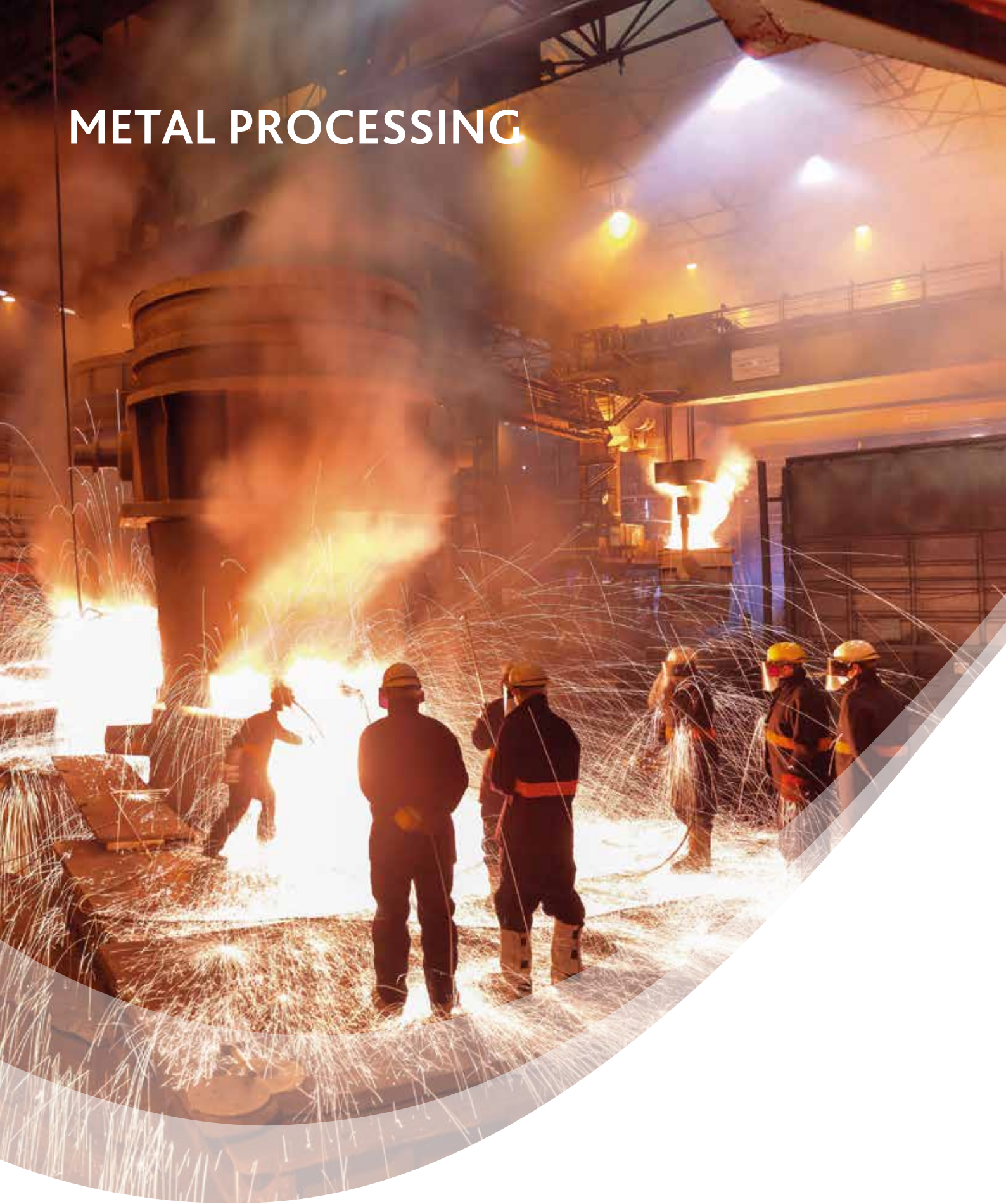


METAL PROCESSING





OFTEN INVISIBLE ALWAYS ESSENTIAL

Freudenberg Sealing Technologies is the largest member of the Freudenberg Group, a family-run company with more than 40.000 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.

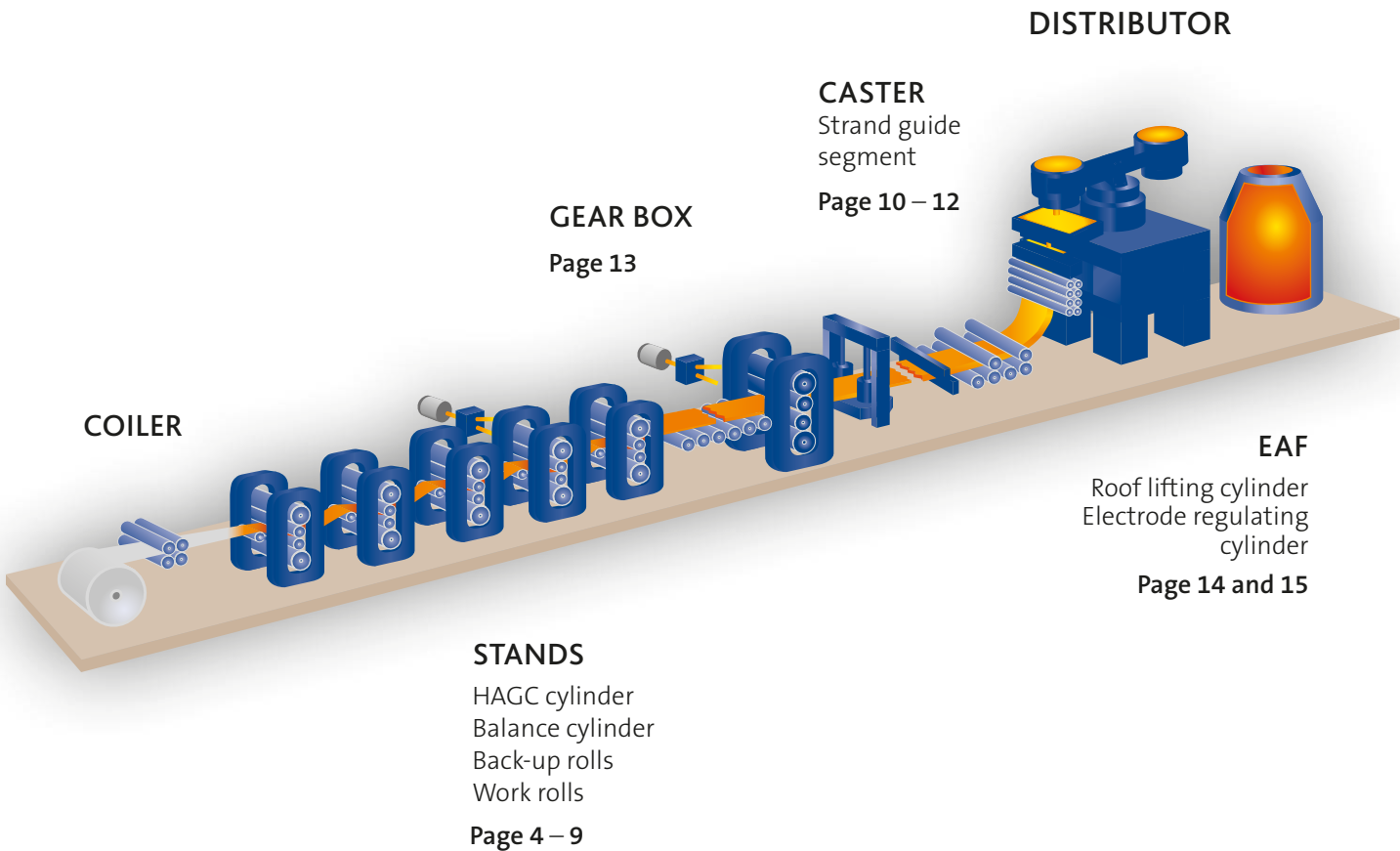
SEALING SOLUTIONS FOR THE IRON AND STEEL INDUSTRY

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.

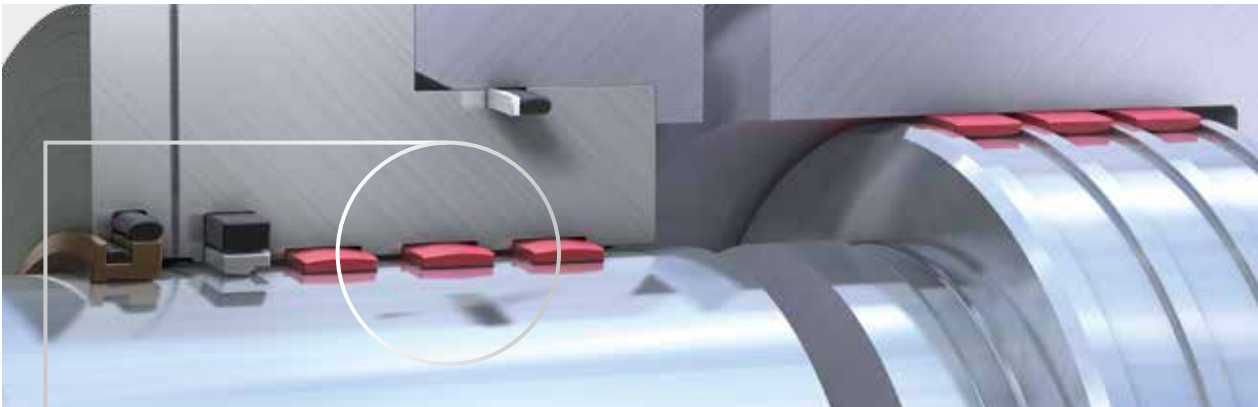
We put much energy into common customer development projects. The target is always the same: we always seek for the best sealing solution.

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.



SYSTEMS FOR BALANCE CYLINDERS

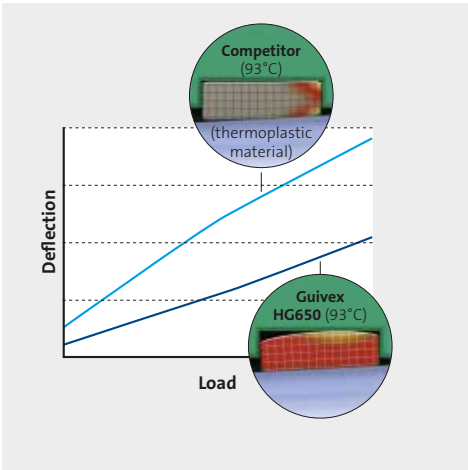
OUR RECOMMENDATION FOR MAXIMUM CONTROL OF A FAST MOVING CYLINDER



— Merkel Omegat OMS-MR (OMS-S) rod seal in combination with Merkel PT 2 wiper and triple Merkel Guivex guide rings

Precise guiding – long service intervals

- Best adjustability and cylinder control due to advanced functionality of Merkel Omegat PTFE seals.
- Reliable handling of large gaps by high load capability of Merkel Guivex guide elements
- Our sealing arrangement provides for improved performance in while allowing for shorter housings



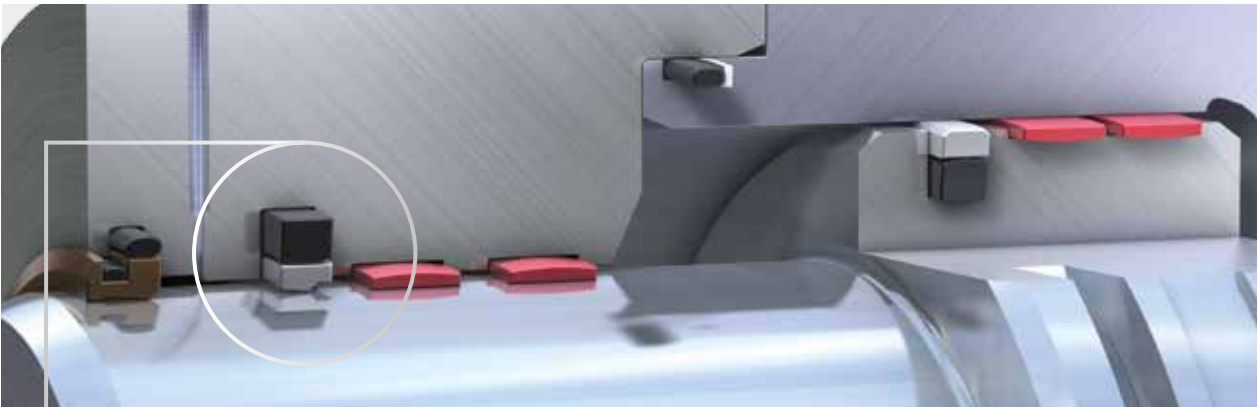
PATENTED GEOMETRY OF THE GUIVEX GUIDE RINGS EASES THE LOAD

- Improved rigidity and lifetime due to a precise control of high side loads
- Best functional behavior by a balanced handling of surface loads up to 80 MPa
- No metal contact of the shaft

Stiffness of the Merkel Guivex guide ring compared to competitor version
Small pictures: No stress peaks at the edge with the Guivex geometry

SYSTEMS FOR HAGC CYLINDERS

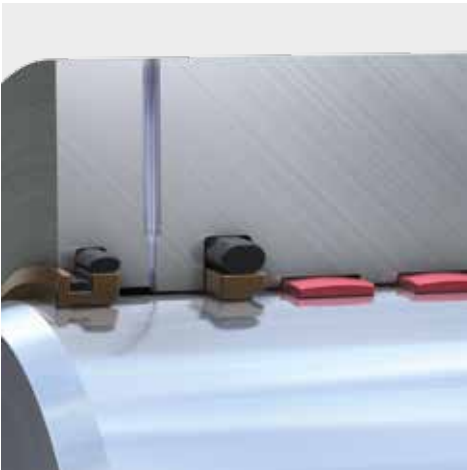
OUR RECOMMENDATION – MAXIMUM PROTECTION OF THE COUNTER SURFACE



— Merkel Omegat OMS-S (rod) and Merkel Omegat OMK-S at the piston in combination with a Merkel PT 2 wiper and Merkel Guivex guide rings

Gentle to the surface – reduced maintenance cost

- 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
- Reliable handling of high pressures (>25 MPa) and maximum lifetime due to heavy duty design of the Merkel Omegat seal
- Protection against extremely dirty environments – Merkel PT 2 double wiper improves the functionality of the complete sealing system

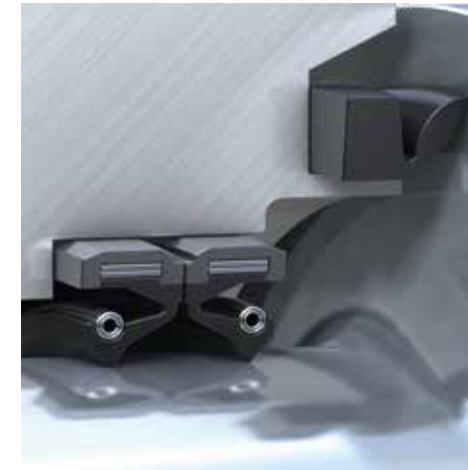


STANDARD FOR EXISTING HOUSINGS – STICK SLIP FREE OPERATION INCLUDED

- 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-MR rod seal in combination with a Merkel PT 2 wiper and Merkel Guivex guide rings

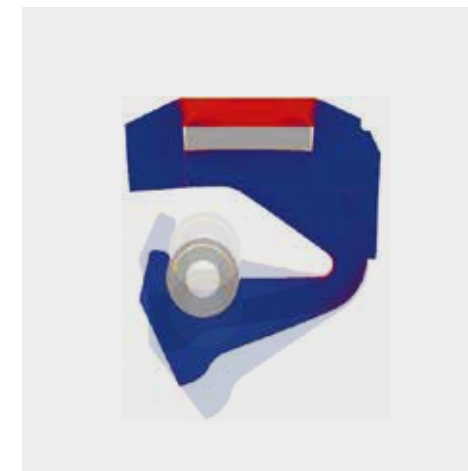
SEALING SYSTEMS FOR PLAIN BEARINGS IN BACK-UP ROLLS



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 integrated steel band
- Simple, housing friendly installation

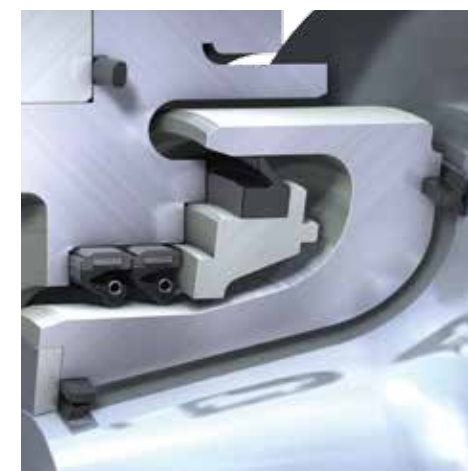
Merkel Radiamatic RHS 51 in combination with a Merkel Enviromatic EA deflector



THE KEY FOR SUCCESS – EVENLY DISTRIBUTED RADIAL FORCES

- Wear at high speeds is a matter of friction and corresponding heat.
- High shaft offsets lead to elevated radial forces if standard pre-stressing elements at the sealing lip are used.
- 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 friction and wear even at high shaft offset – the Merkel Radiamatic RHS 51 offers the right balance

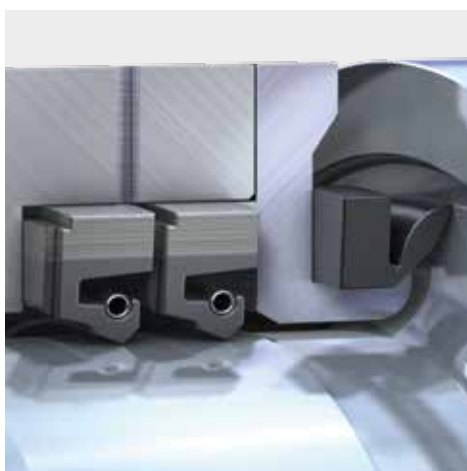


MODERNISATION – COMBINING THE BEST

- High permissible shaft offset
- Maximum environmental protection
- Leak free operation – extended seal life

Special Merkel profile and U-rings in combination with the rotary shaft seal Merkel Radiamatic RHS 51

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 grooves
- Reliable line contact of sealing edge for leak free performance

Merkel Radiamatic R 37 as an example in combination with a standard V-ring in a cover plated housing

OUR HIGHLIGHT



MAXIMUM PROTECTION FOR YOUR WORK ROLL BEARINGS

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

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 without needing to be hit with a hammer – a new experience for the on-site maintenance staff.

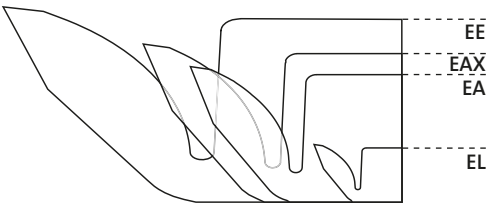
- Reliable protection against water ingress into lubricant
- Without tension spring at the sealing lip – or any other potentially corroding or hazardous components
- Gentle to the housing – easy to install & remove
- Readiness of supply – within hours, if needed



SOLID AS A ROCK

Unlike the usual V-rings, which have a soft, flat sealing lip with a broad contact surface, the new Merkel Enviromatic deflector/ water guard type 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.

Available deflector/water guard versions
Suitable for standard housings



Operating conditions

Criteria	Maximum values
Temperature	−30 ... +100°C
Pressure	0,05 MPa (Ø D ≤700mm) 0,03 MPa (Ø D >700 mm)
Sliding speed	15 m/s

List of shaft seal profiles for diameters D = 200 mm up to 1064 mm

S x L [mm]	200–260	261–300	301–360	361–470	471–684	685–1064
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.

IDEALLY HARMONIZED – OUR RECOMMENDATION

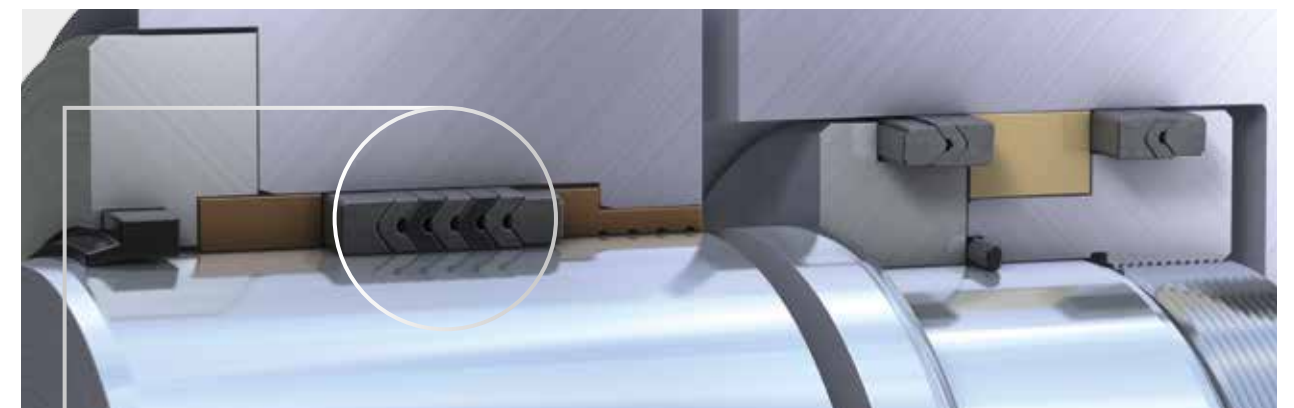


PTFE glass for rod and piston seal offers surface friendly operation

▲ 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 rings

- Smaller housings and larger allowed extrusion gaps stand for lower manufacturing cost
- Ideal, stick-slip free operation for a long service life
- Suitable for high radiant heat

STANDARD FOR EXISTING HOUSINGS



Robustness x Longevity =
Merkel V-packings

▲ Merkel V-packing set EKV at the piston and ESV at the rod combined with a Merkel P 6 wiper and guide elements made of bronze

- Reliable sealing function even if the rod is highly strained
- Split version available for open installation that reduces maintenance cost
- Servicing equipment is minimized

SEALING SYSTEMS FOR CONTINUOUS CASTER

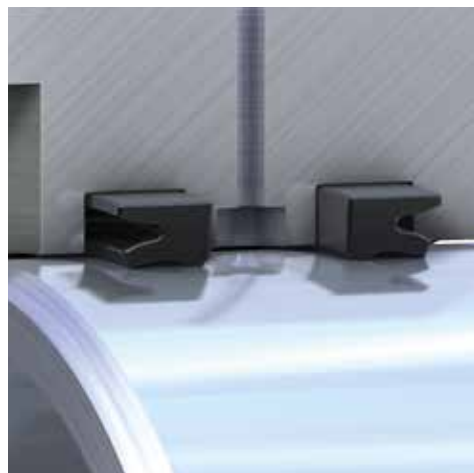
CONTINUOUS CASTER – SYSTEMS FOR SUPPORT ROLLER BEARINGS



SIMMERRING B2 FOR OPEN HOUSINGS

- High wear resistance offering long lifetime
- Simple installation for low service cost
- Standard seals are readily available

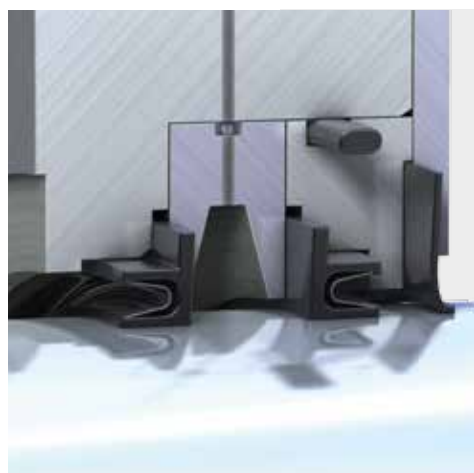
⚡ Simmerring B 2 with self-retaining fit in the housing



MULTI MATERIAL U-RING SOLUTION

- Easy to install snap-in function
- Material mix to meet specific requirements
- All included: Functionality & Longevity

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



BEST SEALING AND WIPING FUNCTION

- Secure protection of the bearing against any contamination
- Suitable for high speeds and temperatures
- Good frictional behavior equals low wear and long service life

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

SEALING SYSTEMS FOR GEAR BOXES



SIMMERRING – A PERFECTLY MATCHING OIL SEAL

- All purpose oil seal, especially for larger dimensions and rough fitting in the housing
- Space saving design and easy to install
- Long runner qualities

⚡ Everything is included – Simmerring Type B2...SL 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
- Multiple use at any position on the shaft
- Shipping of bonding set within one week, if necessary

⚡ Mounted bonding device: the joint is prepared for a temperature controlled curing process

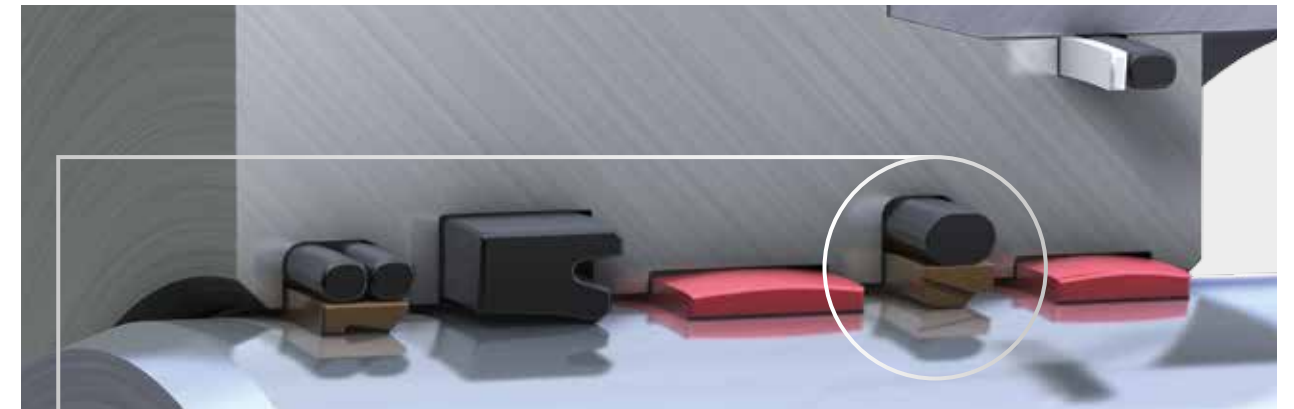


IDEAL COMBINATION TO COPE WITH PRESSURE AND HIGH TEMPERATURES

- Floating cartridge for high radial and axial movements
- No wear issues
- No leakage issues

⚡ Merkel Omegat OKDS-0168, Omegat OSDS-0169 in combination with a special guide ring made of resin bonded fabric

LOW FRICTION AND SMOOTH ACTION – OUR RECOMMENDATION

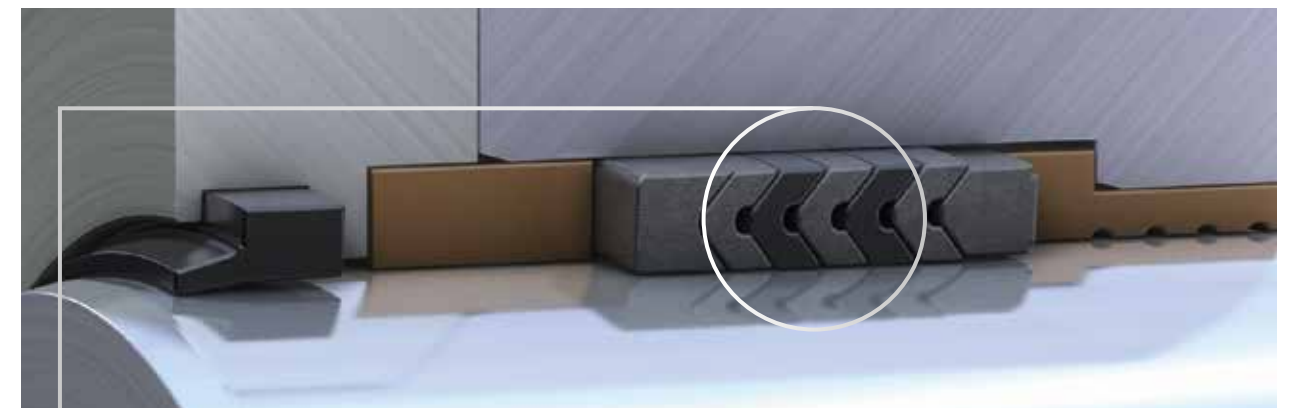


Pressure relief function to prevent extrusion

— Merkel Omegat OMS-MR primary seal and Merkel U-ring L 20 secondary seal, combined with a Merkel PT 1 wiper and Merkel Guivex guide rings

- Stick-slip free operation allows exact positioning
- Ideal sealing function offering long service intervals without leakage
- Pressure relief function to prevent extrusion

FOR EASY REPLACEMENT – OUR TRADITIONAL SOLUTION







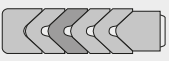






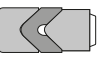

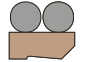

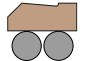


The robustness of a Merkel V-packing set is unique



















— Merkel V-packing set ESV in combination with a Merkel P 6 elastomeric wiper

- 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










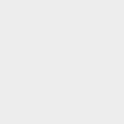








SEALING SYSTEMS FOR EAF – ELECTRIC ARC FURNACE

PRODUCT OVERVIEW

Type	Profile	Material	EAF	Rotary Distributor	Continuous Caster	Gear Box	Mill Stands	Coiler	Xpress: Tailor-made	Xpress: Machined	Technical Data
ROD SEALS											
Merkel Omegat OMS-MR/PR		PTFE	●		●		●	●		●	
Merkel Omegat OMS-S/PR		PTFE	●		●		●			●	
Merkel Omegat OMSU-S/PR		PU					○			●	
Merkel V-packing set ES/ESV		NBR, FKM	○		○		○		●		
Merkel U-ring L 20		NBR	●				●			●	
PISTON SEALS											
Merkel Omegat OMK-MR		PTFE	●		●		●	●		●	
Merkel Omegat OMK-S		PTFE	●		●		●			●	
Merkel Omegat OMKU-S		PU					○			●	
Merkel Omegat OMK-ES		PTFE	○		○					●	
Merkel chevron set EK/EKV		NBR, FKM	●		●		○		●		
WIPERS											
Merkel Double Wiper PT 1		PTFE	●		●		●	●		●	
Merkel Double Wiper PT 2		PTFE	●		●		●			●	
Merkel Double Wiper PT 3		PTFE				●		●		●	
Merkel Wiper P 6		NBR, FKM	○		○		○		●		
Merkel Wiper Type 0238		PTFE	○		○		○			●	

Type	Profile	Material	EAF	Rotary Distributor	Continuous Caster	Gear Box	Mill Stands	Coiler	Xpress: Tailor-made	Xpress: Machined	Technical Data
GUIDES											
Merkel Guide Ring SBK		Resin b. fabric	●		●		●	●	●	●	
Merkel Ruide Ring SB		Lamin. fabric	○		○		○	○	●	●	
Merkel Guide Ring SF		PTFE	○		○		○	○	●		
Merkel Guide Ring KBK		Resin b. fabric	●		●		●	●	●	●	
Merkel Guide Ring KB		Lamin. fabric	○		○		○	○	●	●	
Merkel Guide Ring KF		PTFE	○		○		○	○	●		
RADIAL SHAFT SEALS											
Merkel Radiamatic R 35		(H)NBR, FKM		○	○	●	●				
Merkel Radiamatic R 36		(H)NBR, FKM		○	○	○	●				
Merkel Radiamatic R 37		(H)NBR, FKM		○	○	●	●				
Merkel Radiamatic R 58		NBR				○	●				
Merkel Radiamatic RS 85		(H)NBR, FKM			○	○	●				
Merkel Radiamatic RHS 51		(H)NBR, FKM				○	●				
Radiamatic NOK SBR		(H)NBR, FKM				○					
Merkel Radiamatic RPM 41		NBR		○	○	○	○		●		
NRRW u-cup		PTFE			●					●	
NRSF 2816		NBR			●					●	

- our recommendation for new construction or redesign
- Xpress service
- additional products for repair and maintenance

Type	Profile	Material	EAF	Rotary Distributor	Continuous Caster	Gear Box	Mill Stands	Coiler	Xpress: Tailor-made	Xpress: Machined	Technical Data
SIMMERING 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 Enviromatic EA		(H)NBR, FKM		●		●	●		●	●	
Merkel Enviromatic EAX		(H)NBR, FKM		○		●	●		●	●	
Merkel Enviromatic EE		(H)NBR, FKM		○			●			●	
Merkel Enviromatic EL		(H)NBR, FKM				○				●	
SEALS FOR PIVOTING MOTION											
Merkel Rotomatic M 17		NBR		●							
Merkel Rotomatic M 19		NBR / POM		●							

- our recommendation for new construction or redesign
- Xpress service
- additional products for repair and maintenance

Type	Profile	Material	EAF	Rotary Distributor	Continuous Caster	Gear Box	Mill Stands	Coiler	Xpress: Tailor-made	Xpress: Machined	Technical Data
STATIC SEALS											
Merkel Cover Seal PU 82		PU								●	
Merkel Cover Seal PU 83		PU								●	
Merkel Stircomatic SRC		PU	○	○	○	○	○	○		●	
Merkel O-Rings		NBR, FKM	○	○	○	○	○	○			
PACKINGS											
Merkel Arochem II 6211		PTFE yarn		●			●				
Merkel Unistat 6303		PTFE yarn		●			●			●	
Merkel Ramilon 4586		Natural fibre			●	●	●	●		●	
Merkel Arolan II 6215		Aramid yarn			●	●	●	●		●	
Merkel Unival 6323		PTFE yarn			●	●	●	●		●	
Type	Illustration										Technical Data
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 to earn your confidence.



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.



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