

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 ØD₁	0.05 - 0.2	1.3 max	2 max	2 - 8	52 max	78 max	60% - 90%
Static Sealing Face Ød₁	1.6 max	7 max	10 max	63 max	276 max	394 max	
Static Housing Faces L₁	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	-	-

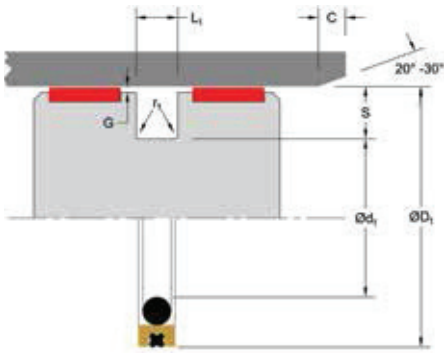
*Seal ratings are based upon capabilities of its matched material components. Hallite cannot rate seal performance when the seal is mixed with other manufacturers' energizers/components.

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

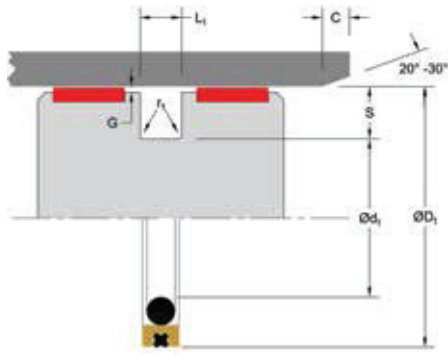
BORE DIAMETER ØD ₁ H9		GROOVE DIAMETER	GROOVE WIDTH	RADIUS	CHAMFER	GROOVE SECTION	RADIAL CLEARANCE G max*			O-RING CROSS SECTION	X-RING CROSS SECTION
DIAMETER RANGE		Ød ₁ h9	L ₁ + 0.2	r ₁	C	S	Up to 100 bar	Up to 200 bar	Up to 400 bar	O-Ring	X-Ring
Standard Duty Application - R	Light Duty Application - L										
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	C	S	Up to 1500 psi	Up to 2900 psi	Up to 5800 psi	O-Ring	X-Ring
Standard Duty Application - R	Light Duty Application - L										
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	0.139

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.



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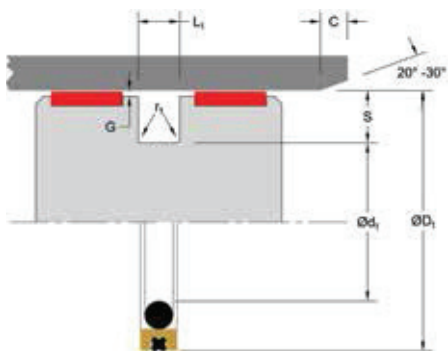
Double-Acting

PART NUMBER RANGE (METRIC)*

metric			PART NUMBER
$\varnothing D_1$	$\varnothing d_1$	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
$\varnothing D_1$	$\varnothing d_1$	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****





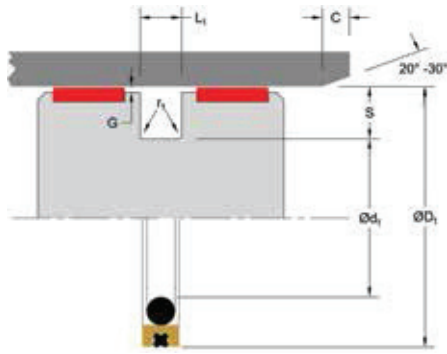
PART NUMBER RANGE (METRIC)*

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	GPSEL01625****
1.687	1.254	0.165	GPSEL01687****
1.750	1.317	0.165	GPSEL01750****
1.812	1.379	0.165	GPSEL01812****
1.875	1.442	0.165	GPSEL01875****
1.937	1.504	0.165	GPSEL01937****
2.000	1.567	0.165	GPSEL02000****
2.125	1.692	0.165	GPSEL02125****
2.250	1.817	0.165	GPSEL02250****
2.375	1.942	0.165	GPSEL02375****
2.500	2.067	0.165	GPSEL02500****
2.625	2.192	0.165	GPSEL02625****
2.750	2.317	0.165	GPSEL02750****
2.875	2.442	0.165	GPSEL02875****
3.000	2.567	0.165	GPSEL03000****
3.125	2.692	0.165	GPSEL03125****
3.250	2.640	0.248	GPSEL03250****
3.375	2.765	0.248	GPSEL03375****
3.500	2.890	0.248	GPSEL03500****
3.625	3.015	0.248	GPSEL03625****
3.750	3.140	0.248	GPSEL03750****
3.875	3.265	0.248	GPSEL03875****
4.000	3.390	0.248	GPSEL04000****
4.125	3.515	0.248	GPSEL04125****
4.250	3.640	0.248	GPSEL04250****
4.375	3.765	0.248	GPSEL04375****



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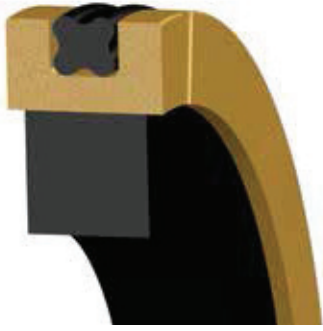
PART NUMBER RANGE (INCH)*

inch			PART NUMBER
ØD ₁	Ød ₁	L ₁	
Tol. H9	Tol. H9	Tol. +0.008	
4.500	3.890	0.248	GPSEL04500****
4.625	4.015	0.248	GPSEL04625****
4.750	4.140	0.248	GPSEL04750****
4.875	4.265	0.248	GPSEL04875****
5.000	4.390	0.248	GPSEL05000****
5.125	4.515	0.248	GPSEL05125****
5.250	4.423	0.319	GPSE05250****
5.375	4.548	0.319	GPSEL05375****
5.500	4.673	0.319	GPSEL05500****
5.625	4.798	0.319	GPSEL05625****
5.750	4.923	0.319	GPSEL05750****
6.000	5.173	0.319	GPSEL06000****
6.250	5.423	0.319	GPSEL06250****
6.500	5.673	0.319	GPSEL06500****
6.750	5.923	0.319	GPSEL06750****
7.000	6.173	0.319	GPSEL07000****
7.250	6.423	0.319	GPSEL07250****
7.500	6.673	0.319	GPSEL07500****
7.750	6.923	0.319	GPSEL07750****
8.000	7.173	0.319	GPSEL08000****
8.250	7.423	0.319	GPSEL08250****
8.500	7.673	0.319	GPSEL08500****
8.750	7.923	0.319	GPSEL08750****
9.000	8.173	0.319	GPSEL09000****
9.250	8.423	0.319	GPSEL09250****
9.500	8.673	0.319	GPSEL09500****
9.750	8.923	0.319	GPSEL09750****
10.000	8.898	0.374	GPSE01000****

inch			PART NUMBER
ØD ₁	Ød ₁	L ₁	
Tol. H9	Tol. H9	Tol. +0.008	
10.500	9.398	0.374	GPSE010500****
11.000	9.898	0.374	GPSE011000****
11.500	10.398	0.374	GPSE011500****
12.000	10.898	0.374	GPSE012000****
12.500	11.398	0.374	GPSE012500****
13.000	11.898	0.374	GPSE013000****
13.500	12.398	0.374	GPSE013500****
14.000	12.898	0.374	GPSE014000****
14.500	13.398	0.374	GPSE014500****
15.000	13.898	0.374	GPSE015000****
15.500	14.398	0.374	GPSE015500****
16.000	14.898	0.374	GPSE016000****
16.500	15.398	0.374	GPSE016500****
17.000	15.898	0.374	GPSE017000****
17.500	16.398	0.374	GPSE017500****
18.000	16.898	0.374	GPSE018000****
18.500	17.122	0.453	GPSE018500****
19.000	17.622	0.453	GPSE019000****
19.500	18.122	0.453	GPSE019500****
20.000	18.622	0.453	GPSE020000****

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





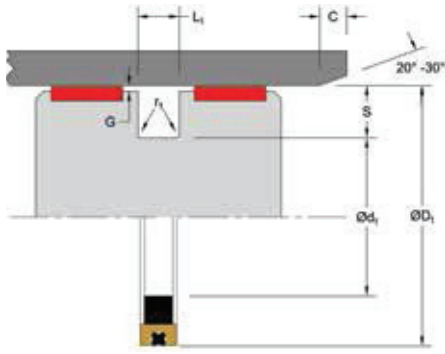
SQUARE ENERGIZER

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

SQUARE ENERGIZER PART NUMBER RANGE (INCH)*

inch			PART NUMBER
$\varnothing D_1$	$\varnothing d_1$	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
$\varnothing D_1$	$\varnothing d_1$	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****



GPS

PISTON SEAL

Double-Acting

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.