



Sealing Solutions for Material Handling Equipment



Your Partner for Sealing Technology

ENSURING LONG-LASTING, RELIABLE OPERATION

Material handling equipment works hard and long to deliver goods when and where they are needed. Vehicles and equipment have become indispensable in a number of working environments. Productivity and safety are crucial and sealing solutions must be long-lasting and ensure continuous, efficient operation.

Trelleborg Sealing Solutions delivers the solutions to meet the demands of material handling equipment. Our know-how and long-standing expertise enable us to provide you with a full range of standard and custom sealing solutions to meet your unique needs.












Global engineering experts

partner with you to develop the optimum sealing solution and **increase the performance** of your material handling application

Around-the-clock operations and **global logistics** designed to meet scheduling requirements

Extensive **sealing expertise** accelerates the time to market, **improves efficiency of components and equipment** and lengthens maintenance intervals

SELECTED TOOLS FOR DESIGN ENGINEERS

Mechanical Design Assistance	Standards, Conversions and Norms	Learning and Knowledge	Product Selection
 Hydraulic System Calculator  Area & Volume Calculator  Mechanical Engineering Calculator  Fluid Mechanics Calculator  CAD Services	 ISO Fits & Tolerances  Unit & Hardness Converter	 Installation Instructions  e-Learning on Sealing Technology	 Electronic Catalog  Sealing Solutions Configurator

● Website Tools & Services

● Mobile Apps

Further Information

To find our complete range of tools and apps for engineers, visit www.tss.trelleborg.com or scan the QR code.



Technical Library

Technical articles, whitepapers and webinars can be found in the Technical Library at www.tss.trelleborg.com.

Unrivaled Services & Capabilities

Trelleborg Sealing Solutions contributes more benefits than a simple seal supplier. Our experts partner with customers across the globe to help them achieve their goals, whether starting from a "black box" specification, aiding testing and qualification to get product to market, or developing solutions to enhance manufacturing and supply chain processes.



ServicePLUS

- Services to support every step of your value chain:
- Optimize product & application performance
- Maximize production throughput
- Enhance supply chain processes
- Boost customer care



ENGINEERING

- State-of-the-art CAD tools
- Experienced designers
- On-site support at customer facilities
- Dedicated project management
- FEA modeling
- Prototyping
- Custom-made solutions



TESTING

- Nine research and development centers globally
- World class material & product testing equipment
- Analytical laboratories



PROJECT MANAGEMENT & QUALIFICATION

- Comprehensive project management
- From development to serial production and product introduction

Sealing Solutions for Forklifts

REDUCING DOWNTIME WITH INNOVATIVE SEALS, BUSHINGS AND CUSTOM-MOLDED PARTS

Forklift trucks have become indispensable in a variety of work environments. They play a valuable role in manufacturing facilities and warehouses, ensuring items are in the right place at the right time. Consequently, forklifts are often in constant use.

Seals and wear rings play a critical role in forklift applications and must withstand heavy loads while ensuring continuous, efficient operation.



Scan the QR code to see our full portfolio of products and solutions for forklifts.



Engineered Molded Parts

Custom-designed components are designed to meet your individual needs. Developed in cooperation with our engineering teams, they can provide significant benefits from a function, manufacturing or performance perspective.



Cassette Seal

For use in heavy-duty vehicle axles, hubs and industrial gearboxes, cassette seals offer long service life, high functional reliability, environmental safety and easy installation.

FUEL SYSTEM

Forklifts have three primary options when it comes to powering the truck: an internal combustion engine, electric power or hydrogen fuel cells. These three options are fundamentally different and require unique sealing solutions for system components, to prevent leakage and keep fuel and lubrication from being contaminated by outside particles.

- 1 **Combustion Engine:** O-Rings, Quad-Ring® seals/X-Rings, Kantseals/ square rings, engineered molded parts
- **Electric drive*:** HiSpin® rotary seals, static seals, engineered molded parts
- **Hydrogen fuel cell system*:** Engineered molded parts

DRIVETRAIN COMPONENTS

Rotary seals, engineered molded parts and custom-machined Orkot® profiles, seal and support the vital drivetrain components that keep the forklift operating efficiently.

- 2 **Axle-wheel hub:** Cassette seals
- 3 **Brake system:** Custom-molded parts
- 4 **Gearbox:** Radial Oil Seals
- 5 **Steering system:** Zurcon® U-Cup RU9, Zurcon® L-Cup®, Zurcon® Scraper DA24, Orkot® & HiMod® Bearings



Radial Oil Seal

Providing long-lasting sealing efficiency, they are designed for sealing shafts and spindles and consist of a rubber sealing lip, metal case, a spiraled tensioning spring and are available with or without an external dust lip.

HYDRAULIC SYSTEM

High-performance radial oil seals, engineered molded parts, Quad-Ring® seals/X-Rings and O-Rings in the hydraulic system ensure all components on the forklift function seamlessly.

- 6 **Hydraulic control unit:** Engineered molded parts, Quad-Ring® seals/X-Rings, O-Rings
- 7 **Axial piston pump:** Turcon® Glyd Ring®, Radial Oil Seals, O-Rings



WHEELS

Trelleborg Wheel Systems is a leading supplier of tires and wheels for forklift trucks. Innovative products like the Pit Stop line improve productivity and safety while reducing tire waste.

➔ Scan the QR code to learn more.





Orkot® Slydring®

Made of a resin-impregnated fine-weave fabric material with added lubricants, this wear ring prevents metal-to-metal contact in hydraulic cylinders and is capable of withstanding high loads.

LIFT & MAST MECHANISMS

Zurcon®, HiMod® and Orkot® materials in engineered seal and wear ring profiles ensure maximum performance in the critical lift and mast applications that are paramount to forklift functionality.

- 8 **Lift/plunger cylinders:** Zurcon® U-Cup RU9, Zurcon® Buffer Seal, HiMod® Slydring®, Zurcon® Scraper DA22
- 9 **Mast:** Machined Orkot® components reduce friction and maintain heavy loads supported by the forklift's mast.

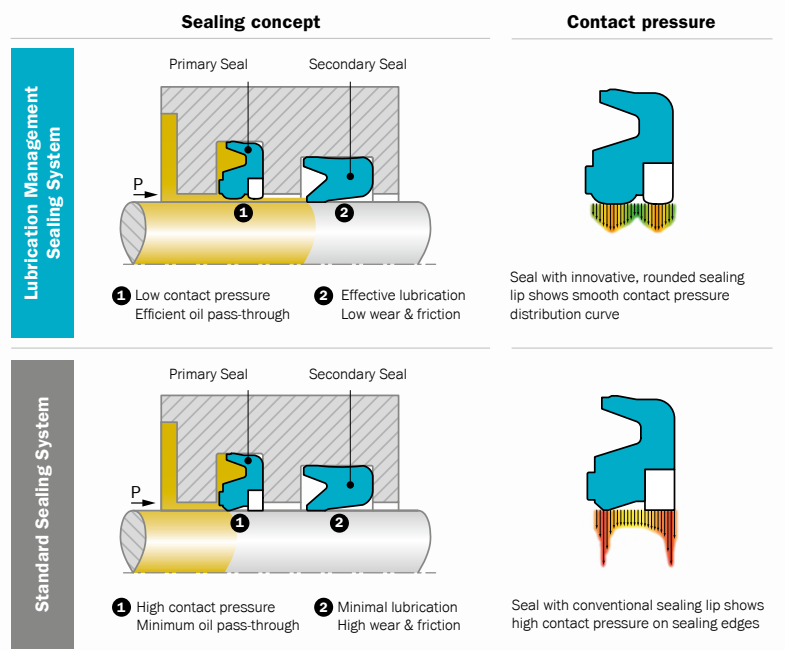


Dualseal

A single seal element for static applications, this seal offers resistance to twisting, easy installation and long service life, and is recommended for heavy duty applications.

LUBRICATION MANAGEMENT TECHNOLOGY

Effective sealing in demanding hydraulic applications requires seals and lubricant to work together. Trelleborg's Lubrication Management technology transforms hydraulic sealing by adjusting lubrication conditions of all single sealing elements within a sealing system.



ATTACHMENTS

A multitude of attachment options are available for forklifts to extend their range and capabilities. Hydraulic cylinders and valves supporting forklift attachments must be reliable and withstand heavy loads. While preventing leakage both internally and externally on the cylinders, sealing solutions must offer easy installation and long service life.

- 10 **Tilt cylinder** / 11 **Side shift cylinder:** Zurcon® U-Cup RU9, Zurcon® Dualseal, Zurcon® Scraper DA24, HiMod® Wear Rings, Zurcon® Wynseal
- 12 **Specialty attachments:**
 - **Push/pull, clamp and rotator cylinders:*** standard and custom engineered seals
 - **Rotary manifolds:*** Turcon® Roto Glyd Ring®, Zurcon® Dualseal, O-Rings, and Back-Up Rings

*not shown

MATERIALS

Trelleborg Sealing Solutions has developed an industry-leading group of materials within each material type. Material handling equipment manufacturers can select the compound that best suits their needs.

TURCON® – Outstanding Friction Characteristics

Turcon® is the brand name of the Trelleborg Sealing Solutions range of proprietary materials based on premium-grade Polytetrafluoroethylene (PTFE). The materials demonstrate low friction, with minimized wear in dynamic and high speed applications. They are compatible to virtually all media, even at elevated temperatures, and are resistant to aging.
Operating temperatures: -196 °C to +260 °C / -320 °F to +500 °F
Recommended material: Turcon® M12

ZURCON® – Exceptional Wear Resistance

Zurcon® engineered thermoplastic-based materials exhibit outstanding friction characteristics, making them ideal for reciprocating, very slow rotating and oscillating situations where high wear resistance is required.
Operating temperatures: -60 °C to +260 °C / -76 °F to +500 °F
Recommended material: Zurcon® Z20

ORKOT® – Advanced composite polymers

Orkot® bearing materials are thermoset composites incorporating advanced polymer technologies. These consist of technical fabrics impregnated with thermosetting resins, evenly dispersed solid lubricants and further additives to ensure optimum performance.
Operating temperatures: -150 °C to +130 °C / -238 °F to 266 °F
Recommended material: Orkot® C320

ADVANCED ELASTOMER MATERIALS

NBR (Nitrile Butadiene Rubber)

NBR is primarily used with mineral-based oils and greases and in general the material has good mechanical operating temperatures.
Operating temperatures: -30 °C to +100 °C / -22 °F to +212 °F

EPDM (Ethylene Propylene Diene Monomer)

EPDM is often used in applications with brake fluids (based on glycol). The materials give good heat, ozone, and aging resistance. They also exhibit high levels of elasticity, good low temperature behavior, as well as good insulating properties.
Operating temperatures: -45 °C to +150 °C / -49 °F to +302 °F

HNBR (Hydrogenated Nitrile Butadiene Rubber)

HNBR is often used in high-temperature applications due to its excellent abrasion resistance and good mechanical properties.
Operating temperatures: -30 °C to +140 °C / -22 °F to +284 °F

FKM (Fluorocarbon Rubber)

FKM is known in particular for its very good resistance to fuel, oil and aggressive media, as well as excellent resistance to ozone, weathering and aging. Depending on structure, fluorine content and used curing system, FKM materials can differ with regards to their chemical resistance and cold-flexibility.
Operating temperatures: -20 °C to +200 °C / -4 °F to +392 °F, for short periods up to +230 °C / +446 °F

ADDITIONAL EQUIPMENT – Seals for a full range of material handling machinery

- Side loaders
- Conveyance systems
- Cranes
- Aerial man lifts
- Automatic Guided Vehicles
- Bucket elevators



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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