SEALING SOLUTIONS FOR METAL PROCESSING
SEALING SOLUTIONS FOR YOUR PRODUCTION LINES

TAILOR-MADE, FIELD-PROVEN, WORLD CLASS QUALITY

Our products and services are renowned for their outstanding performance. It’s good to know that we can make a valuable contribution to the success of major OEM’s and after market customers in various industries.

We put much energy into common customer development projects. The target is always the same: we always seek the best sealing solution.

Even under most adverse conditions – like in the challenging environment of the iron and steel industry – customers around the globe rely on our product quality.

Freudenberg Sealing Technologies is the largest member of the Freudenberg Group, a family-run company with more than 48,000 employees in 60 countries. Starting with the Simmerring® oil seal, which was developed at Freudenberg in 1929, today the specialist technology supplier can call on a broad range of seals and sealing systems that have been rigorously developed to meet customer requirements in a wide variety of applications.

Freudenberg Sealing Technologies has sites in Europe and North and South America. Together with strong partners NOK Corporation, Japan, Sigma Freudenberg NOK in India and NOK-Freudenberg Group in China, the companies form a worldwide network which aims to supply its customers right around the globe with products of the same high quality.

Our products are often invisible, but always essential. That means you can rely on the ultimate in high-performance products supplied by the global market leader in sealing technology: Freudenberg Sealing Technologies.

OFTEN INVISIBLE
ALWAYS ESSENTIAL
SYSTEMS FOR BALANCE CYLINDERS

OUR RECOMMENDATION FOR MAXIMUM CONTROL OF A FAST MOVING CYLINDER

- Merkel Omegat OMS-S rod seal in combination with a Merkel wiper PT 2 and triple Merkel Guivex guide bands
- Best adjustability and cylinder control due to advanced frictional behavior of Merkel Omegat PTFE seals.
- The patented Merkel Guivex geometry allows smaller gaps without any risk of metal-metal contact
- Our sealing arrangement provides for improved performance while allowing for shorter housings

GUIVEX GUIDE BAND – THE SECRET OF GEOMETRY AND MATERIAL

- The patented geometry prevents edge pressing even at high loads
- Best functional behavior by a balanced handling of surface loads up to 80 N/mm²
- No flow of material when overloaded – the laminated fabric HG650 significantly increases functional safety

Above: Stiffness of the guide band material HG650 compared to competitor version
Below: No stress peaks at the edges by the Guivex geometry, thus no uneven wear of the guide band

SYSTEMS FOR HAGC CYLINDERS

OUR RECOMMENDATION – MAXIMUM PROTECTION OF THE COUNTER SURFACE

- Merkel Omegat OMS-S rod and Merkel Omegat OM3K at the piston in combination with a Merkel wiper PT 2 and Merkel Guivex guide bands
- Minimum wear is the target. That’s the reason why we use a glass molybdenum compound offering self-lubricating behavior, which is ideal for short strokes and high frequencies.
- Form follows function – reliable handling of high pressures even above 30 MPa due to heavy duty design of the Merkel Omegat seal, and, simultaneously, offering maximum service life.
- External “protective screen” in extremely dirty environments – Merkel double wiper PT 2 offers the best protection for a long lasting sealing system, even at the static side towards the housing.

STANDARD FOR EXISTING HOUSINGS – STICK SLIP FREE OPERATION INCLUDED

- Precise cylinder adjustment in less than a hundredth of an inch – a matter of course for the functional behavior of our Merkel Omegat seals
- Aggressive coolants in your cold strip mill? The range of our proven sealing materials doesn’t let you down.
- Merkel Omegat OMS-M rod seal in combination with a Merkel wiper PT 2 and Merkel Guivex guide bands

Precise guiding – long service intervals
Gentle to the surface – reduced maintenance cost

MATERIAL

GEOMETRY

HG650
HG650
Competitor
Competitor

HG650
 HG650
 HG650
 Competitor
 Competitor

Competitor
Merkel Guivex

Deflection
Load
SEALING SYSTEMS FOR ROLLER BEARINGS IN WORK ROLLS

IDEAL SOLUTION FOR GREASE LUBRICATED BEARINGS

- Operating speeds up to 20 m/s
- Space saving design utilizes integrated lubrication groves in the sealing element
- Precise line forces of the sealing edge offers leak free performance, as well as minimized wear

Merkel Radiamatic R 37 in tandem arrangement and cover plated, in combination with a water guard Merkel Enviromatic EA

SEALING SYSTEMS FOR PLAIN BEARINGS IN BACK-UP ROLLS

IF SPEED IS THE ISSUE – MERKEL RADIAMATIC RHS 51

- Solid performance – even up to ±3 mm shaft deflection or high speeds up to 35 m/s, 40 m/s intermittent
- Self-retaining fit by vulcanized-in steel bands
- Simple, housing friendly installation

Merkel Radiamatic RHS 51 in combination with a water guard Merkel Enviromatic EA

THE KEY FOR SUCCESS – EVENLY DISTRIBUTED RADIAL FORCES

- To avoid local stress and to focus on longevity, the Merkel Radiamatic RHS 51 uses a double arranged tension spring, a smoothly sliding coil spring inside a second one
- Low heat generation even at high speeds
- Avoids elevated radial forces compared to standard pre-stressing elements at the sealing lip

Low friction and wear even at high shaft offset – the Merkel Radiamatic RHS 51 offers the right balance

MODERNISATION – COMBINING THE BEST

- High permissible shaft offset
- Increased protection for plain bearings

Re-design idea for common plain bearings / oil film bearings, based on two rotary shaft seals Merkel Radiamatic RHS 51
If you think in terms of tons produced and do not want to count lost hours. Nowadays, the term workhorse implies an “all-in carefree package”. The Merkel Radiamatic RPM 41 radial shaft seal, specially designed for work rolls, is such a performer: offering secure and reliable sealing over a long period of time. Its installation is pretty unspectacular. The seal is completely coated in rubber, leaves no traces in the installation space and slides effortlessly into place.

MAXIMUM PROTECTION FOR YOUR WORK ROLL BEARINGS

TAILOR-MADE SEALING COMBINATION:
MERKEL RADIAMATIC RPM 41 + MERKEL ENVIROMATIC

- Readiness of supply – within hours, if needed
- Reliable protection against water ingress into lubricant
- Without tension spring at the sealing lip – any other potentially corrosive or hazardous component is missing as well
- Gentle to the housing – easy to install & remove

SOLID AS A ROCK

Unlike the usual V-rings, which have a soft, flat sealing lip with a broad contact surface, the new water guard Merkel Enviromatic has a defined, linear sealing edge. This functional, linear contact of the sealing lip remains intact even in the case of axial shaft misalignment of ±4 mm up to ±12 mm. The result is maximum protection against ingress of water and dirt in the area of roller and plain bearings.

Available Merkel Enviromatic versions
Suitable for standard housings

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Maximum values</th>
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</thead>
<tbody>
<tr>
<td>Temperature</td>
<td>-30°C .. +100°C</td>
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<tr>
<td>Pressure</td>
<td>0.05 MPa (Ø D ≤700 mm)</td>
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<tr>
<td></td>
<td>0.03 MPa (Ø D &gt;700 mm)</td>
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<tr>
<td>Sliding speed</td>
<td>15 m/s</td>
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</tbody>
</table>

Operating conditions for versions made of NBR*

| List of Merkel Radiomatic RPM 41 profiles for diameters D = 200 mm up to 1064 mm |
|---------------------------------|------------------|------------------|------------------|------------------|------------------|------------------|
| 15,0 x 16,0 | † | † | † | † | | |
| 19,1 x 16,0 | † | † | † | † | | |
| 19,1 x 18,0 | † | † | † | † | | |
| 20,0 x 16,0 | † | † | † | † | | |
| 20,0 x 18,0 | † | † | † | † | | |
| 20,0 x 20,0 | † | † | † | † | | |
| 22,0 x 20,0 | † | † | † | † | | |
| 25,0 x 16,0 | † | † | † | † | | |
| 25,0 x 18,0 | † | † | † | † | | |
| 25,0 x 20,0 | † | † | † | † | | |
| 25,0 x 22,0 | † | † | † | † | | |
| 25,0 x 25,0 | † | † | † | † | | |
| 30,0 x 30,0 | † | † | | | | |
| 32,0 x 25,0 | † | † | | | | |

Further dimensions on request.

* further materials, e. g. HNBR, FKM, on request
## General Information

<table>
<thead>
<tr>
<th>YOUR COMPANY NAME</th>
<th>YOUR NAME / E-MAIL-ADDRESS</th>
<th>NAME OF EQUIPMENT MANUFACTURER</th>
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## MILL TYPE

- Hot flat rolling mill
- Cold rolling mill
- Plate rolling mill
- Profil rolling mill
- Wire rolling mill
- Steckel mill
- Continuous caster
- Steelmaking plant

## TYPE AND NUMBER OF STANDS

e.g. 7-stand cold strip mill F1 - F7, or reversing roughing stand

## TYPE OF PRODUCT

- Steel
- Aluminium
- Stainless steel

## TYPE OF WORK ROLL BEARING

- Roller bearing
- Oil film bearing

## OPERATION MODE

- CSP
- DCR

Duty cycle: ___________ hours  Cycle mode: ___________ (e.g. slow/fast, right/left run)

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**Please note**

If a lubricant supply is used, please specify the exact position of the bore.
In case of a spacer, please share dimensions. The dimension H is the height/thickness of the spacer.

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**FREUDENBERG SEALING TECHNOLOGIES**
SEALING SYSTEMS FOR CONTINUOUS CASTER

SEGMENT CYLINDER FOR THE ROLLER ADJUSTMENT

IDEALLY HARMONIZED – OUR RECOMMENDATION

- Merkel Omegat OMS-S (rod) and Merkel Omegat OMK-S at the piston in combination with a Merkel PT-1 wiper and Merkel Guivex guide bands
- Low-friction materials allow faster control strokes with high sealing function at the same time
- More compact and simple designed housings reduce the material costs for the entire cylinder
- Optimized PTFE wiper achieves better wiping action and thus increases overall cylinder functionality

STANDARD FOR EXISTING HOUSINGS

- Merkel V-packing set EKV at the piston and ESV at the rod combined with a Merkel P-6 wiper and metallic guide elements
- Reliable sealing function even with heavily stressed rod / surfaces or increased dirt entry
- Split version available for easy installation
SEALING SYSTEMS FOR CONTINUOUS CASTER SEGMENTS

SIMMERRING TYPE BAUM FOR OPEN HOUSINGS
- High wear resistance for long service life at high temperatures
- Standard seals are readily available
- Simple installation for low service cost

Simmerring BAUM with self-retaining fit in the housing
In case of heavy contamination also with protective lip or “filter fleece” available for an optimized life

VERSATILE U-RING SOLUTION FOR LOW SPEEDS
- Easy to install snap-in function
- Material mix to meet specific requirements
- No metallic components = no risk of corrosion

Merkel U-ring NRSF made of NBR, HNBR, FKM or Polyurethane

WHEN IT GETS TOO HOT
- Reliable protection of the bearing against contamination by PTFE wiper
- Suitable for high speeds and temperatures
- Low friction and greatly reduced wear due to self-developed, high-quality PTFE compounds which, in addition to the actual sealing function, particularly protect the counter surface

Both made of Carbon filled PTFE - Merkel U-ring NREW in combination with a Merkel water guard WADB-9460

SEALING SYSTEMS FOR GEAR BOXES

SIMMERRING – THE ORIGINAL
- Compared to the competition, lower friction / energy loss / wear and thus offering a significantly longer service life
- Customized adjustments possible
- High availability of standard articles

Everything is included – Simmerring Type B2SL with integrated dust lip and metal insert for increased stiffness

IF EASY REPLACEMENT IS THE ISSUE – MERKEL BONDING SET RK 15
- Cost and time saving, since complete dismantling of housing and shaft can be avoided
- Complete, multi-use set with bonding tool, glue, abrasives and cleaning agent
- Shipping of bonding set within one week, if necessary

Assembled bonding device – the individual joining tool guarantees a precise joining of the sealing edge without misalignment

THE IDEAL COMBINATION FOR DEMANDING TRANSITIONS BETWEEN SPINDLE AND DRIVE
- Floating cartridge for high axial movements
- No wear issues
- No leakage issues

Merkel Omegat OKDS-0168, Omegat OSDS-0169 in combination with a special guide band made of resin bonded fabric
SEALING SYSTEMS FOR EAF – ELECTRIC ARC FURNACE

LIFTING CYLINDER AT THE EAF

FOR EASY REPLACEMENT – OUR TRADITIONAL SOLUTION

- Merkel V-packing set ESV in combination with a Merkel wiper P 6 made of elastomeric material
- Long lifetime even without bellow protection of the rod
- Reliable sealing function even if rod is highly strained
- Split version for ease of installation and reduced maintenance cost

LOW FRICTION AND LONG STROKE PERFORMANCE – OUR RECOMMENDATION

- Merkel Omegat OMS-MR primary seal and Merkel U-ring L 20 secondary seal, combined with a Merkel wiper PT 1 and Merkel Guivex guide bands
- Stick-slip free operation allows exact positioning
- Ideal sealing function for long service intervals without leakage
- Important: the rod must be protected against sparks or the like
**PRODUCT OVERVIEW**

<table>
<thead>
<tr>
<th>Type</th>
<th>Profile</th>
<th>Material</th>
<th>EAF</th>
<th>Rotary</th>
<th>Distributor</th>
<th>Gearbox</th>
<th>Mill</th>
<th>Spindles</th>
<th>Color</th>
<th>Xpress</th>
<th>Tailormade</th>
<th>Technical Data</th>
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**GUIDES**

| | | | | | | | | | | | | | |
| Merkel Guive SBK | Resin b. fabric | | | | | | | | | | | | |
| Merkel Guide Band SB | Lamin. fabric | | | | | | | | | | | | |
| Merkel Guide Band SF | PTFE | | | | | | | | | | | | |
| Merkel Guive KBK | Resin b. fabric | | | | | | | | | | | | |
| Merkel Guide Band KB | Lamin. fabric | | | | | | | | | | | | |
| Merkel Guide Band KF | PTFE | | | | | | | | | | | | |

**RADIAL SHAFT SEALS**

| | | | | | | | | | | | | | |
| Merkel Radiamatic R 35 | 0+NBR, FKM | | | | | | | | | | | | |
| Merkel Radiamatic R 36 | 0+NBR, FKM | | | | | | | | | | | | |
| Merkel Radiamatic R 37 | 0+NBR, FKM | | | | | | | | | | | | |
| Merkel Radiamatic R 58 | NBR | | | | | | | | | | | | |
| Merkel Radiamatic RS 85 | 0+NBR, FKM | | | | | | | | | | | | |
| Merkel Radiamatic RHS 51 | 0+NBR, FKM | | | | | | | | | | | | |
| NOK Radiamatic SBR | 0+NBR, FKM | | | | | | | | | | | | |
| Merkel Radiamatic RPM 41 | NBR | | | | | | | | | | | | |
| Merkel U-cup NRRW | PTFE | | | | | | | | | | | | |
| Merkel U-cup NRSF 2816 | NBR, FKM, PU | | | | | | | | | | | | |

- our recommendation for new construction or redesign
- Xpress service
- additional products for repair and maintenance
**Type** | **Profile** | **Material** | **SAE** | ** Rotary Distributor** | **Contaminant Level** | **Grain Size** | **Mill Speed** | **Color** | **Specialities** | **Xpress** | **Technical Data**
---|---|---|---|---|---|---|---|---|---|---|---
**Simmerring Oil Seals**
BA ... |  | NBR, FKM | ⚫ ⚫ ⚫ ⚫ ⚫
BA ... SL |  | NBR, FKM | ⚫ ⚫ ⚫ ⚫ ⚫
BA – modified standard |  | NBR, FKM | ⚫ ⚫ ⚫ ⚫ ⚫
B1 ... |  | NBR | ⚫ ⚫ ⚫ ⚫ ⚫
B1 ... SL |  | NBR | ⚫ ⚫ ⚫ ⚫ ⚫
B2 ... |  | NBR | ⚫ ⚫ ⚫ ⚫ ⚫
B2 ... SL |  | NBR | ⚫ ⚫ ⚫ ⚫ ⚫
Special design |  | NBR, FKM | ⚫ ⚫ ⚫ ⚫ ⚫

**Water Guards**
Merkel Water Guard WA-A |  | NBR, FKM | ⚫ ⚫ ⚫ ⚫ ⚫
Merkel Water Guard WA-AX |  | NBR, FKM | ⚫ ⚫ ⚫ ⚫ ⚫
Merkel Envromatic EA |  | NBR, FKM | ⚫ ⚫ ⚫ ⚫ ⚫
Merkel Envromatic EAX |  | NBR, FKM | ⚫ ⚫ ⚫ ⚫ ⚫
Merkel Envromatic EE |  | NBR, FKM | ⚫ ⚫ ⚫ ⚫ ⚫
Merkel Envromatic EL |  | NBR, FKM | ⚫ ⚫ ⚫ ⚫ ⚫

**Seals for Pivoting Motion**
Merkel Rotomatic M 17 |  | NBR | ⚫
Merkel Rotomatic M 19 |  | NBR / FKM | ⚫

**Static Seals**
Merkel Cover Seal PU 82 |  | PU, NBR, HNBR, FKM | ⚫ ⚫ ⚫ ⚫ ⚫
Merkel Cover Seal PU 83 |  | PU, NBR, HNBR, FKM | ⚫ ⚫ ⚫ ⚫ ⚫
Merkel Stiromatic SBC |  | PU | ⚫ ⚫ ⚫ ⚫ ⚫
Merkel O-Rings |  | NBR, FKM | ⚫ ⚫ ⚫ ⚫ ⚫

**Packings**
Merkel Arochem II 6211 |  | PTFE yarn | ⚫ ⚫
Merkel Unistat 6303 |  | PTFE yarn | ⚫ ⚫
Merkel Ramilon 4586 |  | Natural fibre | ⚫ ⚫ ⚫ ⚫
Merkel Anolan II 6215 |  | Aramid yarn | ⚫ ⚫ ⚫ ⚫
Merkel Unival 6323 |  | PTFE yarn | ⚫ ⚫ ⚫ ⚫

**Accumulators**
Piston Accumulator
Bladder Accumulator
Diaphragm Accumulator

**Lubricants**
Klüber Stabutherm GH 461
Klübersynth HB 74-401

- our recommendation for new construction or redesign
- Xpress service
- additional products for repair and maintenance
SERVICE – DISCOVER A SATISFYING PACKAGE

Bound by tradition – as a family owned company we know how important it is to rely on each other. For more than 165 years we’ve been listening to our customers to help reduce maintenance costs.

LOCAL SERVICE CENTER – MINIMIZING DOWNTIME, MAXIMIZING YOUR FLEXIBILITY

Our contacts at the service centers are qualified and able to give you competent advice. Their expertise will also be beneficial when it comes to choosing the most suitable sealing system. Here, the right choice is just as important for the best possible performance of the application as the quality of the individual seal.

DISTRIBUTION NETWORK – A WELL TRAINED STAFF OFFERS BEST SUPPORT

Maintenance, repair and overhaul cannot be avoided, but can be reliably controlled and economically organized by our heavy industry partners. We continuously train our staffs with the aim of successively increasing the efficiency of your production lines.

FREUDENBERG XPRESS – SEALS WITHIN 24 HOURS, IF NEEDED

The worldwide Freudenberg Xpress service comprises the complete range of machined seals as well as tailor-made elastomeric solutions and guides. It’s good to rely on a quality standard that keeps up with serial production.