

STEP 2 ALTERNATIVE METHOD

By press; (for a more controlled installation)

- Place piston with the O-ring positioned on the start of the lead in chamfer onto the installation bore fixture
- Press down, the piston will slide into the bore until the O-ring snaps into the groove



SEAL IN GROOVE

STEP 3 SMALL DIAMETER PISTON SEAL



- Once the seal is in the groove, the shaft can be inserted into the bore with the leading edge chamfer contacting the seal first as shown
- This should be done on a press wherever possible

FITTED ASTRA SEAL



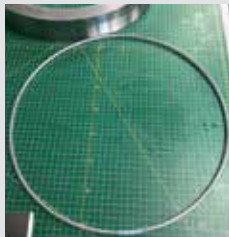
SHAFT ALIGNED READY FOR PRESSING



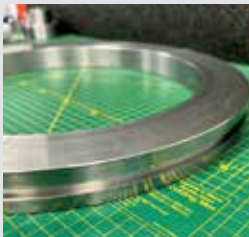
SHAFT FITTED INSIDE BORE

PISTON SEAL (large id) INSTALLATION

PISTON SEAL COMPONENTS



Astra Seal®



PISTON HOUSING



BORE

HOUSING REQUIREMENTS/RECOMMENDATIONS



LEAD IN CHAMFER

A lead in chamfer is required on the shaft, this is to ensure a gradual compression of the seal which reduces the risk of jacket damage.

This chamfer needs to be $<15^\circ$, with the optimum angle being 12° .

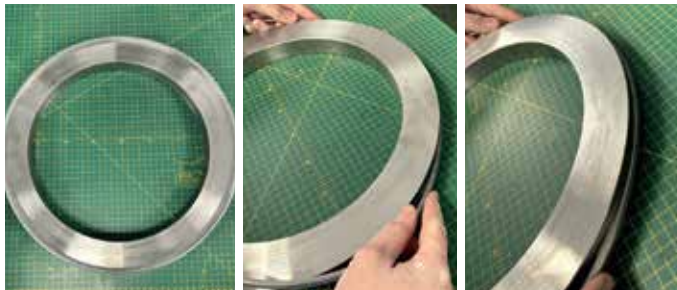
GROOVE

Before fitting an Astra seal ensure the groove is free from any sharp edges, damage or FOD.

Ensure the finish of all sealing surfaces are as smooth as possible with a recommended finish of at least .4Ra



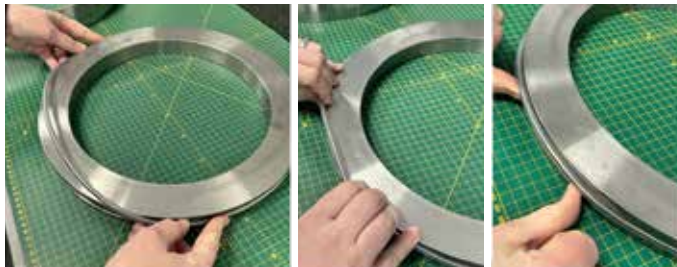
STEP 1 LARGE DIAMETER PISTON SEAL



- *Apply lubrication to the seal & housing
- Begin fitting the astra seal by locating the leading edge of the seal into the groove as shown

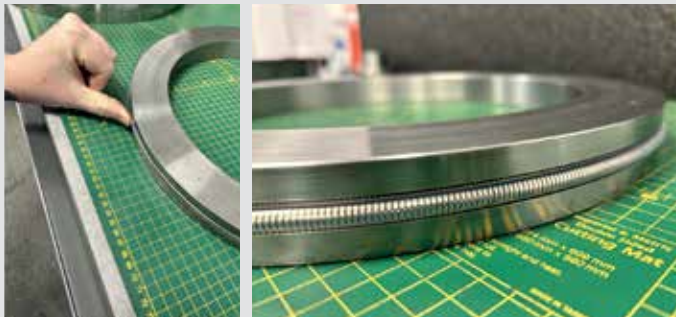
*Where application allows

STEP 2 LARGE DIAMETER PISTON SEAL



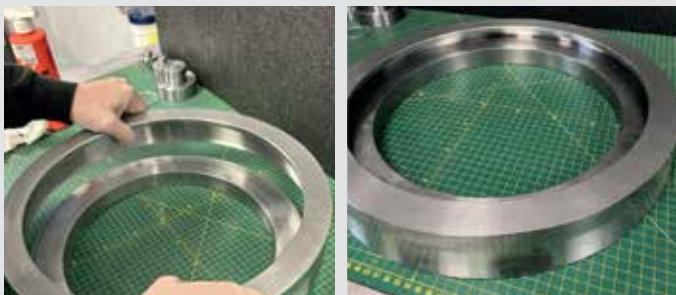
- Continue pressing the seal into the groove along the length of the seal
- When the seal becomes tight, stretch the remaining portion of the seal over the lip of the housing and into the groove
- Check the seal is seated correctly

STEP 3 LARGE DIAMETER PISTON SEAL



Astra Seal® fitted into groove

STEP 4 LARGE DIAMETER PISTON SEAL



- The Piston can now be installed into the bore making sure the lead in chamfer is contacting the seal first to allow gradual compression

APPENDIX A APIEZON N

Apiezion N can contain a high molecular weight polymeric additive that allows it to form a rubbery, cushioning effect between mating surfaces. The physical nature of this product makes it a popular grease for high vacuum use as well as general purpose laboratory use. It is not recommended for use above 30°C. Vapor pressure is estimated to be 8.10-10 mbar at 20°C.

When it comes to low temperature applications, nothing comes close in performance to Apiezion N Grease. The product retains most of its important properties all the way down to -269°C/4°K.

APPENDIX B KRYTOX LVP

Krytox LVP high vacuum grease is used as a sealant or lubricant in vacuum systems. Chemically inert and offering superior lubrication properties, Krytox LVP grease combines the extremely low vapor pressure of Krytox fluorinated oil, which is based on the most stable type of perfluoroalkylpolyether available, with a fluorocarbon thickener. Thus, Krytox LVP grease will not explode, ignite, decompose, react to form gummy or



This lubricant solution to those low temperature challenges can also be cycled from these low temperatures up to room temperature and then back down without showing visible signs of cracking. And in addition, this grease is completely free of any silicones or halogens.

Typical static applications:

- Sensor mount within certain low temperature scientific instruments
- Thermal coupling medium with cryostats
- Use in just about any cryogenic experiments



solid deposits, or act as fuel for fires. It retains its lubricating ability at temperature extremes ranging from -15 to 300°C and offers complete oxidation resistance. All these features add up to lower wear and longer life for equipment and components - so important when access for component repair or replacement is difficult or impossible.

SPECIFICATIONS	UNITS	geminYe Y VAC 3	RT 15 °C	KRYTOX LVP
Vapor pressure at 25°C	mbar	1.10 ⁻⁹	1.10 ⁻⁹	1.10 ⁻¹³
Penetration (worked, 25°C)	mm/10	250	295	265-295
Temperature range	°C	+20/+200	-30/+150	-15/+300
Density	g/ml	1.92	1.92	1.94
Viscosity	cSt	1500 at 20°C	1300 at 20°C	740 at 40°C
Packaging	-	100g	100g	57g

APPENDIX C DOW-CORNING SILICONE HIGH VACUUM GREASE

Silicone High Vacuum Grease is sealant which is ideally suited for all high vacuum applications. The grease is of uniform, soft consistency and can be used over a wide range of temperatures. Important features of this high vacuum grease

include good sealing ability, excellent resistance to water, chemicals, high and low temperatures, and low volatility. This grease can be used in applications operating down to 10⁻⁶ mbar.

SPECIFICATIONS	DC HIGH VACUUM GREASE
Vapor pressure at 25°C	1.10 ⁻⁸ mbar
Color	light grey / translucent
Temperature range	-40 to 200°C
Evaporation after 24h at 200°C	< 2%
Packaging	50g

