Burckhardt Compression

REDURA® OIL SEALING SYSTEMS

HIGHEST QUALITY FOR RELIABLE SEALING EFFICIENCY

Compressors for a Lifetime™

REDURA® OIL SEALING SYSTEMS

DECADES OF EXPERIENCE IN HIGH-PERFORMANCE OIL SEALING SYSTEMS

BURCKHARDT COMPRESSION

As compressor OEM with more than 170 years of experience, Burckhardt Compression has been setting standards for oil wiper packings for decades. Especially our know-how regarding the outstanding performance of oil sealing systems in our extremely reliable Laby® oxygen compressors, where any oil leakage into the compression chambers must be avoided under all circumstances, speaks for itself.

Patented designs developed in-house and exhaustive material research are the perfect recipe for high-performance oil sealing systems for reciprocating compressors. Innovation and vast in-house material know-how from the basis for Redura® brand, which offers a comprehensive product line for rings & packings.

EFFICIENT OIL SEALING

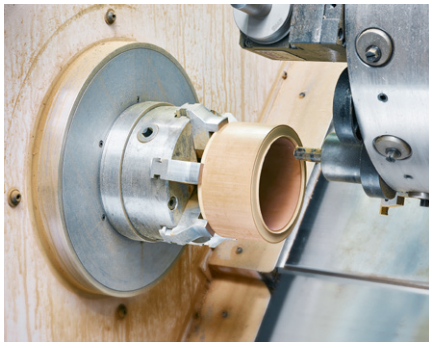
For compressor operators striving to achieve the highest levels of waste management, throwing oil away that has passed by an ineffective set of wipers is a cause for concern. Then there is the cost consideration; crankcase oils are not cheap and neither is the experienced manpower required to monitor and top up the oil.

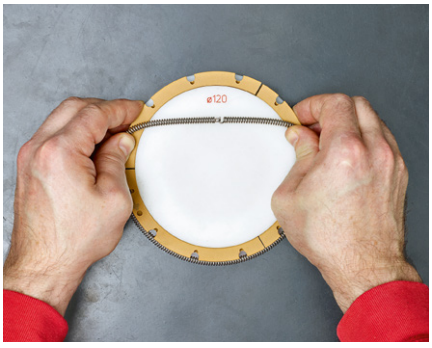
Premature failure of the main gas packings needs also to be considered. Oil that has leaked through the oil wipers has the potential to become airborne within the distance piece and thereby pass round the oil shield and enter the main packings. Here, together with wear particles of dry-running friction sealing rings, the oil forms a detrimental paste that negatively influences tribology and heat dissipation of an “oil-free” packing. Depending on load parameters, the consequences may range from a reduced life-time due to elevated ring wear to a complete packing failure. The associated downtime, loss of production and service costs will be of concern to any compressor operator.

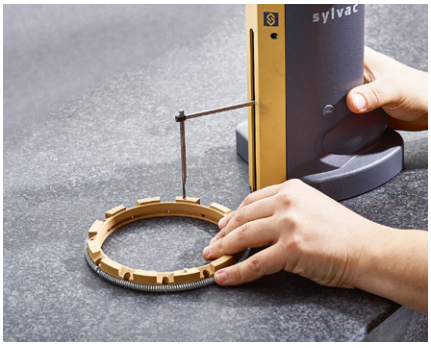
REDURA® OIL SEALING SYSTEMS

Redura® oil sealing systems are heterogeneously designed to meet the needs of today's Plant Managers and Operators. Giving confidence that the crankcase oil will remain safely in the crankcase.

Our know-how and experience results in:
- Longest MTBO (mean time between overhaul) at lowest leakage
- Highest availability
- Lowest life cycle costs





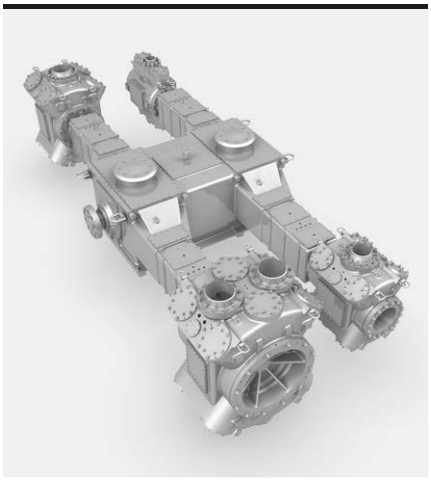


SUPERIOR SEALING SYSTEMS
FOR EVERY APPLICATION

APPLICATIONS

- Upstream oil & gas
- Gas transport & storage
- Refinery
- Petrochemical/Chemical industry
- Industrial gases
- Food & beverage industry
- Wood & charcoal industry
- Mining industry
- Power stations
- Hydro-electric power plants
- Nuclear power plants

COMPRESSOR DESIGNS AND SIZES



- Lubricated and non-lubricated
- Cooled and non-cooled
- Horizontal, vertical and inclined
- Rod diameter from 30–250 mm (1.18–9.84 in)
- Maximum stroke up to 450 mm (17.71 in)

OILS

- Mineral oils with additives to increase corrosion protection and aging resistance
- Synthetic lubricants for gas compressors based on operating conditions

Our internal expertise on lubrication oils allows us to support you with:

- Analyses of oil samples
- Conclusions based on oil samples and compressor/parts condition
- Recommendations and comprehensive solutions

HETEROGENEOUS OIL SEALING SYSTEMS

ELABORATE COMBINATIONS FOR HIGHEST SEALING EFFICIENCY

Heterogeneously designed Redura® oil sealing systems consist of three main elements, each with its own specific function.

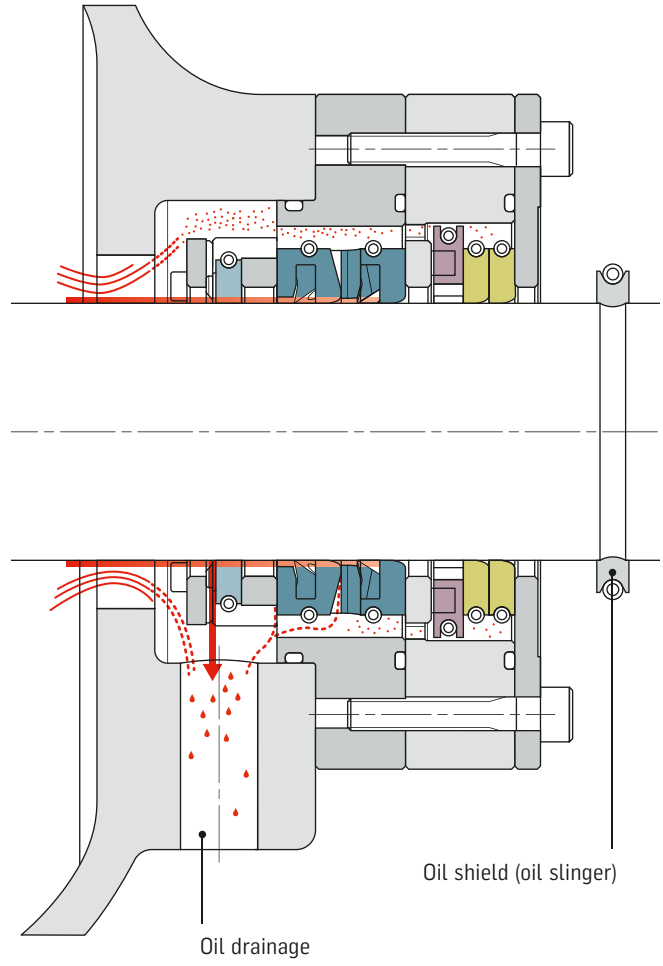
Firstly there is the pre-wiper element. This ring with its flat faces prevents the majority of oil from ever entering the oil wiper housing and filling the chambers within.

The pre-wiper is followed by a series of rings with optimally designed edges to remove all but a fine film of oil from the piston rod. If the oil film is not maintained high wear on the rings or even rod wear can occur.

Any oil mist that has been created within the oil wiper housing is sealed from the distance piece by a final sealing element. As with the oil wiper elements, the contact geometry of these rings is optimized to fulfill requirements of “dynamic tightness”: The amount of leak oil during fore stroke is equal to the amount of oil conveyed back during reverse stroke.

Some would consider the oil shield the last part of the system physically preventing the remaining oil from up the rod to the packing assembly.

Burckhardt Compression provides various oil wiper packing types as well as oil wiper/sealing rings, from enhanced classical wiper rings to specifically in-house developed and patented oil seal rings.

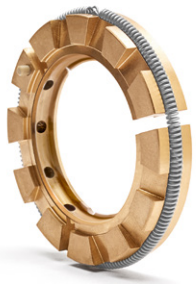


- Pre-wiper elements (e.g. LW 100)
- Oil wiper elements (e.g. LW 400)
- Oil sealing elements (e.g. LS 810)
- Pressure Ring (e.g. LT 955)
- Oil
- Oil mist

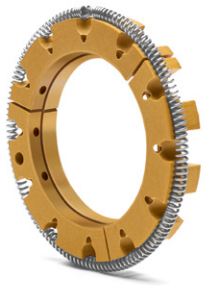
REDURA® OIL SEALING SYSTEMS
PUSHING THE LIMITS

REDURA® OIL WIPER AND SEALING ELEMENTS

COMBINED FOR SUPERIOR PERFORMANCE



	PRE-OIL WIPER ELEMENT	OIL WIPER		
	LW 100	**LW 200**	**LW 250**	
	Pre-oil wiper, vanguard to protect the subsequent rings from overflow	Elaborate oil wiper element for use in vertical applications	Robust oil wiper for universal use	
DESCRIPTION	• Proprietary design • Acts as splash guard	• Proprietary design • Thin radial dimension helps the ring to conform to the rod. • Element design provides maximum oil passage away from the piston rod • Positioning pin for rotational fixation of multiple rings • For use in vertical applications	• Classic oil wiper ring • Positioning pin for rotational fixation of multiple rings • Robust oil wiper • Universal use	
DESIGN	• 1-piece ring • 30–250 mm (1.18–9.84 in) piston rod diameter • No oil grooves • API 618 compliant	• 1-piece, scarf joint ring • 30–250 mm (1.18–9.84 in) piston rod diameter • Typically supplied as a three ring pack of single scarf jointed rings • Sharp leading edge and radial grooves	• 3-piece, radial cut ring • 30–250 mm (1.18–9.84 in) piston rod diameter • API 618 compliant • Sharp scraping edge	
MATERIAL	• Non-metallic	• Bronze/special grade cast iron	• Bronze/cast iron/non-metallic	
SPECIFIC PROPERTIES		• Pre-oil wiper required (i.e. LW 100) • Subsequent oil sealing ring recommended (e.g. LS 810)	• Uniform piston rod required • Recommended for use on hard piston rods	



ELEMENTS			OIL SEALING	
	LW 300	**LW 400**	**LS 810**	
	High-quality oil wiper element with excellent adaptation to non-uniform piston rods	New, patented high performance hybrid oil wiper element for longest MTBO	Well established sealing element prevents oil mist from entering the distance piece	
	• Proprietary design • Positioning pin for rotational fixation of multiple rings • Normally supplied as a pair of rings • Multiple scraping edges with plenty of oil flow area • Flexible oil wiper ring	• Proprietary, patented design • Positioning pin for rotational fixation of multiple rings • Typically combined with support (LC-type) or thrust ring (LT-type) • Universal use	• Positioning pin for rotational fixation of ring pairs • Will also act as a gas seal preventing process gas entering the crankcase • Highly efficient, sealing ring for universal use • Well established sealing element	
	• 3-piece, radial cut ring • 30–250 mm (1.18–9.84 in) piston rod diameter • API 618 compliant • Dulled scraping edge	• Multipiece, radial cut ring • 30–250 mm (1.18–9.84 in) piston rod diameter • Bi-material design, thin radial dimensioned metallic ring supported by non-metallic ring • API 618 compliant • Retainer radial cut for vertical machines and tangent cut for use on horizontal compressors (LW 410)	• 3/3 piece, penguin cut ring pair • 30–250 mm (1.18–9.84 in) piston rod diameter • Profiled bore oil sealing element • API 618 compliant	
	• Non-metallic	• Bronze/non-metallic	• Non-metallic	
	• Excellent performance also on soft piston rods combined with a support ring (e.g. LC 900) and sealing ring (e.g. LS 820)	• Razor blade technology, metallic wiper ring accommodated in a non-metallic retainer for precise and optimal oil removal • Lower surface pressure compared to pure metallic versions	• Bore is profiled to operate only in one direction • Contact geometry is optimized to fulfill requirements of “dynamic tightness”: The amount of leak oil during fore stroke is equal to the amount of oil conveyed back during reverse stroke	

ELEMENTS	SUPPORT RINGS AND PRESSURE RINGS		
	LS 820	LC 900	LT 955
	Well proven oil sealing element with very good adaptation to non-uniform piston rods	Solid support ring for enhanced oil drainage	Pressure ring, used in conjunction with other ring designs to provide side loading
DESCRIPTION	• Proprietary design • Small cross section • Efficient sealing ring	• Proprietary design • Positioning pin for rotational fixation of adjacent rings	• Twin jointed spring holder to provide side loading to the wiping elements or the mist seal • Robust design
DESIGN	• 2-piece, overlap joint ring • 30–250 mm (1.18–9.84 in) piston rod diameter • API 618 compliant	• 1-piece, endless ring • 30–250 mm (1.18–9.84 in) piston rod diameter	• 2-piece ring • 30–250 mm (1.18–9.84 in) piston rod diameter • API 618 compliant • Side loading the wiper rings stops them from pumping
MATERIAL	• Non-metallic	• Bronze/non-metallic	• Cast iron/stainless steel/non-metallic
SPECIFIC PROPERTIES	• Good adaption to non-uniform piston rods • Small axial space required		• Only exerts axial forces for well-balanced axial pre-load

IMMEDIATE PARTS PROVISION

LARGE STOCK OF OIL WIPER AND SEALING ELEMENTS AS WELL AS SEMIMANUFACTURED RING MATERIAL ENSURES IMMEDIATE PARTS PROVISION.

MORE TYPES

ADDITIONAL RING TYPES IN DIFFERENT DESIGNS AND CUTS ARE AVAILABLE.

«BURCKHARDT COMPRESSION PROVIDED AN OIL SEALING SYSTEM FOR OUR ETHYLENE COMPRESSOR BASED ON THEIR TAILOR-MADE REDURA® DESIGN. THE EFFECTIVENESS OF THE OIL WIPERS IS IMPRESSIVE AND EVEN FOR THIS RATHER OLD NON-BURCKHARDT COMPRESSOR THE OIL MIGRATION FROM CRANKCASE WAS SIGNIFICANTLY REDUCED»

Rotating Equipment Engineer, Sweden

APPLICATION ENGINEERING

TAILOR-MADE SYSTEM DESIGN FOR BEST PERFORMANCE

SYSTEM DESIGN

- Complete oil wiper packing design
- Design solutions for every application
- Careful concept evaluation and selection based on individual specifications
- Material selection
- In-house production capabilities for all ring designs and materials

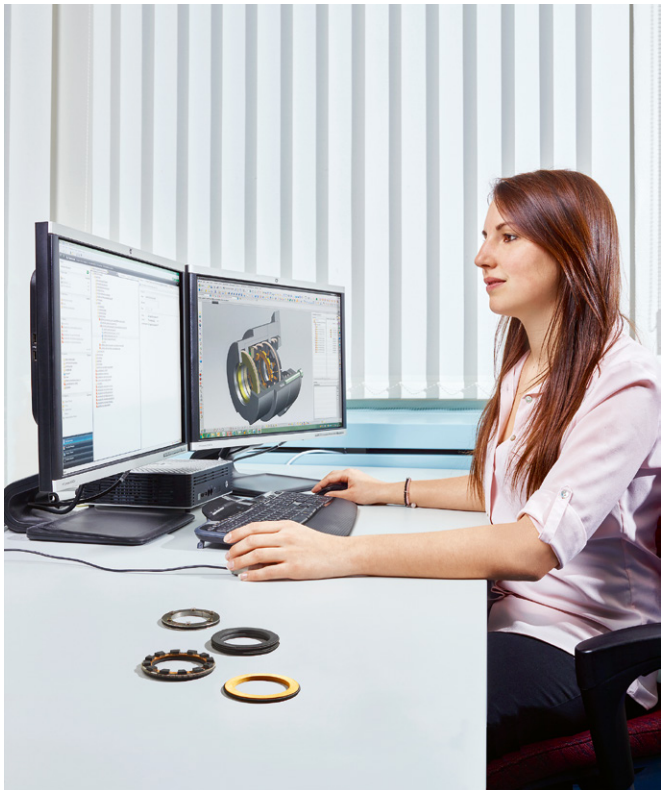
Tailor-made solutions by experienced application engineers for lowest life cycle costs.

MATERIALS

For components of oil sealing systems the following materials are primarily used:

- PTFE-compounds (with appropriate fillers)
- PEEK (with appropriate fillers)
- Polymer blends
- Proprietary materials
- Bronze and sintered metals

For housings: Alloyed steel, stainless steel



REDURA® OIL WIPER PACKINGS
PERFECT FIT FOR EVERY COMPRESSOR DESIGN

Oil wiper housings and assemblies can vary dramatically from one compressor to the other. Our comprehensive know-how, extensive ring portfolio and state-of-the-art manufacturing capabilities enable us to find the optimal oil sealing solution for every geometry and according to the required standards (API 618).

Not only the ring design and its combination are important, the path for returning oil to the crankcase must also be considered. Optimized oil sealing systems require sufficient oil drainage in order to reliably perform their function.

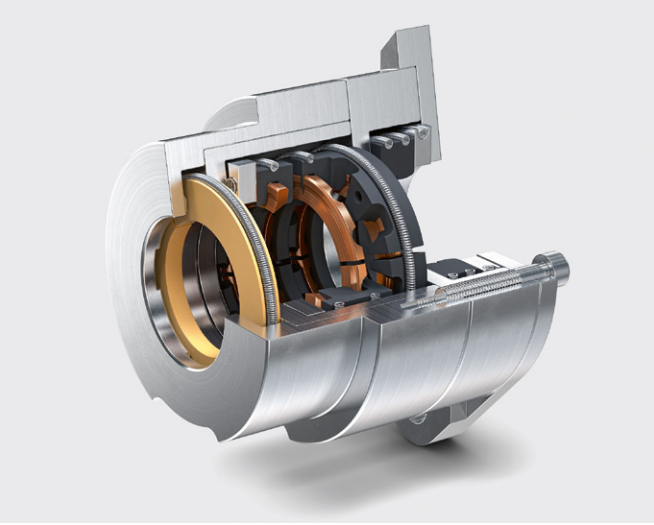
Therefore the housing and the mounting place around it must be considered.

STANDARD WIPER ASSEMBLY

Standard wiper assembly (bottom left) used by Burckhardt Compression, consisting of two cups. The first cup contains a pre-scraper and the second the final scraping system, a metallic front support ring followed by a pair of non-metallic scraping rings and a seal ring. This design has proven itself over many years of operation.

CUSTOMIZED WIPER ASSEMBLY

The oil wiper assembly (bottom right) is from an old model compressor that was not sealing the oil as the customer would like. Burckhardt Compression redesigned the housing, respecting the external dimensions and successfully supplied oil wiper rings designed to the Redura® philosophy, i.e. pre-scraper, hybrid oil scrapers and sealing ring pair for longest MTBO.



OIL WIPER PACKING RECONDITIONING

LOWEST LIFE CYCLE COSTS AND HIGHEST AVAILABILITY

Well maintained oil wiper packings are decisive for compressor performance.

Due to our comprehensive OEM know-how and in-house packing and sealing element production, we are able to service and repair any packing type of any brand. Wiper packings and rings are handled by experts.

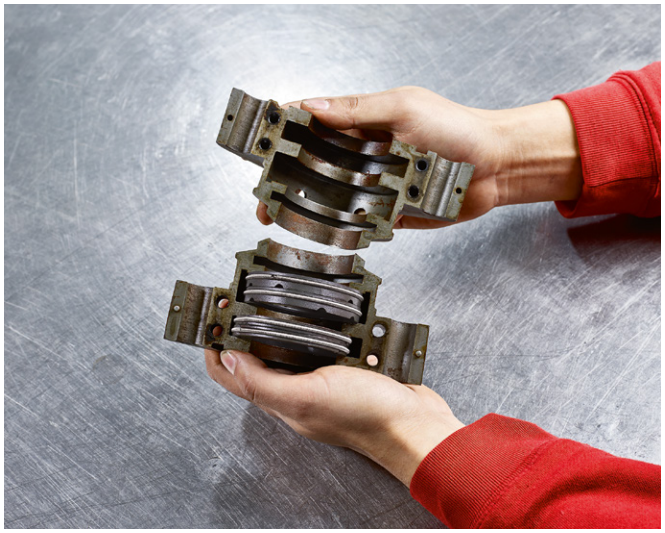
WIPER ASSEMBLY EXCHANGE SERVICE

Upon request we provide a comprehensive oil packing exchange service including stock keeping of the appropriate Redura® packing rings and logistics service.

We recondition your worn housing, prepare these and supply the restored assembly in accordance with your compressor service intervals.

RECONDITIONING SERVICE

- Thorough examination
- Complete disassembly
- Inspection of individual parts
- Recording of main parts condition
- OEM engineering evaluation if required
- Thorough cleaning (glass bead blasting and/or ultrasonic cleaning if necessary)
- Repair and re-machining
- Lapping and grinding of all sealing surfaces
- Dimensional checking
- Replacement of worn and damaged parts with new Burckhardt Compression quality parts
- Careful reassembly
- Quality inspection
- Corrosion protection and adequate packing



Burckhardt Compression

REDURA®
RINGS & PACKINGS ARE CHARACTERIZED BY

LONGEST MTBO (MEAN TIME BETWEEN OVERHAUL) AT LOWEST LEAKAGE

HIGHEST AVAILABILITY

LOWEST LIFE CYCLE COSTS

COMPRESSOR COMPONENTS
BEST PERFORMANCE
AND LONGEST LIFETIME

- Compressor valves
- Redura® rings & packings
- Capacity control systems
- Capital parts
- Labyrinth piston compressor components
- Hyper secondary compressor components

SERVICES
THE FULL RANGE

- Burckhardt Valve Service
- Spare parts logistics
- Field service
- Technical support
- Revamps & upgrades
- Component repair
- Condition monitoring & diagnostics
- Training

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