Forsheda® V-Ring

UNIQUE DESIGN FOR SUPERIOR CONTAMINANT EXCLUSION

Forsheda® V-Ring

Effective sealing is critical to protect rotary systems from external contaminants and ensure long-lasting, efficient performance.

SINGLE-PIECE DESIGN FOR ENHANCED PROTECTION

Forsheda® V-Ring provides a reliable sealing solution for rotary applications and other sealing demands in a wide range of industries, from wind-powered turbines and electric motors to passenger vehicles and domestic appliances.

It is a single-piece, all-rubber, rotary wiper seal that stretches to fit the shaft and is held in place by its own tension. Installed against a stationary or rotating countersurface, Forsheda® V-Ring provides effective axial sealing.

Each seal is engineered to prevent the ingress of dirt, debris, or splash from the outside, whilst positively retaining lubricant within the system. This extends service life for the equipment and reduces unnecessary downtime.

The flexible sealing lip only applies light contact pressure against the counter-surface to reduce wear and permit movement while maintaining effective sealing. The flexible lip and hinge profile ensure integrity even in applications with considerable end play and shaft misalignment.

High-Performance Sealing

FEATURES AND BENEFITS

- Retains lubricant while effectively excluding contaminants
- Protects radial seals in abrasive environments
- Lowers friction losses to reduce wear and extend seal life
- Temperature resistant from -100 °C to +250 °C / -148 °F to +482 °F
- Simplified design reduces overall cost
- Permits axial movement or angular and radial misalignment
- Simple installation - stretches onto the shaft or seating
- No special machining required to close tolerances
- Versatile enough for several fields of application
- Reduced wear at high rotational speeds from lip lift-off technology
- Optional splicing allows any size diameter
- Suitable for partially submerged applications

APPLICATIONS

Any rotating application that requires protection from the external environment, including:

- Gears and transmissions
- Wind turbines
- Electric motors
- Radar equipment
- Machine tool equipment
- Vehicles
- Domestic appliances
- Hand tools
- Mills

ROTARY SEAL SELECTOR

Available online or as a mobile app, the Rotary Seal Selector offers advice on the use of individual rotary seals.

- Search and compare rotary seals based on specific application information, including size, operating parameters and lubricant used, or installation type and seal function
- Find detailed information on materials, sealing capabilities and installation
- Save your project for quick reference

Scan the QR code to find out more.

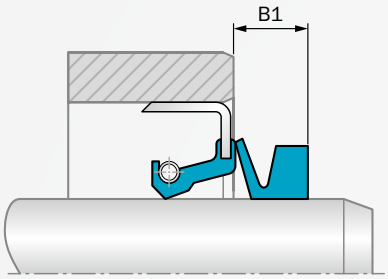
Optimal Protection

The strength of Forsheda® V-Ring lies in effectively sealing within hostile environments, where foreign media accumulate on the outer surface of the seal. As the speed increases, lip lift-off technology ensures that the lip lifts away from the surface and any media on the outside of the seal is removed. As the contact pressure of the lip decreases, functional losses and heat are kept to a minimum to reduce wear and extend seal life.

To ensure a sharp-edged finish, the top lip of the seal is cut to shape following molding. This is proven to effectively seal against dirt and debris, including fine particulates, by directing external media away from the counter-surface.

AXIAL SEALING

The geometry of Forsheda® V-Ring allows it to effectively act as an auxiliary element, offering protection to radial seals in aggressive and abrasive environments.



By installing Forsheda® V-Ring as shown, adequate protection is granted to the Radial Oil Seal and system service life is increased.

Single-piece construction

Keeps the seal in position with its own tension, stretching to fit the shaft

Sharp lip edge

Flexes against the sealing surface to provide a wide contact surface with low pressure and friction

Unique lip design

Acts as a check valve during grease purging

Hinge profile

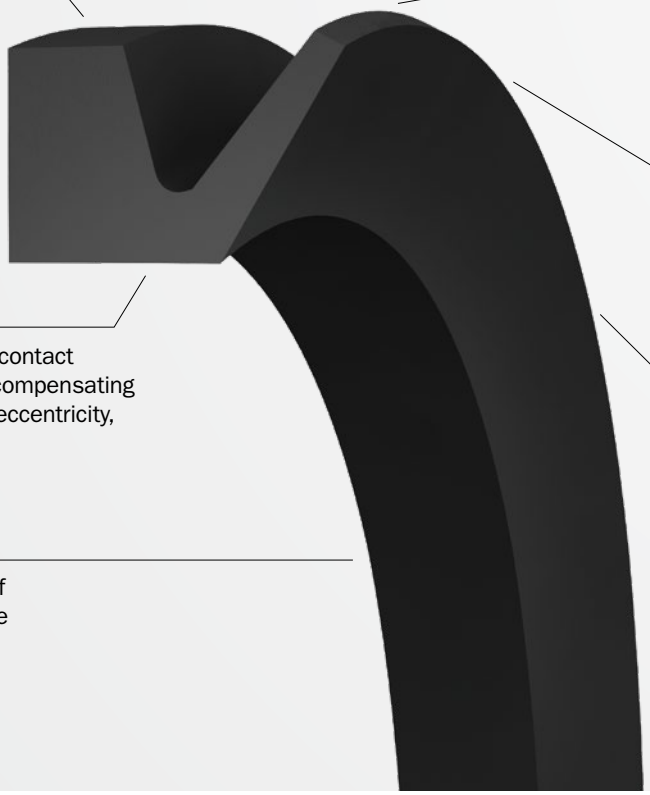
Enables light but continuous contact against the sealing surface, compensating for significant misalignment, eccentricity, ovality or shaft run-out

Lip lift-off technology

Creates a 'slinger' action at high speeds to remove excess droplets and reduce wear on the lip

UV and ozone resistant

Resists the harmful effects of ultraviolet radiation and ozone



Profiles to Fit Your Requirements

TYPES

Forsheda® V-Ring is available in a range of profiles to support a wide variety of applications and hardware designs. Special configurations, modified cross-sections and sizes are offered to meet customer requirements.

Types A and S use different cross-sections for the same shaft diameters, whereas the others use the same cross-section across the whole diameter range. Custom profiles can be created to meet specific application conditions and splicing allows seals up to nearly any diameter.

Profile	A	S	L	E	RM	RME	AX	LX
min ø mm	3 mm	5 mm	110 mm	300 mm	300 mm	300 mm	200 mm	140 mm
max ø mm	∞	199 mm	∞	∞	∞	∞	∞	∞

The size designation gives the nominal shaft diameter in mm. As it is an all-rubber seal, Forsheda® V-Ring can be stretched to use for a range of shaft diameters.

MATERIALS

The choice of material must consider the environmental demands and the desired performance of the seal.

Environmental considerations include:

- Good chemical resistance
- Good resistance to heat and low temperature
- Good resistance to ozone and weathering

Performance demands include:

- High wear resistance
- Low friction
- Low compression set
- Good elasticity

AVAILABLE IN A RANGE OF MATERIALS

- Nitrile (NBR)
- Hydrogenated Nitrile (HNBR)
- Chloroprene (CR)
- Ethylene Propylene (EPDM)
- Fluoroelastomer (FKM)
- Silicone Rubber (VQM)
- Ethylene Acrylic Elastomer (AEM)

Wear Resistance Testing

Trelleborg Sealing Solutions conducts in-house testing to verify the wear resistance of Forsheda® V-Ring using specialized equipment. Different products manufactured from various materials are analyzed simultaneously to measure mass loss from wear over time and compared with competitor products to determine the optimal solution.

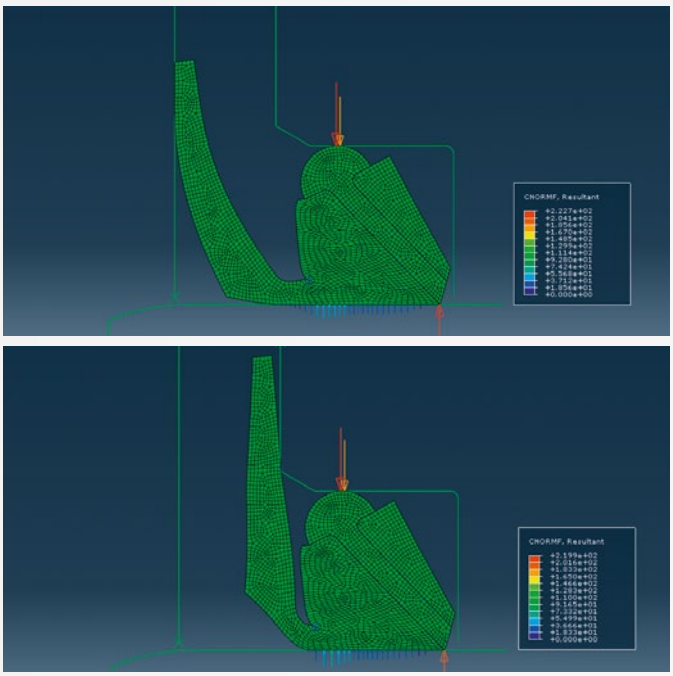
TESTING PARAMETERS

A constant rotational speed of 2,800 rpm was applied against a steel counter surface for 300 hours in dry conditions. The shaft diameter used in these tests was 50 mm using standard recommended assembly parameters.

Parts were disassembled, weighed and examined to determine the wear rate at intervals of 100 hours.

MASS LOSS CONCLUSIONS

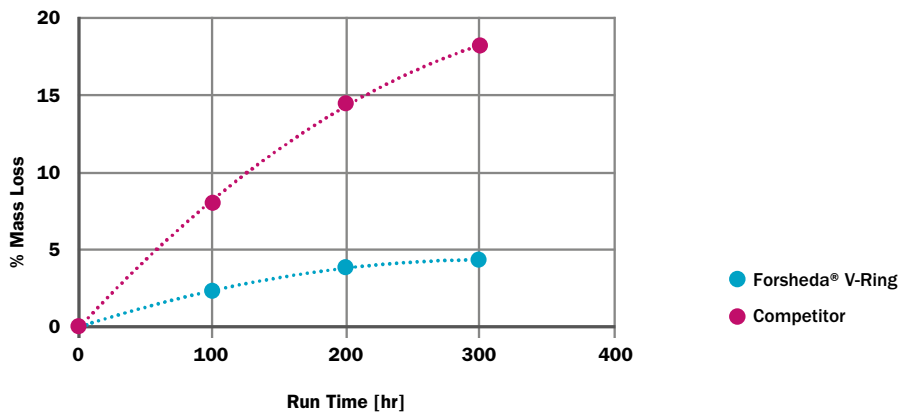
When compared with competitive products, Forsheda® V-Ring demonstrates improved wear resistance due to a superior design and material. This ensures longer sealing life and significantly reduced equipment failure rate with higher Mean Time Between Failure (MTBF).



Trelleborg Sealing Solutions uses the latest practical and simulated testing approaches to predict seal behavior.

WEAR RATE VS TEST RUN-TIME

Graph for mass loss (% of original mass) of Forsheda® V-Ring in NBR versus running time over 300 hours of testing.



Ozone and UV Resistance Testing

OZONE RESISTANCE TESTING

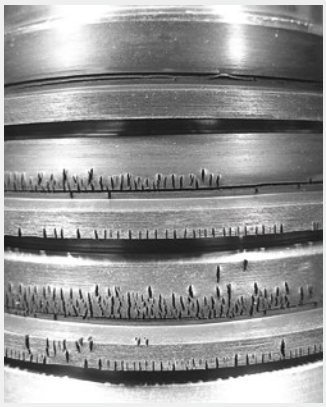
Testing demonstrated effective ozone resistance for up to 96 hours at 10% stretch with temperatures of +30 °C / +86 °F and ozone levels of 50 pphm (parts per hundred million)

To verify the resistance to ozone of Forsheda® V-Ring, Trelleborg Sealing Solutions conducted in-house testing at different stretch levels of 10%, 20%, 30% and 40% for a total of 96 hours at a temperature of +30 °C / +86 °F and 50 pphm (parts per hundred million) ozone.

Seals were routinely inspected every 24 hours for cracks.

Testing demonstrated that Forsheda® V-Ring has superior resistance to ozone when tested against competitor parts with the same material grade.

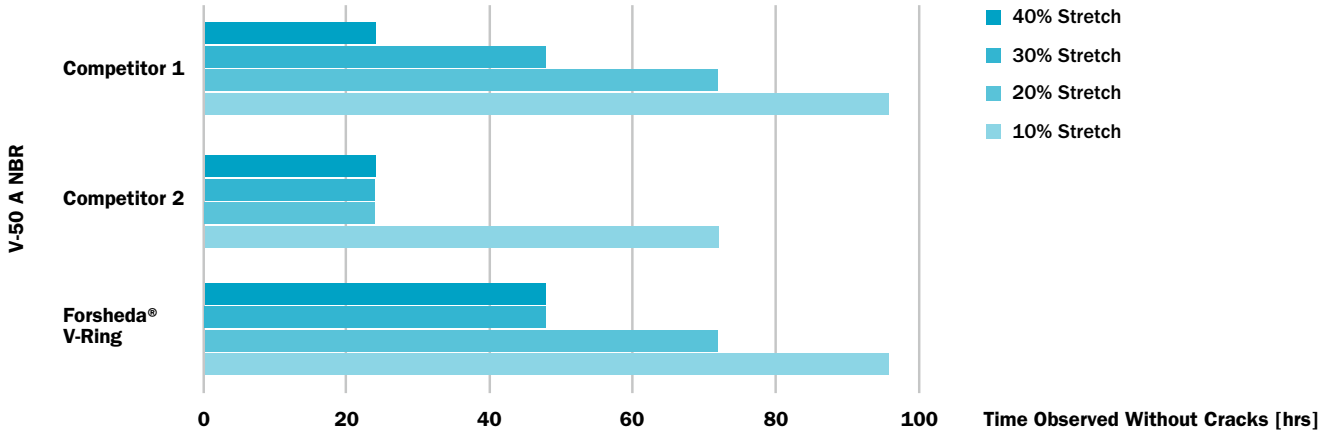
Forsheda® V-Ring in N6T50 strained at 10%, 20%, 30%, and 40% showed no cracks at any strain levels after 24 hours with ozone exposure.



Competitor products strained at 10%, 20%, 30%, and 40% failed after 24 hours at all four strain levels with ozone exposure.

FORSHEDA® V-RINGS HAVE IMPROVED OZONE RESISTANCE VERSUS COMPETITOR PRODUCTS

Testing carried out at different stretch levels; +30 °C / +86 °F; 50 pphm ozone



UV RESISTANCE TESTING

Testing demonstrated effective UV resistance for up to 39 months at temperatures of +10 °C to +35 °C / +50 °F to +95 °F with an average humidity of 73%

These tests demonstrated Forsheda® V-Ring effectively resists natural UV with no material degradation for up to 39 months across all of our materials tested.

Trelleborg is a world leader in engineered polymer solutions that seal, damp and protect critical applications in demanding environments. Its innovative solutions accelerate performance for customers in a sustainable way.

Trelleborg Sealing Solutions is a leading developer, manufacturer and supplier of precision seals, bearings and custom-molded polymer components. It focuses on meeting the most demanding needs of aerospace, automotive and general industrial customers with innovative solutions.

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If you'd like to talk to Trelleborg Sealing Solutions, find your local contact at: www.trelleborg.com/seals/worldwide

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