIONS	FILLER	MATERIAL DESIGNATOR	COLOR	TEMPERATURE RANGE °C	TEMPERATURE RANGE °F	MAXIMUM DYNAMIC PRESSURE - BAR	MAXIMUM DYNAMIC PRESSURE - PSI
ARMORLENE® HLX <ul style="list-style-type: none"> Standard material for hydraulic applications High compressive strength Excellent extrusion resistance Extended wear resistance 	Special Bronze Compound	HLX	Gold	-73 to 288°C	-100 to 550°F	600 bar	8700 psi
ARMORLENE® HLA <ul style="list-style-type: none"> Excellent in all hydraulic fluids Excellent wear resistance Excellent low-friction properties Good extrusion resistance 	Special Mineral Compound	HLA	Gray	-73 to 260°C	-100 to 500°F	600 bar	8700 psi
ARMORLENE® HCF <ul style="list-style-type: none"> Excellent in lubricating and non-lubricating hydraulic fluids (includes water) w/o zinc content Not recommended for gas sealing applications Not recommended for electrical conductive fluids 	Carbon Fiber Filled	HCF	Gray/Black	-73 to 260°C	-100 to 500°F	250 bar	3625 psi
ARMORLENE® 713 <ul style="list-style-type: none"> High compressive strength Excellent extrusion resistance Excellent wear properties 	60% Bronze Content	713	Bronze	-73 to 288°C	-100 to 550°F	600 bar	8700 psi

For other material options consult the Master Materials Index at the front of the catalog. If you do not find the material that you require, please contact your local Hallite sales office.





Applications with maximum radial clearance that are using nylon, phenolic, or PTFE bearings must ensure proper clearance in accordance with the bearing recommendations to avoid metal-to-metal contact. Please refer to Hallite Type 87, Type 506, and Type 533 Specification Sheets for this information.



INSTALLATION RECOMMENDATIONS

METRIC									
ROD DIAMETER $\varnothing d_1$ f8/h9		GROOVE DIAMETER	GROOVE WIDTH	RADIUS	CHAMFER	GROOVE SECTION	RADIAL CLEARANCE G_{max}^*		
DIAMETER RANGE		$\varnothing D_1$ H9	$L_1 + 0.2$	r_1	C	S	Up to 100 bar	Up to 400 bar	Up to 600 bar
Standard Duty Application - R	Light Duty Application - L								
40.0 - 199.9	200.0 - 255.9	$d_1 + 15.1$	6.3	0.4	2.0	7.55	0.50	0.30	0.20

At pressure >600 bar use diameter tolerance f8/h8.

*Radial Clearance G_{max} = maximum permissible gap all on one side using min. rod diameter and max. clearance diameter.

PART NUMBER RANGE (METRIC)*

METRIC			
$\varnothing d_1$	$\varnothing D_1$	L_1	PART NUMBER
Tol. f8/h9	Tol. H9	Tol. +0.2 - 0	
40.0	55.1	6.3	SRBMR00400****
45.0	60.1	6.3	SRBMR00450****
50.0	65.1	6.3	SRBMR00500****
55.0	70.1	6.3	SRBMR00550****
60.0	75.1	6.3	SRBMR00600****
65.0	80.1	6.3	SRBMR00650****
70.0	85.1	6.3	SRBMR00700****
75.0	90.1	6.3	SRBMR00750****
80.0	95.1	6.3	SRBMR00800****
85.0	100.1	6.3	SRBMR00850****
90.0	105.1	6.3	SRBMR00900****
95.0	110.1	6.3	SRBMR00950****
100.0	115.1	6.3	SRBMR01000****
105.0	120.1	6.3	SRBMR01050****
110.0	125.1	6.3	SRBMR01100****
115.0	130.1	6.3	SRBMR01150****
120.0	135.1	6.3	SRBMR01200****
125.0	140.1	6.3	SRBMR01250****
130.0	145.1	6.3	SRBMR01300****
135.0	150.1	6.3	SRBMR01350****
140.0	155.1	6.3	SRBMR01400****
145.0	160.1	6.3	SRBMR01450****
150.0	165.1	6.3	SRBMR01500****
155.0	170.1	6.3	SRBMR01550****
160.0	175.1	6.3	SRBMR01600****
165.0	180.1	6.3	SRBMR01650****
170.0	185.1	6.3	SRBMR01700****
175.0	190.1	6.3	SRBMR01750****

METRIC			
$\varnothing d_1$	$\varnothing D_1$	L_1	PART NUMBER
Tol. f8/h9	Tol. H9	Tol. +0.2 - 0	
180.0	195.1	6.3	SRBMR01800****
185.0	200.1	6.3	SRBMR01850****
190.0	205.1	6.3	SRBMR01900****
195.0	210.1	6.3	SRBMR01950****
200.0	215.1	6.3	SRBML02000****
205.0	220.1	6.3	SRBML02050****
210.0	225.1	6.3	SRBML02100****
215.0	230.1	6.3	SRBML02150****
220.0	235.1	6.3	SRBML02200****
225.0	240.1	6.3	SRBML02250****
230.0	245.1	6.3	SRBML02300****
235.0	250.1	6.3	SRBML02350****
240.0	255.1	6.3	SRBML02400****
245.0	260.1	6.3	SRBML02450****
250.0	265.1	6.3	SRBML02500****

*Please contact Hallite for custom sizes, material selection, or seal design.



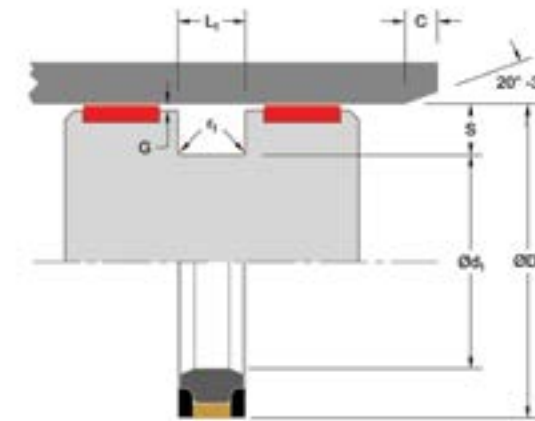
PISTON SEALS



CT

HEAVY-DUTY CAPPED SEAL

Featuring special anti-extrusion technology



TECHNICAL DETAILS

The Hallite Capped T seal is a compact, double-acting, high-performance piston seal design capable of handling the high pressure and pressure spikes associated with high-performance systems. Hallite's industry-leading design maximizes performance by employing thicker anti-extrusion rings that protect the seal face and energizer from damaging high-pressure shocks well beyond what standard industry designs are capable of. This design, along with our exclusive high-performance Armorlene® HLX material and high-grade elastomers are what make Hallite's CT a high-performing seal.

The CT consists of a filled PTFE cap, high-grade elastomeric energizer, and two precision anti-extrusion rings. Hallite's CT is suitable for a wide range of PTFE materials, the most common being bronze, moly-glass, or carbon filled. MoS₂ filled PA AE rings are the most commonly used for fluid power service, though glass filled, PA, virgin PEEK, and other high-performance materials are also available to suit your needs. The most commonly used energizer is the NBR Shore 80A. However, your CT seal can be configured using several different elastomer compounds including HNBR, low temp. NBR, and FKM.



FEATURES

- Heavy-duty
- High-pressure capability
- PTFE cap ring
- Compact design
- Low friction
- Long life
- Range of material options to extend service application range

Part Number Structure

CTER08000NHLX27

CT	E	R	08000	N	HLX	27
PROFILE DESIGNATION	UNIT OF MEASUREMENT M = Metric E = Inch	APPLICATION Refer to Installation Recommendations and use designator for desired application (R, L, and N)	BORE DIAMETER Metric = mm X 10 Inch = inches X 1000	ENERGIZER MATERIAL Refer to Energizer Table for desired energizer material	PTFE MATERIAL Refer to Material Table for desired PTFE (face) material	AE RING MATERIAL Refer to Anti-extrusion Ring Table

OPERATING CONDITIONS

	METRIC	INCH
Maximum Speed	Up to 1.5m/sec	Up to 5.0ft/sec
Temperature Range*	-45 to 200°C	-49 to 392°F
Maximum Dynamic Pressure**	600 bar	8700 psi

*Dependent upon energizer used (NBR, FKM, etc.). **For pressures above 500 bar (7250 psi), contact Hallite Engineering.

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 FINISH RECOMMENDATIONS

SURFACE ROUGHNESS	METRIC			INCH			Rmr*
	µmRa	µmRz	µmRt	µinRa	µinRz	µinRt	
Dynamic Sealing Face ØD ₁	0.05 - 0.2	1.6 max	2 max	2 - 8	63 max	157 max	60% - 90%
Static Sealing Face 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	

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

ENERGIZER TABLE

ENERGIZER MATERIAL, (SHORE A)	ENERGIZER TYPE	ENERGIZER DESIGNATION	ENERGIZER OPERATING TEMPERATURE °C	ENERGIZER OPERATING TEMPERATURE °F
NBR - 80A	Capped T	N	-30 to 100°C	-22 to 212°F
NBR - 80A Low temp.	Capped T	L	-45 to 80°C	-50 to 175°F
HNBR - 80A	Capped T	H	-25 to 150°C	-13 to 300°F
FKM - 85A	Capped T	F	-10 to 200°C	15 to 400°F

MACHINED PRECISION (AE RING TABLE)

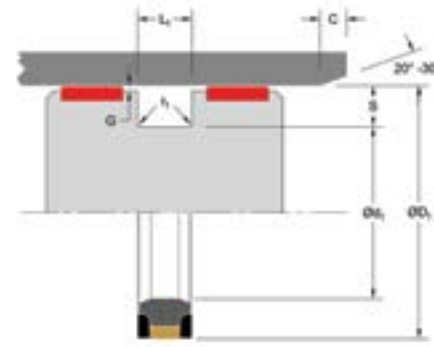
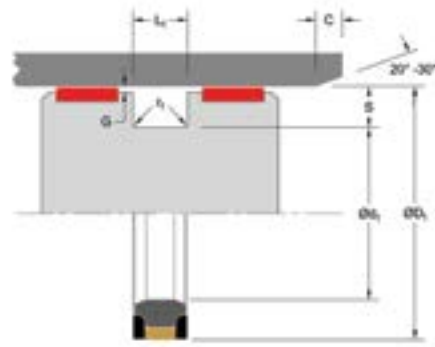
AE RING MATERIAL	AE RING DESCRIPTION	AE RING MATERIAL COLOR	NOMENCLATURE PREFIX	TEMPERATURE RANGE °C	TEMPERATURE RANGE °F
MoS ₂ Filled PA	707	Black	-	-57 to 130°C	-70 to 265°F
Glass Filled PA	710	Green	10	-57 to 150°C	-70 to 300°F
Glass Filled PA	727	Black	27	-57 to 150°C	-70 to 300°F
POM	728	White	28	-57 to 130°C	-70 to 265°F
Virgin PEEK	745	Tan	45	-45 to 200°C	-49 to 392°F

MATERIALS

MATERIAL FEATURES AND APPLICATIONS	FILLER	MATERIAL DESIGNATOR	COLOR	TEMPERATURE RANGE °C	TEMPERATURE RANGE °F	MAXIMUM DYNAMIC PRESSURE - BAR	MAXIMUM DYNAMIC PRESSURE - PSI
ARMORLENE® HLX • Standard material for hydraulic applications • High compressive strength • Excellent extrusion resistance • Extended wear resistance	Special Bronze Compound	HLX	Gold	-73 to 288°C	-100 to 550°F	500 bar	7250 psi
ARMORLENE® 702 • Excellent in lubricating and non-lubricating hydraulic fluids • Good low-friction properties • Excellent extrusion resistance • Good chemical resistance	Glass Molybdenum Disulfide	702	Gray	-73 to 260°C	-100 to 500°F	400 bar	5800 psi
ARMORLENE® 706 • Excellent in lubricating and non-lubricating hydraulic fluids • Excellent extrusion resistance • Good chemical resistance • Good dielectrical properties	15% Glass	706	Off-White	-73 to 260°C	-100 to 500°F	400 bar	5800 psi
ARMORLENE® 713 • High compressive strength • Excellent extrusion resistance • Excellent wear properties	60% Bronze Content	713	Bronze	-73 to 288°C	-100 to 550°F	600 bar	8700 psi
HYTHANE® 9270061 - POLYESTER, 55D • Positive position load holding • High chemical resistance • Excellent extrusion resistance • Excellent wear properties	Standard	061	Red	-40 to 120°C	-40 to 250°F	500 bar	7250 psi
HYTHANE® 9270111 - POLYESTER, 55D • Positive position load holding • Hydrolysis stabilized • Strong chemical resistance • Excellent extrusion resistance • Excellent wear properties	Hydrolysis Stabilized	111	Gray	-40 to 120°C	-40 to 250°F	500 bar	7250 psi
HYTHANE® 9270261 - POLYESTER, 55D • Positive position load holding • Internal lubrication provides extended wear in high-speed applications • Excellent extrusion resistance • Excellent wear resistance	Internally Lubricated	261	Off-White	-40 to 120°C	-40 to 250°F	500 bar	7250 psi
HU5 - POLYURETHANE, 55D • Positive position load holding • Excellent extrusion resistance • Excellent wear resistance	Standard	HU5	Yellow	-20 to 115°C	-20 to 240°F	500 bar	7250 psi
HU9 - POLYURETHANE, 95A • Positive position load holding • Excellent extrusion resistance • Excellent wear resistance	Standard	HU9	Red	-20 to 115°C	-20 to 240°F	500 bar	7250 psi
HE5 - POLYESTER, 55D • Positive position load holding • Excellent extrusion resistance • Excellent wear resistance	Standard	HE5	Gray/Black	-20 to 115°C	-20 to 240°F	500 bar	7250 psi
ARMORLENE® H1G • Excellent in lubricating and non-lubricating fluids • Excellent extrusion resistance • Good chemical resistance • Good dielectrical properties	15% Glass	H1G	Gold	-73 to 260°C	-100 to 500°F	300 bar	4350 psi
ARMORLENE® H2B • Excellent in lubricating and non-lubricating fluids • Excellent extrusion resistance • Good chemical resistance • Good dielectrical properties	25% Glass	H2B	Blue	-73 to 260°C	-100 to 500°F	500 bar	7250 psi

For other material options consult the Master Materials Index at the front of the catalog. If you do not find the material that you require, please contact your local Hallite sales office.





INSTALLATION RECOMMENDATIONS - STANDARD INDUSTRIAL CT (4 PIECE CAPPED T SEAL)

Nomeclature designation: "R" or "L" in part number

METRIC		BORE DIAMETER ØD ₁ H9	GROOVE DIAMETER	GROOVE WIDTH	CHAMFER	GROOVE SECTION	RADIAL CLEARANCE G _{max} *		
DIAMETER RANGE							Ød ₁ h9	L ₁ + 0.2	C
Standard Duty Application - R	Light Duty Application - L								
25.0 - 74.0	-	D ₁ - 10.0	8.00	4.00	5.00	1.0	0.8	0.6	
75.0 - 124.0	125.0 - 405.0	D ₁ - 15.0	12.00	5.00	7.50	1.0	0.8	0.6	
125.0 - 405.0	-	D ₁ - 20.0	16.00	7.00	10.00	1.0	0.8	0.6	
406.0 - 560.0	-	D ₁ - 25.0	20.00	8.00	12.50	1.0	0.8	0.6	

For pressures >500 bar use diameter tolerance H7/f8.

*Radial Clearance G_{max} = maximum permissible gap all on one side using max. tube diameter and min. clearance diameter.

INCH		BORE DIAMETER ØD ₁ H9	GROOVE DIAMETER	GROOVE WIDTH	CHAMFER	GROOVE SECTION	RADIAL CLEARANCE G _{max} *		
DIAMETER RANGE							Ød ₁ h9	L ₁ +0.008	C
Standard Duty Application - R	Light Duty Application - L								
1.000 - 2.999	-	D ₁ - 0.374	0.424	0.160	0.187	0.040	0.030	0.024	
3.000 - 4.999	5.000 - 16.000	D ₁ - 0.478	0.579	0.200	0.240	0.040	0.030	0.024	
5.000 - 16.000	-	D ₁ - 0.725	0.750	0.250	0.365	0.040	0.030	0.024	
16.001 - 22.000	-	D ₁ - 0.940	0.750	0.250	0.470	0.040	0.030	0.024	

For pressures >7250 psi use diameter tolerance H7/f8.

*Radial Clearance G_{max} = maximum permissible gap all on one side using max. tube diameter and min. clearance diameter.

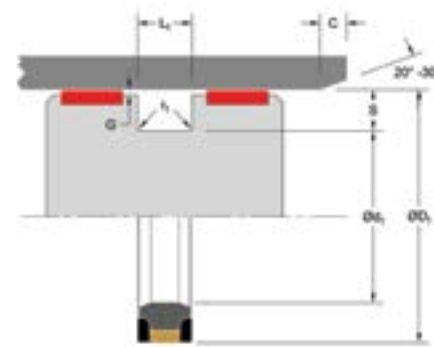
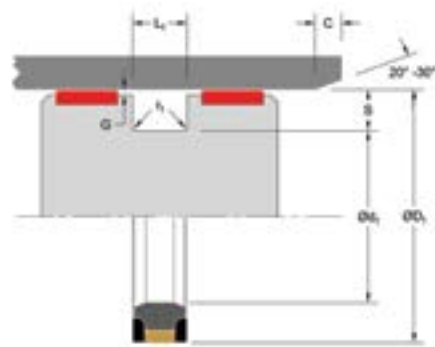
PART NUMBER RANGE (INCH)* L AND R DESIGNATION

INCH				
ØD ₁	Ød ₁	L ₁	LEGACY REF NUMBER	PART NUMBER
Tol. H9	Tol. h9	Tol. +0.008		
1.500	1.126	0.424	71002XX	CTER01500*****
1.750	1.376	0.424	71003XX	CTER01750*****
2.000	1.626	0.424	71005XX	CTER02000*****
2.250	1.876	0.424	71006XX	CTER02250*****
2.500	2.126	0.424	71007XX	CTER02500*****
2.750	2.376	0.424	71008XX	CTER02750*****
3.000	2.522	0.579	71010XX	CTER03000*****
3.250	2.772	0.579	71015XX	CTER03250*****
3.500	3.022	0.579	71020XX	CTER03500*****
3.750	3.272	0.579	71025XX	CTER03750*****
4.000	3.522	0.579	71030XX	CTER04000*****
4.250	3.772	0.579	71035XX	CTER04250*****
4.500	4.022	0.579	71040XX	CTER04500*****
4.750	4.272	0.579	71043XX	CTER04750*****
5.000	4.522	0.579	71048XX	CTEL05000*****
5.000	4.275	0.750	71045XX	CTER05000*****
5.250	4.525	0.750	71050XX	CTER05250*****
5.500	5.025	0.579	71060XX	CTEL05500*****
5.500	4.775	0.750	71055XX	CTER05500*****
6.000	5.275	0.750	71065XX	CTER06000*****
6.030	5.305	0.750	71070XX	CTER06030*****
6.250	5.772	0.579	71069XX	CTEL06250*****
6.500	6.022	0.579	71080XX	CTEL06500*****
6.500	5.775	0.750	71075XX	CTER06500*****
7.000	6.275	0.750	71085XX	CTER07000*****
7.500	6.775	0.750	71090XX	CTER07500*****
8.000	7.275	0.750	71095XX	CTER08000*****
8.500	7.775	0.750	71100XX	CTER08500*****

INCH				
ØD ₁	Ød ₁	L ₁	LEGACY REF NUMBER	PART NUMBER
Tol. H9	Tol. h9	Tol. +0.008		
9.000	8.275	0.750	71105XX	CTER09000*****
10.000	9.275	0.750	71110XX	CTER10000*****
11.000	10.275	0.750	71115XX	CTER11000*****
12.000	11.275	0.750	71120XX	CTER12000*****
12.500	11.775	0.750	71122XX	CTER12500*****
13.000	12.700	0.750	71124XX	CTER13000*****
14.000	13.275	0.750	71140XX	CTER14000*****
14.500	13.775	0.750	71128XX	CTER14500*****
15.000	14.275	0.750	71130XX	CTER15000*****
16.000	15.275	0.750	71132XX	CTER16000*****
18.000	17.060	0.750	71138XX	CTER18000*****

*Please contact Hallite for custom sizes, material selection, or seal design.





INSTALLATION RECOMMENDATIONS - NARROW GROOVE CT (4 PIECE CAPPED T SEAL)

Nomenclature designation: "N" in part number

METRIC							
BORE DIAMETER ØD ₁ H9	GROOVE DIAMETER	GROOVE WIDTH	CHAMFER	GROOVE SECTION	RADIAL CLEARANCE G _{max} *		
					up to 160 bar	up to 250 bar	up to 500 bar
DIAMETER RANGE	Ød ₁ h9	L ₁ + 0.2	C	S			
Standard Duty Application - N							
50.0 - 60.0	D ₁ - 14.0	9.00	4.00	7.00	1.0	0.8	0.6
61.0 - 95.0	D ₁ - 15.0	11.00	5.00	7.50	1.0	0.8	0.6
96.0 - 120.0	D ₁ - 15.0	12.50	5.00	7.50	1.0	0.8	0.6
121.0 - 245.0	D ₁ - 23.0	16.00	6.35	11.50	1.0	0.8	0.6
241.0 - 420.0	D ₁ - 28.0	17.50	7.00	14.00	1.0	0.8	0.6

For pressures >500 bar use diameter tolerance H7/f8.

*Radial Clearance G_{max} = maximum permissible gap all on one side using max. tube diameter and min. clearance diameter.

INCH							
BORE DIAMETER ØD ₁ H9	GROOVE DIAMETER	GROOVE WIDTH	CHAMFER	GROOVE SECTION	RADIAL CLEARANCE G _{max} *		
					up to 2300 psi	up to 3625 psi	up to 7250 psi
DIAMETER RANGE	Ød ₁ h9	L ₁ + 0.008	C	S			
Standard Duty Application - N							
1.750 - 2.375	D ₁ - 0.551	0.354	0.160	0.275	0.040	0.030	0.024
2.500 - 3.500	D ₁ - 0.591	0.433	0.200	0.295	0.040	0.030	0.024
3.750 - 4.750	D ₁ - 0.591	0.492	0.200	0.295	0.040	0.030	0.024
5.000 - 9.750	D ₁ - 0.906	0.630	0.250	0.453	0.040	0.030	0.024
10.000 - 15.000	D ₁ - 1.102	0.689	0.280	0.551	0.040	0.030	0.024

For pressures >7250 psi use diameter tolerance H7/f8.

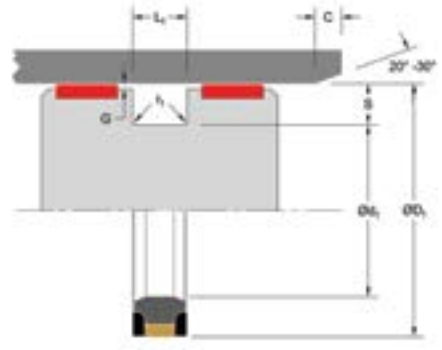
*Radial Clearance G_{max} = maximum permissible gap all on one side using max. tube diameter and min. clearance diameter.

PART NUMBER RANGE (METRIC)* N DESIGNATION

METRIC				
ØD ₁	Ød ₁	L ₁	LEGACY REF NUMBER	PART NUMBER
Tol. H9	Tol. h9	Tol. +0.2		
50.0	36.0	9.0	71510XX	CTMN00500*****
60.0	46.0	9.0	71515XX	CTMN00600*****
63.0	48.0	11.0	71520XX	CTMN00630*****
65.0	50.0	11.0	71525XX	CTMN00650*****
70.0	55.0	11.0	71530XX	CTMN00700*****
75.0	60.0	11.0	71535XX	CTMN00750*****
80.0	65.0	11.0	71540XX	CTMN00800*****
85.0	70.0	11.0	71545XX	CTMN00850*****
90.0	75.0	11.0	71550XX	CTMN00900*****
95.0	80.0	11.0	71555XX	CTMN00950*****
100.0	85.0	12.5	71560XX	CTMN01000*****
105.0	90.0	12.5	71565XX	CTMN01050*****
110.0	95.0	12.5	71570XX	CTMN01100*****
115.0	100.0	12.5	71575XX	CTMN01150*****
125.0	102.0	16.0	71585XX	CTMN01250*****
120.0	105.0	12.5	71580XX	CTMN01200*****
130.0	107.0	16.0	71590XX	CTMN01300*****
135.0	112.0	16.0	71595XX	CTMN01350*****
140.0	117.0	16.0	71600XX	CTMN01400*****
145.0	122.0	16.0	71605XX	CTMN01450*****
150.0	127.0	16.0	71610XX	CTMN01500*****
160.0	137.0	16.0	71615XX	CTMN01600*****
165.0	142.0	16.0	71620XX	CTMN01650*****
170.0	147.0	16.0	71625XX	CTMN01700*****
175.0	152.0	16.0	71628XX	CTMN01750*****
180.0	157.0	16.0	71630XX	CTMN01800*****
185.0	162.0	16.0	71635XX	CTMN01850*****
190.0	167.0	16.0	71640XX	CTMN01900*****

METRIC				
ØD ₁	Ød ₁	L ₁	LEGACY REF NUMBER	PART NUMBER
Tol. H9	Tol. h9	Tol. +0.2		
200.0	177.0	16.0	71645XX	CTMN02000*****
210.0	187.0	16.0	71650XX	CTMN02100*****
215.0	192.0	16.0	71653XX	CTMN02150*****
220.0	197.0	16.0	71655XX	CTMN02200*****
225.0	202.0	16.0	71660XX	CTMN02250*****
230.0	207.0	16.0	71665XX	CTMN02300*****
235.0	212.0	16.0	71668XX	CTMN02350*****
240.0	217.0	16.0	71670XX	CTMN02400*****
250.0	222.0	17.5	71675XX	CTMN02500*****
260.0	232.0	17.5	71680XX	CTMN02600*****
270.0	242.0	17.5	71682XX	CTMN02700*****
275.0	247.0	17.5	71683XX	CTMN02750*****
280.0	252.0	17.5	71684XX	CTMN02800*****
290.0	262.0	17.5	71685XX	CTMN02900*****
300.0	272.0	17.5	71687XX	CTMN03000*****
310.0	282.0	17.5	71688XX	CTMN03100*****
320.0	292.0	17.5	71689XX	CTMN03200*****
330.0	302.0	17.5	71691XX	CTMN03300*****
350.0	322.0	17.5	71695XX	CTMN03500*****
360.0	332.0	17.5	71696XX	CTMN03600*****
400.0	372.0	17.5	71699XX	CTMN04000*****

*Please contact Hallite for custom sizes, material selection, or seal design.

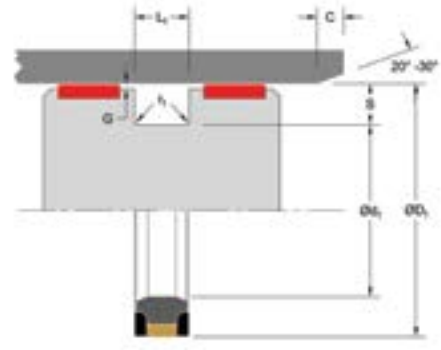


PART NUMBER RANGE (INCH)*

INCH			LEGACY REF NUMBER	PART NUMBER
ØD ₁	Ød ₁	L ₁		
Tol. H9	Tol. h9	Tol. +0.008		
4.500	3.909	0.492	71039XX	CTEN04500*****
4.750	4.159	0.492	71042XX	CTEN04750*****
5.000	4.094	0.630	71044XX	CTEN05000*****
5.500	4.594	0.630	71054XX	CTEN05500*****
6.000	5.094	0.630	71064XX	CTEN06000*****
6.250	5.344	0.630	71068XX	CTEN06250*****
6.500	5.594	0.630	71074XX	CTEN06500*****
7.000	6.094	0.630	71084XX	CTEN07000*****
7.250	6.344	0.630	71086XX	CTEN07250*****
7.500	6.594	0.630	71089XX	CTEN07500*****
7.750	6.844	0.630	71092XX	CTEN07750*****
8.250	7.344	0.630	71097XX	CTEN08250*****
8.500	7.594	0.630	71099XX	CTEN08500*****
10.000	8.898	0.689	71109XX	CTEN10000*****
10.250	9.148	0.689	71700XX	CTEN10250*****
10.500	9.398	0.689	71112XX	CTEN10500*****
11.500	10.398	0.689	71117XX	CTEN11500*****
14.000	12.898	0.687	71127XX	CTEN14000*****

*Please contact Hallite for custom sizes, material selection, or seal design.

HEAVY-DUTY CAPPED SEAL
Featuring special anti-extrusion technology



OTHER GROOVE SIZES

Part Number Structure

CTEZ71021NHLX

CT	E	Z	71021	N	HLX	
PROFILE DESIGNATION	UNIT OF MEASUREMENT M = Metric E = Inch	APPLICATION Z = Non-Standard Grooves	BODY SIZE Legacy serial part number designation (First 5 digits)	ENERGIZER MATERIAL Refer to Energizer Table for desired energizer material	PTFE MATERIAL Refer to Material Table for desired PTFE (face) material	AE RING MATERIAL Refer to Anti-extrusion Ring Table

PART NUMBER RANGE Z DESIGNATION

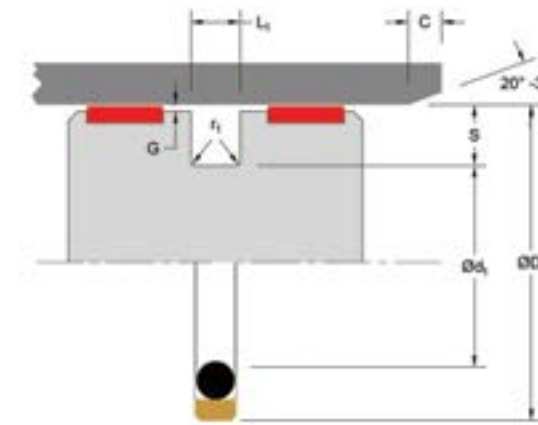
INCH			LEGACY REF NUMBER	PART NUMBER
ØD ₁	Ød ₁	L ₁		
Tol. H9	Tol. h9	Tol. +0.008		
3.525	3.020	0.584	71021XX	CTEZ71021*****
4.500	3.835	0.500	71038XX	CTEZ71038*****
5.000	4.225	0.630	71047XX	CTEZ71047*****
5.500	4.725	0.630	71053XX	CTEZ71053*****
6.030	5.300	0.755	71066XX	CTEZ71066*****
8.250	7.255	0.630	71096XX	CTEZ71096*****
8.250	7.344	0.635	71097XX	CTEZ71097*****
8.500	7.505	0.630	71101XX	CTEZ71101*****
8.500	7.594	0.635	71099XX	CTEZ71099*****
10.000	8.898	0.693	71109XX	CTEZ71109*****
10.500	9.398	0.693	71112XX	CTEZ71112*****
11.500	10.398	0.693	71117XX	CTEZ71117*****

METRIC			LEGACY REF NUMBER	PART NUMBER
ØD ₁	Ød ₁	L ₁		
Tol. H9	Tol. h9	Tol. +0.2		
105.0	88.0	14.0	71566XX	CTMZ71566*****
115.0	98.0	14.0	71576XX	CTMZ71576*****
125.0	108.0	14.0	71584XX	CTMZ71584*****

P54

PISTON SEAL

Double-Acting



TECHNICAL DETAILS

The Hallite P54 is a double-acting, O-ring energized, low-friction piston seal that performs well in both high- and low-pressure systems. High-performance Armorlene® materials, like HLX, provide outstanding wear and extrusion-resistance properties as well as large range of temperature and media compatibility. The P54 has a proven design pedigree as a high-performance seal used in demanding applications. The standard P54 seal face includes pressure notches, which makes the seal very responsive to changes in pressure or direction of travel. Used successfully for years in performance-critical applications in construction equipment, machine tools, material handling, agricultural equipment, and other industries, the Hallite P54 is a workhorse compact, double-acting, piston-sealing solution. Its design fits a variety of housing sizes, including ISO 7425-1 grooves, and is offered in a wide range of metric and inch options. Hallite recommends proper guidance be used with this seal in heavy-duty applications (see Hallite Bearings section).

This seal is available in a variety of Hallite's high-performance Armorlene® and Hythane® materials to suit a wide range of demanding applications.



FEATURES

- No stick-slip
- Low breakout and running friction
- Excellent in high-speed applications
- Compact piston design
- Seal ring component can be machined to any size
- Pressure notches to optimize seal response at all pressures

Part Number Structure

P54MR00900NHLX _

P54	M	R	00900	N	HLX	_
PROFILE DESIGNATION	UNIT OF MEASUREMENT M = Metric E = Inch	APPLICATION Refer to Installation Recommendations and use designator for desired application	BORE DIAMETER Metric = mm X 10 Inch = inches X 1000	ENERGIZER MATERIAL Refer to Energizer Table for desired energizer material	PTFE MATERIAL Refer to Material Table for desired PTFE (face) material	SPECIAL FEATURE Blank = Std profile (with notches) X = No Notches <small>Notches not offered with groove widths (L1) of 2.2mm (0.087in) or 3.2mm (0.126in)</small>

OPERATING CONDITIONS

	METRIC	INCH
Maximum Speed	Up to 15m/sec	Up to 50.0ft/sec
Temperature Range*	-45 to 200°C	-49 to 392°F
Maximum Dynamic Pressure**	600 bar	8700 psi

*Dependent upon energizer used (NBR, FKM, etc.). **For pressures above 400 bar (5800 psi), contact Hallite Engineering.

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 FINISH RECOMMENDATIONS

SURFACE ROUGHNESS	METRIC			INCH			Rmr*
	µmRa	µmRz	µmRt	µinRa	µinRz	µinRt	
Dynamic Sealing Face ØD ₁	0.05 - 0.2	1.6 max	2 max	2 - 8	63 max	157 max	60% - 90%
Static Sealing Face 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	

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

ENERGIZER TABLE

ENERGIZER MATERIAL (SHORE A)	ENERGIZER TYPE	ENERGIZER DESIGNATION	ENERGIZER OPERATING TEMPERATURE°C	ENERGIZER OPERATING TEMPERATURE°F
NBR - 70A	O-ring	N	-30 to 100°C	-22 to 212°F
NBR - 70A Low temp.	O-ring	L	-45 to 80°C	-49 to 176°F
FKM - 75A	O-ring	F	-10 to 200°C	14 to 392°F
EPDM - 70A	O-ring	E	-45 to 145°C	-49 to 293°F
HNBR - 70A	O-ring	H	-25 to 150°C	-13 to 302°F
NBR - 90A	O-ring	Q	-30 to 100°C	-22 to 212°F
HNBR - 90A	O-ring	U	-25 to 150°C	-13 to 302°F
No Energizer*	None	X	-	-

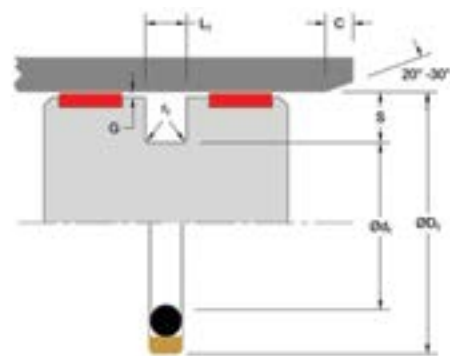
*Seal ratings are based upon capabilities of its matched material components. Hallite cannot rate seal performance when the seal is mixed with other manufacturers' energizers/components.

MATERIALS

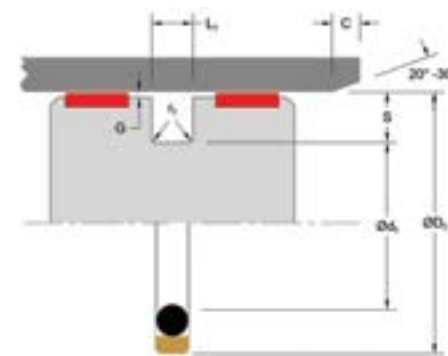
MATERIAL FEATURES AND APPLICATIONS	FILLER	MATERIAL DESIGNATOR	COLOR	TEMPERATURE RANGE°C	TEMPERATURE RANGE°F	MAXIMUM DYNAMIC PRESSURE - BAR	MAXIMUM DYNAMIC PRESSURE - PSI
ARMORLENE® HLX • Standard material for hydraulic applications • High compressive strength • Excellent extrusion resistance • Extended wear resistance	Special Bronze Compound	HLX	Gold	-73 to 288°C	-100 to 550°F	500 bar	7250 psi
ARMORLENE® HLA • Excellent in all hydraulic fluids • Excellent wear resistance • Excellent low-friction properties • Good extrusion resistance	Special Mineral Compound	HLA	Gray	-73 to 260°C	-100 to 500°F	500 bar	7250 psi
ARMORLENE® 702 • Excellent in lubricating and non-lubricating hydraulic fluids • Good low-friction properties • Excellent extrusion resistance • Good chemical resistance	Glass Molybdenum Disulfide	702	Gray	-73 to 260°C	-100 to 500°F	300 bar	4350 psi
ARMORLENE® 706 • Excellent in lubricating and non-lubricating hydraulic fluids • Excellent extrusion resistance • Good chemical resistance • Good dielectrical properties	15% Glass	706	Off-White	-73 to 260°C	-100 to 500°F	300 bar	4350 psi
ARMORLENE® 700 • Excellent in all hydraulic fluids • Recommended for use with soft mating surfaces • Low friction and no stick-slip	Unfilled	700	White	-184 to 204°C	-300 to 400°F	200 bar	2900 psi
ARMORLENE® HCF • Excellent in lubricating and non-lubricating hydraulic fluids (includes water) w/o zinc content • Not recommended for gas sealing applications • Not recommended for electrical conductive fluids	Carbon Fiber Filled	HCF	Gray/Black	-73 to 260°C	-100 to 500°F	250 bar	3600 psi
ARMORLENE® HCV • Recommended for lubricating and non-lubricating fluids • Excellent for high-frequency and short-stroke applications • Not recommended for gas sealing applications • Not recommended for electrical conductive fluids	High Carbon Fiber Filled	HCV	Gray/Black	-73 to 260°C	-100 to 500°F	300 bar	4350 psi
ARMORLENE® 711 • Excellent in all lubricating fluids and pneumatic applications • High chemical resistance • Excellent extrusion resistance • Excellent wear properties	25% Carbon/Graphite	711	Black	-73 to 288°C	-100 to 550°F	400 bar	5800 psi
ARMORLENE® 713 • High compressive strength • Excellent extrusion resistance • Excellent wear properties	60% Bronze Content	713	Bronze	-73 to 288°C	-100 to 550°F	600 bar	8700 psi
HU9 - POLYURETHANE, 95A • Positive position load holding • Excellent extrusion resistance • Excellent wear resistance	Standard	HU9	Red	-20 to 115°C	-4 to 240°F	500 bar	7250 psi
HU5 - POLYURETHANE, 55D • Positive position load holding • Excellent extrusion resistance • Excellent wear resistance	Standard	HU5	Yellow	-20 to 115°C	-4 to 240°F	500 bar	7250 psi
HYTHANE® 9270111 - POLYESTER, 55D • Positive position load holding • Hydrolysis stabilized • Strong chemical resistance • Excellent extrusion resistance • Excellent wear properties	Hydrolysis Stabilized	111	Gray	-40 to 120°C	-40 to 250°F	500 bar	7250 psi
HYTHANE® 9270261 - POLYESTER, 55D • Positive position load holding • Internal lubrication provides extended wear in high-speed applications • Excellent extrusion resistance • Excellent wear resistance	Internally Lubricated	261	Off-White	-40 to 120°C	-40 to 250°F	500 bar	7250 psi
HE5 - POLYESTER, 55D • Positive position load holding • Excellent extrusion resistance • Excellent wear resistance	Standard	HE5	Gray/Black	-20 to 115°C	-40 to 240°F	500 bar	7250 psi
748 - UHMWPE • Excellent impact resistance • Good dielectrical properties • Excellent abrasion resistance • Low coefficient of friction	Standard	748	Translucent	-184 to 82°C	-300 to 180°F	350 bar	5000 psi

For other material options consult the Master Materials Index at the front of the catalog. If you do not find the material that you require, please contact your local Hallite sales office.





Applications with maximum radial clearance that are using nylon, phenolic, or PTFE bearings must ensure proper clearance in accordance with the bearing recommendations to avoid metal-to-metal contact. Please refer to Hallite Type 87, Type 506, and Type 533 Specification Sheets for this information.



P54

PISTON SEAL
Double-Acting

INSTALLATION RECOMMENDATIONS

METRIC											
BORE DIAMETER ØD ₁ H9			GROOVE DIAMETER	GROOVE WIDTH	RADIUS	CHAMFER	GROOVE SECTION	RADIAL CLEARANCE G _{max} *			O-RING CROSS SECTION
DIAMETER RANGE			Ød ₁ h9	L ₁ + 0.2	r ₁	C	S	Up to 100 bar	Up to 200 bar	Up to 400 bar	O-ring
Standard Duty Application - R	Light Duty Application - L	Heavy Duty Application - H	Ød ₁ h9	L ₁ + 0.2	r ₁	C	S	Up to 100 bar	Up to 200 bar	Up to 400 bar	O-ring
8.0 - 14.9	15.0 - 39.9	-	D ₁ - 4.9	2.2	0.4	2.0	2.45	0.30	0.20	0.15	1.78
15.0 - 39.9	40.0 - 79.9	-	D ₁ - 7.5	3.2	0.6	3.0	3.75	0.40	0.25	0.15	2.62
40.0 - 79.9	80.0 - 132.9	15.0 - 39.9	D ₁ - 11.0	4.2	1.0	4.0	5.50	0.40	0.25	0.20	3.53
80.0 - 132.9	133.0 - 329.9	40.0 - 79.9	D ₁ - 15.5	6.3	1.3	6.0	7.75	0.50	0.30	0.20	5.33
133.0 - 329.9	330.0 - 669.9	80.0 - 132.9	D ₁ - 21.0	8.1	1.8	8.0	10.50	0.60	0.35	0.25	6.99
330.0 - 669.9	670.0 - 999.9	133.0 - 329.9	D ₁ - 24.5	8.1	1.8	8.0	12.25	0.60	0.35	0.25	6.99
670.0 - 999.9	≥ 1000.0	330.0 - 669.9	D ₁ - 28.0	9.5	2.5	9.0	14.00	0.70	0.50	0.30	8.40
≥ 1000.0	-	670.0 - 999.9	D ₁ - 38.0	13.8	3.0	10.0	19.00	1.00	0.70	0.60	12.00

At pressure >400 bar use diameter tolerance H8/f7.

*Radial Clearance G_{max} = maximum permissible gap all on one side using max. tube diameter and min. clearance diameter.

INCH											
BORE DIAMETER ØD ₁ H9			GROOVE DIAMETER	GROOVE WIDTH	RADIUS	CHAMFER	GROOVE SECTION	RADIAL CLEARANCE G _{max} *			O-RING CROSS SECTION
DIAMETER RANGE			Ød ₁ h9	L ₁ + .008	r ₁	C	S	Up to 1500 psi	Up to 2900 psi	Up to 5800 psi	O-ring
Standard Duty Application - R	Light Duty Application - L	Heavy Duty Application - H	Ød ₁ h9	L ₁ + .008	r ₁	C	S	Up to 1500 psi	Up to 2900 psi	Up to 5800 psi	O-ring
0.312 - 0.562	0.563 - 1.562	-	D ₁ - 0.193	0.087	0.015	0.079	0.097	0.012	0.008	0.006	0.070
0.563 - 1.562	1.563 - 3.125	-	D ₁ - 0.295	0.126	0.025	0.118	0.148	0.016	0.010	0.006	0.103
1.563 - 3.125	3.126 - 5.250	0.563 - 1.562	D ₁ - 0.433	0.165	0.025	0.157	0.217	0.016	0.010	0.008	0.139
3.126 - 5.250	5.251 - 12.500	1.563 - 3.125	D ₁ - 0.610	0.248	0.035	0.236	0.305	0.020	0.012	0.008	0.210
5.251 - 12.500	12.501 - 26.000	3.126 - 5.250	D ₁ - 0.827	0.319	0.035	0.315	0.414	0.024	0.014	0.010	0.275
12.501 - 26.000	-	5.251 - 12.500	D ₁ - 0.965	0.319	0.035	0.354	0.483	0.024	0.014	0.010	0.275

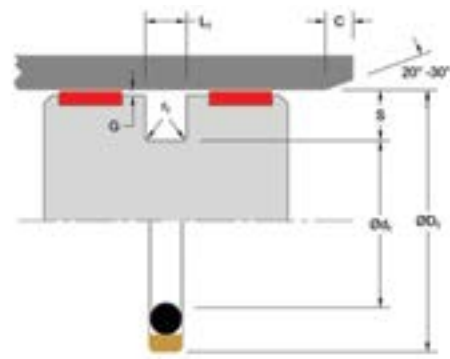
At pressure >5800 psi use diameter tolerance H8/f7.

*Radial Clearance G_{max} = maximum permissible gap all on one side using max. tube diameter and min. clearance diameter.

PART NUMBER RANGE (METRIC)*

METRIC			
ØD ₁	Ød ₁	L ₁	PART NUMBER
Tol. H9	Tol. h9	Tol. +0.2	
8.0	3.1	2.2	P54MR00080****
10.0	5.1	2.2	P54MR00100****
12.0	7.1	2.2	P54MR00120****
14.0	9.1	2.2	P54MR00140****
15.0	7.5	3.2	P54MR00150****
16.0	11.1	2.2	P54ML00160****
16.0	8.5	3.2	P54MR00160****
18.0	13.1	2.2	P54ML00180****
18.0	10.5	3.2	P54MR00180****
20.0	15.1	2.2	P54ML00200****
20.0	12.5	3.2	P54MR00200****
21.0	13.5	3.2	P54MR00210****
22.0	17.1	2.2	P54ML00220****
22.0	14.5	3.2	P54MR00220****
24.0	16.5	3.2	P54MR00240****
24.0	19.1	2.2	P54ML00240****
25.0	20.1	2.2	P54ML00250****
25.0	17.5	3.2	P54MR00250****
25.0	14.0	4.2	P54MH00250****
28.0	20.5	3.2	P54MR00280****
30.0	22.5	3.2	P54MR00300****
32.0	27.1	2.2	P54ML00320****
32.0	24.5	3.2	P54MR00320****
32.0	21.0	4.2	P54MH00320****
35.0	27.5	3.2	P54MR00350****
35.0	24.0	4.2	P54MH00350****
36.0	28.5	3.2	P54MR00360****
38.0	30.5	3.2	P54MR00380****

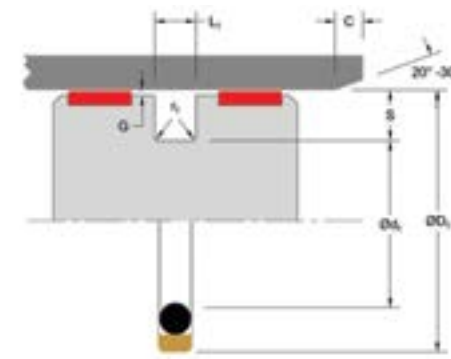
METRIC			
ØD ₁	Ød ₁	L ₁	PART NUMBER
Tol. H9	Tol. h9	Tol. +0.2	
40.0	32.5	3.2	P54ML00400****
40.0	29.0	4.2	P54MR00400****
42.0	31.0	4.2	P54MR00420****
45.0	34.0	4.2	P54MR00450****
48.0	37.0	4.2	P54MR00480****
50.0	42.5	3.2	P54ML00500****
50.0	39.0	4.2	P54MR00500****
50.0	34.5	6.3	P54MH00500****
50.8	43.3	3.2	P54ML00508****
50.8	39.8	4.2	P54MR00508****
52.0	41.0	4.2	P54MR00520****
53.0	42.0	4.2	P54MR00530****
55.0	44.0	4.2	P54MR00550****
57.0	46.0	4.2	P54MR00570****
58.0	47.0	4.2	P54MR00580****
60.0	49.0	4.2	P54MR00600****
62.0	51.0	4.2	P54MR00620****
63.0	52.0	4.2	P54MR00630****
63.0	47.5	6.3	P54MH00630****
65.0	54.0	4.2	P54MR00650****
68.0	57.0	4.2	P54MR00680****
70.0	59.0	4.2	P54MR00700****
70.0	54.5	6.3	P54MH00700****
75.0	64.0	4.2	P54MR00750****
75.0	59.5	6.3	P54MH00750****
80.0	69.0	4.2	P54ML00800****
80.0	64.5	6.3	P54MR00800****
80.0	59.0	8.1	P54MH00800****



PART NUMBER RANGE (METRIC)*

METRIC			PART NUMBER
ØD ₁	Ød ₁	L ₁	
Tol. H9	Tol. h9	Tol. +0.2	
82.5	67.0	6.3	P54MR00825****
85.0	69.5	6.3	P54MR00850****
85.0	64.0	8.1	P54MH00850****
90.0	79.0	4.2	P54ML00900****
90.0	74.5	6.3	P54MR00900****
90.0	69.0	8.1	P54MH00900****
95.0	84.0	4.2	P54ML00950****
95.0	79.5	6.3	P54MR00950****
95.0	74.0	8.1	P54MH00950****
100.0	89.0	4.2	P54ML01000****
100.0	84.5	6.3	P54MR01000****
100.0	79.0	8.1	P54MH01000****
101.6	86.1	6.3	P54MR01016****
105.0	94.0	4.2	P54ML01050****
105.0	89.5	6.3	P54MR01050****
108.0	92.5	6.3	P54MR01080****
110.0	99.0	4.2	P54ML01100****
110.0	94.5	6.3	P54MR01100****
110.0	89.0	8.1	P54MH01100****
115.0	99.5	6.3	P54MR01150****
120.0	109.0	4.2	P54ML01200****
120.0	104.5	6.3	P54MR01200****
120.0	99.0	8.1	P54MH01200****
125.0	114.0	4.2	P54ML01250****
125.0	109.5	6.3	P54MR01250****
125.0	104.0	8.1	P54MH01250****
127.0	111.5	6.3	P54MR01270****
130.0	114.5	6.3	P54MR01300****

METRIC			PART NUMBER
ØD ₁	Ød ₁	L ₁	
Tol. H9	Tol. h9	Tol. +0.2	
130.0	109.0	8.1	P54MH01300****
132.0	121.0	4.2	P54ML01320****
135.0	114.0	8.1	P54MR01350****
140.0	124.5	6.3	P54ML01400****
140.0	119.0	8.1	P54MR01400****
145.0	129.5	6.3	P54ML01450****
145.0	124.0	8.1	P54MR01450****
150.0	134.5	6.3	P54ML01500****
150.0	129.0	8.1	P54MR01500****
155.0	134.0	8.1	P54MR01550****
160.0	144.5	6.3	P54ML01600****
160.0	139.0	8.1	P54MR01600****
165.0	144.0	8.1	P54MR01650****
170.0	149.0	8.1	P54MR01700****
175.0	154.0	8.1	P54MR01750****
180.0	164.5	6.3	P54ML01800****
180.0	159.0	8.1	P54MR01800****
185.0	164.0	8.1	P54MR01850****
190.0	169.0	8.1	P54MR01900****
194.0	178.5	6.3	P54ML01940****
200.0	184.5	6.3	P54ML02000****
200.0	179.0	8.1	P54MR02000****
205.0	184.0	8.1	P54MR02050****
210.0	189.0	8.1	P54MR02100****
215.0	194.0	8.1	P54MR02150****
220.0	199.0	8.1	P54MR02200****
225.0	204.0	8.1	P54MR02250****
230.0	214.5	6.3	P54ML02300****



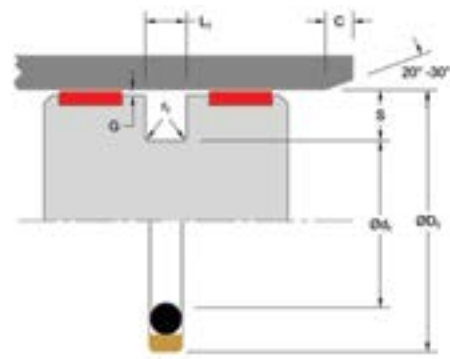
PART NUMBER RANGE (METRIC)*

METRIC			PART NUMBER
ØD ₁	Ød ₁	L ₁	
Tol. H9	Tol. h9	Tol. +0.2	
230.0	209.0	8.1	P54MR02300****
240.0	219.0	8.1	P54MR02400****
250.0	229.0	8.1	P54MR02500****
250.0	225.5	8.1	P54MH02500****
250.0	234.5	6.3	P54ML02500****
254.0	233.0	8.1	P54MR02540****
260.0	239.0	8.1	P54MR02600****
265.0	244.0	8.1	P54MR02650****
268.0	247.0	8.1	P54MR02680****
270.0	249.0	8.1	P54MR02700****
280.0	259.0	8.1	P54MR02800****
290.0	269.0	8.1	P54MR02900****
300.0	279.0	8.1	P54MR03000****
300.0	275.5	8.1	P54MH03000****
304.8	283.8	8.1	P54MR03048****
310.0	289.0	8.1	P54MR03100****
320.0	299.0	8.1	P54MR03200****
320.0	295.5	8.1	P54MH03200****
330.0	305.5	8.1	P54MR03300****
340.0	315.5	8.1	P54MR03400****
350.0	325.5	8.1	P54MR03500****
360.0	335.5	8.1	P54MR03600****
370.0	345.5	8.1	P54MR03700****
380.0	355.5	8.1	P54MR03800****
390.0	365.5	8.1	P54MR03900****
400.0	375.5	8.1	P54MR04000****
420.0	395.5	8.1	P54MR04200****
430.0	405.5	8.1	P54MR04300****

METRIC			PART NUMBER
ØD ₁	Ød ₁	L ₁	
Tol. H9	Tol. h9	Tol. +0.2	
440.0	415.5	8.1	P54MR04400****
450.0	425.5	8.1	P54MR04500****
460.0	435.5	8.1	P54MR04600****
480.0	455.5	8.1	P54MR04800****
500.0	475.5	8.1	P54MR05000****
555.0	530.5	8.1	P54MR05550****
600.0	575.5	8.1	P54MR06000****
640.0	615.5	8.1	P54MR06400****
660.0	635.5	8.1	P54MR06600****
700.0	672.0	9.5	P54MR07000****
710.0	682.0	9.5	P54MR07100****
740.0	712.0	9.5	P54MR07400****
780.0	752.0	9.5	P54MR07800****
800.0	772.0	9.5	P54MR08000****
900.0	872.0	9.5	P54MR09000****
1000.0	972.0	9.5	P54ML10000****
1000.0	962.0	13.8	P54MR10000****
1050.0	1022.0	9.5	P54ML10500****
1065.0	1027.0	13.8	P54MR10650****
1070.0	1032.0	13.8	P54MR10700****
1200.0	1172.0	9.5	P54ML12000****
1200.0	1162.0	13.8	P54MR12000****
1225.0	1187.0	13.8	P54MR12250****

*Please contact Hallite for custom sizes, material selection, or seal design.





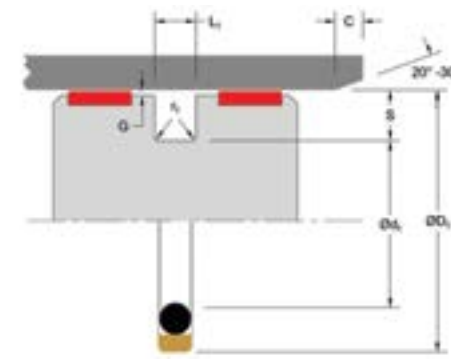
P54

PISTON SEAL
Double-Acting

PART NUMBER RANGE (INCH)*

INCH			PART NUMBER
ØD ₁	Ød ₁	L ₁	
Tol. H9	Tol. h9	Tol. +0.008	
0.500	0.307	0.087	P54ER00500****
0.562	0.369	0.087	P54ER00562****
0.625	0.330	0.126	P54ER00625****
0.687	0.392	0.126	P54ER00687****
0.750	0.455	0.126	P54ER00750****
0.812	0.517	0.126	P54ER00812****
0.875	0.580	0.126	P54ER00875****
0.937	0.642	0.126	P54ER00937****
1.000	0.705	0.126	P54ER01000****
1.062	0.767	0.126	P54ER01062****
1.125	0.830	0.126	P54ER01125****
1.187	0.892	0.126	P54ER01187****
1.250	0.955	0.126	P54ER01250****
1.312	1.017	0.126	P54ER01312****
1.375	1.080	0.126	P54ER01375****
1.437	1.142	0.126	P54ER01437****
1.500	1.205	0.126	P54ER01500****
1.562	1.267	0.126	P54ER01562****
1.625	1.192	0.165	P54ER01625****
1.687	1.254	0.165	P54ER01687****
1.750	1.317	0.165	P54ER01750****
1.812	1.379	0.165	P54ER01812****
1.875	1.442	0.165	P54ER01875****
1.937	1.504	0.165	P54ER01937****
2.000	1.567	0.165	P54ER02000****
2.125	1.692	0.165	P54ER02125****
2.250	1.817	0.165	P54ER02250****
2.375	1.942	0.165	P54ER02375****

INCH			PART NUMBER
ØD ₁	Ød ₁	L ₁	
Tol. H9	Tol. h9	Tol. +0.008	
2.500	2.067	0.165	P54ER02500****
2.625	2.192	0.165	P54ER02625****
2.750	2.317	0.165	P54ER02750****
2.875	2.442	0.165	P54ER02875****
3.000	2.567	0.165	P54ER03000****
3.125	2.692	0.165	P54ER03125****
3.250	2.640	0.248	P54ER03250****
3.375	2.765	0.248	P54ER03375****
3.500	2.890	0.248	P54ER03500****
3.625	3.015	0.248	P54ER03625****
3.750	3.140	0.248	P54ER03750****
3.875	3.265	0.248	P54ER03875****
4.000	3.390	0.248	P54ER04000****
4.125	3.515	0.248	P54ER04125****
4.250	3.640	0.248	P54ER04250****
4.375	3.765	0.248	P54ER04375****
4.500	3.890	0.248	P54ER04500****
4.625	4.015	0.248	P54ER04625****
4.750	4.140	0.248	P54ER04750****
4.875	4.265	0.248	P54ER04875****
5.000	4.390	0.248	P54ER05000****
5.125	4.515	0.248	P54ER05125****
5.250	4.640	0.248	P54ER05250****
5.375	4.548	0.319	P54ER05375****
5.500	4.673	0.319	P54ER05500****
5.625	4.798	0.319	P54ER05625****
5.750	4.923	0.319	P54ER05750****
6.000	5.173	0.319	P54ER06000****

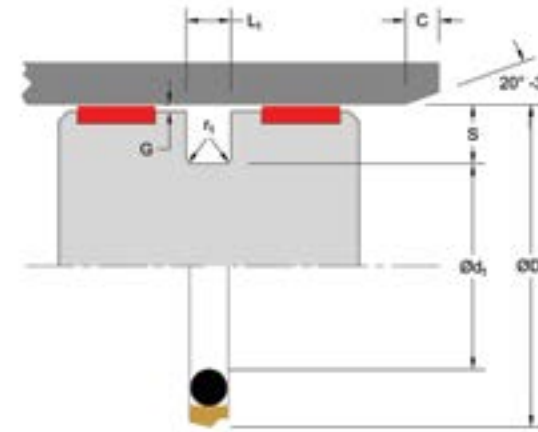


PART NUMBER RANGE (INCH)*

INCH			PART NUMBER
ØD ₁	Ød ₁	L ₁	
Tol. H9	Tol. h9	Tol. +0.008	
6.250	5.423	0.319	P54ER06250****
6.500	5.673	0.319	P54ER06500****
6.750	5.923	0.319	P54ER06750****
7.000	6.173	0.319	P54ER07000****
7.250	6.423	0.319	P54ER07250****
7.500	6.673	0.319	P54ER07500****
7.750	6.923	0.319	P54ER07750****
8.000	7.173	0.319	P54ER08000****
8.250	7.423	0.319	P54ER08250****
8.500	7.673	0.319	P54ER08500****
8.750	7.923	0.319	P54ER08750****
9.000	8.173	0.319	P54ER09000****
9.250	8.423	0.319	P54ER09250****
9.500	8.673	0.319	P54ER09500****
9.750	8.923	0.319	P54ER09750****
10.000	9.173	0.319	P54ER10000****
10.500	9.673	0.319	P54ER10500****
11.000	10.173	0.319	P54ER11000****
11.500	10.673	0.319	P54ER11500****
12.000	11.173	0.319	P54ER12000****
12.500	11.673	0.319	P54ER12500****
13.000	12.035	0.319	P54ER13000****
13.500	12.535	0.319	P54ER13500****
14.000	13.035	0.319	P54ER14000****
14.500	13.535	0.319	P54ER14500****
15.000	14.035	0.319	P54ER15000****
15.500	14.535	0.319	P54ER15500****
16.000	15.035	0.319	P54ER16000****

INCH			PART NUMBER
ØD ₁	Ød ₁	L ₁	
Tol. H9	Tol. h9	Tol. +0.008	
16.500	15.535	0.319	P54ER16500****
17.000	16.035	0.319	P54ER17000****
17.500	16.535	0.319	P54ER17500****
18.000	17.035	0.319	P54ER18000****
18.500	17.535	0.319	P54ER18500****
19.000	18.035	0.319	P54ER19000****
19.500	18.535	0.319	P54ER19500****
20.000	19.035	0.319	P54ER20000****

*Please contact Hallite for custom sizes, material selection, or seal design.



P16

PISTON SEAL

Single-Acting



TECHNICAL DETAILS

The Hallite P16 is a single-acting, O-ring energized, low-friction piston seal especially useful where smooth movement and location accuracy is required. The P16 design is based on the very successful R16 rod-seal design which has been proven in the market to be an excellent seal. High-performance Armorlene® materials, like HLX, provide outstanding wear and extrusion-resistance properties as well as large range of temperature and high-speed capabilities.

The P16's design eliminates the potential for stick-slip and its very low running friction makes it ideal for high-speed applications. In particular, this seal is well-suited for use in piston accumulators in conjunction with other Hallite piston seals. The P16 is designed to fit a variety of inch and metric grooves, including ISO 7425-1 standard.

This seal is available in a variety of Hallite's high-performance Armorlene® materials to suit a wide range of demanding applications. A tandem arrangement using the P54 or P16 in an Armorlene® material is effective in sealing high-frequency and long-stroke applications.

FEATURES

- Low breakout friction and elimination of stick-slip action
- Excellent dynamic and static sealability
- Long wear and high extrusion resistance
- Ability to absorb shock loads from pressure spikes

Part Number Structure

P16MR00500NHLX __

P16	M	R	00500	N	HLX	__
PROFILE DESIGNATION	UNIT OF MEASUREMENT M = Metric E = Inch	APPLICATION Refer to <i>Installation Recommendations</i> and use designator for desired application	BORE DIAMETER Metric = mm X 10 Inch = inches X 1000	ENERGIZER MATERIAL Refer to <i>Energizer Table</i> for desired energizer material	PTFE MATERIAL Refer to <i>Material Table</i> for desired PTFE (face) material	SPECIAL FEATURE Blank = Std profile

OPERATING CONDITIONS

	METRIC	INCH
Maximum Speed	Up to 15.0m/sec	Up to 50.0ft/sec
Temperature Range*	-45 to 200°C	-49 to 392°F
Maximum Dynamic Pressure**	600 bar	8700 psi

*Dependent upon energizer used (NBR, FKM, etc.). **For pressures above 400 bar (5800 psi), contact Hallite Engineering.

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 FINISH RECOMMENDATIONS

SURFACE ROUGHNESS	METRIC			INCH			Rmr*
	µmRa	µmRz	µmRt	µinRa	µinRz	µinRt	
Dynamic Sealing Face ØD ₁	0.05 - 0.2	1.6 max	2 max	2 - 8	63 max	157 max	60% - 90%
Static Sealing Face 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	

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

ENERGIZER TABLE

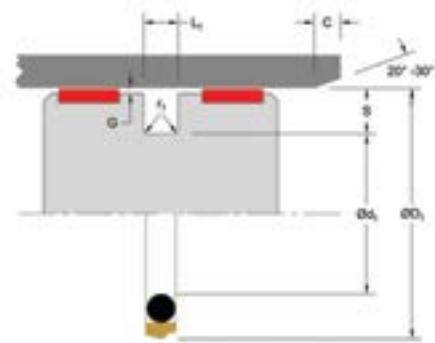
ENERGIZER MATERIAL (SHORE A)	ENERGIZER TYPE	ENERGIZER DESIGNATION	ENERGIZER OPERATING TEMPERATURE°C	ENERGIZER OPERATING TEMPERATURE°F
NBR - 70A	O-ring	N	-30 to 100°C	-22 to 212°F
NBR - 70A Low temp.	O-ring	L	-45 to 80°C	-49 to 176°F
FKM - 75A	O-ring	F	-10 to 200°C	14 to 392°F
EPDM - 70A	O-ring	E	-45 to 145°C	-49 to 293°F
HNBR - 70A	O-ring	H	-25 to 150°C	-13 to 302°F
NBR - 90A	O-ring	Q	-30 to 100°C	-22 to 212°F
HNBR - 90A	O-ring	U	-25 to 150°C	-13 to 302°F
No Energizer*	None	X	-	-

*Seal ratings are based upon capabilities of its matched material components. Hallite cannot rate seal performance when the seal is mixed with other manufacturers' energizers/components.

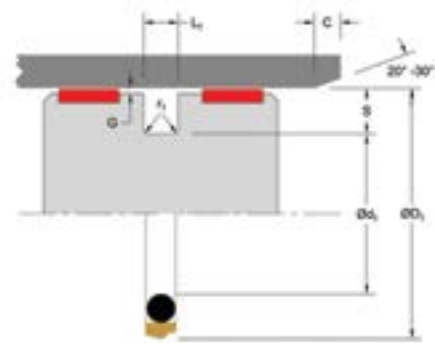
MATERIALS

MATERIAL FEATURES AND APPLICATIONS	FILLER	MATERIAL DESIGNATOR	COLOR	TEMPERATURE RANGE°C	TEMPERATURE RANGE°F	MAXIMUM DYNAMIC PRESSURE - BAR	MAXIMUM DYNAMIC PRESSURE - PSI
ARMORLENE® HLX • Standard material for hydraulic applications • High compressive strength • Excellent extrusion resistance • Extended wear resistance	Special Bronze Compound	HLX	Gold	-73 to 288°C	-100 to 550°F	500 bar	7250 psi
ARMORLENE® 713 • High compressive strength • Excellent extrusion resistance • Excellent wear properties	60% Bronze Content	713	Bronze	-73 to 288°C	-100 to 550°F	600 bar	8700 psi
ARMORLENE® HCF • Excellent in lubricating and non-lubricating hydraulic fluids (includes water) w/o zinc content • Not recommended for gas sealing applications • Not recommended for electrical conductive fluids	Carbon Fiber Filled	HCF	Gray/Black	-73 to 260°C	-100 to 500°F	250 bar	3600 psi
ARMORLENE® HCV • Recommended for lubricating and non-lubricating fluids • Excellent for high-frequency and short-stroke applications • Not recommended for gas sealing applications • Not recommended for electrical conductive fluids	High Carbon Fiber Filled	HCV	Gray/Black	-73 to 260°C	-100 to 500°F	300 bar	4350 psi
ARMORLENE® 700 • Excellent in all hydraulic fluids • Recommended for use with soft mating surfaces • Low friction and no stick-slip	Unfilled	700	White	-184 to 204°C	-300 to 400°F	200 bar	2900 psi
ARMORLENE® 706 • Excellent in lubricating and non-lubricating hydraulic fluids • Excellent extrusion resistance • Good chemical resistance • Good dielectrical properties	15% Glass	706	Off-White	-73 to 260°C	-100 to 500°F	400 bar	5800 psi
ARMORLENE® 702 • Excellent in lubricating and non-lubricating hydraulic fluids • Good low-friction properties • Excellent extrusion resistance • Good chemical resistance	Glass Molybdenum Disulfide	702	Gray	-73 to 260°C	-100 to 500°F	400 bar	5800 psi
ARMORLENE® 711 • Excellent in all lubricating fluids and pneumatic applications • High chemical resistance • Excellent extrusion resistance • Excellent wear properties	25% Carbon/Graphite	711	Black	-73 to 288°C	-100 to 550°F	400 bar	5800 psi
ARMORLENE® HLA • Excellent in all hydraulic fluids • Excellent wear resistance • Excellent low-friction properties • Good extrusion resistance	Special Mineral Compound	HLA	Gray	-73 to 260°C	-100 to 500°F	500 bar	7250 psi
ARMORLENE® 782 • Good abrasion resistance • Recommended for lubricating and non-lubricating fluids • Recommended for high frequency and short-stroke applications • Not recommended for electrical and conductive fluids	Modified Carbon Fiber Filled	782	Black	-73 to 260°C	-100 to 500°F	300 bar	4350 psi
748 - UHMWPE • Excellent impact resistance • Good dielectrical properties • Excellent abrasion resistance • Low coefficient of friction	Standard	748	Translucent	-184 to 82°C	-300 to 180°F	350 bar	5000 psi

For other material options consult the Master Materials Index at the front of the catalog. If you do not find the material that you require, please contact your local Hallite sales office.



Applications with maximum radial clearance that are using nylon, phenolic, or PTFE bearings must ensure proper clearance in accordance with the bearing recommendations to avoid metal-to-metal contact. Please refer to Hallite Type 87, Type 506, and Type 533 Specification Sheets for this information.



P16

PISTON SEAL
Single-Acting

INSTALLATION RECOMMENDATIONS

METRIC											
BORE DIAMETER ØD ₁ H9			GROOVE DIAMETER	GROOVE WIDTH	RADIUS	CHAMFER	GROOVE SECTION	RADIAL CLEARANCE G _{max} *			O-RING CROSS SECTION
DIAMETER RANGE			Ød ₁ h9	L ₁ + 0.2	r ₁	C	S	Up to 100 bar	Up to 200 bar	Up to 400 bar	O-ring
Standard Duty Application - R	Light Duty Application - L	Heavy Duty Application - H									
8.0 - 16.9	17.0 - 26.9	-	D ₁ - 4.9	2.2	0.4	2.0	2.45	0.30	0.20	0.15	1.78
17.0 - 26.9	27.0 - 59.9	-	D ₁ - 7.5	3.2	0.6	3.0	3.75	0.40	0.25	0.15	2.62
27.0 - 59.9	60.0 - 199.9	17.0 - 26.9	D ₁ - 11.0	4.2	1.0	4.0	5.50	0.50	0.30	0.20	3.53
60.0 - 199.9	200.0 - 255.9	27.0 - 59.9	D ₁ - 15.5	6.3	1.3	6.0	7.75	0.70	0.40	0.25	5.33
200.0 - 255.9	256.0 - 669.9	60.0 - 199.9	D ₁ - 21.0	8.1	1.8	8.0	10.50	0.80	0.60	0.35	6.99
256.0 - 669.9	670.0 - 999.9	200.0 - 255.9	D ₁ - 24.5	8.1	1.8	8.0	12.25	0.90	0.70	0.40	6.99
670.0 - 999.9	≥1000.0	256.0 - 669.9	D ₁ - 28.0	9.5	2.5	9.0	14.00	1.00	0.80	0.60	8.40
≥1000.0	-	670.0 - 999.9	D ₁ - 38.0	13.8	3.0	10.0	19.00	1.20	0.90	0.60	12.00

At pressure >400 bar use diameter tolerance H8/f7.

*Radial Clearance G_{max} = maximum permissible gap all on one side using max. tube diameter and min. clearance diameter.

INCH											
BORE DIAMETER ØD ₁ H9			GROOVE DIAMETER	GROOVE WIDTH	RADIUS	CHAMFER	GROOVE SECTION	RADIAL CLEARANCE G _{max} *			O-RING CROSS SECTION
DIAMETER RANGE			Ød ₁ h9	L ₁ + 0.008	r ₁	C	S	Up to 1500 psi	Up to 2900 psi	Up to 5800 psi	O-ring
Standard Duty Application - R	Light Duty Application - L	Heavy Duty Application - H									
0.312 - 0.749	0.750 - 1.499	-	D ₁ - 0.193	0.087	0.020	0.079	0.097	0.012	0.009	0.007	0.070
0.750 - 1.499	1.500 - 2.499	-	D ₁ - 0.287	0.126	0.020	0.118	0.144	0.016	0.012	0.008	0.103
1.500 - 2.499	2.500 - 7.999	0.625 - 1.499	D ₁ - 0.421	0.165	0.025	0.157	0.211	0.016	0.012	0.009	0.139
2.500 - 7.999	8.000 - 9.999	1.000 - 2.499	D ₁ - 0.594	0.248	0.030	0.236	0.297	0.020	0.014	0.010	0.210
8.000 - 9.999	10.000 - 26.000	3.125 - 7.999	D ₁ - 0.807	0.319	0.035	0.315	0.404	0.024	0.017	0.012	0.275
10.000 - 26.000	-	8.000 - 9.999	D ₁ - 0.945	0.319	0.035	0.315	0.473	0.024	0.017	0.012	0.275

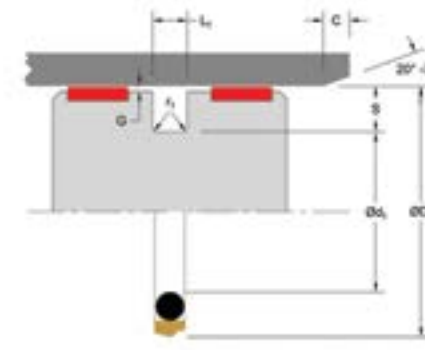
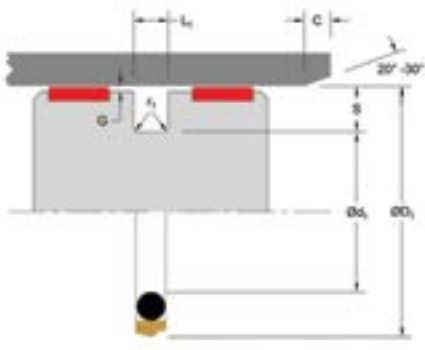
At pressure >5800 psi use diameter tolerance H8/f7.

*Radial Clearance G_{max} = maximum permissible gap all on one side using max. tube diameter and min. clearance diameter.

PART NUMBER RANGE (METRIC)*

METRIC							
ØD ₁	Ød ₁	L ₁	PART NUMBER		ØD ₁	Ød ₁	L ₁
Tol. H9	Tol. h9	Tol. +0.2			Tol. H9	Tol. h9	Tol. +0.2
8.0	3.1	2.2	P16MR00080****	Also Fits	-	-	-
9.0	4.1	2.2	P16MR00090****	Also Fits	-	-	-
10.0	5.1	2.2	P16MR00100****	Also Fits	-	-	-
12.0	7.1	2.2	P16MR00120****	Also Fits	-	-	-
14.0	9.1	2.2	P16MR00140****	Also Fits	-	-	-
15.0	10.1	2.2	P16MR00150****	Also Fits	-	-	-
16.0	11.1	2.2	P16MR00160****	Also Fits	-	-	-
18.0	10.5	3.2	P16MR00180****	Also Fits	18.0	10.7	3.2
18.0	13.1	2.2	P16ML00180****	Also Fits	-	-	-
20.0	12.5	3.2	P16MR00200****	Also Fits	20.0	12.7	3.2
20.0	15.1	2.2	P16ML00200****	Also Fits	-	-	-
20.0	9.0	4.2	P16MH00200****	Also Fits	20.0	9.3	4.2
22.0	14.5	3.2	P16MR00220****	Also Fits	22.0	14.7	3.2
22.0	11.0	4.2	P16MH00220****	Also Fits	22.0	11.3	4.2
25.0	17.5	3.2	P16MR00250****	Also Fits	25.0	17.7	3.2
25.0	20.1	2.2	P16ML00250****	Also Fits	-	-	-
25.0	14.0	4.2	P16MH00250****	Also Fits	25.0	14.3	4.2
28.0	17.0	4.2	P16MR00280****	Also Fits	28.0	17.3	4.2
28.0	20.5	3.2	P16ML00280****	Also Fits	28.0	20.7	3.2
28.0	12.5	6.3	P16MH00280****	Also Fits	28.0	12.9	6.3
30.0	19.0	4.2	P16MR00300****	Also Fits	30.0	19.3	4.2
30.0	22.5	3.2	P16ML00300****	Also Fits	30.0	22.7	3.2
30.0	14.5	6.3	P16MH00300****	Also Fits	30.0	14.9	6.3
32.0	21.0	4.2	P16MR00320****	Also Fits	32.0	21.3	4.2
32.0	24.5	3.2	P16ML00320****	Also Fits	32.0	24.7	3.2
35.0	24.0	4.2	P16MR00350****	Also Fits	35.0	24.3	4.2
35.0	27.5	3.2	P16ML00350****	Also Fits	35.0	27.7	3.2
36.0	25.0	4.2	P16MR00360****	Also Fits	36.0	25.3	4.2

METRIC							
ØD ₁	Ød ₁	L ₁	PART NUMBER		ØD ₁	Ød ₁	L ₁
Tol. H9	Tol. h9	Tol. +0.2			Tol. H9	Tol. h9	Tol. +0.2
36.0	28.5	3.2	P16ML00360****	Also Fits	36.0	28.7	3.2
40.0	29.0	4.2	P16MR00400****	Also Fits	40.0	29.3	4.2
40.0	32.5	3.2	P16ML00400****	Also Fits	40.0	32.7	3.2
40.0	24.5	6.3	P16MH00400****	Also Fits	40.0	24.9	6.3
42.0	31.0	4.2	P16MR00420****	Also Fits	42.0	31.3	4.2
42.0	34.5	3.2	P16ML00420****	Also Fits	42.0	34.7	3.2
43.0	27.5	6.3	P16MH00430****	Also Fits	43.0	27.9	6.3
45.0	34.0	4.2	P16MR00450****	Also Fits	45.0	34.3	4.2
45.0	37.5	3.2	P16ML00450****	Also Fits	45.0	37.7	3.2
45.0	29.5	6.3	P16MH00450****	Also Fits	45.0	29.9	6.3
48.0	40.5	3.2	P16ML00480****	Also Fits	48.0	40.7	3.2
50.0	39.0	4.2	P16MR00500****	Also Fits	50.0	39.3	4.2
50.0	42.5	3.2	P16ML00500****	Also Fits	50.0	42.7	3.2
50.0	34.5	6.3	P16MH00500****	Also Fits	50.0	34.9	6.3
52.0	44.5	3.2	P16ML00520****	Also Fits	52.0	44.7	3.2
55.0	44.0	4.2	P16MR00550****	Also Fits	55.0	44.3	4.2
55.0	47.5	3.2	P16ML00550****	Also Fits	55.0	47.7	3.2
55.0	39.5	6.3	P16MH00550****	Also Fits	55.0	39.9	6.3
56.0	45.0	4.2	P16MR00560****	Also Fits	56.0	45.3	4.2
56.0	40.5	6.3	P16MH00560****	Also Fits	56.0	40.9	6.3
60.0	44.5	6.3	P16MR00600****	Also Fits	60.0	44.9	6.3
60.0	49.0	4.2	P16ML00600****	Also Fits	60.0	49.3	4.2
63.0	47.5	6.3	P16MR00630****	Also Fits	63.0	47.9	6.3
63.0	52.0	4.2	P16ML00630****	Also Fits	63.0	52.3	4.2
65.0	49.5	6.3	P16MR00650****	Also Fits	65.0	49.9	6.3
65.0	54.0	4.2	P16ML00650****	Also Fits	65.0	54.3	4.2
70.0	54.5	6.3	P16MR00700****	Also Fits	70.0	54.9	6.3
70.0	59.0	4.2	P16ML00700****	Also Fits	70.0	59.3	4.2



PART NUMBER RANGE (METRIC)*

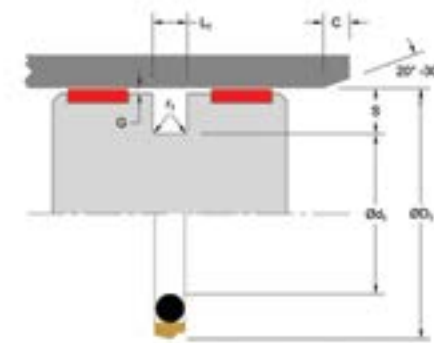
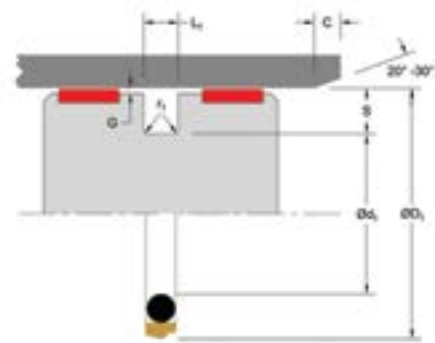
METRIC			PART NUMBER	Also Fits	METRIC		
ØD ₁	Ød ₁	L ₁			ØD ₁	Ød ₁	L ₁
Tol. H9	Tol. h9	Tol. +0.2			Tol. H9	Tol. h9	Tol. +0.2
75.0	59.5	6.3	P16MR00750****	Also Fits	75.0	59.9	6.3
75.0	64.0	4.2	P16ML00750****	Also Fits	75.0	63.3	4.2
78.0	62.5	6.3	P16MR00780****	Also Fits	78.0	62.9	6.3
78.0	67.0	4.2	P16ML00780****	Also Fits	78.0	66.3	4.2
80.0	64.5	6.3	P16MR00800****	Also Fits	80.0	64.9	6.3
80.0	69.0	4.2	P16ML00800****	Also Fits	80.0	69.3	4.2
80.0	59.0	8.1	P16MH00800****	Also Fits	80.0	59.5	8.1
85.0	69.5	6.3	P16MR00850****	Also Fits	85.0	69.9	6.3
85.0	74.0	4.2	P16ML00850****	Also Fits	85.0	74.3	4.2
85.0	64.0	8.1	P16MH00850****	Also Fits	85.0	64.5	8.1
90.0	74.5	6.3	P16MR00900****	Also Fits	90.0	74.9	6.3
90.0	79.0	4.2	P16ML00900****	Also Fits	90.0	79.3	4.2
90.0	69.0	8.1	P16MH00900****	Also Fits	90.0	69.5	8.1
95.0	79.5	6.3	P16MR00950****	Also Fits	95.0	79.9	6.3
95.0	84.0	4.2	P16ML00950****	Also Fits	95.0	84.3	4.2
95.0	74.0	8.1	P16MH00950****	Also Fits	95.0	74.5	8.1
97.0	81.5	6.3	P16MR00970****	Also Fits	97.0	81.9	6.3
97.0	76.0	8.1	P16MH00970****	Also Fits	97.0	76.5	8.1
100.0	84.5	6.3	P16MR01000****	Also Fits	100.0	84.9	6.3
100.0	89.0	4.2	P16ML01000****	Also Fits	100.0	89.3	4.2
100.0	79.0	8.1	P16MH01000****	Also Fits	100.0	79.5	8.1
105.0	89.5	6.3	P16MR01050****	Also Fits	105.0	89.9	6.3
105.0	94.0	4.2	P16ML01050****	Also Fits	105.0	94.3	4.2
105.0	84.0	8.1	P16MH01050****	Also Fits	105.0	84.5	8.1
110.0	94.5	6.3	P16MR01100****	Also Fits	110.0	94.9	6.3
110.0	99.0	4.2	P16ML01100****	Also Fits	110.0	99.3	4.2
110.0	89.0	8.1	P16MH01100****	Also Fits	110.0	89.5	8.1
115.0	99.5	6.3	P16MR01150****	Also Fits	115.0	99.9	6.3

METRIC			PART NUMBER	Also Fits	METRIC		
ØD ₁	Ød ₁	L ₁			ØD ₁	Ød ₁	L ₁
Tol. H9	Tol. h9	Tol. +0.2			Tol. H9	Tol. h9	Tol. +0.2
115.0	104.0	4.2	P16ML01150****	Also Fits	115.0	99.3	4.2
115.0	94.0	8.1	P16MH01150****	Also Fits	115.0	94.5	8.1
120.0	104.5	6.3	P16MR01200****	Also Fits	120.0	104.9	6.3
120.0	109.0	4.2	P16ML01200****	Also Fits	120.0	104.3	4.2
120.0	99.0	8.1	P16MH01200****	Also Fits	120.0	99.5	8.1
125.0	109.5	6.3	P16MR01250****	Also Fits	125.0	109.9	6.3
125.0	114.0	4.2	P16ML01250****	Also Fits	125.0	109.3	4.2
125.0	104.0	8.1	P16MH01250****	Also Fits	125.0	104.5	8.1
130.0	114.5	6.3	P16MR01300****	Also Fits	130.0	114.9	6.3
130.0	119.0	4.2	P16ML01300****	Also Fits	130.0	114.3	4.2
130.0	109.0	8.1	P16MH01300****	Also Fits	130.0	109.5	8.1
135.0	119.5	6.3	P16MR01350****	Also Fits	135.0	119.9	6.3
135.0	124.0	4.2	P16ML01350****	Also Fits	135.0	124.3	4.2
135.0	114.0	8.1	P16MH01350****	Also Fits	135.0	114.5	8.1
140.0	124.5	6.3	P16MR01400****	Also Fits	140.0	124.9	6.3
140.0	129.0	4.2	P16ML01400****	Also Fits	140.0	129.3	4.2
140.0	119.0	8.1	P16MH01400****	Also Fits	140.0	119.5	8.1
145.0	129.5	6.3	P16MR01450****	Also Fits	145.0	129.9	6.3
145.0	134.0	4.2	P16ML01450****	Also Fits	145.0	134.3	4.2
145.0	124.0	8.1	P16MH01450****	Also Fits	145.0	124.5	8.1
150.0	134.5	6.3	P16MR01500****	Also Fits	150.0	134.9	6.3
150.0	139.0	4.2	P16ML01500****	Also Fits	150.0	139.3	4.2
150.0	129.0	8.1	P16MH01500****	Also Fits	150.0	129.5	8.1
155.0	139.5	6.3	P16MR01550****	Also Fits	155.0	139.9	6.3
155.0	144.0	4.2	P16ML01550****	Also Fits	155.0	144.3	4.2
155.0	134.0	8.1	P16MH01550****	Also Fits	155.0	134.5	8.1
160.0	144.5	6.3	P16MR01600****	Also Fits	160.0	144.9	6.3
160.0	149.0	4.2	P16ML01600****	Also Fits	160.0	149.3	4.2

PART NUMBER RANGE (METRIC)*

METRIC			PART NUMBER	Also Fits	METRIC		
ØD ₁	Ød ₁	L ₁			ØD ₁	Ød ₁	L ₁
Tol. H9	Tol. h9	Tol. +0.2			Tol. H9	Tol. h9	Tol. +0.2
160.0	139.0	8.1	P16MH01600****	Also Fits	160.0	139.5	8.1
165.0	154.0	4.2	P16ML01650****	Also Fits	165.0	154.3	4.2
170.0	154.5	6.3	P16MR01700****	Also Fits	170.0	154.9	6.3
170.0	159.0	4.2	P16ML01700****	Also Fits	170.0	159.3	4.2
170.0	149.0	8.1	P16MH01700****	Also Fits	170.0	149.5	8.1
175.0	164.0	4.2	P16ML01750****	Also Fits	175.0	164.3	4.2
180.0	164.5	6.3	P16MR01800****	Also Fits	180.0	164.9	6.3
180.0	169.0	4.2	P16ML01800****	Also Fits	180.0	169.3	4.2
180.0	159.0	8.1	P16MH01800****	Also Fits	180.0	159.5	8.1
190.0	174.5	6.3	P16MR01900****	Also Fits	190.0	174.9	6.3
190.0	179.0	4.2	P16ML01900****	Also Fits	190.0	179.3	4.2
190.0	169.0	8.1	P16MH01900****	Also Fits	190.0	169.5	8.1
200.0	179.0	8.1	P16MR02000****	Also Fits	200.0	179.5	8.1
200.0	184.5	6.3	P16ML02000****	Also Fits	200.0	184.9	6.3
205.0	189.5	6.3	P16ML02050****	Also Fits	205.0	189.9	6.3
210.0	189.0	8.1	P16MR02100****	Also Fits	210.0	189.5	8.1
210.0	194.5	6.3	P16ML02100****	Also Fits	210.0	194.9	6.3
210.0	185.5	8.1	P16MH02100****	Also Fits	210.0	186.0	8.1
220.0	199.0	8.1	P16MR02200****	Also Fits	220.0	199.5	8.1
220.0	204.5	6.3	P16ML02200****	Also Fits	220.0	204.9	6.3
220.0	195.5	8.1	P16MH02200****	Also Fits	220.0	196.0	8.1
225.0	204.0	8.1	P16MR02250****	Also Fits	225.0	204.5	8.1
225.0	200.5	8.1	P16MH02250****	Also Fits	225.0	201.0	8.1
230.0	214.5	6.3	P16ML02300****	Also Fits	230.0	214.9	6.3
240.0	219.0	8.1	P16MR02400****	Also Fits	240.0	219.5	8.1
240.0	224.5	6.3	P16ML02400****	Also Fits	240.0	224.9	6.3
240.0	215.5	8.1	P16MH02400****	Also Fits	240.0	216.0	8.1
250.0	229.0	8.1	P16MR02500****	Also Fits	250.0	229.5	8.1

METRIC			PART NUMBER	Also Fits	METRIC		
ØD ₁	Ød ₁	L ₁			ØD ₁	Ød ₁	L ₁
Tol. H9	Tol. h9	Tol. +0.2			Tol. H9	Tol. h9	Tol. +0.2
250.0	234.5	6.3	P16ML02500****	Also Fits	250.0	234.9	6.3
250.0	225.5	8.1	P16MH02500****	Also Fits	250.0	226.0	8.1
260.0	235.5	8.1	P16MR02600****	Also Fits	260.0	236.0	8.1
260.0	239.0	8.1	P16ML02600****	Also Fits	260.0	239.5	8.1
260.0	232.0	9.5	P16MH02600****	Also Fits	-	-	-
270.0	245.5	8.1	P16MR02700****	Also Fits	270.0	246.0	8.1
270.0	249.0	8.1	P16ML02700****	Also Fits	270.0	249.5	8.1
270.0	242.0	9.5	P16MH02700****	Also Fits	-	-	-
280.0	255.5	8.1	P16MR02800****	Also Fits	280.0	256.0	8.1
280.0	259.0	8.1	P16ML02800****	Also Fits	280.0	259.5	8.1
280.0	252.0	9.5	P16MH02800****	Also Fits	-	-	-
290.0	265.5	8.1	P16MR02900****	Also Fits	290.0	266.0	8.1
290.0	269.0	8.1	P16ML02900****	Also Fits	290.0	269.5	8.1
300.0	275.5	8.1	P16MR03000****	Also Fits	300.0	276.0	8.1
300.0	279.0	8.1	P16ML03000****	Also Fits	300.0	279.5	8.1
300.0	272.0	9.5	P16MH03000****	Also Fits	-	-	-
310.0	282.0	9.5	P16MH03100****	Also Fits	-	-	-
320.0	295.5	8.1	P16MR03200****	Also Fits	320.0	296.0	8.1
320.0	299.0	8.1	P16ML03200****	Also Fits	320.0	299.5	8.1
320.0	292.0	9.5	P16MH03200****	Also Fits	-	-	-
330.0	305.5	8.1	P16MR03300****	Also Fits	330.0	306.0	8.1
330.0	309.0	8.1	P16ML03300****	Also Fits	330.0	309.5	8.1
330.0	302.0	9.5	P16MH03300****	Also Fits	-	-	-
340.0	315.5	8.1	P16MR03400****	Also Fits	340.0	316.0	8.1
340.0	319.0	8.1	P16ML03400****	Also Fits	340.0	319.5	8.1
340.0	312.0	9.5	P16MH03400****	Also Fits	-	-	-
345.0	320.5	8.1	P16MR03450****	Also Fits	345.0	321.0	8.1
350.0	325.5	8.1	P16MR03500****	Also Fits	350.0	326.0	8.1



P16

PISTON SEAL
Single-Acting

PART NUMBER RANGE (METRIC)*

METRIC			PART NUMBER	Also Fits	METRIC		
ØD ₁	Ød ₁	L ₁			ØD ₁	Ød ₁	L ₁
Tol. H9	Tol. h9	Tol. +0.2			Tol. H9	Tol. h9	Tol. +0.2
350.0	329.0	8.1	P16ML03500****	Also Fits	350.0	329.5	8.1
350.0	322.0	9.5	P16MH03500****	Also Fits	-	-	-
360.0	335.5	8.1	P16MR03600****	Also Fits	360.0	336.0	8.1
360.0	339.0	8.1	P16ML03600****	Also Fits	360.0	339.5	8.1
360.0	332.0	9.5	P16MH03600****	Also Fits	-	-	-
370.0	345.5	8.1	P16MR03700****	Also Fits	370.0	346.0	8.1
370.0	349.0	8.1	P16ML03700****	Also Fits	370.0	349.5	8.1
370.0	342.0	9.5	P16MH03700****	Also Fits	-	-	-
380.0	355.5	8.1	P16MR03800****	Also Fits	380.0	356.0	8.1
380.0	359.0	8.1	P16ML03800****	Also Fits	380.0	359.5	8.1
380.0	352.0	9.5	P16MH03800****	Also Fits	-	-	-
390.0	369.0	8.1	P16ML03900****	Also Fits	390.0	369.5	8.1
390.0	362.0	9.5	P16MH03900****	Also Fits	-	-	-
400.0	375.5	8.1	P16MR04000****	Also Fits	400.0	376.0	8.1
400.0	379.0	8.1	P16ML04000****	Also Fits	400.0	379.5	8.1
400.0	372.0	9.5	P16MH04000****	Also Fits	-	-	-
410.0	389.0	8.1	P16ML04100****	Also Fits	410.0	389.5	8.1
410.0	382.0	9.5	P16MH04100****	Also Fits	-	-	-
420.0	395.5	8.1	P16MR04200****	Also Fits	420.0	396.0	8.1
420.0	399.0	8.1	P16ML04200****	Also Fits	420.0	399.5	8.1
420.0	392.0	9.5	P16MH04200****	Also Fits	-	-	-
430.0	405.5	8.1	P16MR04300****	Also Fits	430.0	406.0	8.1
440.0	415.5	8.1	P16MR04400****	Also Fits	440.0	416.0	8.1
450.0	425.5	8.1	P16MR04500****	Also Fits	450.0	426.0	8.1
450.0	429.0	8.1	P16ML04500****	Also Fits	450.0	429.5	8.1
450.0	422.0	9.5	P16MH04500****	Also Fits	-	-	-
460.0	439.0	8.1	P16ML04600****	Also Fits	460.0	439.5	8.1
460.0	432.0	9.5	P16MH04600****	Also Fits	-	-	-

METRIC			PART NUMBER	Also Fits	METRIC		
ØD ₁	Ød ₁	L ₁			ØD ₁	Ød ₁	L ₁
Tol. H9	Tol. h9	Tol. +0.2			Tol. H9	Tol. h9	Tol. +0.2
480.0	455.5	8.1	P16MR04800****	Also Fits	480.0	456.0	8.1
480.0	459.0	8.1	P16ML04800****	Also Fits	480.0	459.5	8.1
480.0	452.0	9.5	P16MH04800****	Also Fits	-	-	-
500.0	475.5	8.1	P16MR05000****	Also Fits	500.0	476.0	8.1
500.0	479.0	8.1	P16ML05000****	Also Fits	500.0	479.5	8.1
500.0	472.0	9.5	P16MH05000****	Also Fits	-	-	-
520.0	495.5	8.1	P16MR05200****	Also Fits	520.0	496.0	8.1
520.0	499.0	8.1	P16ML05200****	Also Fits	520.0	499.5	8.1
520.0	492.0	9.5	P16MH05200****	Also Fits	-	-	-
540.0	515.5	8.1	P16MR05400****	Also Fits	540.0	516.0	8.1
550.0	529.0	8.1	P16ML05500****	Also Fits	550.0	529.5	8.1
550.0	522.0	9.5	P16MH05500****	Also Fits	-	-	-
560.0	539.0	8.1	P16ML05600****	Also Fits	560.0	539.5	8.1
560.0	532.0	9.5	P16MH05600****	Also Fits	-	-	-
590.0	569.0	8.1	P16ML05900****	Also Fits	590.0	569.5	8.1
590.0	562.0	9.5	P16MH05900****	Also Fits	-	-	-
600.0	575.5	8.1	P16MR06000****	Also Fits	600.0	576.0	8.1
600.0	579.0	8.1	P16ML06000****	Also Fits	600.0	579.5	8.1
600.0	572.0	9.5	P16MH06000****	Also Fits	-	-	-
625.0	604.0	8.1	P16ML06250****	Also Fits	625.0	604.5	8.1
625.0	597.0	9.5	P16MH06250****	Also Fits	-	-	-
650.0	625.5	8.1	P16MR06500****	Also Fits	650.0	626.0	8.1
650.0	629.0	8.1	P16ML06500****	Also Fits	650.0	629.5	8.1
650.0	622.0	9.5	P16MH06500****	Also Fits	-	-	-
700.0	672.0	9.5	P16MR07000****	Also Fits	-	-	-
700.0	675.5	8.1	P16ML07000****	Also Fits	700.0	676.0	8.1
700.0	662.0	13.8	P16MH07000****	Also Fits	-	-	-
750.0	722.0	9.5	P16MR07500****	Also Fits	-	-	-

PART NUMBER RANGE (METRIC)*

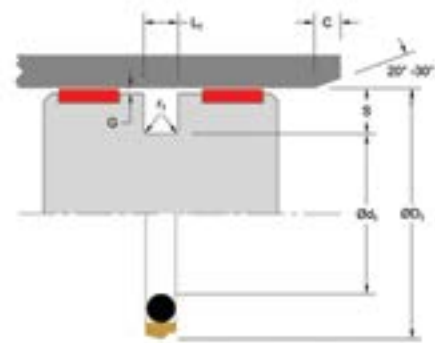
METRIC			PART NUMBER	Also Fits	METRIC		
ØD ₁	Ød ₁	L ₁			ØD ₁	Ød ₁	L ₁
Tol. H9	Tol. h9	Tol. +0.2			Tol. H9	Tol. h9	Tol. +0.2
800.0	772.0	9.5	P16MR08000****	Also Fits	-	-	-
800.0	775.5	8.1	P16ML08000****	Also Fits	800.0	776.0	8.1
800.0	762.0	13.8	P16MH08000****	Also Fits	-	-	-
850.0	822.0	9.5	P16MR08500****	Also Fits	-	-	-
850.0	812.0	13.8	P16MH08500****	Also Fits	-	-	-
860.0	835.5	8.1	P16ML08600****	Also Fits	860.0	836.0	8.1
900.0	872.0	9.5	P16MR09000****	Also Fits	-	-	-
900.0	875.5	8.1	P16ML09000****	Also Fits	900.0	876.0	8.1
900.0	862.0	13.8	P16MH09000****	Also Fits	-	-	-
920.0	895.5	8.1	P16ML09200****	Also Fits	920.0	896.0	8.1
920.0	882.0	13.8	P16MH09200****	Also Fits	-	-	-
950.0	922.0	9.5	P16MR09500****	Also Fits	-	-	-
1000.0	962.0	13.8	P16MR10000****	Also Fits	-	-	-
1000.0	972.0	9.5	P16ML10000****	Also Fits	-	-	-
1050.0	1012.0	13.8	P16MR10500****	Also Fits	-	-	-
1050.0	1022.0	9.5	P16ML10500****	Also Fits	-	-	-
1100.0	1062.0	13.8	P16MR11000****	Also Fits	-	-	-
1100.0	1072.0	9.5	P16ML11000****	Also Fits	-	-	-
1150.0	1112.0	13.8	P16MR11500****	Also Fits	-	-	-
1150.0	1122.0	9.5	P16ML11500****	Also Fits	-	-	-
1200.0	1162.0	13.8	P16MR12000****	Also Fits	-	-	-
1200.0	1172.0	9.5	P16ML12000****	Also Fits	-	-	-
1250.0	1212.0	13.8	P16MR12500****	Also Fits	-	-	-
1300.0	1262.0	13.8	P16MR13000****	Also Fits	-	-	-
1350.0	1312.0	13.8	P16MR13500****	Also Fits	-	-	-

*Please contact Hallite for custom sizes, material selection, or seal design.

PART NUMBER RANGE (INCH)*

INCH			PART NUMBER
ØD ₁	Ød ₁	L ₁	
Tol. H9	Tol. h9	Tol. +0.008	
0.500	0.307	0.087	P16ER00500****
0.562	0.369	0.087	P16ER00562****
0.625	0.432	0.087	P16ER00625****
0.687	0.494	0.087	P16ER00687****
0.750	0.557	0.087	P16EL00750****
0.750	0.329	0.165	P16EH00750****
0.812	0.525	0.126	P16ER00812****
0.812	0.391	0.165	P16EH00812****
0.875	0.588	0.126	P16ER00875****
0.875	0.454	0.165	P16EH00875****
0.937	0.650	0.126	P16ER00937****
0.937	0.516	0.165	P16EH00937****
1.000	0.713	0.126	P16ER01000****
1.000	0.579	0.165	P16EH01000****
1.062	0.775	0.126	P16ER01062****
1.062	0.641	0.165	P16EH01062****
1.125	0.838	0.126	P16ER01125****
1.125	0.704	0.165	P16EH01125****
1.187	0.900	0.126	P16ER01187****
1.187	0.766	0.165	P16EH01187****
1.250	0.963	0.126	P16ER01250****
1.250	0.829	0.165	P16EH01250****
1.312	1.025	0.126	P16ER01312****
1.312	0.891	0.165	P16EH01312****
1.375	1.088	0.126	P16ER01375****
1.375	0.954	0.165	P16EH01375****
1.437	1.150	0.126	P16ER01437****
1.437	1.016	0.165	P16EH01437****

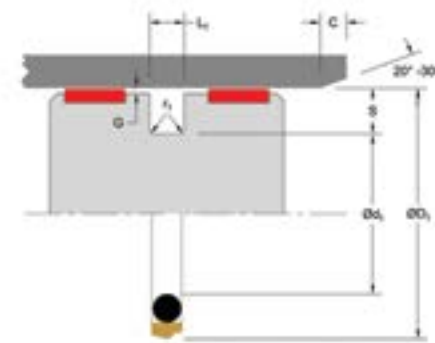




PART NUMBER RANGE (INCH)*

INCH			PART NUMBER
ØD ₁	Ød ₁	L ₁	
Tol. H9	Tol. h9	Tol. +0.008	
1.500	1.213	0.126	P16EL01500****
1.500	1.079	0.165	P16ER01500****
1.500	0.906	0.248	P16EH01500****
1.562	1.141	0.165	P16ER01563****
1.562	0.968	0.248	P16EH01563****
1.625	1.204	0.165	P16ER01625****
1.625	1.031	0.248	P16EH01625****
1.687	1.266	0.165	P16ER01687****
1.687	1.093	0.248	P16EH01687****
1.750	1.329	0.165	P16ER01750****
1.750	1.156	0.248	P16EH01750****
1.812	1.391	0.165	P16ER01812****
1.812	1.218	0.248	P16EH01812****
1.875	1.454	0.165	P16ER01875****
1.875	1.281	0.248	P16EH01875****
1.937	1.516	0.165	P16ER01937****
1.937	1.343	0.248	P16EH01937****
2.000	1.579	0.165	P16ER02000****
2.000	1.406	0.248	P16EH02000****
2.125	1.704	0.165	P16ER02125****
2.125	1.531	0.248	P16EH02125****
2.250	1.829	0.165	P16ER02250****
2.250	1.656	0.248	P16EH02250****
2.375	1.954	0.165	P16ER02375****
2.375	1.781	0.248	P16EH02375****
2.500	2.079	0.165	P16EL02500****
2.500	1.906	0.248	P16ER02500****
2.625	2.204	0.165	P16EL02625****

INCH			PART NUMBER
ØD ₁	Ød ₁	L ₁	
Tol. H9	Tol. h9	Tol. +0.008	
2.625	2.031	0.248	P16ER02625****
2.750	2.329	0.165	P16EL02750****
2.750	2.156	0.248	P16ER02750****
2.875	2.454	0.165	P16EL02875****
2.875	2.281	0.248	P16ER02875****
3.000	2.579	0.165	P16EL03000****
3.000	2.406	0.248	P16ER03000****
3.125	2.704	0.165	P16EL03125****
3.125	2.531	0.248	P16ER03125****
3.250	2.829	0.165	P16EL03250****
3.250	2.656	0.248	P16ER03250****
3.375	2.954	0.165	P16EL03375****
3.375	2.781	0.248	P16ER03375****
3.500	3.079	0.165	P16EL03500****
3.500	2.906	0.248	P16ER03500****
3.625	3.204	0.165	P16EL03625****
3.625	3.031	0.248	P16ER03625****
3.750	3.329	0.165	P16EL03750****
3.750	3.156	0.248	P16ER03750****
3.875	3.454	0.165	P16EL03875****
3.875	3.281	0.248	P16ER03875****
4.000	3.579	0.165	P16EL04000****
4.000	3.406	0.248	P16ER04000****
4.125	3.704	0.165	P16EL04125****
4.125	3.531	0.248	P16ER04125****
4.250	3.829	0.165	P16EL04250****
4.250	3.656	0.248	P16ER04250****
4.375	3.954	0.165	P16EL04375****

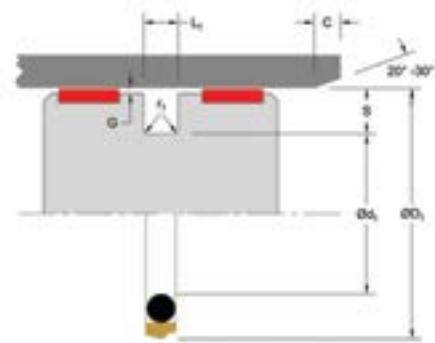


PART NUMBER RANGE (INCH)*

INCH			PART NUMBER
ØD ₁	Ød ₁	L ₁	
Tol. H9	Tol. h9	Tol. +0.008	
4.375	3.781	0.248	P16ER04375****
4.500	4.079	0.165	P16EL04500****
4.500	3.906	0.248	P16ER04500****
4.625	4.031	0.248	P16ER04625****
4.625	3.818	0.319	P16EH04625****
4.750	4.156	0.248	P16ER04750****
4.750	3.943	0.319	P16EH04750****
4.875	4.281	0.248	P16ER04875****
4.875	4.068	0.319	P16EH04875****
5.000	4.406	0.248	P16ER05000****
5.000	4.193	0.319	P16EH05000****
5.125	4.531	0.248	P16ER05125****
5.125	4.318	0.319	P16EH05125****
5.250	4.656	0.248	P16ER05250****
5.250	4.443	0.319	P16EH05250****
5.375	4.781	0.248	P16ER05375****
5.375	4.568	0.319	P16EH05375****
5.500	4.906	0.248	P16ER05500****
5.500	4.693	0.319	P16EH05500****
5.625	5.031	0.248	P16ER05625****
5.625	4.818	0.319	P16EH05625****
5.750	5.156	0.248	P16ER05750****
5.750	4.943	0.319	P16EH05750****
6.000	5.406	0.248	P16ER06000****
6.000	5.193	0.319	P16EH06000****
6.250	5.656	0.248	P16ER06250****
6.250	5.443	0.319	P16EH06250****
6.500	5.906	0.248	P16ER06500****

INCH			PART NUMBER
ØD ₁	Ød ₁	L ₁	
Tol. H9	Tol. h9	Tol. +0.008	
6.500	5.693	0.319	P16EH06500****
6.750	6.156	0.248	P16ER06750****
6.750	5.943	0.319	P16EH06750****
7.000	6.406	0.248	P16ER07000****
7.000	6.193	0.319	P16EH07000****
7.250	6.656	0.248	P16ER07250****
7.250	6.443	0.319	P16EH07250****
7.500	6.906	0.248	P16ER07500****
7.500	6.693	0.319	P16EH07500****
7.750	7.156	0.248	P16ER07750****
7.750	6.943	0.319	P16EH07750****
8.000	7.193	0.319	P16ER08000****
8.250	7.443	0.319	P16ER08250****
8.500	7.693	0.319	P16ER08500****
8.750	7.943	0.319	P16ER08750****
9.000	8.193	0.319	P16ER09000****
9.250	8.443	0.319	P16ER09250****
9.500	8.693	0.319	P16ER09500****
9.750	8.943	0.319	P16ER09750****
10.000	9.193	0.319	P16EL10000****
10.000	9.055	0.319	P16ER10000****
10.500	9.693	0.319	P16EL10500****
10.500	9.555	0.319	P16ER10500****
11.000	10.193	0.319	P16EL11000****
11.000	10.055	0.319	P16ER11000****
11.500	10.693	0.319	P16EL11500****
11.500	10.555	0.319	P16ER11500****
12.000	11.055	0.319	P16ER12000****





PART NUMBER RANGE (INCH)*

INCH			PART NUMBER
ØD ₁	Ød ₁	L ₁	
Tol. H9	Tol. h9	Tol. +0.008	
12.500	11.555	0.319	P16ER12500****
13.000	12.055	0.319	P16ER13000****
13.500	12.555	0.319	P16ER13500****
14.000	13.055	0.319	P16ER14000****
14.500	13.555	0.319	P16ER14500****
15.000	14.055	0.319	P16ER15000****
15.500	14.555	0.319	P16ER15500****
16.000	15.055	0.319	P16ER16000****

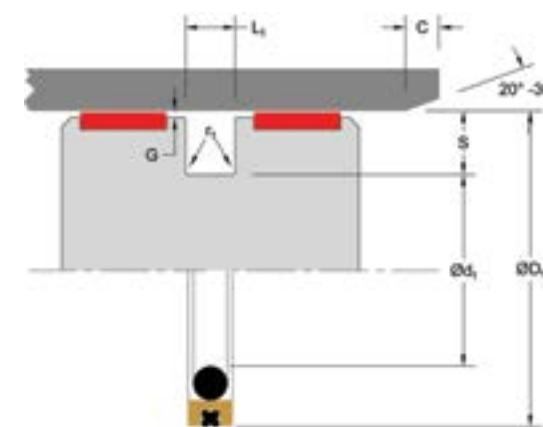
INCH			PART NUMBER
ØD ₁	Ød ₁	L ₁	
Tol. H9	Tol. h9	Tol. +0.008	
16.500	15.555	0.319	P16ER16500****
17.000	16.055	0.319	P16ER17000****
17.500	16.555	0.319	P16ER17500****
18.000	17.055	0.319	P16ER18000****
18.500	17.555	0.319	P16ER18500****
19.000	18.055	0.319	P16ER19000****
19.500	18.555	0.319	P16ER19500****
20.000	19.055	0.319	P16ER20000****

*Please contact Hallite for custom sizes, material selection, or seal design.

GPS

PISTON SEAL

Double-Acting



TECHNICAL DETAILS

The Hallite GPS is a double-acting piston seal utilizing Hallite's high-performance Armorlene® HLX PTFE paired with an elastomer energizer and x-ring for optimum performance and durability. The Armorlene® PTFE seal ring and the x-ring together provides the dynamic sealing function, while the elastomeric energizer provides the static sealing. The standard GPS seal face includes pressure notches, which makes the seal very responsive to changes in pressure or direction of travel.

Hallite GPS seals are especially effective in applications where two different types of media need to be separated such as in piston accumulators, intensifiers, and position-holding applications. This makes this seal a good choice for applications such as stabilizers, accumulators, manlifts, and industrial presses. Designed for basic grooves, the GPS seal fits the same ISO 7425-1 housing as the Hallite P16 and P54 series.



FEATURES

- Excellent in separation of two different fluids under pressure
- Compact design and groove structure allow interchangeability with the Hallite P54
- Low breakaway friction and no issues with stick-slip
- Uses energizer and x-ring to maximize sealing response at all pressure ranges to ensure best performance

Part Number Structure

GPSMR00550NHLX _

GPS	M	R	00550	N	HLX	—
PROFILE DESIGNATION	UNIT OF MEASUREMENT M = Metric E = Inch N = Inch/Square Energizer	APPLICATION Refer to <i>Installation Recommendations</i> and use designator for desired application	BORE DIAMETER Metric = mm X 10 Inch = inches X 1000	ENERGIZER MATERIAL Refer to <i>Energizer Table</i> for desired energizer material	PTFE MATERIAL Refer to <i>Material Table</i> for desired PTFE (face) material	SPECIAL FEATURE Blank = Std profile (with notches) X = No notches

OPERATING CONDITIONS

	METRIC	INCH
Maximum Speed	Up to 2.0m/sec	Up to 6.5ft/sec
Temperature Range*	-45 to 200°C	-49 to 392°F
Maximum Dynamic Pressure**	500 bar	7200 psi

*Dependent upon energizer used (NBR, FKM, etc.). **For pressures above 400 bar (5800 psi), contact Hallite Engineering.

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 FINISH RECOMMENDATIONS

SURFACE ROUGHNESS	METRIC			INCH			Rmr*
	µmRa	µmRz	µmRt	µinRa	µinRz	µinRt	
Dynamic Sealing Face ØD ₁	0.05 - 0.2	1.6 max	2 max	2 - 8	63 max	157 max	60% - 90%
Static Sealing Face 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	

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

ENERGIZER AND X-RING TABLE

ENERGIZER AND X-RING MATERIAL (SHORE A)	ENERGIZER TYPE	ENERGIZER DESIGNATION	ENERGIZER OPERATING TEMPERATURE°C	ENERGIZER OPERATING TEMPERATURE°F
NBR - 70A	O-ring/X-Ring	N	-30 to 100°C	-22 to 212°F
NBR - 70A Low temp.	O-ring/X-Ring	L	-45 to 80°C	-49 to 176°F
FKM - 75A	O-ring/X-Ring	F	-10 to 200°C	14 to 392°F
EPDM - 70A	O-ring/X-Ring	E	-45 to 145°C	-49 to 293°F
HNBR - 70A	O-ring/X-Ring	H	-25 to 150°C	-13 to 302°F
NBR - 90A	O-ring/X-Ring	Q	-30 to 100°C	-22 to 212°F
HNBR - 90A	O-ring/X-Ring	U	-25 to 150°C	-13 to 302°F
No O-ring Energizer or X-Ring*	-	X	-	-

*Seal ratings are based upon capabilities of its matched material components. Hallite cannot rate seal performance when the seal is mixed with other manufacturers' energizers/components.

SQUARE ENERGIZER AND X-RING TABLE

Available for inch sizes only

ENERGIZER AND X-RING MATERIAL (SHORE A)	ENERGIZER TYPE	ENERGIZER DESIGNATION	ENERGIZER OPERATING TEMPERATURE°C	ENERGIZER OPERATING TEMPERATURE°F
NBR - 70A	Square/X-Ring	R	-30 to 100°C	-22 to 212°F
FKM - 75A	Square/X-Ring	K	-10 to 200°C	14 to 392°F
No Energizer or X-Ring*	-	X	-	-

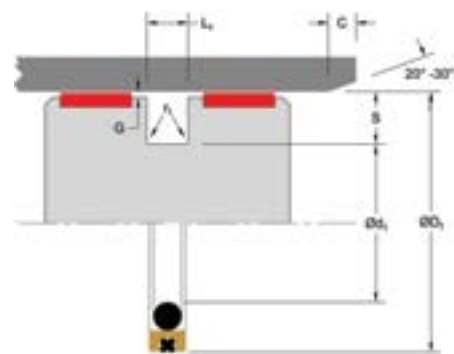
*Seal ratings are based upon capabilities of its matched material components. Hallite cannot rate seal performance when the seal is mixed with other manufacturers' energizers/components.

MATERIALS

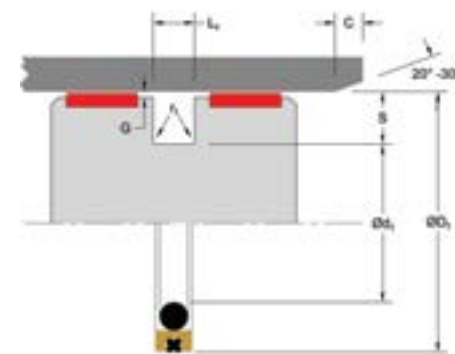
MATERIAL FEATURES AND APPLICATIONS	FILLER	MATERIAL DESIGNATOR	COLOR	TEMPERATURE RANGE°C	TEMPERATURE RANGE°F	MAXIMUM DYNAMIC PRESSURE - BAR	MAXIMUM DYNAMIC PRESSURE - PSI
ARMORLENE® HLX <ul style="list-style-type: none"> Standard material for hydraulic applications High compressive strength Excellent extrusion resistance Extended wear resistance 	Special Bronze Compound	HLX	Gold	-73 to 288°C	-100 to 550°F	400 bar	5800 psi
ARMORLENE® HLA <ul style="list-style-type: none"> Excellent in all hydraulic fluids Excellent wear resistance Excellent low-friction properties Good extrusion resistance 	Special Mineral Compound	HLA	Gray	-73 to 260°C	-100 to 500°F	400 bar	5800 psi
ARMORLENE® HCF <ul style="list-style-type: none"> Excellent in lubricating and non-lubricating hydraulic fluids (includes water) w/o zinc content Not recommended for gas sealing applications Not recommended for electrical conductive fluids 	Carbon Fiber Filled	HCF	Gray/Black	-73 to 260°C	-100 to 500°F	250 bar	3625 psi
ARMORLENE® 700 <ul style="list-style-type: none"> Excellent in all hydraulic fluids Recommended for use with soft mating surfaces Low friction and no stick-slip 	Unfilled	700	White	-184 to 204°C	-300 to 400°F	200 bar	2900 psi
ARMORLENE® 713 <ul style="list-style-type: none"> High compressive strength Excellent extrusion resistance Excellent wear properties 	60% Bronze Content	713	Bronze	-73 to 288°C	-100 to 550°F	500 bar	7250 psi

For other material options consult the Master Materials Index at the front of the catalog. If you do not find the material that you require, please contact your local Hallite sales office.





Applications with maximum radial clearance that are using nylon, phenolic, or PTFE bearings must ensure proper clearance in accordance with the bearing recommendations to avoid metal-to-metal contact. Please refer to Hallite Type 87, Type 506, and Type 533 Specification Sheets for this information.



INSTALLATION RECOMMENDATIONS

METRIC		BORE DIAMETER ØD ₁ H9	GROOVE DIAMETER	GROOVE WIDTH	RADIUS	CHAMFER	GROOVE SECTION	RADIAL CLEARANCE G _{max} *			O-RING CROSS SECTION	X-RING CROSS SECTION
DIAMETER RANGE								Ød ₁ h9	L ₁ + 0.2	r ₁		
Standard Duty Application - R	Light Duty Application - L	Ød ₁ h9	L ₁ + 0.2	r ₁	C	S	Up to 100 bar	Up to 200 bar	Up to 400 bar	O-ring	X-Ring	
15.0 - 39.9	40.0 - 79.9	D ₁ - 11.0	4.2	1.0	2.0	5.5	0.25	0.15	0.10	3.53	1.78	
40.0 - 79.9	80.0 - 132.9	D ₁ - 15.5	6.3	1.3	2.5	7.75	0.30	0.20	0.15	5.33	1.78	
80.0 - 132.9	133.0 - 252.9	D ₁ - 21.0	8.1	1.8	5.0	10.5	0.30	0.20	0.15	6.99	2.62	
133.0 - 252.9	-	D ₁ - 24.5	8.1	1.8	7.5	12.25	0.30	0.20	0.15	6.99	2.62	
253.0 - 462.9	-	D ₁ - 28.0	9.5	2.5	10.0	14.0	0.45	0.30	0.25	8.40	3.53	
463.0 - 700.0	-	D ₁ - 35.0	11.5	3.0	10.0	17.5	0.55	0.40	0.35	10.00	5.33	

At pressure >400 bar use diameter tolerance H8/f7. *Radial Clearance G_{max} = maximum permissible gap all on one side using max. tube diameter and min. clearance diameter.

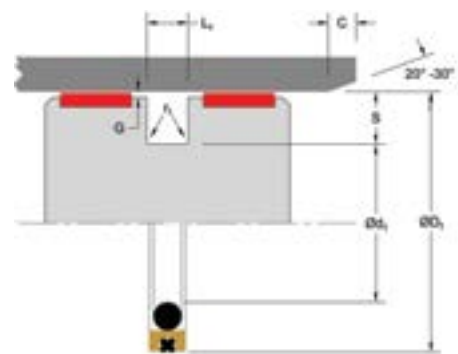
INCH		BORE DIAMETER ØD ₁ H9	GROOVE DIAMETER	GROOVE WIDTH	RADIUS	CHAMFER	GROOVE SECTION	RADIAL CLEARANCE G _{max} *			O-RING CROSS SECTION	X-RING CROSS SECTION
DIAMETER RANGE								Ød ₁ h9	L ₁ + 0.008	r ₁		
Standard Duty Application - R	Light Duty Application - L	Ød ₁ h9	L ₁ + 0.008	r ₁	C	S	Up to 1500 psi	Up to 2900 psi	Up to 5800 psi	O-ring	X-Ring	
0.500 - 1.562	1.563 - 3.125	D ₁ - 0.433	0.165	0.040	0.016	0.217	0.010	0.006	0.004	0.139	0.070	
1.563 - 3.125	3.126 - 5.250	D ₁ - 0.610	0.248	0.050	0.016	0.305	0.012	0.008	0.006	0.21	0.070	
3.126 - 5.250	5.251 - 9.999	D ₁ - 0.827	0.319	0.070	0.032	0.414	0.012	0.008	0.006	0.275	0.103	
5.251 - 9.999	-	D ₁ - 0.965	0.319	0.070	0.032	0.483	0.012	0.008	0.006	0.275	0.103	
10.000 - 18.000	-	D ₁ - 1.102	0.374	0.100	0.032	0.551	0.018	0.012	0.010	0.33	0.139	
18.001 - 27.500	-	D ₁ - 1.378	0.453	0.120	0.032	0.689	0.022	0.016	0.014	0.394	0.210	

At pressure >5800 psi use diameter tolerance H8/f7. *Radial Clearance G_{max} = maximum permissible gap all on one side using max. tube diameter and min. clearance diameter.

PART NUMBER RANGE (METRIC)*

METRIC			PART NUMBER
ØD ₁	Ød ₁	L ₁	
Tol. H9	Tol. h9	Tol. +0.2	
16.0	5.0	4.2	GPSMR00160****
18.0	7.0	4.2	GPSMR00180****
20.0	9.0	4.2	GPSMR00200****
22.0	11.0	4.2	GPSMR00220****
25.0	14.0	4.2	GPSMR00250****
28.0	17.0	4.2	GPSMR00280****
30.0	19.0	4.2	GPSMR00300****
32.0	21.0	4.2	GPSMR00320****
35.0	24.0	4.2	GPSMR00350****
40.0	29.0	4.2	GPSML00400****
42.0	31.0	4.2	GPSML00420****
45.0	34.0	4.2	GPSML00450****
48.0	37.0	4.2	GPSML00480****
50.0	39.0	4.2	GPSML00500****
50.0	34.5	6.3	GPSMR00500****
50.8	39.8	4.2	GPSML00508****
52.0	41.0	4.2	GPSML00520****
55.0	44.0	4.2	GPSML00550****
60.0	49.0	4.2	GPSML00600****
63.0	52.0	4.2	GPSML00630****
63.0	47.5	6.3	GPSMR00630****
63.5	42.5	4.2	GPSML00635****
65.0	54.0	4.2	GPSML00650****
70.0	59.0	4.2	GPSML00700****
70.0	54.5	6.3	GPSMR00700****
75.0	64.0	4.2	GPSML00750****
80.0	64.5	6.3	GPSML00800****
80.0	59.5	8.1	GPSMR00800****

METRIC			PART NUMBER
ØD ₁	Ød ₁	L ₁	
Tol. H9	Tol. h9	Tol. +0.2	
85.0	69.5	6.3	GPSML00850****
85.0	64.0	8.1	GPSMR00850****
90.0	74.5	6.3	GPSML00900****
90.0	69.0	8.1	GPSMR00900****
95.0	79.5	6.3	GPSML00950****
95.0	74.0	8.1	GPSMR00950****
100.0	84.5	6.3	GPSML01000****
100.0	79.0	8.1	GPSMR01000****
105.0	89.5	6.3	GPSML01050****
105.0	84.0	8.1	GPSMR01050****
110.0	94.5	6.3	GPSML01100****
110.0	89.0	8.1	GPSMR01100****
115.0	99.5	6.3	GPSML01150****
115.0	94.0	8.1	GPSMR01150****
120.0	104.5	6.3	GPSML01200****
120.0	99.0	8.1	GPSMR01200****
125.0	109.5	6.3	GPSML01250****
125.0	104.0	8.1	GPSMR01250****
130.0	114.5	6.3	GPSML01300****
130.0	109.0	8.1	GPSMR01300****
135.0	114.0	8.1	GPSML01350****
140.0	119.0	8.1	GPSML01400****
145.0	124.0	8.1	GPSMR01450****
150.0	129.0	8.1	GPSML01500****
155.0	134.0	8.1	GPSMR01550****
160.0	139.0	8.1	GPSML01600****
165.0	144.0	8.1	GPSMR01650****
170.0	149.0	8.1	GPSML01700****



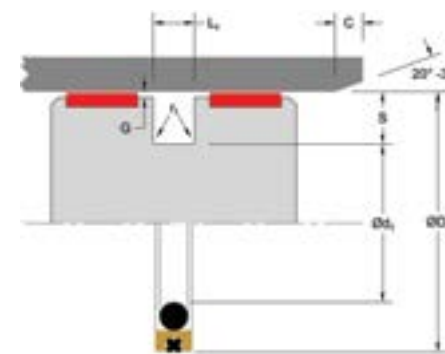
PART NUMBER RANGE (METRIC)*

METRIC			PART NUMBER
ØD ₁	Ød ₁	L ₁	
Tol. H9	Tol. h9	Tol. +0.2	
175.0	154.0	8.1	GPSMR01750****
180.0	159.0	8.1	GPSML01800****
190.0	169.0	8.1	GPSML01900****
200.0	179.0	8.1	GPSML02000****
210.0	189.0	8.1	GPSML02100****
220.0	199.0	8.1	GPSML02200****
230.0	209.0	8.1	GPSMI02300****
240.0	219.0	8.1	GPSML02400****
250.0	229.0	8.1	GPSML02500****
250.0	225.5	8.1	GPSMR02500****
280.0	252.0	9.5	GPSMR02800****
300.0	272.0	9.5	GPSMR03000****
310.0	282.0	9.5	GPSMR03100****
320.0	292.0	9.5	GPSMR03200****
350.0	322.0	9.5	GPSMR03500****
400.0	372.0	9.5	GPSMR04000****
420.0	392.0	9.5	GPSMR04200****
450.0	422.0	9.5	GPSMR04500****
480.0	445.0	11.5	GPSMR04800****
500.0	465.0	11.5	GPSMR05000****
600.0	565.0	11.5	GPSMR06000****
700.0	665.0	11.5	GPSMR07000****

*Please contact Hallite for custom sizes, material selection, or seal design.

PART NUMBER RANGE (INCH)*

INCH			PART NUMBER
ØD ₁	Ød ₁	L ₁	
Tol. H9	Tol. h9	Tol. +0.008	
1.500	1.067	0.165	GPSE01500****
1.562	1.129	0.165	GPSE01562****
1.625	1.192	0.165	GPSE01625****
1.687	1.254	0.165	GPSE01687****
1.750	1.317	0.165	GPSE01750****
1.812	1.379	0.165	GPSE01812****
1.875	1.442	0.165	GPSE01875****
1.937	1.504	0.165	GPSE01937****
2.000	1.567	0.165	GPSE02000****
2.125	1.692	0.165	GPSE02125****
2.250	1.817	0.165	GPSE02250****
2.375	1.942	0.165	GPSE02375****
2.500	2.067	0.165	GPSE02500****
2.625	2.192	0.165	GPSE02625****
2.750	2.317	0.165	GPSE02750****
2.875	2.442	0.165	GPSE02875****
3.000	2.567	0.165	GPSE03000****
3.125	2.692	0.165	GPSE03125****
3.250	2.640	0.248	GPSE03250****
3.375	2.765	0.248	GPSE03375****
3.500	2.890	0.248	GPSE03500****
3.625	3.015	0.248	GPSE03625****
3.750	3.140	0.248	GPSE03750****
3.875	3.265	0.248	GPSE03875****
4.000	3.390	0.248	GPSE04000****
4.125	3.515	0.248	GPSE04125****
4.250	3.640	0.248	GPSE04250****
4.375	3.765	0.248	GPSE04375****



PART NUMBER RANGE (INCH)*

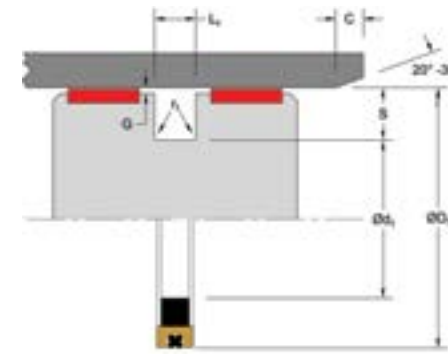
INCH			PART NUMBER
ØD ₁	Ød ₁	L ₁	
Tol. H9	Tol. h9	Tol. +0.008	
4.500	3.890	0.248	GPSE04500****
4.625	4.015	0.248	GPSE04625****
4.750	4.140	0.248	GPSE04750****
4.875	4.265	0.248	GPSE04875****
5.000	4.390	0.248	GPSE05000****
5.125	4.515	0.248	GPSE05125****
5.250	4.423	0.319	GPSE05250****
5.375	4.548	0.319	GPSE05375****
5.500	4.673	0.319	GPSE05500****
5.625	4.798	0.319	GPSE05625****
5.750	4.923	0.319	GPSE05750****
6.000	5.173	0.319	GPSE06000****
6.250	5.423	0.319	GPSE06250****
6.500	5.673	0.319	GPSE06500****
6.750	5.923	0.319	GPSE06750****
7.000	6.173	0.319	GPSE07000****
7.250	6.423	0.319	GPSE07250****
7.500	6.673	0.319	GPSE07500****
7.750	6.923	0.319	GPSE07750****
8.000	7.173	0.319	GPSE08000****
8.250	7.423	0.319	GPSE08250****
8.500	7.673	0.319	GPSE08500****
8.750	7.923	0.319	GPSE08750****
9.000	8.173	0.319	GPSE09000****
9.250	8.423	0.319	GPSE09250****
9.500	8.673	0.319	GPSE09500****
9.750	8.923	0.319	GPSE09750****
10.000	8.898	0.374	GPSE10000****

*Please contact Hallite for custom sizes, material selection, or seal design.



SQUARE ENERGIZER

GPS is also available in a square energizer variant, with alternative part numbers.



SQUARE ENERGIZER PART NUMBER RANGE (INCH)*

INCH			PART NUMBER
ØD ₁	Ød ₁	L ₁	
Tol. H9	Tol. h9	Tol. +0.008	
1.000	0.576	0.210	GPSNR01000****
1.125	0.701	0.210	GPSNR01125****
1.250	0.826	0.210	GPSNR01250****
1.375	0.951	0.210	GPSNR01375****
1.500	1.076	0.210	GPSNR01500****
1.625	1.201	0.210	GPSNR01625****
1.750	1.326	0.210	GPSNR01750****
1.875	1.451	0.210	GPSNR01875****
2.000	1.384	0.288	GPSNR02000****
2.125	1.509	0.288	GPSNR02125****
2.250	1.634	0.288	GPSNR02250****
2.375	1.759	0.288	GPSNR02375****
2.500	1.884	0.288	GPSNR02500****
2.625	2.009	0.288	GPSNR02625****
2.750	2.134	0.288	GPSNR02750****
2.875	2.259	0.288	GPSNR02875****
3.000	2.384	0.288	GPSNR03000****
3.125	2.509	0.288	GPSNR03125****
3.250	2.634	0.288	GPSNR03250****
3.375	2.759	0.288	GPSNR03375****
3.500	2.884	0.288	GPSNR03500****
3.625	3.009	0.288	GPSNR03625****
3.750	3.134	0.288	GPSNR03750****
3.875	3.259	0.288	GPSNR03875****
4.000	3.384	0.288	GPSNR04000****
4.125	3.509	0.288	GPSNR04125****
4.250	3.634	0.288	GPSNR04250****
4.375	3.759	0.288	GPSNR04375****

INCH			PART NUMBER
ØD ₁	Ød ₁	L ₁	
Tol. H9	Tol. h9	Tol. +0.008	
4.500	3.884	0.288	GPSNR04500****
4.625	4.009	0.288	GPSNR04625****
4.750	4.134	0.288	GPSNR04750****
4.875	4.259	0.288	GPSNR04875****
5.000	4.384	0.288	GPSNR05000****
5.125	4.509	0.288	GPSNR05125****
5.250	4.634	0.288	GPSNR05250****
5.375	4.535	0.375	GPSNR05375****
5.500	4.660	0.375	GPSNR05500****
5.625	4.785	0.375	GPSNR05625****
5.750	4.910	0.375	GPSNR05750****
5.875	5.035	0.375	GPSNR05875****
6.000	5.160	0.375	GPSNR06000****
6.125	5.285	0.375	GPSNR06125****
6.250	5.415	0.375	GPSNR06250****
6.375	5.540	0.375	GPSNR06375****
6.500	5.665	0.375	GPSNR06500****
6.625	5.795	0.375	GPSNR06625****
6.750	5.920	0.375	GPSNR06750****
6.875	6.045	0.375	GPSNR06875****
7.000	6.170	0.375	GPSNR07000****
7.250	6.420	0.375	GPSNR07250****
7.500	6.670	0.375	GPSNR07500****
7.750	6.915	0.375	GPSNR07750****
8.000	7.170	0.375	GPSNR08000****
8.250	7.415	0.375	GPSNR08250****
8.500	7.665	0.375	GPSNR08500****
8.750	7.915	0.375	GPSNR08750****

SQUARE ENERGIZER PART NUMBER RANGE (INCH)*

INCH			PART NUMBER
ØD ₁	Ød ₁	L ₁	
Tol. H9	Tol. h9	Tol. +0.008	
9.000	8.165	0.375	GPSNR09000****
9.250	8.420	0.375	GPSNR09250****
9.500	8.665	0.375	GPSNR09500****
9.750	8.920	0.375	GPSNR09750****
10.000	9.165	0.375	GPSNR10000****
10.250	9.340	0.375	GPSNR10250****
10.500	9.580	0.375	GPSNR10500****
10.750	9.840	0.375	GPSNR10750****
11.000	10.080	0.375	GPSNR11000****
11.250	10.340	0.375	GPSNR11250****
11.500	10.580	0.375	GPSNR11500****

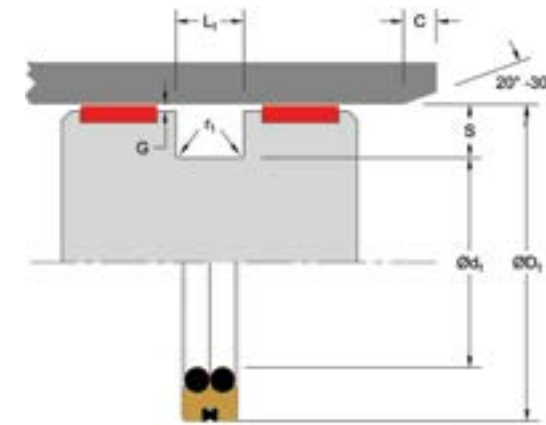
INCH			PART NUMBER
ØD ₁	Ød ₁	L ₁	
Tol. H9	Tol. h9	Tol. +0.008	
11.750	10.840	0.375	GPSNR11750****
12.000	11.080	0.375	GPSNR12000****
12.250	10.340	0.375	GPSNR12250****
12.500	11.580	0.375	GPSNR12500****
12.750	11.840	0.375	GPSNR12750****
13.000	12.080	0.375	GPSNR13000****
13.250	12.335	0.375	GPSNR13250****
13.500	12.580	0.375	GPSNR13500****
13.750	12.840	0.375	GPSNR13750****
14.000	13.080	0.375	GPSNR14000****

*Please contact Hallite for custom sizes, material selection, or seal design.

GP2

PISTON SEAL

Double-Acting



TECHNICAL DETAILS

The Hallite GP2 is a double-acting piston seal utilizing Hallite's proprietary high-performance Armorlene® HLX PTFE paired with twin premium O-ring energizers and an x-ring for optimum performance and durability. The Armorlene® PTFE seal ring and the x-ring together provides the dynamic sealing function, while the O-ring energizers provide the static sealing.

Hallite's GP2 seals are especially effective in applications where two different types of media need to be separated such as in piston accumulators, intensifiers, and position-holding applications. This makes this seal a good choice for applications in stabilizers, accumulators, manlifts, industrial machinery, and hydraulic suspension. The GP2 is well-suited for larger-diameter heavy-duty systems.



FEATURES

- Excellent sealing in applications that require separation of two different fluids
- Low breakout friction and elimination of stick-slip action
- Higher pressure rating than original GPS
- Uses an x-ring and 2 energizers to maximize sealing response at all pressure ranges to ensure best performance

Part Number Structure

GP2MR00550NHLX_

GP2	M	R	00550	N	HLX	—
PROFILE DESIGNATION	UNIT OF MEASUREMENT M = Metric E = Inch	APPLICATION Refer to <i>Installation Recommendations</i> and use designator for desired application	BORE DIAMETER Metric = mm X 10 Inch = inches X 1000	ENERGIZER MATERIAL Refer to <i>Energizer Table</i> for desired energizer material	PTFE MATERIAL Refer to <i>Material Table</i> for desired PTFE (face) material	SPECIAL FEATURE Blank = Std profile N = Notches

OPERATING CONDITIONS

	METRIC	INCH
Maximum Speed	Up to 3.0m/sec	Up to 10.0ft/sec
Temperature Range*	-45 to 200°C	-49 to 392°F
Maximum Dynamic Pressure**	600 bar	8700 psi

*Dependent upon energizer used (NBR, FKM, etc.). **For pressures above 300 bar (4350 psi), contact Hallite Engineering.

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 FINISH RECOMMENDATIONS

SURFACE ROUGHNESS	METRIC			INCH			Rmr*
	µmRa	µmRz	µmRt	µinRa	µinRz	µinRt	
Dynamic Sealing Face ØD ₁	0.05 - 0.2	1.6 max	2 max	2 - 8	63 max	157 max	60% - 90%
Static Sealing Face 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	

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

ENERGIZER AND X-RING TABLE

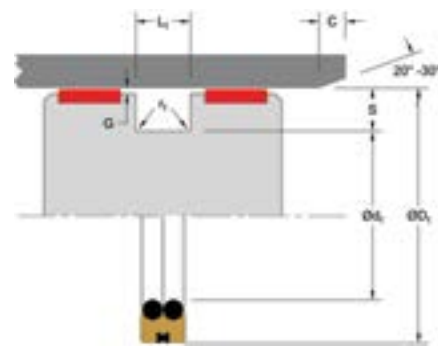
ENERGIZER AND X-RING MATERIAL (SHORE A)	ENERGIZER TYPE	ENERGIZER DESIGNATION	ENERGIZER OPERATING TEMPERATURE°C	ENERGIZER OPERATING TEMPERATURE°F
NBR - 70A	O-ring/X-Ring	N	-30 to 100°C	-22 to 212°F
NBR - 70A Low temp.	O-ring/X-Ring	L	-45 to 80°C	-49 to 176°F
FKM - 75A	O-ring/X-Ring	F	-10 to 200°C	14 to 392°F
EPDM - 70A	O-ring/X-Ring	E	-45 to 145°C	-49 to 293°F
HNBR - 70A	O-ring/X-Ring	H	-25 to 150°C	-13 to 302°F
NBR - 90A	O-ring/X-Ring	Q	-30 to 100°C	-22 to 212°F
HNBR - 90A	O-ring/X-Ring	U	-25 to 150°C	-13 to 302°F
No O-ring Energizers or X-Ring*	-	X	-	-

*Seal ratings are based upon capabilities of its matched material components. Hallite cannot rate seal performance when the seal is mixed with other manufacturers' energizers/components.

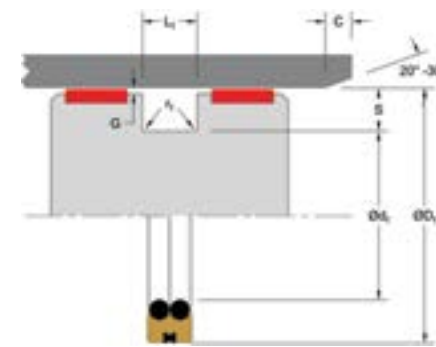
MATERIALS

MATERIAL FEATURES AND APPLICATIONS	FILLER	MATERIAL DESIGNATOR	COLOR	TEMPERATURE RANGE°C	TEMPERATURE RANGE°F	MAXIMUM DYNAMIC PRESSURE - BAR	MAXIMUM DYNAMIC PRESSURE - PSI
ARMORLENE® HLX <ul style="list-style-type: none"> Standard material for hydraulic applications High compressive strength Excellent extrusion resistance Extended wear resistance 	Special Bronze Compound	HLX	Gold	-73 to 288°C	-100 to 550°F	500 bar	7250 psi
ARMORLENE® HLA <ul style="list-style-type: none"> Excellent in all hydraulic fluids Excellent wear resistance Excellent low-friction properties Good extrusion resistance 	Special Mineral Compound	HLA	Gray	-73 to 260°C	-100 to 500°F	500 bar	7250 psi
ARMORLENE® HCF <ul style="list-style-type: none"> Excellent in lubricating and non-lubricating hydraulic fluids (includes water) w/o zinc content Not recommended for gas sealing applications Not recommended for electrical conductive fluids 	Carbon Fiber Filled	HCF	Gray/Black	-73 to 260°C	-100 to 500°F	250 bar	3625 psi
ARMORLENE® 700 <ul style="list-style-type: none"> Excellent in all hydraulic fluids Recommended for use with soft mating surfaces Low friction and no stick-slip 	Unfilled	700	White	-184 to 204°C	-300 to 400°F	200 bar	2900 psi
ARMORLENE® 713 <ul style="list-style-type: none"> High compressive strength Excellent extrusion resistance Excellent wear properties 	60% Bronze Content	713	Bronze	-73 to 288°C	-100 to 550°F	600 bar	8700 psi

For other material options consult the Master Materials Index at the front of the catalog. If you do not find the material that you require, please contact your local Hallite sales office.



Applications with maximum radial clearance that are using nylon, phenolic, or PTFE bearings must ensure proper clearance in accordance with the bearing recommendations to avoid metal-to-metal contact. Please refer to Hallite Type 87, Type 506, and Type 533 Specification Sheets for this information.



INSTALLATION RECOMMENDATIONS

METRIC		BORE DIAMETER ØD ₁ H9	GROOVE DIAMETER	GROOVE WIDTH	RADIUS	CHAMFER	GROOVE SECTION	RADIAL CLEARANCE G _{max} *			O-RING CROSS SECTION	X-RING CROSS SECTION
Standard Duty Application - R	Heavy Duty Application - H							Up to 100 bar	Up to 200 bar	Up to 300 bar		
DIAMETER RANGE		Ød ₁ h9	L ₁ + 0.2	r ₁	C	S	Up to 100 bar	Up to 200 bar	Up to 300 bar	O-ring	X-Ring	
40.0 - 79.9	25.0 - 39.9	D ₁ - 10.0	6.3	0.6	2.5	5.00	0.30	0.20	0.15	2.62	1.78	
80.0 - 132.9	50.0 - 79.9	D ₁ - 13.0	8.3	1.0	5	6.50	0.40	0.30	0.15	3.53	2.62	
133.0 - 462.9	100.0 - 132.9	D ₁ - 18.0	12.3	1.3	7.5	9.00	0.40	0.30	0.20	5.33	3.53	
463.0 - 700.0	425.0 - 462.9	D ₁ - 31.0	16.3	1.8	10	15.50	0.50	0.40	0.30	6.99	5.33	

At pressure >300 bar use diameter tolerance H8/f7.

*Radial Clearance G_{max} = maximum permissible gap all on one side using max. tube diameter and min. clearance diameter.

INCH		BORE DIAMETER ØD ₁ H9	GROOVE DIAMETER	GROOVE WIDTH	RADIUS	CHAMFER	GROOVE SECTION	RADIAL CLEARANCE G _{max} *		O-RING CROSS SECTION	X-RING CROSS SECTION
Standard Duty Application - R	Heavy Duty Application - H							Up to 1500 psi	Up to 4350 psi		
DIAMETER RANGE		Ød ₁ h9	L ₁ + 0.2	r ₁	C	S	Up to 1500 psi	Up to 4350 psi	O-ring	X-Ring	
1.500 - 2.999	-	D ₁ - 0.394	0.248	0.005	2.500	0.197	0.012	0.009	0.103	0.070	
3.000 - 4.999	1.500 - 2.999	D ₁ - 0.512	0.326	0.010	5.000	0.256	0.013	0.010	0.139	0.103	
5.000 - 11.999	3.000 - 4.999	D ₁ - 0.709	0.484	0.015	7.500	0.354	0.014	0.011	0.210	0.139	
12.000 - 26.999	5.000 - 11.999	D ₁ - 1.220	0.642	0.015	10.000	0.610	0.016	0.013	0.275	0.210	

At pressure >4350 psi use diameter tolerance H8/f7.

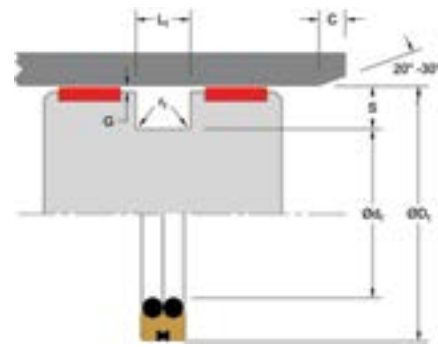
*Radial Clearance G_{max} = maximum permissible gap all on one side using max. tube diameter and min. clearance diameter.

PART NUMBER RANGE (METRIC)*

METRIC			PART NUMBER
ØD ₁	Ød ₁	L ₁	
Tol. H9	Tol. h9	Tol. +0.2	
40.0	30.0	6.3	GP2MR00400****
42.0	32.0	6.3	GP2MR00420****
45.0	35.0	6.3	GP2MR00450****
48.0	38.0	6.3	GP2MR00480****
50.0	40.0	6.3	GP2MR00500****
52.0	42.0	6.3	GP2MR00520****
55.0	45.0	6.3	GP2MR00550****
60.0	50.0	6.3	GP2MR00600****
63.0	53.0	6.3	GP2MR00630****
65.0	55.0	6.3	GP2MR00650****
70.0	60.0	6.3	GP2MR00700****
75.0	65.0	6.3	GP2MR00750****
80.0	67.0	8.3	GP2MR00800****
85.0	72.0	8.3	GP2MR00850****
90.0	77.0	8.3	GP2MR00900****
95.0	82.0	8.3	GP2MR00950****
100.0	87.0	8.3	GP2MR01000****
105.0	92.0	8.3	GP2MR01050****
110.0	97.0	8.3	GP2MR01100****
115.0	102.0	8.3	GP2MR01150****
120.0	107.0	8.3	GP2MR01200****
125.0	112.0	8.3	GP2MR01250****
130.0	117.0	8.3	GP2MR01300****
135.0	117.0	12.3	GP2MR01350****
140.0	122.0	12.3	GP2MR01400****
150.0	132.0	12.3	GP2MR01500****
160.0	142.0	12.3	GP2MR01600****
170.0	152.0	12.3	GP2MR01700****

METRIC			PART NUMBER
ØD ₁	Ød ₁	L ₁	
Tol. H9	Tol. h9	Tol. +0.2	
180.0	162.0	12.3	GP2MR01800****
190.0	172.0	12.3	GP2MR01900****
200.0	182.0	12.3	GP2MR02000****
210.0	192.0	12.3	GP2MR02100****
220.0	202.0	12.3	GP2MR02200****
230.0	212.0	12.3	GP2MR02300****
240.0	222.0	12.3	GP2MR02400****
250.0	232.0	12.3	GP2MR02500****
280.0	262.0	12.3	GP2MR02800****
300.0	282.0	12.3	GP2MR03000****
320.0	302.0	12.3	GP2MR03200****
350.0	332.0	12.3	GP2MR03500****
400.0	382.0	12.3	GP2MR04000****
420.0	402.0	12.3	GP2MR04200****
450.0	432.0	12.3	GP2MR04500****
480.0	449.0	16.3	GP2MR04800****
500.0	469.0	16.3	GP2MR05000****
600.0	569.0	16.3	GP2MR06000****
700.0	669.0	16.3	GP2MR07000****

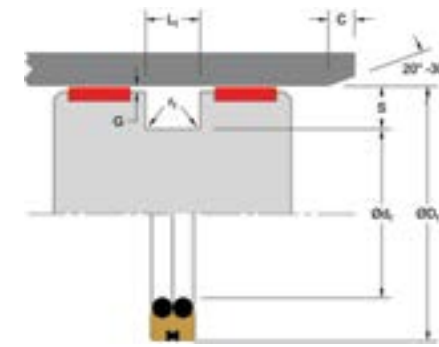
*Please contact Hallite for custom sizes, material selection, or seal design.



PART NUMBER RANGE (INCH)*

INCH			PART NUMBER
ØD ₁	Ød ₁	L ₁	
Tol. H9	Tol. h9	Tol. +0.008	
1.500	1.106	0.248	GP2ER01500****
1.562	1.168	0.248	GP2ER01562****
1.625	1.231	0.248	GP2ER01625****
1.687	1.293	0.248	GP2ER01687****
1.750	1.356	0.248	GP2ER01750****
1.812	1.418	0.248	GP2ER01812****
1.875	1.481	0.248	GP2ER01875****
1.937	1.543	0.248	GP2ER01937****
2.000	1.606	0.248	GP2ER02000****
2.125	1.731	0.248	GP2ER02125****
2.250	1.856	0.248	GP2ER02250****
2.375	1.981	0.248	GP2ER02375****
2.500	2.106	0.248	GP2ER02500****
2.625	2.231	0.248	GP2ER02625****
2.750	2.356	0.248	GP2ER02750****
2.875	2.481	0.248	GP2ER02875****
3.000	2.488	0.326	GP2ER03000****
3.125	2.613	0.326	GP2ER03125****
3.250	2.738	0.326	GP2ER03250****
3.375	2.863	0.326	GP2ER03375****
3.500	2.988	0.326	GP2ER03500****
3.625	3.113	0.326	GP2ER03625****
3.750	3.238	0.326	GP2ER03750****
3.875	3.363	0.326	GP2ER03875****
4.000	3.488	0.326	GP2ER04000****
4.125	3.613	0.326	GP2ER04125****
4.250	3.738	0.326	GP2ER04250****
4.375	3.863	0.326	GP2ER04375****

INCH			PART NUMBER
ØD ₁	Ød ₁	L ₁	
Tol. H9	Tol. h9	Tol. +0.008	
4.500	3.988	0.326	GP2ER04500****
4.625	4.113	0.326	GP2ER04625****
4.750	4.238	0.326	GP2ER04750****
4.875	4.363	0.326	GP2ER04875****
5.000	4.291	0.484	GP2ER05000****
5.125	4.416	0.484	GP2ER05125****
5.250	4.541	0.484	GP2ER05250****
5.375	4.666	0.484	GP2ER05375****
5.500	4.791	0.484	GP2ER05500****
5.625	4.916	0.484	GP2ER05625****
5.750	5.041	0.484	GP2ER05750****
5.875	5.166	0.484	GP2ER05875****
6.000	5.291	0.484	GP2ER06000****
6.250	5.541	0.484	GP2ER06250****
6.500	5.791	0.484	GP2ER06500****
6.750	6.041	0.484	GP2ER06750****
7.000	6.291	0.484	GP2ER07000****
7.250	6.541	0.484	GP2ER07250****
7.500	6.791	0.484	GP2ER07500****
7.750	7.041	0.484	GP2ER07750****
8.000	7.291	0.484	GP2ER08000****
8.250	7.541	0.484	GP2ER08250****
8.500	7.791	0.484	GP2ER08500****
8.750	8.041	0.484	GP2ER08750****
9.000	8.291	0.484	GP2ER09000****
9.250	8.541	0.484	GP2ER09250****
9.500	8.791	0.484	GP2ER09500****
9.750	9.041	0.484	GP2ER09750****



PART NUMBER RANGE (INCH)*

INCH			PART NUMBER
ØD ₁	Ød ₁	L ₁	
Tol. H9	Tol. h9	Tol. +0.008	
10.000	9.291	0.484	GP2ER10000****
10.500	9.791	0.484	GP2ER10500****
11.000	10.291	0.484	GP2ER11000****
11.500	10.791	0.484	GP2ER11500****
12.000	10.78	0.642	GP2ER12000****
12.500	11.28	0.642	GP2ER12500****
13.000	11.78	0.642	GP2ER13000****
13.500	12.28	0.642	GP2ER13500****
14.000	12.78	0.642	GP2ER14000****
14.500	13.28	0.642	GP2ER14500****
15.000	13.78	0.642	GP2ER15000****

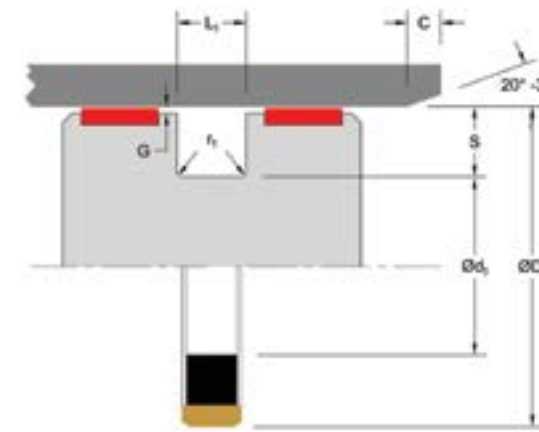
INCH			PART NUMBER
ØD ₁	Ød ₁	L ₁	
Tol. H9	Tol. h9	Tol. +0.008	
15.500	14.28	0.642	GP2ER15500****
16.000	14.78	0.642	GP2ER16000****
16.500	15.28	0.642	GP2ER16500****
17.000	15.78	0.642	GP2ER17000****
17.500	16.28	0.642	GP2ER17500****
18.000	16.78	0.642	GP2ER18000****
18.500	17.28	0.642	GP2ER18500****
19.000	17.78	0.642	GP2ER19000****
19.500	18.28	0.642	GP2ER19500****
20.000	18.78	0.642	GP2ER20000****

*Please contact Hallite for custom sizes, material selection, or seal design.

PFR

PISTON SEAL

Double-Acting



TECHNICAL DETAILS

The Hallite PFR is a chamfered, double-acting piston seal that performs well in both high- and low-pressure systems. The PFR has chamfers on the primary sealing face paired with either a square or an O-ring elastomer energizer. Typically, the square energizer is preferred for heavy-duty applications, as it provides superior interference and stability in the groove. High-performance Armorlene® materials, like HLX, provide outstanding wear and extrusion-resistance properties as well as large range of temperature and media compatibility.

Hallite's PFR seal is well-suited for a variety of hydraulic and pneumatic reciprocating applications. Hallite recommends proper guidance (see Hallite Bearings section) be used with this seal in heavy-duty applications. The PFR seal is available in a variety of Hallite's high-performance Armorlene® materials to suit a wide range of demanding applications.

This seal is designed to fit the ANSI B93.32-1973 and NFPAT3.19.18 housing size.



FEATURES

- Precision machined bronze/PTFE cap ring
- High-strength compression-molded material
- Chamfered corners for easier installation
- Low friction, no stick-slip issues
- Wide range of materials available

Part Number Structure

PFRR01250NHLX _

PFR	E	R	01250	R	HLX	—
PROFILE DESIGNATION	UNIT OF MEASUREMENT M = Metric E = Inch	APPLICATION Refer to <i>Installation Recommendations</i> and use designator for desired application	BORE DIAMETER Metric = mm X 10 Inch = inches X 1000	ENERGIZER MATERIAL Refer to <i>Energizer Table</i> for desired energizer material	PTFE MATERIAL Refer to <i>Material Table</i> for desired PTFE (face) material	SPECIAL FEATURE Blank = Std profile N Notches

OPERATING CONDITIONS

	METRIC	INCH
Maximum Speed	Up to 4.0m/sec	Up to 13.0ft/sec
Temperature Range*	-45 to 200°C	-49 to 392°F
Maximum Dynamic Pressure	350 bar	5000 psi

*Dependent upon energizer used (NBR, FKM, etc.).

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 FINISH RECOMMENDATIONS

SURFACE ROUGHNESS	METRIC			INCH			Rmr*
	µmRa	µmRz	µmRt	µinRa	µinRz	µinRt	
Dynamic Sealing Face ØD ₁	0.05 - 0.2	1.6 max	2 max	2 - 8	63 max	157 max	60% - 90%
Static Sealing Face 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	

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

ENERGIZER TABLE

ENERGIZER MATERIAL (SHORE A)	ENERGIZER TYPE	ENERGIZER DESIGNATION	ENERGIZER OPERATING TEMPERATURE°C	ENERGIZER OPERATING TEMPERATURE°F
NBR - 70A	Square	R	-30 to 100°C	-22 to 212°F
No Energizer*	None	X	-	-

*Seal ratings are based upon capabilities of its matched material components. Hallite cannot rate seal performance when the seal is mixed with other manufacturers' energizers/components.

MATERIALS

MATERIAL FEATURES AND APPLICATIONS	FILLER	MATERIAL DESIGNATOR	COLOR	TEMPERATURE RANGE°C	TEMPERATURE RANGE°F	MAXIMUM DYNAMIC PRESSURE - BAR	MAXIMUM DYNAMIC PRESSURE - PSI
ARMORLENE® HLX <ul style="list-style-type: none"> Standard material for hydraulic applications High compressive strength Excellent extrusion resistance Extended wear resistance 	Special Bronze Compound	HLX	Gold	-73 to 288°C	-100 to 550°F	350 bar	5000 psi
ARMORLENE® 702 <ul style="list-style-type: none"> Excellent in lubricating and non-lubricating hydraulic fluids Good low-friction properties Excellent extrusion resistance Good chemical resistance 	Glass Molybdenum Disulfide	702	Gray	-73 to 260°C	-100 to 500°F	300 bar	4350 psi
ARMORLENE® 706 <ul style="list-style-type: none"> Excellent in lubricating and non-lubricating hydraulic fluids Excellent extrusion resistance Good chemical resistance Good dielectrical properties 	15% Glass	706	Off-White	-73 to 260°C	-100 to 500°F	300 bar	4350 psi
ARMORLENE® 701 <ul style="list-style-type: none"> Excellent in lubricating and non-lubricating hydraulic fluids Excellent extrusion resistance Good chemical resistance Good dielectrical properties 	25% Glass	701	Off-White	-73 to 260°C	-100 to 500°F	350 bar	5000 psi

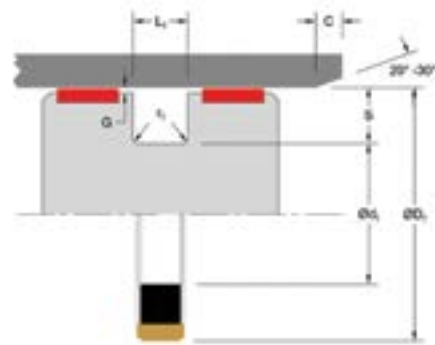
For other material options consult the Master Materials Index at the front of the catalog. If you do not find the material that you require please contact your local Hallite sales office.

INSTALLATION RECOMMENDATIONS

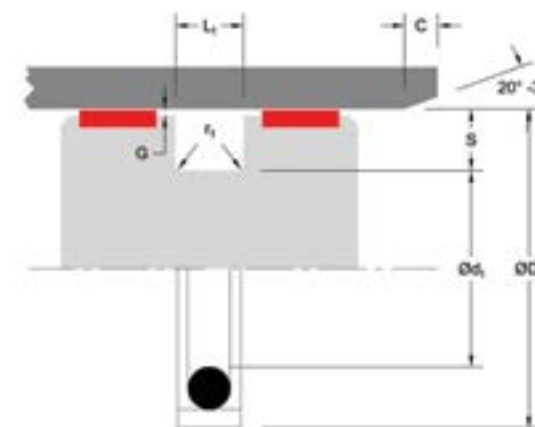
INCH		GROOVE DIAMETER	GROOVE WIDTH	RADIUS	CHAMFER	GROOVE SECTION	RADIAL CLEARANCE G max*		
Standard Duty Application - R	Heavy Duty Application - H						Ød ₁ h9	L ₁ + 0.008	r ₁
1.000 - 2.999	-	D1 - 0.308	0.129	0.016	0.125	0.154	0.026	0.010	0.006
3.000 - 5.000	1.000 - 2.999	D1 - 0.555	0.284	0.024	0.260	0.278	0.040	0.030	0.007
5.001 - 8.999	3.000 - 5.001	D1 - 0.762	0.379	0.032	0.325	0.381	0.050	0.033	0.008
9.000 - 15.000	5.001 - 8.999	D1 - 0.878	0.379	0.032	0.325	0.439	0.064	0.044	0.009
15.001 - 50.000	9.000-15.000	D1 - 1.396	0.505	0.032	0.325	0.698	0.078	0.055	0.010

*Radial Clearance G max. = maximum permissible gap all on one side using max. tube diameter and min. clearance diameter.





Applications with maximum radial clearance that are using nylon, phenolic, or PTFE bearings must ensure proper clearance in accordance with the bearing recommendations to avoid metal-to-metal contact. Please refer to Hallite Type 87, Type 506, and Type 533 Specification Sheets for this information.



G54

PISTON SEAL

Double-Acting

PART NUMBER RANGE (INCH)*

INCH			PART NUMBER
ØD ₁	Ød ₁	L ₁	
Tol. H9	Tol. h9	Tol. +0.008	
1.000	0.692	0.129	PFRER01000RHLX
1.250	0.942	0.129	PFRER01250RHLX
1.500	1.192	0.129	PFRER01500RHLX
1.750	1.442	0.129	PFRER01750RHLX
2.000	1.692	0.129	PFRER02000RHLX
2.250	1.942	0.129	PFRER02250RHLX
2.500	2.192	0.129	PFRER02500RHLX
2.750	2.442	0.129	PFRER02750RHLX
3.000	2.445	0.284	PFRER03000RHLX
3.250	2.695	0.284	PFRER03250RHLX
3.500	2.945	0.284	PFRER03500RHLX
3.750	3.195	0.284	PFRER03750RHLX
4.000	3.445	0.284	PFRER04000RHLX
4.125	3.570	0.284	PFRER04125RHLX
4.250	3.695	0.284	PFRER04250RHLX
4.500	3.945	0.284	PFRER04500RHLX
4.750	4.195	0.284	PFRER04750RHLX
5.000	4.445	0.284	PFRER05000RHLX
5.250	4.488	0.379	PFRER05250RHLX

INCH			PART NUMBER
ØD ₁	Ød ₁	L ₁	
Tol. H9	Tol. h9	Tol. +0.008	
5.500	4.738	0.379	PFRER05500RHLX
5.750	4.988	0.379	PFRER05750RHLX
6.000	5.238	0.379	PFRER06000RHLX
6.250	5.488	0.379	PFRER06250RHLX
6.500	5.738	0.379	PFRER06500RHLX
7.000	6.238	0.379	PFRER07000RHLX
7.250	6.488	0.379	PFRER07250RHLX
7.500	6.738	0.379	PFRER07500RHLX
7.750	6.988	0.379	PFRER07750RHLX
8.000	7.238	0.379	PFRER08000RHLX
8.250	7.488	0.379	PFRER08250RHLX
8.500	7.738	0.379	PFRER08500RHLX
9.000	8.122	0.379	PFRER09000RHLX
9.500	8.622	0.379	PFRER09500RHLX
10.000	9.122	0.379	PFRER10000RHLX
11.000	10.122	0.379	PFRER11000RHLX
12.000	11.122	0.379	PFRER12000RHLX
13.000	12.122	0.379	PFRER13000RHLX
14.000	13.122	0.379	PFRER14000RHLX

*Please contact Hallite for custom sizes, material selection, or seal design.

TECHNICAL DETAILS

The Hallite G54 is a double-acting, O-ring energized, low-friction piston seal that performs well in both high- and low-pressure systems. Its design has square-cut edges and is often preferred in glass-filled high-performance Armorlene® materials, such as HQ6 or 701, to provide outstanding wear and extrusion-resistance properties as well as large range of temperature and media compatibility. The G54 has a proven design pedigree as a high-performance seal used in demanding applications.

Used successfully for years in challenging applications in construction equipment, machine tools, material handling, agricultural equipment, and other industries, the Hallite G54 is a proven compact, double-acting piston sealing solution. This seal is available to fit a variety of housing sizes, including the ISO 7425-1 grooves. Hallite recommends proper guidance be used with this seal in heavy-duty applications (see Hallite Bearings section).

This seal is available in a variety of Hallite's high-performance Armorlene® materials to suit a wide range of demanding applications.



FEATURES

- Compact design to save metal spacing
- High service temperature, long wear, and high extrusion resistance
- Effective O-ring and face ring pressure energized
- Able to handle higher service pressure applications

Part Number Structure

G54MR00900NHQ6 _

G54	M	R	00900	N	HQ6	—
PROFILE DESIGNATION	UNIT OF MEASUREMENT M = Metric E = Inch	APPLICATION Refer to <i>Installation Recommendations</i> and use designator for desired application	BORE DIAMETER Metric = mm X 10 Inch = inches X 1000	ENERGIZER MATERIAL Refer to <i>Energizer Table</i> for desired energizer material	PTFE MATERIAL Refer to <i>Material Table</i> for desired PTFE (face) material	SPECIAL FEATURE Blank = Std profile N = Notches

OPERATING CONDITIONS

	METRIC	INCH
Maximum Speed	Up to 4.0m/sec	Up to 12.0ft/sec
Temperature Range*	-45 to 200°C	-49 to 392°F
Maximum Dynamic Pressure**	400 bar	5800 psi

*Dependent upon energizer used (NBR, FKM, etc.). **For pressures above 300 bar (4350 psi), contact Hallite Engineering.

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 FINISH RECOMMENDATIONS

SURFACE ROUGHNESS	METRIC			INCH			Rmr*
	µmRa	µmRz	µmRt	µinRa	µinRz	µinRt	
Dynamic Sealing Face ØD ₁	0.05 - 0.2	1.6 max	2 max	2 - 8	63 max	157 max	60% - 90%
Static Sealing Face 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	

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

ENERGIZER TABLE

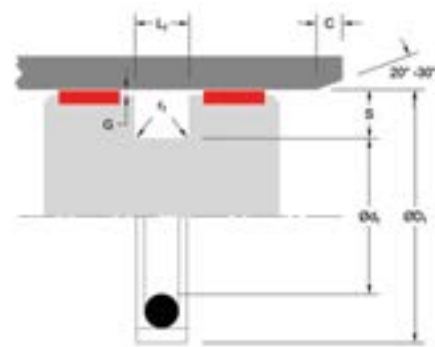
ENERGIZER MATERIAL (SHORE A)	ENERGIZER TYPE	ENERGIZER DESIGNATION	ENERGIZER OPERATING TEMPERATURE°C	ENERGIZER OPERATING TEMPERATURE°F
NBR - 70A	O-ring	N	-30 to 100°C	-22 to 212°F
NBR - 70A Low temp.	O-ring	L	-45 to 80°C	-49 to 176°F
FKM - 75A	O-ring	F	-10 to 200°C	14 to 392°F
EPDM - 70A	O-ring	E	-45 to 145°C	-49 to 293°F
HNBR - 70A	O-ring	H	-25 to 150°C	-13 to 302°F
NBR - 90A	O-ring	Q	-30 to 100°C	-22 to 212°F
HNBR - 90A	O-ring	U	-25 to 150°C	-13 to 302°F
No Energizer*	None	X	-	-

*Seal ratings are based upon capabilities of its matched material components. Hallite cannot rate seal performance when the seal is mixed with other manufacturers' energizers/components.

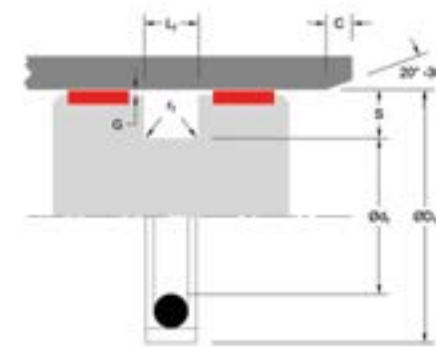
MATERIALS

MATERIAL FEATURES AND APPLICATIONS	FILLER	MATERIAL DESIGNATOR	COLOR	TEMPERATURE RANGE°C	TEMPERATURE RANGE°F	MAXIMUM DYNAMIC PRESSURE - BAR	MAXIMUM DYNAMIC PRESSURE - PSI
ARMORLENE® HQ6* <ul style="list-style-type: none"> Standard material for G16 and G54 profiles Excellent in lubricating and non-lubricating hydraulic fluids Excellent extrusion resistance Excellent chemical resistance 	Special Glass Compound	HQ6	White	-73 to 288°C	-100 to 500°F	400 bar	5800 psi
ARMORLENE® 701 <ul style="list-style-type: none"> Excellent in lubricating and non-lubricating hydraulic fluids Excellent extrusion resistance Good chemical resistance Good dielectric properties 	25% Glass	701	Off-White	-73 to 260°C	-100 to 500°F	400 bar	5800 psi
ARMORLENE® 706 <ul style="list-style-type: none"> Excellent in lubricating and non-lubricating hydraulic fluids Excellent extrusion resistance Good chemical resistance Good dielectric properties 	15% Glass	706	Off-White	-73 to 260°C	-100 to 500°F	350 bar	5000 psi

*Available up to 380mm diameter. For other material options consult the Master Materials Index at the front of the catalog. If you do not find the material that you require, please contact your local Hallite sales office.



Applications with maximum radial clearance that are using nylon, phenolic, or PTFE bearings must ensure proper clearance in accordance with the bearing recommendations to avoid metal-to-metal contact. Please refer to Hallite Type 87, Type 506, and Type 533 Specification Sheets for this information.



G54

PISTON SEAL
Double-Acting

INSTALLATION RECOMMENDATIONS

METRIC			BORE DIAMETER ØD ₁ H9	GROOVE DIAMETER	GROOVE WIDTH	RADIUS	CHAMFER	GROOVE SECTION	RADIAL CLEARANCE G _{max} *			O-RING CROSS SECTION
DIAMETER RANGE									Ød ₁ h9	L ₁ + 0.2	r ₁	
Standard Duty Application - R	Light Duty Application - L	Heavy Duty Application - H	Ød ₁ h9	L ₁ + 0.2	r ₁	C	S	Up to 100 bar	Up to 200 bar	Up to 300 bar	O-ring	
8.0 - 14.9	15.0 - 39.9	-	D ₁ - 4.9	2.2	0.4	2.0	2.45	0.30	0.20	0.15	1.78	
15.0 - 39.9	40.0 - 79.9	-	D ₁ - 7.5	3.2	0.6	3.0	3.75	0.40	0.25	0.15	2.62	
40.0 - 79.9	80.0 - 132.9	15.0 - 39.9	D ₁ - 11.0	4.2	1.0	4.0	5.50	0.40	0.25	0.20	3.53	
80.0 - 132.9	133.0 - 329.9	40.0 - 79.9	D ₁ - 15.5	6.3	1.3	6.0	7.75	0.50	0.30	0.20	5.33	
133.0 - 329.9	330.0 - 669.9	80.0 - 132.9	D ₁ - 21.0	8.1	1.8	8.0	10.50	0.60	0.35	0.25	6.99	
330.0 - 669.9	670.0 - 999.9	133.0 - 329.9	D ₁ - 24.5	8.1	1.8	8.0	12.25	0.60	0.35	0.25	6.99	
670.0 - 999.9	≥ 1000.0	330.0 - 669.9	D ₁ - 28.0	9.5	2.5	9.0	14.00	0.70	0.50	0.30	8.40	
≥ 1000.0	-	670.0 - 999.9	D ₁ - 38.0	13.8	3.0	10.0	19.00	1.00	0.70	0.60	12.00	

At pressure >300 bar use diameter tolerance H8/f7.

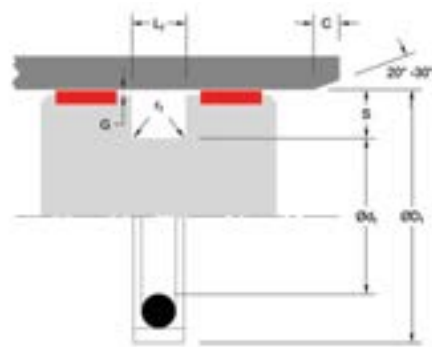
*Radial Clearance G_{max} = maximum permissible gap all on one side using max. tube diameter and min. clearance diameter.

Temperature Range °C	-30 TO 80		-30 TO 100	
Max. Pressure Bar	300	200	240	160
At Speed v m/s	2	4	2	4

PART NUMBER RANGE (METRIC)*

METRIC			PART NUMBER
ØD ₁	Ød ₁	L ₁	
Tol. H9	Tol. h9	Tol. +0.2	
8.0	3.1	2.2	G54MR00080****
10.0	5.1	2.2	G54MR00100****
12.0	7.1	2.2	G54MR00120****
14.0	9.1	2.2	G54MR00140****
15.0	7.5	3.2	G54MR00150****
16.0	11.1	2.2	G54ML00160****
16.0	8.5	3.2	G54MR00160****
18.0	13.1	2.2	G54ML00180****
18.0	10.5	3.2	G54MR00180****
20.0	15.1	2.2	G54ML00200****
20.0	12.5	3.2	G54MR00200****
21.0	13.5	3.2	G54MR00210****
22.0	17.1	2.2	G54ML00220****
22.0	14.5	3.2	G54MR00220****
24.0	16.5	3.2	G54MR00240****
25.0	20.1	2.2	G54ML00250****
25.0	17.5	3.2	G54MR00250****
25.0	14.0	4.2	G54MH00250****
28.0	20.5	3.2	G54MR00280****
30.0	22.5	3.2	G54MR00300****
32.0	27.1	2.2	G54ML00320****
32.0	24.5	3.2	G54MR00320****
32.0	21.0	4.2	G54MH00320****
35.0	27.5	3.2	G54MR00350****
35.0	24.0	4.2	G54MH00350****
36.0	28.5	3.2	G54MR00360****
38.0	30.5	3.2	G54MR00380****
40.0	32.5	3.2	G54ML00400****

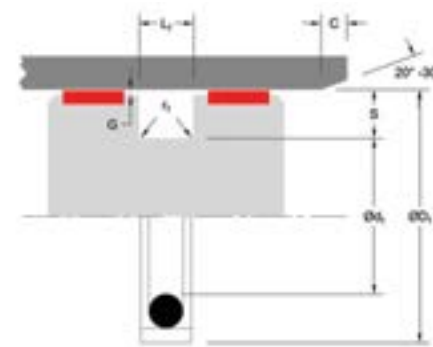
METRIC			PART NUMBER
ØD ₁	Ød ₁	L ₁	
Tol. H9	Tol. h9	Tol. +0.2	
40.0	29.0	4.2	G54MR00400****
42.0	31.0	4.2	G54MR00420****
45.0	34.0	4.2	G54MR00450****
48.0	37.0	4.2	G54MR00480****
50.0	42.5	3.2	G54ML00500****
50.0	39.0	4.2	G54MR00500****
50.0	34.5	6.3	G54MH00500****
50.8	43.3	3.2	G54ML00508****
50.8	39.8	4.2	G54MR00508****
52.0	41.0	4.2	G54MR00520****
53.0	42.0	4.2	G54MR00530****
55.0	44.0	4.2	G54MR00550****
57.0	46.0	4.2	G54MR00570****
58.0	47.0	4.2	G54MR00580****
60.0	49.0	4.2	G54MR00600****
62.0	51.0	4.2	G54MR00620****
63.0	52.0	4.2	G54MR00630****
63.0	47.5	6.3	G54MH00630****
65.0	54.0	4.2	G54MR00650****
68.0	57.0	4.2	G54MR00680****
70.0	59.0	4.2	G54MR00700****
70.0	54.5	6.3	G54MH00700****
75.0	64.0	4.2	G54MR00750****
75.0	59.5	6.3	G54MH00750****
80.0	69.0	4.2	G54ML00800****
80.0	64.5	6.3	G54MR00800****
80.0	59.0	8.1	G54MH00800****
82.5	67.0	6.3	G54MR00825****



PART NUMBER RANGE (METRIC)*

METRIC			PART NUMBER
ØD ₁	Ød ₁	L ₁	
Tol. H9	Tol. h9	Tol. +0.2	
85.0	69.5	6.3	G54MR00850****
85.0	64.0	8.1	G54MH00850****
90.0	79.0	4.2	G54ML00900****
90.0	74.5	6.3	G54MR00900****
90.0	69.0	8.1	G54MH00900****
95.0	84.0	4.2	G54ML00950****
95.0	79.5	6.3	G54MR00950****
95.0	74.0	8.1	G54MH00950****
100.0	89.0	4.2	G54ML01000****
100.0	84.5	6.3	G54MR01000****
100.0	79.0	8.1	G54MH01000****
101.6	86.1	6.3	G54MR01016****
105.0	94.0	4.2	G54ML01050****
105.0	89.5	6.3	G54MR01050****
108.0	92.5	6.3	G54MR01080****
110.0	99.0	4.2	G54ML01100****
110.0	94.5	6.3	G54MR01100****
110.0	89.0	8.1	G54MH01100****
115.0	99.5	6.3	G54MR01150****
120.0	109.0	4.2	G54ML01200****
120.0	104.5	6.3	G54MR01200****
120.0	99.0	8.1	G54MH01200****
125.0	114.0	4.2	G54ML01250****
125.0	109.5	6.3	G54MR01250****
125.0	104.0	8.1	G54MH01250****
127.0	111.5	6.3	G54MR01270****
130.0	114.5	6.3	G54MR01300****
130.0	109.0	8.1	G54MH01300****

METRIC			PART NUMBER
ØD ₁	Ød ₁	L ₁	
Tol. H9	Tol. h9	Tol. +0.2	
132.0	121.0	4.2	G54ML01320****
135.0	114.0	8.1	G54MR01350****
140.0	124.5	6.3	G54ML01400****
140.0	119.0	8.1	G54MR01400****
145.0	129.5	6.3	G54ML01450****
145.0	124.0	8.1	G54MR01450****
150.0	134.5	6.3	G54ML01500****
150.0	129.0	8.1	G54MR01500****
155.0	134.0	8.1	G54MR01550****
160.0	144.5	6.3	G54ML01600****
160.0	139.0	8.1	G54MR01600****
165.0	144.0	8.1	G54MR01650****
170.0	149.0	8.1	G54MR01700****
175.0	154.0	8.1	G54MR01750****
180.0	164.5	6.3	G54ML01800****
180.0	159.0	8.1	G54MR01800****
190.0	169.0	8.1	G54MR01900****
194.0	178.5	6.3	G54ML01940****
200.0	184.5	6.3	G54ML02000****
200.0	179.0	8.1	G54MR02000****
205.0	184.0	8.1	G54MR02050****
210.0	189.0	8.1	G54MR02100****
215.0	194.0	8.1	G54MR02150****
220.0	199.0	8.1	G54MR02200****
230.0	214.5	6.3	G54ML02300****
230.0	209.0	8.1	G54MR02300****
240.0	219.0	8.1	G54MR02400****
250.0	229.0	8.1	G54MR02500****



PART NUMBER RANGE (METRIC)*

METRIC			PART NUMBER
ØD ₁	Ød ₁	L ₁	
Tol. H9	Tol. h9	Tol. +0.2	
250.0	225.5	8.1	G54MR02500****
250.0	234.5	6.3	G54ML02500****
254.0	233.0	8.1	G54MR02540****
260.0	239.0	8.1	G54MR02600****
265.0	244.0	8.1	G54MR02650****
268.0	247.0	8.1	G54MR02680****
270.0	249.0	8.1	G54MR02700****
280.0	259.0	8.1	G54MR02800****
290.0	269.0	8.1	G54MR02900****
300.0	279.0	8.1	G54MR03000****
300.0	275.5	8.1	G54ML03000****
304.8	283.8	8.1	G54MR03048****
310.0	289.0	8.1	G54MR03100****
320.0	299.0	8.1	G54MR03200****
320.0	295.5	8.1	G54ML03200****
330.0	305.5	8.1	G54MR03300****
340.0	315.5	8.1	G54MR03400****
350.0	325.5	8.1	G54MR03500****
360.0	335.5	8.1	G54MR03600****
370.0	345.5	8.1	G54MR03700****
380.0	355.5	8.1	G54MR03800****
400.0	375.5	8.1	G54MR04000****
420.0	395.5	8.1	G54MR04200****
430.0	405.5	8.1	G54MR04300****
440.0	415.5	8.1	G54MR04400****
450.0	425.5	8.1	G54MR04500****
460.0	435.5	8.1	G54MR04600****
480.0	455.5	8.1	G54MR04800****

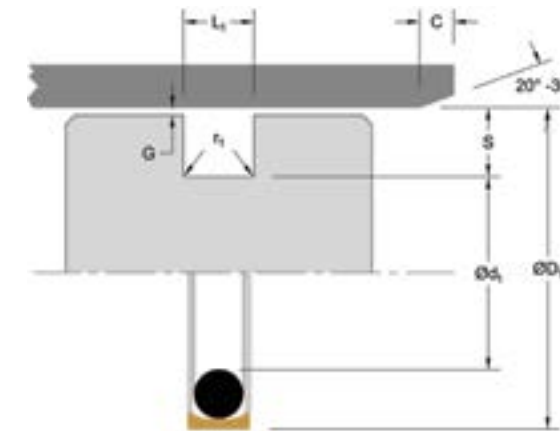
METRIC			PART NUMBER
ØD ₁	Ød ₁	L ₁	
Tol. H9	Tol. h9	Tol. +0.2	
500.0	475.5	8.1	G54MR05000****
555.0	530.5	8.1	G54MR05550****
600.0	575.5	8.1	G54MR06000****
640.0	615.5	8.1	G54MR06400****
660.0	635.5	8.1	G54MR06600****
700.0	672.0	9.5	G54MR07000****
710.0	682.0	9.5	G54MR07100****
740.0	712.0	9.5	G54MR07400****
780.0	752.0	9.5	G54MR07800****
800.0	772.0	9.5	G54MR08000****
900.0	872.0	9.5	G54MR09000****
1000.0	972.0	9.5	G54ML10000****
1000.0	962.0	13.8	G54MR10000****
1050.0	1022.0	9.5	G54ML10500****
1065.0	1027.0	13.8	G54MR10650****
1070.0	1032.0	13.8	G54MR10700****
1200.0	1172.0	9.5	G54ML12000****
1200.0	1162.0	13.8	G54MR12000****
1225.0	1187.0	13.8	G54MR12250****

*Please contact Hallite for custom sizes, material selection, or seal design.

PDS

PISTON SEAL

Double-Acting



TECHNICAL DETAILS

The Hallite PDS is a double-acting low-friction piston seal solution for compact O-ring grooves, that extends the service range above what an O-ring alone is capable of supporting. The PDS is designed for light-duty applications, is particularly suited for small-diameter installations, and due to its size and design, is easy to install. High-performance Armorlene® materials, like HLX, provide outstanding wear and extrusion-resistance properties as well as large range of temperature and media compatibility.

Hallite's PDS is designed to be used in existing dynamic O-ring grooves and does not require any groove modification. A good choice for pneumatic and hydraulic equipment sealing needs, the PDS is proven to extend the service range and seal longevity over stand-alone O-ring installations.

This seal is available in a variety of Hallite's high-performance Armorlene® materials to suit a wide range of demanding applications.



FEATURES

- Compact design to save metal spacing
- Low breakout friction and elimination of stick-slip action
- Effective in pneumatic cylinder and light-duty hydraulic cylinder
- Can be used in standard AS-568 dynamic O-ring groove
- Fits groove dimensions per MIL-G-5514F
- Recommended for light-duty and small-diameter applications

Part Number Structure

PDSMR00700NHLX _

PDS	M	R	00700	N	HLX	—
PROFILE DESIGNATION	UNIT OF MEASUREMENT M = Metric E = Inch	APPLICATION Refer to <i>Installation Recommendations</i> and use designator for desired application	BORE DIAMETER Metric = mm X 10 Inch = inches X 1000	ENERGIZER MATERIAL Refer to <i>Energizer Table</i> for desired energizer material	PTFE MATERIAL Refer to <i>Material Table</i> for desired PTFE (face) material	SPECIAL FEATURE Blank = Std profile N = Notches

OPERATING CONDITIONS

	METRIC	INCH
Maximum Speed	Up to 15.0m/sec	Up to 50.0ft/sec
Temperature Range*	-45 to 200°C	-49 to 392°F
Maximum Dynamic Pressure	350 bar	5000 psi

*Dependent upon energizer used (NBR, FKM, etc.).

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 FINISH RECOMMENDATIONS

SURFACE ROUGHNESS	METRIC			INCH			Rmr*
	µmRa	µmRz	µmRt	µinRa	µinRz	µinRt	
Dynamic Sealing Face ØD ₁	0.05 - 0.2	1.6 max	2 max	2 - 8	63 max	157 max	60% - 90%
Static Sealing Face 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	

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

ENERGIZER TABLE

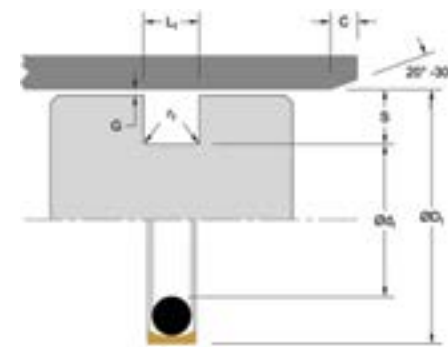
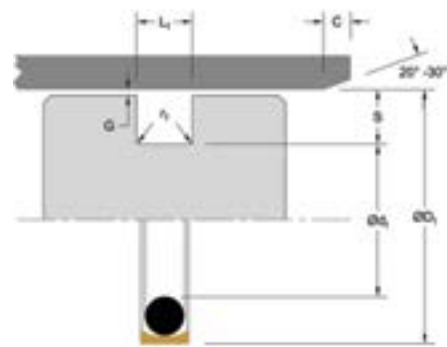
ENERGIZER MATERIAL (SHORE A)	ENERGIZER TYPE	ENERGIZER DESIGNATION	ENERGIZER OPERATING TEMPERATURE°C	ENERGIZER OPERATING TEMPERATURE°F
NBR - 70A	O-ring	N	-30 to 100°C	-22 to 212°F
NBR - 70A Low temp.	O-ring	L	-45 to 80°C	-49 to 176°F
FKM - 75A	O-ring	F	-10 to 200°C	14 to 392°F
EPDM - 70A	O-ring	E	-45 to 145°C	-49 to 293°F
HNBR - 70A	O-ring	H	-25 to 150°C	-13 to 302°F
NBR - 90A	O-ring	Q	-30 to 100°C	-22 to 212°F
HNBR - 90A	O-ring	U	-25 to 150°C	-13 to 302°F
No Energizer*	None	X	-	-

*Seal ratings are based upon capabilities of its matched material components. Hallite cannot rate seal performance when the seal is mixed with other manufacturers' energizers/components.

MATERIALS

MATERIAL FEATURES AND APPLICATIONS	FILLER	MATERIAL DESIGNATOR	COLOR	TEMPERATURE RANGE°C	TEMPERATURE RANGE°F	MAXIMUM DYNAMIC PRESSURE - BAR	MAXIMUM DYNAMIC PRESSURE - PSI
ARMORLENE® HLX <ul style="list-style-type: none"> Standard material for hydraulic applications High compressive strength Excellent extrusion resistance Extended wear resistance 	Special Bronze Compound	HLX	Gold	-73 to 288°C	-100 to 550°F	350 bar	5000 psi
ARMORLENE® 711 <ul style="list-style-type: none"> Excellent in all lubricating fluids and pneumatic applications High chemical resistance Excellent extrusion resistance Excellent wear properties 	25% Carbon Graphite	711	Black	-73 to 288°C	-100 to 550°F	350 bar	5000 psi
ARMORLENE® 700 <ul style="list-style-type: none"> Excellent in all hydraulic fluids Recommended for use with soft mating surfaces Low friction and no stick-slip 	Unfilled	700	White	-184 to 204°C	-300 to 400°F	200 bar	2900 psi

For other material options consult the Master Materials Index at the front of the catalog. If you do not find the material that you require, please contact your local Hallite sales office.



INSTALLATION RECOMMENDATIONS

METRIC											
BORE DIAMETER ØD ₁ H9		GROOVE DIAMETER	GROOVE WIDTH	RADIUS	CHAMFER	GROOVE SECTION	RADIAL CLEARANCE G _{max} *				O-RING CROSS SECTION
DIAMETER RANGE		Ød ₁ h9	L ₁ + 0.2	r ₁	C	S	Up to 20 bar	Up to 100 bar	Up to 200 bar	Up to 350 bar	O-ring
Standard Duty Application - R	Light Duty Application - L										
5.0 - 13.9	14.0 - 24.9	D ₁ - 2.9	2.4	0.4	2.0	1.45	0.10	0.10	0.08	0.05	1.78
14.0 - 24.9	25.0 - 45.9	D ₁ - 4.5	3.6	0.4	3.0	2.25	0.15	0.15	0.10	0.07	2.62
25.0 - 45.9	46.0 - 124.9	D ₁ - 6.2	4.8	0.6	4.0	3.10	0.25	0.20	0.15	0.08	3.53
46.0 - 124.9	125.0 - 669.9	D ₁ - 9.4	7.1	0.8	6.0	4.70	0.35	0.25	0.20	0.10	5.33
125.0 - 669.9	670.0 - 999.9	D ₁ - 12.2	9.5	0.8	8.0	6.10	0.50	0.30	0.25	0.15	6.99
670.0 - 999.9	> 999.9	D ₁ - 15.0	10.0	1.0	1.0	7.50	0.60	0.40	0.30	0.20	8.40

*Radial Clearance G_{max} = maximum permissible gap all on one side using max. tube diameter and min. clearance diameter.

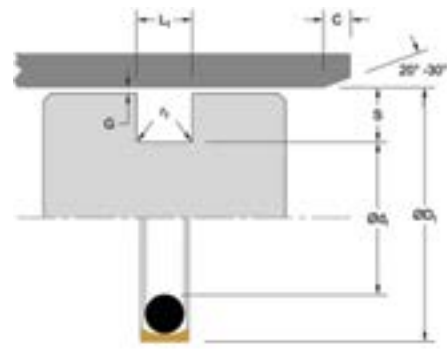
INCH											
BORE DIAMETER ØD ₁ H9		GROOVE DIAMETER	GROOVE WIDTH	RADIUS	CHAMFER	GROOVE SECTION	RADIAL CLEARANCE G _{max} *				O-RING CROSS SECTION
DIAMETER RANGE		Ød ₁ h9	L ₁ + .008	r ₁	C	S	Up to 290 psi	Up to 1500 psi	Up to 2900 psi	Up to 5000 psi	O-ring
Standard Duty Application - R	Light Duty Application - L										
0.250 - 0.312	0.313 - 0.999	D ₁ - 0.110	0.093	0.016	0.079	0.055	0.004	0.004	0.003	0.002	0.070
0.313 - 0.999	1.000 - 2.500	D ₁ - 0.176	0.140	0.016	0.118	0.088	0.006	0.006	0.004	0.003	0.103
1.000 - 2.500	2.501 - 4.999	D ₁ - 0.242	0.187	0.024	0.157	0.121	0.010	0.008	0.006	0.003	0.139
2.501 - 4.999	-	D ₁ - 0.370	0.281	0.032	0.236	0.185	0.014	0.010	0.008	0.004	0.210
5.000 - 16.000	-	D ₁ - 0.474	0.375	0.032	0.315	0.237	0.020	0.012	0.010	0.006	0.275

*Radial Clearance G_{max} = maximum permissible gap all on one side using max. tube diameter and min. clearance diameter.

PART NUMBER RANGE (METRIC)*

METRIC			
ØD ₁	Ød ₁	L ₁	PART NUMBER
Tol. H9	Tol. h9	Tol. +0.2	
6.0	3.1	2.4	PDSMR00060****
8.0	5.1	2.4	PDSMR00080****
9.0	6.1	2.4	PDSMR00090****
10.0	7.1	2.4	PDSMR00100****
11.0	8.1	2.4	PDSMR00110****
12.0	9.1	2.4	PDSMR00120****
12.7	9.8	2.4	PDSMR00127****
14.0	9.5	3.6	PDSMR00140****
15.0	10.5	3.6	PDSMR00150****
16.0	11.5	3.6	PDSMR00160****
18.0	13.5	3.6	PDSMR00180****
20.0	15.5	3.6	PDSMR00200****
22.0	17.5	3.6	PDSMR00220****
24.0	19.5	3.6	PDSMR00240****
25.0	18.8	4.8	PDSMR00250****
25.4	19.2	4.8	PDSMR00254****
27.0	20.8	4.8	PDSMR00270****
28.0	21.8	4.8	PDSMR00280****
30.0	23.8	4.8	PDSMR00300****
32.0	25.8	4.8	PDSMR00320****
35.0	28.8	4.8	PDSMR00350****
40.0	33.8	4.8	PDSMR00400****
42.0	35.8	4.8	PDSMR00420****
45.0	38.8	4.8	PDSMR00450****
48.0	38.6	7.1	PDSMR00480****
50.0	40.6	7.1	PDSMR00500****
50.8	41.4	7.1	PDSMR00508****
52.0	42.6	7.1	PDSMR00520****

METRIC			
ØD ₁	Ød ₁	L ₁	PART NUMBER
Tol. H9	Tol. h9	Tol. +0.2	
55.0	45.6	7.1	PDSMR00550****
56.0	46.6	7.1	PDSMR00560****
60.0	50.6	7.1	PDSMR00600****
63.0	53.6	7.1	PDSMR00630****
65.0	55.6	7.1	PDSMR00650****
70.0	60.6	7.1	PDSMR00700****
75.0	65.6	7.1	PDSMR00750****
80.0	70.6	7.1	PDSMR00800****
85.0	75.6	7.1	PDSMR00850****
90.0	80.6	7.1	PDSMR00900****
95.0	85.6	7.1	PDSMR00950****
100.0	90.6	7.1	PDSMR01000****
110.0	100.6	7.1	PDSMR01100****
115.0	105.6	7.1	PDSMR01150****
120.0	110.6	7.1	PDSMR01200****
125.0	112.8	9.5	PDSMR01250****
130.0	117.8	9.5	PDSMR01300****
135.0	122.8	9.5	PDSMR01350****
140.0	127.8	9.5	PDSMR01400****
150.0	137.8	9.5	PDSMR01500****
160.0	147.8	9.5	PDSMR01600****
170.0	157.8	9.5	PDSMR01700****
180.0	167.8	9.5	PDSMR01800****
190.0	177.8	9.5	PDSMR01900****
200.0	187.8	9.5	PDSMR02000****
210.0	197.8	9.5	PDSMR02100****
220.0	207.8	9.5	PDSMR02200****
230.0	217.8	9.5	PDSMR02300****



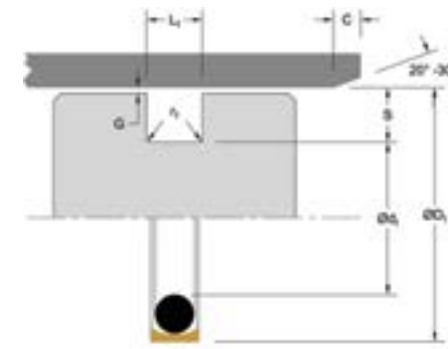
PART NUMBER RANGE (METRIC)*

METRIC			PART NUMBER
ØD ₁	Ød ₁	L ₁	
Tol. H9	Tol. h9	Tol. +0.2	
240.0	227.8	9.5	PDSMR02400****
250.0	237.8	9.5	PDSMR02500****
280.0	267.8	9.5	PDSMR02800****
300.0	287.8	9.5	PDSMR03000****
320.0	307.8	9.5	PDSMR03200****
350.0	337.8	9.5	PDSMR03500****
400.0	387.8	9.5	PDSMR04000****
420.0	407.8	9.5	PDSMR04200****
450.0	437.8	9.5	PDSMR04500****
480.0	467.8	9.5	PDSMR04800****
500.0	487.8	9.5	PDSMR05000****
600.0	587.8	9.5	PDSMR06000****
650.0	637.8	9.5	PDSMR06500****

*Please contact Hallite for custom sizes, material selection, or seal design.

PART NUMBER RANGE (INCH)*

INCH			PART NUMBER
ØD ₁	Ød ₁	L ₁	
Tol. H9	Tol. h9	Tol. +0.008	
0.250	0.140	0.093	PDSE00250****
0.281	0.171	0.093	PDSE00281****
0.312	0.202	0.093	PDSE00312****
0.344	0.234	0.093	PDSE00344****
0.375	0.265	0.093	PDSE00375****
0.437	0.327	0.093	PDSE00437****
0.500	0.390	0.093	PDSE00500****
0.562	0.452	0.093	PDSE00562****
0.625	0.515	0.093	PDSE00625****
0.687	0.577	0.093	PDSE00687****
0.750	0.640	0.093	PDSE00750****
0.812	0.702	0.093	PDSE00812****
0.875	0.765	0.093	PDSE00875****
0.937	0.827	0.093	PDSE00937****
1.000	0.824	0.140	PDSE01000****
1.062	0.886	0.140	PDSE01062****
1.125	0.949	0.140	PDSE01125****
1.187	1.011	0.140	PDSE01187****
1.250	1.074	0.140	PDSE01250****
1.312	1.136	0.140	PDSE01312****
1.375	1.199	0.140	PDSE01375****
1.437	1.261	0.140	PDSE01437****
1.500	1.324	0.140	PDSE01500****
1.562	1.386	0.140	PDSE01562****
1.625	1.449	0.140	PDSE01625****
1.687	1.511	0.140	PDSE01687****
1.750	1.574	0.140	PDSE01750****
1.812	1.636	0.140	PDSE01812****



PART NUMBER RANGE (INCH)*

INCH			PART NUMBER
ØD ₁	Ød ₁	L ₁	
Tol. H9	Tol. h9	Tol. +0.008	
1.875	1.699	0.187	PDSE01875****
1.937	1.761	0.187	PDSE01937****
2.000	1.824	0.187	PDSE02000****
2.062	1.886	0.187	PDSE02062****
2.125	1.949	0.187	PDSE02125****
2.187	2.011	0.187	PDSE02187****
2.250	2.074	0.187	PDSE02250****
2.312	2.136	0.187	PDSE02312****
2.375	2.199	0.187	PDSE02375****
2.437	2.261	0.187	PDSE02437****
2.500	2.324	0.187	PDSE02500****
2.625	2.383	0.187	PDSE02625****
2.750	2.508	0.187	PDSE02750****
2.875	2.633	0.187	PDSE02875****
3.000	2.758	0.187	PDSE03000****
3.125	2.883	0.187	PDSE03125****
3.250	3.008	0.187	PDSE03250****
3.375	3.133	0.187	PDSE03375****
3.500	3.258	0.187	PDSE03500****
3.625	3.383	0.187	PDSE03625****
3.750	3.508	0.187	PDSE03750****
3.875	3.633	0.187	PDSE03875****
4.000	3.758	0.187	PDSE04000****
4.125	3.883	0.187	PDSE04125****
4.250	4.008	0.187	PDSE04250****
4.375	4.133	0.187	PDSE04375****
4.500	4.258	0.187	PDSE04500****
4.625	4.383	0.187	PDSE04625****

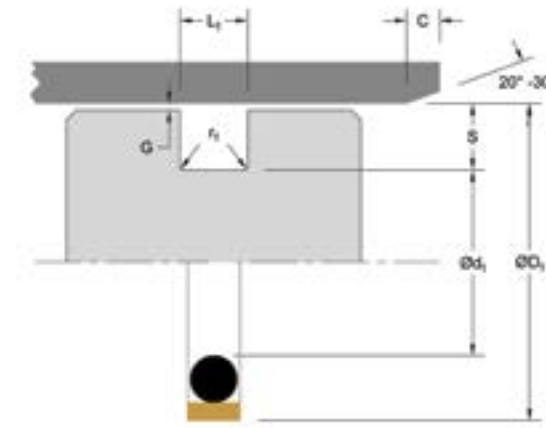
*Please contact Hallite for custom sizes, material selection, or seal design.



PCG

PISTON SEAL

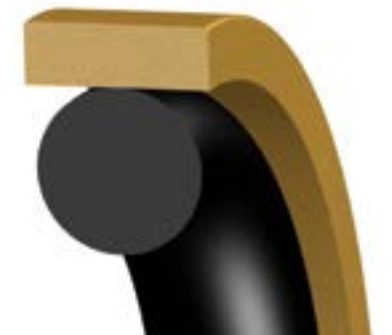
Double-Acting



TECHNICAL DETAILS

The Hallite PCG is a double-acting, O-ring energized, low-friction piston seal designed for low- and medium-pressure systems. High-performance Armorlene® materials, like HLX, provide outstanding wear and extrusion-resistance properties as well as large range of temperature and media compatibility.

The compact design of the PCG piston seal provides an ideal sealing solution where housing space is limited. This seal is available in a variety of Hallite's high-performance Armorlene® materials to suit a wide range of demanding applications.



FEATURES

- Low breakout friction and elimination of stick-slip action
- Compact design to save metal spacing
- High service temperature, long wear, and high extrusion resistance

Part Number Structure

PCGMR00400NHLX _

PCG	M	R	00400	N	HLX	_
PROFILE DESIGNATION	UNIT OF MEASUREMENT M = Metric E = Inch	APPLICATION Refer to <i>Installation Recommendations</i> and use designator for desired application	BORE DIAMETER Metric = mm X 10 Inch = inches X 1000	ENERGIZER MATERIAL Refer to <i>Energizer Table</i> for desired energizer material	PTFE MATERIAL Refer to <i>Material Table</i> for desired PTFE (face) material	SPECIAL FEATURE Blank = Std profile N = Notches

OPERATING CONDITIONS

	METRIC	INCH
Maximum Speed	Up to 15.0m/sec	Up to 50.0ft/sec
Temperature Range*	-45 to 200°C	-49 to 392°F
Maximum Dynamic Pressure	200 bar	2900 psi

*Dependent upon energizer used (NBR, FKM, etc.).

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 FINISH RECOMMENDATIONS

SURFACE ROUGHNESS	METRIC			INCH			Rmr*
	µmRa	µmRz	µmRt	µinRa	µinRz	µinRt	
Dynamic Sealing Face ØD ₁	0.05 - 0.2	1.6 max	2 max	2 - 8	63 max	157 max	60% - 90%
Static Sealing Face 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	

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

ENERGIZER TABLE

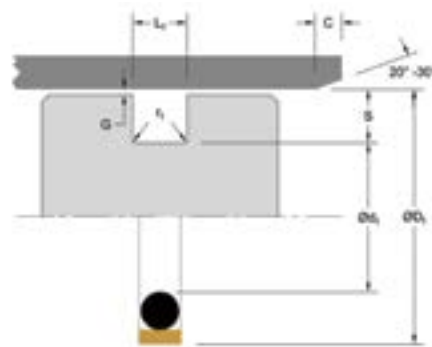
ENERGIZER MATERIAL (SHORE A)	ENERGIZER TYPE	ENERGIZER DESIGNATION	ENERGIZER OPERATING TEMPERATURE°C	ENERGIZER OPERATING TEMPERATURE°F
NBR - 70A	O-ring	N	-30 to 100°C	-22 to 212°F
NBR - 70A Low temp.	O-ring	L	-45 to 80°C	-49 to 176°F
FKM - 75A	O-ring	F	-10 to 200°C	14 to 392°F
EPDM - 70A	O-ring	E	-45 to 145°C	-49 to 293°F
HNBR - 70A	O-ring	H	-25 to 150°C	-13 to 302°F
NBR - 90A	O-ring	Q	-30 to 100°C	-22 to 212°F
HNBR - 90A	O-ring	U	-25 to 150°C	-13 to 302°F
No Energizer*	None	X	-	-

*Seal ratings are based upon capabilities of its matched material components. Hallite cannot rate seal performance when the seal is mixed with other manufacturers' energizers/components.

MATERIALS

MATERIAL FEATURES AND APPLICATIONS	FILLER	MATERIAL DESIGNATOR	COLOR	TEMPERATURE RANGE°C	TEMPERATURE RANGE°F	MAXIMUM DYNAMIC PRESSURE - BAR	MAXIMUM DYNAMIC PRESSURE - PSI
ARMORLENE® HLX <ul style="list-style-type: none"> Standard material for hydraulic applications High compressive strength Excellent extrusion resistance Extended wear resistance 	Special Bronze Compound	HLX	Gold	-73 to 288°C	-100 to 550°F	200 bar	2900 psi
ARMORLENE® HCF <ul style="list-style-type: none"> Excellent in lubricating and non-lubricating hydraulic fluids (includes water) w/o zinc content Not recommended for gas sealing applications Not recommended for electrical conductive fluids 	Carbon Fiber Filled	HCF	Gray/Black	-73 to 260°C	-100 to 500°F	200 bar	2900 psi
ARMORLENE® 700 <ul style="list-style-type: none"> Excellent in all hydraulic fluids Recommended for use with soft mating surfaces Low friction and no stick-slip 	Unfilled	700	White	-184 to 204°C	-300 to 400°F	200 bar	2900 psi
ARMORLENE® 711 <ul style="list-style-type: none"> Excellent in all lubricating fluids and pneumatic applications High chemical resistance Excellent extrusion resistance Excellent wear properties 	25% Carbon/Graphite	711	Black	-73 to 288°C	-100 to 550°F	200 bar	2900 psi
748 - UHMWPE <ul style="list-style-type: none"> Excellent impact resistance Good dielectrical properties Excellent abrasion resistance Low coefficient of friction 	Standard	748	Translucent	-184 to 82°C	-300 to 180°F	200 bar	2900 psi

For other material options consult the Master Materials Index at the front of the catalog. If you do not find the material that you require, please contact your local Hallite sales office.



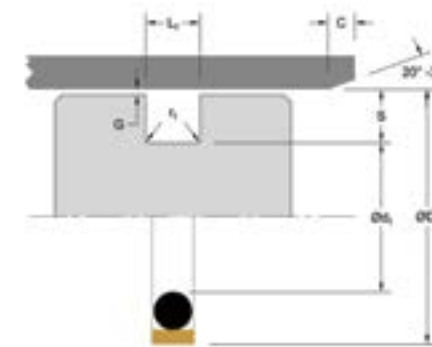
INSTALLATION RECOMMENDATIONS

METRIC								
BORE DIAMETER ØD ₁ H9		GROOVE DIAMETER	GROOVE WIDTH	RADIUS	GROOVE SECTION	RADIAL CLEARANCE G _{max} *		O-RING CROSS SECTION
DIAMETER RANGE		Ød ₁ h9	L ₁ + 0.2	r _i	S	Up to 100 bar	Up to 200 bar	O-ring
Standard Duty Application - R								
7.0 - 15.9		D ₁ - 4.0	2.00	0.50	2.20	0.08	0.08	1.78
16.0 - 26.9		D ₁ - 6.0	2.85	0.50	3.00	0.08	0.08	2.62
27.0 - 49.9		D ₁ - 7.5	3.8	0.80	3.75	0.08	0.08	3.53
50.0 - 129.9		D ₁ - 12.5	5.6	1.30	6.25	0.10	0.10	5.33
130.0 - 179.9		D ₁ - 15.0	7.55	1.50	7.50	0.10	0.10	6.99
180.0 - 239.9		D ₁ - 18.0	7.55	1.50	9.00	0.10	0.10	6.99
240.0 - 420.0		D ₁ - 24.0	7.55	1.50	12.00	0.10	0.10	6.99

*Radial Clearance G_{max} = maximum permissible gap all on one side using max. tube diameter and min. clearance diameter.

INCH								
BORE DIAMETER ØD ₁ H9		GROOVE DIAMETER	GROOVE WIDTH	RADIUS	GROOVE SECTION	RADIAL CLEARANCE G _{max} *		O-RING CROSS SECTION
DIAMETER RANGE		Ød ₁ h9	L ₁ + 0.008	r _i	S	Up to 1500 psi	Up to 2900 psi	O-ring
Standard Duty Application - R	Light Duty Application - L							
0.250 - 0.937	0.938 - 2.500	D ₁ - 0.172	0.079	0.02	0.086	0.002	0.002	0.070
0.938 - 2.500	2.501 - 3.875	D ₁ - 0.236	0.112	0.02	0.118	0.003	0.003	0.103
2.501 - 3.875	3.876 - 5.000	D ₁ - 0.363	0.149	0.03	0.182	0.003	0.003	0.139
3.876 - 5.000	5.001 - 6.500	D ₁ - 0.491	0.221	0.05	0.246	0.004	0.004	0.210
5.001 - 6.500	6.501 - 8.500	D ₁ - 0.593	0.297	0.06	0.297	0.004	0.004	0.275
6.501 - 8.500	8.501 - 25.500	D ₁ - 0.718	0.297	0.06	0.359	0.004	0.004	0.275
8.501 - 25.500	-	D ₁ - 0.968	0.297	0.06	0.484	0.004	0.004	0.275

*Radial Clearance G_{max} = maximum permissible gap all on one side using max. tube diameter and min. clearance diameter.

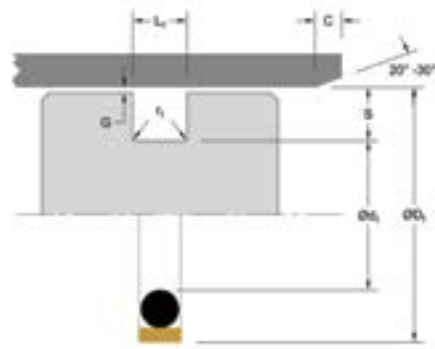


PART NUMBER RANGE (METRIC)*

METRIC			
ØD ₁	Ød ₁	L ₁	PART NUMBER
Tol. H9	Tol. h9	Tol. +0.2	
7.0	3.0	2.00	PCGMR00070****
8.0	4.0	2.00	PCGMR00080****
9.0	5.0	2.00	PCGMR00090****
10.0	6.0	2.00	PCGMR00100****
11.0	7.0	2.00	PCGMR00110****
12.0	8.0	2.00	PCGMR00120****
14.0	10.0	2.00	PCGMR00140****
16.0	10.0	2.85	PCGMR00160****
18.0	12.0	2.85	PCGMR00180****
19.0	13.0	2.85	PCGMR00190****
20.0	14.0	2.85	PCGMR00200****
22.0	16.0	2.85	PCGMR00220****
25.0	19.0	2.85	PCGMR00250****
28.0	20.5	3.80	PCGMR00280****
30.0	22.5	3.80	PCGMR00300****
32.0	24.5	3.80	PCGMR00320****
35.0	27.5	3.80	PCGMR00350****
36.0	28.5	3.80	PCGMR00360****
38.0	30.5	3.80	PCGMR00380****
40.0	32.5	3.80	PCGMR00400****
42.0	34.5	3.80	PCGMR00420****
45.0	37.5	3.80	PCGMR00450****

METRIC			
ØD ₁	Ød ₁	L ₁	PART NUMBER
Tol. H9	Tol. h9	Tol. +0.2	
48.0	40.5	3.80	PCGMR00480****
50.0	37.5	5.60	PCGMR00500****
55.0	42.5	5.60	PCGMR00550****
60.0	47.5	5.60	PCGMR00600****
63.0	50.5	5.60	PCGMR00630****
65.0	52.5	5.6	PCGMR00650****
70.0	57.5	5.6	PCGMR00700****
74.0	61.5	5.60	PCGMR00740****
75.0	62.5	5.60	PCGMR00750****
80.0	67.5	5.60	PCGMR00800****
85.0	72.5	5.60	PCGMR00850****
90.0	77.5	5.60	PCGMR00900****
92.0	79.5	5.60	PCGMR00920****
100.0	87.5	5.60	PCGMR01000****
105.0	92.5	5.60	PCGMR01050****
110.0	97.5	5.60	PCGMR01100****
115.0	102.5	5.60	PCGMR01150****
120.0	107.5	5.60	PCGMR01200****
125.0	112.5	5.60	PCGMR01250****
130.0	115.0	7.55	PCGMR01300****
140.0	125.0	7.55	PCGMR01400****

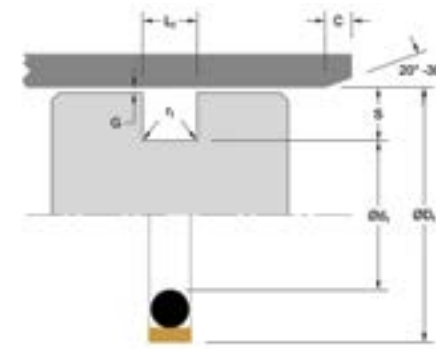
*Please contact Hallite for custom sizes, material selection, or seal design.



PART NUMBER RANGE (INCH)*

INCH			PART NUMBER
ØD ₁	Ød ₁	L ₁	
Tol. H9	Tol. h9	Tol. +0.008	
0.250	0.078	0.079	PCGER00250****
0.312	0.140	0.079	PCGER00312****
0.375	0.203	0.079	PCGER00375****
0.437	0.265	0.079	PCGER00437****
0.500	0.328	0.079	PCGER00500****
0.562	0.390	0.079	PCGER00562****
0.625	0.453	0.079	PCGER00625****
0.687	0.515	0.079	PCGER00687****
0.750	0.578	0.079	PCGER00750****
0.812	0.640	0.079	PCGER00812****
0.875	0.703	0.079	PCGER00875****
0.937	0.765	0.079	PCGER00937****
1.000	0.764	0.112	PCGER01000****
1.062	0.826	0.112	PCGER01062****
1.125	0.889	0.112	PCGER01125****
1.187	0.951	0.112	PCGER01187****
1.250	1.014	0.112	PCGER01250****
1.312	1.076	0.112	PCGER01312****
1.375	1.139	0.112	PCGER01375****
1.437	1.201	0.112	PCGER01437****
1.500	1.264	0.112	PCGER01500****
1.562	1.326	0.112	PCGER01562****
1.625	1.389	0.112	PCGER01625****
1.687	1.451	0.112	PCGER01687****
1.750	1.514	0.112	PCGER01750****
1.812	1.576	0.112	PCGER01812****
1.875	1.639	0.112	PCGER01875****
1.937	1.701	0.112	PCGER01937****

INCH			PART NUMBER
ØD ₁	Ød ₁	L ₁	
Tol. H9	Tol. h9	Tol. +0.008	
2.000	1.764	0.112	PCGER02000****
2.062	1.826	0.112	PCGER02062****
2.125	1.889	0.112	PCGER02125****
2.187	1.951	0.112	PCGER02187****
2.250	2.014	0.112	PCGER02250****
2.312	2.076	0.112	PCGER02312****
2.375	2.139	0.112	PCGER02375****
2.437	2.201	0.112	PCGER02437****
2.500	2.264	0.112	PCGER02500****
2.625	2.262	0.149	PCGER02625****
2.750	2.387	0.149	PCGER02750****
2.875	2.512	0.149	PCGER02875****
3.000	2.637	0.149	PCGER03000****
3.125	2.762	0.149	PCGER03125****
3.250	2.887	0.149	PCGER03250****
3.375	3.012	0.149	PCGER03375****
3.500	3.137	0.149	PCGER03500****
3.625	3.262	0.149	PCGER03625****
3.750	3.387	0.149	PCGER03750****
3.875	3.512	0.149	PCGER03875****
4.000	3.509	0.221	PCGER04000****
4.125	3.634	0.221	PCGER04125****
4.250	3.759	0.221	PCGER04250****
4.375	3.884	0.221	PCGER04375****
4.500	4.009	0.221	PCGER04500****
4.625	4.134	0.221	PCGER04625****
4.750	4.259	0.221	PCGER04750****
4.875	4.384	0.221	PCGER04875****



PART NUMBER RANGE (INCH)*

INCH			PART NUMBER
ØD ₁	Ød ₁	L ₁	
Tol. H9	Tol. h9	Tol. +0.008	
5.000	4.509	0.221	PCGER05000****
5.125	4.532	0.297	PCGER05125****
5.250	4.657	0.297	PCGER05250****
5.375	4.782	0.297	PCGER05375****
5.500	4.907	0.297	PCGER05500****
5.625	5.032	0.297	PCGER05625****
5.750	5.157	0.297	PCGER05750****
5.875	5.282	0.297	PCGER05875****
6.000	5.407	0.297	PCGER06000****
6.125	5.532	0.297	PCGER06125****
6.250	5.657	0.297	PCGER06250****
6.375	5.782	0.297	PCGER06375****
6.500	5.907	0.297	PCGER06500****

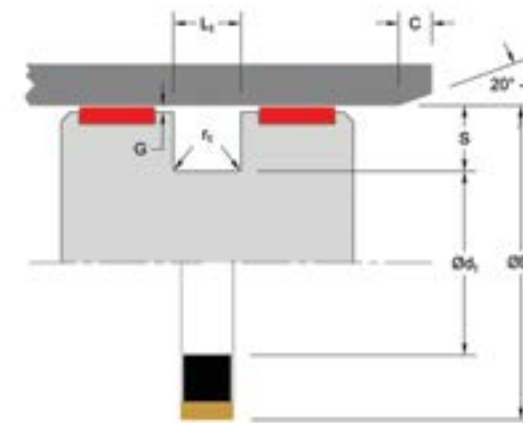
INCH			PART NUMBER
ØD ₁	Ød ₁	L ₁	
Tol. H9	Tol. h9	Tol. +0.008	
6.750	6.032	0.297	PCGER06750****
7.000	6.282	0.297	PCGER07000****
7.250	6.532	0.297	PCGER07250****
7.500	6.782	0.297	PCGER07500****
7.750	7.032	0.297	PCGER07750****
8.000	7.282	0.297	PCGER08000****
8.250	7.532	0.297	PCGER08250****
8.500	7.782	0.297	PCGER08500****
9.000	8.032	0.297	PCGER09000****
9.500	8.532	0.297	PCGER09500****
10.000	9.032	0.297	PCGER10000****
10.500	9.532	0.297	PCGER10500****

*Please contact Hallite for custom sizes, material selection, or seal design.

PCA

PISTON SEAL

Double-Acting



TECHNICAL DETAILS

The Hallite PCA is a double-acting piston seal that performs well in both high- and low-pressure systems. The PCA has a square edge design on the primary sealing face paired with a square elastomer energizer. The square ring provides more stable pressure loading to the PTFE face ring, therefore it provides exceptional sealability throughout the pressure ranges. High-performance Armorlene® materials, like HLX, provide outstanding wear and extrusion-resistance properties as well as large range of temperature and media compatibility.

The Hallite PCA seal is well-suited for a variety of hydraulic and pneumatic reciprocating applications. The compact housing allows designers to use a narrow-width piston, but it is recommended that proper guidance be used with this seal, especially in heavy-duty applications (see Hallite Bearings section). The PCA seal is available in a variety of Hallite's high-performance Armorlene® materials to suit a wide range of demanding applications.



FEATURES

- Low breakout friction and elimination of stick-slip action
- Compact design to save metal spacing
- High service temperature, long wear, and high extrusion resistance
- Compact design allows for smaller grooves in hardware

Part Number Structure

PCAMR00400RHLX _

PCA	M	R	00400	R	HLX	—
PROFILE DESIGNATION	UNIT OF MEASUREMENT M = Metric E = Inch	APPLICATION Refer to <i>Installation Recommendations</i> and use designator for desired application	BORE DIAMETER Metric = mm X 10 Inch = inches X 1000	ENERGIZER MATERIAL Refer to <i>Energizer Table</i> for desired energizer material	PTFE MATERIAL Refer to <i>Material Table</i> for desired PTFE (face) material	SPECIAL FEATURE Blank = Std profile N = Notches

OPERATING CONDITIONS

	METRIC	INCH
Maximum Speed	Up to 15.0m/sec	Up to 50.0ft/sec
Temperature Range*	-45 to 200°C	-49 to 392°F
Maximum Dynamic Pressure**	400 bar	5800 psi

*Dependent upon energizer used (NBR, FKM, etc.). **For pressures above 400 bar, contact Hallite Engineering.

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 FINISH RECOMMENDATIONS

SURFACE ROUGHNESS	METRIC			INCH			Rmr*
	µmRa	µmRz	µmRt	µinRa	µinRz	µinRt	
Dynamic Sealing Face ØD ₁	0.05 - 0.2	1.6 max	2 max	2 - 8	63 max	157 max	60% - 90%
Static Sealing Face 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	

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

ENERGIZER TABLE

ENERGIZER MATERIAL (SHORE A)	ENERGIZER TYPE	ENERGIZER DESIGNATION	ENERGIZER OPERATING TEMPERATURE°C	ENERGIZER OPERATING TEMPERATURE°F
NBR - 70A	Square	R	-30 to 100°C	-22 to 212°F
No Energizer*	None	X	-	-

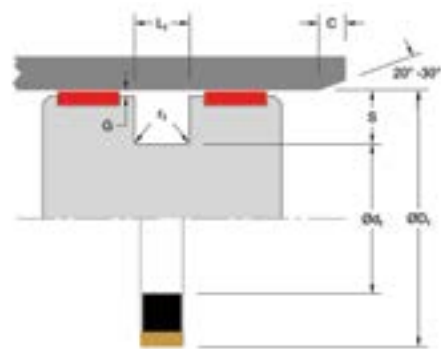
*Seal ratings are based upon capabilities of its matched material components. Hallite cannot rate seal performance when the seal is mixed with other manufacturers' energizers/components.

MATERIALS

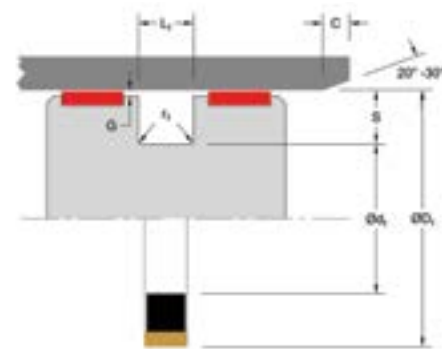
MATERIAL FEATURES AND APPLICATIONS	FILLER	MATERIAL DESIGNATOR	COLOR	TEMPERATURE RANGE°C	TEMPERATURE RANGE°F	MAXIMUM DYNAMIC PRESSURE - BAR	MAXIMUM DYNAMIC PRESSURE - PSI
ARMORLENE® HLX <ul style="list-style-type: none"> Standard material for hydraulic applications High compressive strength Excellent extrusion resistance Extended wear resistance 	Special Bronze Compound	HLX	Gold	-73 to 288°C	-100 to 550°F	500 bar	7250 psi
ARMORLENE® HLA <ul style="list-style-type: none"> Excellent in all hydraulic fluids Excellent wear resistance Excellent low-friction properties Good extrusion resistance 	Special Mineral Compound	HLA	Gray	-73 to 260°C	-100 to 500°F	500 bar	7250 psi
ARMORLENE® 702 <ul style="list-style-type: none"> Excellent in lubricating and non-lubricating hydraulic fluids Good low-friction properties Excellent extrusion resistance Good chemical resistance 	Glass Molybdenum Disulfide	702	Gray	-73 to 260°C	-100 to 500°F	300 bar	4350 psi

For other material options consult the Master Materials Index at the front of the catalog. If you do not find the material that you require, please contact your local Hallite sales office.





Applications with maximum radial clearance that are using nylon, phenolic, or PTFE bearings must ensure proper clearance in accordance with the bearing recommendations to avoid metal-to-metal contact. Please refer to Hallite Type 87, Type 506, and Type 533 Specification Sheets for this information.



INSTALLATION RECOMMENDATIONS

METRIC									
BORE DIAMETER ØD ₁ H9	GROOVE DIAMETER	GROOVE WIDTH	RADIUS	CHAMFER	GROOVE SECTION	RADIAL CLEARANCE G max*			
						Up to 100 bar	Up to 160 bar	Up to 250 bar	Up to 400 bar
DIAMETER RANGE	Ød ₁ h9	L ₁ + 0.2	r ₁	C	S				
Standard Duty Application - R									
20.0 - 60.0	D ₁ - 10.0	4.5	0.3	4.0	5.00	0.30	0.25	0.22	0.13
61.0 - 107.0	D ₁ - 15.0	7.5	0.5	6.5	7.50	0.30	0.25	0.22	0.13
108.0 - 160.0	D ₁ - 16.0	7.5	0.5	6.5	8.00	0.30	0.25	0.22	0.13
161.0 - 250.0	D ₁ - 22.0	11.0	0.5	6.5	11.00	0.30	0.25	0.22	0.13
251.0 - 400.0	D ₁ - 24.0	12.0	0.5	10.0	12.00	0.30	0.25	0.22	0.13
401.0 - 900.0	D ₁ - 30.0	15.0	0.8	15.0	15.00	0.30	0.25	0.22	0.13
> 900.0	D ₁ - 40.0	20.0	0.8	20.0	20.00	0.30	0.25	0.22	0.13

*Radial Clearance G max. = maximum permissible gap all on one side using max. tube diameter and min. clearance diameter.

PART NUMBER RANGE (METRIC)*

METRIC				METRIC			
ØD ₁	Ød ₁	L ₁	PART NUMBER	ØD ₁	Ød ₁	L ₁	PART NUMBER
Tol. H9	Tol. H9	Tol. +0.2		Tol. H9	Tol. H9	Tol. +0.2	
40.0	30.0	4.5	PCAMR00400****	69.0	54.0	7.5	PCAMR00690****
45.0	35.0	4.5	PCAMR00450****	70.0	55.0	7.5	PCAMR00700****
50.0	40.0	4.5	PCAMR00500****	71.0	56.0	7.5	PCAMR00710****
55.0	45.0	4.5	PCAMR00550****	75.0	60.0	7.5	PCAMR00750****
56.0	46.0	4.5	PCAMR00560****	80.0	65.0	7.5	PCAMR00800****
60.0	50.0	4.5	PCAMR00600****	85.0	70.0	7.5	PCAMR00850****
63.0	48.0	7.5	PCAMR00630****	90.0	75.0	7.5	PCAMR00900****
65.0	50.0	7.5	PCAMR00650****	95.0	80.0	7.5	PCAMR00950****

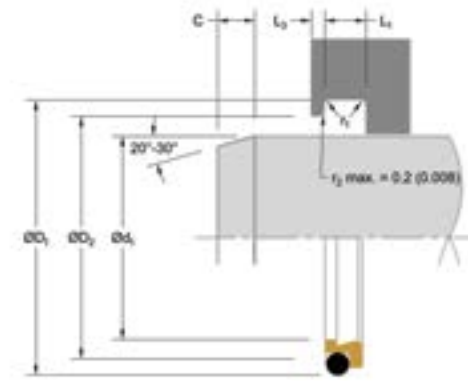
PART NUMBER RANGE (METRIC)*

METRIC				METRIC			
ØD ₁	Ød ₁	L ₁	PART NUMBER	ØD ₁	Ød ₁	L ₁	PART NUMBER
Tol. H9	Tol. h9	Tol. +0.2		Tol. H9	Tol. h9	Tol. +0.2	
100.0	85.0	7.5	PCAMR01000****	270.0	246.0	12.0	PCAMR02700****
105.0	90.0	7.5	PCAMR01050****	280.0	256.0	12.0	PCAMR02800****
108.0	92.0	7.5	PCAMR01080****	290.0	266.0	12.0	PCAMR02900****
110.0	94.0	7.5	PCAMR01100****	300.0	276.0	12.0	PCAMR03000****
112.0	96.0	7.5	PCAMR01120****	310.0	286.0	12.0	PCAMR03100****
120.0	104.0	7.5	PCAMR01200****	320.0	296.0	12.0	PCAMR03200****
125.0	109.0	7.5	PCAMR01250****	360.0	336.0	12.0	PCAMR03600****
130.0	114.0	7.5	PCAMR01300****	400.0	376.0	12.0	PCAMR04000****
135.0	119.0	7.5	PCAMR01350****	485.0	455.0	15.0	PCAMR04850****
140.0	124.0	7.5	PCAMR01400****	500.0	470.0	15.0	PCAMR05000****
145.0	129.0	7.5	PCAMR01450****	600.0	570.0	15.0	PCAMR06000****
150.0	134.0	7.5	PCAMR01500****	650.0	620.0	15.0	PCAMR06500****
155.0	139.0	7.5	PCAMR01550****	720.0	690.0	15.0	PCAMR07200****
160.0	144.0	7.5	PCAMR01600****	900.0	870.0	15.0	PCAMR09000****
170.0	148.0	11.0	PCAMR01700****	930.0	890.0	20.0	PCAMR09300****
180.0	158.0	11.0	PCAMR01800****	1000.0	960.0	20.0	PCAMR10000****
190.0	168.0	11.0	PCAMR01900****	1060.0	1020.0	20.0	PCAMR10600****
200.0	178.0	11.0	PCAMR02000****	1120.0	1080.0	20.0	PCAMR11200****
204.0	182.0	11.0	PCAMR02040****	1150.0	1110.0	20.0	PCAMR11500****
210.0	188.0	11.0	PCAMR02100****	1210.0	1170.0	20.0	PCAMR12100****
215.0	193.0	11.0	PCAMR02150****	1250.0	1210.0	20.0	PCAMR12500****
220.0	198.0	11.0	PCAMR02200****				
224.0	202.0	11.0	PCAMR02240****				
225.0	203.0	11.0	PCAMR02250****				
230.0	208.0	11.0	PCAMR02300****				
240.0	218.0	11.0	PCAMR02400****				
250.0	228.0	11.0	PCAMR02500****				
260.0	236.0	12.0	PCAMR02600****				

*Please contact Hallite for custom sizes, material selection, or seal design.

WIPER SEALS





E2W

WIPER/EXCLUDER

Double-Acting

TECHNICAL DETAILS

The Hallite E2W is a double-acting, O-ring energized, rod wiper/excluder designed to include two different unique wiping lip geometries. The two lips combine to scrape debris from the rod and contain residual oil on rod extension, as well as allowing oil to pump back into the cylinder. The O-ring energizer provides the force necessary to maintain the engagement of the wiping lips against the sliding surface and allow the wiper to adjust for deflection.

Typically made from exclusive Hallite Armorlene® materials, this seal is capable of high-speed applications and eliminates any potential for stick-slip. High-performance Armorlene® materials, like HLX, provide outstanding wear and scraping capability as well as large range of temperature and media compatibility.

The Halite E2W works well paired with rod seals that support the requisite dynamic pressure pump-back, like the Hallite R16 rod seal. When paired, they produce a sealing system capable of handling higher speeds, large range of fluid compatibilities, and temperature range of service. For other rod seal arrangements with E2W, it is necessary to make sure the rod seal will provide proper pressure pump-back, or alternatively vent the system. Hallite recommends proper guidance be used with this seal in heavy-duty applications (see Hallite Bearings section). This seal is available in a variety of Hallite's high-performance Armorlene® and Hythane® materials to suit a wide range of demanding applications.

*See Hallite 87, 506 or 533 bearing data sheets.



FEATURES

- Low friction and elimination of stick-slip action
- Self-adjustment for side movement of rod
- High-performance PTFE material as standard offering
- Balanced design keeps contamination out of cylinder while also minimizing oil film on rod

Part Number Structure

E2WMR00500NHLX _

E2W	M	R	00500	N	HLX	_
PROFILE DESIGNATION	UNIT OF MEASUREMENT M = Metric E = Inch	APPLICATION Refer to Installation Recommendations and use designator for desired application	ROD DIAMETER Metric = mm X 10 Inch = inches X 1000	ENERGIZER MATERIAL Refer to Energizer Table for desired energizer material	PTFE MATERIAL Refer to Material Table for desired PTFE (face) material	SPECIAL FEATURE Blank = Std profile

OPERATING CONDITIONS

	METRIC	INCH
Maximum Speed	Up to 15.0m/sec	Up to 50.0ft/sec
Temperature Range*	-45 to 200°C	-49 to 392°F

*Dependent upon energizer used (NBR, FKM, etc.).

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 FINISH RECOMMENDATIONS

SURFACE ROUGHNESS	METRIC			INCH			Rmr*
	µmRa	µmRz	µmRt	µinRa	µinRz	µinRt	
Dynamic Sealing Face Ød ₁	0.05 - 0.2	1.6 max	2 max	2 - 8	63 max	157 max	60% - 90%
Static Sealing Face ØD ₁ and 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	

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

ENERGIZER TABLE

ENERGIZER MATERIAL (SHORE A)	ENERGIZER TYPE	ENERGIZER DESIGNATION	ENERGIZER OPERATING TEMPERATURE°C	ENERGIZER OPERATING TEMPERATURE°F
NBR - 70A	O-ring	N	-30 to 100°C	-22 to 212°F
NBR - 70A Low temp.	O-ring	L	-45 to 80°C	-49 to 176°F
FKM - 75A	O-ring	F	-10 to 200°C	14 to 392°F
EPDM - 70A	O-ring	E	-45 to 145°C	-49 to 293°F
HNBR - 70A	O-ring	H	-25 to 150°C	-13 to 302°F
NBR - 90A	O-ring	Q	-30 to 100°C	-22 to 212°F
HNBR - 90A	O-ring	U	-25 to 150°C	-13 to 302°F
No Energizer*	None	X	-	-

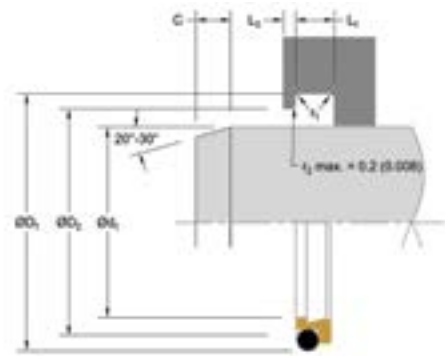
*Seal ratings are based upon capabilities of its matched material components. Hallite cannot rate seal performance when the seal is mixed with other manufacturers' energizers/components.

MATERIALS

MATERIAL FEATURES AND APPLICATIONS	FILLER	MATERIAL DESIGNATOR	COLOR	TEMPERATURE RANGE°C	TEMPERATURE RANGE°F
ARMORLENE® HLX <ul style="list-style-type: none"> Standard material for hydraulic applications High compressive strength Excellent extrusion resistance Extended wear resistance 	Special Bronze Compound	HLX	Gold	-73 to 288°C	-100 to 550°F
ARMORLENE® HCF <ul style="list-style-type: none"> Excellent in lubricating and non-lubricating hydraulic fluids (includes water) w/o zinc content Not recommended for gas sealing applications Not recommended for electrical conductive fluids 	Carbon Fiber Filled	HCF	Gray/Black	-73 to 260°C	-100 to 500°F
ARMORLENE® 702 <ul style="list-style-type: none"> Excellent in lubricating and non-lubricating hydraulic fluids Good low-friction properties Excellent extrusion resistance Good chemical resistance 	Glass Molybdenum Disulfide	702	Gray	-73 to 260°C	-100 to 500°F
ARMORLENE® 711 <ul style="list-style-type: none"> Excellent in all lubricating fluids and pneumatic applications High chemical resistance Excellent extrusion resistance Excellent wear properties 	25% Carbon/Graphite	711	Black	-73 to 288°C	-100 to 550°F
ARMORLENE® 700 <ul style="list-style-type: none"> Excellent in all hydraulic fluids Recommended for use with soft mating surfaces Low friction and no stick-slip 	Unfilled	700	White	-184 to 204°C	-300 to 400°F
748 - UHMWPE <ul style="list-style-type: none"> Excellent impact resistance Good dielectrical properties Excellent abrasion resistance Low coefficient of friction 	Standard	748	Translucent	-184 to 82°C	-300 to 180°F
HU5 - POLYURETHANE, 55D <ul style="list-style-type: none"> Positive position load holding Excellent extrusion resistance Excellent wear resistance Available up to 2540mm (100 inches) diameter 	Standard	HU5	Yellow	-20 to 115°C	-4 to 240°F
HU9 - POLYURETHANE, 95A <ul style="list-style-type: none"> Positive position load holding Excellent extrusion resistance Excellent wear resistance Available up to 2540mm (100 inches) diameter 	Standard	HU9	Red	-20 to 115°C	-4 to 240°F

For other material options consult the Master Materials Index at the front of the catalog. If you do not find the material that you require, please contact your local Hallite sales office.





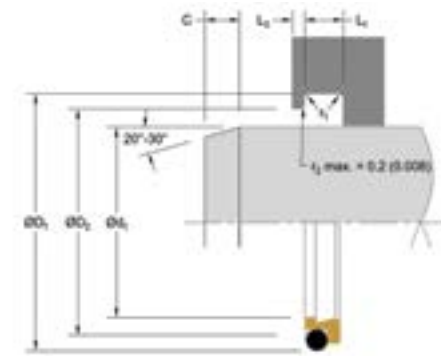
INSTALLATION RECOMMENDATIONS

METRIC		GROOVE DIAMETER	GROOVE WIDTH	BORE DIAMETER	STEP WIDTH	RADIUS	CHAMFER	O-RING CROSS SECTION
ROD DIAMETER Ød ₁ f8/h9								
DIAMETER RANGE*		D ₁ H9	L ₁ + 0.2	D ₂ H11	L ₃ Min	r ₁	C	O-ring
Standard Duty Application - R	Light Duty Application - L							
4.0 - 11.9	12.0 - 64.9	d ₁ + 4.8	3.7	d ₁ + 1.5	2.0	0.5	2.0	1.78
12.0 - 64.9	65.0 - 250.9	d ₁ + 6.8	5.0	d ₁ + 1.5	2.0	0.5	3.0	2.62
65.0 - 250.9	251.0 - 420.9	d ₁ + 8.8	6.0	d ₁ + 1.5	3.0	0.8	4.0	3.53
251.0 - 420.9	421.0 - 650.9	d ₁ + 12.2	8.4	d ₁ + 2.0	4.0	1.0	6.0	5.33
421.0 - 650.9	651.0 - 999.9	d ₁ + 16.0	11.0	d ₁ + 2.0	4.0	1.5	8.0	6.99
651.0 - 999.9	≥ 1000.0	d ₁ + 20.0	14.0	d ₁ + 2.5	5.0	1.5	8.0	8.40

*For diameters >400 mm Hallite recommends using the E5W.

INCH			GROOVE DIAMETER	GROOVE WIDTH	BORE DIAMETER	STEP WIDTH	RADIUS	CHAMFER	O-RING CROSS SECTION
ROD DIAMETER Ød ₁ f8/h9									
DIAMETER RANGE*			D ₁ H9	L ₁ + 0.008	D ₂ H11	L ₃ Min	r ₁	C	O-ring
Standard Duty Application - R	Light Duty Application - L	Heavy Duty Application - H							
0.313 - 0.499	0.500 - 2.499	-	d ₁ + 0.190	0.146	d ₁ + 0.060	0.079	0.015	0.079	0.070
0.500 - 2.499	2.500 - 9.999	0.375 - 0.499	d ₁ + 0.270	0.196	d ₁ + 0.060	0.079	0.015	0.118	0.103
2.500 - 7.999	-	1.000 - 2.499	d ₁ + 0.345	0.236	d ₁ + 0.060	0.118	0.015	0.157	0.139
8.000 - 9.999	10.000 - 15.750	-	d ₁ + 0.345	0.236	d ₁ + 0.060	0.150	0.015	0.157	0.139
10.000 - 16.999	17.000 - 19.999	2.500 - 9.999	d ₁ + 0.480	0.332	d ₁ + 0.080	0.150	0.035	0.236	0.210
17.000 - 19.999	20.000 - 25.750	10.000 - 16.999	d ₁ + 0.630	0.434	d ₁ + 0.080	0.150	0.035	0.315	0.275

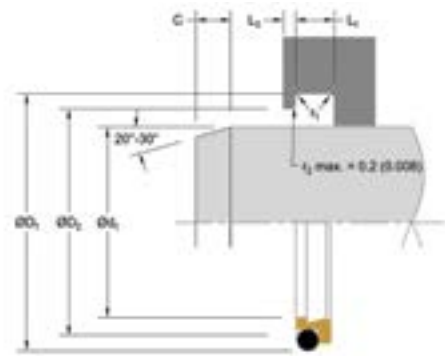
*For diameters >15.750 inch Hallite recommends using the E5W.



PART NUMBER RANGE (METRIC)*

METRIC					PART NUMBER
Ød ₁	ØD ₁	L ₁	ØD ₂	STEP WIDTH	
Tol. f8/h9	Tol. H9	Tol. +0.2	Tol. H11	L ₃ Min	
4.0	8.8	3.7	5.5	2.0	E2WMR00040****+
5.0	9.8	3.7	6.5	2.0	E2WMR00050****+
6.0	10.8	3.7	7.5	2.0	E2WMR00060****+
8.0	12.8	3.7	9.5	2.0	E2WMR00080****+
10.0	14.8	3.7	11.5	2.0	E2WMR00100****+
12.0	18.8	5.0	13.5	2.0	E2WMR00120****+
14.0	20.8	5.0	15.5	2.0	E2WMR00140****+
15.0	21.8	5.0	16.5	2.0	E2WMR00150****
16.0	20.8	3.7	17.5	2.0	E2WML00160****
16.0	22.8	5.0	17.5	2.0	E2WMR00160****+
18.0	22.8	3.7	19.5	2.0	E2WML00180****
18.0	24.8	5.0	19.5	2.0	E2WMR00180****+
20.0	26.8	5.0	21.5	2.0	E2WMR00200****+
22.0	28.8	5.0	23.5	2.0	E2WMR00220****+
25.0	31.8	5.0	26.5	2.0	E2WMR00250****+
28.0	34.8	5.0	29.5	2.0	E2WMR00280****+
30.0	34.8	3.7	31.5	2.0	E2WML00300****
30.0	36.8	5.0	31.5	2.0	E2WMR00300****
32.0	38.8	5.0	33.5	2.0	E2WMR00320****+
35.0	41.8	5.0	36.5	2.0	E2WMR00350****
36.0	42.8	5.0	37.5	2.0	E2WMR00360****+
37.0	43.8	5.0	38.5	2.0	E2WMR00370****
40.0	46.8	5.0	41.5	2.0	E2WMR00400****+
42.0	48.8	5.0	43.5	2.0	E2WMR00420****
45.0	51.8	5.0	46.5	2.0	E2WMR00450****+
49.0	55.8	5.0	50.5	2.0	E2WMR00490****
50.0	56.8	5.0	51.5	2.0	E2WMR00500****+
50.8	57.6	5.0	52.3	2.0	E2WMR00508****
54.0	60.8	5.0	55.5	2.0	E2WMR00540****
55.0	61.8	5.0	56.5	2.0	E2WMR00550****
56.0	62.8	5.0	57.5	2.0	E2WMR00560****+
60.0	66.8	5.0	61.5	2.0	E2WMR00600****
63.0	69.8	5.0	64.5	2.0	E2WMR00630****+
65.0	73.8	6.0	66.5	3.0	E2WMR00650****
70.0	78.8	6.0	71.5	3.0	E2WMR00700****
75.0	83.8	6.0	76.5	3.0	E2WMR00750****
80.0	88.8	6.0	81.5	3.0	E2WMR00800****
85.0	93.8	6.0	86.5	3.0	E2WMR00850****
90.0	98.8	6.0	91.5	3.0	E2WMR00900****
95.0	103.8	6.0	96.5	3.0	E2WMR00950****
100.0	108.8	6.0	101.5	3.0	E2WMR01000****
105.0	113.8	6.0	106.5	3.0	E2WMR01050****
110.0	118.8	6.0	111.5	3.0	E2WMR01100****
115.0	123.8	6.0	116.5	3.0	E2WMR01150****
120.0	128.8	6.0	121.5	3.0	E2WMR01200****
125.0	133.8	6.0	126.5	3.0	E2WMR01250****
130.0	138.8	6.0	131.5	3.0	E2WMR01300****
135.0	143.8	6.0	136.5	3.0	E2WMR01350****
137.0	145.8	6.0	138.5	3.0	E2WMR01370****
140.0	148.8	6.0	141.5	3.0	E2WMR01400****
145.0	153.8	6.0	146.5	3.0	E2WMR01450****
150.0	158.8	6.0	151.5	3.0	E2WMR01500****
160.0	168.8	6.0	161.5	3.0	E2WMR01600****
170.0	178.8	6.0	171.5	3.0	E2WMR01700****
180.0	188.8	6.0	181.5	3.0	E2WMR01800****
190.0	198.8	6.0	191.5	3.0	E2WMR01900****

+ Fits ISO 6195 Type D grooves.



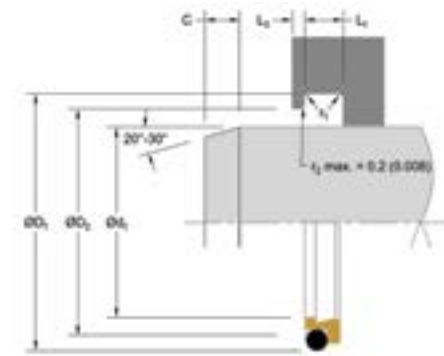
PART NUMBER RANGE (METRIC)*

METRIC					
Ød ₁	ØD ₁	L ₁	ØD ₂	STEP WIDTH	PART NUMBER
Tol. f8/h9	Tol. H9	Tol. +0.2	Tol. H11	L ₃ Min	
200.0	208.8	6.0	201.5	3.0	E2WMR02000****
210.0	218.8	6.0	211.5	3.0	E2WMR02100****
220.0	228.8	6.0	221.5	3.0	E2WMR02200****
230.0	238.8	6.0	231.5	3.0	E2WMR02300****
240.0	248.8	6.0	241.5	3.0	E2WMR02400****
250.0	258.8	6.0	251.5	3.0	E2WMR02500****
260.0	272.2	8.4	262.0	4.0	E2WMR02600****
280.0	292.2	8.4	282.0	4.0	E2WMR02800****
300.0	312.2	8.4	302.0	4.0	E2WMR03000****
320.0	332.2	8.4	322.0	4.0	E2WMR03200****
350.0	362.2	8.4	352.0	4.0	E2WMR03500****
360.0	372.2	8.4	362.0	4.0	E2WMR03600****
370.0	382.2	8.4	372.0	4.0	E2WMR03700****
400.0	412.2	8.4	402.0	4.0	E2WMR04000****
440.0	456.0	11.0	442.0	4.0	E2WMR04400****
480.0	496.0	11.0	482.0	4.0	E2WMR04800****
600.0	616.0	11.0	602.0	4.0	E2WMR06000****
630.0	646.0	11.0	632.0	4.0	E2WMR06300****
680.0	700.0	14.0	682.5	5.0	E2WMR06800****
700.0	720.0	14.0	702.5	5.0	E2WMR07000****
770.0	790.0	14.0	772.5	5.0	E2WMR07700****
828.0	848.0	14.0	830.5	5.0	E2WMR08280****
880.0	900.0	14.0	882.5	5.0	E2WMR08800****
900.0	920.0	14.0	902.5	5.0	E2WMR09000****
1030.0	1050.0	14.0	1032.5	5.0	E2WML10300****
1180.0	1200.0	14.0	1182.5	5.0	E2WML11800****

* Fits ISO 6195 Type D grooves. *Please contact Hallite for custom sizes, material selection, or seal design.

PART NUMBER RANGE (INCH)*

INCH					
Ød ₁	ØD ₁	L ₁	ØD ₂	STEP WIDTH	PART NUMBER
Tol. f8/h9	Tol. H9	Tol. +.008	Tol. H11	L ₃ Min	
1.500	1.770	0.196	1.560	0.079	E2WER01500****
1.562	1.832	0.196	1.623	0.079	E2WER01562****
1.625	1.895	0.196	1.685	0.079	E2WER01625****
1.687	1.957	0.196	1.748	0.079	E2WER01687****
1.750	2.020	0.196	1.810	0.079	E2WER01750****
1.812	2.082	0.196	1.873	0.079	E2WER01812****
1.875	2.145	0.196	1.935	0.079	E2WER01875****
1.937	2.207	0.196	1.998	0.079	E2WER01937****
2.000	2.270	0.196	2.060	0.079	E2WER02000****
2.125	2.395	0.196	2.185	0.079	E2WER02125****
2.250	2.520	0.196	2.310	0.079	E2WER02250****
2.375	2.645	0.196	2.435	0.079	E2WER02375****
2.500	2.845	0.236	2.560	0.118	E2WER02500****
2.625	2.970	0.236	2.685	0.118	E2WER02625****
2.750	3.095	0.236	2.810	0.118	E2WER02750****
2.875	3.220	0.236	2.935	0.118	E2WER02875****
3.000	3.345	0.236	3.060	0.118	E2WER03000****
3.125	3.470	0.236	3.185	0.118	E2WER03125****
3.250	3.595	0.236	3.310	0.118	E2WER03250****
3.375	3.720	0.236	3.435	0.118	E2WER03375****
3.500	3.845	0.236	3.560	0.118	E2WER03500****
3.625	3.970	0.236	3.685	0.118	E2WER03625****
3.750	4.095	0.236	3.810	0.118	E2WER03750****
3.875	4.220	0.236	3.935	0.118	E2WER03875****
4.000	4.345	0.236	4.060	0.118	E2WER04000****
4.125	4.470	0.236	4.185	0.118	E2WER04125****
4.250	4.595	0.236	4.310	0.118	E2WER04250****
4.375	4.720	0.236	4.435	0.118	E2WER04375****



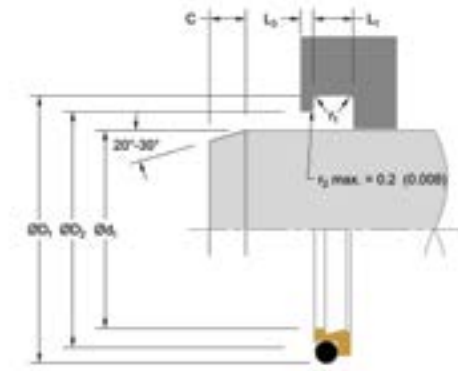
PART NUMBER RANGE (INCH)*

INCH					
Ød ₁	ØD ₁	L ₁	ØD ₂	STEP WIDTH	PART NUMBER
Tol. f8/h9	Tol. H9	Tol. +.008	Tol. H11	L ₃ Min	
4.500	4.845	0.236	4.560	0.118	E2WER04500****
4.625	4.970	0.236	4.685	0.118	E2WER04625****
4.750	5.095	0.236	4.810	0.118	E2WER04750****
4.875	5.220	0.236	4.935	0.118	E2WER04875****
5.000	5.345	0.236	5.060	0.118	E2WER05000****
5.125	5.470	0.236	5.185	0.118	E2WER05125****
5.250	5.595	0.236	5.310	0.118	E2WER05250****
5.375	5.720	0.236	5.435	0.118	E2WER05375****
5.500	5.845	0.236	5.560	0.118	E2WER05500****
5.625	5.970	0.236	5.685	0.118	E2WER05625****
5.750	6.095	0.236	5.810	0.118	E2WER05750****
6.000	6.345	0.236	6.060	0.118	E2WER06000****
6.250	6.595	0.236	6.310	0.118	E2WER06250****
6.500	6.845	0.236	6.560	0.118	E2WER06500****
6.750	7.095	0.236	6.810	0.118	E2WER06750****
7.000	7.345	0.236	7.060	0.118	E2WER07000****
7.250	7.595	0.236	7.310	0.118	E2WER07250****
7.500	7.845	0.236	7.560	0.118	E2WER07500****
7.750	8.095	0.236	7.810	0.118	E2WER07750****
8.000	8.345	0.236	8.060	0.150	E2WER08000****
8.250	8.595	0.236	8.310	0.150	E2WER08250****
8.500	8.845	0.236	8.560	0.150	E2WER08500****
8.750	9.095	0.236	8.810	0.150	E2WER08750****
9.000	9.345	0.236	9.060	0.150	E2WER09000****
9.250	9.595	0.236	9.310	0.150	E2WER09250****
9.500	9.845	0.236	9.560	0.150	E2WER09500****
9.750	10.095	0.236	9.810	0.150	E2WER09750****
10.000	10.480	0.332	10.080	0.150	E2WER10000****

INCH					
Ød ₁	ØD ₁	L ₁	ØD ₂	STEP WIDTH	PART NUMBER
Tol. f8/h9	Tol. H9	Tol. +.008	Tol. H11	L ₃ Min	
10.500	10.980	0.332	10.580	0.150	E2WER10500****
11.000	11.480	0.332	11.080	0.150	E2WER11000****
11.500	11.980	0.332	11.580	0.150	E2WER11500****
12.000	12.480	0.332	12.080	0.150	E2WER12000****
12.500	12.980	0.332	12.580	0.150	E2WER12500****
13.000	13.480	0.332	13.080	0.150	E2WER13000****
13.500	13.980	0.332	13.580	0.150	E2WER13500****
14.000	14.480	0.332	14.080	0.150	E2WER14000****
14.500	14.980	0.332	14.580	0.150	E2WER14500****
15.000	15.480	0.332	15.080	0.150	E2WER15000****
15.500	15.980	0.332	15.580	0.150	E2WER15500****
16.000	16.480	0.332	16.080	0.150	E2WER16000****
16.500	16.980	0.332	16.580	0.150	E2WER16500****
17.000	17.630	0.434	17.080	0.150	E2WER17000****
17.500	18.130	0.434	17.580	0.150	E2WER17500****
18.000	18.630	0.434	18.080	0.150	E2WER18000****
18.500	19.130	0.434	18.580	0.150	E2WER18500****
19.000	19.630	0.434	19.080	0.150	E2WER19000****
19.500	20.130	0.434	19.580	0.150	E2WER19500****
20.000	20.630	0.434	20.080	0.150	E2WEL20000****

*Please contact Hallite for custom sizes, material selection, or seal design.





E5W

WIPER/EXCLUDER

Double-Acting

TECHNICAL DETAILS

The Hallite E5W is a double-acting, O-ring energized, rod wiper/excluder designed to include two different unique wiping lip geometries. The two lips combine to scrape debris from the rod and contain residual oil on rod extension, as well as allowing oil to pump back into the cylinder. The O-ring energizer provides the force necessary to maintain the engagement of the wiping lips against the sliding surface and allow the wiper to adjust for deflection.

Typically made from exclusive Hallite Armorlene® materials, this seal is capable of high speed applications and eliminates any potential for stick-slip. High-performance Armorlene® materials, like HLX, provide outstanding wear and scraping capability as well as large range of temperature and media compatibility.

The Halite E5W works well paired with rod seals that support the requisite dynamic pressure pump-back, like the Hallite R16 rod seal. When paired, they produce a sealing system capable of handling higher speeds, large range of fluid compatibilities, and temperature range of service. For other rod seal arrangements with E5W, it is necessary to make sure the rod seal will provide proper pressure pump-back, or alternatively vent the system. The E5W is often preferred for heavier duty and large-diameter applications. Please consult the series part listing for more information.



FEATURES

- Low friction and elimination of stick-slip action
- Self-adjustment for side movement of rod
- High-performance PTFE material as standard offering
- Balanced design keeps contamination out of cylinder while also minimizing oil film on rod

Part Number Structure

E5WMR00500NHLX _

E5W	M	R	00500	N	HLX	_
PROFILE DESIGNATION	UNIT OF MEASUREMENT M = Metric E = Inch	APPLICATION Refer to <i>Installation Recommendations</i> and use designator for desired application	ROD DIAMETER Metric = mm X 10 Inch = inches X 1000	ENERGIZER MATERIAL Refer to <i>Energizer Table</i> for desired energizer material	PTFE MATERIAL Refer to <i>Material Table</i> for desired PTFE (face) material	SPECIAL FEATURE Blank = Std profile

OPERATING CONDITIONS

	METRIC	INCH
Maximum Speed	Up to 15.0m/sec	Up to 50.0ft/sec
Temperature Range*	-45 to 200°C	-49 to 392°F

*Dependent upon energizer used (NBR, FKM, etc.).

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 FINISH RECOMMENDATIONS

SURFACE ROUGHNESS	METRIC			INCH			Rmr*
	µmRa	µmRz	µmRt	µinRa	µinRz	µinRt	
Dynamic Sealing Face Ød ₁	0.05 - 0.2	1.6 max	2 max	2 - 8	63 max	157 max	60% - 90%
Static Sealing Face ØD ₁ and 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	

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

ENERGIZER TABLE

ENERGIZER MATERIAL (SHORE A)	ENERGIZER TYPE	ENERGIZER DESIGNATION	ENERGIZER OPERATING TEMPERATURE°C	ENERGIZER OPERATING TEMPERATURE°F
NBR - 70A	O-ring	N	-30 to 100°C	-22 to 212°F
NBR - 70A Low temp.	O-ring	L	-45 to 80°C	-49 to 176°F
FKM - 75A	O-ring	F	-10 to 200°C	14 to 392°F
EPDM - 70A	O-ring	E	-45 to 145°C	-49 to 293°F
HNBR - 70A	O-ring	H	-25 to 150°C	-13 to 302°F
NBR - 90A	O-ring	Q	-30 to 100°C	-22 to 212°F
HNBR - 90A	O-ring	U	-25 to 150°C	-13 to 302°F
No Energizer*	None	X	-	-

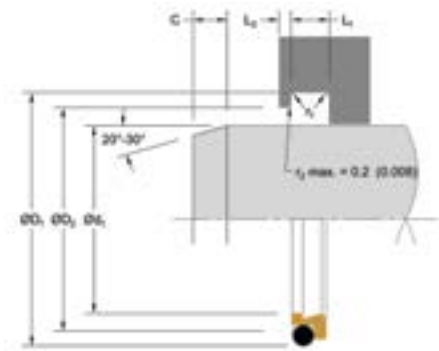
*Seal ratings are based upon capabilities of its matched material components. Hallite cannot rate seal performance when the seal is mixed with other manufacturers' energizers/components.

MATERIALS

MATERIAL FEATURES AND APPLICATIONS	FILLER	MATERIAL DESIGNATOR	COLOR	TEMPERATURE RANGE°C	TEMPERATURE RANGE°F
ARMORLENE® HLX <ul style="list-style-type: none"> Standard material for hydraulic applications High compressive strength Excellent extrusion resistance Extended wear resistance 	Special Bronze Compound	HLX	Gold	-73 to 288°C	-100 to 550°F
ARMORLENE® HCF <ul style="list-style-type: none"> Excellent in lubricating and non-lubricating hydraulic fluids (includes water) w/o zinc content Not recommended for gas sealing applications Not recommended for electrical conductive fluids 	Carbon Fiber Filled	HCF	Gray/Black	-73 to 260°C	-100 to 500°F
ARMORLENE® 702 <ul style="list-style-type: none"> Excellent in lubricating and non-lubricating hydraulic fluids Good low-friction properties Excellent extrusion resistance Good chemical resistance 	Glass Molybdenum Disulfide	702	Gray	-73 to 260°C	-100 to 500°F
ARMORLENE® 711 <ul style="list-style-type: none"> Excellent in all lubricating fluids and pneumatic applications High chemical resistance Excellent extrusion resistance Excellent wear properties 	25% Carbon/Graphite	711	Black	-73 to 288°C	-100 to 550°F
ARMORLENE® 700 <ul style="list-style-type: none"> Excellent in all hydraulic fluids Recommended for use with soft mating surfaces Low friction and no stick-slip 	Unfilled	700	White	-184 to 204°C	-300 to 400°F
748 - UHMWPE <ul style="list-style-type: none"> Excellent impact resistance Good dielectrical properties Excellent abrasion resistance Low coefficient of friction 	Standard	748	Translucent	-184 to 82°C	-300 to 180°F
HU5 - POLYURETHANE, 55D <ul style="list-style-type: none"> Positive position load holding Excellent extrusion resistance Excellent wear resistance Available up to 2540mm (100 INCHes) diameter 	Standard	HU5	Yellow	-20 to 115°C	-4 to 240°F
HU9 - POLYURETHANE, 95A <ul style="list-style-type: none"> Positive position load holding Excellent extrusion resistance Excellent wear resistance Available up to 2540mm (100 INCHes) diameter 	Standard	HU9	Red	-20 to 115°C	-4 to 240°F

For other material options consult the Master Materials Index at the front of the catalog. If you do not find the material that you require, please contact your local Hallite sales office.

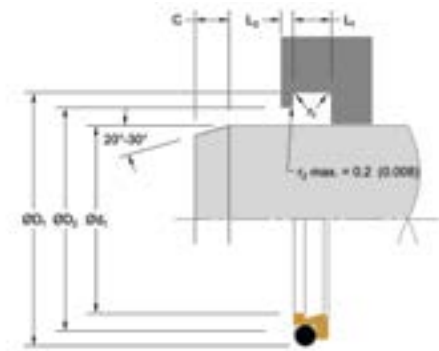




INSTALLATION RECOMMENDATIONS

METRIC										
ROD DIAMETER Ød ₁ f8/h9			GROOVE DIAMETER	GROOVE WIDTH	BORE DIAMETER	STEP WIDTH	RADIUS	CHAMFER	O-RING CROSS SECTION	
DIAMETER RANGE			D ₁ H9	L ₁ + 0.2	D ₂ H11	L ₃ Min	r ₁	C	O-ring	
Standard Duty Application - R		Light Duty Application - L								
19.0 - 39.9		40.0 - 69.9	d ₁ + 7.6	4.2	d ₁ + 1.5	3.0	0.5	3.0	2.62	
40.0 - 69.9		70.0 - 139.9	d ₁ + 8.8	6.3	d ₁ + 1.5	3.0	0.8	4.0	2.62	
70.0 - 139.9		140.0 - 399.9	d ₁ + 12.2	8.1	d ₁ + 2.0	4.0	1.0	6.0	3.53	
140.0 - 399.9		400.0 - 649.9	d ₁ + 16.0	9.5	d ₁ + 2.5	5.0	1.5	6.0	5.33	
400.0 - 649.9		650.0 - 999.9	d ₁ + 24.0	14.0	d ₁ + 2.5	8.0	1.5	8.0	6.99	
650.0 - 999.9		≥ 1000.0	d ₁ + 27.3	16.0	d ₁ + 2.5	10.0	2.0	9.0	8.40	

INCH										
ROD DIAMETER Ød ₁ f8/h9			GROOVE DIAMETER	GROOVE WIDTH	BORE DIAMETER	STEP WIDTH	RADIUS	CHAMFER	O-RING CROSS SECTION	
DIAMETER RANGE			D ₁ H9	L ₁ + .008	D ₂ H11	L ₃ Min	r ₁	C	O-ring	
Standard Duty Application - R	Light Duty Application - L	Heavy Duty Application - H								
1.500 - 2.749	2.750 - 5.499	1.188 - 1.499	d ₁ + 0.346	0.248	d ₁ + 0.060	0.079	0.015	0.157	0.103	
2.750 - 5.499	5.500 - 15.749	1.500 - 2.749	d ₁ + 0.480	0.319	d ₁ + 0.080	0.118	0.015	0.236	0.139	
5.500 - 7.999	-	2.750 - 5.499	d ₁ + 0.630	0.374	d ₁ + 0.100	0.118	0.035	0.236	0.210	
8.000 - 15.749	15.750 - 25.500	-	d ₁ + 0.630	0.374	d ₁ + 0.100	0.150	0.035	0.236	0.210	
15.750 - 25.500	-	5.500 - 15.749	d ₁ + 0.945	0.551	d ₁ + 0.100	0.150	0.035	0.315	0.275	

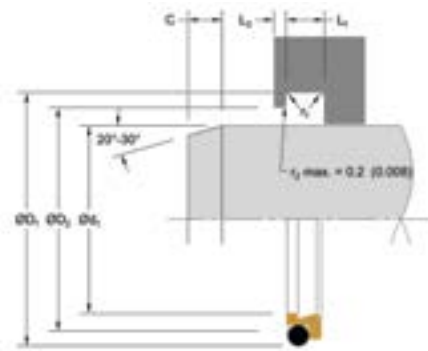


E5W
WIPER/EXCLUDER
Double-Acting

PART NUMBER RANGE (METRIC)*

METRIC						PART NUMBER
Ød ₁	ØD ₁	L ₁	ØD ₂	STEP WIDTH		
Tol. f8/h9	Tol. H9	Tol. +0.2	Tol. H11	L ₃ Min		
20.0	27.6	4.2	21.5	3.0		E5WMR00200****
25.0	32.6	4.2	26.5	3.0		E5WMR00250****
28.0	35.6	4.2	29.5	3.0		E5WMR00280****
30.0	37.6	4.2	31.5	3.0		E5WMR00300****
32.0	39.6	4.2	33.5	3.0		E5WMR00320****
36.0	43.6	4.2	37.5	3.0		E5WMR00360****
40.0	48.8	6.3	41.5	3.0		E5WMR00400****+
42.0	50.8	6.3	43.5	3.0		E5WMR00420****
45.0	53.8	6.3	46.5	3.0		E5WMR00450****+
50.0	58.8	6.3	51.5	3.0		E5WMR00500****+
55.0	63.8	6.3	56.5	3.0		E5WMR00550****
56.0	64.8	6.3	57.5	3.0		E5WMR00560****+
60.0	68.8	6.3	61.5	3.0		E5WMR00600****
63.0	71.8	6.3	64.5	3.0		E5WMR00630****+
65.0	73.8	6.3	66.5	3.0		E5WMR00650****
70.0	78.8	6.3	71.5	3.0		E5WML00700****+
70.0	82.2	8.1	72.0	4.0		E5WMR00700****+
75.0	87.2	8.1	77.0	4.0		E5WMR00750****
80.0	88.8	6.3	81.5	3.0		E5WML00800****+
80.0	92.2	8.1	82.0	4.0		E5WMR00800****+
85.0	97.2	8.1	87.0	4.0		E5WMR00850****
90.0	98.8	6.3	91.5	3.0		E5WML00900****+
90.0	102.2	8.1	92.0	4.0		E5WMR00900****+
97.0	109.2	8.1	99.0	4.0		E5WMR00970****
99.0	111.2	8.1	101.0	4.0		E5WMR00990****
100.0	108.8	6.3	101.5	3.0		E5WML01000****+
100.0	112.2	8.1	102.0	4.0		E5WMR01000****+
110.0	118.8	6.3	111.5	3		E5WML01100****+

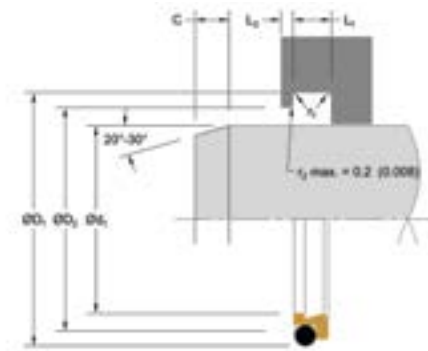
METRIC						PART NUMBER
Ød ₁	ØD ₁	L ₁	ØD ₂	STEP WIDTH		
Tol. f8/h9	Tol. H9	Tol. +0.2	Tol. H11	L ₃ Min		
110.0	122.2	8.1	112.0	4.0		E5WMR01100****+
115.0	127.2	8.1	117.0	4.0		E5WMR01150****
120.0	132.2	8.1	122.0	4.0		E5WMR01200****
125.0	133.8	6.3	126.5	3.0		E5WML01250****+
125.0	137.2	8.1	127.0	4.0		E5WMR01250****+
125.4	137.6	8.1	127.4	4.0		E5WMR01254****
130.0	142.2	8.1	132.0	4.0		E5WMR01300****
135.0	147.2	8.1	137.0	4.0		E5WMR01350****
140.0	152.2	8.1	142.0	4.0		E5WML01400****+
140.0	156.0	9.5	142.5	5.0		E5WMR01400****+
140.5	156.5	9.5	143.0	5.0		E5WMR01405****
150.0	166.0	9.5	152.5	5.0		E5WMR01500****
153.0	169.0	9.5	155.5	5.0		E5WMR01530****
155.0	171.0	9.5	157.5	5.0		E5WMR01550****
160.0	172.2	8.1	162.0	4.0		E5WML01600****+
160.0	176.0	9.5	162.5	5.0		E5WMR01600****+
165.0	181.0	9.5	167.5	5.0		E5WMR01650****
170.0	186.0	9.5	172.5	5.0		E5WMR01700****
175.0	191.0	9.5	177.5	5.0		E5WMR01750****
180.0	192.2	8.1	182.0	4.0		E5WML01800****+
180.0	196.0	9.5	182.5	5.0		E5WMR01800****+
188.2	204.2	9.5	190.7	5.0		E5WMR01882****
190.0	206.0	9.5	192.5	5.0		E5WMR01900****
192.0	208.0	9.5	194.5	5.0		E5WMR01920****
200.0	212.2	8.1	202.0	4.0		E5WML02000****+
200.0	216.0	9.5	202.5	5.0		E5WMR02000****+
211.0	227.0	9.5	213.5	5		E5WMR02110****
220.0	232.2	8.1	222.0	4		E5WML02200****+



PART NUMBER RANGE (METRIC)*

METRIC					
Ød ₁	ØD ₁	L ₁	ØD ₂	STEP WIDTH	PART NUMBER
Tol. f8/h9	Tol. H9	Tol. +0.2	Tol. H11	L ₂ Min	
220.0	236.0	9.5	222.5	5.0	E5WMR02200****+
240.0	256.0	9.5	242.5	5.0	E5WMR02400****
250.0	262.2	8.1	252.0	4.0	E5WML02500****+
250.0	266.0	9.5	252.5	5.0	E5WMR02500****+
260.0	276.0	9.5	262.5	5.0	E5WMR02600****
270.0	286.0	9.5	272.5	5.0	E5WMR02700****
280.0	292.2	8.1	282.0	4.0	E5WML02800****+
280.0	296.0	9.5	282.5	5.0	E5WMR02800****+
300.0	316.0	9.5	302.5	5.0	E5WMR03000****
320.0	332.2	8.1	322.0	4.0	E5WML03200****+
320.0	336.0	9.5	322.5	5.0	E5WMR03200****+
330.0	346.0	9.5	332.5	5.0	E5WMR03300****
350.0	366.0	9.5	352.5	5.0	E5WMR03500****
360.0	372.2	8.1	362.0	4.0	E5WML03600****+
360.0	376.0	9.5	362.5	5.0	E5WMR03600****+
380.0	396.0	9.5	382.5	5.0	E5WMR03800****
400.0	424.0	14.0	402.5	8.0	E5WMR04000****
440.0	464.0	14.0	442.5	8.0	E5WMR04400****
450.0	474.0	14.0	452.5	8.0	E5WMR04500****
480.0	504.0	14.0	482.5	8.0	E5WMR04800****
500.0	524.0	14.0	502.5	8.0	E5WMR05000****
560.0	584.0	14.0	562.5	8.0	E5WMR05600****
600.0	624.0	14.0	602.5	8.0	E5WMR06000****
650.0	677.3	16.0	652.5	10.0	E5WMR06500****
680.0	707.3	16.0	682.5	10.0	E5WMR06800****
700.0	727.3	16.0	702.5	10.0	E5WMR07000****
770.0	797.3	16.0	772.5	10.0	E5WMR07700****
785.0	812.3	16.0	787.5	10.0	E5WMR07850****

+ Fits ISO 6195 Type D grooves. *Please contact Hallite for sizes, material selection, or seal design.

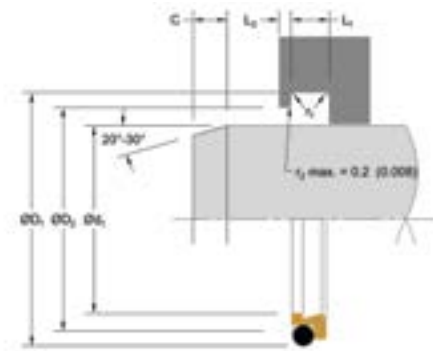


PART NUMBER RANGE (INCH)*

INCH					
Ød ₁	ØD ₁	L ₁	ØD ₂	STEP WIDTH	PART NUMBER
Tol. f8/h9	Tol. H9	Tol. +.008	Tol. H11	L ₂ Min	
1.500	1.846	0.248	1.560	0.079	E5WER01500****
1.562	1.908	0.248	1.623	0.079	E5WER01562****
1.625	1.971	0.248	1.685	0.079	E5WER01625****
1.687	2.033	0.248	1.748	0.079	E5WER01687****
1.750	2.096	0.248	1.810	0.079	E5WER01750****
1.812	2.158	0.248	1.873	0.079	E5WER01812****
1.875	2.221	0.248	1.935	0.079	E5WER01875****
1.937	2.283	0.248	1.998	0.079	E5WER01937****
2.000	2.346	0.248	2.060	0.079	E5WER02000****
2.125	2.471	0.248	2.185	0.079	E5WER02125****
2.250	2.596	0.248	2.310	0.079	E5WER02250****
2.375	2.721	0.248	2.435	0.079	E5WER02375****
2.500	2.846	0.248	2.560	0.079	E5WER02500****
2.625	2.971	0.248	2.685	0.079	E5WER02625****
2.750	3.230	0.319	2.830	0.118	E5WER02750****
2.875	3.355	0.319	2.955	0.118	E5WER02875****
3.000	3.480	0.319	3.080	0.118	E5WER03000****
3.125	3.605	0.319	3.205	0.118	E5WER03125****
3.250	3.730	0.319	3.330	0.118	E5WER03250****
3.375	3.855	0.319	3.455	0.118	E5WER03375****
3.500	3.980	0.319	3.580	0.118	E5WER03500****
3.625	4.105	0.319	3.705	0.118	E5WER03625****
3.750	4.230	0.319	3.830	0.118	E5WER03750****
3.875	4.355	0.319	3.955	0.118	E5WER03875****
4.000	4.480	0.319	4.080	0.118	E5WER04000****
4.125	4.605	0.319	4.205	0.118	E5WER04125****
4.250	4.730	0.319	4.330	0.118	E5WER04250****
4.375	4.855	0.319	4.455	0.118	E5WER04375****

INCH					
Ød ₁	ØD ₁	L ₁	ØD ₂	STEP WIDTH	PART NUMBER
Tol. f8/h9	Tol. H9	Tol. +.008	Tol. H11	L ₂ Min	
4.500	4.980	0.319	4.580	0.118	E5WER04500****
4.625	5.105	0.319	4.705	0.118	E5WER04625****
4.750	5.230	0.319	4.830	0.118	E5WER04750****
4.875	5.355	0.319	4.955	0.118	E5WER04875****
5.000	5.480	0.319	5.080	0.118	E5WER05000****
5.125	5.605	0.319	5.205	0.118	E5WER05125****
5.250	5.730	0.319	5.330	0.118	E5WER05250****
5.375	5.855	0.319	5.455	0.118	E5WER05375****
5.500	6.130	0.374	5.600	0.118	E5WER05500****
5.625	6.255	0.374	5.725	0.118	E5WER05625****
5.750	6.380	0.374	5.850	0.118	E5WER05750****
6.000	6.630	0.374	6.100	0.118	E5WER06000****
6.250	6.880	0.374	6.350	0.118	E5WER06250****
6.500	7.130	0.374	6.600	0.118	E5WER06500****
6.750	7.380	0.374	6.850	0.118	E5WER06750****
7.000	7.630	0.374	7.100	0.118	E5WER07000****
7.250	7.880	0.374	7.350	0.118	E5WER07250****
7.500	8.130	0.374	7.600	0.118	E5WER07500****
7.750	8.380	0.374	7.850	0.118	E5WER07750****
8.000	8.630	0.374	8.100	0.150	E5WER08000****
8.250	8.880	0.374	8.350	0.150	E5WER08250****
8.500	9.130	0.374	8.600	0.150	E5WER08500****
8.750	9.380	0.374	8.850	0.150	E5WER08750****
9.000	9.630	0.374	9.100	0.150	E5WER09000****
9.250	9.880	0.374	9.350	0.150	E5WER09250****
9.500	10.130	0.374	9.600	0.150	E5WER09500****
9.750	10.380	0.374	9.850	0.150	E5WER09750****
10.000	10.630	0.374	10.100	0.150	E5WER10000****





PART NUMBER RANGE (INCH)*

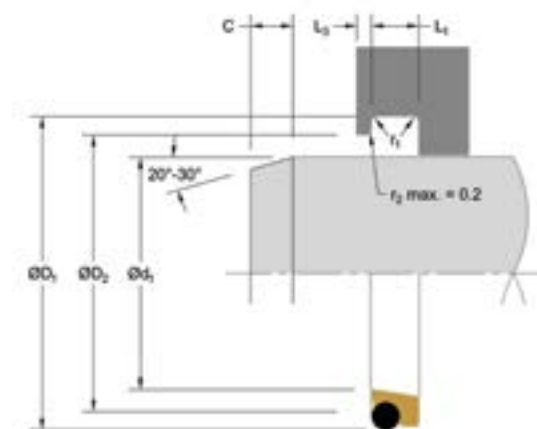
INCH					PART NUMBER
Ød ₁	ØD ₁	L ₁	ØD ₂	STEP WIDTH	
Tol. f8/h9	Tol. H9	Tol. +.008	Tol. H11	L ₂ Min	
10.500	11.130	0.374	10.600	0.150	E5WER10500****
11.000	11.630	0.374	11.100	0.150	E5WER11000****
11.500	12.130	0.374	11.600	0.150	E5WER11500****
12.000	12.630	0.374	12.100	0.150	E5WER12000****
12.500	13.130	0.374	12.600	0.150	E5WER12500****
13.000	13.630	0.374	13.100	0.150	E5WER13000****
13.500	14.130	0.374	13.600	0.150	E5WER13500****
14.000	14.630	0.374	14.100	0.150	E5WER14000****
14.500	15.130	0.374	14.600	0.150	E5WER14500****
15.000	15.630	0.374	15.100	0.150	E5WER15000****

INCH					PART NUMBER
Ød ₁	ØD ₁	L ₁	ØD ₂	STEP WIDTH	
Tol. f8/h9	Tol. H9	Tol. +.008	Tol. H11	L ₂ Min	
15.500	16.130	0.374	15.600	0.150	E5WER15500****
16.000	16.945	0.551	16.100	0.150	E5WER16000****
16.500	17.445	0.551	16.600	0.150	E5WER16500****
17.000	17.945	0.551	17.100	0.150	E5WER17000****
17.500	18.445	0.551	17.600	0.150	E5WER17500****
18.000	18.945	0.551	18.100	0.150	E5WER18000****
18.500	19.445	0.551	18.600	0.150	E5WER18500****
19.000	19.945	0.551	19.100	0.150	E5WER19000****
19.500	20.445	0.551	19.600	0.150	E5WER19500****
20.000	20.945	0.551	20.100	0.150	E5WER20000****

*Please contact Hallite for custom sizes, material selection, or seal design.

ELA

WIPER/EXCLUDER
Single-Acting



TECHNICAL DETAILS

The Hallite ELA rod wiper/excluder uses a single aggressive wiping lip that provides ingress protection. The ELA wiper uses an O-ring energizer to keep the wiper centered, helping to compensate for potential side-to-side movement in the application. Typically made from exclusive Hallite Armorlene® materials, this seal is capable of high-speed applications and eliminates any potential for stick-slip. The ELA wiper is a low-friction design, making it an energy-efficient choice. The ELA wiper follows ISO 6195, Type D dimensions.



F E A T U R E S

- Low friction and elimination of stick-slip
- Excellent in high-speed applications
- More stable design for application with excessive side-to-side movement on rod

Part Number Structure

ELAMR00400NHLX_

ELA	M	R	00400	N	HLX	_
PROFILE DESIGNATION	UNIT OF MEASUREMENT M = Metric E = Inch	APPLICATION Refer to Installation Recommendations and use designator for desired application	ROD DIAMETER Metric = mm X 10 Inch = inches X 1000	ENERGIZER MATERIAL Refer to Energizer Table for desired energizer material	PTFE MATERIAL Refer to Material Table for desired PTFE (face) material	SPECIAL FEATURE Blank = Std profile

OPERATING CONDITIONS

	METRIC	INCH
Maximum Speed	Up to 4.0m/sec	Up to 13.0ft/sec
Temperature Range*	-45 to 200°C	-49 to 392°F

*Dependent upon energizer used (NBR, FKM, etc.).

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 FINISH RECOMMENDATIONS

SURFACE ROUGHNESS	METRIC			INCH			Rmr*
	µmRa	µmRz	µmRt	µinRa	µinRz	µinRt	
Dynamic Sealing Face Ød ₁	0.05 - 0.2	1.6 max	2 max	2 - 8	63 max	157 max	60% - 90%
Static Sealing Face ØD ₁ and 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	

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

ENERGIZER TABLE

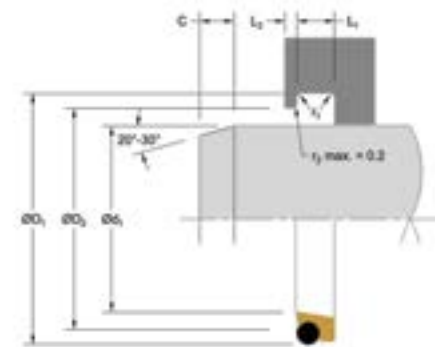
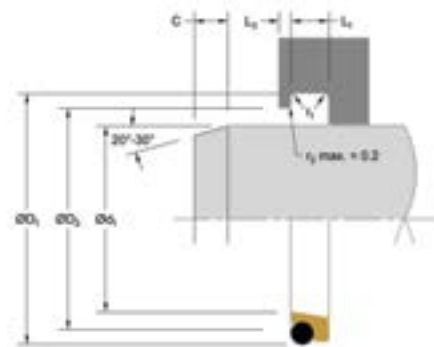
ENERGIZER MATERIAL (SHORE A)	ENERGIZER TYPE	ENERGIZER DESIGNATION	ENERGIZER OPERATING TEMPERATURE°C	ENERGIZER OPERATING TEMPERATURE°F
NBR - 70A	O-ring	N	-30 to 100°C	-22 to 212°F
NBR - 70A Low temp.	O-ring	L	-45 to 80°C	-49 to 176°F
FKM - 75A	O-ring	F	-10 to 200°C	14 to 392°F
EPDM - 70A	O-ring	E	-45 to 145°C	-49 to 293°F
HNBR - 70A	O-ring	H	-25 to 150°C	-13 to 302°F
NBR - 90A	O-ring	Q	-30 to 100°C	-22 to 212°F
HNBR - 90A	O-ring	U	-25 to 150°C	-13 to 302°F
No Energizer*	None	X	-	-

*Seal ratings are based upon capabilities of its matched material components. Hallite cannot rate seal performance when the seal is mixed with other manufacturers' energizers/components.

MATERIALS

MATERIAL FEATURES AND APPLICATIONS	FILLER	MATERIAL DESIGNATOR	COLOR	TEMPERATURE RANGE°C	TEMPERATURE RANGE°F
ARMORLENE® HLX <ul style="list-style-type: none"> Standard material for hydraulic applications High compressive strength Excellent extrusion resistance Extended wear resistance 	Special Bronze Compound	HLX	Gold	-73 to 288°C	-100 to 550°F
ARMORLENE® HCF <ul style="list-style-type: none"> Excellent in lubricating and non-lubricating hydraulic fluids (includes water) w/o zinc content Not recommended for gas sealing applications Not recommended for electrical conductive fluids 	Carbon Fiber Filled	HCF	Gray/Black	-73 to 260°C	-100 to 500°F
ARMORLENE® 702 <ul style="list-style-type: none"> Excellent in lubricating and non-lubricating hydraulic fluids Good low-friction properties Excellent extrusion resistance Good chemical resistance 	Glass Molybdenum Disulfide	702	Gray	-73 to 260°C	-100 to 500°F
ARMORLENE® 711 <ul style="list-style-type: none"> Excellent in all lubricating fluids and pneumatic applications High chemical resistance Excellent extrusion resistance Excellent wear properties 	25% Carbon/Graphite	711	Black	-73 to 288°C	-100 to 550°F
ARMORLENE® 700 <ul style="list-style-type: none"> Excellent in all hydraulic fluids Recommended for use with soft mating surfaces Low friction and no stick-slip 	Unfilled	700	White	-184 to 204°C	-300 to 400°F
748 - UHMWPE <ul style="list-style-type: none"> Excellent impact resistance Good dielectrical properties Excellent abrasion resistance Low coefficient of friction 	Standard	748	Translucent	-184 to 82°C	-300 to 180°F
HU5 - POLYURETHANE, 55D <ul style="list-style-type: none"> Positive position load holding Excellent extrusion resistance Excellent wear resistance Available up to 2540mm (100 inches) diameter 	Standard	HU5	Yellow	-20 to 115°C	-4 to 240°F
HU9 - POLYURETHANE, 95A <ul style="list-style-type: none"> Positive position load holding Excellent extrusion resistance Excellent wear resistance Available up to 2540mm (100 inches) diameter 	Standard	HU9	Red	-20 to 115°C	-4 to 240°F

For other material options consult the Master Materials Index at the front of the catalog. If you do not find the material that you require, please contact your local Hallite sales office.



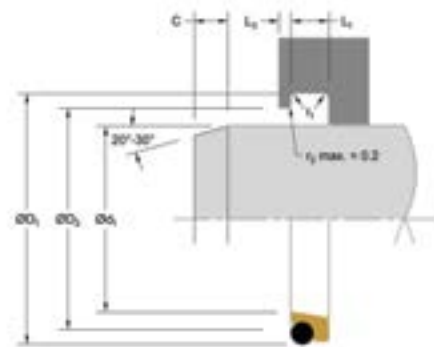
INSTALLATION RECOMMENDATIONS

METRIC						
ROD DIAMETER $\varnothing d_1$, f8/h9	GROOVE DIAMETER	GROOVE WIDTH	BORE DIAMETER	RADIUS	CHAMFER	O-RING CROSS SECTION
DIAMETER RANGE	D_1 H9	$L_1 + 0.2$	D_2 H11	r_1	C	O-ring
Standard Duty Application - R						
6.0 - 11.9	$d_1 + 4.8$	3.7	$d_1 + 2.7$	0.4	3.0	1.78
12.0 - 64.9	$d_1 + 6.8$	5.0	$d_1 + 3.5$	0.4	4.0	2.62
65.0 - 249.9	$d_1 + 8.8$	6.0	$d_1 + 4.0$	0.4	6.0	3.53
250.0 - 419.9	$d_1 + 12.2$	8.4	$d_1 + 4.5$	0.4	8.0	5.33
420.0 - 649.9	$d_1 + 16.0$	11.0	$d_1 + 5.2$	0.4	8.0	6.99
650.0 - 900.0	$d_1 + 20.0$	14.0	$d_1 + 6.6$	0.4	8.0	8.40

PART NUMBER RANGE (METRIC)*

METRIC				
$\varnothing d_1$	$\varnothing D_1$	L_1	$\varnothing D_2$	PART NUMBER
Tol. f9/h9	Tol. H9	Tol. +0.2	Tol. H11	
4	8.8	3.7	6.7	ELAMR00040****
5	9.8	3.7	7.7	ELAMR00050****
8	12.8	3.7	10.7	ELAMR00080****
10	14.8	3.7	12.7	ELAMR00100****
12	18.8	5.0	15.5	ELAMR00120****
14	20.8	5.0	17.5	ELAMR00140****
15	21.8	5.0	18.5	ELAMR00150****
18	24.8	5.0	21.5	ELAMR00180****
20	26.8	5.0	23.5	ELAMR00200****
24	30.8	5.0	27.5	ELAMR00240****
25	31.8	5.0	28.5	ELAMR00250****
28	34.8	5.0	31.5	ELAMR00280****
30	36.8	5.0	33.5	ELAMR00300****
32	38.8	5.0	35.5	ELAMR00320****
35	41.8	5.0	38.5	ELAMR00350****
38	44.8	5.0	41.5	ELAMR00380****
40	46.8	5.0	43.5	ELAMR00400****
42	48.8	5.0	45.5	ELAMR00420****
45	51.8	5.0	48.5	ELAMR00450****
48	54.8	5.0	51.5	ELAMR00480****
50	56.8	5.0	53.5	ELAMR00500****
55	61.8	5.0	58.5	ELAMR00550****
60	66.8	5.0	63.5	ELAMR00600****
65	73.8	6.0	69.0	ELAMR00650****
70	78.8	6.0	74.0	ELAMR00700****
75	83.8	6.0	79.0	ELAMR00750****
80	88.8	6.0	84.0	ELAMR00800****
85	93.8	6.0	89.0	ELAMR00850****

METRIC				
$\varnothing d_1$	$\varnothing D_1$	L_1	$\varnothing D_2$	PART NUMBER
Tol. f9/h9	Tol. H9	Tol. +0.2	Tol. H11	
90	98.8	6.0	94.0	ELAMR00900****
95	103.8	6.0	99.0	ELAMR00950****
100	108.8	6.0	104.0	ELAMR01000****
110	118.8	6.0	114.0	ELAMR01100****
120	128.8	6.0	124.0	ELAMR01200****
125	133.8	6.0	129.0	ELAMR01250****
130	138.8	6.0	134.0	ELAMR01300****
140	148.8	6.0	144.0	ELAMR01400****
150	158.8	6.0	154.0	ELAMR01500****
160	168.8	6.0	164.0	ELAMR01600****
170	178.8	6.0	174.0	ELAMR01700****
175	183.8	6.0	179.0	ELAMR01750****
180	188.8	6.0	184.0	ELAMR01800****
190	198.8	6.0	194.0	ELAMR01900****
195	203.8	6.0	199.0	ELAMR01950****
200	208.8	6.0	204.0	ELAMR02000****
210	218.8	6.0	214.0	ELAMR02100****
220	228.8	6.0	224.0	ELAMR02200****
230	238.8	6.0	234.0	ELAMR02300****
240	248.8	6.0	244.0	ELAMR02400****
250	262.2	8.4	254.5	ELAMR02500****
260	272.2	8.4	264.5	ELAMR02600****
270	282.2	8.4	274.5	ELAMR02700****
280	292.2	8.4	284.5	ELAMR02800****
290	302.2	8.4	294.5	ELAMR02900****
300	312.2	8.4	304.5	ELAMR03000****
310	322.2	8.4	314.5	ELAMR03100****
320	332.2	8.4	324.5	ELAMR03200****

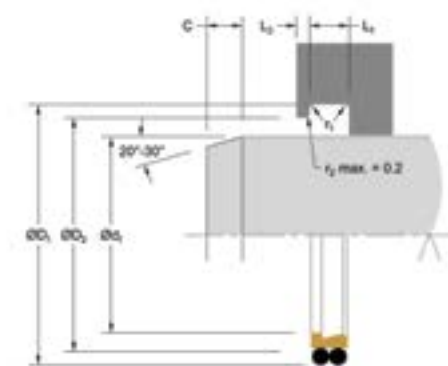


PART NUMBER RANGE (METRIC)*

METRIC				PART NUMBER
Ød ₁	ØD ₁	L ₁	ØD ₂	
Tol. f9/h9	Tol. H9	Tol. +0.2	Tol. H11	
330	342.2	8.4	334.5	ELAMR03300****
340	352.2	8.4	344.5	ELAMR03400****
350	362.2	8.4	354.5	ELAMR03500****
360	372.2	8.4	364.5	ELAMR03600****
370	382.2	8.4	374.5	ELAMR03700****
380	392.2	8.4	384.5	ELAMR03800****
390	402.2	8.4	394.5	ELAMR03900****
400	412.2	8.4	404.5	ELAMR04000****
410	422.2	8.4	414.5	ELAMR04100****
420	436.0	11.0	425.2	ELAMR04200****
430	446	11.0	435.2	ELAMR04300****
440	456	11.0	445.2	ELAMR04400****
450	466	11.0	455.2	ELAMR04500****
460	476	11.0	465.2	ELAMR04600****

METRIC				PART NUMBER
Ød ₁	ØD ₁	L ₁	ØD ₂	
Tol. f9/h9	Tol. H9	Tol. +0.2	Tol. H11	
470	486	11.0	475.2	ELAMR04700****
480	496	11.0	485.2	ELAMR04800****
490	506	11.0	495.2	ELAMR04900****
500	516	11.0	505.2	ELAMR05000****
520	536	11.0	525.2	ELAMR05200****
550	566	11.0	555.2	ELAMR05500****
570	586	11.0	575.2	ELAMR05700****
600	616	11.0	605.2	ELAMR06000****
620	636	11.0	625.2	ELAMR06200****
640	656	11.0	645.2	ELAMR06400****
650	670	14.0	656.6	ELAMR06500****
700	720	14.0	706.6	ELAMR07000****
800	820	14.0	806.6	ELAMR08000****
900	920	14.0	906.6	ELAMR09000****

*Please contact Hallite for custom sizes, material selection, or seal design.



EXF

WIPER/EXCLUDER
Double-Acting

TECHNICAL DETAILS

The Hallite EXF is a double-acting, twin O-ring energized, rod wiper designed to include two different unique wiping geometries. The two lips combine to scrape debris from the rod and contain residual oil on rod extension, as well as allowing oil to pump back into the cylinder. The O-ring energizers provide the force necessary to maintain the engagement of the wiping lips against the sliding surface and allow the wiper to adjust for deflection.

Typically made from exclusive Hallite Armorlene® materials, this seal is capable of high speed applications and eliminates any potential for stick-slip. High-performance Armorlene® materials, like HLX, provide outstanding wear and scraping capability as well as large range of temperature and media compatibility.

The Halite EXF works well paired with rod seals that support the requisite dynamic pressure pump-back, like the Hallite R16 rod seal. When paired, they produce a sealing system capable of handling higher speeds, a large range of fluid compatibilities, and temperature range of service. For other rod seal arrangements with EXF, it is necessary to make sure the rod seal will provide proper pressure pump-back, or alternatively vent the system. The Hallite wipers/excluder series EXF is built to service moderate to slightly heavy-duty applications. It has the advantages of improved sealing function due to its twin energizer arrangement. Though it is easier to install in the groove, care must be taken to ensure it is not installed backwards and to ensure the proper fit of three individual components.



F E A T U R E S

- Low friction and elimination of stick-slip
- Excellent in high-speed applications
- More stable design for application with excessive side-to-side movement on rod
- Balanced design keeps contamination out of cylinder while also minimizing oil film on rod

Part Number Structure

EXFMR00400NHLX _

EXF	M	R	00400	N	HLX	—
PROFILE DESIGNATION	UNIT OF MEASUREMENT M = Metric E = Inch	APPLICATION Refer to Installation Recommendations and use designator for desired application	ROD DIAMETER Metric = mm X 10 Inch = inches X 1000	ENERGIZER MATERIAL Refer to Energizer Table for desired energizer material	PTFE MATERIAL Refer to Material Table for desired PTFE (face) material	SPECIAL FEATURE Blank = Std profile

OPERATING CONDITIONS

	METRIC	INCH
Maximum Speed	Up to 15.0m/sec	Up to 50.0ft/sec
Temperature Range*	-45 to 200°C	-49 to 392°F

*Dependent upon energizer used (NBR, FKM, etc.).

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 FINISH RECOMMENDATIONS

SURFACE ROUGHNESS	METRIC			INCH			Rmr*
	µmRa	µmRz	µmRt	µinRa	µinRz	µinRt	
Dynamic Sealing Face Ød ₁	0.05 - 0.2	1.6 max	2 max	2 - 8	63 max	157 max	60% - 90%
Static Sealing Face ØD ₁ and 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	

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

ENERGIZER TABLE

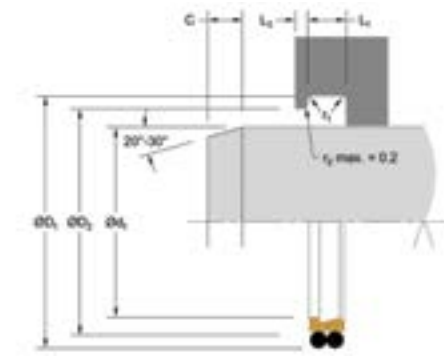
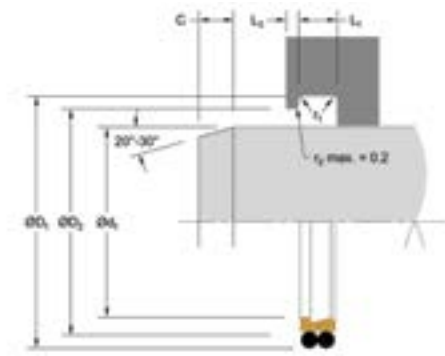
ENERGIZER MATERIAL (SHORE A)	ENERGIZER TYPE	ENERGIZER DESIGNATION	ENERGIZER OPERATING TEMPERATURE°C	ENERGIZER OPERATING TEMPERATURE°F
NBR - 70A	O-ring	N	-30 to 100°C	-22 to 212°F
NBR - 70A Low temp.	O-ring	L	-45 to 80°C	-49 to 176°F
FKM - 75A	O-ring	F	-10 to 200°C	14 to 392°F
EPDM - 70A	O-ring	E	-45 to 145°C	-49 to 293°F
HNBR - 70A	O-ring	H	-25 to 150°C	-13 to 302°F
NBR - 90A	O-ring	Q	-30 to 100°C	-22 to 212°F
HNBR - 90A	O-ring	U	-25 to 150°C	-13 to 302°F
No Energizer*	None	X	-	-

*Seal ratings are based upon capabilities of its matched material components. Hallite cannot rate seal performance when the seal is mixed with other manufacturers' energizers/components.

MATERIALS

MATERIAL FEATURES AND APPLICATIONS	FILLER	MATERIAL DESIGNATOR	COLOR	TEMPERATURE RANGE°C	TEMPERATURE RANGE°F
ARMORLENE® HLX <ul style="list-style-type: none"> Standard material for hydraulic applications High compressive strength Excellent extrusion resistance Extended wear resistance 	Special Bronze Compound	HLX	Gold	-73 to 288°C	-100 to 550°F
ARMORLENE® HCF <ul style="list-style-type: none"> Excellent in lubricating and non-lubricating hydraulic fluids (includes water) w/o zinc content Not recommended for gas sealing applications Not recommended for electrical conductive fluids 	Carbon Fiber Filled	HCF	Gray/Black	-73 to 260°C	-100 to 500°F
ARMORLENE® 702 <ul style="list-style-type: none"> Excellent in lubricating and non-lubricating hydraulic fluids Good low-friction properties Excellent extrusion resistance Good chemical resistance 	Glass Molybdenum Disulfide	702	Gray	-73 to 260°C	-100 to 500°F
ARMORLENE® 711 <ul style="list-style-type: none"> Excellent in all lubricating fluids and pneumatic applications High chemical resistance Excellent extrusion resistance Excellent wear properties 	25% Carbon/Graphite	711	Black	-73 to 288°C	-100 to 550°F
ARMORLENE® 700 <ul style="list-style-type: none"> Excellent in all hydraulic fluids Recommended for use with soft mating surfaces Low friction and no stick-slip 	Unfilled	700	White	-184 to 204°C	-300 to 400°F
748 - UHMWPE <ul style="list-style-type: none"> Excellent impact resistance Good dielectrical properties Excellent abrasion resistance Low coefficient of friction 	Standard	748	Translucent	-184 to 82°C	-300 to 180°F
HU5 - POLYURETHANE, 55D <ul style="list-style-type: none"> Positive position load holding Excellent extrusion resistance Excellent wear resistance Available up to 2540mm (100 inches) diameter 	Standard	HU5	Yellow	-20 to 115°C	-4 to 240°F
HU9 - POLYURETHANE, 95A <ul style="list-style-type: none"> Positive position load holding Excellent extrusion resistance Excellent wear resistance Available up to 2540mm (100 inches) diameter 	Standard	HU9	Red	-20 to 115°C	-4 to 240°F

For other material options consult the Master Materials Index at the front of the catalog. If you do not find the material that you require, please contact your local Hallite sales office.



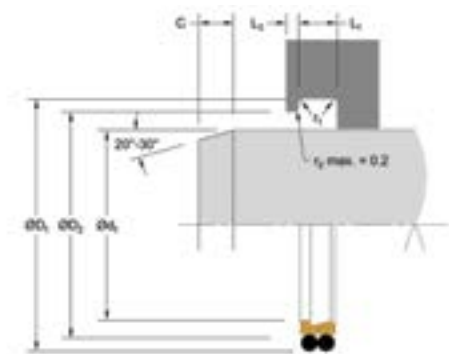
INSTALLATION RECOMMENDATIONS

METRIC		GROOVE DIAMETER	GROOVE WIDTH	BORE DIAMETER	STEP WIDTH	RADIUS	CHAMFER	O-RING CROSS SECTION
ROD DIAMETER Ød ₁ f8/h9								
DIAMETER RANGE		D ₁ H9	L ₁ + 0.2	D ₂ H11	L ₃ min	r ₁	C	O-ring
Standard Duty Application - R	Light Duty Application - L							
19.0 - 39.9	40.0 - 69.9	d ₁ + 7.6	4.2	d ₁ + 1.0	3.0	0.4	3.0	1.78
40.0 - 69.9	70.0 - 139.9	d ₁ + 8.8	6.3	d ₁ + 1.5	3.0	1.0	4.0	2.62
70.0 - 139.9	140.0 - 399.9	d ₁ + 12.2	8.1	d ₁ + 2.0	4.0	1.2	6.0	3.53
140.0 - 399.9	400.0 - 649.9	d ₁ + 16.0	11.5	d ₁ + 2.0	5.0	2.0	8.0	5.33
400.0 - 649.9	650.0 - 999.9	d ₁ + 24.0	15.5	d ₁ + 2.5	8.0	2.5	8.0	6.99
650.0 - 999.9	≥ 1000.0	d ₁ + 27.3	18.0	d ₁ + 2.5	10.0	2.5	11.0	8.40

PART NUMBER RANGE (METRIC)*

METRIC					PART NUMBER
Ød ₁	ØD ₁	L ₁	ØD ₂	STEP WIDTH	
Tol. f8/h9	Tol. H9	Tol. +0.2	Tol. H11	L ₃ Min	
20.0	27.6	4.2	21.0	3.0	EXFMR00200****
25.0	32.6	4.2	26.0	3.0	EXFMR00250****
28.0	35.6	4.2	29.0	3.0	EXFMR00280****
30.0	37.6	4.2	31.0	3.0	EXFMR00300****
32.0	39.6	4.2	33.0	3.0	EXFMR00320****
35.0	42.6	4.2	36.0	3.0	EXFMR00350****
36.0	43.6	4.2	37.0	3.0	EXFMR00360****
40.0	48.8	6.3	41.5	3.0	EXFMR00400**** ₊
42.0	50.8	6.3	43.5	3.0	EXFMR00420****
45.0	53.8	6.3	46.5	3.0	EXFMR00450**** ₊
50.0	58.8	6.3	51.5	3.0	EXFMR00500****
55.0	63.8	6.3	56.5	3.0	EXFMR00550****
56.0	64.8	6.3	57.5	3.0	EXFMR00560****
60.0	68.8	6.3	61.5	3.0	EXFMR00600****
63.0	71.8	6.3	64.5	3.0	EXFMR00630**** ₊
65.0	73.8	6.3	66.5	3.0	EXFMR00650****
70.0	82.2	8.1	72.0	4.0	EXFMR00700**** ₊
75.0	87.2	8.1	77.0	4.0	EXFMR00750****
80.0	92.2	8.1	82.0	4.0	EXFMR00800**** ₊
85.0	97.2	8.1	87.0	4.0	EXFMR00850****
90.0	102.2	8.1	92.0	4.0	EXFMR00900**** ₊
100.0	112.2	8.1	102.0	4.0	EXFMR01000****
105.0	117.2	8.1	107.0	4.0	EXFMR01050****
110.0	122.2	8.1	112.0	4.0	EXFMR01100**** ₊
115.0	127.2	8.1	117.0	4.0	EXFMR01150****
120.0	132.2	8.1	122.0	4.0	EXFMR01200****
125.0	137.2	8.1	127.0	4.0	EXFMR01250**** ₊
130.0	142.2	8.1	132.0	4.0	EXFMR01300****

METRIC					PART NUMBER
Ød ₁	ØD ₁	L ₁	ØD ₂	STEP WIDTH	
Tol. f8/h9	Tol. H9	Tol. +0.2	Tol. H11	L ₃ Min	
135.0	147.2	8.1	137.0	4.0	EXFMR01350****
140.0	156.0	11.5	142.0	5.0	EXFMR01400****
145.0	161.0	11.5	147.0	5.0	EXFMR01450****
150.0	166.0	11.5	152.0	5.0	EXFMR01500****
155.0	171.0	11.5	157.0	5.0	EXFMR01550****
160.0	176.0	11.5	162.0	5.0	EXFMR01600**** ₊
165.0	181.0	11.5	167.0	5.0	EXFMR01650****
170.0	186.0	11.5	172.0	5.0	EXFMR01700****
175.0	191.0	11.5	177.0	5.0	EXFMR01750****
180.0	196.0	11.5	182.0	5.0	EXFMR01800****
190.0	206.0	11.5	192.0	5.0	EXFMR01900****
200.0	216.0	11.5	202.0	5.0	EXFMR02000**** ₊
210.0	226.0	11.5	212.0	5.0	EXFMR02100****
220.0	236.0	11.5	222.0	5.0	EXFMR02200****
230.0	246.0	11.5	232.0	5.0	EXFMR02300****
240.0	256.0	11.5	242.0	5.0	EXFMR02400****
245.0	261.0	11.5	247.0	5.0	EXFMR02450****
250.0	266.0	11.5	252.0	5.0	EXFMR02500**** ₊
260.0	276.0	11.5	262.0	5.0	EXFMR02600****
265.0	281.0	11.5	267.0	5.0	EXFMR02650****
280.0	296.0	11.5	282.0	5.0	EXFMR02800**** ₊
290.0	306.0	11.5	292.0	5.0	EXFMR02900****
300.0	316.0	11.5	302.0	5.0	EXFMR03000****
310.0	326.0	11.5	312.0	5.0	EXFMR03100****
320.0	336.0	11.5	322.0	5.0	EXFMR03200**** ₊
330.0	346.0	11.5	332.0	5.0	EXFMR03300****
340.0	356.0	11.5	342.0	5.0	EXFMR03400****
350.0	366.0	11.5	352.0	5.0	EXFMR03500****



PART NUMBER RANGE (METRIC)*

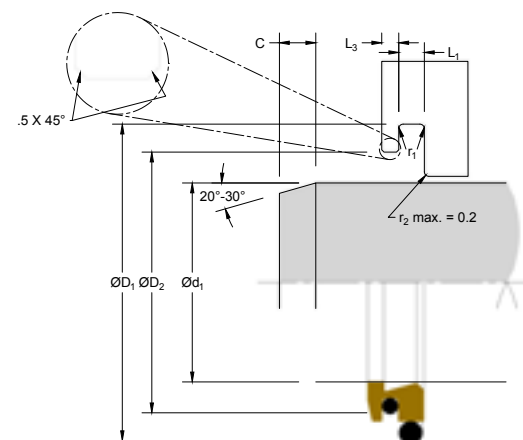
METRIC					PART NUMBER
ØD ₁	ØD ₂	L ₁	ØD ₃	STEP WIDTH	
Tol. f8/h9	Tol. H9	Tol. +0.2	Tol. H11	L ₂ Min	
355.0	371.0	11.5	357.0	5.0	EXFMR03550****
360.0	376.0	11.5	362.0	5.0	EXFMR03600**** _±
365.0	381.0	11.5	367.0	5.0	EXFMR03650****
370.0	386.0	11.5	372.0	5.0	EXFMR03700****
375.0	391.0	11.5	377.0	5.0	EXFMR03750****
380.0	396.0	11.5	382.0	5.0	EXFMR03800****
390.0	406.0	11.5	392.0	5.0	EXFMR03900****
400.0	416.0	11.5	402.0	5.0	EXFML04000****
400.0	424.0	15.5	402.5	8.0	EXFMR04000****
410.0	434.0	15.5	412.5	8.0	EXFMR04100****
420.0	444.0	15.5	422.5	8.0	EXFMR04200****
430.0	454.0	15.5	432.5	8.0	EXFMR04300****
440.0	464.0	15.5	442.5	8.0	EXFMR04400****
445.0	469.0	15.5	447.5	8.0	EXFMR04450****
450.0	474.0	15.5	452.5	8.0	EXFMR04500****
460.0	484.0	15.5	462.5	8.0	EXFMR04600****
465.0	489.0	15.5	467.5	8.0	EXFMR04650****
470.0	494.0	15.5	472.5	8.0	EXFMR04700****
475.0	499.0	15.5	477.5	8.0	EXFMR04750****

METRIC					PART NUMBER
Ød ₁	ØD ₁	L ₁	ØD ₂	STEP WIDTH	
Tol. f8/h9	Tol. H9	Tol. +0.2	Tol. H11	L ₂ Min	
495.0	519.0	15.5	497.5	8.0	EXFMR04950****
510.0	534.0	15.5	512.5	8.0	EXFMR05100****
520.0	544.0	15.5	522.5	8.0	EXFMR05200****
525.0	549.0	15.5	527.5	8.0	EXFMR05250****
530.0	554.0	15.5	532.5	8.0	EXFMR05300****
540.0	564.0	15.5	542.5	8.0	EXFMR05400****
570.0	594.0	15.5	572.5	8.0	EXFMR05700****
585.0	609.0	15.5	587.5	8.0	EXFMR05850****
590.0	614.0	15.5	592.5	8.0	EXFMR05900****
600.0	624.0	15.5	602.5	8.0	EXFMR06000****
620.0	644.0	15.5	622.5	8.0	EXFMR06200****
635.0	659.0	15.5	637.5	8.0	EXFMR06350****
675.0	702.3	18.0	677.5	10.0	EXFMR06750****
690.0	717.3	18.0	692.5	10.0	EXFMR06900****
745.0	772.3	18.0	747.5	10.0	EXFMR07450****
800.0	827.3	18.0	802.5	10.0	EXFMR08000****
815.0	842.3	18.0	817.5	10.0	EXFMR08150****
900.0	927.3	18.0	902.5	10.0	EXFMR09000****
910.0	937.3	18.0	912.5	10.0	EXFMR09100****

+Fits ISO 6195 Type D Grooves *Please contact Hallite for custom sizes, material selection, or seal design.

EXG

WIPER/EXCLUDER
Double-Acting



TECHNICAL DETAILS

The Hallite EXG is a double-acting, two O-ring energized, rod wiper/excluder designed to include two different unique wiping lip geometries. The EXG wiper is primarily designed for environments with heavy contamination, particularly when the rod is facing upwards. The two wiping lips combine to scrape debris from the rod and contain residual oil on rod extension. Hallite's innovative Umbrella® wiper technology is designed to eliminate debris buildup from in front of the primary wiping lip by forcing it to flow to the outer diameter of the cylinder away from the rod. The EXG design requires two O-ring energizers; one O-ring energizer provides downward force to maintain the engagement of the inner wiping lip, while the other O-ring provides the necessary force and static sealing of the primary wiping lip area to the sliding surface.

Typically made from exclusive Hallite Armorlene® materials, this seal is capable of high-speed applications and eliminates any potential for stick-slip. High-performance Armorlene® materials, like HLX, provide outstanding wear and scraping capability as well as large range of temperature and media compatibility. The Hallite EXG wiper employs the same basic principles of design function as the Hallite E2W, E5W, and EXF, though the EXG wiper may require a gland drain to properly relieve pressure between the wiper and rod seal.



F E A T U R E S

- Low friction and elimination of stick-slip
- Excellent in high-speed applications
- More stable design for application with excessive side-to-side movement on rod
- Balanced design keeps contamination out of cylinder while also minimizing oil film on rod

Part Number Structure

EXGMR00400NHLX _

EXG	M	R	00400	N	HLX	—
PROFILE DESIGNATION	UNIT OF MEASUREMENT M = Metric E = Inch	APPLICATION Refer to Installation Recommendations and use designator for desired application	ROD DIAMETER Metric = mm X 10 Inch = inches X 1000	ENERGIZER MATERIAL Refer to Energizer Table for desired energizer material	PTFE MATERIAL Refer to Material Table for desired PTFE (face) material	SPECIAL FEATURE Blank = Std profile



OPERATING CONDITIONS

	METRIC	INCH
Maximum Speed	Up to 5.0m/sec	Up to 16.4ft/sec
Temperature Range*	-45 to 200°C	-49 to 392°F

*Dependent upon energizer used (NBR, FKM, etc.).

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 FINISH RECOMMENDATIONS

SURFACE ROUGHNESS	METRIC			INCH			Rmr*
	µmRa	µmRz	µmRt	µinRa	µinRz	µinRt	
Dynamic Sealing Face Ød ₁	0.05 - 0.2	1.6 max	2 max	2 - 8	63 max	157 max	60% - 90%
Static Sealing Face ØD ₁ and 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	

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

ENERGIZER TABLE

ENERGIZER MATERIAL (SHORE A)	ENERGIZER TYPE	ENERGIZER DESIGNATION	ENERGIZER OPERATING TEMPERATURE°C	ENERGIZER OPERATING TEMPERATURE°F
NBR - 70A	O-ring	N	-30 to 100°C	-22 to 212°F
NBR - 70A Low temp.	O-ring	L	-45 to 80°C	-49 to 176°F
FKM - 75A	O-ring	F	-10 to 200°C	14 to 392°F
EPDM - 70A	O-ring	E	-45 to 145°C	-49 to 293°F
HNBR - 70A	O-ring	H	-25 to 150°C	-13 to 302°F
NBR - 90A	O-ring	Q	-30 to 100°C	-22 to 212°F
HNBR - 90A	O-ring	U	-25 to 150°C	-13 to 302°F
No Energizer*	None	X	-	-

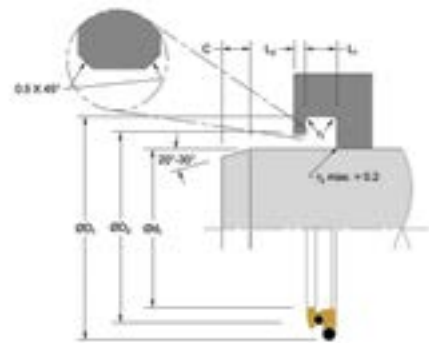
*Seal ratings are based upon capabilities of its matched material components. Hallite cannot rate seal performance when the seal is mixed with other manufacturers' energizers/components.

MATERIALS

MATERIAL FEATURES AND APPLICATIONS	FILLER	MATERIAL DESIGNATOR	COLOR	TEMPERATURE RANGE°C	TEMPERATURE RANGE°F
ARMORLENE® HLX <ul style="list-style-type: none"> Standard material for hydraulic applications High compressive strength Excellent extrusion resistance Extended wear resistance 	Special Bronze Compound	HLX	Gold	-73 to 288°C	-100 to 550°F
ARMORLENE® HCF <ul style="list-style-type: none"> Excellent in lubricating and non-lubricating hydraulic fluids (includes water) w/o zinc content Not recommended for gas sealing applications Not recommended for electrical conductive fluids 	Carbon Fiber Filled	HCF	Gray/Black	-73 to 260°C	-100 to 500°F
ARMORLENE® 702 <ul style="list-style-type: none"> Excellent in lubricating and non-lubricating hydraulic fluids Good low-friction properties Excellent extrusion resistance Good chemical resistance 	Glass Molybdenum Disulfide	702	Gray	-73 to 260°C	-100 to 500°F
ARMORLENE® 711 <ul style="list-style-type: none"> Excellent in all lubricating fluids and pneumatic applications High chemical resistance Excellent extrusion resistance Excellent wear properties 	25% Carbon/Graphite	711	Black	-73 to 288°C	-100 to 550°F
ARMORLENE® 700 <ul style="list-style-type: none"> Excellent in all hydraulic fluids Recommended for use with soft mating surfaces Low friction and no stick-slip 	Unfilled	700	White	-184 to 204°C	-300 to 400°F
748 - UHMWPE <ul style="list-style-type: none"> Excellent impact resistance Good dielectrical properties Excellent abrasion resistance Low coefficient of friction 	Standard	748	Translucent	-184 to 82°C	-300 to 180°F
HU5 - POLYURETHANE, 55D <ul style="list-style-type: none"> Positive position load holding Excellent extrusion resistance Excellent wear resistance Available up to 2540mm (100 inches) diameter 	Standard	HU5	Yellow	-20 to 115°C	-4 to 240°F
HU9 - POLYURETHANE, 95A <ul style="list-style-type: none"> Positive position load holding Excellent extrusion resistance Excellent wear resistance Available up to 2540mm (100 inches) diameter 	Standard	HU9	Red	-20 to 115°C	-4 to 240°F

For other material options consult the Master Materials Index at the front of the catalog. If you do not find the material that you require, please contact your local Hallite sales office.



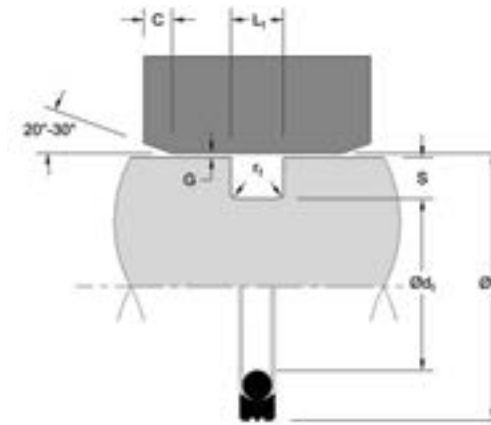


INSTALLATION RECOMMENDATIONS

METRIC

ROD DIAMETER ϕd , f8/h9		GROOVE DIAMETER	GROOVE WIDTH	BORE DIAMETER	STEP WIDTH	RADIUS	CHAMFER	O-RING CROSS SECTION	O-RING 2 CROSS SECTION
DIAMETER RANGE		ϕD_1 H8	$L_1 + 0.2$	D_2 H8	L_3 +0-0.1	r_1	C	O-ring	O-ring
Standard Duty Application - R	Extended Range - L								
120.0 - 229.9	230.0 - 299.9	$d_1 + 22.2$	6.3	$d_1 + 10.7$	4.2	1.2	4.0	5.33	3.53
230.0 - 299.9	300.0 - 629.9	$d_1 + 24.2$	6.3	$d_1 + 10.7$	4.2	1.2	4.0	5.33	3.53
300.0 - 629.9	630.0 - 999.9	$d_1 + 33.0$	8.1	$d_1 + 15.1$	6.3	1.2	6.0	6.99	5.33
630.0 - 999.9	≥ 1000.0	$d_1 + 36.5$	9.5	$d_1 + 15.1$	6.3	2.0	6.0	8.40	5.33

SWIVEL SEALS



TECHNICAL DETAILS

The Hallite SSP is a double-acting, O-ring energized, rotary swivel seal designed to be used to seal outer diameters of shafts, bores, swivels, and other applications with rotating or oscillating movement. The SSP rotary seal has one or two machined grooves in the face ring, depending on the face-ring cross-section, that function to improve sealing against the surface while trapping lubrication and reducing surface contact area, thereby reducing running friction. The O-ring serves to energize the seal face ring, exerting a designed downward force, and also provides static sealing of the housing.

Hallite's SSP rotary seal has a specially designed circular inner recess that provides for maximum O-ring contact area to the inner diameter of the seal face, thereby minimizing the possibility of sealing components spinning relative to each other. The standard SSP seal face includes pressure notches, which makes the seal very responsive to changes in pressure. Made from exclusive Hallite Armorlene® 711 or HCF PTFE materials, the SSP rotary seal is energy-efficient due to its low-friction qualities and eliminates any potential sticking on start-up.

High-performance Armorlene® materials, like 711, provide outstanding wear resistance and support a large range of temperature and media compatibilities. The Armorlene® SSP and SSR rotary swivel seals are designed for slow-speed rotary and swivel applications.



FEATURES

- High temperature rating, low-friction and wear-resistant face-ring
- Good anti-extrusion resistance
- Compact groove design suitable for narrow spacing

Part Number Structure

SSPMR00550N711 _

SSP	M	R	00550	N	711	—
PROFILE DESIGNATION	UNIT OF MEASUREMENT M = Metric E = Inch	APPLICATION Refer to <i>Installation Recommendations</i> and use designator for desired application	BORE DIAMETER Metric = mm X 10 Inch = inches X 1000	ENERGIZER MATERIAL Refer to <i>Energizer Table</i> for desired energizer material	PTFE MATERIAL Refer to <i>Material Table</i> for desired PTFE (face) material	SPECIAL FEATURE Blank = Std profile (with notches) X = No notches

OPERATING CONDITIONS

	METRIC	INCH
Maximum Speed	Up to 2.0m/sec	Up to 6.5ft/sec
Temperature Range*	-45 to 200°C	-49 to 392°F
Maximum Dynamic Pressure**	300 bar	4350 psi

*Dependent upon energizer used (NBR, FKM, etc.). **For pressures above 300 bar (4350 psi), contact Hallite Engineering. Application limit PV ≤ 25 bar m/s (40 bar m/s for interrupted rotary).

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 FINISH RECOMMENDATIONS

SURFACE ROUGHNESS	METRIC			INCH			Rmr*
	µmRa	µmRz	µmRt	µinRa	µinRz	µinRt	
Dynamic Sealing Face ØD ₁	0.05 - 0.2	1.6 max	2 max	2 - 8	63 max	157 max	60% - 90%
Static Sealing Face 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	

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

ENERGIZER TABLE

ENERGIZER MATERIAL (SHORE A)	ENERGIZER TYPE	ENERGIZER DESIGNATION	ENERGIZER OPERATING TEMPERATURE°C	ENERGIZER OPERATING TEMPERATURE°F
NBR - 70A	O-ring	N	-30 to 100°C	-22 to 212°F
NBR - 70A Low temp.	O-ring	L	-45 to 80°C	-49 to 176°F
FKM - 75A	O-ring	F	-10 to 200°C	14 to 392°F
EPDM - 70A	O-ring	E	-45 to 145°C	-49 to 293°F
HNBR - 70A	O-ring	H	-25 to 150°C	-13 to 302°F
NBR - 90A	O-ring	Q	-30 to 100°C	-22 to 212°F
HNBR - 90A	O-ring	U	-25 to 150°C	-13 to 302°F
No Energizer*	None	X	-	-

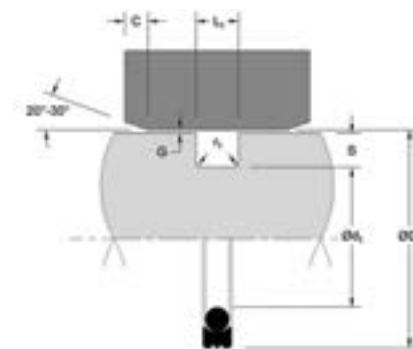
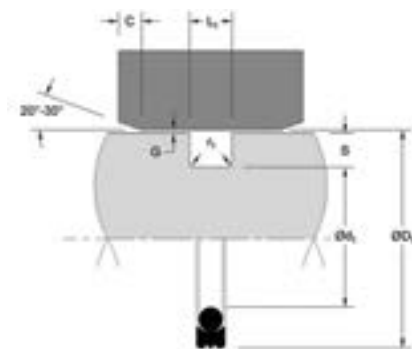
*Seal ratings are based upon capabilities of its matched material components. Hallite cannot rate seal performance when the seal is mixed with other manufacturers' energizers/components.

MATERIALS

MATERIAL FEATURES AND APPLICATIONS	FILLER	MATERIAL DESIGNATOR	COLOR	TEMPERATURE RANGE°C	TEMPERATURE RANGE°F	MAXIMUM DYNAMIC PRESSURE - BAR	MAXIMUM DYNAMIC PRESSURE - PSI
ARMORLENE® 711 <ul style="list-style-type: none"> Excellent in all lubricating fluids and pneumatic applications High chemical resistance Excellent extrusion resistance Excellent wear properties 	25% Carbon/Graphite	711	Black	-73 to 288°C	-100 to 550°F	300 bar	4350 psi
ARMORLENE® HCF <ul style="list-style-type: none"> Excellent in lubricating and non-lubricating hydraulic fluids (includes water) w/o zinc content Not recommended for gas sealing applications Not recommended for electrical conductive fluids 	Carbon Fiber Filled	HCF	Gray/Black	-73 to 260°C	-100 to 500°F	300 bar	4350 psi
ARMORLENE® HCV <ul style="list-style-type: none"> Recommended for lubricating and non-lubricating fluids Excellent for high-frequency and short-stroke applications Not recommended for gas sealing applications Not recommended for electrical conductive fluids 	High Carbon Fiber Filled	HCV	Gray/Black	-73 to 260°C	-100 to 500°F	300 bar	4350 psi

For other material options consult the Master Materials Index at the front of the catalog. If you do not find the material that you require, please contact your local Hallite sales office.





INSTALLATION RECOMMENDATIONS

METRIC		GROOVE DIAMETER	GROOVE WIDTH	RADIUS	CHAMFER	GROOVE SECTION	RADIAL CLEARANCE G max*	NUMBER OF GROOVES
BORE DIAMETER ØD ₁ H9								
DIAMETER RANGE								
Standard Duty Application - R	Light Duty Application - L	Ød ₁ h9	L ₁ + 0.2	r ₁	C	S	Up to 300 bar	
8.0 - 39.9	40.0 - 79.9	D ₁ - 4.9	2.2	0.4	2.5	2.45	Tol H8/f7	0
40.0 - 79.9	80.0 - 132.9	D ₁ - 7.5	3.2	0.6	3.5	3.75	Tol H8/f7	1
80.0 - 132.9	133.0 - 329.9	D ₁ - 11.0	4.2	1.0	4.0	5.50	Tol H8/f7	1
133.0 - 329.9	330.0 - 649.9	D ₁ - 15.5	6.3	1.3	6.0	7.75	Tol H8/f7	2
330.0 - 649.9	650.0 - 999.9	D ₁ - 21.0	8.1	1.8	8.0	10.50	Tol H8/f7	2
650.0 - 999.9	-	D ₁ - 28.0	9.5	2.5	10.0	14.00	Tol H8/f7	2

At pressure >300 bar or greater contact Hallite Engineering.

*Radial Clearance G max. = maximum permissible gap all on one side using max. tube diameter and min. clearance diameter.

INCH		GROOVE DIAMETER	GROOVE WIDTH	RADIUS	CHAMFER	GROOVE SECTION	RADIAL CLEARANCE G max*	NUMBER OF GROOVES
BORE DIAMETER ØD ₁ H9								
DIAMETER RANGE								
Standard Duty Application - R	Light Duty Application - L	Ød ₁ h9	L ₁ + .008	r ₁	C	S	Up to 4350 psi	
0.375 - 1.499	1.500 - 2.999	D ₁ - 0.193	0.087	0.015	0.100	0.096	Tol H8/f7	0
1.500 - 2.999	3.000 - 5.999	D ₁ - 0.295	0.126	0.015	0.125	0.147	Tol H8/f7	1
3.000 - 5.999	6.000 - 11.999	D ₁ - 0.433	0.165	0.015	0.187	0.216	Tol H8/f7	1
6.000 - 11.999	12.000-20.000	D ₁ - 0.610	0.248	0.035	0.250	0.305	Tol H8/f7	2
12.000-20.000	-	D ₁ - 0.827	0.319	0.035	0.312	0.413	Tol H8/f7	2

At pressure >4350 psi or greater contact Hallite Engineering.

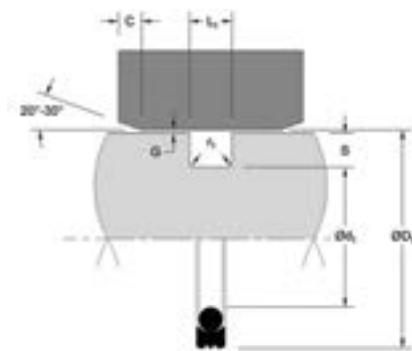
*Radial Clearance G max. = maximum permissible gap all on one side using max. tube diameter and min. clearance diameter.

PART NUMBER RANGE (METRIC)*

METRIC			PART NUMBER
ØD ₁	Ød ₁	L ₁	
Tol. H9	Tol. h9	Tol. +0.2	
16.0	11.1	2.2	SSPMR00160****
18.0	13.1	2.2	SSPMR00180****
20.0	15.1	2.2	SSPMR00200****
22.0	17.1	2.2	SSPMR00220****
25.0	20.1	2.2	SSPMR00250****
28.0	23.1	2.2	SSPMR00280****
30.0	25.1	2.2	SSPMR00300****
32.0	27.1	2.2	SSPMR00320****
35.0	30.1	2.2	SSPMR00350****
40.0	32.5	3.2	SSPMR00400****
42.0	34.5	3.2	SSPMR00420****
45.0	37.5	3.2	SSPMR00450****
48.0	40.5	3.2	SSPMR00480****
50.0	42.5	3.2	SSPMR00500****
52.0	44.5	3.2	SSPMR00520****
55.0	47.5	3.2	SSPMR00550****
60.0	52.5	3.2	SSPMR00600****
63.0	55.5	3.2	SSPMR00630****
65.0	57.5	3.2	SSPMR00650****
70.0	62.5	3.2	SSPMR00700****
75.0	67.5	3.2	SSPMR00750****
80.0	69.0	4.2	SSPMR00800****
85.0	74.0	4.2	SSPMR00850****
90.0	79.0	4.2	SSPMR00900****
95.0	84.0	4.2	SSPMR00950****
100.0	89.0	4.2	SSPMR01000****
105.0	94.0	4.2	SSPMR01050****
110.0	99.0	4.2	SSPMR01100****

METRIC			PART NUMBER
ØD ₁	Ød ₁	L ₁	
Tol. H9	Tol. h9	Tol. +0.2	
115.0	104.0	4.2	SSPMR01150****
120.0	109.0	4.2	SSPMR01200****
125.0	114.0	4.2	SSPMR01250****
130.0	119.0	4.2	SSPMR01300****
135.0	119.5	6.3	SSPMR01350****
140.0	124.5	6.3	SSPMR01400****
150.0	134.5	6.3	SSPMR01500****
160.0	144.5	6.3	SSPMR01600****
170.0	154.5	6.3	SSPMR01700****
180.0	164.5	6.3	SSPMR01800****
190.0	174.5	6.3	SSPMR01900****
200.0	184.5	6.3	SSPMR02000****
210.0	194.5	6.3	SSPMR02100****
220.0	204.5	6.3	SSPMR02200****
230.0	214.5	6.3	SSPMR02300****
240.0	224.5	6.3	SSPMR02400****
250.0	234.5	6.3	SSPMR02500****
280.0	264.5	6.3	SSPMR02800****
300.0	284.5	6.3	SSPMR03000****
320.0	304.5	6.3	SSPMR03200****
350.0	329.0	8.1	SSPMR03500****
360.0	339.0	8.1	SSPMR03600****
400.0	379.0	8.1	SSPMR04000****
420.0	399.0	8.1	SSPMR04200****
450.0	429.0	8.1	SSPMR04500****
480.0	459.0	8.1	SSPMR04800****
500.0	479.0	8.1	SSPMR05000****
600.0	579.0	8.1	SSPMR06000****

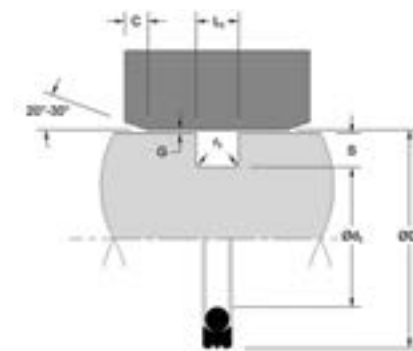
*Please contact Hallite for custom sizes, material selection, or seal design.



PART NUMBER RANGE (INCH)*

INCH			PART NUMBER
ØD ₁	Ød ₁	L ₁	
Tol. H9	Tol. h9	Tol. +0.008	
0.375	0.182	0.087	SSPER00375****
0.437	0.244	0.087	SSPER00437****
0.500	0.307	0.087	SSPER00500****
0.562	0.369	0.087	SSPER00562****
0.625	0.432	0.087	SSPER00625****
0.687	0.494	0.087	SSPER00687****
0.750	0.557	0.087	SSPER00750****
0.812	0.619	0.087	SSPER00812****
0.875	0.682	0.087	SSPER00875****
0.937	0.744	0.087	SSPER00937****
1.000	0.807	0.087	SSPER01000****
1.125	0.932	0.087	SSPER01125****
1.250	1.057	0.087	SSPER01250****
1.375	1.182	0.087	SSPER01375****
1.500	1.205	0.126	SSPER01500****
1.625	1.330	0.126	SSPER01625****
1.750	1.455	0.126	SSPER01750****
1.875	1.580	0.126	SSPER01875****
2.000	1.705	0.126	SSPER02000****
2.125	1.830	0.126	SSPER02125****
2.250	1.955	0.126	SSPER02250****
2.375	2.080	0.126	SSPER02375****
2.500	2.205	0.126	SSPER02500****
2.625	2.330	0.126	SSPER02625****
2.750	2.455	0.126	SSPER02750****
2.875	2.580	0.126	SSPER02875****
3.000	2.567	0.165	SSPER03000****
3.125	2.692	0.165	SSPER03125****

INCH			PART NUMBER
ØD ₁	Ød ₁	L ₁	
Tol. H9	Tol. h9	Tol. +0.008	
3.250	2.817	0.165	SSPER03250****
3.375	2.942	0.165	SSPER03375****
3.500	3.067	0.165	SSPER03500****
3.625	3.192	0.165	SSPER03625****
3.750	3.317	0.165	SSPER03750****
3.875	3.442	0.165	SSPER03875****
4.000	3.567	0.165	SSPER04000****
4.125	3.692	0.165	SSPER04125****
4.250	3.817	0.165	SSPER04250****
4.375	3.942	0.165	SSPER04375****
4.500	4.067	0.165	SSPER04500****
4.625	4.192	0.165	SSPER04625****
4.750	4.317	0.165	SSPER04750****
4.875	4.442	0.165	SSPER04875****
5.000	4.567	0.165	SSPER05000****
5.125	4.692	0.165	SSPER05125****
5.250	4.817	0.165	SSPER05250****
5.375	4.942	0.165	SSPER05375****
5.500	5.067	0.165	SSPER05500****
5.625	5.192	0.165	SSPER05625****
5.750	5.317	0.165	SSPER05750****
5.875	5.442	0.165	SSPER05875****
6.000	5.390	0.248	SSPER06000****
6.250	5.640	0.248	SSPER06250****
6.500	5.890	0.248	SSPER06500****
6.750	6.140	0.248	SSPER06750****
7.000	6.390	0.248	SSPER07000****
7.250	6.640	0.248	SSPER07250****



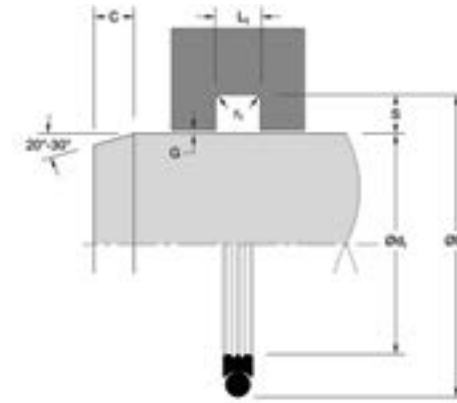
PART NUMBER RANGE (INCH)*

INCH			PART NUMBER
ØD ₁	Ød ₁	L ₁	
Tol. H9	Tol. h9	Tol. +0.008	
7.500	6.890	0.248	SSPER07500****
7.750	7.140	0.248	SSPER07750****
8.000	7.390	0.248	SSPER08000****
8.250	7.640	0.248	SSPER08250****
8.500	7.890	0.248	SSPER08500****
8.750	8.140	0.248	SSPER08750****
9.000	8.390	0.248	SSPER09000****
9.250	8.640	0.248	SSPER09250****
9.500	8.890	0.248	SSPER09500****
9.750	9.140	0.248	SSPER09750****
10.000	9.390	0.248	SSPER10000****
10.500	9.890	0.248	SSPER10500****
11.000	10.390	0.248	SSPER11000****
11.500	10.890	0.248	SSPER11500****
12.000	11.173	0.319	SSPER12000****
12.500	11.673	0.319	SSPER12500****

INCH			PART NUMBER
ØD ₁	Ød ₁	L ₁	
Tol. H9	Tol. h9	Tol. +0.008	
13.000	12.173	0.319	SSPER13000****
13.500	12.673	0.319	SSPER13500****
14.000	13.173	0.319	SSPER14000****
14.500	13.673	0.319	SSPER14500****
15.000	14.173	0.319	SSPER15000****
15.500	14.673	0.319	SSPER15500****
16.000	15.173	0.319	SSPER16000****
16.500	15.673	0.319	SSPER16500****
17.000	16.173	0.319	SSPER17000****
17.500	16.673	0.319	SSPER17500****
18.000	17.173	0.319	SSPER18000****
18.500	17.673	0.319	SSPER18500****
19.000	18.173	0.319	SSPER19000****
19.500	18.673	0.319	SSPER19500****
20.000	19.173	0.319	SSPER20000****

*Please contact Hallite for custom sizes, material selection, or seal design.





TECHNICAL DETAILS

The Hallite SSR is a double-acting, O-ring energized, rotary swivel seal designed to be used to seal inner diameters of shafts, rods, swivels, and other applications with rotating or oscillating movement. The SSR rotary seal has one or two machined grooves in the face ring, depending on the face ring cross-section, that function to improve sealing against the surface while trapping lubrication and reducing surface contact area, thereby reducing running friction. The O-ring serves to energize the seal face ring, exerting a designed downward force, and also provides static sealing of the housing.

Hallite's SSR rotary seal has a specially designed circular inner recess that provides for maximum O-ring contact area to the inner diameter of the seal face, thereby minimizing the possibility of sealing components spinning relative to each other. The standard SSR seal face includes pressure notches, which makes the seal very responsive to changes in pressure. Made from exclusive Hallite Armormlene® 711 or HCF PTFE materials, the SSR rotary seal is energy-efficient due to its low-friction qualities and eliminates any potential sticking on start-up.

High-performance Armormlene® materials, like 711, provide outstanding wear resistance and support a large range of temperature and media compatibilities. The SSR rotary swivel seal is designed for slow-speed rotary and swivel applications.

FEATURES

- High temperature rating, low-friction and wear resistant face-ring
- Good anti-extrusion resistance
- Compact groove design suitable for narrow spacing

Part Number Structure

SSRmr00550N711 _

SSR	M	R	00550	N	711	—
PROFILE DESIGNATION	UNIT OF MEASUREMENT M = Metric E = Inch	APPLICATION Refer to <i>Installation Recommendations</i> and use designator for desired application	ROD DIAMETER Metric = mm X 10 Inch = inches X 1000	ENERGIZER MATERIAL Refer to <i>Energizer Table</i> for desired energizer material	PTFE MATERIAL Refer to <i>Material Table</i> for desired PTFE (face) material	SPECIAL FEATURE Blank = Std profile (with notches) X = No notches

OPERATING CONDITIONS

	METRIC	INCH
Maximum Speed	Up to 2.0m/sec	Up to 6.5ft/sec
Temperature Range*	-45 to 200°C	-49 to 392°F
Maximum Dynamic Pressure**	300 bar	4350 psi

*Dependent upon energizer used (NBR, FKM, etc.). **For pressures above 300 bar (4350 psi), contact Hallite Engineering. Application limit PV ≤ 25 bar m/s (40 bar for interrupted rotary).

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 FINISH RECOMMENDATIONS

SURFACE ROUGHNESS	METRIC			INCH			Rmr*
	µmRa	µmRz	µmRt	µinRa	µinRz	µinRt	
Dynamic Sealing Face Ød ₁	0.05 - 0.2	1.6 max	2 max	2 - 8	63 max	157 max	60% - 90%
Static Sealing Face 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	

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

ENERGIZER TABLE

ENERGIZER MATERIAL (SHORE A)	ENERGIZER TYPE	ENERGIZER DESIGNATION	ENERGIZER OPERATING TEMPERATURE°C	ENERGIZER OPERATING TEMPERATURE°F
NBR - 70A	O-ring	N	-30 to 100°C	-22 to 212°F
NBR - 70A Low temp.	O-ring	L	-45 to 80°C	-49 to 176°F
FKM - 75A	O-ring	F	-10 to 200°C	14 to 392°F
EPDM - 70A	O-ring	E	-45 to 145°C	-49 to 293°F
HNBR - 70A	O-ring	H	-25 to 150°C	-13 to 302°F
NBR - 90A	O-ring	Q	-30 to 100°C	-22 to 212°F
HNBR - 90A	O-ring	U	-25 to 150°C	-13 to 302°F
No Energizer*	None	X	-	-

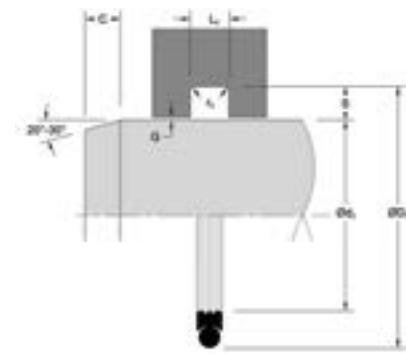
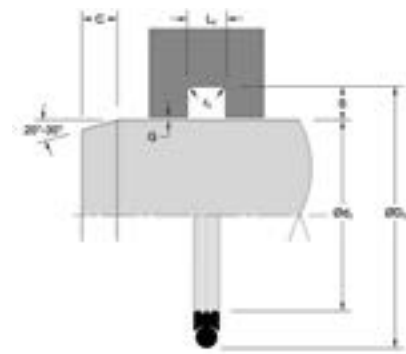
*Seal ratings are based upon capabilities of its matched material components. Hallite cannot rate seal performance when the seal is mixed with other manufacturers' energizers/components.

MATERIALS

MATERIAL FEATURES AND APPLICATIONS	FILLER	MATERIAL DESIGNATOR	COLOR	TEMPERATURE RANGE°C	TEMPERATURE RANGE°F	MAXIMUM DYNAMIC PRESSURE - BAR	MAXIMUM DYNAMIC PRESSURE - PSI
ARMORLENE® 711 <ul style="list-style-type: none"> Excellent in all lubricating fluids and pneumatic applications High chemical resistance Excellent extrusion resistance Excellent wear properties 	25% Carbon/Graphite	711	Black	-73 to 288°C	-100 to 550°F	300 bar	4350 psi
ARMORLENE® HCF <ul style="list-style-type: none"> Excellent in lubricating and non-lubricating hydraulic fluids (includes water) w/o zinc content Not recommended for gas sealing applications Not recommended for electrical conductive fluids 	Carbon Fiber Filled	HCF	Gray/Black	-73 to 260°C	-100 to 500°F	300 bar	4350 psi
ARMORLENE® HCV <ul style="list-style-type: none"> Recommended for lubricating and non-lubricating fluids Excellent for high-frequency and short-stroke applications Not recommended for gas sealing applications Not recommended for electrical conductive fluids 	High Carbon Fiber Filled	HCV	Gray/Black	-73 to 260°C	-100 to 500°F	300 bar	4350 psi

For other material options consult the Master Materials Index at the front of the catalog. If you do not find the material that you require, please contact your local Hallite sales office.





INSTALLATION RECOMMENDATIONS

METRIC		GROOVE DIAMETER	GROOVE WIDTH	RADIUS	CHAMFER	GROOVE SECTION	RADIAL CLEARANCE G max*	NUMBER OF GROOVES
ROD DIAMETER Ød ₁ f8								
DIAMETER RANGE								
Standard Duty Application - R	Light Duty Application - L	ØD ₁ H9	L ₁ + 0.2	r ₁	C	S	Up to 300 bar	
6.0 - 18.9	19.0 - 37.9	d ₁ + 4.9	2.2	0.4	2.5	2.45	Tol H8/f7	0
19.0 - 37.9	38.0 - 199.9	d ₁ + 7.5	3.2	0.6	3.5	3.75	Tol H8/f7	1
38.0 - 199.9	200.0 - 255.9	d ₁ + 11.0	4.2	1.0	4.0	5.50	Tol H8/f7	1
200.0 - 255.9	256.0 - 649.9	d ₁ + 15.5	6.3	1.3	6.0	7.75	Tol H8/f7	2
256.0 - 649.9	650.0 - 999.9	d ₁ + 21.0	8.1	1.8	8.0	10.50	Tol H8/f7	2
650.0 - 999.9	-	d ₁ + 28.0	9.5	2.5	10.0	14.00	Tol H8/f7	2

At pressure >300 bar or greater contact Hallite Engineering.

*Radial Clearance G max. = maximum permissible gap all on one side using min. rod diameter and max. clearance diameter.

INCH		GROOVE DIAMETER	GROOVE WIDTH	RADIUS	CHAMFER	GROOVE SECTION	RADIAL CLEARANCE G max*	NUMBER OF GROOVES
ROD DIAMETER Ød ₁ f8								
DIAMETER RANGE								
Standard Duty Application - R	Light Duty Application - L	ØD ₁ H9	L ₁ + .008	r ₁	C	S	Up to 4350 psi	
1.000 - 1.499	1.500 - 2.999	d ₁ + 0.193	0.087	0.015	0.098	0.096	Tol H8/f7	0
1.500 - 2.999	3.000 - 5.999	d ₁ + 0.295	0.126	0.015	0.138	0.147	Tol H8/f7	1
3.000 - 5.999	6.000 - 11.999	d ₁ + 0.433	0.165	0.015	0.157	0.216	Tol H8/f7	1
6.000 - 11.999	12.000 - 20.000	d ₁ + 0.610	0.248	0.035	0.236	0.305	Tol H8/f7	2
12.000 - 20.000	-	d ₁ + 0.827	0.319	0.035	0.315	0.413	Tol H8/f7	2

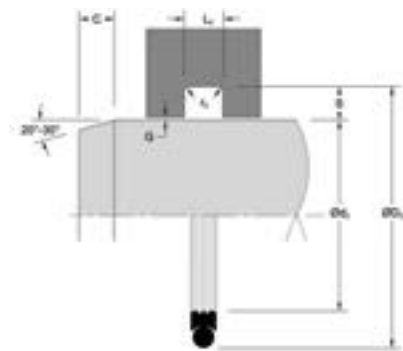
At pressure >4350 psi or greater contact Hallite Engineering.

*Radial Clearance G max. = maximum permissible gap all on one side using min. rod diameter and max. clearance diameter.

PART NUMBER RANGE (METRIC)*

METRIC			PART NUMBER
Ød ₁	ØD ₁	L ₁	
Tol. f8	Tol. H9	Tol. +0.2	
12.0	16.9	2.2	SSRMR00120****
14.0	18.9	2.2	SSRMR00140****
15.0	19.9	2.2	SSRMR00150****
16.0	20.9	2.2	SSRMR00160****
18.0	22.9	2.2	SSRMR00180****
20.0	27.5	3.2	SSRMR00200****
22.0	29.5	3.2	SSRMR00220****
25.0	32.5	3.2	SSRMR00250****
28.0	35.5	3.2	SSRMR00280****
30.0	37.5	3.2	SSRMR00300****
32.0	39.5	3.2	SSRMR00320****
35.0	42.5	3.2	SSRMR00350****
36.0	43.5	3.2	SSRMR00360****
40.0	51.0	4.2	SSRMR00400****
42.0	53.0	4.2	SSRMR00420****
45.0	56.0	4.2	SSRMR00450****
48.0	59.0	4.2	SSRMR00480****
50.0	61.0	4.2	SSRMR00500****
52.0	63.0	4.2	SSRMR00520****
55.0	66.0	4.2	SSRMR00550****
56.0	67.0	4.2	SSRMR00560****
60.0	71.0	4.2	SSRMR00600****
63.0	74.0	4.2	SSRMR00630****
65.0	76.0	4.2	SSRMR00650****
70.0	81.0	4.2	SSRMR00700****
75.0	86.0	4.2	SSRMR00750****
80.0	91.0	4.2	SSRMR00800****
85.0	96.0	4.2	SSRMR00850****

METRIC			PART NUMBER
Ød ₁	ØD ₁	L ₁	
Tol. f8	Tol. H9	Tol. +0.2	
90.0	101.0	4.2	SSRMR00900****
95.0	106.0	4.2	SSRMR00950****
100.0	111.0	4.2	SSRMR01000****
105.0	116.0	4.2	SSRMR01050****
110.0	121.0	4.2	SSRMR01100****
115.0	126.0	4.2	SSRMR01150****
120.0	131.0	4.2	SSRMR01200****
125.0	136.0	4.2	SSRMR01250****
130.0	141.0	4.2	SSRMR01300****
135.0	146.0	4.2	SSRMR01350****
140.0	151.0	4.2	SSRMR01400****
150.0	161.0	4.2	SSRMR01500****
160.0	171.0	4.2	SSRMR01600****
170.0	181.0	4.2	SSRMR01700****
180.0	191.0	4.2	SSRMR01800****
190.0	201.0	4.2	SSRMR01900****
200.0	215.5	6.3	SSRMR02000****
210.0	225.5	6.3	SSRMR02100****
220.0	235.5	6.3	SSRMR02200****
230.0	245.5	6.3	SSRMR02300****
240.0	255.5	6.3	SSRMR02400****
250.0	265.5	6.3	SSRMR02500****
280.0	301.0	8.1	SSRMR02800****
300.0	321.0	8.1	SSRMR03000****
320.0	341.0	8.1	SSRMR03200****
350.0	371.0	8.1	SSRMR03500****
360.0	381.0	8.1	SSRMR03600****
400.0	421.0	8.1	SSRMR04000****



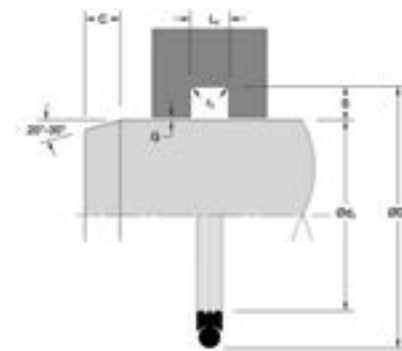
PART NUMBER RANGE (METRIC)*

METRIC			PART NUMBER
$\varnothing d_1$	$\varnothing D_1$	L_1	
Tol. f8	Tol. H9	Tol. +0.2	
420.0	441.0	8.1	SSRMR04200****
450.0	471.0	8.1	SSRMR04500****
480.0	501.0	8.1	SSRMR04800****

*Please contact Hallite for custom sizes, material selection, or seal design.

PART NUMBER RANGE (INCH)*

INCH			PART NUMBER
$\varnothing d_1$	$\varnothing D_1$	L_1	
Tol. f8	Tol. H9	Tol. +0.008	
1.000	1.193	0.087	SSRER01000****
1.125	1.318	0.087	SSRER01125****
1.250	1.443	0.087	SSRER01250****
1.375	1.568	0.087	SSRER01375****
1.500	1.795	0.126	SSRER01500****
1.625	1.920	0.126	SSRER01625****
1.750	2.045	0.126	SSRER01750****
1.875	2.170	0.126	SSRER01875****
2.000	2.295	0.126	SSRER02000****
2.125	2.420	0.126	SSRER02125****
2.250	2.545	0.126	SSRER02250****
2.375	2.670	0.126	SSRER02375****
2.500	2.795	0.126	SSRER02500****
2.625	2.920	0.126	SSRER02625****
2.750	3.045	0.126	SSRER02750****
2.875	3.170	0.126	SSRER02875****
3.000	3.433	0.165	SSRER03000****
3.125	3.558	0.165	SSRER03125****
3.250	3.683	0.165	SSRER03250****
3.375	3.808	0.165	SSRER03375****
3.500	3.933	0.165	SSRER03500****
3.625	4.058	0.165	SSRER03625****
3.750	4.183	0.165	SSRER03750****
3.875	4.308	0.165	SSRER03875****
4.000	4.433	0.165	SSRER04000****
4.125	4.558	0.165	SSRER04125****
4.250	4.683	0.165	SSRER04250****
4.375	4.808	0.165	SSRER04375****



PART NUMBER RANGE (INCH)*

INCH			PART NUMBER
$\varnothing d_1$	$\varnothing D_1$	L_1	
Tol. f8	Tol. H9	Tol. +0.008	
4.500	4.933	0.165	SSRER04500****
4.625	5.058	0.165	SSRER04625****
4.750	5.183	0.165	SSRER04750****
4.875	5.308	0.165	SSRER04875****
5.000	5.433	0.165	SSRER05000****
5.125	5.558	0.165	SSRER05125****
5.250	5.683	0.165	SSRER05250****
5.375	5.808	0.165	SSRER05375****
5.500	5.933	0.165	SSRER05500****
5.625	6.058	0.165	SSRER05625****
5.750	6.183	0.165	SSRER05750****
5.875	6.308	0.165	SSRER05875****
6.000	6.610	0.248	SSRER06000****
6.250	6.860	0.248	SSRER06250****
6.500	7.110	0.248	SSRER06500****
6.750	7.360	0.248	SSRER06750****
7.000	7.610	0.248	SSRER07000****
7.250	7.860	0.248	SSRER07250****
7.500	8.110	0.248	SSRER07500****
7.750	8.360	0.248	SSRER07750****
8.000	8.610	0.248	SSRER08000****
8.250	8.860	0.248	SSRER08250****
8.500	9.110	0.248	SSRER08500****
8.750	9.360	0.248	SSRER08750****
9.000	9.610	0.248	SSRER09000****
9.250	9.860	0.248	SSRER09250****
9.500	10.110	0.248	SSRER09500****
9.750	10.360	0.248	SSRER09750****

*Please contact Hallite for custom sizes, material selection, or seal design.

OPTISEAL[®]



OPTISEAL®

HALLITE SPRING-ENERGIZED SYSTEM

TECHNICAL DETAILS

The OptiSeal® system is a high-performance, low-friction, full-spectrum sealing solution. This widely used spring-energized seal offers performance benefits ranging from enhanced media compatibility to superior performance in broad temperature ranges. The basic design consists of a U-shaped jacket made from inert thermoplastic materials specifically selected for the application. The addition of a metal spring actuates the jacket material used in the system, which provides sealing at low system pressures. At higher system pressures, the seal becomes pressure-energized by the fluid media—a sealing combination that ensures adequate sealing throughout the entire pressure range. By coupling the OptiSeal® system with other specialty components such as anti-extrusion devices, PakRings, V-Rings, adapters, bushings, and bearings, users can achieve an expanded operational envelope.

With diameters from 0.040in (1mm) to 110in (2.8m), customizable heights and special geometries, the OptiSeal® system can be configured to fit in almost any hardware, making it the ideal choice for critical-service sealing.

F E A T U R E S

- Thermal stability across broad temperature range
- Low coefficient of friction
- Inherent lubricating properties
- Excellent chemical and corrosion capabilities
- Reduced stick-slip
- Unlimited shelf life
- No explosive decompression
- No swelling due to moisture absorption
- Safe for vacuum conditions
- Excellent dielectrical properties
- Sealing across broad pressure range
- Static and dynamic applications
- Flanged and rotating applications

COMMON PTFE JACKET MATERIALS

COMPOUND	POLYMER	FILLER	COLOR	ABRASIAN RESISTANCE	METAL MATING WEAR	RELATIVE SEALABILITY	RELATIVE EXTRUSION RESISTANCE	MEDIA RESISTANCE						OPERATING TEMPERATURES	
								NORSOK M710 COMPOUND	HYDROCARBONS	OXYGENATED SOLVENTS	STEAM	ACIDS	BASES	F°	C°
700	PTFE	None	White	P	L	E	P	Yes	E	E	E	S	S	-300 to 400°F	-184 to 204°C
701	PTFE	25% Glass	White	E	H	G	E	Yes	E	E	E	S	S	-100 to 550°F	-73 to 288°C
702	PTFE	Glass, MoS ₂	Gray	E	H	G	G	-	E	E	E	S	S	-100 to 500°F	-73 to 260°C
711	PTFE	25% Carbon/Graphite	Black	G	M	G	E	Yes	E	E	E	S	S	-100 to 550°F	-73 to 288°C
777	MPTFE	Premium Virgin	White	P	L	E	G	Yes	E	E	E	S	S	-300 to 450°F	-184 to 232°C
HLX	PTFE	Special Bronze	Gold	G	M	G	G	-	E	E	E	S	S	-100 to 550°F	-73 to 288°C
HCF	PTFE	Carbon Fiber	Gray/Black	G	M	G	G	-	E	E	E	S	S	-100 to 500°F	-73 to 260°C

KEY
E = Excellent **H** = High **NR** = Not Recommended
G = Good **M** = Medium **W** = Resistant to weak acid/base
P = Poor **L** = Low **S** = Resistant to strong acid/base

Conditions shown are approximate. Actual operating conditions are contingent upon media, pressure, and design factors as well as polymer types. Testing in your assembly is always recommended, especially when applications approach or exceed the conditions shown above.

SPECIALTY JACKET MATERIALS

COMPOUND	POLYMER	FILLER	COLOR	ABRASIAN RESISTANCE	METAL MATING WEAR	RELATIVE SEALABILITY	RELATIVE EXTRUSION RESISTANCE	MEDIA RESISTANCE						OPERATING TEMPERATURES	
								NORSOK M710 COMPOUND	HYDROCARBONS	OXYGENATED SOLVENTS	STEAM	ACIDS	BASES	F°	C°
703	PTFE	PPS, Carbon, MoS ₂	Black	E	M	G	E	-	E	E	E	S	S	-100 to 550°F	-73 to 288°C
712	PTFE	5% MoS ₂	Gray	A	L	E	A	-	E	E	E	S	S	-200 to 450°F	-129 to 232°C
716	PTFE	15% Graphite	Black	A	M	E	G	Yes	E	E	E	S	S	-100 to 500°F	-73 to 260°C
720	PTFE	2% Carbon	Black	A	L	E	A	-	E	E	E	S	S	-200 to 500°F	-129 to 260°C
733	PTFE	15% Carbon/Graphite	Black	G	M	G	G	-	E	E	E	S	S	-100 to 500°F	-73 to 260°C
734	PTFE	10% Carbon/Graphite	Black	G	M	G	G	-	E	E	E	S	S	-100 to 500°F	-73 to 260°C
780	PTFE	None	Turquoise	A	L	E	A	-	E	E	E	S	S	-300 to 450°F	-184 to 232°C
728	ACETAL	None	Black	A	M	A	G	-	E	E	E	W	W	-70 to 300°F	-56 to 149°C
Arylex™ 745	PEEK	None	Beige	A	M	G	G	Yes	E	E	E	S	S	-70 to 500°F	-56 to 260°C
748	UHMWPE	None	Translucent	E	L	E	G	-	E	E	E	S	S	-300 to 180°F	-184 to 82°C
HLA	PTFE	Mineral	White	G	M	G	G	-	E	E	E	W	S	-100 to 500°F	-73 to 260°C
HCV	PTFE	Carbon Fiber	Gray/Black	G	M	G	G	-	E	E	E	S	S	-100 to 500°F	-73 to 260°C
7HP	UHMWPE	None	Translucent	E	L	E	G	-	E	E	E	S	S	-22 to 275°F	-30 to 135°C

KEY
E = Excellent **H** = High **NR** = Not Recommended
G = Good **M** = Medium **W** = Resistant to weak acid/base
A = Average **L** = Low **S** = Resistant to strong acid/base
P = Poor

Conditions shown are approximate. Actual operating conditions are contingent upon media, pressure, and design factors as well as polymer types. Testing in your assembly is always recommended, especially when applications approach or exceed the conditions shown above.



FILLERS

To enhance performance capabilities, a range of fillers and additives can be added to materials. Reinforcing fibers, conductive fillers, and colorants are among the additives available.

COMMON FILLERS

Glass Fibers

The most common filler. Minor effect on electrical properties. Increased abrasion on mating metal surfaces.

Carbon/Carbon Fibers

Low abrasion and wear. Good deformation and extrusion resistance.

Graphite

Non-abrasive. Low friction. Minor effect on deformation properties.

MoS₂

Lowers break-in wear and starting friction.

Bronze

Very high wear resistance and load-bearing capability. Poor chemical resistance.

Stainless Steel

High wear resistance and load-bearing capability. Wider chemical resistance than bronze.

PPS

Low wear and abrasion. Excellent deformation and extrusion resistance. Large reduction in tensile and elongation values.

CAF₂

Hydrofluoric acid service.

Mineral

Properties similar to glass, but less abrasive.

While maintaining its inherent properties and characteristics in material compounds, PTFE can benefit from the improved mechanical strength, stability, and wear resistance provided by an additive. The various mechanical properties of PTFE can be enhanced by adding a range of fillers, including glass fiber, carbon, and bronze.

FILLERS AND THEIR RELATIVE EFFECTS ON PTFE	WEAR RESISTANCE	FRICTION	CREEP RESISTANCE	THERMAL CONDUCTIVITY	METAL MATING WEAR	ELECTRICAL RESISTANCE
GLASS FIBERS	▲▲▲	▲▲	▲▲	▲	▲▲▲	▲
CARBON	▲▲▲	▲	▲▲▲	▲▲	▲	▼
GRAPHITE	▲▲	◆	▲▲	▲▲	◆	▼▼
MoS ₂	▲	◆	◆	▲	◆	▼
BRONZE	▲▲▲	▲▲	▲▲	▲▲▲	▲	▼▼
CARBON FIBERS	▲▲▲	▲	▲▲	▲▲	▲	▼
MINERAL	▲▲▲	▲▲	▲▲	▲▲	▲▲	◆
STAINLESS STEEL	▲▲▲	▲▲	▲▲	▲▲▲	▲▲	▼▼
HIGH-TEMPERATURE POLYMERS	▲▲▲	▲	▲▲▲	◆	◆	◆

KEY	
◆	= No Effect
▲	= Slight Increase
▲▲	= Moderate Increase
▲▲▲	= Significant Increase
▼	= Slight Decrease
▼▼	= Moderate Decrease
▼▼▼	= Significant Decrease

JACKET MATERIAL SUGGESTIONS

The Hallite material portfolio contains additional compounds that are not mentioned in this listing. Our specialists can work with you to provide the ideal engineering solution for your specific needs. If your application requires a custom compound or material that is not listed, visit Hallite.com to submit your inquiry, or submit an inquiry at sales@hallite.com, or contact your Hallite representative.

APPLICATIONS	STATIC														
	LOW PRESSURE	MEDIUM PRESSURE	HIGH PRESSURE	ROTATING				OSCILLATING				RECIPROCATING			
				LOW SPEED	HIGH SPEED	LOW PRESSURE	HIGH PRESSURE	LOW PRESSURE	HIGH PRESSURE	LOW PRESSURE	HIGH PRESSURE				
Hydrocarbon Oils and Lubrication Typically fuels and lubricants of petroleum-based products	700	777 711	703 745 701	716 720 780	HLX HCF	755 HCF	HLX HCF	716 720 780	HLX HCF	HCF 755	HLX HCF	780 720 712	HLX 702 7HP 711 748	HLX 711	HLX 7HP 748
Pneumatic and Gases Primarily for air and other gases	700 777 7HP 748	777 7HP 748	777 7HP 745 748	780 777	755 HCF	711 755 HCF	HCF 756	780 777	755 HCF	HCF 755	HCF 756	780 777	7HP 777 PS3 748	711 HCF	HLX 711
Chemical Processing Typical service includes the handling and dispensing of acidic and basic products	700 711	777 7HP 748	703 745 701	716 720	HCF 711	755 HCF	711 703	716 720 712	HCF 711	HCF 755	711 703	720 712	7HP 711 748	711 703	7HP 703 748

Conditions shown are approximate. Actual operating conditions are contingent upon media, pressure, and design factors as well as polymer types. Testing in your assembly is always recommended, especially when applications approach or exceed the conditions shown above.



SPRING TYPES

The addition of a metal spring or elastomer actuates the jacket material used in the system. Upon seal installation, the spring energizer responds with an outward force, thereby energizing the jacket material and providing positive sealing. Characteristics such as load value, deflection range, and corrosion resistance are among the primary spring factors that affect seal performance in a given application.



V-SPRING

The most versatile of all the spring types, the V-Spring design is suited for use in a wide range of applications and services, from static applications to those with rotary or reciprocating motion. The materials used in this design option enhance sealing performance without degradation of material properties. Available in our internal and external pressure face seal design, the V-Spring energizer features a wide deflection range and can be designed with medium or heavy spring loads. This spring is a good choice for glands with wide tolerance variations.



FLAT BAND HELICAL

For applications with less dynamic operating conditions, the flat band helical spring design is an ideal choice because of its small deflection range. The high unit load of this spring-energized design makes it the optimal solution for static applications where wear and friction are not great concerns. In addition, it is the preferred design for cryogenic services.



CANTED COIL

This spring offers light constant loading over a wide deflection range, reducing frictional drag and seal wear. Typically, applications include measurement and instrumentation, high-speed/low pressure, and single-seal applications.



J-SPRING

The J-spring has been designed to allow for high flexibility while also providing high loads. Primarily used in large rotating equipment such as FPSO swivels, the J-spring allows for a more robust, heavy cross-section design that can withstand the extremes of high pressure in applications for decades.



FULL CONTACT SPRING

This heavy-duty spring provides a constant ultra high load over the entire sealing lip. Available in either internal or external face seal configurations, this spring provides the high sealing loads needed for cryogenic fluids, tight gas sealing, and ultra-high vacuum applications.

SPRING MATERIALS

MATERIAL	APPLICATION DESCRIPTION	MEDIA RESISTANCE					OPERATING TEMPERATURES		SPRING TYPE	
		HYDROCARBONS	OXYGENATED SOLVENTS	STEAM	ACIDS	BASES	F°	C°	V	HELICAL
301 Stainless Steel*	General Service Hydraulics	E	E	E	W	S	-300 to 400°F	-184 to 204°C	Yes	Yes
Elgiloy Alloy	Harsh Service, NACE MR-01-75	E	E	E	S	S	-300 to 800°F	-184 to 427°C	Yes	Yes
301 SS/Silicone Filled	Food and Pharmaceuticals	P	E	E	W	W	-300 to 400°F	-184 to 204°C	Yes	No
Hastalloy		E	E	E	S	S	-300 to 800°F	-184 to 427°C	No	Yes

KEY

E = Excellent
P = Poor

W = Resistant to weak acid/base
S = Resistant to strong acid/base

*Certain applications require higher grades of stainless steel; grades such as 300, 304/316 are available.



V-SPRING LIP PROFILES

Seal characteristics such as sealability, wear, and friction are greatly affected by lip-profile construction and seal geometry. In addition to our standard forms, lip profiles can be customized for specific gland configurations such as highly abrasive environments and rough surface finishes.



S LIP DOUBLE RADIUS LIP

The S lip is the standard lip profile design. It offers redundant sealing surfaces with radiused contact areas for medium unit loading. This design feature provides the best combination of wear and sealability, making the S lip suitable for the widest range of applications.

SEALABILITY = Medium WEAR = Medium FRICTION = Medium



A LIP SINGLE RADIUS LIP

The A lip employs a large radius, and therefore low unit loading, resulting in low friction and low wear. This lip profile is recommended for applications with high surface speeds or those that require low friction. The profile also facilitates installation in glands with insufficient lead-in chamfers.

SEALABILITY = Low WEAR = Low FRICTION = Low



B LIP BEVEL LIP

The B lip profile produces the highest unit loading of all of the lip profiles offered by Hallite. The B lip is recommended for use in static applications and is required when the OptiSeal® component diameter is less than 3/16" (4.7mm).

SEALABILITY = High WEAR = High FRICTION = High



C LIP FLAT LIP

The C lip provides a flat sealing surface which allows for a constant wear rate over the life of the seal, making it ideal for rotary applications where extending seal life is the primary goal.

SEALABILITY = High WEAR = High FRICTION = High



D LIP SCRAPER LIP

The D lip profile's low unit loading characteristics offer long wear, with somewhat less effective sealing than higher unit loaded seals. This design is particularly well-suited for reciprocating applications.

SEALABILITY = Medium WEAR = Low FRICTION = Medium



E LIP RADIUS END LIP

The E lip profile is a radiused lip profile similar to the S lip, but with a single point of contact. This lip profile generates the lowest friction of any V-Spring Optiseal® and has extremely high sealability. This lip is best suited for static sealing applications and light oscillating applications where tight sealing is required.

SEALABILITY = Medium WEAR = Low FRICTION = Medium



F LIP DUAL SCRAPER LIP

The F lip features a profile suitable for systems contaminated with abrasives. Lower unit loadings offer extended seal life in rotary applications.

SEALABILITY = Medium WEAR = Medium FRICTION = Low



J LIP SCRAPER RADIUS LIP

The J lip also has redundant sealing surfaces, with the sharp front edge protecting the secondary, radiused surface from abrasive media. Besides use in scraping applications, this lip is also used with step-cut glands and is the preferred profile for use with high-viscosity media.

SEALABILITY = Medium WEAR = Medium FRICTION = Medium

V-SPRING PROFILE USAGE GUIDE

PROFILE & CODE	S	A	B	C	D	E	F	J
RECIPROCATING	Preferred	Preferred	Preferred	Preferred	Preferred	Preferred	Preferred	Preferred
ROTATING	Preferred	Preferred	Neutral	Preferred	Neutral	Neutral	Preferred	Preferred
STATIC	Preferred	Neutral	Preferred	Neutral	Neutral	Neutral	Neutral	Neutral
OSCILLATING	Preferred	Preferred	Neutral	Preferred	Neutral	Neutral	Preferred	Preferred
HIGH SEALABILITY	Preferred	Neutral	Preferred	Neutral	Neutral	Neutral	Neutral	Neutral
EXCLUSION	Neutral	Neutral	Neutral	Neutral	Preferred	Preferred	Preferred	Preferred
LOW-FRICTION	Neutral	Preferred	Neutral	Neutral	Preferred	Preferred	Neutral	Neutral
STEP GLAND	Do Not Use	Neutral	Neutral	Neutral	Preferred	Preferred	Preferred	Preferred
<3/16" ID	Do Not Use	Do Not Use	Preferred	Do Not Use	Preferred	Preferred	Do Not Use	Do Not Use



LIP PROFILES

Seal characteristics such as sealability, wear, and friction are greatly affected by lip-profile construction and seal geometry. In addition to our standard forms, lip profiles can be customized for specific gland configurations such as highly abrasive environments and rough surface finishes.

K LIP SINGLE RADIUS LIP



The K lip is similar to the A lip for V-Springs but designed for circular springs in mind. The radiused lip profile provides low unit loading which results in low friction. The radius also allows for easy installation in glands with insufficient lead-in chamfers. Typical applications include high-speed rotary, gas sealing, and cryogenics.

SEALABILITY = Medium WEAR = Medium FRICTION = Medium

L LIP SINGLE RADIUS LIP FOR BACK PRESSURE



The L lip is designed for applications where a single seal is desired and significant back pressure will be seen. The extended lips of this seal protect the sealing surfaces from damage as pressure is reversed. Radial slots through the lips allow pressure to re-energize the seal once normal pressure is restored, preventing fluid blow-by.

SEALABILITY = Low WEAR = Low FRICTION = Low

M LIP SCRAPER RADIUS LIP



The M lip is similar in function to the J lip but designed for use with circular springs. The scraper lip helps to protect the radius lip from damage by abrasive media and acts as a redundant sealing surface. Additionally, the scraper portion of the lip allows this seal to be installed in step cut glands.

SEALABILITY = High WEAR = High FRICTION = High

N LIP POINT CONTACT LIP



The N lip profile features a pointed contact surface, ensuring minimal contact area and maximum unit loading. This profile, when used in conjunction with a helical coil spring, allows for tight sealing of gas and low-viscosity liquids in static applications.

SEALABILITY = Medium WEAR = Low FRICTION = Medium

P LIP SUPPORTED HEEL FLAT LIP



The P lip utilizes a flat sealing surface, allowing for a constant wear rate over the life of the seal. The high load spring is ideal for heavy cross-section geometries used in large rotating equipment. The heel support ensures that seals made from softer materials like PTFE remain parallel to gland walls without distortion.

SEALABILITY = Medium WEAR = Medium FRICTION = Low


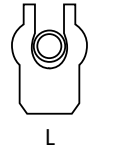


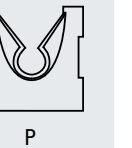

R LIP FLAT LIP



The R lip is similar to the P lip, but does not have the additional heel support. This geometry is ideal when used with more rigid materials like UHMW-PE. Additionally, the lack of heel support makes this geometry lower friction than the P lip.

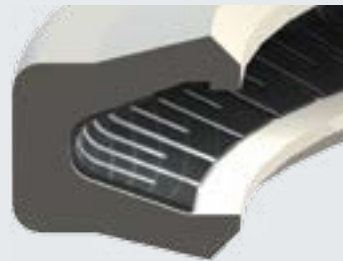
SEALABILITY = Medium WEAR = Medium FRICTION = Medium

LIP PROFILE USAGE GUIDE

PROFILE & CODE						
RECIPROCATING	Neutral	Preferred	Preferred	Neutral	Preferred	Preferred
ROTATING	Neutral	Neutral	Neutral	Neutral	Preferred	Preferred
STATIC	Preferred	Neutral	Preferred	Preferred	Preferred	Preferred
OSCILLATING	Preferred	Preferred	Preferred	Neutral	Preferred	Preferred
HIGH SEALABILITY	Neutral	Neutral	Neutral	Preferred	Neutral	Neutral
EXCLUSION	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral
LOW-FRICTION	Preferred	Preferred	Preferred	Neutral	Neutral	Neutral
STEP GLAND	Neutral	Neutral	Preferred	Do Not Use	Neutral	Neutral
<3/16" ID	Do Not Use	Do Not Use	Do Not Use	Preferred	Do Not Use	Do Not Use

SPECIALITY TYPES

Components based on the basic seal design can be further customized to provide sealing performance that is application- and industry-specific. Our engineering team is able to incorporate a variety of shapes and geometries to optimize seal performance and versatility.

**OPTIFACE™ SEAL**

OptiFace seals are used in static seal applications and feature an axial squeeze design offered for either external or internal pressure. As compression against the seal is increased, the lips of the jacket are pressed against the gland surface, providing resistance and sealability while ensuring stability within the gland. The beveled lip featured in this design provides excellent sealability in applications that require high unit loading. The internal or external preload is based on the application. For components such as flanges and swivel joints, the design is configured for internal pressure. In sealing vacuum applications, the design can be configured for external pressure.

**FLANGED OPTISEAL® COMPONENT**

Best suited for rotary applications, this seal is designed to prevent seal movement on the static gland surface. The clamped flange prevents seal movement and blocks potential leak paths. In cryogenic applications, the clamped flange also reduces the thermal contraction of the seal OD away from the gland.

**OPTI-OIL™ SEAL**

The Opti-Oil seal is the ideal choice for low-pressure, dynamic shaft seals. The outer diameter of this configuration is tightly sealed with an O-ring, reducing slippage on the static surface in rotary applications. The inner diameter contact surface of this seal features a low-friction, spring-loaded jacket, enabling adequate sealing along the surface of the shaft.

**A6R OPTISEAL®**

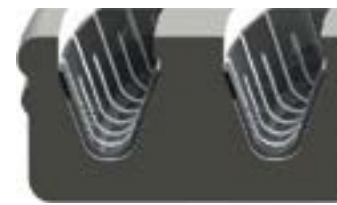
When tight shutoff is required and space is limited, the A6R Optiseal® outperforms PTFE seals. This hybrid elastomer/PTFE seal couples the high sealing capabilities of elastomers with the low-friction characteristics of PTFE. The PTFE ID limits the amount of elastomer contact on the running surface, resulting in significantly lower friction.

CUSTOM SEAL CHARACTERISTICS

In addition to jacket and material customization, the standard OptiSeal® design can be further customized based on the service conditions of the individual application, enabling it to perform in a wide range of services and applications.

**NESTED SPRINGS OPTISEAL®**

Multiple or nested springs are used when greater sealing force is required, such as in low-pressure or low-temperature applications. This design is able to increase the force exerted by the sealing lips without increasing the lip interference. Examples of such applications are valve stems, choke seals, and low-pressure systems.

**LARGE CROSS SECTION OPTISEAL®**

In larger diameter applications where existing glands have radial cross sections greater than 0.600" (15.2mm) or have limited axial lengths, two springs may be radially spaced. Dual springs are also used when retrofitting existing glands where the axial gland length is less than the radial gland cross section. This allows the sealing system to be employed in cross sections that are greater than 1" (25.4mm).

**SILICONE-FILLED CAVITY OPTISEAL®**

In sanitary applications, the spring cavity of the OptiSeal® system can feature a silicone filling to effectively protect against contamination. This configuration prevents media from becoming trapped in the cavity, enabling excess media to be completely flushed out if necessary.

ADDITIONAL CUSTOM DESIGNS



BIDIRECTIONAL SPRING-ENERGIZED FLOATING PISTON SEAL



FLANGED SEAL WITH INTERNAL SPRING ENERGIZER

OptiSeal® design principles can be applied to a variety of custom configurations. For custom seal geometries, please contact your Hallite representative.

BACK-UP RINGS/ANTI-EXTRUSION DEVICES

BACK-UP AND ADAPTER MATERIAL SELECTION

The materials and compounds selected in a seal's design will differ in their ability to resist seal extrusion once installed in a given application. The effects that temperature, pressure, and media have on the compound used are key considerations. When determining whether or not a sealing system requires the use of a back-up ring or anti-extrusion device, the magnitude of pressure a seal must contain and the clearance gap should be considered. The properties of the jacket materials used in the seal design provide varying levels of resistance to seal extrusion in a given application.



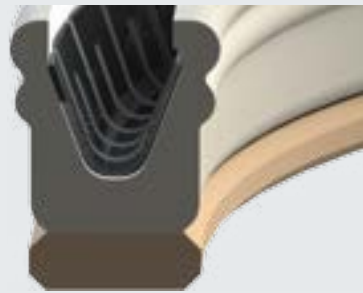
FDA APPROVED	COMPOUND	POLYMER	FILLER	COLOR	ABRASIAN RESISTANCE	METAL MATING WEAR	RELATIVE SEALABILITY	RELATIVE EXTRUSION RESISTANCE	MEDIA RESISTANCE					OPERATING TEMPERATURE	
									HYDROCARBONS	OXYGENATED SOLVENTS	STEAM	ACIDS	BASES	F°	C°
Yes	728	ACETAL	None	Black	A	M	A	G	E	G	G	W	W	-70 to 300°F	-56 to 149°C
No	744	PPS	Glass	Grey	G	H	P	E	E	E	E	S	S	-70 to 500°F	-56 to 260°C
Yes	Arylex™ 745	PEEK	None	Beige	A	M	G	G	E	E	E	S	S	-70 to 500°F	-56 to 260°C
No	Arylex™ 747	PEEK	Glass	Beige	G	H	P	E	E	E	E	S	S	-70 to 550°F	-56 to 288°C
Yes	748	UHMWPE	None	Translucent	E	L	E	G	G	G	P	S	S	-300 to 180°F	-184 to 82°C
No	Arylex™ 754	PEEK	Carbon	Black	G	H	P	E	E	E	E	S	S	-70 to 550°F	-56 to 288°C

KEY

E = Excellent	H = High	NR = Not Recommended
G = Good	M = Medium	W = Resistant to weak acid/base
A = Average	L = Low	S = Resistant to strong acid/base
P = Poor		

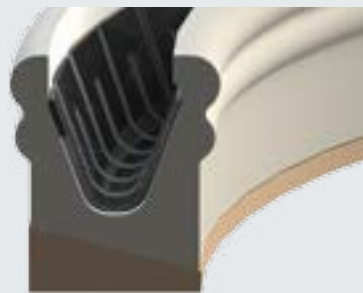
BACK-UP RING DESIGN OPTIONS

When back-up or auxiliary devices are required, Hallite can provide a range of components that prevent seal extrusion. Several geometries are used for anti-extrusion devices that allow the extrusion-resistant material to move into the clearance gap quickly and efficiently. Constructed from materials that are stronger than the seal jacket, the back-up ring blocks extrusion paths, allowing for maximum seal life in high-temperature and high-pressure applications.



OPTIBACK™ COMPONENT

The standard back-up ring offered by Hallite features a close-tolerance rectangular OptiBack design. The chamfered edges on the OptiBack ring aid in installation.



DELTA BACK-UP RING

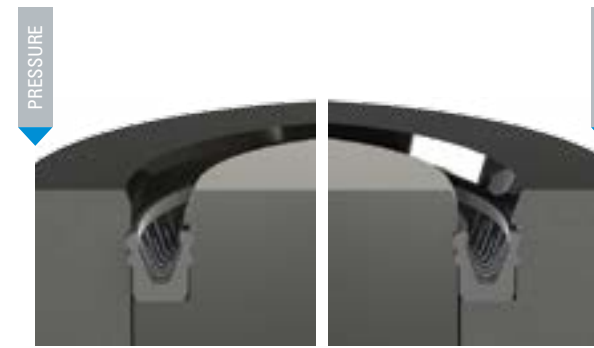
The Delta Back-Up uses system pressure to prevent seal extrusion when using the OptiSeal® system. The force induced by the system pressure will cause the Delta Back-Up to move into the extrusion gap and close it off.



INTEGRAL BACK-UP RING

The Integral Back-Up is placed at the corner of the seal where the extrusion gap is located. This configuration is ideal when the axial gland length is so short as to prevent the use of a standard back-up. Its snap-in feature also eliminates loose components, thereby providing easier installation.

GLAND DESIGN OPTIONS



STEP-CUT GLAND

This modification of the one-piece gland minimizes the deformation of the OptiSeal® jacket during installation and eliminates the need for a separate retaining piece. Dimensions for step-cut glands are available upon request.



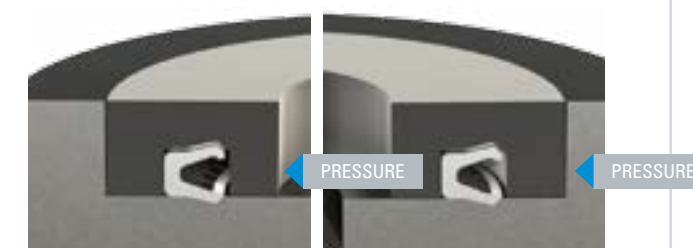
TWO-PIECE GLAND

The two-piece gland eliminates deformation during installation and is required for small-diameter or large cross-section designs. In reciprocating applications, the gland must be carefully designed, or a PakRing must be used to prevent the sealing lips from shifting on to the installation bevel.



ONE-PIECE GLAND

The one-piece gland is used only for OptiSeal® systems with larger diameters or small cross sections to prevent damage from stretching or buckling during installation. Please consult Hallite for installation tools and instruction before installing OptiSeal® components into this gland configuration.



FACE SEAL GLAND

Face seal gland design and seal design are different from the design of radial seals. Gland recommendations are available from Hallite for individual applications, or OptiFace seals may be proposed based upon existing gland dimensions.



GLAND RECOMMENDATIONS: OPTIGLAND

Larger gland diameters require greater tolerances to manufacture at reasonable and comparable costs. OptiSeal® components have a “designed-in” squeeze on the cross section, but manufacturing tolerances determine the minimum and maximum. If the minimum squeeze is too small, the seal can tolerate less wear before it fails. If the maximum squeeze is too large, the friction and wear will be unacceptable.

The Hallite OptiGland system of gland dimension recommendations is centered around the active gland diameter (the bore diameter for piston seals and the rod diameter for rod seals) and takes into account manufacturing capabilities, wear and friction concern, extrusion gaps, and expenses incurred during manufacturing. The OptiGland system calculates the optimal cross-section for a given active gland diameter or, working backwards, the optimal active diameter for a given cross section, giving consideration to the rationale of tolerance selection.

The result is a set of gland dimensions that balances the best seal performance and longevity with the lowest manufacturing costs required for that gland. The processes and examples below demonstrate how to effectively use OptiGland measurements.

PISTON SEALS: 8-STEP PROCESS

A	S	B	L	F	E	C
Active gland diameter	Minimum gland cross section	Non-active gland diameter	Minimum axial gland length	Minimum installation bevel length	Diametrical clearance	Gland clearance diameter

Step 1: Determine the active gland diameter. For piston seals, “A” equals the bore diameter and is the minimum gland OD.

Step 2: Determine the minimum gland cross section. This value is based on A and can be found in the Gland Dimension Examples tables on the following pages.

Step 3: Determine the non-active gland diameter. For piston seals, “B” equals A-2S and is the maximum gland ID.

Step 4: Determine tolerances for gland diameters. Tolerances are given in the Gland Dimension Examples tables on the following pages, dependent only upon cross section in order to control seal squeeze.

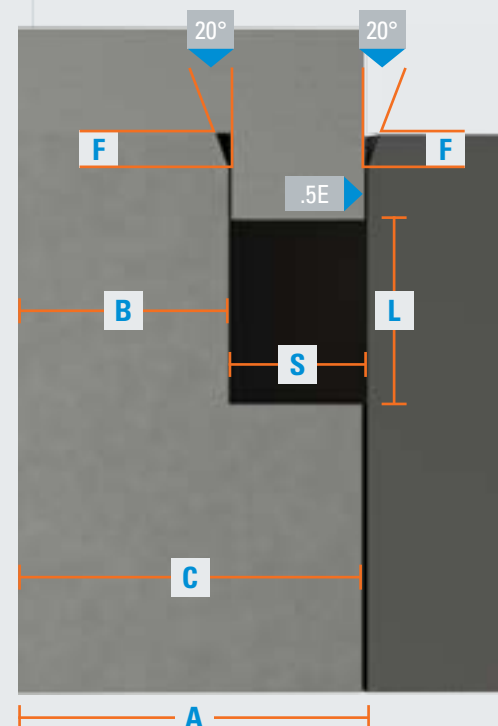
Step 5: Determine the minimum axial gland length. For pressures less than 10,000 psi (690 bar), use the value L₁. Value L₂ accommodates the addition of an OptiBack back-up ring and can be used for pressure above 10,000 psi (690 bar) up to 17,000 psi (1,172 bar). For pressures above 17,000 psi (1,172 bar), please consult Hallite. The tolerance for both L₁ and L₂ is 0.010in (0.25mm).

Step 6: Determine the minimum installation bevel length. This value is also given in the Gland Dimension Examples tables on the following pages, according to the cross section.

Step 7: Determine the minimum and maximum diametrical clearance. These values are shown in the table. The minimum diametrical clearance will be used to calculate “C” —the gland clearance diameter.

Step 8: Determine the gland clearance diameter and tolerance. For piston seals, C equals A-E minimum and is the maximum clearance diameter. Shaft and hole tolerances can be applied to these values using the table.

DIAGRAM 1
PISTON SEAL RECOMMENDATION



ROD SEALS: 8-STEP PROCESS

A	S	B	L	F	E	C
Active gland diameter	Minimum gland cross section	Non-active gland diameter	Minimum axial gland length	Minimum installation bevel length	Diametrical clearance	Gland clearance diameter

Step 1: Determine the active gland diameter. For rod seals, “A” equals the rod diameter and is the maximum gland ID.

Step 2: Determine the minimum gland cross section. This value is based on A and can be found in the Gland Dimension Examples tables on the following pages.

Step 3: Determine the non-active gland diameter. For rod seals, “B” equals A+2S and is the minimum gland ØD.

Step 4: Determine tolerances for gland diameters. Tolerances are given in the Gland Dimension Examples tables on the following pages, dependent only upon cross section in order to control seal squeeze.

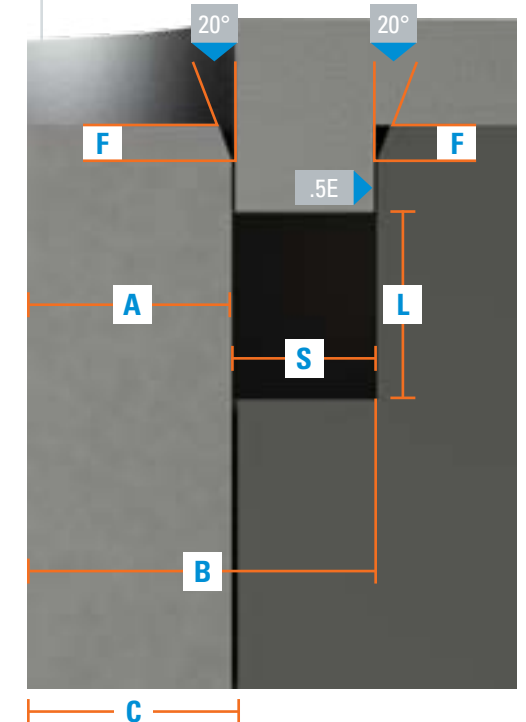
Step 5: Determine the minimum axial gland length. For pressures less than 10,000 psi (690 bar), use the value L₁. Value L₂ accommodates the addition of an OptiBack back-up ring and can be used for pressure above 10,000 psi (690 bar) up to 17,000 psi (1,172 bar). For pressures above 17,000 (1,172 bar), please consult Hallite. The tolerance for both L₁ and L₂ is 0.010in (0.25mm).

Step 6: Determine the minimum installation bevel length. This value is also given in the Gland Dimension Examples tables on the following pages, according to the cross section.

Step 7: Determine the minimum and maximum diametrical clearance. These values are shown in the table. The minimum diametrical clearance will be used to calculate “C” —the gland clearance diameter.

Step 8: Determine the gland clearance diameter and tolerance. For rod seals, C equals A+E min and is the minimum clearance diameter.

DIAGRAM 2
ROD SEAL RECOMMENDATION



SUGGESTED GLAND SURFACE FINISHES

STATIC	DYNAMIC
Ra 32 max	Ra 16 max
Ra 0.8 µm max.	Ra 0.4 µm max.

GLAND DIMENSION EXAMPLES

These examples show a relationship between active diameter and gland cross section.

METRIC									
ROD DIAMETER OR CYLINDER BORE	NOMINAL GLAND CROSS SECTION	MINIMUM GLAND CROSS SECTION	MINIMUM AXIAL GLAND LENGTH	MINIMUM AXIAL GLAND LENGTH	MINIMUM INSTALLATION BEVEL LENGTH	MINIMUM DIAMETRICAL CLEARANCE	MAXIMUM DIAMETRICAL CLEARANCE	SHAFT TOLERANCE	HOLE TOLERANCE
A	S	L ₁ + 0.25	L ₂ + 0.25	F min.	E min.	E max.		-.xxx	+.xxx
5.0 - 14.9	3.00	2.98	4.06	5.45	0.86	0.02	0.11	0.03	0.06
15.0 - 24.9	4.00	3.97	5.37	7.19	1.14	0.04	0.17	0.05	0.08
25.0 - 59.9	5.00	4.96	6.64	8.92	1.43	0.05	0.20	0.06	0.09
60.0 - 169.9	7.50	7.44	9.82	13.24	2.14	0.09	0.33	0.10	0.14
170.0 - 409.9	10.00	9.92	13.01	17.53	2.85	0.12	0.45	0.15	0.18
410.0 - 500.0	12.50	12.41	16.16	21.81	3.56	0.17	0.60	0.20	0.23

INCH									
ROD DIAMETER OR CYLINDER BORE	NOMINAL GLAND CROSS SECTION	MINIMUM GLAND CROSS SECTION	MINIMUM AXIAL GLAND LENGTH	MINIMUM AXIAL GLAND LENGTH	MINIMUM INSTALLATION BEVEL LENGTH	MINIMUM DIAMETRICAL CLEARANCE	MAXIMUM DIAMETRICAL CLEARANCE	SHAFT TOLERANCE	HOLE TOLERANCE
A	S	L ₁ + .010	L ₂ + .010	F min.	E min.	E max.		-.xxx	+.xxx
0.215 - 0.749	0.125	0.124	0.169	0.226	0.036	0.001	0.004	0.001	0.002
0.750 - 2.499	0.188	0.186	0.250	0.336	0.054	0.002	0.009	0.003	0.004
2.500 - 6.499	0.250	0.248	0.329	0.443	0.071	0.003	0.012	0.004	0.005
6.500 - 16.999	0.375	0.372	0.488	0.658	0.107	0.005	0.018	0.006	0.007
17.000 - 20.000	0.500	0.496	0.646	0.872	0.142	0.007	0.023	0.007	0.009

Notes: For pressures less than 10,000 psi (690 bar), the OptiSeal® system can be used without back-up ring and axial gland length L₁. For pressures greater than or equal to 10,000 psi (690 bar) but less than 17,000 psi (1,172 bar), the OptiBack back-up ring can be used with the OptiSeal® system and axial gland length L₂. Contact Hallite regarding: all pressures exceeding 17,000 psi (1,172 bar), and regarding piston seals with bore diameters of .500in/.254m or less.

GLAND DIMENSION EXAMPLES

METRIC			INCH		
NOMINAL GLAND CROSS SECTION	200mm ROD, 125 bar		NOMINAL GLAND CROSS SECTION	4" ROD, 15,000 PSI	
	DIMENSION	TOLERANCE		DIMENSION	TOLERANCE
Max. Gland ID	181.16	-0.15	Max. Gland ID	4.000	-0.004
Min. Gland OD	200.00	+0.18	Min. Gland OD	4.496	+0.005
Nom. Gland Cross Section	10.00	Nominal	Nom. Gland Cross Section	0.250	Nominal
Min. Gland Cross Section	9.92	Minimum	Min. Gland Cross Section	0.248	Minimum
Min. Axial Gland Length	13.01	+0.25	Min. Axial Gland Length	0.443	0.010
Min. Installation Bevel Length	2.85	Minimum	Min. Installation Bevel Length	0.071	Minimum
Min. Diametrical Clearance	0.12	Minimum	Min. Diametrical Clearance	0.003	Minimum
Gland Clearance Diameter	199.88	+0.15	Gland Clearance Diameter	4.003	+0.005
Max. Diametrical Clearance	0.45	Maximum	Max. Diametrical Clearance	0.012	Maximum



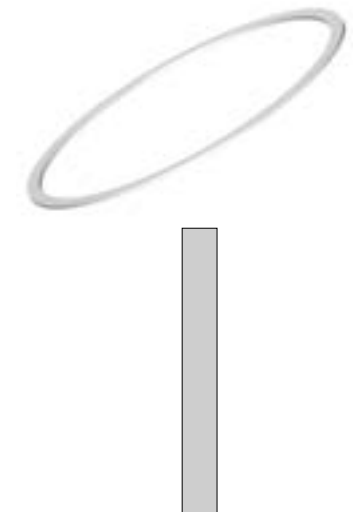
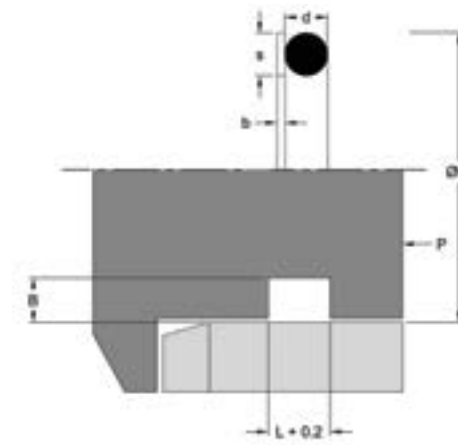
BACK-UP RINGS



PME

UNCUT BACK-UP RINGS

For External Grooves



TECHNICAL DETAILS

Hallite PME back-up rings are uncut back-up rings made from specific conditioned PTFE to be assembled into one-piece external grooves. PME back-up rings are designed to support O-rings mainly in static applications. The cold flow feature of the specially conditioned virgin PTFE grade reliably closes the extrusion gap and protects the O-ring from extruding into the gap and helps to reasonably increase the acceptable system pressure. Hallite PME back-up rings are produced from stocked material and can be supplied on short notice.

FEATURES

- More extrusion resistant than conventional PTFE back-up rings
- No spiral or cut design; rings will not wrap around the rod jack and be sheared off
- Economical assembly of series with assembling tool
- Uncut design ensures no gap will endanger the O-ring
- Immediate reconversion after termination of assembly so that the back-up ring fits tightly on the bottom of the groove
- Simple assembly of small quantities with synthetic strip

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.

INSTALLATION RECOMMENDATIONS

SMALL QUANTITY ASSEMBLY – PME BACK-UP RINGS*

When assembling small quantities of PME back-up rings, a synthetic strip can be used to best fit the back-up ring into the groove. The back-up ring should first be fitted into the groove at one part of the circumference and held in place in the groove. Work the ring into the groove around the part, using circular motions as quickly as possible. Note that the faster the assembly of the part into the groove, the faster the part will resize into the groove, minimizing time before the seal can be assembled.



LARGE QUANTITY ASSEMBLY – PME BACK-UP RINGS*

When assembling large quantities of PME back-up rings, the use of an assembly cone can minimize time needed to assemble. With this method, the O-ring and PME back-up can be assembled at the same time. This method provides quick assembly, as the back-up ring will immediately resize in the groove with the O-ring, making the assembly ready for use.



**If you choose to heat the part for easier assembly, you will need to verify that the ring has properly resized in the groove as the heat may interfere with the self-sizing function of the part.*

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

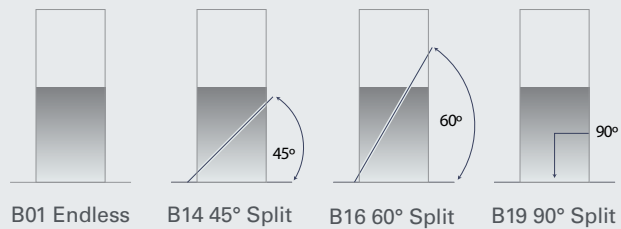
NOTE

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

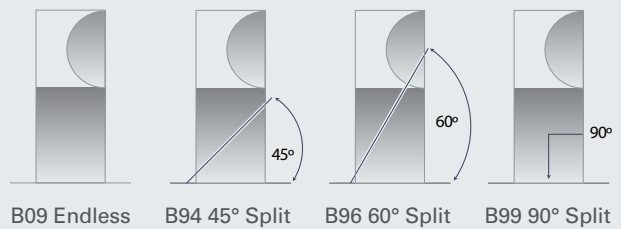
RECTANGULAR BACK-UP AND ANTI-DIESEL RINGS

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 Armorlene® PTFE compounds, PEEK, POM, PA, Composites, TPU, TPE, PPS, NBR, HNBR, and FKM.



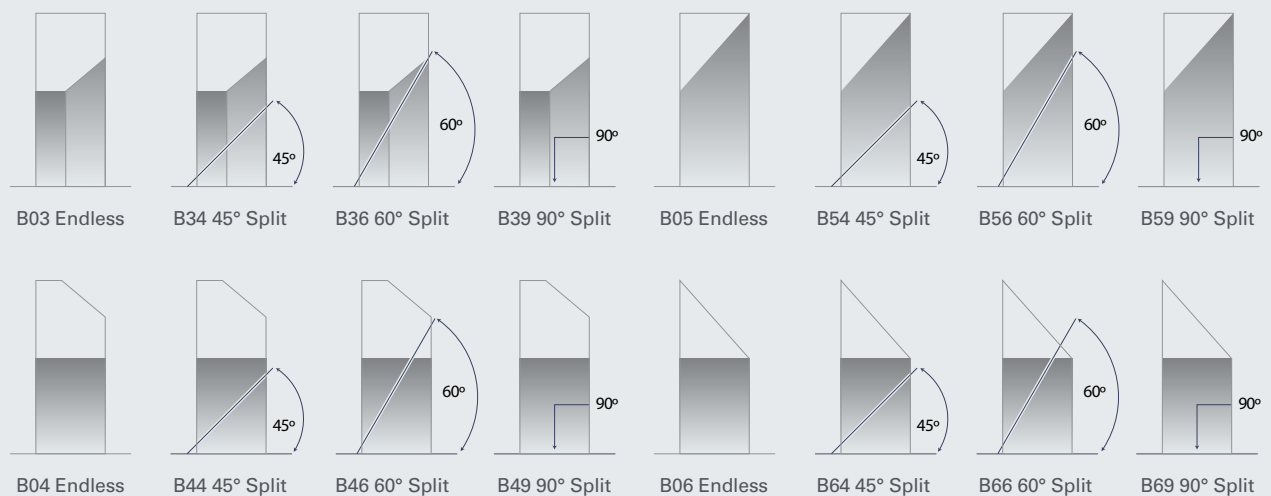
CONTOURED BACK-UP RINGS

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 Armorlene® PTFE compounds, PEEK, POM, PA, Composites, TPU, TPE, PPS, NBR, HNBR, and FKM.

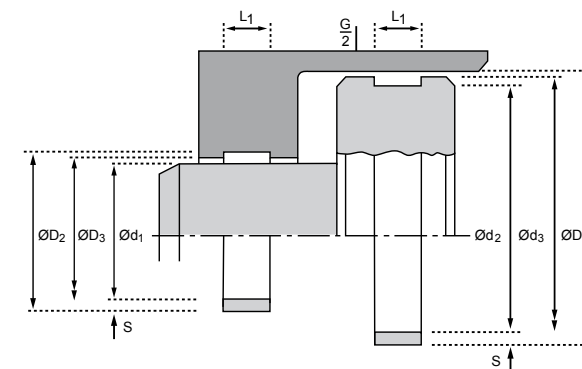


INTEGRATED BACK-UP RINGS

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 Armorlene® PTFE compounds, PEEK, POM, PA, Composites, TPU, TPE, PPS, NBR, HNBR, and FKM.



T87



TECHNICAL DETAILS

The Hallite T87 bearing strip has the ability to support side loads and eliminate stick-slip between moving parts. It is produced from a special combination of PTFE and bronze materials. It has excellent heat resistance and strength to resist creep, making it suitable for bearings with reciprocating, oscillating, or rotary movement, whether lubricated or not. Our standard range of cross-section sizes are proportioned to be wrapped around a wide range of rod or piston diameters. The Hallite T87 may also be used in many applications other than hydraulic or pneumatic cylinders.

The material is compatible with hydraulic mineral oil, lubricating oil, water-based and synthetic fire-resistant fluids, and lubricating grease. Although the material is rated at 200°C, the recommended maximum temperature for bearing applications is 150°C. Hallite T87 is offered in uncut strips by the meter or foot. It can also be supplied in cut lengths as defined by the customer. Hallite also offers cut and formed pieces for either a piston or rod application.



FEATURES

- Low friction
- Infinite length range
- Easy installation
- Extremely flexible

Part Number Structure

CSBE1500RB03125

CS	B	E	1500	R	B	03125
CS = Cut Strip	MATERIAL Refer to <i>Material Table</i>	UNITS FOR ALL DIMENSIONS M = Metric E = Inch	WIDTH OF STRIP Metric = XX.XX Inch = X.XXX	Refer to <i>Cross-Section Table</i>	CUT TYPE B = Butt A = 30° (Angle) F = 45° S = Special	LENGTH OF STRIP Metric = XXXX.X Inch = XX.XXX

OPERATING CONDITIONS*

	METRIC	INCH
Maximum Speed	5.0m/sec	16.4ft/sec
Temperature Range	-50 to 200°C	-58 to 390°F

*When using the compressive stress at yield in your calculation, it is suggested a 4:1 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.

SURFACE FINISH RECOMMENDATIONS*

	µmRa	µmRt	µinRa	µinRt
Dynamic Sealing Face Ød, ØD ₁	0.4	4 max	16	158
Static Housing Faces ØD ₂ L ₁ Ød ₂	3.2 max	16 max	125 max	630 max

*Or surface finish of seal being used.

TYPICAL PHYSICAL PROPERTIES

	METRIC		INCH	
Specific Gravity	3.1		3.1	
Compression Stress at Yield	23°C	20 MN/m ²	73°F	2900 psi
	80°C	9 MN/m ²	176°F	1300 psi
Coefficient of Thermal Conductivity	2.5 W/mK		1.48tu/hft°F	
Coefficient of Thermal Expansion	Length & Thickness: 6.5 x 10 ⁻⁵ per °C			
Coefficient of Dynamic Friction	Dry 0.25	Lubricated 0.05	-	

HOUSING DETAILS & TOLERANCES WITH RADIAL CLEARANCE RECOMMENDATIONS

Rod	Ød ₁	f8/h9
	ØD ₂ =Ød ₁ +2S	up to: Ø80 H10 above: Ø80 H9
	ØD ₃ =Ød ₁ +2G	G min / max
	L ₁	-0 + 0.2mm
Piston	ØD ₁	H11
	Ød ₂ =ØD ₁ -2S	h8
	Ød ₃ =ØD ₁ -2G	G min / max
	L ₁	-0 + 0.2mm

G min controls the minimum metal-to-metal clearance between the gland and rod, or bore and piston. G max controls the maximum extrusion gap seen by a seal associated with the bearing. Typically G min should be 0.7mm (0.028”) 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 0.1mm (0.004”). For applications not using a seal G max, see the table below.

METRIC			INCH		
NOMINAL DIAMETER RANGE	G MIN* (mm)	G MAX	NOMINAL DIAMETER RANGE	G MIN* (mm)	G MAX
8.0 - 20.0	0.6	AS REQUIRED BY THE SEAL EXTRUSION GAP (see note below)	0.315 - 0.787	0.024	AS REQUIRED BY THE SEAL EXTRUSION GAP (see note below)
> 20.0 - 120.0	0.7		> 0.787 - 4.725	0.028	
> 120.0 - 500.0	0.8		> 4.725 - 19.685	0.031	
500.0 - 1000.0	1.0		> 19.685 - 39.370	0.039	
1000.0	1.2		> 39.370	0.047	

*G min gives the minimum metal-to-metal clearance that is required at all times. G/2 specifies the minimum metal-to-metal clearance on either position of the rod or piston at all times.

FOR APPLICATIONS NOT USING A SEAL G MAX

	METRIC	INCH
S	G MIN* (mm)	G MAX (mm)
1.50 - 1.55	1.0	0.039
> 1.55 - 2.00	1.1	0.043
> 2.00	1.6	0.063

BEARING STRIP TOLERANCES

L ₁				S			
-0.1mm	+0.000in	-0.5mm	-0.008in	+0.00mm	+0.000in	-0.05mm	-0.002in

CUTTING STRIP TO LENGTH

CALCULATING CUT LENGTH

L2	Length of strip
Pi	3.1415
ØD₁	Cylinder bore diameter
Ød₁	Rod diameter
S	Cross section of strip
W	Width of gap

Calculating Strip Length:

Piston Applications

$$L2 = \text{Pi} \times (\text{ØD}_1 - S) \times 0.99 - 0.8\text{mm} / 0.03\text{in}$$

Rod Applications

$$L2 = \text{Pi} \times (\text{Ød}_1 + S) \times 0.99 - 0.8\text{mm} / 0.03\text{in}$$

Calculating Proper Gap:

Metric: gap W = cut length L2 x 0.01 + 0.8mm

Inch: gap W = cut length L2 x 0.01 + 0.03in

BEARING STRIP CUTTING ANGLES



MATERIALS

MATERIAL FEATURES AND APPLICATIONS	MATERIAL DESIGNATOR	COLOR	TEMPERATURE RANGE °C	TEMPERATURE RANGE °F
BRONZE FILLED <ul style="list-style-type: none"> Standard material for hydraulic applications High compressive strength Extended wear resistance 	B	Bronze	-60 to 200°C	-76 to 392°F
BRONZE/MoS₂ FILLED <ul style="list-style-type: none"> High compressive strength Excellent extrusion resistance Very low running friction 	T	Dark Bronze	-60 to 200°C	-76 to 392°F
CARBON FILLED <ul style="list-style-type: none"> Excellent in all lubricating fluids and pneumatic applications High chemical resistance 	C	Black	-60 to 200°C	-76 to 392°F
CARBON FILLED (BAM CERTIFIED) <ul style="list-style-type: none"> Excellent in all lubricating fluids and pneumatic applications High chemical resistance Approved for use with oxygen (BAM certified) 	G	Black	-60 to 200°C	-76 to 392°F

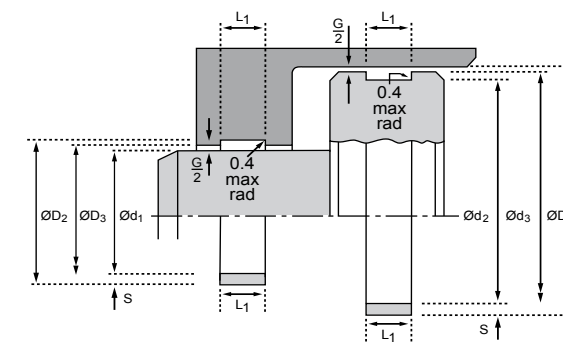
For other material options consult the Master Materials Index at the front of the catalog. If you do not find the material that you require, please contact your local Hallite sales office.

CROSS SECTIONS & DESIGNATION

METRIC		INCH	
CROSS SECTION TABLE	DESIGNATION	CROSS SECTION TABLE	DESIGNATION
1.00	A	0.062	M
1.50	C	0.093	N
1.55	D	0.125	R
2.00	E	-	-
2.20	F	-	-
2.50	G	-	-
3.00	H	-	-
3.50	J	-	-
4.00	K	-	-
5.00	L	-	-



506



TECHNICAL DETAILS

The Hallite 506 bearing strip is available in three forms: cut rings, spiral lengths and flat coils. Hallite 506 provides an extremely effective, hard wearing, and easy-to-use bearing material.

Manufactured to very tight tolerances and providing bearing solutions for reciprocating, oscillating, and slow rotary movement applications, the Hallite 506 bearing strip is used in many of today's most arduous hydraulic applications around the world. Commonly fitted in reciprocating cylinders as rod and piston bearings, the Hallite 506 is capable of withstanding extreme side-loads, preventing metal-to-metal contact.

The material's design incorporates micro-indentations on the bearing strip's surface to trap fluid and provide built-in lubrication to the bearing. The 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 rectangular section strip is available in a wide range of inch and metric sizes, including cross sections specified in ISO 10766.



FEATURES

- Ultra low friction
- Compact housing
- Inch sizes available upon request
- Available in ready-made bearings cut to size and to customer specifications
- Available in coil lengths and flat coils

OPERATING CONDITIONS

	METRIC		INCH	
Temperature Range	-40 to 120°C		-40 to 250°F	
	Speed m/sec	Pressure MN/m ²	Speed ft/sec	Pressure psi
Limiting PV Values Lubricated*	0.1	10.0	0.3	1500
	1.0	6.0	3.0	900
	5.0	0.8	16.0	120

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.

**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.*

SURFACE FINISH RECOMMENDATIONS

	μmRa	μmRt	μinRa	μinRt
Dynamic Sealing Face $\varnothing d_1, \varnothing D_1$	0.4	4 max	16	158
Static Housing Faces $\varnothing D_2, L_1, \varnothing d_2$	3.2 max	16 max	125 max	630 max

TYPICAL PHYSICAL PROPERTIES

	METRIC		INCH	
Specific Gravity	1.27		1.27	
Compression Stress at Failure	23°C	450 MN/m ²	73°F	65,000 psi
Compression Stress at Yield	23°C	115 MN/m ²	73°F	16,500 psi
	80°C	58 MN/m ²	176°F	8,500 psi
Coefficient of Thermal Conductivity	0.27 W/mK		0.16 Btu/hft °F	
Coefficient of Thermal Expansion	Length	Thickness	Length	Thickness
	9×10^{-5} per °C	13×10^{-5} per °C	5×10^{-5} per °F	7.3×10^{-5} per °F
Coefficient of Dynamic Friction on Steel Surface (0.2 μmRa) / (8 μinCLA)	Dry 0.50	Lubricated 0.06	Dry 0.50	Lubricated 0.06

HOUSING DETAILS & TOLERANCES

	$\varnothing d_1$	f8/h9	$\varnothing d_1$	f9
Rod	$\varnothing D_2 = \varnothing d_1 + 2S$	up to : $\varnothing 80$ H10	$\varnothing D_2 = \varnothing d_1 + 2S$	up to : $\varnothing 3$ in H10
		above : $\varnothing 80$ H9		above : $\varnothing 3$ in H9
	$\varnothing D_3 = \varnothing d_1 + 2G$	G min / max	$\varnothing D_3 = \varnothing d_1 + 2G$	G min / max
	L_1	+ 0.2 -0 mm		+ 0.008 -0 in
Piston	$\varnothing D_1$	H11	$\varnothing D_1$	H11
	$\varnothing d_2 = \varnothing D_1 - 2S$	h8	$\varnothing d_2 = \varnothing D_1 - 2S$	f9
	$\varnothing d_3 = \varnothing D_1 - 2G$	G min / max	$\varnothing d_3 = \varnothing D_1 - 2G$	G min / max
	L_1	+ 0.2 -0 mm	L_1	+ 0.008 -0 in

RADIAL CLEARANCE RECOMMENDATIONS

METRIC - SPIRAL LENGTHS		S	L_1	G MAX	G MIN*
\varnothing RANGE					
$\varnothing d_1$	$\varnothing D_1$				
25.0 - 41.0	45.0 - 90.0	2.0	10.0		0.7
35.0 - 70.0	74.0 - 160.0	2.0	10.0		0.7
70.0 - 155.0	159.0 - 310.0	2.0	10.0		0.7
35.0 - 50.0	54.0 - 110.0	2.0	15.0		0.7
50.0 - 100.0	104.0 - 210.0	2.0	15.0		0.7
90.0 - 180.0	184.0 - 370.0	2.0	15.0		0.7
25.0 - 30.0	35.0 - 70.0	2.5	5.6		0.7
25.0 - 50.0	55.0 - 110.0	2.5	5.6		0.7
50.0 - 100.0	105.0 - 210.0	2.5	5.6		0.7
25.0 - 40.0	45.0 - 90.0	2.5	9.7		0.7
35.0 - 70.0	75.0 - 150.0	2.5	9.7		0.7
70.0 - 150.0	155.0 - 310.0	2.5	9.7		0.7
40.0 - 50.0	55.0 - 110.0	2.5	13.0		0.7
50.0 - 100.0	105.0 - 210.0	2.5	13.0		0.7
90.0 - 180.0	185.0 - 370.0	2.5	13.0		0.8
40.0 - 50.0	55.0 - 110.0	2.5	15.0		0.7
50.0 - 100.0	105.0 - 210.0	2.5	15.0		0.7
90.0 - 180.0	185.0 - 370.0	2.5	15.0		0.8
50.0 - 80.0	85.0 - 170.0	2.5	20.0		0.7
75.0 - 150.0	155.0 - 310.0	2.5	20.0		0.8
125.0 - 250.0	255.0 - 510.0	2.5	20.0		0.8
60.0 - 80.0	85.0 - 170.0	2.5	25.0		0.7
70.0 - 150.0	155.0 - 310.0	2.5	25.0		0.8
125.0 - 250.0	255.0 - 510.0	2.5	25.0		0.8
40.0 - 50.0	56.0 - 100.0	3.0	9.7		0.8
50.0 - 100.0	106.0 - 210.0	3.0	9.7		0.8
100.0 - 150.0	156.0 - 310.0	3.0	9.7		0.8
50.0 - 60.0	66.0 - 120.0	3.0	12.8		0.7
60.0 - 104.0	110.0 - 220.0	3.0	12.8		0.8
90.0 - 149.0	155.0 - 300.0	3.0	12.8		0.8
55.0 - 80.0	86.0 - 170.0	3.0	20.0		0.8
80.0 - 150.0	156.0 - 310.0	3.0	20.0		0.8
140.0 - 250.0	256.0 - 510.0	3.0	20.0		0.8
50.0 - 75.0	81.0 - 160.0	3.02	15.0		0.7

AS REQUIRED
BY THE SEAL
EXTRUSION GAP
For applications
not using a seal,
G MAX can be 1.6mm



RADIAL CLEARANCE RECOMMENDATIONS

METRIC - SPIRAL LENGTHS		S	L ₁	G MAX	G MIN*
Ø RANGE					
Ød ₁	ØD ₁				
60.0 - 80.0	68.0 - 170.0	4.0	6.1	AS REQUIRED BY THE SEAL EXTRUSION GAP For applications not using a seal, G MAX can be 1.6mm	0.8
80.0 - 150.0	158.0 - 310.0	4.0	6.1		0.8
150.0 - 250.0	258.0 - 510.0	4.0	6.1		0.8
60.0 - 80.0	88.0 - 170.0	4.0	9.7		0.8
80.0 - 150.0	158.0 - 310.0	4.0	9.7		0.8
150.0 - 250.0	258.0 - 510.0	4.0	9.7		0.8
60.0 - 80.0	88.0 - 170.0	4.0	20.0		0.8
80.0 - 150.0	158.0 - 310.0	4.0	20.0		0.8
150.0 - 250.0	258.0 - 510.0	4.0	20.0		0.8
120.0 - 150.0	158.0 - 310.0	4.0	25.0		0.8
150.0 - 250.0	258.0 - 510.0	4.0	25.0		0.8
120.0 - 150.0	158.0 - 310.0	4.0	30.0		0.8
150.0 - 250.0	258.0 - 510.0	4.0	30.0		0.8
170.0 - 200.0	208.0 - 410.0	4.0	40.1		0.8
200.0 - 300.0	308.0 - 610.0	4.0	40.1		0.8

INCH - SPIRAL LENGTHS		S	L ₁	G MAX	G MIN*
Ø RANGE					
Ød ₁	ØD ₁				
1.000 - 1.375	1.625 - 3.500	0.125	0.375	AS REQUIRED BY THE SEAL EXTRUSION GAP For applications not using a seal, G MAX can be 0.080in	0.031
1.250 - 1.875	2.125 - 4.250	0.125	0.375		0.031
2.000 - 3.500	3.750 - 6.250	0.125	0.375		0.031
1.250 - 1.750	2.000 - 4.000	0.125	0.500		0.031
1.750 - 3.500	3.750 - 6.250	0.125	0.500		0.031
3.500 - 6.000	6.250 - 10.000	0.125	0.500		0.031
8.000 - 12.500	12.750 - 25.000	0.125	0.500		0.031
2.000 - 3.500	3.750 - 6.250	0.125	0.625		0.031
3.500 - 6.000	6.250 - 10.000	0.125	0.625		0.031
2.000 - 3.500	3.750 - 6.250	0.125	0.750		0.031
3.500 - 6.000	6.250 - 10.000	0.125	0.750		0.031
2.500 - 3.500	3.750 - 6.250	0.125	1.000		0.031
3.500 - 6.000	6.250 - 10.000	0.125	1.000		0.031
8.000 - 12.500	12.750 - 25.000	0.125	1.000		0.031

*This value can be reduced if required by the seal's maximum extrusion gap - Refer to Housing Design section.

BEARING STRIP TOLERANCES

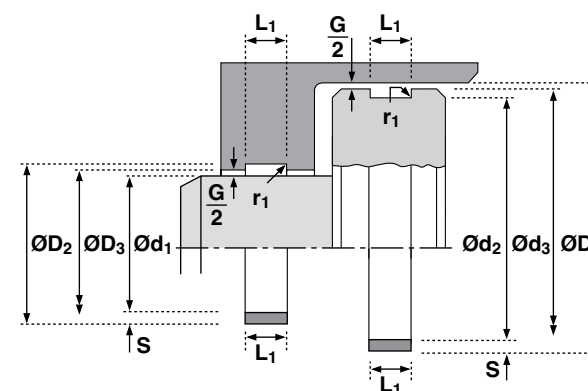
METRIC		INCH	
L1	S	L1	S
-0.1 to -0.6mm	-0.02 to -0.08mm	-0.005 to -0.025in	-0.001 to -0.003in

WIDTH OF BEARING SPLIT - W

ØD ₁ / ØD ₁	W	ØD ₁ / ØD ₁	W
Up to 50	3.00 - 1.50	Up to 2"	0.12 - 0.60
Up to 120	5.00 - 3.50	Up to 5"	0.19 - 0.14
Up to 250	9.00 - 7.25	Up to 10"	0.35 - 0.29
Up to 550	17.00 - 15.00	Up to 22"	0.67 - 0.59



533



T Bearing



T Bearing



Groove



Standard

TECHNICAL DETAILS

The Hallite 533 glass-filled polyamide wear rings are designed for reciprocating piston and rod bearing applications. The material is heat-stabilized 33% glass reinforced polyamide 6/6, which offers excellent bearing properties. The material is compatible with hydraulic and lubricating oils. The material is not recommended for use in water-based fluids (HFA) or where significant water is present, due to the swell of the polyamide. For these applications the use of Hallite 506 or Hallite 63 bearings are recommended.

Note: Metric sizes are also available upon request. For further information about these and any other sizes that you are looking for, please contact your local Hallite sales office.

FEATURES

- Molded to size
- Easy Installation
- Robust
- Long life
- Economical

OPERATING CONDITIONS

	METRIC	INCH
Maximum Speed	5.0m/sec	16.4ft/sec
Temperature Range	-40 to 120°C	-40 to 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 FINISH RECOMMENDATIONS

	μmRa	μmRt	μinRa	μinRt
Dynamic Sealing Face – Rod $\text{\O}d$	0.4	4 max	16	158
Static Sealing Face – Rod $\text{\O}D_2 L_1$	3.2 max	16 max	125 max	630 max
Dynamic Sealing Face – Piston $\text{\O}d_1 L_1$	0.4	4 max	16	158
Static Sealing Face – Piston $\text{\O}d_2 L_1$	3.2 max	16 max	125 max	630 max

TYPICAL PHYSICAL PROPERTIES

PROPERTY	TEST METHOD	UNITS	VALUE
Tensile Strength at Yield	ASTM D638	psi (Mpa)	27,000 (186)
Elongation at Break	ASTM D638	%	3
Flexural Strength at Yield	ASTM D790	psi (Mpa)	38,000 (262)
Flexural Modulus	ASTM D790	psi (Mpa)	1,300,000 (8,965)
Izod Impact	ASTM D256	ft-lb/in (J/m)	2.1 (112)
Specific Gravity	ASTM D792		1.41
Compressive Strength	ASTM D695	psi (Mpa)	25,500 (176)
Water Absorption	ASTM D570	%	0.7
Hardness - Rockwell	ASTM D785	R	120
Deformation Under Load at 4,000 psi	ASTM D621	%	0.8
Shear Strength	ASTM D732	psi (Mpa)	12,500 (86)
Shrinkage Flow Direction	ASTM D955	in/in	0.003

HOUSING DETAILS & TOLERANCES

L_1 in	0.015 +0.010	-	-
r_1 in	0.016 max	-	-
Rod $\text{\O}d_1$ in	f9	-	-
$\text{\O}D_2$ in	$\text{\O}d_1+2S$	+0.004 -0.000	-
$\text{\O}D_3$ in	$\text{\O}d_1+2G$	-	-
Piston $\text{\O}D_1$ in	H11	-	-
$\text{\O}d_2$ in	$\text{\O}D_1-2S$	+0.000 -0.0004	-
$\text{\O}d_3$ in	$\text{\O}D_1-2G$	-	-
1/8 Nominal Cross Sections - in	$S = 0.126$	G max 0.080	G min 0.031
3/32 Nominal Cross Sections - in	$S = 0.093$	G max 0.060	G min 0.031

RADIAL CLEARANCE RECOMMENDATIONS

	INCH	
	G MIN (MINIMUM GAP)	G MAX (MAXIMUM GAP)
1/8 inch (0.125 inch) nominal cross section	0.031	0.080
3/32 inch (0.093 inch) nominal cross section	0.031	0.060
1/16 inch (0.062 inch) nominal cross section	0.031	0.040

G-SERIES

TECHNICAL DETAILS

Hallite G-Series guide elements are commonly constructed from high-performance composite materials and produced in several different high-performance bearing material families including: POM, PA, Armorlene® PTFE, UHMWPE, PEEK, and PPS. The Hallite G-Series is machined to precise tolerances, assuring no metal-to-metal contact of components, even in heavy load-bearing applications.

Popular for a myriad of applications, Hallite's composite materials consist of synthetic fibers, modern resins, and internal lubricating additives. The results are bearings, bushings, and other wear products that support a diverse range of applications including hydraulic cylinders, guides, valves, and pumps.

Hallite's R1 composite material has excellent compressive strength and wear characteristics and can operate in either lubricated or dry run situations. Hallite G-Series composite bearings have limited stick-slip and frictional drag, as compared to typical hard plastic bearings, and are ideal for use in high loading applications where smooth operation is a must. Additionally, the R1 material is compatible with water, is capable of running immersed, and — since it does not absorb moisture — is a very dimensionally stable material. The R1 material is internally lubricated with PTFE, supporting lower friction, higher speeds, and longevity in applications where lubrication is limited. Being virtually inert, reactions with food and cleaning substances almost never occur.



FEATURES

- High allowable loads
- Low friction value
- Excellent wear resistance
- Water inert – Does not swell
- Available up to 1270mm (50 inches) diameter
- Available in a variety of widths
- Precision machined to suit application
- Offered in wide range of profiles
- High degree of customizability to suit
- Proven performance replacement for bronze

OPERATING CONDITIONS

	METRIC	INCH
Maximum Speed	5.0m/sec	16.4ft/sec
Temperature Range	-200 to 130°C	-328 to 266°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.

R1 POLYESTER RESIN MATERIAL

R1 is a high load composite bearing material made from impregnating synthetic fabric into a thermosetting resin system. PTFE is added to reduce friction.

PROPERTY	UNIT	VALUE
Hardness	Rockwell M	107
Compressive Strength (Flatwise)	N/mm ² (Psi)	338 (49,033)
Compressive Strength (Edgewise)	N/mm ² (Psi)	95 (13,756)
Density	g/cc	1.27
Tensile Strength	N/mm ² (Psi)	64 (9,250)
Coefficient Of Thermal Expansion	10 ⁻⁵ /°F	6
Operating Temperatures	C	-200° to 130°

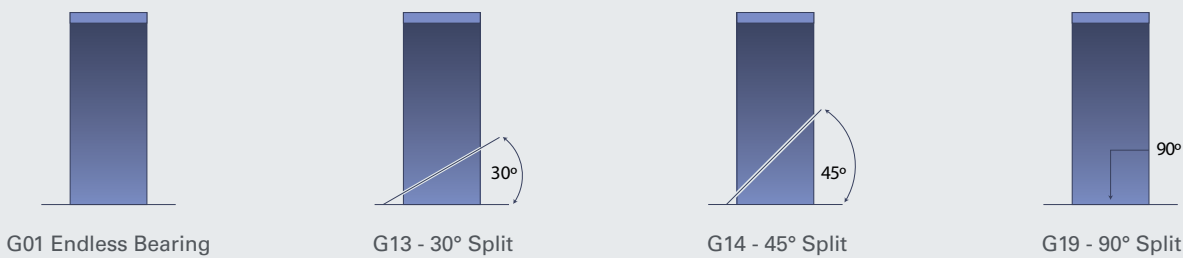
The above values are typical.

HALLITE G-SERIES BEARINGS

RECTANGULAR BACK UP RINGS - SQUARE CUT

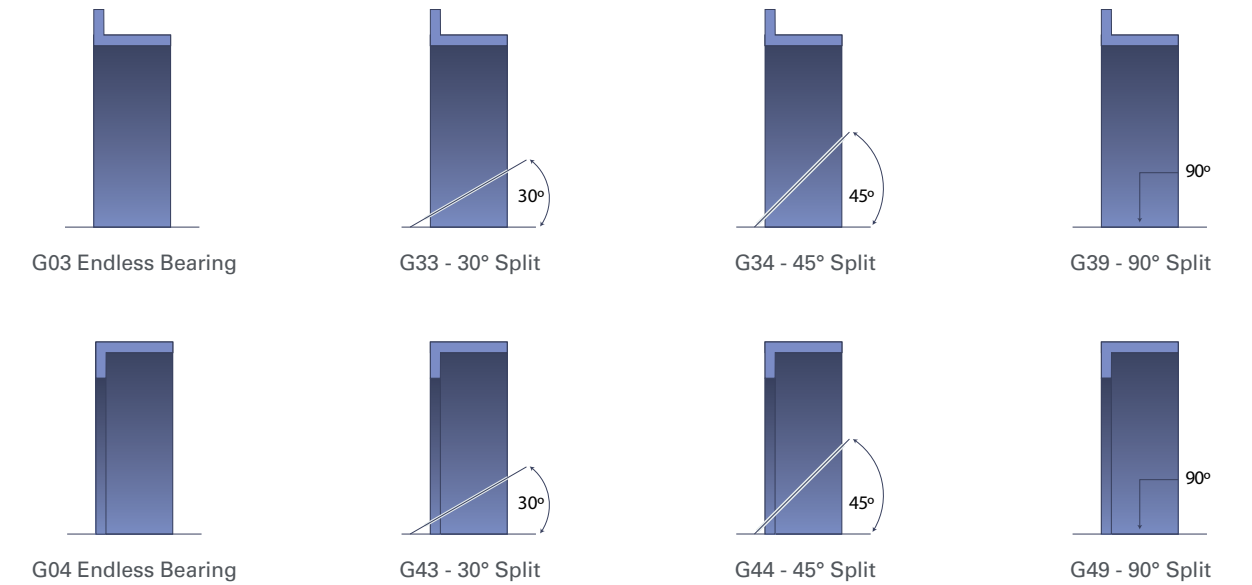


RECTANGULAR BEARINGS - CHAMFERED EDGES

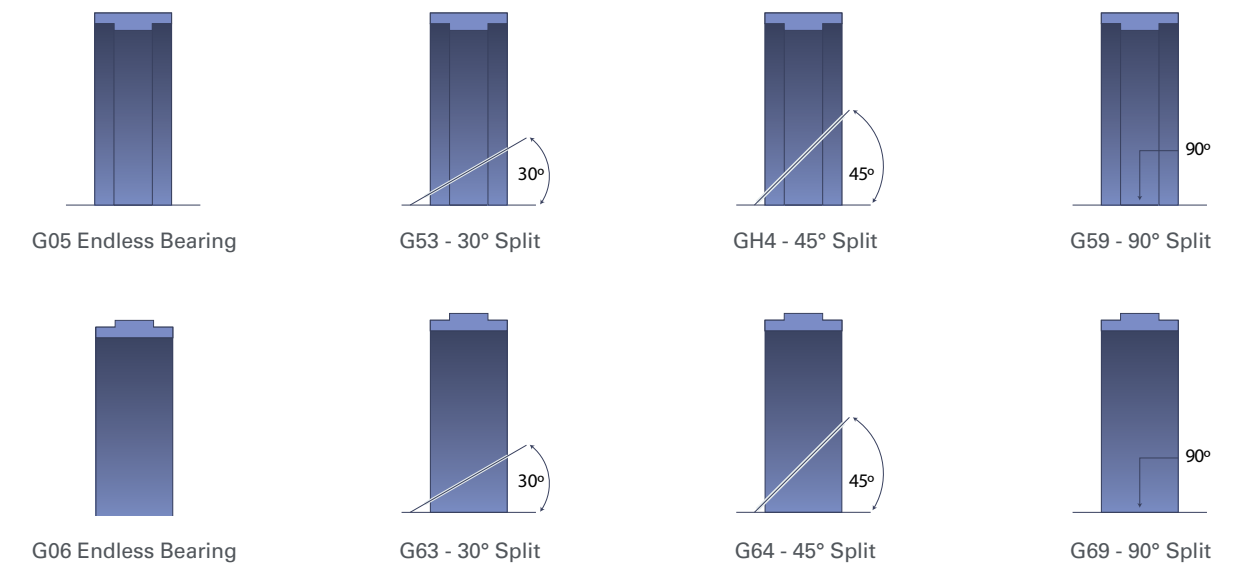


HALLITE G-SERIES BEARINGS

L BEARINGS - LEFT AND RIGHT FACING

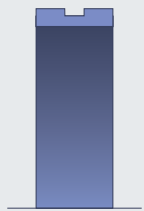


T BEARINGS - ID AND OD

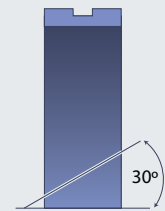


HALLITE G-SERIES BEARINGS

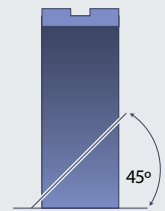
U BEARINGS - ID AND OD



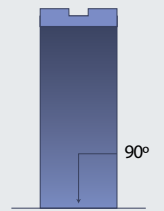
G07 Endless Bearing



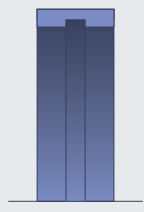
G73 - 30° Split



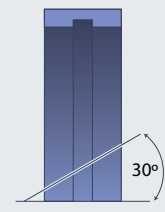
G74 - 45° Split



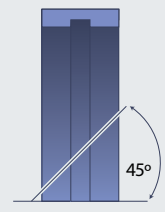
G79 - 90° Split



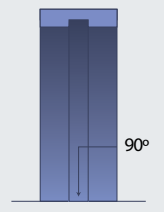
G08 Endless Bearing



G83 - 30° Split



G84 - 45° Split



G89 - 90° Split

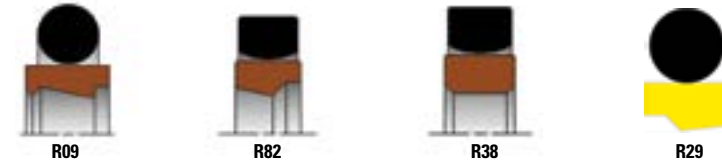


RELATED PRODUCTS

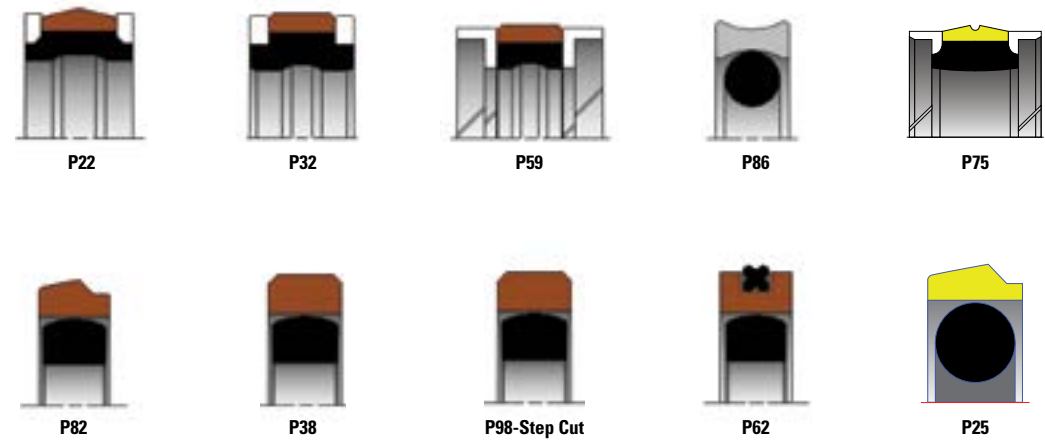


OTHER RELATED HALLITE PRODUCTS AVAILABLE

ROD SEALS



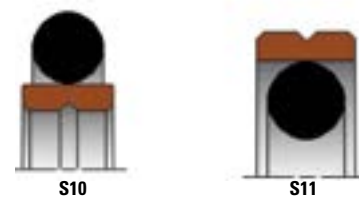
PISTON SEALS



WIPERS



SWIVEL SEALS



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 cataloged and customized 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 utilized in the most demanding applications.

To meet growing worldwide demand, Hallite combines carefully chosen and managed inventory in local markets,

supported by fast-track molding and machining capabilities to provide high service levels. Hallite offers a broad range of catalog products, OEM custom molded 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

AUSTRALIA

Hallite Seals Australia Pty. Ltd.

Unit 2, 1A Bessemer Street
Blacktown
NSW 2148
T: +61 (0) 2 9620 7300
F: +61 (0) 2 9620 7400
seals@hallite.com.au

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

CHINA

Hallite Shanghai Co. Ltd.

785 Xing Rong Road
Jiading Industrial Park
Jiading District
Shanghai 201807
T: +86 (0)21 3351 7272
F: +86 (0)21 3351 7085
hallite.shanghai@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

INDIA

Hallite Seals India Pvt. Ltd.

Special Plot #10, 3rd Main
1st Stage, Peenya Industrial
Estate
Bangalore 560 058
T: +91 (0)80 2372 6000
F: +91 (0)80 2372 6002
seals@hallite.in

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

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

UNITED STATES

Hallite Seals Americas

50777 Varsity Court
Wixom
Michigan 48393
T: +1 (248) 668 5200
F: +1 (248) 668 5210
seals@hallite.us

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