

**James Walker®**

# Hydraulic Packings & Sealing Products

Issue 11



High Performance Sealing Technology



# Hydraulic Packings & Sealing Products

## Introduction

James Walker's highly-proven ranges of fluid sealing products and services are widely used in hydraulic applications around the world — from the heaviest forging and extrusion presses to the smallest actuators.

We back these products with top level technical expertise from dedicated industry specialists and highly efficient customer support operations.

The quality and longevity of our products are well appreciated by original equipment manufacturers and hydraulic plant operators, who rely on their efficiency to improve cost effectiveness and operational performance by helping to reduce plant downtime.

## Your partner in sealing success

James Walker is a global manufacturer and distributor that supplies standard ranges and custom-designed sealing products to virtually every industrial sector. We help to keep plant and equipment running safely, efficiently and with improved environmental performance, year-in and year-out.

We have a worldwide family of companies with over 50 production, engineering, distribution and customer support sites spread across the Americas, Europe, Australasia, Asia Pacific and Africa.

At a local level, a close-knit network of James Walker companies and official distributors supplies our products and services to well over 100 countries. Our worldwide IT systems and logistics operations give customers the surety of supply they need.



## James Walker Mfg. Co.

Our Glenwood, Illinois, manufacturing plant is a self contained unit that manufactures a full range of molded seals in NBR, HNBR and fluoroelastomers — both homogenous and textile reinforced — as well as other materials as required.

With some innovative molding techniques we have been able to manufacture endless fully molded rings up to 14ft diameter.

The plant focuses on the production of standard and custom designs for high pressures, large diameters, inch and metric sizes, exotic fluids, and other specialized applications.

Our unique prototype mold facility gives one-off and short-run molding capabilities without the high capital cost associated with conventional tools. These short-run mold tools are AutoCAD® designed and produced in-house.

## Quality systems

At James Walker Mfg Co, our quality systems are third party registered to ISO 9001, the international standard that covers design, manufacture and supply.

For manufacturing, we source the best raw materials and use advanced processes with strict quality control and traceability at every stage. This culminates in an exacting inspection procedure for the finished product. Our stockholding and distribution also meet exacting standards.

## Trademark acknowledgements

James Walker acknowledges the following trademarks as mentioned in this document. All other names bearing the ® symbol are registered trademarks of James Walker.

AutoCAD® Autodesk, Inc  
Viton® DuPont Performance Elastomers

## General information

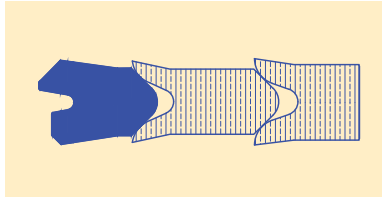
**Health warning:** If PTFE or fluoroelastomer (eg, FKM, FFKM, FEPM) products are heated to elevated temperatures, fumes will be produced which may give unpleasant effects, if inhaled. Whilst some fumes are emitted below 480°F (250°C) from fluoroelastomers or below 570°F (300°C) from PTFE, the effect at these temperatures is negligible. Care should be taken to avoid contaminating tobacco with particles of PTFE or fluoroelastomer, or with PTFE dispersion, which may remain on hands or clothing. Material Safety Data Sheets (MSDS) are available on request.

Information in this publication and otherwise supplied to users is based on our general experience and is given in good faith, but because of factors which are outside our knowledge and control and affect the use of products, no warranty is given or is to be implied with respect to such information. Unless governed by type approval or contract, specifications are subject to change without notice. Statements of operating limits quoted in this publication are not an indication that these values can be applied simultaneously.

To ensure you are working with the very latest product specifications, please consult the relevant section in the James Walker website: [www.jameswalker.com](http://www.jameswalker.com).

# Quick reference guide

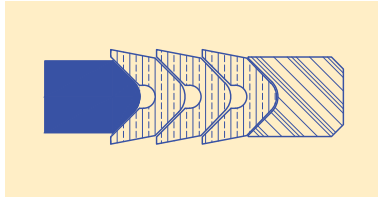
**Lofilm® HD Packing**  
For rods/rams



**For heavy forging & extrusion presses**  
Max working pressure: 9000psi (standard)  
Maximum stroke speed: 100fpm  
Temperature range: -4°F to +250°F  
Supplied: Split or Endless

[More details: pages 4 - 5](#)

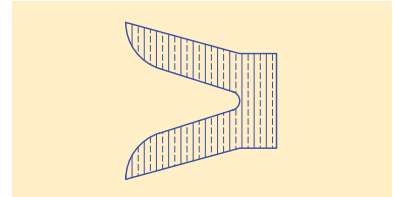
**Shallex® Packing**  
For rods/rams



**Universally proven multi-lip packing**  
Maximum working pressure: 6100psi  
Maximum stroke speed: 100fpm  
Temperature range: -4°F to +250°F  
Supplied: Split or Endless

[More details: pages 12 - 18](#)

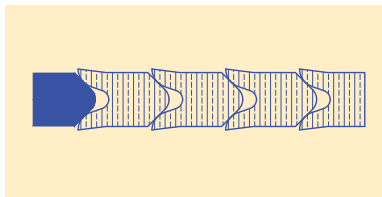
**Lion® D/C Ring**  
For rods & pistons



**U-seal for pneumatics & hydraulics**  
Maximum working pressure: 3000psi  
Maximum stroke speed: 100fpm  
Temp range: -4°F to +250°F (standard)  
Supplied: Endless

[More details: pages 23 - 24](#)

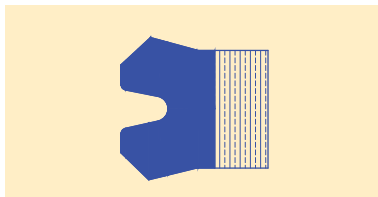
**Lion® Expanding Packing**  
For rods/rams



**Traditional heavy-duty multi-lip packing**  
Max working pressure: 9000psi (standard)  
Maximum stroke speed: 100fpm  
Temperature range: -4°F to +212°F  
Supplied: Split or Endless

[More details: pages 6 - 7](#)

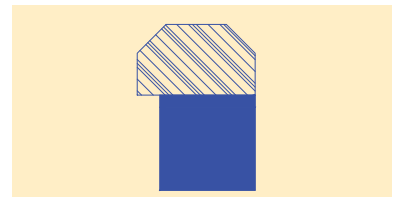
**Solosele® G**  
For rods/rams & pistons



**Robust single element seal**  
Maximum working pressure: 6100psi  
Maximum stroke speed: 100fpm  
Temp range: -4°F to +250°F (standard)  
Supplied: Endless (Split can be supplied)

[More details: pages 19 - 20](#)

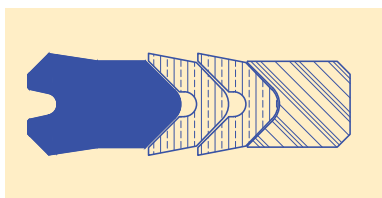
**Lion® Composite Seals**  
For pistons & rods



**Low friction with high performance**  
Maximum working pressure: 5800psi  
Maximum stroke speed: 1000fpm  
Temperature range: -13°F to +200°F  
Supplied: Endless

[More details: pages 25 - 26](#)

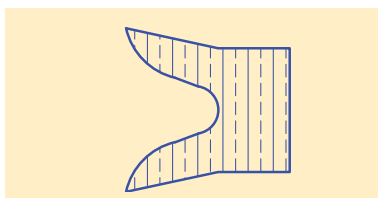
**Lofilm Shallex® Packing**  
For rods/rams



**Highly versatile multi-lip packing**  
Maximum working pressure: 6100psi  
Maximum stroke speed: 100fpm  
Temperature range: -4°F to +250°F  
Supplied: Split or Endless

[More details: pages 8 - 11](#)

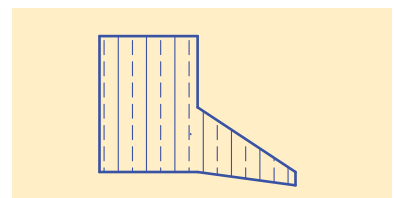
**Lion® Glandseal**  
For rods/rams & pistons



**U-packing for medium & heavy duty**  
Maximum working pressure: 5000psi  
Maximum stroke speed: 100fpm  
Temp range: -4°F to +250°C (standard)  
Supplied: Endless

[More details: pages 21 - 22](#)

**Lion® Rod Wiper Type L**  
For rod wiping



**Wiper for highly abrasive media**  
Temperature range: -4°F to +250°F  
Supplied: Split or Endless  
Robust and wear-resistant wiper of tough rubberised fabric construction.

[More details: page 27](#)

# Lofilm® HD — rod/ram packing

**For forging and extrusion presses, and other heavy-duty rod applications**

- Max pressure: 9000psi (standard)
- Temperature range: -4°F to +250°F
- Max stroke speed: 100fpm (standard)
- Supplied: Split or Endless
- Robust rubberized fabric intermediate rings and gland rings with improved side-load capability
- Pressure responsive primary sealing ring of rubber
- Improved sealing on worn shafts.

**Description**

Lofilm® HD is a pressure-responsive hydraulic packing specifically for use in arduous reciprocating gland applications, where fast pressure rises occur and side loads can be substantial.

In these heavy-duty applications, the packing is often required to support the ram as well as maintaining a high-pressure seal. Support is particularly necessary when the ram is horizontal.

For many years, this ‘bearing’ role has been a feature of our Lion® Expanding Packing (see page 6), which has deep rings of robust construction that provide radial support to a large ram. Similar rings are now incorporated in our Lofilm HD.

**Construction**

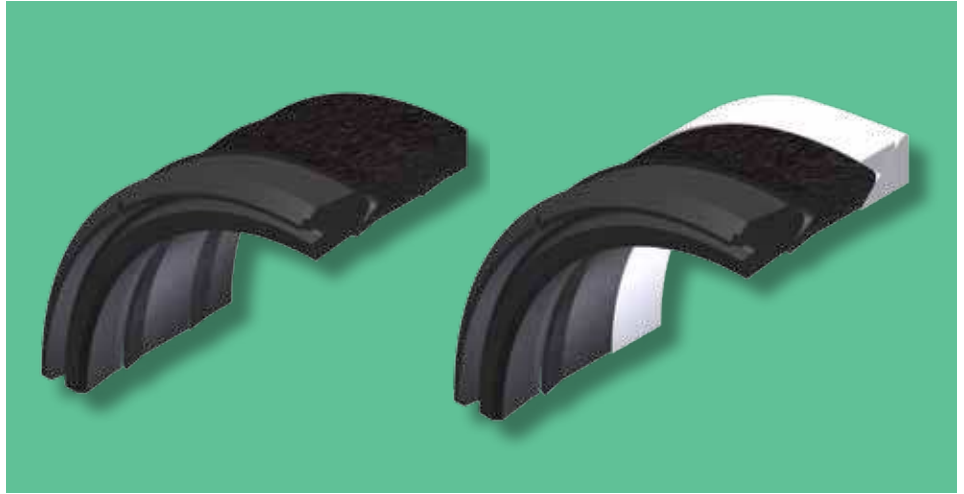
Each Lofilm HD Packing set typically comprises intermediate rings and a gland ring (female adapter) of heavy-duty rubberized fabric, and an ‘odd-leg’ header ring (see Figure 1) of molded rubber.

**Operational benefits**

The molded rubber header is the principal sealing element of the set. Its initial radial interference reduces the fluid film to a minimum, which is a particular advantage on down-stroking operations where excessive leakage can be hazardous. This is also of great importance when auxiliary cylinders provide a rapid advance.

Usually, this means that the main ram is emerging under low-pressure conditions that lead to thick film formation or heavy leakage with conventional packings.

An annular groove is incorporated in the header of Lofilm HD to increase its response to applied pressure.



Furthermore, its ported ‘odd-leg’ design allows the gland loading to be transferred through the set to retain the main bushing — which is often not fixed — while also allowing system pressure to act on the annular groove.

The rubber sealing lips also conform more readily to an uneven surface, improving sealing integrity on worn shafts.

On equipment with rapid advance mechanisms and pre-fill valves, Lofilm HD prevents air being drawn into the system. This helps avoid uncontrollable movements of the main ram and severe cavitation damage to the seal and other components.

Lofilm HD occupies less space than other heavy-duty packings, which means that longer bushes can be used to reduce side-loads and prolong seal life. If it is impractical to fit new bushings when installing Lofilm HD, we can supply metal or composite spacer rings to adjust the housing depth, as this packing set must be fitted in an adjustable housing.

**Design considerations: new projects**

The limits, fits and surface finishes stated are a general guide, when manufacturing and reconditioning equipment, to achieve good sealing performance (see Figure 2). We acknowledge that acceptable results may be obtained with values outside those stated.

**Diameters of ram to main bushing**

should be as close to nominal as possible, with clearances on bushings or piston heads giving an H9/e8 fit (ANSI B4.i.1967 RC-5).

**Control of extrusion clearances**

between the gland follower and ram is most important. The gap between the ram and inside of the gland plate must be as small as possible, but NOT smaller than guidance fit allows. Also insure a very close fit between the outside of the gland plate and housing bore.

Selection of tolerances must be influenced by any cylinder expansion at high pressure.

**Finish of sliding surfaces** with respect to the packing should be between 8µin and 16µin Ra, and the static surfaces 32µin Ra or better.

**Housing chamfers** aid assembly and prevent damage to sealing lips. The chamfer should be 20° to 30° to the ram, and the following lengths (Table 1):

Nominal radial section	inch	3/4	7/8	1	1 1/4
	mm	20	-	25	30
Minimum chamfer length	inch	3/8	3/8	3/8	1/2
	mm	10	-	10	12.5

**Table 1**

# Lofilm® HD — rod/ram packing

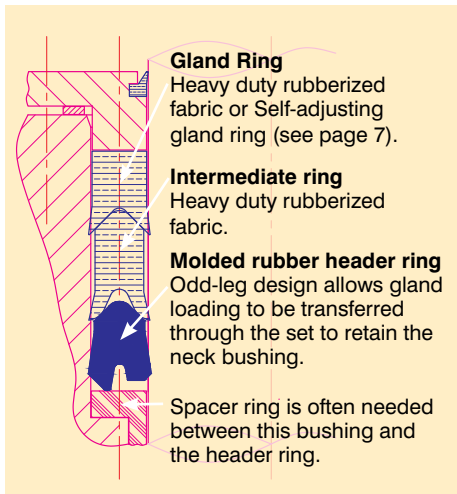


Figure 1: Arrangement

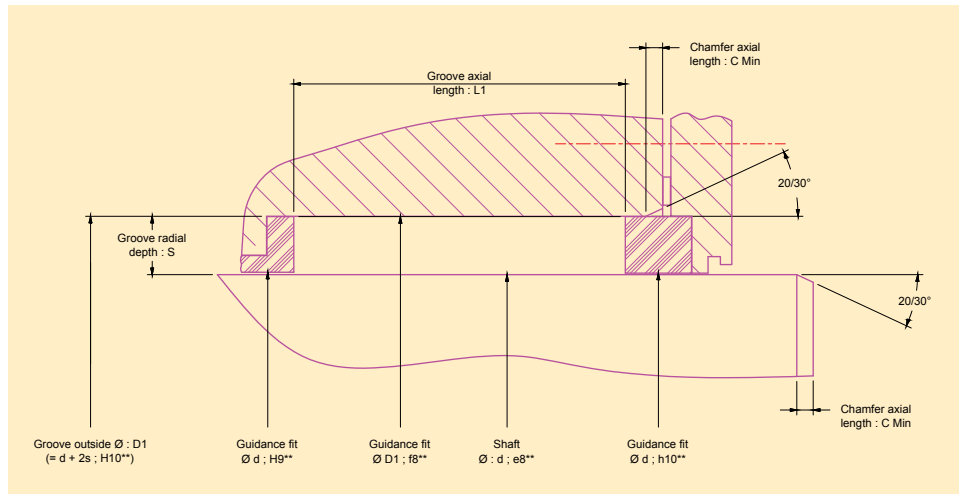


Figure 2: Housing diagram

**Sections, diameters and depths** for new designs are shown in Table 2. Special sets can be designed for existing equipment where modifications are not possible.

Ram diameter		Radial section	Housing depth
Above	Up to & incl.		
Inch			
19 5/8	48	7/8	4 1/2
48	-	1	5 1/2
mm			
500	1000	25	112.5
1000	-	30	135

Table 2

Where existing housings are deeper than those indicated in Table 2, we recommend our metal or composite spacer rings to adjust the housing to its correct depth. These are designed as a tight fit in the housing bore and have a wide clearance on the inside diameter to facilitate pressure transfer. They **MUST** be fitted on the pressure side of the packing (see Figure 1).

**Axial compression:** An important aspect of Lofilm® HD is that it must be very slightly compressed, or nipped, in the housing so that the main bushings are retained. This reduces the risk of damage to the seals by axial movement of these bushes as they follow the ram, especially on large horizontal presses.

To attain the correct compression, it may be necessary to insert shims under the gland plate. We supply shims on request.

### Ordering Lofilm® HD Packing

Please contact us and state seal size and/or housing dimensions.

Our standard materials are intended for service with hydraulic oils and water-based hydraulic fluids at pressures up to 9000psi. To ensure compatibility with the fluid used on any specific application, please advise us of the manufacturer and designation of the fluid.

Sets will normally be supplied in a split format, where the Lofilm HD header has a unique bird-lip split (see Figure 3) which insures the integrity of the seal at the cut. (Bird-lip split **MUST** be cut at our plant).

Where endless sets are required, these can be supplied with an endless header, and split or endless intermediate rings and gland ring.



Figure 3: Bird-lip split

# Lion® Expanding — rod/ram packing

## Traditional heavy multi-lip packing for large presses and reciprocating pumps

- Max pressure: 9000psi (standard)
- Temperature range: -4°F to +212°F
- Max stroke speed: 100fpm (standard)
- Supplied: Split or Endless
- Withstands heavy side loads and high pressure peaks.

### Description

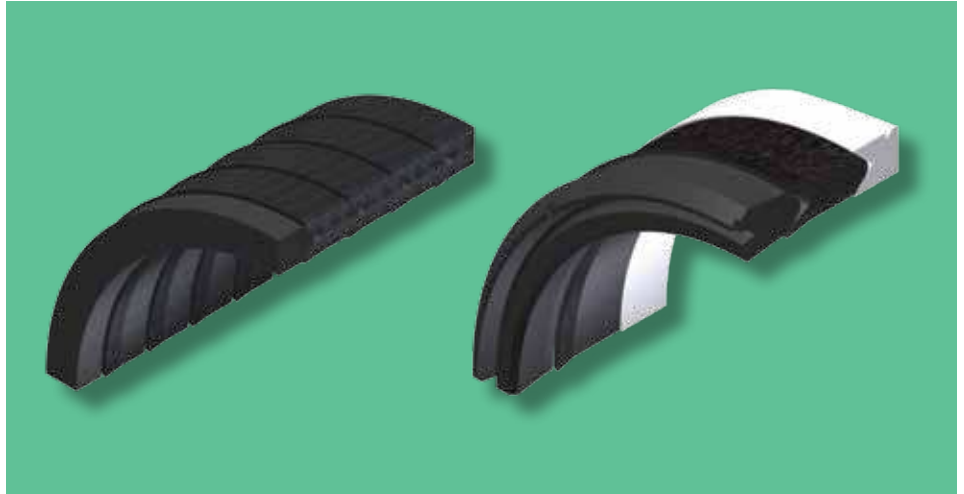
Lion® Expanding Packing is a heavy-duty design that has been in service worldwide on severe applications for many years. The profile of the sealing lips is especially suited to applications where heavy side loads and high pressure peaks are encountered on equipment such as forging presses.

### Construction

Each packing set comprises a gland ring, two or more intermediate rings, and a non-sealing header ring. The sealing rings have double lips. Figure 4 shows a typical set.

A 'V' shaped base on the header and intermediate rings insures that this robust packing responds automatically to system pressure. The base shapes also give a wedging action under gland compression that can keep equipment in service — even with worn bushes or rams.

The sealing rings are molded with an interference fit on the lips to give an effective seal at low pressure, which is augmented by the system pressure when applied. The gland ring is manufactured with a heavily reinforced base to resist extrusion.



In order to resist distortion when under heavy side loads, and to withstand high pressure peaks, the individual rings are much more robust than those in a normal 'V' packing.

### Design considerations: new assemblies

The recommended limits, fits and surface finishes are the same as for our Lofilm® HD packing (see pages 4-5).

The use of spacers or shims between the gland plate and cylinder is recommended to insure even compression of the packing, and to prevent 'hammering' of the gland plate under fluctuating pressure conditions.

Recommended sections, diameters and depths for new designs are shown below.



Figure 4: typical packing set

Ram diameter (Inch)		Section (inch)	Pressure range			
Above	Up to & including		Up to 5000psi		Above 5000psi and up to 9500psi	
			Number of intermediate rings	Set depth (inch)	Number of intermediate rings	Set depth (inch)
12	18	3/4	2	4 1/2	3	5 1/2
18	24	7/8	2	5	3	6 3/8
24	-	1	2	5 3/4	3	7 3/8
Ram diameter (mm)		Section (mm)		Set depth (mm)		Set depth (mm)
300	600	20	2	115	3	148
600	1200	25	2	145	3	183
1200	-	30	2	175	3	224

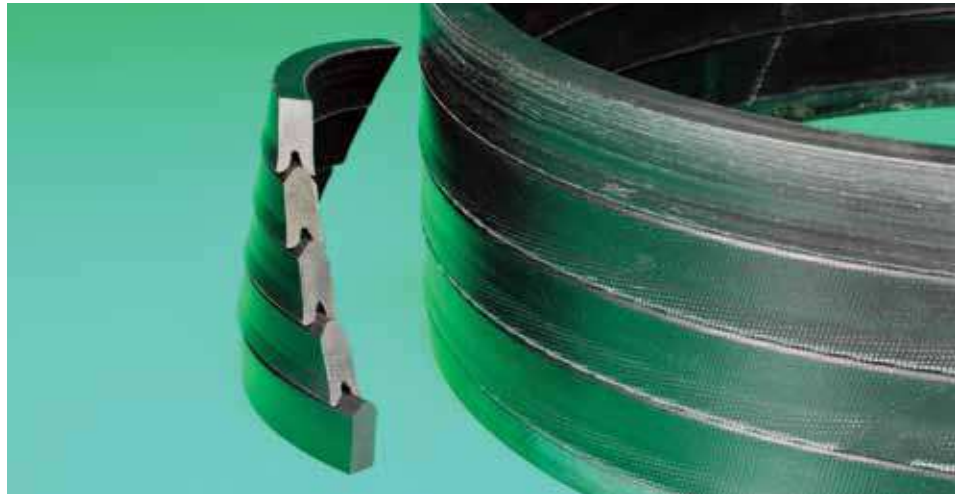
Recommended sections, diameters and depths for new designs

# Lion® Expanding — rod/ram packing

**Availability**

Split packing sets to suit the following nominal housing sections are readily available from stock without mold charges for the specified diameter ranges.

Cross section	Ram diameter	
	Above	Up to & incl
inch		
3/4	20	40
7/8	30	44
1	30	56
1 1/8	38	56
mm		
25	750	1400



*Lion® Expanding Packing*

Standard material for the gland ring and sealing rings is cotton fabric impregnated with a tough synthetic rubber.

**Ordering Lion® Expanding Packing**

Please contact us and state the type of fluid being used, the working temperature range, and the relevant ram and stuffing box dimensions.

## Self-aligning Gland Ring

**Description**

Our Self-aligning Gland Ring is designed for use with heavy-duty packings where conditions are particularly arduous.

Each set comprises two triangular section rings of wear-resistant engineering thermoplastic. Under system pressure these slide apart from each other in a controlled manner to absorb wear and off-set in the system.

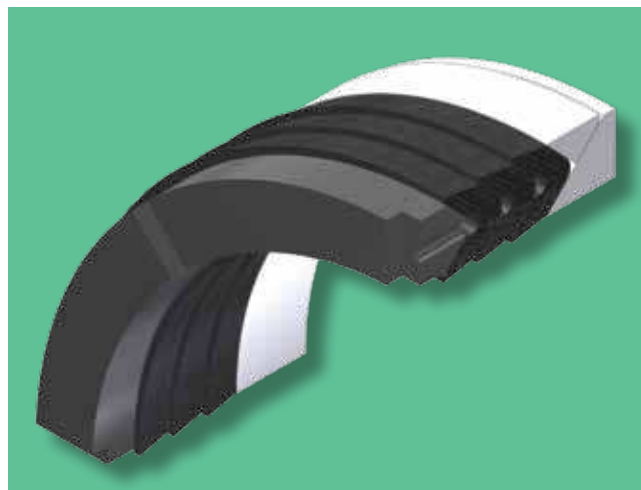
**Typical applications**

These are available as an optional extra with our following hydraulic packings:

- Lofilm® HD Packing (pages 4-5)
- Lion® Expanding Packing (pages 6-7)
- Lofilm Shallex® Packing (pages 8-11)
- Shallex® Packing (pages 12-18).

They are recommended for plants with:

- Heavily worn rams
- Large degrees of shaft off-set
- Large extrusion gaps between the gland follower and ram.



*Shallex® Packing with Self-aligning Gland Ring*



*For Pistons*



*For Shafts*

**Availability**

Each set is designed to suit an individual application. Please contact us for further information.

# Lofilm Shallex® — rod/ram packing

**Combines a traditional robust multi-lip proofed fabric seal, with the film-wiping ability of a profiled rubber header**

- Max pressure: 6100psi (standard)
- Temperature range: -4°F to +250°C.
- Max stroke speed: 100fpm (standard)  
— higher speeds possible for short periods
- Supplied: Split or Endless
- Reduces the fluid film to a minimum.
- Split design offers reduced downtime and excellent performance at high and low pressure.

## Description

As its name suggests, our Lofilm Shallex® Packing for rods and glands operates reliably for very long periods with the absolute minimum thickness of stable fluid film on the dynamic contact surfaces.

This product comprises a robust gland ring/female adapter plus one or more V-shaped intermediate rings, and a header ring that is an interference fit on the housing width.

With its 'dry' running characteristics, this high-performance packing is ideal for virtually any type of hydraulic press (main rams and drawback rams), hydraulic cylinder glands, single-acting piston heads, and hydraulic valves. It is suitable for applications with mineral-based fluids.

## Construction — standard

**Header ring:** abrasion-resistant medium nitrile (NBR) rubber.

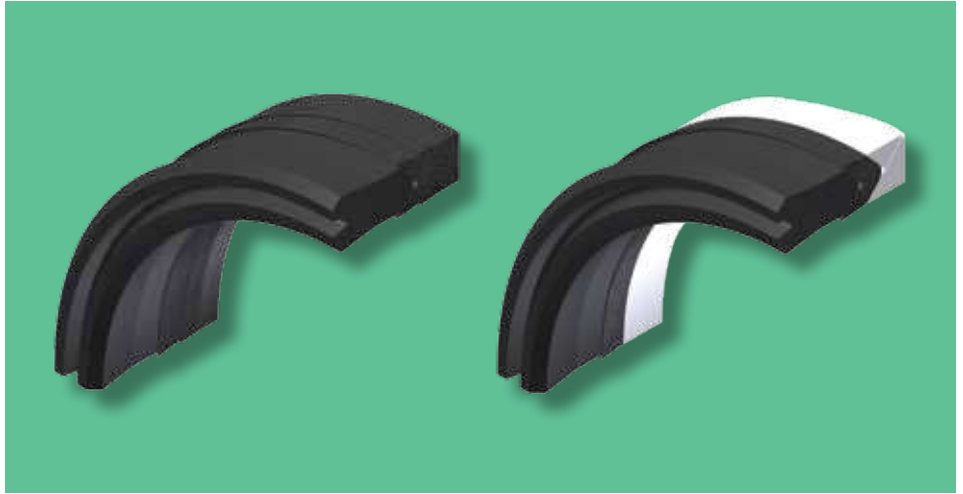
**Intermediate ring/s:** cotton fabric proofed with a blend of synthetic rubbers.

**Gland ring:** cotton fabric proofed with a blend of synthetic rubbers. Self-aligning Glands Rings are available (see page 7).

**Solid seals:** when endless seals are specified, the fabric and rubber rings are supplied solid, and any support rings contain a single split.

**Split seals:** when split seals are specified the fabric rings are scarf split, the rubber header contains a bird-lip split (see page 5) and support rings are supplied in halves.

**Non-specified:** when split/endless is not specified, the rubber header will be supplied endless, but fabric gland and intermediate rings may be split.



## Construction — non-standard

Working conditions exceeded those stated may be accommodated by material or set compensation. *Please consult our Technical Department.*

Where minimum packing friction is needed — eg, on gravity return multi-ram presses, or sensitive actuators — please consider our multi-lip Shallex® Packings or Composite Seal ranges.

## Design considerations

Our recommendations for tolerances and surface finish will support requirements for good performance. These are for guidance only, as often reasonable performance will be achieved with values outside those stated. *If in doubt, please contact our Technical Department.*

**ISO 5597/1** guidance on tolerances, extrusion gap, surface finish and lead-in chamfers, will suit most applications.

**Tolerances:** for optimum sealing, the diameters of rod/cylinder and housing, should be as close to nominal as possible. See ANSI B4.1 RC5 for typical tolerances.

**Surface finish:** surfaces with movement relative to the packing should have a finish of 8-16µin (0.2-0.4µm) Ra or CLA. On static surfaces a finish of 16-32µin (0.4-0.8µm) Ra or CLA is acceptable.

## Standard ranges

**Table 1** gives recommended housing section width and depth dimensions for inch and metric rod seal housings. The metric recommendations conform to ISO 5597/1. Maximum axial length L3 and the wider section width options are given as they are more suitable for plant with adverse mechanical conditions such as side thrust.

**Table 2** details our standard range of Lofilm Shallex® to JW Chart 75 complying with ISO 5597/1 L3 wide.





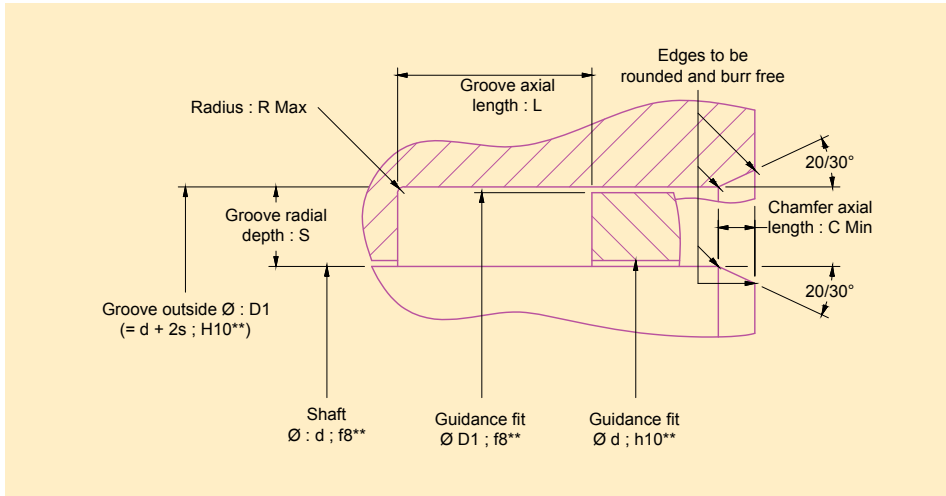
# Lofilm Shallex® — rod/ram packing

**JW Charts 830 & 831 (overleaf)**

These charts will suit customers whose plant has existing seal housings for our conventional Shallex® Packings to JW Charts 430 and 431 (see pages 15-18), but would prefer the exceptional dry-running characteristics of Lofilm Shallex®.

The sizes in Charts 830 and 831 suit all housing dimensions covered by Charts 430 and 431.

The packing sets in Charts 830 and 831 are also suitable for pressures up to 6100psi. Please consult our Technical Department if higher pressures are involved.



Housing arrangement

**Table 1**  
Design guide for Lofilm Shallex®

Rod diameter		Section width	Housing depth	C min
Above	Up to & including			
Inch sizes (in)				
-	11/16	3/16	1/2	3/32
11/16	1	1/4	3/4	1/8
1	2	5/16	1	5/8
2	3 1/2	3/8	1 1/4	3/16
3 1/2	6	1/2	1 3/4	1/4
6	16	5/8	2	5/16
16	24	3/4	2 7/8	3/8
24	36	3/4	3 1/4	3/8
36	50	1	3 3/4	3/8
Metric sizes (mm)				
-	8	4	14.5	2
8	25	5	16	2.5
25	50	7.5	25	4
50	90	10	32	5
90	150	12.5	40	6.5
150	300	15	50	7.5
300	500	20	63	10
500	900	20	73	10
900	1275	25	95	10

For RAM sizes greater than 50in (1275mm) please consult our Technical Department.

**Table 2: JW Chart 75 Lofilm Shallex®**  
To suit housings to ISO 5597 L3 wide

Rod dia	Housing dia	Housing depth	JW Part No	Order No
Metric sizes (mm)				
6	14	14.5	75-006014	LU-050060
8	16	14.5	75-008016	LU-050087
10	20	16	75-010020	LU-050109
12	22	16	75-012022	LU-050125
14	24	16	75-014024	LU-050141
16	26	16	75-016026	LU-050168
18	28	16	75-018028	LU-050184
20	30	16	75-020030	LU-050206
22	32	16	75-022032	LU-050222
25	35	16	75-025035	LU-050257
28	43	25	75-028043	LU-050281
32	47	25	75-032047	LU-05032X
36	51	25	75-036051	LU-050362
40	55	25	75-040055	LU-050400
45	60	25	75-045060	LU-050451
50	65	25	75-050065	LU-050508
56	76	32	75-056076	LU-050567
63	83	32	75-063083	LU-05063X
70	90	32	75-070090	LU-050702
80	100	32	75-080100	LU-05080X
90	110	32	75-090110	LU-050907
100	125	40	75-100125	LU-051008
110	135	40	75-110135	LU-051105
125	150	40	75-125150	LU-051253
140	165	40	75-140165	LU-051407
160	190	40	75-160190	LU-051601
180	210	40	75-180210	LU-051806
200	230	40	75-200230	LU-052004
220	250	40	75-220250	LU-052209
250	280	40	75-250280	LU-052500
280	310	40	75-280310	LU-052802
320	350	63	75-320350	LU-053205
360	400	63	75-360400	LU-053604

# Lofilm Shallex<sup>®</sup> — rod/ram packing

## JW Chart 830: inch sizes

James Walker Part No.	Re-order No.	Shaft dia (inch)	Bore dia (inch)	Section (inch)	Housing depth (inch)
830-1	LU-001019	5/16	11/16	3/16	1/2
830-2	LU-001027	3/8	3/4		
830-3	LU-001035	7/16	13/16		
830-4	LU-001043	1/2	7/8		
830-5	LU-001051	9/16	15/16		
830-6	LU-00106X	5/8	1		
830-7	LU-001078	11/16	1 1/16		
830-8	LU-001086	5/8	1 1/8	1/4	3/4
830-9	LU-001094	11/16	1 3/16		
830-10	LU-001108	3/4	1 1/4		
830-11	LU-001116	13/16	1 5/16		
830-12	LU-001124	7/8	1 3/8		
830-13	LU-001132	15/16	1 7/16		
830-14	LU-001140	1	1 1/2		
830-15	LU-001159	15/16	1 9/16	5/16	1
830-16	LU-001167	1	1 5/8		
830-17	LU-001175	1 1/16	1 11/16		
830-18	LU-001183	1 1/8	1 3/4		
830-19	LU-001191	1 3/16	1 13/16		
830-20	LU-001205	1 1/4	1 7/8		
830-21	LU-001213	1 5/16	1 15/16		
830-22	LU-001221	1 3/8	2		
830-23	LU-00123X	1 7/16	2 1/16		
830-24	LU-001248	1 1/2	2 1/8		
830-25	LU-001256	1 9/16	2 3/16		
830-26	LU-001264	1 5/8	2 1/4		
830-27	LU-001272	1 11/16	2 5/16		
830-28	LU-001280	1 3/4	2 3/8		
830-29	LU-001299	1 13/16	2 7/16		
830-30	LU-001302	1 7/8	2 1/2		
830-31	LU-001310	1 15/16	2 9/16		
830-32	LU-001329	2	2 5/8		
830-33	LU-001337	2	2 3/4	3/8	1 1/4
830-34	LU-001345	2 1/8	2 7/8		
830-35	LU-001353	2 1/4	3		
830-36	LU-001361	2 3/8	3 1/8		
830-37	LU-00137X	2 1/2	3 1/4		
830-38	LU-001388	2 5/8	3 3/8		
830-39	LU-001396	2 3/4	3 1/2		
830-40	LU-00140X	2 7/8	3 5/8		
830-41	LU-001418	3	3 3/4		
830-42	LU-001426	3 1/8	3 7/8		
830-43	LU-001434	3 1/4	4		
830-44	LU-001442	3 3/8	4 1/8		
830-45	LU-001450	3 1/2	4 1/4		
830-46	LU-001469	3 3/8	4 3/8		
830-47	LU-001477	3 1/2	4 1/2		
830-48	LU-001485	3 5/8	4 5/8		
830-49	LU-001493	3 3/4	4 3/4		
830-50	LU-001507	3 7/8	4 7/8		
830-51	LU-001515	4	5		
830-52	LU-001523	4 1/8	5 1/8		
830-53	LU-001531	4 1/4	5 1/4		
830-54	LU-00154X	4 3/8	5 3/8		
830-55	LU-001558	4 1/2	5 1/2		
830-56	LU-001566	4 5/8	5 5/8		
830-57	LU-001574	4 3/4	5 3/4		
830-58	LU-001582	4 7/8	5 7/8		
830-59	LU-001590	5	6		
830-60	LU-001604	5 1/8	6 1/8		
830-61	LU-001612	5 1/4	6 1/4		
830-62	LU-001620	5 3/8	6 3/8		
830-63	LU-001639	5 1/2	6 1/2		
830-64	LU-001647	5 5/8	6 5/8		
830-65	LU-001655	5 3/4	6 3/4		
830-66	LU-001663	5 7/8	6 7/8		
830-67	LU-001671	6	7		

James Walker Part No.	Re-order No.	Shaft dia (inch)	Bore dia (inch)	Section (inch)	Housing depth (inch)
830-68	LU-00168X	6	7 1/4		
830-69	LU-001698	6 1/4	7 1/2		
830-70	LU-001701	6 1/2	7 3/4		
830-71	LU-00171X	6 3/4	8		
830-72	LU-001728	7	8 1/4		
830-73	LU-001736	7 1/4	8 1/2		
830-74	LU-001744	7 1/2	8 3/4		
830-75	LU-001752	7 3/4	9		
830-76	LU-001760	8	9 1/4		
830-77	LU-001779	8 1/4	9 1/2		
830-78	LU-001787	8 1/2	9 3/4		
830-79	LU-001795	8 3/4	10		
830-80	LU-001809	9	10 1/4		
830-81	LU-001817	9 1/4	10 1/2		
830-82	LU-001825	9 1/2	10 3/4		
830-83	LU-001833	9 3/4	11		
830-84	LU-001841	10	11 1/4		
830-85	LU-00185X	10 1/4	11 1/2		
830-86	LU-001868	10 1/2	11 3/4		
830-87	LU-001876	10 3/4	12		
830-88	LU-001884	11	12 1/4		
830-89	LU-001892	11 1/4	12 1/2		
830-90	LU-001906	11 1/2	12 3/4		
830-91	LU-001914	11 3/4	13		
830-92	LU-001922	12	13 1/4		
830-93	LU-001930	12 1/4	13 1/2		
830-94	LU-001949	12 1/2	13 3/4		
830-95	LU-001957	12 3/4	14		
830-96	LU-001965	13	14 1/4		
830-97	LU-001973	13 1/4	14 1/2		
830-98	LU-001981	13 1/2	14 3/4		
830-99	LU-00199X	13 3/4	15		
830-100	LU-002007	14	15 1/4		
830-101	LU-002015	14 1/4	15 1/2		
830-102	LU-002023	14 1/2	15 3/4		
830-103	LU-002031	14 3/4	16		
830-104	LU-00204X	15	16 1/4		
830-105	LU-002058	15 1/4	16 1/2		
830-106	LU-002066	15 1/2	16 3/4		
830-107	LU-002074	15 3/4	17		
830-108	LU-002082	16	17 1/4		
830-109	LU-002090	16	17 1/2		
830-110	LU-002104	16 1/2	18		
830-111	LU-002112	17	18 1/2		
830-112	LU-002120	17 1/2	19		
830-113	LU-002139	18	19 1/2		
830-114	LU-002147	18 1/2	20		
830-115	LU-002155	19	20 1/2		
830-116	LU-002163	19 1/2	21		
830-117	LU-002171	20	21 1/2		

All dimensions in inches unless otherwise stated.

• Chart 830 packing sets are suitable for pressures up to 6100 psi. Where higher pressures are involved, please consult our Technical Department

# Lofilm Shallex® — rod/ram packing

## JW Chart 831: metric sizes (mm)

James Walker Part No.	Re-order No.	Shaft dia (mm)	Bore dia (mm)	Section (mm)	Housing depth (mm)	James Walker Part No.	Re-order No.	Shaft dia (mm)	Bore dia (mm)	Section (mm)	Housing depth (mm)
831-1	LU-010018	8	18	5	14.5	831-67	LU-010697	90	115	12.5	42.5
831-2	LU-010026	9	19			831-68	LU-010700	95	120		
831-3	LU-010034	10	20			831-69	LU-010719	100	125		
831-4	LU-010042	11	21			831-70	LU-010727	105	130		
831-5	LU-010050	12	22			831-71	LU-010735	110	135		
831-6	LU-010069	13	23			831-72	LU-010743	115	140		
831-7	LU-010077	14	24			831-73	LU-010751	120	145		
831-8	LU-010085	15	25			831-74	LU-01076X	125	150		
831-9	LU-010093	13	26	6.5	18.5	831-75	LU-010778	130	155		
831-10	LU-010107	14	27			831-76	LU-010786	135	160		
831-11	LU-010115	15	28			831-77	LU-010794	140	165		
831-12	LU-010123	16	29			831-78	LU-010808	145	170		
831-13	LU-010131	17	30			831-79	LU-010816	150	175		
831-14	LU-01014X	18	31			831-80	LU-010824	150	180		
831-15	LU-010158	19	32			831-81	LU-010832	155	185		
831-16	LU-010166	20	33			831-82	LU-010840	160	190		
831-17	LU-010174	21	34			831-83	LU-010859	165	195		
831-18	LU-010182	22	35			831-84	LU-010867	170	200		
831-19	LU-010190	23	36			831-85	LU-010875	175	205		
831-20	LU-010204	24	37			831-86	LU-010883	180	210		
831-21	LU-010212	25	38	831-87	LU-010891	185	215				
831-22	LU-010220	23	39	8	29	831-88	LU-010905	190	220		
831-23	LU-010239	24	40			831-89	LU-010913	195	225		
831-24	LU-010247	25	41			831-90	LU-010921	200	230		
831-25	LU-010255	26	42			831-91	LU-01093X	205	235		
831-26	LU-010263	27	43			831-92	LU-010948	210	240		
831-27	LU-010271	28	44			831-93	LU-010956	215	245		
831-28	LU-01028X	29	45			831-94	LU-010964	220	250		
831-29	LU-010298	30	46			831-95	LU-010972	225	255		
831-30	LU-010301	31	47			831-96	LU-010980	230	260		
831-31	LU-01031X	32	48			831-97	LU-010999	235	265		
831-32	LU-010328	33	49			831-98	LU-011006	240	270		
831-33	LU-010336	34	50			831-99	LU-011014	245	275		
831-34	LU-010344	35	51			831-100	LU-011022	250	280		
831-35	LU-010352	36	52			831-101	LU-011030	255	285		
831-36	LU-010360	37	53			831-102	LU-011049	260	290		
831-37	LU-010379	38	54			831-103	LU-011057	265	295		
831-38	LU-010387	39	55			831-104	LU-011065	270	300		
831-39	LU-010395	40	56			831-105	LU-011073	280	310		
831-40	LU-010409	41	57	831-106	LU-011081	290	320				
831-41	LU-010417	42	58	831-107	LU-01109X	300	330				
831-42	LU-010425	43	59	831-108	LU-011103	310	340				
831-43	LU-010433	44	60	831-109	LU-011111	320	350				
831-44	LU-010441	45	61	831-110	LU-01112X	330	360				
831-45	LU-01045X	46	62	831-111	LU-011138	340	370				
831-46	LU-010468	47	63	831-112	LU-011146	350	380				
831-47	LU-010476	48	64	831-113	LU-011154	360	390				
831-48	LU-010484	49	65	831-114	LU-011162	370	400				
831-49	LU-010492	50	66	831-115	LU-011170	380	410				
831-50	LU-010506	50	70	10	35	831-116	LU-011189	390	420		
831-51	LU-010514	52	72			831-117	LU-011197	400	430		
831-52	LU-010522	55	75			831-118	LU-011200	400	440		
831-52A	LU-010530	56	76			831-119	LU-011219	410	450		
831-53	LU-010549	57	77			831-120	LU-011227	420	460		
831-54	LU-010557	60	80			831-121	LU-011235	430	470		
831-55	LU-010565	62	82			831-122	LU-011243	440	480		
831-55A	LU-010573	63	83			831-123	LU-011251	450	490		
831-56	LU-010581	65	85			831-124	LU-01126X	460	500		
831-57	LU-01059X	67	87			831-125	LU-011278	470	510		
831-58	LU-010603	70	90			831-126	LU-011286	480	520		
831-59	LU-010611	72	92			831-127	LU-011294	490	530		
831-60	LU-01062X	75	95	831-128	LU-011308	500	540				
831-61	LU-010638	77	97								
831-62	LU-010646	80	100								
831-63	LU-010654	82	102								
831-64	LU-010662	85	105								
831-65	LU-010670	87	107								
831-66	LU-010689	90	110								

All dimensions in mm unless otherwise stated.

• Chart 831 packing sets are suitable for pressures up to 6100 psi. Where higher pressures are involved, please consult our Technical Department

# Shallex® — rod/ram & piston packing

**Universally proven multi-lip packing suitable for safety critical duties and adverse mechanical conditions**

- Max pressure: 6100psi (standard)
- Temperature range: -4°F to +250°F with rubber-proofed fabric header, or +212°F with acetal header
- Max stroke speed: 100fpm (standard) — higher speeds possible for short periods
- Supplied Split or Endless
- Excellent extrusion and wear resistance.
- For adjustable and non-adjustable housings.
- Double-acting capability with back-to-back configuration.

**Description**

Shallex® is our universal multi-lip packing that is highly regarded for its long working life and ability to operate under adverse mechanical conditions. When used in split form it can provide major downtime savings.

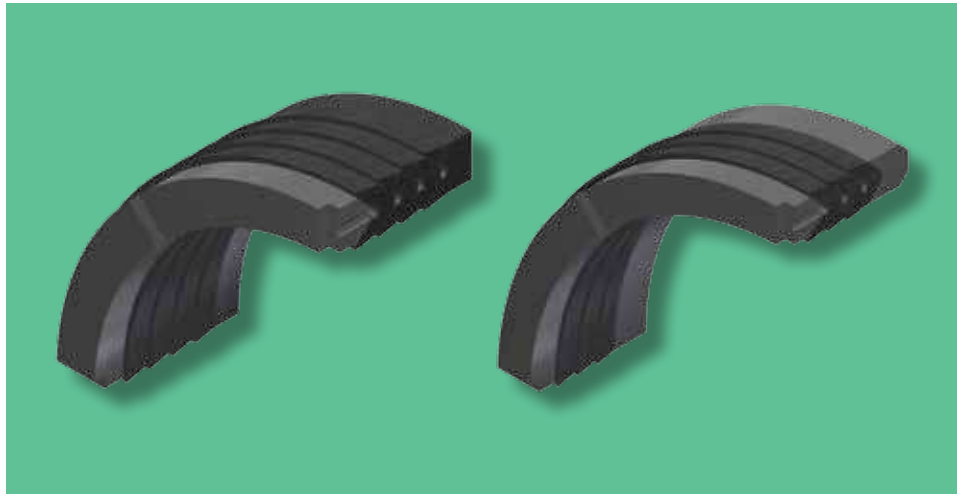
This robust packing comprises a gland ring/female adapter, header/male adapter and one or more intermediate V-shaped rings. The rings are tapered to give an interference fit when confined in the seal housing. The resulting radial force, together with the fine finish of the lips, insures a good seal at low or slack pressures. A scarf abutment is used when the packing is supplied in split form.

In standard form, Shallex Packing is suitable for most types of hydraulic press (main rams and drawback rams), hydraulic cylinder glands and piston heads; hydraulic valves; and oil pipeline expansion glands.

When manufactured in special materials, this packing can work in reciprocating steam systems, water and oil pumps, hot oil reciprocating pumps, pumps for refinery duties up to +500°F, sludge pumps and swivels.

**Construction — standard**

**Gland ring:** cotton fabric proofed with a blend of synthetic rubbers. High performance acetal copolymer (up to 9.8in OD) and UHMW polyethylene are also supplied. Self-aligning Gland Rings of wear resistant thermoplastic are available (see page 7).



**V-shape intermediate rings:** cotton fabric proofed with synthetic rubbers.

**Header:** high performance acetal copolymer (available up to 9.8in OD), or UHMW polyethylene. For large diameters, cotton fabric proofed with a blend of synthetic rubbers can be supplied.

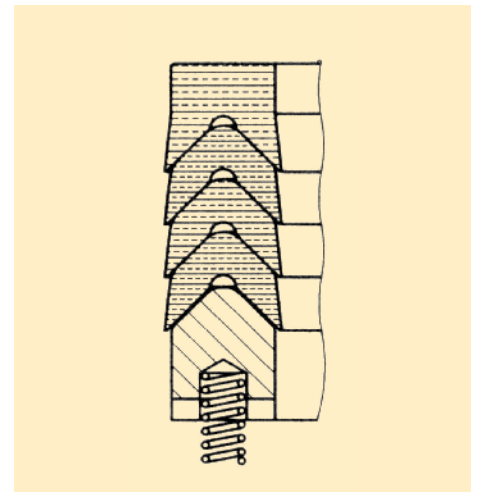
Standard materials are suitable for use with most mineral-based hydraulic fluids and lubricating oils, greases, water and air. The rubber blend we use has proved satisfactory with a number of fire-resistant fluids, including many phosphate ester and poliol ester types. *Where fire resistant fluids are used, it is essential that we be informed of type and designation.*

**Construction — non standard**

**Alternative materials** are available that extend considerably the packing's working temperature, fluid compatibility or wear resistance. These include aramid fabrics with proofing of butyl, fluorocarbon (eg, Viton®), and other elastomers. Where specified, sealing rings in homogeneous rubber or PTFE may be incorporated.

**Spring-loaded header:** this automatically compensates for wear, and supplements initial molded lip interference. It is recommended for use in fixed-depth housings when:

- The packing may be over-compressed.
- Housing is inaccessible for regular maintenance.
- Build-up to high pressure is rapid.
- Seepage occurs when a down-stroking press is non-operational — the springs provide a load to the sealing rings.



Shallex® with spring-loaded header

# Shallex<sup>®</sup> — rod/ram & piston packing

## Application considerations

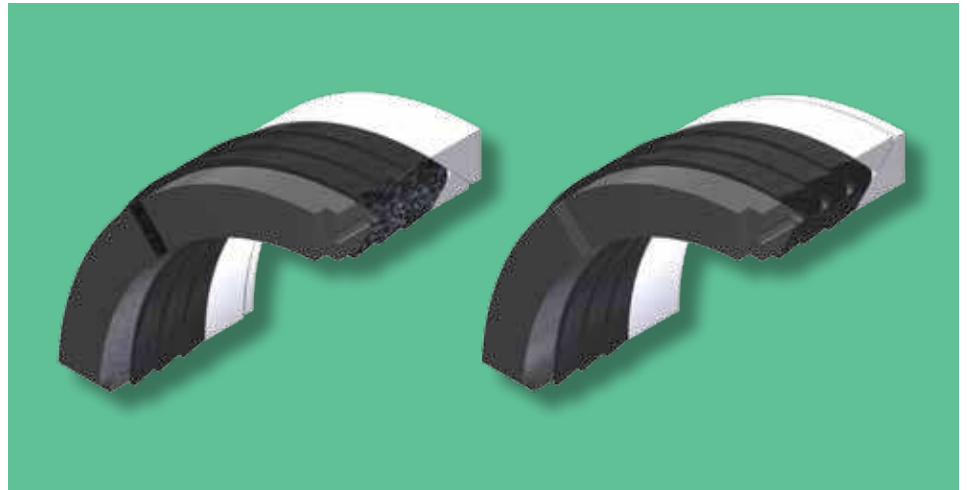
**Non-adjustable housings:** we need to be informed so that overall packing depth can be controlled and adequate compression is obtained. When ordering from our standard charts, the appropriate part number should be specified.

Non-adjustable housing depths should be equivalent to the normal set depth C (page 14) with the following limits applying:

Packing ID	Limits
<b>Inch housings (inch)</b>	
≤ 20	+0.01 / -0
> 20	+0.015 / -0
<b>Metric housings (mm)</b>	
≤ 500	+0.25 / -0
> 500	+0.40 / -0

**Piston heads:** we recommend that two Shallex<sup>®</sup> packing sets be used on double-acting pistons operating under constant pressure. These should be fitted in opposed mode, and independently housed to avoid undesirable pressure transference — see typical installation below.

Endless rings are always preferred for piston head assemblies, and this should be noted when placing inquiries or orders.



## Design considerations

This information is for guidance only, as other considerations may affect the final decision. *If in doubt, please contact our Technical Department.*

**Tolerances:** for optimum sealing, the diameters shaft/cylinder and housing should be as close to nominal as possible, and adjacent fits kept to a minimum. ISO tolerance scale H8/f8 or ANSI B4.1 RC5 are ideal for most services.

**Surface finish:** surfaces with movement relative to the packing should have a finish of 8-16 $\mu$ in (0.2-0.4 $\mu$ m) Ra or CLA. On static surfaces a finish of 16-32 $\mu$ in (0.4-0.8 $\mu$ m) Ra or CLA is acceptable.

## Assembly

Shallex Packing is entirely self-sealing and heavy gland compression is undesirable as it can reduce packing life.

Adequate chamfer should be provided at the entrance to all packing spaces to avoid lip damage on assembly.

## How supplied

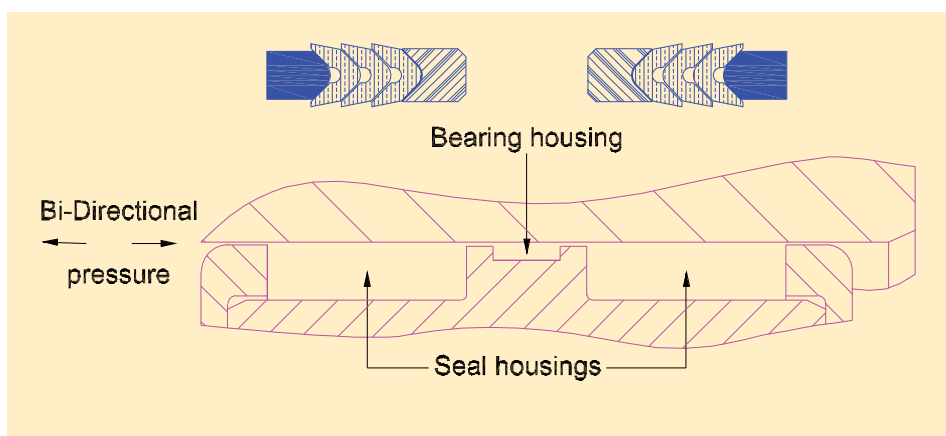
Shallex Packing sets are available in sections from 3/16in (5mm) upwards, except for spring-loaded versions where minimum section is 1/4in (6.5mm).

Split rings are supplied to any maximum diameter, and endless rings up to 88 1/2in (2250mm) OD. For non-standard sizes, sets may be supplied in split form at our discretion, unless endless packing rings are specifically requested when ordering.

See page 14 for recommended packing dimensions relating to shaft and cylinder dimensions and pressure.

## When ordering please state:

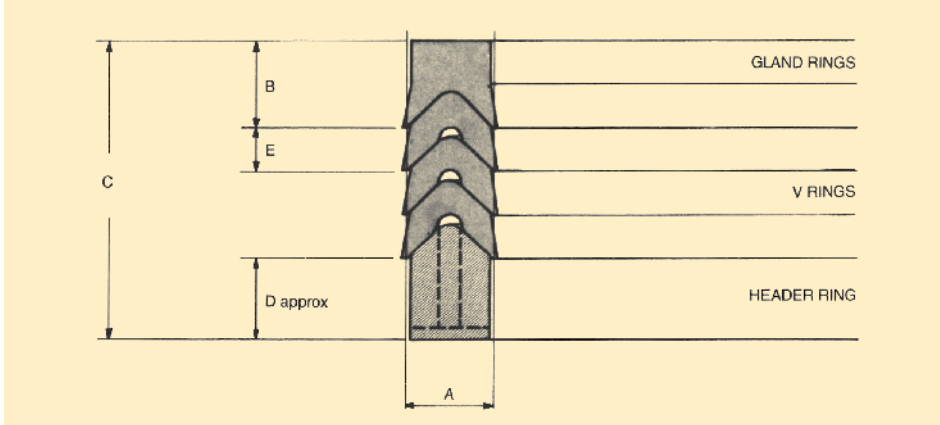
- Type of machine.
- Gland or piston head (for piston, state if cover plate is bolted or screwed)
- Exact diameters of ram and stuffing box.
- Length of gland lip.
- Adjustable or non-adjustable housing.
- Pressure medium.
- Pressure.
- Temperature.
- If application involves edible products.
- Whether ram is assisted on down-stroke, or falls by gravity.
- Whether endless or split rings required.



Shallex<sup>®</sup> double-acting piston arrangement

# Shallex<sup>®</sup> — rod/ram & piston packing

**Recommendations for section, depth & number of rings**



Shaft diameter (inch)		Cylinder diameter (inch)		Section (inch)	Gland ring depth (inch)	V-ring depth (inch)	Header ring depth (approx) (inch)	Up to & including 5000psi (34MPa)		Over 5000psi (34MPa)	
Above	Up to & including	Above	Up to & including	A	B	E	D	Total rings in set	Total depth of set C (inch)	Total rings in set	Total depth of set C (inch)
-	11/16	-	1 1/16	3/16	3/16	3/32	1/8	4	1/2	5	19/32
11/16	1	1 1/16	1 1/2	1/4	1/4	1/8	1/4	4	3/4	5	7/8
1	2	1 1/2	2 5/8	5/16	5/16	5/32	7/32	5	1	6	1 5/32
2	3 1/2	2 5/8	4 1/4	3/8	3/8	3/16	5/16	5	1 1/4	6	1 7/16
3 1/2	6	4 1/4	7	1/2	1/2	1/4	1/2	5	1 3/4	6	2
6	16	7	17 1/4	5/8	5/8	5/16	7/16	5	2	6	2 5/16
16	24	17 1/4	25 1/2	3/4	3/4	3/8	5/8	6	2 7/8	7	3 1/4
24	36	25 1/2	37 1/2	3/4	3/4	3/8	5/8	7	3 1/4	8	3 5/8
26	48	37 1/2	49 1/2	1	1	1/2	3/4	8	4 3/4	9	5 1/4

For RAM sizes greater than shown, and for metric recommendations not covered by JW Chart 431, please consult our Technical Department.

# Shallex<sup>®</sup> — rod/ram & piston packing

## JW Chart 430 — inch sizes

The JW Part Numbers specified indicate endless type packing rings. If split-type rings are required add **SPLIT** to the appropriate Part Number.

Total depth 'C' is expressed as a nominal dimension. All packings to our Standard Charts are supplied with the set depth accurately controlled so as to be equally suited to adjustable or non-adjustable housings.

All standard sizes detailed are supplied without mold charge. In addition, a wide range of molds exists for non-standard sizes.

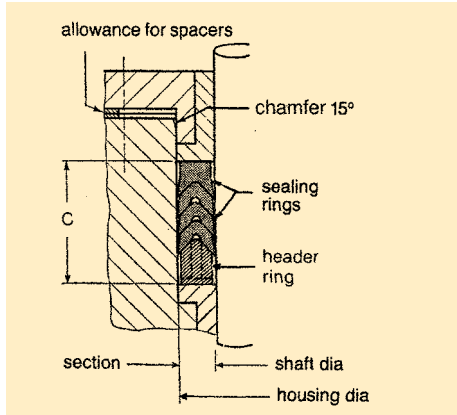
JW Chart 430			Packing details and Part Numbers							
Nominal housing dimensions			Up to 34MPa (5000 lbf/in <sup>2</sup> )				Over 34MPa (5000 lbf/in <sup>2</sup> )			
ID (inch)	OD (inch)	Sect. (inch)	No. of rings in set incl. header	Nom. depth of set C (inch)	J W Part No.		No. of rings in set incl. header	Nom. depth of set C (inch)	J W Part No.	
					Non-spring loaded	Spring loaded			Non-spring loaded	Spring loaded
5/16	11/16	3/16	4	1/2	430 LNA 1	430 LSL 1	5	19/32	430 HNA 1	430 HSL 1
3/8	3/4				430 LNA 2	430 LSL 2			430 HNA 2	430 HSL 2
7/16	13/16				430 LNA 3	430 LSL 3			430 HNA 3	430 HSL 3
1/2	7/8				430 LNA 4	430 LSL 4			430 HNA 4	430 HSL 4
9/16	15/16				430 LNA 5	430 LSL 5			430 HNA 5	430 HSL 5
5/8	1				430 LNA 6	430 LSL 6			430 HNA 6	430 HSL 6
11/16	1 1/16				430 LNA 7	430 LSL 7			430 HNA 7	430 HSL 7
5/8	1 1/8	1/4	4	3/4	430 LNA 8	430 LSL 8	5	7/8	430 HNA 8	430 HSL 8
11/16	1 3/16				430 LNA 9	430 LSL 9			430 HNA 9	430 HSL 9
3/4	1 1/4				430 LNA 10	430 LSL 10			430 HNA 10	430 HSL 10
13/16	1 5/16				430 LNA 11	430 LSL 11			430 HNA 11	430 HSL 11
7/8	1 3/8				430 LNA 12	430 LSL 12			430 HNA 12	430 HSL 12
15/16	1 7/16				430 LNA 13	430 LSL 13			430 HNA 13	430 HSL 13
1	1 1/2				430 LNA 14	430 LSL 14			430 HNA 14	430 HSL 14
15/16	1 9/16	5/16	5	1	430 LNA 15	430 LSL 15	6	1 5/32	430 HNA 15	430 HSL 15
1	1 5/8				430 LNA 16	430 LSL 16			430 HNA 16	430 HSL 16
1 1/16	1 11/16				430 LNA 17	430 LSL 17			430 HNA 17	430 HSL 17
1 1/8	1 3/4				430 LNA 18	430 LSL 18			430 HNA 18	430 HSL 18
1 3/16	1 13/16				430 LNA 19	430 LSL 19			430 HNA 19	430 HSL 19
1 1/4	1 7/8				430 LNA 20	430 LSL 20			430 HNA 20	430 HSL 20
1 5/16	1 15/16				430 LNA 21	430 LSL 21			430 HNA 21	430 HSL 21
1 3/8	2				430 LNA 22	430 LSL 22			430 HNA 22	430 HSL 22
1 7/16	2 1/16				430 LNA 23	430 LSL 23			430 HNA 23	430 HSL 23
1 1/2	2 1/8				430 LNA 24	430 LSL 24			430 HNA 24	430 HSL 24
1 9/16	2 3/16				430 LNA 25	430 LSL 25			430 HNA 25	430 HSL 25
1 5/8	2 1/4				430 LNA 26	430 LSL 26			430 HNA 26	430 HSL 26
1 11/16	2 5/16				430 LNA 27	430 LSL 27			430 HNA 27	430 HSL 27
1 3/4	2 3/8				430 LNA 28	430 LSL 28			430 HNA 28	430 HSL 28
1 13/16	2 7/16				430 LNA 29	430 LSL 29			430 HNA 29	430 HSL 29
1 7/8	2 1/2				430 LNA 30	430 LSL 30			430 HNA 30	430 HSL 30
1 15/16	2 9/16				430 LNA 31	430 LSL 31			430 HNA 31	430 HSL 31
2	2 5/8				430 LNA 32	430 LSL 32			430 HNA 32	430 HSL 32
2	2 3/4				430 LNA 33	430 LSL 33			430 HNA 33	430 HSL 33
2 1/8	2 7/8				430 LNA 34	430 LSL 34			430 HNA 34	430 HSL 34
2 1/4	3				430 LNA 35	430 LSL 35			430 HNA 35	430 HSL 35
2 3/8	3 1/8	430 LNA 36	430 LSL 36	430 HNA 36	430 HSL 36					
2 1/2	3 1/4	430 LNA 37	430 LSL 37	430 HNA 37	430 HSL 37					
2 5/8	3 3/8	430 LNA 38	430 LSL 38	430 HNA 38	430 HSL 38					
2 3/4	3 1/2	430 LNA 39	430 LSL 39	430 HNA 39	430 HSL 39					
2 7/8	3 5/8	430 LNA 40	430 LSL 40	430 HNA 40	430 HSL 40					
3	3 3/4	430 LNA 41	430 LSL 41	430 HNA 41	430 HSL 41					
3 1/8	3 7/8	430 LNA 42	430 LSL 42	430 HNA 42	430 HSL 42					
3 1/4	4	430 LNA 43	430 LSL 43	430 HNA 43	430 HSL 43					
3 3/8	4 1/8	430 LNA 44	430 LSL 44	430 HNA 44	430 HSL 44					
3 1/2	4 1/4	430 LNA 45	430 LSL 45	430 HNA 45	430 HSL 45					
3 3/8	4 3/8	430 LNA 46	430 LSL 46	430 HNA 46	430 HSL 46					
3 1/2	4 1/2	430 LNA 47	430 LSL 47	430 HNA 47	430 HSL 47					
3 5/8	4 5/8	430 LNA 48	430 LSL 48	430 HNA 48	430 HSL 48					
3 3/4	4 3/4	430 LNA 49	430 LSL 49	430 HNA 49	430 HSL 49					
3 7/8	4 7/8	430 LNA 50	430 LSL 50	430 HNA 50	430 HSL 50					
4	5	430 LNA 51	430 LSL 51	430 HNA 51	430 HSL 51					
4 1/8	5 1/8	430 LNA 52	430 LSL 52	430 HNA 52	430 HSL 52					
4 1/4	5 1/4	430 LNA 53	430 LSL 53	430 HNA 53	430 HSL 53					
4 3/8	5 3/8	430 LNA 54	430 LSL 54	430 HNA 54	430 HSL 54					
4 1/2	5 1/2	430 LNA 55	430 LSL 55	430 HNA 55	430 HSL 55					
4 5/8	5 5/8	430 LNA 56	430 LSL 56	430 HNA 56	430 HSL 56					
4 3/4	5 3/4	430 LNA 57	430 LSL 57	430 HNA 57	430 HSL 57					
4 7/8	5 7/8	430 LNA 58	430 LSL 58	430 HNA 58	430 HSL 58					

Continued ...

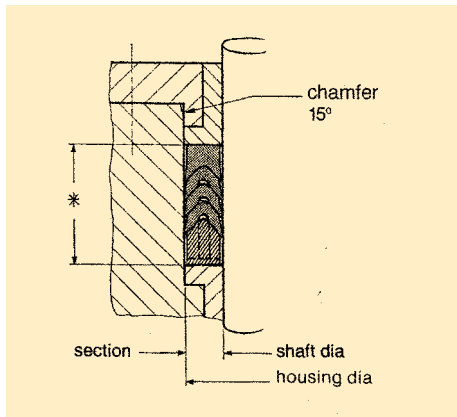
# Shallex® — rod/ram & piston packing

## JW Chart 430 — inch sizes continued

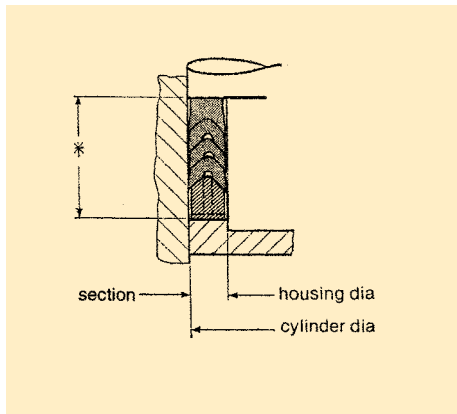
### Adjustable



### Non-adjustable — gland



### Non-adjustable — piston head



### JW Chart 430

\* Housing depth = C + 0.010in / -0

### JW Chart 431

\* Housing depth = C + 0.25mm / -0

JW Chart 430			Packing details and Part Numbers							
Nominal housing dimensions			Up to 34MPa (5000 lbf/in <sup>2</sup> )				Over 34MPa (5000 lbf/in <sup>2</sup> )			
			No. of rings in set incl. header	Nom. depth of set C (inch)	J W Part No.		No. of rings in set incl. header	Nom. depth of set C (inch)	J W Part No.	
ID (inch)	OD (inch)	Sect. (inch)			Non-spring loaded	Spring loaded			Non-spring loaded	Spring loaded
5	6				430 LNA 59	430 LSL 59			430 HNA 59	430 HSL 59
5 1/8	6 1/8				430 LNA 60	430 LSL 60			430 HNA 60	430 HSL 60
5 1/4	6 1/4				430 LNA 61	430 LSL 61			430 HNA 61	430 HSL 61
5 3/8	6 3/8				430 LNA 62	430 LSL 62			430 HNA 62	430 HSL 62
5 1/2	6 1/2	1/2	5	1 3/4	430 LNA 63	430 LSL 63	6	2	430 HNA 63	430 HSL 63
5 5/8	6 5/8				430 LNA 64	430 LSL 64			430 HNA 64	430 HSL 64
5 3/4	6 3/4				430 LNA 65	430 LSL 65			430 HNA 65	430 HSL 65
5 7/8	6 7/8				430 LNA 66	430 LSL 66			430 HNA 66	430 HSL 66
6	7				430 LNA 67	430 LSL 67			430 HNA 67	430 HSL 67
6	7 1/4				430 LNA 68	430 LSL 68			430 HNA 68	430 HSL 68
6 1/4	7 1/2				430 LNA 69	430 LSL 69			430 HNA 69	430 HSL 69
6 1/2	7 3/4				430 LNA 70	430 LSL 70			430 HNA 70	430 HSL 70
6 3/4	8				430 LNA 71	430 LSL 71			430 HNA 71	430 HSL 71
7	8 1/4				430 LNA 72	430 LSL 72			430 HNA 72	430 HSL 72
7 1/4	8 1/2				430 LNA 73	430 LSL 73			430 HNA 73	430 HSL 73
7 1/2	8 3/4				430 LNA 74	430 LSL 74			430 HNA 74	430 HSL 74
7 3/4	9				430 LNA 75	430 LSL 75			430 HNA 75	430 HSL 75
8	9 1/4				430 LNA 76	430 LSL 76			430 HNA 76	430 HSL 76
8 1/4	9 1/2				430 LNA 77	430 LSL 77			430 HNA 77	430 HSL 77
8 1/2	9 3/4				430 LNA 78	430 LSL 78			430 HNA 78	430 HSL 78
8 3/4	10				430 LNA 79	430 LSL 79			430 HNA 79	430 HSL 79
9	10 1/4				430 LNA 80	430 LSL 80			430 HNA 80	430 HSL 80
9 1/4	10 1/2				430 LNA 81	430 LSL 81			430 HNA 81	430 HSL 81
9 1/2	10 3/4				430 LNA 82	430 LSL 82			430 HNA 82	430 HSL 82
9 3/4	11				430 LNA 83	430 LSL 83			430 HNA 83	430 HSL 83
10	11 1/4				430 LNA 84	430 LSL 84			430 HNA 84	430 HSL 84
10 1/4	11 1/2				430 LNA 85	430 LSL 85			430 HNA 85	430 HSL 85
10 1/2	11 3/4				430 LNA 86	430 LSL 86			430 HNA 86	430 HSL 86
10 3/4	12				430 LNA 87	430 LSL 87			430 HNA 87	430 HSL 87
11	12 1/4	5/8	5	2	430 LNA 88	430 LSL 88	6	2 5/16	430 HNA 88	430 HSL 88
11 1/4	12 1/2				430 LNA 89	430 LSL 89			430 HNA 89	430 HSL 89
11 1/2	12 3/4				430 LNA 90	430 LSL 90			430 HNA 90	430 HSL 90
11 3/4	13				430 LNA 91	430 LSL 91			430 HNA 91	430 HSL 91
12	13 1/4				430 LNA 92	430 LSL 92			430 HNA 92	430 HSL 92
12 1/4	13 1/2				430 LNA 93	430 LSL 93			430 HNA 93	430 HSL 93
12 1/2	13 3/4				430 LNA 94	430 LSL 94			430 HNA 94	430 HSL 94
12 3/4	14				430 LNA 95	430 LSL 95			430 HNA 95	430 HSL 95
13	14 1/4				430 LNA 96	430 LSL 96			430 HNA 96	430 HSL 96
13 1/4	14 1/2				430 LNA 97	430 LSL 97			430 HNA 97	430 HSL 97
13 1/2	14 3/4				430 LNA 98	430 LSL 98			430 HNA 98	430 HSL 98
13 3/4	15				430 LNA 99	430 LSL 99			430 HNA 99	430 HSL 99
14	15 1/4				430 LNA 100	430 LSL 100			430 HNA 100	430 HSL 100
14 1/4	15 1/2				430 LNA 101	430 LSL 101			430 HNA 101	430 HSL 101
14 1/2	15 3/4				430 LNA 102	430 LSL 102			430 HNA 102	430 HSL 102
14 3/4	16				430 LNA 103	430 LSL 103			430 HNA 103	430 HSL 103
15	16 1/4				430 LNA 104	430 LSL 104			430 HNA 104	430 HSL 104
15 1/4	16 1/2				430 LNA 105	430 LSL 105			430 HNA 105	430 HSL 105
15 1/2	16 3/4				430 LNA 106	430 LSL 106			430 HNA 106	430 HSL 106
15 3/4	17				430 LNA 107	430 LSL 107			430 HNA 107	430 HSL 107
16	17 1/4				430 LNA 108	430 LSL 108			430 HNA 108	430 HSL 108
16 1/2	17 1/2				430 LNA 109	430 LSL 109			430 HNA 109	430 HSL 109
17	18 1/2				430 LNA 110	430 LSL 110			430 HNA 110	430 HSL 110
17 1/2	19				430 LNA 111	430 LSL 111			430 HNA 111	430 HSL 111
18	19 1/2	3/4	6	2 7/8	430 LNA 112	430 LSL 112	7	3 1/4	430 HNA 112	430 HSL 112
18 1/2	20				430 LNA 113	430 LSL 113			430 HNA 113	430 HSL 113
19	20 1/2				430 LNA 114	430 LSL 114			430 HNA 114	430 HSL 114
19 1/2	21				430 LNA 115	430 LSL 115			430 HNA 115	430 HSL 115
20	21 1/2				430 LNA 116	430 LSL 116			430 HNA 116	430 HSL 116
					430 LNA 117	430 LSL 117			430 HNA 117	430 HSL 117

All dimensions in inches



# Shallex<sup>®</sup> — rod/ram & piston packing

## JW Chart 431 — metric sizes (mm)

The JW Part Numbers specified indicate endless type packing. If split rings are required add **SPLIT** to the appropriate Part Number.

Total depth 'C' is expressed as a nominal dimension. All packings to our Standard Charts are supplied with the set depth accurately controlled so as to be equally suited to adjustable or non-adjustable housings.

All standard sizes detailed are supplied without mold charge. In addition, a wide range of molds exists for non-standard sizes — including our alternative metric range for JW Chart 345.

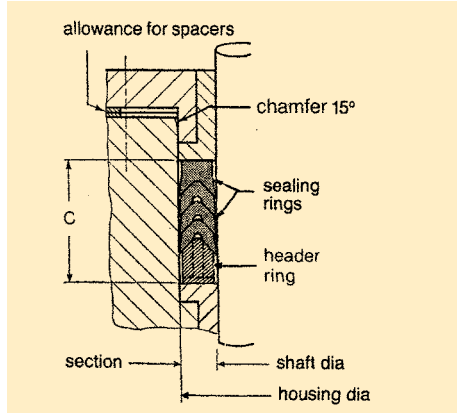
JW Chart 431			Packing details and Part Numbers							
Nominal housing dimensions			Up to 34MPa (5000 lbf/in <sup>2</sup> )				Over 34MPa (5000 lbf/in <sup>2</sup> )			
			No. of rings in set incl. header	Nom. depth of set C (mm)	J W Part No.		No. of rings in set incl. header	Nom. depth of set C (mm)	J W Part No.	
ID (mm)	OD (mm)	Sect. (mm)			Non-spring loaded	Spring loaded			Non-spring loaded	Spring loaded
8	18				431 LNA 1	431 LSL 1			431 HNA 1	431 HSL 1
9	19				431 LNA 2	431 LSL 2			431 HNA 2	431 HSL 2
10	20				431 LNA 3	431 LSL 3			431 HNA 3	431 HSL 3
11	21				431 LNA 4	431 LSL 4			431 HNA 4	431 HSL 4
12	22	5	4	14.5	431 LNA 5	431 LSL 5	5	17	431 HNA 5	431 HSL 5
13	23				431 LNA 6	431 LSL 6			431 HNA 6	431 HSL 6
14	24				431 LNA 7	431 LSL 7			431 HNA 7	431 HSL 7
15	25				431 LNA 8	431 LSL 8			431 HNA 8	431 HSL 8
13	26				431 LNA 9	431 LSL 9			431 HNA 9	431 HSL 9
14	27				431 LNA 10	431 LSL 10			431 HNA 10	431 HSL 10
15	28				431 LNA 11	431 LSL 11			431 HNA 11	431 HSL 11
16	29				431 LNA 12	431 LSL 12			431 HNA 12	431 HSL 12
17	30				431 LNA 13	431 LSL 13			431 HNA 13	431 HSL 13
18	31				431 LNA 14	431 LSL 14			431 HNA 14	431 HSL 14
19	32	6.5	4	18.5	431 LNA 15	431 LSL 15	5	21.5	431 HNA 15	431 HSL 15
20	33				431 LNA 16	431 LSL 16			431 HNA 16	431 HSL 16
21	34				431 LNA 17	431 LSL 17			431 HNA 17	431 HSL 17
22	35				431 LNA 18	431 LSL 18			431 HNA 18	431 HSL 18
23	36				431 LNA 19	431 LSL 19			431 HNA 19	431 HSL 19
24	37				431 LNA 20	431 LSL 20			431 HNA 20	431 HSL 20
25	38				431 LNA 21	431 LSL 21			431 HNA 21	431 HSL 21
23	39				431 LNA 22	431 LSL 22			431 HNA 22	431 HSL 22
24	40				431 LNA 23	431 LSL 23			431 HNA 23	431 HSL 23
25	41				431 LNA 24	431 LSL 24			431 HNA 24	431 HSL 24
26	42				431 LNA 25	431 LSL 25			431 HNA 25	431 HSL 25
27	43				431 LNA 26	431 LSL 26			431 HNA 26	431 HSL 26
28	44				431 LNA 27	431 LSL 27			431 HNA 27	431 HSL 27
29	45				431 LNA 28	431 LSL 28			431 HNA 28	431 HSL 28
30	46				431 LNA 29	431 LSL 29			431 HNA 29	431 HSL 29
31	47				431 LNA 30	431 LSL 30			431 HNA 30	431 HSL 30
32	48				431 LNA 31	431 LSL 31			431 HNA 31	431 HSL 31
33	49				431 LNA 32	431 LSL 32			431 HNA 32	431 HSL 32
34	50				431 LNA 33	431 LSL 33			431 HNA 33	431 HSL 33
35	51				431 LNA 34	431 LSL 34			431 HNA 34	431 HSL 34
36	52				431 LNA 35	431 LSL 35			431 HNA 35	431 HSL 35
37	53	8	5	29	431 LNA 36	431 LSL 36	6	33	431 HNA 36	431 HSL 36
38	54				431 LNA 37	431 LSL 37			431 HNA 37	431 HSL 37
39	55				431 LNA 38	431 LSL 38			431 HNA 38	431 HSL 38
40	56				431 LNA 39	431 LSL 39			431 HNA 39	431 HSL 39
41	57				431 LNA 40	431 LSL 40			431 HNA 40	431 HSL 40
42	58				431 LNA 41	431 LSL 41			431 HNA 41	431 HSL 41
43	59				431 LNA 42	431 LSL 42			431 HNA 42	431 HSL 42
44	60				431 LNA 43	431 LSL 43			431 HNA 43	431 HSL 43
45	61				431 LNA 44	431 LSL 44			431 HNA 44	431 HSL 44
46	62				431 LNA 45	431 LSL 45			431 HNA 45	431 HSL 45
47	63				431 LNA 46	431 LSL 46			431 HNA 46	431 HSL 46
48	64				431 LNA 47	431 LSL 47			431 HNA 47	431 HSL 47
49	65				431 LNA 48	431 LSL 48			431 HNA 48	431 HSL 48
50	66				431 LNA 49	431 LSL 49			431 HNA 49	431 HSL 49
50	70				431 LNA 50	431 LSL 50			431 HNA 50	431 HSL 50
52	72				431 LNA 51	431 LSL 51			431 HNA 51	431 HSL 51
55	75				431 LNA 52	431 LSL 52			431 HNA 52	431 HSL 52
56	76				431 LNA 52A	431 LSL 52A			431 HNA 52A	431 HSL 52A
57	77				431 LNA 53	431 LSL 53			431 HNA 53	431 HSL 53
60	80				431 LNA 54	431 LSL 54			431 HNA 54	431 HSL 54
62	82				431 LNA 55	431 LSL 55			431 HNA 55	431 HSL 55
63	83				431 LNA 55A	431 LSL 55A			431 HNA 55A	431 HSL 55A
65	85	10	5	35	431 LNA 56	431 LSL 56	6	40	431 HNA 56	431 HSL 56
67	87				431 LNA 57	431 LSL 57			431 HNA 57	431 HSL 57
70	90				431 LNA 58	431 LSL 58			431 HNA 58	431 HSL 58
72	92				431 LNA 59	431 LSL 59			431 HNA 59	431 HSL 59
75	95				431 LNA 60	431 LSL 60			431 HNA 60	431 HSL 60
77	97				431 LNA 61	431 LSL 61			431 HNA 61	431 HSL 61
80	100				431 LNA 62	431 LSL 62			431 HNA 62	431 HSL 62
82	102				431 LNA 63	431 LSL 63			431 HNA 63	431 HSL 63

Continued ...

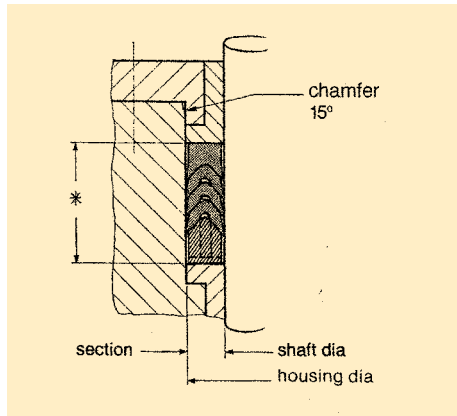
# Shallex<sup>®</sup> — rod/ram & piston packing

## JW Chart 431 — metric sizes (mm) continued

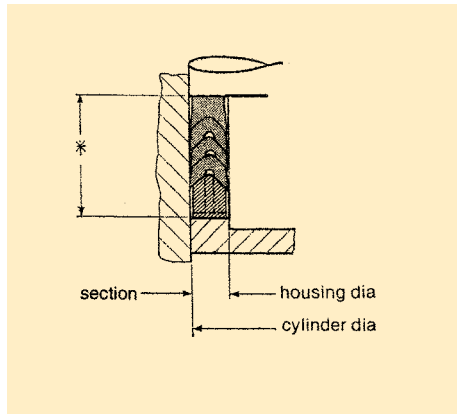
### Adjustable



### Non-adjustable — gland



### Non-adjustable — piston head



### JW Chart 430

\* Housing depth = C + 0.010in / - 0

### JW Chart 431

\* Housing depth = C + 0.25mm / - 0

JW Chart 431			Packing details and Part Numbers							
Nominal housing dimensions			Up to 34MPa (5000 lbf/in <sup>2</sup> )				Over 34MPa (5000 lbf/in <sup>2</sup> )			
			No. of rings in set incl. header	Nom. depth of set C (mm)	J W Part No.		No. of rings in set incl. header	Nom. depth of set C (mm)	J W Part No.	
ID (mm)	OD (mm)	Sect. (mm)			Non-spring loaded	Spring loaded			Non-spring loaded	Spring loaded
85	105	10	5	35	431 LNA 64	431 LSL 64	6	40	431 HNA 64	431 HSL 64
87	107				431 LNA 65	431 LSL 65			431 HNA 65	431 HSL 65
90	110				431 LNA 66	431 LSL 66			431 HNA 66	431 HSL 66
90	115				431 LNA 67	431 LSL 67			431 HNA 67	431 HSL 67
95	120				431 LNA 68	431 LSL 68			431 HNA 68	431 HSL 68
100	125				431 LNA 69	431 LSL 69			431 HNA 69	431 HSL 69
105	130				431 LNA 70	431 LSL 70			431 HNA 70	431 HSL 70
110	135				431 LNA 71	431 LSL 71			431 HNA 71	431 HSL 71
115	140				431 LNA 72	431 LSL 72			431 HNA 72	431 HSL 72
120	145	12.5	5	42.5	431 LNA 73	431 LSL 73	6	48.5	431 HNA 73	431 HSL 73
125	150				431 LNA 74	431 LSL 74			431 HNA 74	431 HSL 74
130	155				431 LNA 75	431 LSL 75			431 HNA 75	431 HSL 75
135	160				431 LNA 76	431 LSL 76			431 HNA 76	431 HSL 76
140	165				431 LNA 77	431 LSL 77			431 HNA 77	431 HSL 77
145	170				431 LNA 78	431 LSL 78			431 HNA 78	431 HSL 78
150	175				431 LNA 79	431 LSL 79			431 HNA 79	431 HSL 79
150	180				431 LNA 80	431 LSL 80			431 HNA 80	431 HSL 80
155	185				431 LNA 81	431 LSL 81			431 HNA 81	431 HSL 81
160	190				431 LNA 82	431 LSL 82			431 HNA 82	431 HSL 82
165	195				431 LNA 83	431 LSL 83			431 HNA 83	431 HSL 83
170	200				431 LNA 84	431 LSL 84			431 HNA 84	431 HSL 84
175	205				431 LNA 85	431 LSL 85			431 HNA 85	431 HSL 85
180	210				431 LNA 86	431 LSL 86			431 HNA 86	431 HSL 86
185	215				431 LNA 87	431 LSL 87			431 HNA 87	431 HSL 87
190	220				431 LNA 88	431 LSL 88			431 HNA 88	431 HSL 88
195	225				431 LNA 89	431 LSL 89			431 HNA 89	431 HSL 89
200	230				431 LNA 90	431 LSL 90			431 HNA 90	431 HSL 90
205	235				431 LNA 91	431 LSL 91			431 HNA 91	431 HSL 91
210	240				431 LNA 92	431 LSL 92			431 HNA 92	431 HSL 92
215	245				431 LNA 93	431 LSL 93			431 HNA 93	431 HSL 93
220	250				431 LNA 94	431 LSL 94			431 HNA 94	431 HSL 94
225	255				431 LNA 95	431 LSL 95			431 HNA 95	431 HSL 95
230	260				431 LNA 96	431 LSL 96			431 HNA 96	431 HSL 96
235	265				431 LNA 97	431 LSL 97			431 HNA 97	431 HSL 97
240	270	15	5	50.5	431 LNA 98	431 LSL 98	6	58	431 HNA 98	431 HSL 98
245	275				431 LNA 99	431 LSL 99			431 HNA 99	431 HSL 99
250	280				431 LNA 100	431 LSL 100			431 HNA 100	431 HSL 100
255	285				431 LNA 101	431 LSL 101			431 HNA 101	431 HSL 101
260	290				431 LNA 102	431 LSL 102			431 HNA 102	431 HSL 102
265	295				431 LNA 103	431 LSL 103			431 HNA 103	431 HSL 103
270	300				431 LNA 104	431 LSL 104			431 HNA 104	431 HSL 104
280	310				431 LNA 105	431 LSL 105			431 HNA 105	431 HSL 105
290	320				431 LNA 106	431 LSL 106			431 HNA 106	431 HSL 106
300	330				431 LNA 107	431 LSL 107			431 HNA 107	431 HSL 107
310	340				431 LNA 108	431 LSL 108			431 HNA 108	431 HSL 108
320	350				431 LNA 109	431 LSL 109			431 HNA 109	431 HSL 109
330	360				431 LNA 110	431 LSL 110			431 HNA 110	431 HSL 110
340	370				431 LNA 111	431 LSL 111			431 HNA 111	431 HSL 111
350	380				431 LNA 112	431 LSL 112			431 HNA 112	431 HSL 112
360	390				431 LNA 113	431 LSL 113			431 HNA 113	431 HSL 113
370	400				431 LNA 114	431 LSL 114			431 HNA 114	431 HSL 114
380	410				431 LNA 115	431 LSL 115			431 HNA 115	431 HSL 115
390	420				431 LNA 116	431 LSL 116			431 HNA 116	431 HSL 116
400	430				431 LNA 117	431 LSL 117			431 HNA 117	431 HSL 117
400	440				431 LNA 118	431 LSL 118			431 HNA 118	431 HSL 118
410	450				431 LNA 119	431 LSL 119			431 HNA 119	431 HSL 119
420	460				431 LNA 120	431 LSL 120			431 HNA 120	431 HSL 120
430	470				431 LNA 121	431 LSL 121			431 HNA 121	431 HSL 121
440	480				431 LNA 122	431 LSL 122			431 HNA 122	431 HSL 122
450	490	20	6	79	431 LNA 123	431 LSL 123	7	89	431 HNA 123	431 HSL 123
460	500				431 LNA 124	431 LSL 124			431 HNA 124	431 HSL 124
470	510				431 LNA 125	431 LSL 125			431 HNA 125	431 HSL 125
480	520				431 LNA 126	431 LSL 126			431 HNA 126	431 HSL 126
490	530				431 LNA 127	431 LSL 127			431 HNA 127	431 HSL 127
500	540				431 LNA 128	431 LSL 128			431 HNA 128	431 HSL 128

All dimensions in mm

## Solosele® G — rod/ram &amp; piston packing

**Robust and compact seal for single ring duties on all hydraulic or pneumatic applications**

- Max pressure: 6100psi (standard)
- Temperature range: -4°F to +250°F
- Max stroke speed: 100fpm
- Supplied: Endless
- Long life with zero seal maintenance
- Easy retrofit into existing grooves.

**Description**

Solosele® G is our primary recommendation for all single-ring hydraulic and pneumatic services — including the heaviest duty applications.

Its sealing area is manufactured from a specially-formulated rubber that resists virtually all known hydraulic fluids (except some phosphate esters). In addition, a fabric reinforced base is press vulcanized to the sealing portion, which eliminates the need for separate anti-extrusion rings.

Sealing geometry includes chamfered lips, and a fixed interference level that provided the lowest possible fluid film — even at slack pressures that are usually more difficult to seal than full hydraulic loads.

A major feature is the seal's float-fit in its housing, which offers many advantages:

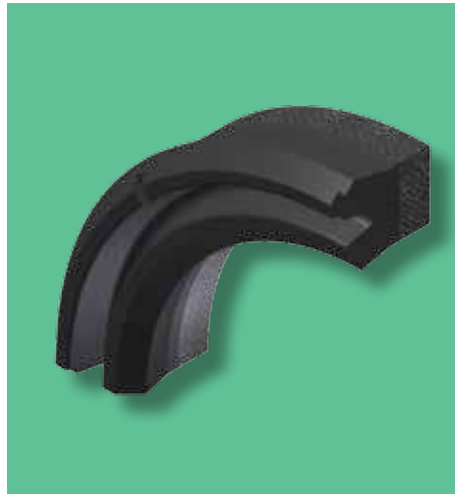
- Easy retrofit into existing grooves.
- No adjustments — zero maintenance
- Low friction for gravity return without hang-up.

Solosele G is recommended for:

- Hydraulics and pneumatics to 6100psi.
- Upstroking presses, slab side or four poster — especially in rubber and thermoset compression molding.
- Hydraulic cylinder piston heads and rods.
- Hydraulic control valves and accumulators.
- Gravity return presses needing low friction characteristics.
- Older presses with scored rams, worn bushes or guides (sharp edges on scores must be smoothed).

**Construction — standard**

**LR6364/NM59-74/80:** an ideal material for most hydraulic and pneumatic services, such as press rams, hydraulic cylinders, valves, end caps and swivels. Also used on hydroelectric services including wicket gates, trunnion bearings and servo motors. Maximum temperature is 250°F.

**Construction – non-standard**

**FR22/LR5781:** Fluoroelastomer-based materials for high temperatures, phosphate esters and services requiring additional chemical/solvent resistance. Maximum temperature is 400°F.

**EOL/FC/175:** Elast-O-Lion® hydrogenated nitrile (HNBR) elastomer-coated fabric with very high abrasion resistance and excellent hydrocarbon resistance. Maximum temperature is 250°F.

**Design considerations**

**Diameters:** Diametral tolerances should be as close as possible to nominal. From the seal function point of view, ANSI B4.1 running clearance class RC6 (H9/e8) is recommended. Please note that other design considerations may affect the use of RC6. *If in doubt, please contact our Technical Department.*

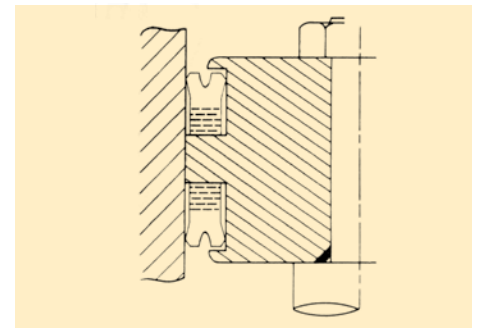
**Housing depths:** These seals must NOT be compressed axially. The housing depth must be at least 1/8" greater than seal depth to allow 'float'. Although there is no theoretical maximum housing depth, this should be close to minimum on severely scored rams, otherwise the seal may be dragged up and down in the housing. Filler rings are available for this purpose.

**Single piece, spool-type pistons** should have a retaining shoulder (*see diagrams in column three*) to provide a snap-in housing.

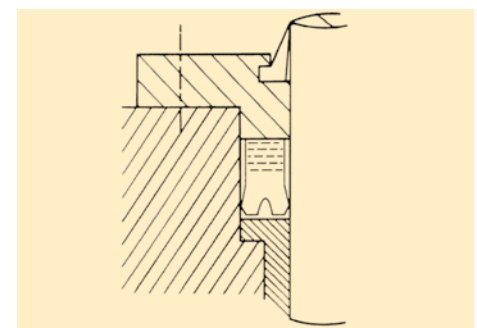
**Surface finish:** Surfaces with movement relative to the seal should have a finish of 8-16µin (0.2-0.4µm) Ra or CLA. On static surfaces a finish of 16-32µin (0.4-0.8µm) Ra or CLA is acceptable.

**How supplied**

Please see charts on page 20 and quote the JW Part Number. Alternatively, state seal size or housing dimensions. Please inform us of relevant application details.



Typical double-acting piston arrangement



Typical rod/ram housing arrangement

# Solosele® G — rod/ram & piston packing

## Standard range — inch sizes

James Walker Part No.	ID (inch)	OD (inch)	Housing depth (inch) +0.009/-0.0
1567-032	2	2 5/8	7/16
1567-033	2	2 3/4	1/2
1567-034	2 1/8	2 7/8	1/2
1567-035	2 1/4	3	1/2
1567-036	2 3/8	3 1/8	1/2
1567-037	2 1/2	3 1/4	1/2
1567-038	2 5/8	3 3/8	1/2
1567-039	2 3/4	3 1/2	1/2
1567-040	2 7/8	3 5/8	1/2
1567-041	3	3 3/4	1/2
1567-042	3 1/8	3 7/8	1/2
1567-043	3 1/4	4	1/2
1567-044	3 3/8	4 1/8	1/2
1567-045	3 1/2	4 1/4	1/2
1567-046	3 3/8	4 3/8	5/8
1567-047	3 1/2	4 1/2	5/8
1567-048	3 5/8	4 5/8	5/8
1567-049	3 3/4	4 3/4	5/8
1567-050	3 7/8	4 7/8	5/8
1567-051	4	5	5/8
1567-052	4 1/8	5 1/8	5/8
1567-053	4 1/4	5 1/4	5/8
1567-054	4 3/8	5 3/8	5/8
1567-055	4 1/2	5 1/2	5/8
1567-056	4 5/8	5 5/8	5/8
1567-057	4 3/4	5 3/4	5/8
1567-058	4 7/8	5 7/8	5/8
1567-059	5	6	5/8
1567-060	5 1/8	6 1/8	5/8
1567-061	5 1/4	6 1/4	5/8
1567-062	5 3/8	6 3/8	5/8
1567-063	5 1/2	6 1/2	5/8
1567-064	5 5/8	6 5/8	5/8
1567-065	5 3/4	6 3/4	5/8
1567-066	5 7/8	6 7/8	5/8
1567-067	6	7	5/8
1567-068	6	7 1/4	13/16
1567-069	6 1/4	7 1/2	13/16
1567-070	6 1/2	7 3/4	13/16
1567-071	6 3/4	8	13/16
1567-072	7	8 1/4	13/16
1567-073	7 1/4	8 1/2	13/16
1567-074	7 1/2	8 3/4	13/16
1567-075	7 3/4	9	13/16
1567-076	8	9 1/4	13/16
1567-077	8 1/4	9 1/2	13/16
1567-078	8 1/2	9 3/4	13/16
1567-079	8 3/4	10	13/16
1567-080	9	10 1/4	13/16
1567-081	9 1/4	10 1/2	13/16
1567-082	9 1/2	10 3/4	13/16
1567-083	9 3/4	11	13/16
1567-084	10	11 1/4	13/16
1567-085	10 1/4	11 1/2	13/16
1567-086	10 1/2	11 3/4	13/16
1567-087	10 3/4	12	13/16
1567-088	11	12 1/4	13/16
1567-089	11 1/4	12 1/2	13/16
1567-090	11 1/2	12 3/4	13/16
1567-091	11 3/4	13	13/16

## Metric range — mm sizes

James Walker Part No.	ID (inch)	OD (inch)	Housing depth (inch) +0.009/-0.0
1567-092	12	13 1/4	13/16
1567-092A	12	13 1/2	1
1567-093	12 1/4	13 1/2	13/16
1567-094	12 1/2	13 3/4	13/16
1567-095	12 3/4	14	13/16
1567-096	13	14 1/4	13/16
1567-097	13 1/4	14 1/2	13/16
1567-098	13 1/2	14 3/4	13/16
1567-099	13 3/4	15	13/16
1567-100	14	15 1/4	13/16
1567-100A	14	15 1/2	1 1/8
1567-100B	14	15 3/4	1 13/16
1567-101	14 1/4	15 1/2	13/16
1567-102	14 1/2	15 3/4	13/16
1567-103	14 3/4	16	13/16
1567-104	15	16 1/4	13/16
1567-105	15 1/4	16 1/2	13/16
1567-106	15 1/2	16 3/4	13/16
1567-107	15 3/4	17	13/16
1567-108	16	17 1/4	13/16
1567-109	16	17 1/2	1 1/8
1567-109A	16	17 3/4	1 3/16
1567-109B	16	18	1 1/4
1567-110	16 1/2	18	1 1/8
1567-111	17	18 1/2	1 1/8
1567-112	17 1/2	19	1 1/8
1567-113	18	19 1/2	1 1/8
1567-113A	18	19 3/4	1 3/16
1567-113B	18	20	1 1/4
1567-114	18 1/2	20	1 1/8
1567-115	19	20 1/2	1 1/8
1567-116	19 1/2	21	1 1/8
1567-117	20	21 1/2	1 1/8
1567-118	20	21 3/4	1 3/16
1567-119	20	22	1 1/4
1567-120	22	23 1/2	1 1/8
1567-121	22	23 3/4	1 3/16
1567-122	22	24	1 1/4
1567-123	24	25 1/2	1 1/8
1567-124	24	25 3/4	1 3/16
1567-125	24	26	1 1/4
1567-126	26	27 1/2	1 1/8
1567-127	26	27 3/4	1 3/16
1567-128	28	29 1/2	1 1/8
1567-129	28	29 3/4	1 3/16
1567-130	28	30	1 1/4
1567-131	30	31 1/2	1 1/8
1567-132	30	31 3/4	1 3/16
1567-133	32	33 1/2	1 1/8
1567-134	36	37 1/2	1 1/8
1567-135	36	37 3/4	1 3/16

James Walker Part No.	ID (mm)	OD (mm)	Housing depth (mm) +0.25/-0.0
74-006014	6	14	5
74-008016	8	16	5
74-010018	10	18	5
74-012020	12	20	5
74-014022	14	22	5
74-016024	16	24	5
74-017025	17	25	5
74-018026	18	26	5
74-020028	20	28	5
74-022030	22	30	5
74-024032	24	32	5
74-025033	25	33	5
74-032040	32	40	5
74-028038	28	38	6.3
74-032042	32	42	6.3
74-036046	36	46	6.3
74-040050	40	50	6.3
74-045055	45	55	6.3
74-050060	50	60	6.3
74-053063	53	63	6.3
74-056071	56	71	9.5
74-063078	63	78	9.5
74-065080	65	80	9.5
74-070085	70	85	9.5
74-080095	80	95	9.5
74-085100	85	100	9.5
74-090105	90	105	9.5
74-100120	100	120	12.5
74-105125	105	125	12.5
74-110130	110	130	12.5
74-125145	125	145	12.5
74-140160	140	160	12.5
74-160185	160	185	16
74-175200	175	200	16
74-180205	180	205	16
74-200225	200	225	16
74-225250	225	250	16
74-220250	220	250	20
74-250280	250	280	20
74-280310	280	310	20
74-290320	290	320	20
74-320360	320	360	25
74-360400	360	400	25
74-460500	460	500	25

# Lion® Glandsele — rod/ram & piston packing

## Medium to heavy duty U-packing for services requiring a single ring seal

- Max pressure: 5000psi (standard)
- Temperature range: -4°F to +250°F
- Max stroke speed: 100fpm
- Supplied: Endless
- Easy retrofit into existing grooves.

### Description

Lion® Glandsele is a medium to heavy duty U-packing with a reinforced base, for services where a single ring seal is required.

This seal is designed to be a float-fit in its housing, which provides benefits such as minimal maintenance and low friction characteristics. It has a molded-in interference fit at the lip tips to provide an initial seal under low or slack pressure conditions, and a heavy base that acts as an anti-extrusion device for conditions involving worn bushings or rams.

With its symmetrical section, Lion Glandsele works with equal efficiency on rod/ram services (ID sealing) and piston heads (OD sealing). It is suitable for conventional rod housings with removable gland retainer plates, and most piston heads — including single-piece pistons.

A snap-in groove for the seal is a simple machining operation, although opposing seals in double-acting pistons need to be separated by a fixed metal plate to avoid undesirable pressure transference.

Lion Glandsele is recommended for:

- Hydraulics and pneumatics to 5000psi.
- Upstroking presses, slab side or four poster — especially in rubber and thermoset compression molding.
- Hydraulic cylinder piston heads and rods.
- Hydraulic control valves and accumulators.
- Gravity return presses needing low friction characteristics.
- Older presses with scored rams, worn bushes or guides (sharp edges on scores must be smoothed).

### Construction — standard

**Nitrile synthetic rubber** with a fine weave fabric reinforcement. This is suitable for most hydraulic fluids including oil, water, water/soluble oil, water-glycol and many phosphate ester fluids. Maximum temperature is 250°F.



**Construction – high temperature**  
**Fluoroelastomer-based** elastomer blend with textile reinforcement, developed for high temperature applications. Maximum constant temperature is 400°F.

**Construction — non-standard**  
**Elast-O-Lion®** hydrogenated nitrile (HNBR) elastomer-coated fabric for improved oil and solvent resistance. Maximum temperature is 250°F.

**Polyurethane:** for cold water and warm oil services. Maximum continuous temperature is 175°F.

### Design considerations

**Diameters:** Diametral tolerances should be as close as possible to nominal. From the seal function point of view, ANSI B4.1 running clearance class RC6 (H9/e8) is recommended. Please note that other design considerations may affect the use of RC6. *If in doubt, please contact our Technical Department.*

**Housing depths:** These seals must NOT be compressed axially. The housing depth must be at least 1/8" greater than seal depth to allow 'float'. Although there is no theoretical maximum housing depth, this should be close to minimum on severely scored rams, otherwise the seal may be dragged up and down in the housing. Filler rings are available for this purpose.

**Single piece, spool-type pistons** should have a retaining shoulder to provide a snap-in housing.

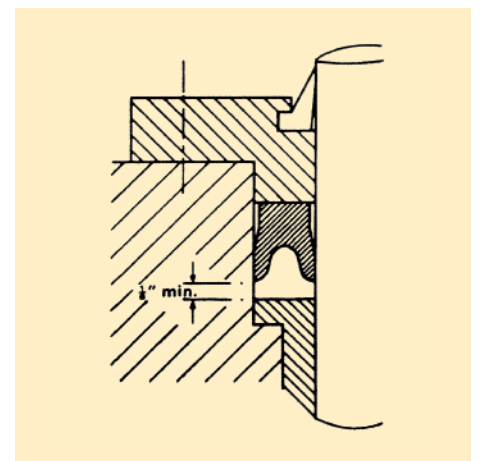


**Surface finish:** surfaces with movement relative to the seal should have a finish of 8-16µin (0.2-0.4µm) Ra or CLA. On static surfaces a finish of 16-32µin (0.4-0.8µm) Ra or CLA is acceptable.

### How supplied

Please see charts on page 22 and quote the JW Part Number. Alternatively, state seal size or housing dimensions. Please inform us of relevant application details.

Note: higher pressures than 5000psi may need special designs. *Please consult our Technical Department.*



Typical rod/ram housing arrangement

# Lion® Glandsele — rod/ram & piston packing

## Standard range — inch sizes

James Walker Part No.	ID (inch)	OD (inch)	Seal* depth (inch)	James Walker Part No.	ID (inch)	OD (inch)	Seal* depth (inch)	James Walker Part No.	ID (inch)	OD (inch)	Seal* depth (inch)
150120-034	2	2 1/2	5/16	150120-081	6	7 1/2	1	150120-128	14 3/4	16	1
150120-035	2	2 5/8	7/16	150120-082	6 1/4	7 1/2	1	150120-129	15	16 1/4	1
150120-036	2	2 3/4	9/16	150120-083	6 1/2	7 3/4	1	150120-130	15 1/4	16 1/2	1
150120-037	2	3	5/8	150120-084	6 3/4	8	1	150120-131	15 1/2	16 3/4	1
150120-038	2 1/8	2 7/8	9/16	150120-085	6 3/4	8 1/32	1	150120-132	15 3/4	17	1
150120-039	2 1/4	3	9/16	150120-086	7	8 1/32	3/4	150120-133	16	17 1/4	1
150120-040	2 1/4	3 1/4	9/16	150120-087	7	8 1/4	1	150120-134	16	17 1/2	1 1/8
150120-041	2 3/8	3 1/8	9/16	150120-088	7 1/4	8 1/2	1	150120-135	16	17 3/4	1 3/16
150120-042	2 1/2	3 1/8	5/16	150120-089	7 1/2	8 3/4	1	150120-136	16	18	1 1/4
150120-043	2 1/2	3 1/4	9/16	150120-090	7 3/4	9	1	150120-137	16 1/2	18	1 1/8
150120-044	2 5/8	3 3/8	9/16	150120-091	8	9 1/4	1	150120-138	16 3/4	18	1
150120-045	2 3/4	3 1/2	9/16	150120-092	8	9 1/2	1 1/8	150120-139	17	18 1/2	1 1/8
150120-046	2 7/8	3 5/8	9/16	150120-093	8	9 3/4	1 3/16	150120-140	17 1/2	19	1 1/8
150120-047	3	3 5/8	11/32	150120-094	8 1/4	9 1/2	1	150120-142	18	19 1/2	1 1/8
150120-048	3 1/8	3 7/8	9/16	150120-095	8 1/4	9 7/16	7/8	150120-143	18	19 3/4	1 3/16
150120-049	3 1/4	4	9/16	150120-096	8 1/2	9 3/4	1	150120-144	18	20	1 1/4
150120-050	3 3/8	4 1/8	9/16	150120-097	8 3/4	10	1	150120-145	18 1/2	20	1 1/8
150120-051	3 3/8	4 3/8	13/16	150120-098	9	10 1/4	1	150120-146	18 3/4	20	1
150120-052	3 1/2	4 1/4	9/16	150120-099	9 1/4	10 1/2	1	150120-147	19	20 1/2	1 1/8
150120-053	3 1/2	4 1/2	13/16	150120-100	9 1/2	10 3/4	1	150120-148	19 1/2	21	1 1/8
150120-054	3 5/8	4 5/8	13/16	150120-101	9 3/4	11	1	150120-149	20	21 1/2	1 1/8
150120-055	3 3/4	4 3/4	13/16	150120-102	10	11 1/4	1	150120-150	20	21 3/4	1 3/16
150120-056	3 7/8	4 7/8	13/16	150120-103	10	11 1/2	1 1/8	150120-151	20	22	1 1/4
150120-057	4	4 5/8	5/16	150120-104	10	11 3/4	1 3/16	150120-152	22	23 1/2	1 1/8
150120-058	4	5	13/16	150120-105	10 1/4	11 1/2	1	150120-153	22	23 3/4	1 3/16
150120-059	4	5 1/32	3/4	150120-106	10 1/2	11 3/4	1	150120-154	22	24	1 1/4
150120-060	4	5 1/4	7/8	150120-107	10 3/4	12	1	150120-155	24	25 1/2	1 1/8
150120-061	4 1/8	5 1/8	13/16	150120-108	11	12 1/4	1	150120-156	24	25 3/4	1 3/16
150120-062	4 1/4	5 1/4	13/16	150120-109	11 1/4	12 1/2	1	150120-156A	24	26	1 1/4
150120-063	4 3/8	5 3/8	13/16	150120-110	11 1/2	12 3/4	1	150120-157	26	27 1/2	1 1/8
150120-064	4 1/2	5 1/2	13/16	150120-111	11 3/4	13	1	150120-158	26	27 3/4	1 3/16
150120-065	4 5/8	5 5/8	13/16	150120-112	12	13	13/16	150120-159	28	29 1/2	1 1/8
150120-066	4 3/4	5 3/4	13/16	150120-113	12	13 1/4	1	150120-160	28	29 3/4	1 3/16
150120-067	4 7/8	5 7/8	13/16	150120-114	12	13 1/2	1 1/8	150120-161	28	30	1 1/4
150120-068	5	6	13/16	150120-115	12	13 3/4	1 3/16	150120-162	30	31 1/2	1 1/8
150120-069	5	6 1/32	3/4	150120-116	12 1/4	13 1/2	1	150120-163	30	31 3/4	1 3/16
150120-070	5 1/8	6 1/8	13/16	150120-117	12 1/2	13 3/4	1	150120-164	32	33 1/2	1 1/8
150120-071	5 1/4	6 1/4	13/16	150120-118	12 3/4	14	1	150120-165	36	37 1/2	1 1/8
150120-072	5 3/8	6 3/8	13/16	150120-119	13	14 1/4	1	150120-166	36	37 3/4	1 3/16
150120-073	5 1/2	6 1/2	13/16	150120-120	13 1/4	14 1/2	1				
150120-074	5 5/8	6 5/8	13/16	150120-121	13 1/2	14 3/4	1				
150120-075	5 3/4	6 3/4	13/16	150120-122	13 3/4	15	1				
150120-076	5 7/8	6 7/8	13/16	150120-123	14	15 1/4	1				
150120-077	6	7	13/16	150120-124	14	15 1/2	1 1/8				
150120-078	6	7 1/32	3/4	150120-125	14	15 3/4	1 3/16				
150120-079	6	7 1/4	1	150120-126	14 1/4	15 1/2	1				
150120-080	6	7 3/8	1	150120-127	14 1/2	15 3/4	1				

\* Note: see **Housing depths** on page 21.

# Lion® D/C Ring — rod/ram & piston packing

## Light to medium duty U-packing for pneumatic and hydraulic cylinders or presses

- Max pressure: 3000psi continuous, plus spikes to 5000psi
- Temperature range: -4°F to +250°F
- Max stroke speed: 100fpm
- Supplied: Endless
- Over-square section avoids rolling in the housing groove.

### Description

Our Lion® D/C Ring is a light to medium duty U-packing especially designed for pneumatic services in both cylinders and presses. A higher pressure version is supplied for hydraulic applications.

For pneumatic services, the D/C Ring is a soft, flexible yet hardwearing seal, with a wide flare at the lips for rapid response to low pressure air conditions.

In either form, pneumatic or hydraulic, the cross section of the seal is over-square — deeper than it is wide — which helps to prevent the seal from rolling in its housing groove. Seal rolling is a common fault with some 'square' seals, especially those made of homogeneous rubber.

The fabric reinforcement of our Lion D/C Ring further reduces the risk of rollover by avoiding the tendency of homogeneous rubber or urethane to 'stick' to a rod under low pressure conditions.

Lion D/C Rings are recommended for:

- Mechanical stamping and transfer presses, including clutches, brakes, die-cushions and counter balance cylinders.
- Pneumatic cylinder rods and pistons.
- Hydraulic cylinder rods and pistons up to 3000psi continuous pressure, with pressure spikes up to 5000psi. *(For higher pressures, please consult our Technical Department.)*
- Hydraulic press rams in good condition. *(For presses with worn rams and bushings we recommend our Lion® Glandsele — see page 21).*



**Construction — standard**  
Nitrile synthetic rubbers with a fine weave fabric reinforcement. This is recommended for hydraulic and pneumatic services up to 250°F.

As well as the air in pneumatic services, it is also suitable for use with oil, water, and some fire resistant hydraulic fluids at up to 250°F.

**Construction — non-standard**  
Elast-O-Lion® hydrogenated nitrile (HNBR) elastomer-coated fabric. This material is recommended for certain hot air conditions as well as hydraulic services at up to 250°F.

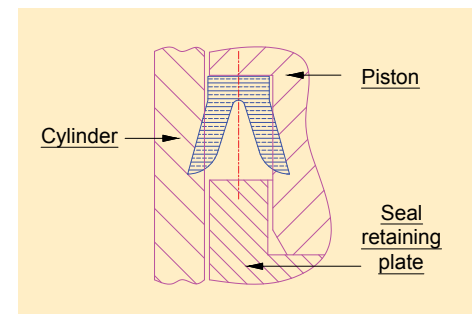
### Design considerations

**Groove design:** Standard sizes are shown on the chart on page 24. *For non-standard designs, please consult our Technical Department.*

**Diameters:** Diametral tolerances should be as close as possible to nominal. From the seal function point of view, ANSI B4.1 running clearance class RC6 (H9/e8) is recommended. Please note that other design considerations may affect the use of RC6. *If in doubt, please contact our Technical Department.*

**Housing depths:** Lion D/C Rings are designed to operate with a 1/8" 'float' within the housing. If your housing does not conform to this requirement, please contact our Technical Department for recommendations.

**Surface finish:** Surfaces with movement relative to the seal should have a finish of 8-16µin (0.2-0.4µm) Ra or CLA. On static surfaces a finish of 16-32µin (0.4-0.8µm) Ra or CLA is acceptable.



Typical piston housing arrangement

# Lion<sup>®</sup> D/C Ring — rod/ram & piston packing

## Standard range — inch sizes

James Walker Part No.	ID (inch)	OD (inch)	Housing depth (inch)	Piston size (inch)	Cylinder size (inch)
DC01	3	3	1/2	3	3 3/4
DC02	3 1/4	4		3 1/4	4
DC03	3 1/2	4 1/4		3 1/2	4 1/4
DC04	3 3/4	4 1/2		3 3/4	4 1/2
DC05	4	4 3/4		4	4 3/4
DC06	4 1/4	5		4 1/4	5
DC07	4 1/2	5 1/4		4 1/2	5 1/4
DC08	4 3/4	5 1/2		4 3/4	5 1/2
DC09	5	5 3/4		5	5 3/4
DC10	5 1/4	6		5 1/4	6
DC11	5 1/2	6 1/4		5 1/2	6 1/4
DC12	5 3/4	6 1/2		5 3/4	6 1/2
DC13	6	6 3/4		6	6 3/4
DC14	6 1/4	7		6 1/4	7
DC15	6 1/2	7 1/4		6 1/2	7 1/4
DC16	6 3/4	7 1/2		6 3/4	7 1/2
DC17	7	7 3/4		7	7 3/4
DC18	7 1/4	8	7 1/4	8	
DC19	7 1/2	8 1/4	7 1/2	8 1/4	
DC20	7 3/4	8 1/2	7 3/4	8 1/2	
DC21	8	8 3/4	8	8 3/4	
DC22	8 1/4	9	8 1/4	9	
DC23	8 1/2	9 1/4	8 1/2	9 1/4	
DC24	8 3/4	9 1/2	8 3/4	9 1/2	
DC25	9	9 3/4	9	9 3/4	
DC26	9 1/4	10	9 1/4	10	
DC27	9 1/2	10 1/4	9 1/2	10 1/4	
DC28	9 3/4	10 1/2	9 3/4	10 1/2	
DC29	10	10 3/4	10	10 3/4	
DC30	10 1/4	11	10 1/4	11	
DC31	11 1/8	11 7/8	1/2	11	12
DC32	12 1/8	12 7/8		12	13
DC33	13 1/8	13 7/8		13	14
DC34	14 1/8	14 7/8		14	15
DC35	15 1/8	15 7/8		15	16
DC36	16 1/8	16 7/8		16	17
DC37	16 7/8	17 7/8	3/4	16 3/4	18
DC38	17 7/8	18 7/8		17 3/4	19
DC39	18 1/8	19 1/8		18	19 1/4
DC40	18 7/8	19 7/8		18 3/4	20
DC41	19 7/8	20 7/8		19 3/4	21
DC41A	20	21		20	21
DC42	20 7/8	21 7/8		20 3/4	22

James Walker Part No.	ID (inch)	OD (inch)	Housing depth (inch)	Piston size (inch)	Cylinder size (inch)
DC43	21 7/8	22 7/8	3/4	21 3/4	23
DC44	22 7/8	23 7/8		22 3/4	24
DC45	23 7/8	24 7/8		23 1/4	24 1/2
DC46	23 7/8	24 7/8		23 3/4	25
DC47	24 7/8	25 7/8		24 3/4	26
DC48	25 7/8	26 7/8		25 3/4	27
DC49	26 7/8	27 7/8		26 3/4	28
DC50	27 7/8	28 7/8		27 3/4	29
DC51	28 7/8	29 7/8		28 3/4	30
DC52	29 7/8	30 7/8		29 3/4	31
DC53	30 7/8	31 7/8		30 3/4	32
DC54	31 7/8	32 7/8		31 3/4	33
DC55	32 7/8	33 7/8		32 3/4	34
DC56	33 7/8	34 7/8		33 3/4	35
DC57	34 7/8	35 7/8		34 3/4	36
DC58	36 7/8	37 7/8		36 3/4	38
DC59	38 7/8	39 7/8		38 3/4	40
DC60	40 7/8	41 7/8	40 3/4	42	
DC61	42 7/8	43 7/8	42 3/4	44	
DC62	44 7/8	45 7/8	44 3/4	46	
DC63	46 7/8	47 7/8	46 3/4	48	
DC64	48 7/8	49 7/8	48 3/4	50	



# Lion® Composite Seals — for pistons & rods

## Running sleeve of PTFE, supported and energized by a rubber element

- Max pressure: 5800psi (standard)
- Temperature range: -13°F to +200°F
- Max stroke speed: 1000fpm
- Supplied: Endless
- 'Instant' response to pressure variations, with minimal leakage.
- Low dynamic and breakout friction for smooth operation and reduced power consumption.
- Extended sealing life.
- Compact design to suit simple recess grooves.

### Description

Designed for use on both pneumatic and hydraulic services, Lion® Composite Seals combine the low friction characteristics of Fluolion® PTFE or high-performance Fluolion® Xtreme PTFE, with the energizing capability and static sealing efficiency of compressed rubber.

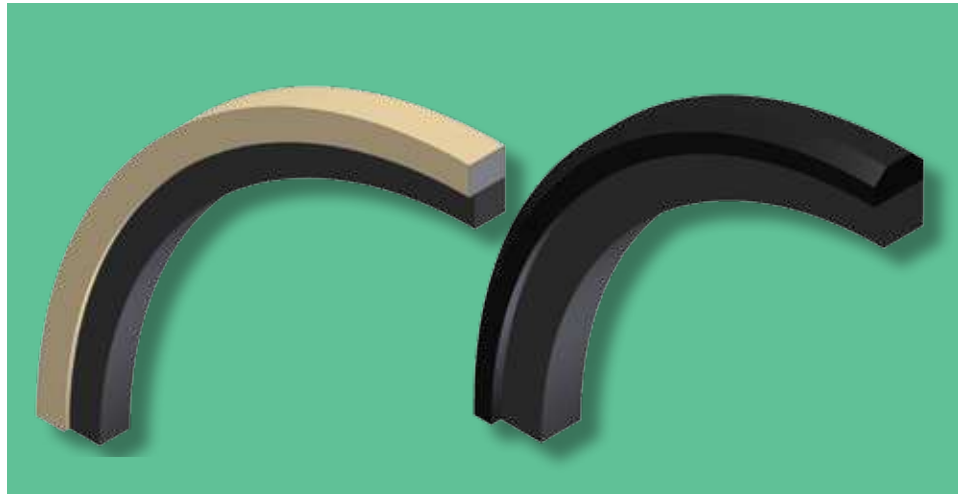
The energizer is designed to distribute an even load to the PTFE sealing element, to maximize the sealing efficiency of the system and to minimize leakage.

In operation, there is an intimate face-to-face contact between the PTFE sleeve and the cylinder or rod surface, and the sleeve is securely restrained to prevent it from rocking or twisting in the housing. This enables stable fluid film conditions to be maintained with consistently low friction values.

In contrast, conventional rubber and proofed fabric packings, when sealing satisfactorily, may cause an unacceptable level of friction. Moreover, the break out force required to start movement may be substantially greater than the running force required to sustain motion. Such erratic frictional values are undesirable on critical services where an exact and predictable response to applied pressure is required.

Our Lion Composite Seals are therefore highly recommended for services such as:

- AGC systems.
- Actuators.
- Servo-mechanisms.
- Weighing and measuring instruments.
- Hydraulic testing apparatus.
- Machine tools.
- Construction plant.



Lion Composite Seals have enabled the manufactures and users of actuators to reduce the size of their cylinders, as they no longer need large diameter pistons to operate efficiently at low pressures.

### Construction — standard

Sleeve/seal ring of Fluolion® G15 graphite-loaded PTFE, and a nitrile rubber (NBR) energizer. This combination is suitable for general petroleum-based hydraulic fluids at up to 200°F, including the kerosene-based fluids used in some AGC services.

Also, sleeve/sealing ring of high-performance Fluolion Xtreme PTFE, with a nitrile (NBR) or fluoroelastomer (FKM) energizing element.

*Please consult our Technical Department if non-flammable fluids are used, as a different rubber type may be required.*

### Construction — non-standard

Other Fluolion PTFE grades are available, included 60 per cent bronze by weight. Alternative energizer materials, such as Viton® (FKM) and hydrogenated nitrile (HNBR) are available for use with higher temperatures or exotic fluids.

### Design considerations

**Tolerances:** This range of seals is designed to suit cylinders conforming to ANSI B4.1 to tolerance class RC5.

**Surface finish:** To achieve optimum seal life, cylinders should have a honed finish to  $8\mu\text{in}$  ( $0.2\mu\text{m}$ ) Ra or CLA. Metal surfaces in static contact with the seal should be finished to  $32\mu\text{in}$  ( $0.8\mu\text{m}$ ) Ra or CLA.

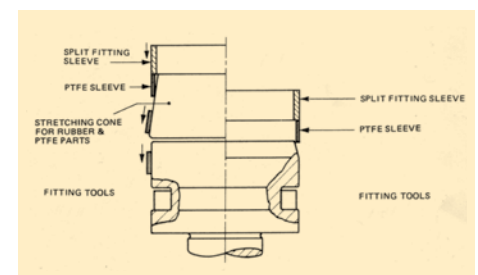
### Fitting considerations

On a single piece, spool-type piston head, a cone should be used to pre-stretch both the energizer and the PTFE sleeve before assembly. This simplifies considerably the fitting of seal sizes below 2" (50mm) OD.

If a two-piece housing is NOT used for sizes below 1" (25mm), it is essential to have a fitting cone of reasonable length, with a minor diameter of approximately the same size as the root diameter of the housing groove.

It is strongly recommended that the PTFE sleeve be allowed to 'recover' for about three hours after stretching, before the piston assembly is fitted into the cylinder.

It is essential NOT to scratch or otherwise damage the PTFE sleeve. The energizer, and metal surfaces over which it passes, should be lightly lubricated prior to fitting.



Fitting tools

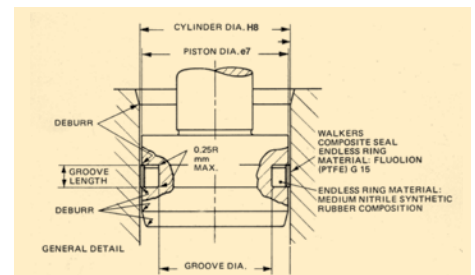
# Lion® Composite Seals — for pistons & rods

## JW Charts 96 & 95 — standard inch & metric sizes

96 Inch cylinders	95 Metric cylinders	Nominal cyl. dia. (inch)	Nominal cyl. dia. (mm)	Groove diameter (inch)	Groove diameter (mm)	Groove length (inch)	Groove length (mm)
96-037		3/8		0.1385 / 0.140	3.52 / 3.56	0.154 / 0.162	3.9 / 4.1
96-050		1/2		0.2635 / 0.265	6.70 / 6.74	0.154 / 0.162	3.9 / 4.1
96-062		5/8		0.389 / 0.3905	9.88 / 9.92	0.154 / 0.162	3.9 / 4.1
96-075		3/4		0.514 / 0.516	13.06 / 13.10	0.154 / 0.162	3.9 / 4.1
96-087		7/8		0.639 / 0.641	16.24 / 16.28	0.154 / 0.162	3.9 / 4.1
	95 - 025		25	0.470 / 0.476	11.96 / 12.10	0.291 / 0.299	7.4 / 7.6
96-100		1		0.486 / 0.492	12.36 / 12.50	0.291 / 0.299	7.4 / 7.6
96-125		1 1/4		0.737 / 0.743	18.72 / 18.86	0.291 / 0.299	7.4 / 7.6
	95 - 032		32	0.746 / 0.752	18.96 / 19.10	0.291 / 0.299	7.4 / 7.6
96-150		1 1/2		0.986 / 0.992	25.06 / 25.20	0.291 / 0.299	7.4 / 7.6
	95 - 040		40	1.061 / 1.067	26.96 / 27.10	0.291 / 0.299	7.4 / 7.6
96-175		1 3/4		1.237 / 1.243	31.42 / 31.56	0.291 / 0.299	7.4 / 7.6
	95 - 050		50	1.455 / 1.461	36.96 / 37.10	0.291 / 0.299	7.4 / 7.6
96-200		2		1.486 / 1.492	37.76 / 37.90	0.291 / 0.299	7.4 / 7.6
	95 - 063		63	1.849 / 1.855	46.96 / 47.12	0.350 / 0.358	8.9 / 9.1
96-250		2 1/2		1.869 / 1.875	47.46 / 47.62	0.350 / 0.358	8.9 / 9.1
96-275		2 3/4		2.118 / 2.124	53.80 / 53.96	0.350 / 0.358	8.9 / 9.1
	95 - 070		70	2.125 / 2.131	53.96 / 54.12	0.350 / 0.358	8.9 / 9.1
	95 - 075		75	2.321 / 2.327	58.96 / 59.12	0.350 / 0.358	8.9 / 9.1
96-300		3		2.369 / 2.375	60.16 / 60.32	0.350 / 0.358	8.9 / 9.1
	95 - 080		80	2.518 / 2.524	63.96 / 64.12	0.350 / 0.358	8.9 / 9.1
96-325		3 1/4		2.618 / 2.624	66.50 / 66.66	0.350 / 0.358	8.9 / 9.1
96-350		3 1/2		2.869 / 2.875	72.86 / 73.02	0.350 / 0.358	8.9 / 9.1
	95 - 090		90	2.912 / 2.918	73.96 / 74.12	0.350 / 0.358	8.9 / 9.1
	95 - 100		100	3.306 / 3.312	83.96 / 84.12	0.350 / 0.358	8.9 / 9.1
96-400		4		3.368 / 3.374	85.56 / 85.72	0.350 / 0.358	8.9 / 9.1
	95 - 110		110	3.540 / 3.548	89.92 / 90.14	0.429 / 0.437	10.9 / 11.1
96-450		4 1/2		3.710 / 3.718	94.22 / 94.44	0.429 / 0.437	10.9 / 11.1
	95 - 125		125	4.131 / 4.139	104.92 / 105.14	0.429 / 0.437	10.9 / 11.1
96-500		5		4.209 / 4.218	106.92 / 107.14	0.429 / 0.437	10.9 / 11.1
96-550		5 1/2		4.709 / 4.718	119.62 / 119.84	0.429 / 0.437	10.9 / 11.1
	95 - 140		140	4.721 / 4.730	119.92 / 120.14	0.429 / 0.437	10.9 / 11.1
96-600		6		5.209 / 5.218	132.32 / 132.54	0.429 / 0.437	10.9 / 11.1
	95 - 160		160	5.508 / 5.517	139.92 / 140.14	0.429 / 0.437	10.9 / 11.1

For intermediate sizes not listed above, and larger sizes to 56" (1420mm), the following apply:

Inch sizes (in)				Metric sizes (mm)			
Cylinder size		A	B	Cylinder size		A	B
Above	Up to & including			Above	Up to & including		
-	7/8	0.117/0.119	0.154/0.162	-	22	2.98/3.02	3.9/4.1
7/8	2	0.254/0.257	0.291/0.299	22	50	6.45/6.52	7.7/7.6
2	4	0.312/0.315	0.350/0.358	50	100	7.94/8.02	8.9/9.1
4	16	0.391/0.399	0.429/0.437	100	400	9.93/10.13	10.9/11.1
16	35	0.506/0.517	0.567/0.575	400	900	12.86/13.14	14.4/14.6
35	56	0.780/0.794	0.799/0.811	900	1420	19.82/20.18	20.3/20.6



Housing arrangements

# Lion® Wiper Type L — for rods/rams

**Robust wiper for heavy duty service in highly abrasive conditions**

- Temperature range: -4°F to +250°F
- Supplied: Split or Endless
- Tough, rubberized fabric construction.
- Hardwearing for long working life.

**Description**

Lion® Wiper Type L rings are designed to limit severely the ingress of foreign matter into the seal housing on a wide variety of reciprocating hydraulic systems.

Manufactured in a versatile rubber-proofed fabric, these rings provide an effective wiping action while being tough and resilient to the wear encountered in such applications.

The wiping lip has a molded-in interference to ensure contact with the reciprocating ram at all times.

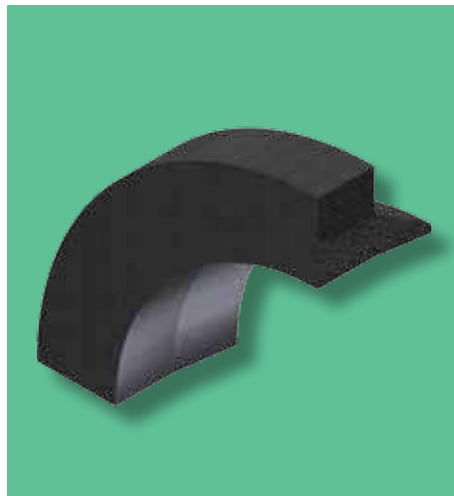
We recommend Lion Wiper Type L for heavy duty wiping operations on a wide range of reciprocating plant and equipment.

**Construction — standard**

Cotton fabric proofed with nitrile (NBR) rubber. This is suitable for service with most mineral-based hydraulic fluids, and most fire-resistant fluids of the water/oil emulsion or water/glycol types at temperatures up to 250°F. It also resists air, water, and most lubricating oils and greases.

**Construction — non-standard**

Special materials extend considerably the temperature range and fluid compatibility. *Please contact our Technical Department.*



**Design considerations**

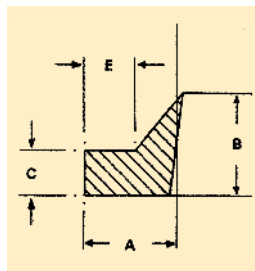
These fabric wipers may be housed in various ways, depending on the designer's choice. Limits H8 from ANSI B4.1 RC5 apply to diameters D2 and D3.

**How supplied**

In split or endless form to any practical size.

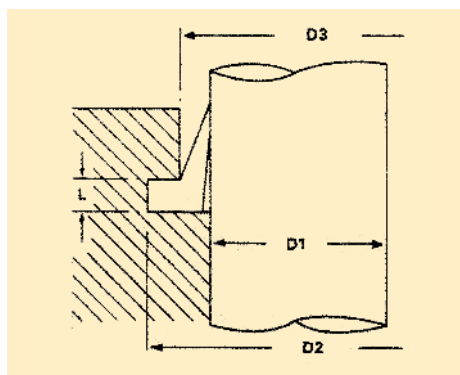
**Ordering**

Please state James Walker's product style, followed by ram size, stating inch or mm, and specify split or endless.



Seal size diagram

Seal size defaults				
Product style	A (inch)	A (mm)	B (inch)	B (mm)
524	0.256	6.5	0.315	8
525	0.295	7.5	0.472	12
526	0.354	9	0.591	15
527	0.472	12	0.709	18
528	0.630	16	0.866	22
Product style	C (inch)	C (mm)	E (inch)	E (mm)
524	0.157	4	0.118	3
525	0.276	7	0.138	3.5
526	0.295	7.5	0.177	4.5
527	0.315	8	0.236	6
528	0.433	11	0.315	8



Housing arrangement

Housing size defaults										
Product style	Diameter range (inch)	Diameter range (mm)	D2 = D1 +		D3 = D1 +		L		L	
			(inch)	(mm)	(inch)	(mm)	(inch)		(mm)	
524	< 4	< 100	0.512	13	0.276	7	0.157	+0.005 -0.000	4	+ 0.1 - 0.0
525	> 4 < 10	> 100 < 250	0.590	15	0.315	8	0.275	+0.005 -0.000	7	+ 0.1 - 0.0
526	> 10 < 16	> 250 < 400	0.709	18	0.354	9	0.295	+0.005 -0.000	7.5	+ 0.1 - 0.0
527	> 16 < 24	> 400 < 600	0.945	24	0.472	12	0.315	+0.008 -0.000	8	+ 0.2 - 0.0
528	> 24	> 600	1.260	32	0.630	16	0.433	+0.008 -0.000	11	+ 0.2 - 0.0

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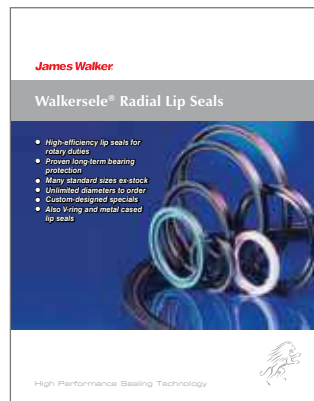
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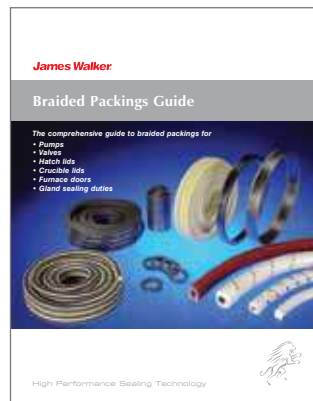
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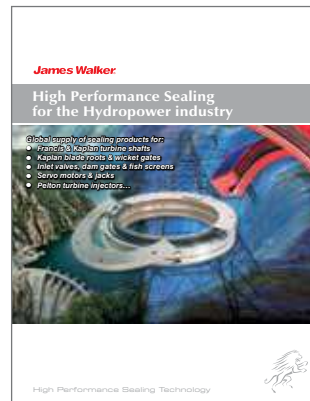
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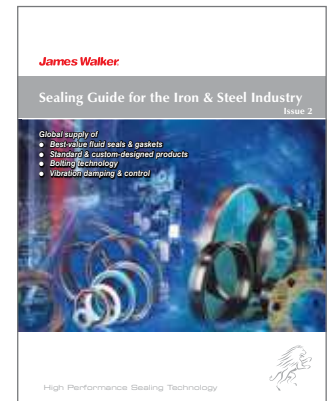
Walkersele® Radial Lip Seals



Braided Packings



Sealing for Hydropower Industry



Sealing for Iron & Steel Industry

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