

X-Rings & Quad Rings (4-Lobe Seals)

Bi-directional sealing with lower friction and longer life than conventional O-rings

Overview

X-Rings - also known as Quad Rings or four-lobe seals - feature a four-lobed cross-section that provides two sealing surfaces on each side of the groove. This unique geometry offers several advantages over standard round O-rings: lower friction, reduced compression set, better resistance to spiral failure, and the ability to seal bi-directionally in dynamic applications.

We manufacture X-Rings in NBR, FKM, EPDM, and VMQ (Silicone) to match AS568 and ISO 3601 groove dimensions. Because X-Rings occupy the same groove width as O-rings, they are often used as drop-in upgrades to improve seal life without changing gland design.

Advantages

Description	Best For
The four-lobe design reduces contact area, cutting friction by 20-40% compared to round O-rings. Ideal for reciprocating dynamic seals.	Pneumatic cylinders, hydraulic rams
Two sealing lips on each side provide reliable sealing in applications where pressure direction alternates or is uncertain.	Double-acting cylinders, oscillating
The stable cross-section resists twisting and rolling in the groove - the primary cause of spiral failure in round O-rings.	Rod seals, piston seals, high-stroke
Less heat generation and better lubricant retention extend seal life in continuous dynamic service.	Production machinery, automation

Materials

Material	Properties	Best For
NBR X-Rings	-40 C to +120 C, excellent oil and fuel resistance, low cost	General hydraulics, pneumatics, fuel systems
FKM X-Rings	-20 C to +200 C, superior chemical and heat resistance	High-temperature hydraulics, chemical processing, aerospace
EPDM X-Rings	-50 C to +150 C, excellent water, steam and ozone resistance	Water systems, HVAC, food and beverage processing
VMQ (Silicone) X-Rings	-60 C to +230 C, FDA grades available, extreme temperature flexibility	Medical devices, food equipment, cryogenic and high-heat static seals

Sizing

X-Rings are dimensioned by inside diameter and cross-sectional width, using the same groove design as standard O-rings. We supply standard sizes to match AS568 and ISO 3601 series, plus custom dimensions.

Available Size Ranges

Series	Coverage
AS568 Series	1.78mm (CS), 2.62mm (CS), 3.53mm (CS), 5.33mm (CS), 6.99mm (CS)
ISO 3601 / Metric	1.80mm, 2.65mm, 3.55mm, 5.30mm, 7.00mm
Custom	Any ID and CS manufactured to drawing

FAQ

What is the difference between an X-Ring and a Quad Ring?

They are the same product. X-Ring and Quad Ring are trade names for seals with a four-lobed cross-section. The terms are used interchangeably in the sealing industry.

Can I use an X-Ring in a standard O-ring groove?

Yes. X-Rings are designed to fit in standard O-ring grooves without changing gland dimensions. Always verify groove width and depth match the specific X-Ring size chart, as squeeze requirements may differ slightly from round O-rings.

When should I choose an X-Ring over a round O-ring?

Choose an X-Ring for dynamic applications where lower friction, longer life, or resistance to spiral failure is important. They are also preferred in double-acting cylinders where pressure direction alternates.

Do X-Rings cost more than O-rings?

X-Rings typically cost 10-30% more than equivalent O-rings due to the more complex mold geometry. The price difference is often justified by longer service life and reduced maintenance in dynamic applications.

What hardness is standard for X-Rings?

70 Shore A is the most common hardness for dynamic X-Rings. Softer compounds (50-60 Shore A) are available for low-pressure or fragile housings, while 90 Shore A is used for high-pressure extrusion resistance.