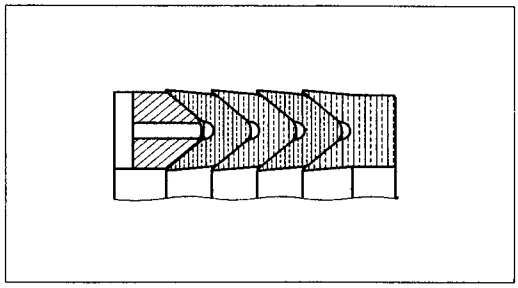
# Lionsele® Chevron

## Introduction

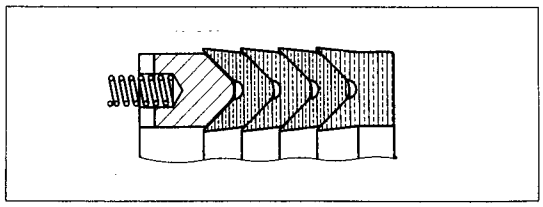
There are many applications where the greater space occupied by the multi-lip proofed fabric packing can be amply justified by the reliability and life it offers, its ability to cater for adverse mechanical conditions and its suitability for use in split ring form. Correct awareness of safety-critical situations or duties with high contingent costs in the event of seal failure, will steer the choice of hydraulic reciprocating seal in the direction of the multi-lip concept.



## Description

The proofed fabric sealing components are tapered to give an initial interference when confined in the seal housing. The radial force which results, together with the fine finish of the lip, ensures a good seal at low or slack pressures. When required in split form a scarf abutment is used. These components are:

- a gland ring (female adapter) in GHN/FC – a cotton fabric proofed with a blend of synthetic rubbers moulded in a robust construction designed to resist extrusion and offer maximum wear resistance on the majority of duties. Where recommended levels of fit are exceeded, materials are available to offer additional support of the packing.
- one or more V-shaped intermediate rings in GHN/FC with a profile and ply construction giving the right balance of strength and response to applied fluid pressure.
- the conventional Lionsele Chevron header (male adapter) is a clearance in the housing and moulded in a hard material. Shape is retained even under extreme conditions to give correct alignment to the adjacent intermediate ring. This component is supplied with a single gap when endless sealing rings are used and in halves when packings are split.
- a variation on the conventional Lionsele Chevron header includes multiple coil springs to give a degree of compensation for wear and loss of as-moulded interference of sealing rings.
  Details are available on request.



## Benefits

- Proven universal multi-lip packing with double acting capabilities (when fitted back to back).
- Comprehensive stock – speedy delivery without tool charge
- Suitable for adjustable and non-adjustable housings

## Capabilities

- Pressures up to 420 bar
- Temperatures from -20°C to +100°C (standard materials). Special materials available to allow up to +260°C
- Reciprocating speeds up to 0.5m/s (for higher speeds please consult our free Technical Advisory Service on +44 1900 823555)

NB The operating limits quoted are not an indication that these values can be applied simultaneously

The standard Lionsele Chevron shown in this brochure is rated at the maximum working pressure of 420 bar when used in the correct housing environment specified by ISO 5597. Modifications to standard design and materials can extend this capability considerably.

## Media

Standard materials are suitable for use with most mineral based hydraulic fluids, most fire-resistant fluids of the water/oil emulsion or water/glycol types at temperatures up to 100°C, and are suitable for most lubricating oils, greases, air and water. For other media, alternative materials are available on request.

Where fire-resistant fluids are used it is essential to advise the type and designation due to the variable effects that can occur with different grades. In many cases our standard GHN/FC proofed fabric material has proved satisfactory with phosphate ester fluids despite the volumetric expansion of the material which occurs. Considered within the context of an enclosed packing housing and the seal surface area exposed to fluid penetration, an acceptable sealing performance is frequently obtained which obviates the need to resort to more costly materials.

Alternative materials are available which considerably extend the range of application of Lionsele Chevron in respect of temperature, fluid compatibility and abrasion resistance. These include alternative fabrics including synthetics and alternative rubber proofings such as hydrogenated nitrile (HNBR), butyl (IIR) and fluorocarbon (FKM).

Sets incorporating solid rubber or PTFE intermediate rings are also available on request. (For details of solid PTFE Chevron rings please consult our Technical Advisory Service on +44 1900 823555).

## Applications

Typical applications include:

Standard materials –

- most types of hydraulic press (main rams, drawback rams)
- hydraulic cylinder glands and piston heads
- hydraulic valves
- oil pipe line expansion glands

Special materials –

- reciprocating steam, water and oil pumps
- hot oil reciprocating pumps for refinery duty up to 260°C
- sludge pumps, swivels

## Housing Design

Lionsele Chevron is designed to work in a housing of fixed axial length, relying on a small initial axial compression. This is achieved by controlling the free packing depth (axial length in free state) in manufacture to take account of the known increase in axial length, which will occur when the packing is constrained radially on assembly. This design philosophy provides optimum seal compression together with controlled friction levels and minimum wear.

For a piston head, the housing must be of fixed axial length. Only endless rings should be used on piston head duties and note of this need should be made when ordering or placing enquiries. For double acting piston heads not operating under constant pressure, it is recommended that two Lionsele Chevron sets be used. These sets should be fitted in an opposed manner and housed independently to preclude the possibility of over-compression due to pressure transference through the seals (as shown on page 33).

Housing sizes are indicated in the following lists. For full machining information please refer to the general housing design section of this guide. The axial length of housings should be manufactured to nominal size $^{+0.25}_{-0.0}$ mm.

## Availability and How to Order

Lionsele Chevron is available in radial sections from 4mm upwards with the exception of the spring-loaded type, which is not available below 6.5mm. Split rings are supplied in any diameter. Endless rings can be supplied up to 2250mm outside diameter.

All standard range seals will be supplied endless ex-stock. Split sets are available on request. For non-standard sizes, sets may be supplied in split form at our discretion unless endless packing is specifically requested when ordering. All header rings above 300mm outside diameter will be supplied split and will normally not contain radial ports.

In the ranges available within five working days of ordering, the Lionsele Chevron set to suit the minimum housing depth consists of : one gland ring, one intermediate ring and one header while the set for maximum housing depth consists of : one gland ring, four intermediates and one header ring.

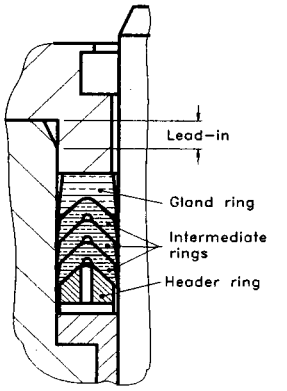
A range of ex-stock seals is available in our standard composition to suit housings to ISO 5597. Use of the James Walker Fluid Seal Division Enquiry/Order form will place orders and enquiries in a standard format to ensure trouble free correspondence with our customer services team. To order – simply specify the Re-Order Number e.g. CH-034058.

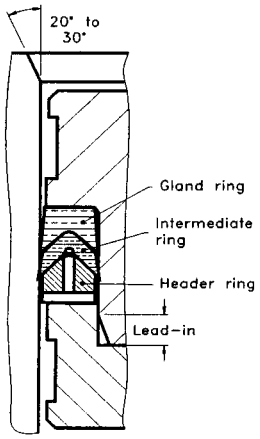
Split seal sets to suit standard housing sections are available without mould charges for the diameter ranges specified in the split seal set table. This extensive range is available within five working days of ordering.

A further extensive range of endless seals is available within five working days of ordering. To order – simply specify the nominal housing sizes e.g. 150mm x 180mm x 22mm.

Specials – Non standard sizes/materials can be manufactured from new permanent moulds. To order – please specify the nominal housing sizes and material type (or operating fluid, e.g. mineral oil) e.g. 150mm x 180mm x 22mm, GHN/FC.

## Fitting instructions for Lionsele® Chevron




1.Thoroughly clean packing housing.
2. Each ring and adjacent metal parts should be smeared with a suitable lubricant before fitting. Occasional further application to rods during service will prolong packing life.

**Non-adjustable glands and piston heads**

3. Ensure that the housing dimensions are the recommended ones.
4. Fit header ring with apex-facing retaining plate/spigot then insert sealing rings individually (grooves facing pressure) taking care not to damage lips. Ensure that each is firmly seated.
5.Tighten retaining plate/spigot hard against the cylinder/piston face. In cases where worn or incorrect sized rods/cylinders are encountered, additional compression may be applied by inserting thin jointing washers between packing and gland spigot.

**Adjustable Housings**

3. Fit header ring with apex-facing gland spigot then insert sealing rings individually (grooves facing pressure) taking care not to damage lips. Ensure that each is firmly seated.
4. Measure the space remaining between the cylinder face and packing. Then measure length of gland spigot and select metal spacers of suitable thickness for insertion between cylinder face and gland. Tighten gland so that the packing is gently and evenly compressed to the recommended housing depth. If additional compression is required to overcome leakage this is achieved by reducing spacer thickness.

**Split-form only**

1. The above procedures should be followed except that the ends of the packing must be entered first to obtain a tight joint, thereafter working around the remainder. Splits must be staggered
2. The rings are supplied slightly oversize in order to ensure interference between the ends of the split rings. Therefore any tightness within the housing is intentional and must not be relieved by trimming.

**NOTE**

To avoid damage in transit, spring loaded Lionsele Chevron headers are dispatched assembled to the packing, upside down. Please check before installing that the header is re-fitted to the set with the springs exposed.
Lionsele Chevron is self sealing under pressure and over-compression must be avoided.