MERKEL PACKINGS
STANDARD RANGE

Freudenberg
Sealing Technologies

OFTEN INVISIBLE
ALWAYS ESSENTIAL

The technology specialist Freudenberg Sealing Technologies is a supplier, development and service partner for customers from a variety of market segments, such as the heavy industry, mechanical engineering and ship-building, food processing and pharmaceuticals, or the process industry. On the basis of the Simmerring® developed by Freudenberg in 1929, Freudenberg Sealing Technologies now has a broad and continuously customer-oriented product portfolio of seals. Based on detailed process knowledge, innovative development methods and selected materials, the range includes both customized individual solutions as well as complete seal packages.

Together with its partners NOK Corporation, Japan, USA, Sigma Freudenberg NOK, India, and NOK-Freudenberg Group China, Freudenberg Sealing Technologies forms a global network which aims to supply its customers all over the world with products of the same high quality.

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The figures indicated in the catalogue are based on experiences gathered within Freudenberg Sealing Technologies in the field of research over several decades for the development and manufacture of seals and they are in line with today's state-of-the-art expertise.
However, the sealing effect provided by numerous products mentioned in the catalogue is not only generated by the component itself. It is rather based to a very large extent – depending on the specific application involved – on other parameters such as the place of installation and counter surface, the pressure applied, the operating temperature, the media to be sealed, the lubrication, vibration-related influences and possible dirt from outside. These and further unknown factors are likely to exert a tangible influence on the function of seals in practical applications.
Against this background, no standard statements can be made about the function of the products mentioned in the catalogue. The data stated in the latter merely represent general, non-binding reference values which cannot be applied to every case of application. As a result, we recommend that you discuss concrete cases of application with our consulting services.
In the event of higher and special stresses, e. g. exerted by aggressive media, the seal should be selected in cooperation with us, as functional reliability tests are frequently indispensable.

Environmental protection, improvement in working conditions and increased operational safety are of fundamental importance in the sealing of valves, centrifugal pumps and high-pressure plunger pumps. Correct selection of Merkel packings will ensure these requirements are met.

Thanks to continued material research, the latest in design technology and the most advanced production processes Merkel packings offer superior sealing performance, long service life and the ability to be used in a wide range of applications.

Note
The listed parameters represent maximum values. They refer to the specification of the basic materials and impregnations. The temperature application limit may be influenced by the pressure involved. This temperature/pressure ratio is also widely dependent on the media used.
Simultaneous, maximum loads might lead to necessary, relieving measurements.

PRE-SELECTION PACKINGS STANDARD RANGE

Product	Pressure [MPa]			Speed [m/s]		Temperature [°C]	pH value
	Rotary pumps	Plunger pumps	Valves	Rotary pumps	Plunger pumps		
Merkel Ramilon 4586	4	100*		13	2	–40 … +120	5 … 11
Merkel Arostat 6204			20			–50 … +250	1 … 13
Merkel Arolan II 6215	2.5		10	26		–50 … +280	1 … 13
Merkel Arochem S 6216	2.5	25*		25	2	–50 … +280	1 … 13
Merkel Unistat 6303		80*	25		2	–200 … +280	0 … 14
Merkel Unichem 6313	1.5			8		–100 … +250	0 … 14
Merkel Unival 6323	2.5		25	20		–100 … +280	0 … 14
Merkel Alchem 6375		50*	25		2	–200 … +280	0 … 14
Merkel Grafiflex 6501			100			–200 … +450[1] –200 … +700[2] –200 … +2,500[3]	0 … 14
Merkel Grafiflex Cover Seal			100			–200 … +450[1] –200 … +700[2] –200 … +2,500[3]	0 … 14
Merkel Carbosteam 6550			30			–30 … +400[1] –30 … +550[2]	0 … 14
Merkel G-Spezial 6560			45			–200 … +450[1] –200 … +650[2]	1 … 14
Merkel G-Spezial S 6565	2.5		25	25		–200 … +450[1] –200 … +650[2]	0 … 14
Merkel Uniflex 6588	2.5			25		–50 … +280	1 … 13
Merkel Kombilon 6742	2.5			20		–100 … +280	0 … 14
Merkel Univerdit 7000	2.5*		16*	6		–30 … +250	0 … 14

1 most media and air 2 steam 3 inert gas * installation with anti-extrusion rings

Ordering note:
Standard packings are supplied by the kilo. The content of the boxes in kg in each case is given in the dimension lists in the kg/box column. Packing can also be supplied as rings on request.

MERKEL RAMILON 4586

Economical packing, ideal for all water pump applications

Merkel Ramilon is braided from Ramie, an extremely strong and water resistant natural fibre. The packing also contains a high level of PTFE due to a comprehensive impregnation process. This ensures high density and low friction performance. Merkel Ramilon is also widely used in plunger pumps for high-pressure water applications.
The packing is approved for use in the food processing industries.

Application

Rotary pumps, refiners, mills, plunger pumps, stern tubes

Media

Cold water, drinking water, sea water, warm water, solutions containing solid particles, oils, greases, solvents, foodstuffs

VALUES TO THE CUSTOMER

- Extremely wear-resistant
- Water resistant
- Strong yarn
- Long service life
- Will not swell or rot
- Excellent pressure resistance

Operating conditions

Pumps		
p	4 MPa 100 MPa*	580 psi 14,300 psi*
T	–40 … +120 °C	–22 … +248 °F
v	13 m/s 2 m/s*	2,500 fpm 400 fpm*
pH	5 … 11	5 … 11

* installation with end rings

mm	inch	g/m	m/kg	kg/box	Article No.
3	1/8	12	85.5	1	24115932
4		21	48.1	1	24107608
5	3/16	33	30.8	1	24107609
6		47	21.4	1	24107610
	1/4	52	19.1	1	24121704
8	5/16	83	12.1	2	24107612
	3/8	118	8.5	2	24119759
10		130	7.7	2	24107613
12		187	5.3	3	24107614
	1/2	210	4.8	3	24107615
14	9/16	255	3.9	3	24107616
15		293	3.4	3	24107617
16	5/8	333	3.0	3	24107618
18		421	2.4	3	24107619
19	3/4	469	2.1	3	24117489
20		520	1.9	5	24107620
22	7/8	629	1.6	5	24107621
25	1	813	1.2	10	24113360

Also available in die-formed rings and pre-cut lengths.

MERKEL AROSTAT 6204

Wear-resistant allround packing for static and valve applications

Merkel Arostat is made of wear-resistant and flexible aramid yarn. The packing is thoroughly impregnated with PTFE. This results in a very dense and resilient structure making Merkel Arostat particularly ideal for housing and cover lid applications.

Application

Valves

Media

Cold and hot water, steam up to 180 °C, salt solutions, organic solvents, hydro-carbons, oils, greases, diluted acids and alkalis

VALUES TO THE CUSTOMER

- Highly wear-resistant
- High content of PTFE impregnation
- Extremely flexible
- Can withstand very abrasive media
- Improved density and low leakage
- Minimum maintenance

Operating conditions

Valves		
p	20 MPa	2,900 psi
T	–50 … +250 °C	–58 … +482 °F
pH	1 … 13	1 … 13

mm	inch	g/m	m/kg	kg/box	Article No.
3	1/8	10	101.0	1	24246907
4		18	56.8	1	24216841
5	3/16	28	36.4	1	24198908
6		40	25.3	1	24198907
	1/4	44	22.5	1	24353539
8	5/16	70	14.2	2	24198906
9	3/8	89	11.2	2	24335330
10		110	9.1	2	24198042
12		158	6.3	3	24291198
	1/2	177	5.6	3	24353564
14	9/16	216	4.6	3	24224826
15		248	4.0	3	24233204
16	5/8	282	3.6	3	24199444
18		356	2.8	3	24291163
19	3/4	397	2.5	3	24262740
20		440	2.3	5	24250751
22	7/8	532	1.9	5	24261064
25	1	688	1.5	10	24232513

Also available in die-formed rings and pre-cut lengths.

MERKEL AROLAN II 6215

Universal pump packing, especially suitable
for abrasive media and shaft deflection

Merkel Arolan II is made from highly wear-resistant aramid yarn with a special PTFE impregnation and a universally stable running-in lubricant. Its high level of resistance to abrasion as well as to temperature and chemical fluctuations make Merkel Arolan II a universal packing for many industry sectors.

Application

Rotary pumps, valves

Media

Cold and hot water, salt solutions, organic solvents, hydrocarbons, oils, greases, diluted acids and alkalis.

VALUES TO THE CUSTOMER

- Robust and durable
- Extremely wear resistant
- Very resilient and flexible
- Suitable for sealing against abrasive media
- Very long service life
- Ideal for sealing against shaft deflection

Operating conditions

Rotary pumps		
p	2.5 MPa	362 psi
T	–50 … +280 °C	–58 … +536 °F
v	26 m/s	5,100 fpm
pH	1 … 13	1 … 13
Valves		
p	10 MPa	1,450 psi
T	–50 … +280 °C	–58 … +536 °F
pH	1 … 13	1 … 13

mm	inch	g/m	m/kg	kg/box	Article No.
3	1/8	12	84.2	1	24195260
4		21	47.3	1	24181505
5	3/16	33	30.3	1	24181506
6		48	21.0	1	24172093
	1/4	53	18.8	1	24180316
8	5/16	84	11.8	2	24175041
	3/8	120	8.3	2	24175049
10		132	7.6	2	24177176
12		190	5.3	3	24175522
	1/2	213	4.7	3	24175051
14	9/16	259	3.9	3	24170381
15		297	3.4	3	24175638
16	5/8	338	3.0	3	24181718
18		428	2.3	3	24180328
19	3/4	477	2.1	3	24178406
20		528	1.9	5	24174987
22	7/8	639	1.6	5	24188238
25	1	825	1.2	10	24181719

Also available in die-formed rings and pre-cut lengths.

MERKEL AROCHEM S 6216

Pump packing suitable for high shaft speeds and abrasive media.

Merkel Arochem S combines the advantages of two advanced yarn materials in the sealing of high-speed shafts. The particular running qualities of thermally stable PTFE-graphite compound yarn ensure shaft protection and even short-term „dry-running" without damage. Due to their stability, wear-resistant aramid yarn edges prevent packing extrusion and protects against abrasive media. Merkel Arochem S contains a universally stable silicone-free lubricant. This ensures superior lubrication during the run-in phase.

Application

Rotary pumps, plunger pumps

Media

Hot water, salt solutions, alkalis, organic solvents, hydrocarbons, medium concentration acids

VALUES TO THE CUSTOMER

- Thermally stable PTFE-graphite compound running surface
- Wear-resistant multi-filament aramid yarn in the corners
- Very stable and dense
- Smooth running, low friction
- Anti-extrusion protection and extra stability
- Ideal for higher pressure/wider clearance gaps

Operating conditions

Rotary pumps		
p	2.5 MPa	362 psi
T	–50 … +280 °C	–58 … +536 °F
v	25 m/s	4,900 fpm
pH	1 … 13	1 … 13
Plunger pumps		
p	25 MPa	3,625 psi
T	–50 … +280 °C	–58 … +536 °F
v	2 m/s	400 fpm
pH	1 … 13	1 … 13

mm	inch	g/m	m/kg	kg/box	Article No.
5	3/16	38	26.7	1	24258231
6		54	18.5	1	24233069
	1/4	60	16.5	1	24251376
8	5/16	96	10.4	2	24232488
	3/8	136	7.3	2	24242764
10		150	6.7	2	24232489
12		216	4.6	3	24232490
	1/2	242	4.1	3	24237883
14	9/16	294	3.4	3	24233070
15		338	3.0	3	24234711
16	5/8	384	2.6	3	24233071
18		486	2.1	3	24239422
19	3/4	542	1.8	3	24242763
20		600	1.7	5	24232491
22	7/8	726	1.4	5	24250804
25	1	938	1.1	10	24232492

Also available in die-formed rings and pre-cut lengths.

MERKEL UNISTAT 6303

Ideal for control valves and plunger pumps

Merkel Unistat is manufactured from graphite-filled PTFE yarn. The high level of graphite ensures excellent heat conduction while the PTFE content provides low friction performance. Due to its dense and pressure-resistant structure Merkel Unistat is widely used in plunger pump applications. In addition, its excellent chemical resistance allows for universal use in the chemical industry.
The packing is approved for use in the food processing industries.

VALUES TO THE CUSTOMER

- Stable PTFE-graphite compound
- High graphite content
- Very low soluble chlorides content
- High chemical and pressure stability
- Excellent thermal conductivity
- Suitable for use in nuclear applications

Application

Plunger pumps, valves

Media

Steam, condensate, alkalis, solvents, almost all acids.
Exceptions: highly concentrated nitric acid and oleum.
BAM approval for gaseous oxygen (4 MPa up to 150 °C; 3 MPa up to 200 °C)

Operating conditions

Valves		
p	25 MPa	3,625 psi
T	–200 … +280 °C	–328 … +536 °F
pH	0 … 14	0 … 14
Plunger pumps		
p	80 MPa*	11,600 psi*
T	–200 … +280 °C	–328 … +536 °F
v	2 m/s	400 fpm
pH	0 … 14	0 … 14

*installation with end rings

mm	inch	g/m	m/kg	kg/box	Article No.
3	1/8	13	76.6	1	24192301
4		23	43.1	1	24195261
5	3/16	36	27.6	1	24192302
6		52	19.2	1	24127129
	1/4	59	16.8	1	24353543
8	5/16	93	10.8	2	24183946
	3/8	131	7.6	2	24147002
10		145	6.9	2	24183126
12		209	4.8	3	24187294
	1/2	234	4.3	3	24147003
14	9/16	284	3.5	3	24195262
15		326	3.1	3	24235919
16	5/8	371	2.7	3	24191302
18		470	2.1	3	24195263
19	3/4	523	1.9	3	24193673
20		580	1.7	5	24195264
22	7/8	702	1.4	5	24191529
25	1	906	1.1	10	24188161

Also available in die-formed rings and pre-cut lengths.

MERKEL UNICHEM 6313

Rotary pump packing ideal for all chemical media

Merkel Unichem is made from pure PTFE yarn with an additional PTFE impregnation and lubricant. It has a very dense but soft and pliable structure so that sealing can be achieved with a minimum of gland pressure. Due to its excellent lubrication Merkel Unichem exhibits very low friction.
The packing is approved for use in the food processing industries.

Merkel Unichem is also available as a flat tape material for static sealing.*

*Dimensions are available on request

Application
Rotary pumps

Media
All chemicals including concentrated hot acids and alkalis.
Exceptions: molten alkali metals, fluorine and some fluorine compounds

VALUES TO THE CUSTOMER

- Very pliable
- Very dense when compressed
- 0–14 pH range
- Provides excellent sealing effect
- Very low leakage performance
- Can be used in all chemical applications

Operating conditions

Rotary pumps		
p	1.5 MPa	220 psi
T	–100 … +250 °C	–148 … +482 °F
v	8 m/s	1,600 fpm
pH	0 … 14	0 … 14

mm	inch	g/m	m/kg	kg/box	Article No.
3	1/8	15	64.6	1	24107742
4		28	36.3	1	24107743
5	3/16	43	23.3	1	24107744
6		62	16.2	1	24107745
	1/4	70	14.2	1	24124436
8	5/16	110	9.1	2	24107746
	3/8	156	6.4	2	24121470
10		172	5.8	2	24107747
12		248	4.0	3	24107748
	1/2	277	3.6	3	24120009
14	9/16	337	3.0	3	24116266
15		387	2.6	3	24117707
16	5/8	440	2.3	3	24116267
18		557	1.8	3	24115577
19	3/4	621	1.6	3	24266456
20		688	1.5	5	24115575
22	7/8	832	1.2	5	24115576
25	1	1,075	0.9	10	24120976

Also available in die-formed rings and pre-cut lengths.

MERKEL UNIVAL 6323

Universal packing for high speed/high temperature pumps

Merkel Unival consists of graphite-filled lubricated PTFE yarn. The special braiding structure offers the benefits of low thermal expansion and excellent heat conduction. Due to its low friction characteristics Merkel Unival can also withstand dry running up to a certain limit. In addition, its pliable and dense composition allows Merkel Unival to seal effectively with a minimum of gland pressure.
The packing is approved for use in the food processing industries.

Application

Rotary pumps, valves

Media

Alkalis, solvents, bitumen, almost all acids.
Exceptions: highly concentrated nitric acid, oleum

VALUES TO THE CUSTOMER

- Very low thermal expansion
- Low friction characteristics
- Dense and pliable composition
- Ability to run at high speeds
- Longer service life
- Low leakage with a minimum of gland pressure

Operating conditions

Valves		
p	25 MPa	3,625 psi
T	–100 … +280 °C	–148 … +536 °F
pH	0 … 14	0 … 14
Rotary pumps		
p	2.5 MPa	362 psi
T	–100 … +280 °C	–148 … +536 °F
v	20 m/s	3,900 fpm
pH	0 … 14	0 … 14

mm	inch	g/m	m/kg	kg/box	Article No.
3	1/8	14	69.4	1	24230131
4		26	39.1	1	24191207
5	3/16	40	25.0	1	24187457
6		58	17.4	1	24186270
	1/4	65	15.5	1	24188526
8	5/16	102	9.8	2	24186511
	3/8	145	6.9	2	24188537
10		160	6.3	2	24186500
12		230	4.3	3	24186161
	1/2	258	3.9	3	24193723
14	9/16	314	3.2	3	24187392
15		360	2.8	3	24186570
16	5/8	410	2.5	3	24188237
18		518	1.9	3	24193023
19	3/4	578	1.7	3	24199600
20		640	1.6	5	24186633
22	7/8	774	1.3	5	24191064
25	1	1,000	1.0	10	24186194

Also available in die-formed rings and pre-cut lengths.

MERKEL ALCHEM 6375

Universal chemical valve packing

Merkel Alchem is manufactured from pure PTFE yarn with an additional PTFE impregnation, ensuring excellent chemical resistance. Its high density and tight braid structure ensure very low leakage performance. The packing has a high degree of form stability and a low compressibility which makes it also suitable for plunger pump applications.
The packing is approved for use in the food processing industries.

Application

Plunger pumps, valves

Media

All chemicals including concentrated hot acids and alkalis
Exceptions: molten alkali metals, fluorine and some fluorine compounds
BAM approved for gaseous oxygen (3 MPa up to 60 °C)

VALUES TO THE CUSTOMER

- Particularly tight braid and dense structure
- High degree of form stability and compressibility
- Low soluble chloride content
- Very low leakage rates
- Very low setting rates
- Suitable for nuclear applications

Operating conditions

Valves		
p	25 MPa	3,625 psi
T	–200 … +280 °C	–328 … +536 °F
pH	0 … 14	0 … 14
Plunger pumps		
p	50 MPa*	7,250 psi*
T	–200 … +280 °C	–328 … +536 °F
v	2 m/s	400 fpm
pH	0 … 14	0 … 14

* installation with end rings

mm	inch	g/m	m/kg	kg/box	Article No.
3	1/8	16	63.5	1	24107749
4		28	35.7	1	24107750
5	3/16	44	22.9	1	24107751
6		63	15.9	1	24107752
	1/4	72	14.0	1	24115712
8	5/16	112	8.9	2	24107753
	3/8	159	6.3	2	24117570
10		175	5.7	2	24107754
12		252	4.0	3	24107755
	1/2	282	3.5	3	24107756
14	9/16	343	2.9	3	24116248
15		394	2.5	3	24116340
16	5/8	448	2.2	3	24107757
18		567	1.8	3	24117869
19	3/4	632	1.6	3	24192581
20		700	1.4	5	24115579
22	7/8	847	1.2	5	24115580
25		1,094	0.9	10	24121883

Also available in die-formed rings and pre-cut lengths.

MERKEL GRAFIFLEX

Packing rings for high temperature valve applications

Merkel Grafiflex is characterized by a high level of chemical resistance and thermal stability as well as excellent sealing effect and constant elasticity. Regardless of temperature cycle this material is not subject to cold flow, shrinkage or aging. Merkel Grafiflex fulfills the purity requirements for seals in nuclear power station valves (content of soluble chlorides < 20 ppm). The packing is approved for use in the food processing industries (version 6501 additionally for drinking water, respectively KTW compliant).

Preformed **Merkel Grafiflex rings** are supplied in densities between 1.4 and 1.85 g/cm³.
Additionally they are available as:

- Merkel Grafiflex Cover Lid seals (see page 15)
- Merkel Grafiflex **6501** with carbon content 98 % or 99,85 %
- Merkel Grafiflex **6561** with carbon content 98 % and PTFE coating
- Merkel Grafiflex **6509** with carbon content 99,85 % and corrosion inhibitor

Merkel Grafiflex tape is also available as foil material with a unique surface pattern for quick repair service.

Merkel Grafiflex material is approved for use in food, drinking water and oxygen applications.

For re-conditioned valves we recommend the combined use of Merkel Grafiflex and Merkel Carbosteam 6550 anti-extrusion rings.

Application
Valves

Media
Hot water and feed water, steam, heat transfer oils, hydrocarbons and many other media
Exceptions: strongly oxidising media
BAM approved for gaseous oxygen (45 MPa up to 60 °C; 22 MPa up to 200 °C)

VALUES TO THE CUSTOMER

- Pure expanded graphite
- Dense and resilient
- Wide variety of moulds available
- Very high temperature and chemical resistance
- Excellent sealing effect and constant elasticity
- Fast delivery without mould charges

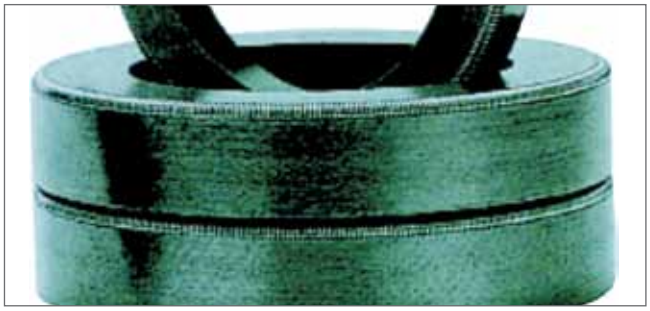
Operating conditions

Valves		
p	100 MPa	14,500 psi
T	–200 … +450 °C[1] –200 … +700 °C[2] –200 … +2,500 °C[3]	–328 … +842 °F[1] –328 … +1,292 °F[2] –328 … +4,532 °F[3]
pH	0 … 14	0 … 14

1 most media and air 2 steam 3 inert gas

MERKEL GRAFIFLEX COVER SEALS

Packing rings for high pressure cover seal applications



Merkel Grafiflex-cover seals are supplied as preformed rings and offer proven high performance, especially in heavy-duty valves or high-pressure feed-water pre-heaters.
Merkel Grafiflex remains elastic even with fluctuating temperatures and pressures up to 200 N/mm². Clearances up to 0.3 mm can be sealed without difficulty.
Larger gaps can be controlled by Merkel Grafiflex reinforced with stainless steel springs or caps integrated into the corners.

VALUES TO THE CUSTOMER

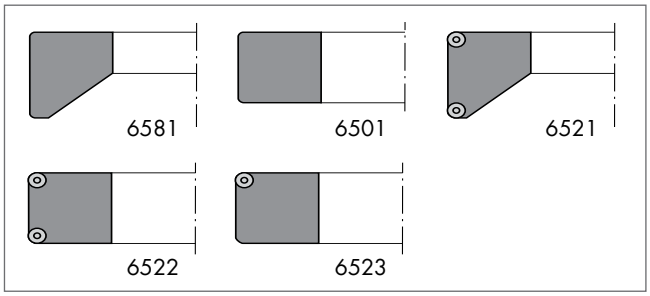
- Pure expanded graphite
- Dense and resilient
- Incorporated spring insert/caps
- Fast delivery without mould charges
- Very high temperature and chemical resistance
- Excellent sealing effect and constant elasticity
- Prevents extrusion at high pressures and temperatures
- Fast delivery without mould charges

Application

Valves

Media

Hot water and feed water, steam, heat transfer oils, hydrocarbons and many other media.
Exceptions: strongly oxidising media.

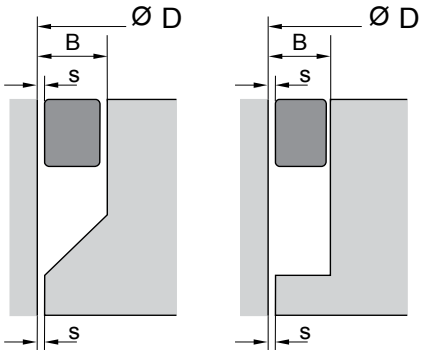


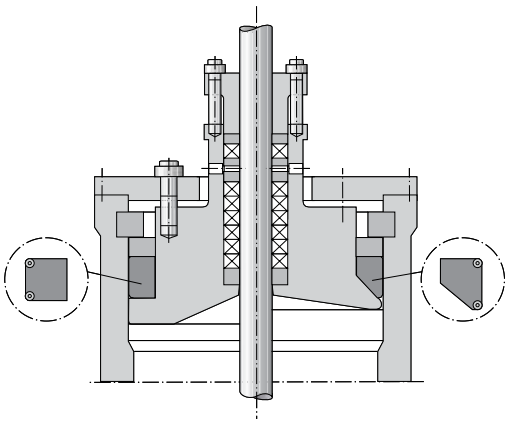
Operating conditions

Valves		
p	100 MPa	14,500 psi
T	–200 … +450 °C[1] –200 … +700 °C[2] –200 … +2,500 °C[3]	–328 … +842 °F[1] –328 … +1,292 °F[2] –328 … +4,532 °F[3]
pH	0 … 14	0 … 14

1 most media and air 2 steam 3 inert gas

Ø D	B	$S_{(centr.)}$
≤350	≤20	≤0.8
≤350	≥20	≤1.2
>350	≤20	≤0.8
>350	≤25	≤1.2
>350	≥25	≤1.5





MERKEL CARBOSTEAM 6550

High temperature valve packing

Merkel Carbosteam is made of flexible carbon yarns and a special graphite-based impregnation. Thanks to its excellent thermal stability Merkel Carbosteam is widely used in high temperature steam applications.
Because of its high pressure and extrusion resistance Merkel Carbosteam is ideally used as end rings for Merkel Grafiflex and Merkel G-Spezial and Merkel G-Spezial S.

Application
Valves

Media
Hot water, hot air, steam, acids and alkalis
Exceptions: strongly oxidizing media such as hot sulfuric acid and nitric acid

VALUES TO THE CUSTOMER

- Thermally stable carbon yarn and impregnation
- High graphite content in impregnation
- High strength carbon yarns
- Very high temperature resistance
- Reduced friction, longer service life
- Used as anti-extrusion and wiper end rings with Grafiflex or G-Spezial

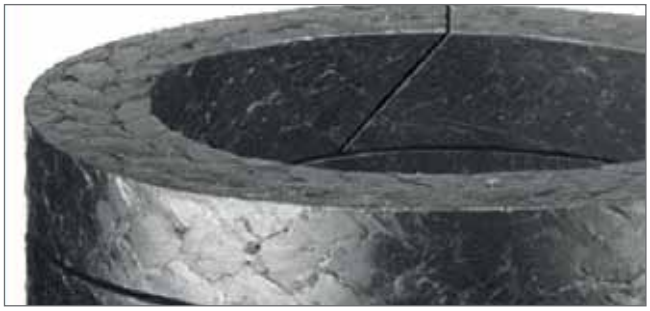
Operating conditions

Valves		
p	30 MPa	4,350 psi
T	–30 … +400 °C[1] –30 … +550 °C[2]	–22 … +750 °F[1] –22 … +1,022 °F[2]
pH	0 … 14	0 … 14

1 most media and air 2 steam

mm	inch	g/m	m/kg	kg/box	Article No.
3	1/8	10	101.0	1	24199354
4		18	56.8	1	24196161
5	3/16	28	36.4	1	24191670
6		40	25.3	1	24196568
	1/4	44	22.2	1	24199357
8	5/16	70	14.2	2	24191671
	3/8	99	10.1	2	24199361
10		110	9.1	2	24191672
12		158	6.3	3	24190391
	1/2	177	5.6	3	24199363
14	9/16	216	4.6	3	24197176
15		248	4.0	3	24216138
16	5/8	282	3.6	3	24195492
18		356	2.8	3	24199366
19	3/4	397	2.5	3	24315375
20		440	2.3	5	24199368
22	7/8	532	1.9	5	24290307
25	1	688	1.5	10	24199373

Also available in die-formed rings and pre-cut lengths.



MERKEL G-SPEZIAL 6560

General service packing for high temperature steam valves

Merkel G-Spezial is made from temperature-resistant flexible graphite yarns, reinforced with a thin Inconel wire. This highly pressure resistant braided packing has the same excellent sealing effect as pure die-formed graphite rings.
Merkel G-Spezial is particularly suitable for quick-repair service.
For clearance gaps greater than 0.2 mm we recommend the use of Merkel Carbosteam 6550 anti-extrusion rings.
Can be used in combination with Merkel Carbosteam 6550 end rings for high-pressure valve applications.
Also available with corrosion inhibitor, Merkel G-Spezial S 6569.

VALUES TO THE CUSTOMER

- Pure expanded graphite yarn
- Extremely dense when compressed
- Reinforced with Inconel wire
- Ideal service packing
- High temperature and chemical resistance
- Very low leakage
- High pressure resistance
- Quick repair for all valve dimensions

Application

Valves

Media

Hot water, steam, gases, oils, acids and alkalis
Exceptions: strongly oxidizing acids such as sulfuric and nitric acid in high concentrations

Operating conditions

Valves		
p	45 MPa	5,800 psi
T	–200 … +450 °C[1] –200 … +650 °C[2]	–328 … +842 °F[1] –328 … +1,022 °F[2]
pH	1 … 14	1 … 14

1 most media and air 2 steam

mm	inch	g/m	m/kg	kg/box	Article No.
4		19	52.1	1	24356667
5	3/16	30	33.3	1	24356668
6		43	23.1	1	24356669
	1/4	49	20.3	1	24377809
8	5/16	77	13.0	2	24356670
	3/8	108	9.2	2	24377978
10		120	8.3	2	24356671
12		173	5.8	3	24356672
	1/2	194	5.2	3	24356673
14	9/16	235	4.3	3	24356674
15		270	3.7	3	24356675
16	5/8	307	3.3	3	24356676
18		389	2.6	3	24356677
19	3/4	433	2.3	3	24356678
20		480	2.1	5	24356679
22	7/8	557	1.7	5	24373834
25	1	719	1.3	10	24373836

Also available in die-formed rings and pre-cut lengths.

MERKEL G-SPEZIAL S 6565

High performance service packing for pumps and valves

Merkel G-Spezial S is braided from expanded pure graphite and is suitable for the use in pump and valve applications. It combines all the advantages of expanded graphite, such as high temperature stability and cross sectional density. Rings from Merkel G-Spezial S can be cut easily from a roll, thus ensuring a prompt repair service.
Can be used in combination with Merkel Carbosteam 6550 end rings for high pressure valve applications.

Application

Valves, rotary pumps

Media

Hot water, steam, gases, oils, acids and alkalis
Exceptions: strongly oxidizing acids like sulfuric acid and nitric acid in high concentrations

VALUES TO THE CUSTOMER

- Pure expanded graphite
- Dense and resilient
- Wide variety of moulds available
- Very high temperature and chemical resistance
- Excellent sealing effect and constant elasticity
- Fast delivery without mould charges

Operating conditions

Valves		
p	25 MPa	3,556 psi
T	–200 … +450 °C[1)] –200 … +650 °C[2)]	–328 … +842 °F[1)] –328 … +1202 °F[2)]
pH	0 … 14	0 … 14
Rotary pumps		
p	2.5 MPa	362 psi
T	–200 … +450 °C[1)] –200 … +650 °C[2)]	–328 … +842 °F[1)] –328 … +1202 °F[2)]
v	25 m/s	4,900 fpm
pH	0 … 14	0 … 14

1 most media and air 2 steam

mm	inch	g/m	m/kg	kg/box	Article No.
3	1/8	10	96.6	1	49302798
4		18	54.4	1	00527400
5	3/16	29	34.8	1	49001846
6		41	24.2	1	00527397
	1/4	46	21.6	1	00529142
8	5/16	74	13.6	2	00527398
9		93	10.7	2	49054414
	3/8	104	9.6	2	49054415
10		115	8.7	2	00527399
12		166	6.0	3	00527640
	1/2	185	5.4	3	00529143
14	9/16	225	4.4	3	00527641
15		259	3.9	3	00528454
16	5/8	294	3.4	3	00527642
18		373	2.7	3	00527643
19	3/4	415	2.4	3	49054416
20		460	2.2	5	00527644
22	7/8	557	1.8	5	49054417
25	1	719	1.4	10	49054419

Also available in pre-cut lengths.

MERKEL UNIFLEX 6588

The ideal general-purpose pump packing

Merkel Uniflex is manufactured from a carbonized yarn with a special PTFE-graphite impregnation. The packing is very flexible and extrusion-resistant. The impregnation maintains an excellent bond to the yarn over the complete life of the packing. The thermal and volumetric stability provides superior sealing performance with minimal gland compression.
These features make Merkel Uniflex suitable for use in "dry-running" applications.

Application

Rotary pumps

Media

Cold and hot water, steam, aqueous solutions, diluted acids and alkalis

VALUES TO THE CUSTOMER

- High carbon content
- Strong, flexible yarn
- Excellent long-term bond between impregnation and yarn
- Very good heat dissipation
- Extrusion resistant and good resilience
- Long service life, can run "dry" for periods

Operating conditions

Pumps		
p	2.5 MPa	362 psi
T	–50 … +280 °C	–58 … +536 °F
v	25 m/s	4,900 fpm
pH	1 … 13	1 … 13

mm	inch	g/m	m/kg	kg/box	Article No.
6		48	21.0	1	24374614
	1/4	54	18.5	1	24374615
8	5/16	84	11.8	2	24374616
	3/8	120	8.4	2	24374617
10		132	7.6	2	24374618
12		190	5.3	3	24374619
	1/2	213	4.7	3	24374620
14	9/16	259	3.9	3	24374621
15		297	3.4	3	24374622
16	5/8	338	3.0	3	24374623
18		428	2.3	3	24374624
19	3/4	477	2.1	3	24374625
20		528	1.9	5	24374626
25	1	825	1.2	10	24374627

Also available in die-formed rings and pre-cut lengths.

MERKEL KOMBILON 6742

Ideal for rotary pumps and agitators in the paper and chemical industry

Merkel Kombilon is an elastic combination braid made from carbon and PTFE yarns. It is impregnated with a special PTFE compound and running-in lubricant.
The unique construction of Merkel Kombilon provides a very low coefficient of friction and exceptional resilience making it ideal for mixer or agitator applications.
The packing maintains its elasticity even after prolonged operation and under high contact pressure. The specially processed carbon yarns ensure excellent flexibility and shaft protection.
The packing is approved for use in the food processing industries.

Application

Rotary pumps, agitators and mixers

Media

Alkalis, all forms of solvents, alcohols, ketones, esters, oils, acids, hot water, boiler lye, brine, ammonia
Exceptions: strongly oxidizing acids

VALUES TO THE CUSTOMER

- Excellent elasticity and resilience
- Very low coefficient of friction
- Good heat dissipation and creep resistance
- Low leakage rates even with slight shaft deflection
- Longer operating life
- Excellent performance at higher temperatures

Operating conditions

Pumps		
p	2.5 MPa	362 psi
T	–100 … +280 °C	–148 … +536 °F
v	20 m/s	3,900 fpm
pH	0 … 14	0 … 14

mm	inch	g/m	m/kg	kg/box	Article No.
4		26	37.9	1	24293761
5	3/16	41	24.2	1	24293762
6		59	16.8	1	24293763
	1/4	68	14.8	1	24327565
8	5/16	106	9.5	2	24293764
	3/8	150	6.7	2	24312110
10		165	6.1	2	24293765
12		238	4.2	3	24293766
	1/2	266	3.8	3	24302371
14	9/16	323	3.1	3	24292346
15		371	2.7	3	24314668
16	5/8	422	2.4	3	24293767
18		535	1.9	3	24301906
19	3/4	596	1.7	3	24337151
20		660	1.5	5	24293768
25	1	1,031	1.0	10	24299492

Also available in die-formed rings and pre-cut lengths.

MERKEL UNIVERDIT 7000

Special high-density pump and valve packing

Compact extruded packing made of PTFE graphite compound. **Merkel Univerdit** has extremely good resistance to gas permeation and has the ability to embed abrasive particles. Merkel Univerdit remains self-lubricating even during extended periods of operation and therefore reduces friction on shafts and spindles. Generally, Merkel Univerdit must always be installed with end rings.*

* End-ring selection is dependent on application parameters

Application

Rotary pumps, valves

Media

Alkalis, all forms of solvents, alcohols, ketones, esters, oils, acids, hot water, boiler lye, brine, ammonia
Exceptions: strongly oxidizing acids

VALUES TO THE CUSTOMER

- Very high density
- Both pliable and volumetrically stable
- Ability to absorb media particles
- Self-lubricating
- Resistance to gas permeation
- Easy installation and long service life
- Ideal for sealing abrasive media
- Can run "dry" in some applications

Operating conditions

Valves		
p	16 MPa	2,230 psi
T	–30 … +250 °C	–22 … +482 °F
pH	0 … 14	0 … 14
Rotary pumps		
p	2.5 MPa	362 psi
T	–30 … +250 °C	–22 … +482 °F
v	6 m/s	1,200 fpm
pH	0 … 14	0 … 14

mm	inch	g/m	m/kg	kg/box	Article No.
3	1/8	16	61.7	1	24139912
4		29	34.7	1	24115567
5	3/16	45	22.2	1	24107764
6		65	15.4	1	24107765
	1/4	73	13.8	1	24121706
8	5/16	115	8.7	2	24107766
	3/8	162	6.2	2	24117922
10		180	5.6	2	24107767
12		259	3.9	3	24107768
	1/2	290	3.4	3	24117923
14	9/16	353	2.8	3	24107770
15		405	2.5	3	24120253
16	5/8	461	2.2	3	24107771
18		583	1.7	3	24115709
19	3/4	650	1.5	3	24120998
20		720	1.4	5	24107772
22	7/8	871	1.1	5	24141641
25	1	1.125	0.9	10	24116047

Also available in pre-cut lengths.

MERKEL FITTING TOOLS

1 Merkel Packing Extractors 7500

Merkel Packing Extractors have been developed for rapid and careful removal of old sealing material to provide a clean stuffing box before applying the new packing. They are made from stainless steel. With its flexible and powerful shaft, even packings in difficult to access stuffing boxes of pumps, valves, mixers and other applications are easy to remove.
These extractors are available in four sizes (see table on the right). They can be ordered separately or as a set consisting of a case and extractors in sizes 1, 2 and 3.

2 Merkel Ring Segments 7511

For the installation of stuffing box packing, metal ring segments can be screwed onto the Merkel Packing Extractors making them the ideal tool for pushing the packing evenly into the installation space without damaging the shaft or the housing of the stuffing box.
Merkel ring segments are available in 4 sizes equivalent to the sizes of the Merkel packing extractors.

VALUES TO THE CUSTOMER

- Flexible shaft for working on hard-to-reach stuffing boxes
- Special manufactured screw for all type and size of stuffing box packing and metal ring segments

1

2

1 Merkel packing extractors			
Size	**Length**	**Installation space**	**Article no.**
3	22 cm	6 mm	24107984
2	33 cm	10 mm	24107985
1	44 cm	13 mm	24107986
0	50 cm	16 mm	24107987
Extractor set (sizes 1, 2, 3)			24107983

2 Merkel ring segment	
Size	**Article no.**
3	24107988
2	24107989
1	24107990
0	24107991

3 Merkel Packing Cutter 7505

The universal packing cutter is designed for the precision cutting of packing materials. With the help of this cutter, precise lengths can be cut from a coil of packing material.

VALUES TO THE CUSTOMER

- For radial scarf cuts of 45° for shafts and spindles. Maximum cutting length 470 mm.
- Cross section measuring scale in inches and millimeters
- Clamping device for holding the packing in place
- Finger guard for additional safety quality
- Knife (can be ordered as replacement knife 7513)

3

3 Packing cutter	Article no.
Merkel 7505	24118583
Replacement knife 7513	24122885

TABLE OF PRINCIPAL MEDIA GROUPS

	Page	9	8	20	6	11	19	10	12	21	13	7	16	14	17	18
Principal media group		**Merkel packing**														
		Arochem S 6216	**Arolan II 6215**	**Kombilon 6742**	**Ramilon 4586**	**Unichem 6313**	**Uniflex 6588**	**Unistat 6303**	**Unival 6323**	**Univerdit 7000**	**Alchem 6375**	**Arostat 6204**	**Carbosteam 6550**	**Grafiflex 6501**	**G-Spezial 6560**	**G-Spezial S 6565**
1.	Acids															
1.1	Heavily diluted inorganic and organic acids	■	■	■		■	■	■	■	■	■	■	■	■	■	■
1.2	Concentrated organic acids, inorganic acids (medium concentration)	○	○	■		■	○	■	■	■	■	○	■	■	■	■
1.3	Concentrated inorganic acids			■		■		■	■		■		○	○	○	○
2.	Alkalis															
2.1	Diluted alkalis	■	■	■	○	■	■	■	■	■	■	■	■	■	■	■
2.2	Concentrated alkalis			■		■	■	■	■	■	■	■	■	■	■	■
3.	Oils and lubricants															
3.1	Mineral oils and lubricants, plant and animal oils and lubricants	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
3.2	Synthetic oils, heat transfer oils	■	■	■			■	■	■		■	■		■	■	■
4.	Other organic compounds (nitriles, amines, lactames)	■	■	■		■	■	■	■		■			■	■	■
5.	Neutral aqueous solutions (salt solutions)	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
6.	Solvents (aliphatic and aromatic hydrocarbons, aldehydes, alcohols, esters, ketones, chlorinated hydrocarbons)	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
7.	Steam															
7.1	up to 180 °C	■		■			■	■	■	■	■	○	■	■	■	■
7.2	up to 280 °C	■					■	■			■		■	■	■	■
7.3	up to 550 °C												■	■	■	■
8.	Steams and gases															
8.1	Inert gases, Air	■	■	■	○	■	■	■	■	■	■	■	■	■	■	■
8.2	Volatile hydrocarbons, solvent steams	■	■	■		■	■	■	■	■	■	■	■	■	■	■
8.3	Sour gases	■	■	■		○	■	■	■	■	■			■	■	■
8.4	Oxygen							■						■		
	Hydrogen	■	■	■			■	■	■	■	■	■		■		
9.	Water															
9.1	Drinking water, sea water, sewage, hot water up to 100 °C	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
9.2	Hot water over 100 °C, boiler feed water	■	■	■	○	■	■	■	■	■	■	○	■	■	■	■

■ suitable ○ conditionally suitable

MEDIA LIST KEYED TO PRINCIPAL GROUP

A	
Accumulator acid	1.2
Acetic acid	1.1; 1.2
Acetic acid, glacial	1.1; 1.2
Acetic anhydride	1.1; 1.2
Acetone	6
Acetylene	3.2
Acids of a sulphurous type	1.2
Acrylonitrile	4
Adipic acid	1.1; 1.2
Aircraft fuel	6
Al-Acetate	5
Al-Chloride	1.3
Alum, aqueous	1.1
Aluminium sulphate	2.1
Ammonia, aqueos	2.1; 2.2
Ammonia, gaseous	2.2
Ammonia, liquid	2.2
Ammonium chloride	5
Ammonium sulphate	5
Aniline	4
Antifreeze (motor vehicle)	6
Asphalt	3.1
ASTM oils 1,2,3	3.1
Atznatron/Natron alkali	2.1; 2.2

B	
Barium salts, aqueous	5
Benzaldehyde	6
Benzene	6
Benzoic acid, aqueous	1.1; 1.2
Benzyl alcohol	6
Benzyl chloride	6
Bitumen	3.1
Blast furnace gas	8.2
Boiler feed water	9.2
Borax, aqueous	5
Brake fluid (ATE blue)	3.2
Bromine	2.3
Butadiene	8.2; 6
Butane	8.2; 6
Butanediol	6
Butyl acetate	6
Butyl alcohol	6
Butylene glycol	6
Butyraldehyde	6
Butyric acid	1.1; 1.2

C	
Calcium acetate	5
Calcium bisulphites (alkaline)	5;1.1
Calcium chloride, aqueous	5
Calcium hydroxide, aqueous	2.1
Calcium hypo-chloride	1.1; 1.2
Camphor	4
Caprolactam	4
Carbon dioxide (gas)	8.1
Carbon monoxide	3.1
Carbon tetrachloride	6
Caustic potash	2.1; 2.2
Chlorinated paraffin	3.2
Chlorine water RT	1.2; 1.3
Chlorine, wet	8.3
Chlorobenzene	6
Chloroform	6
Chlorsulphonic acid	1.1; 1.2
Chromic acid	1.1; 1.3
Citric acid	1.1; 1.2
Coconut oil	3.1
Cod-liver oil	3.1
Coke-oven gas	8.1
Copper chloride, aqueous	5
Copper sulfate, aqueous	5
Cresylic acid	6
Crude oil	3.2
Cupric acetate, aqueous	5
Cyclohexane	6
Cyclohexanol	6
Cyclohexanone	6

D	
Diamide, hydrazine	2.1; 2.2
Dibenzyl ether	6
Dibutyl ether	6
Dibutyl phthalate	6
Dichlorethane	6
Diesel oil	3.1
Diethanolamine	4
Diethyl ether	6
Diethyl sebacate	6
Diethylene glycol	6
Dimethylformamide	6
Dioctyl phthalate	6
Diphenyl oxide	6
Diphyl	3.2
Dowtherm A	3.2

E	
Ethane	8.2
Ethanolamine	4
Ethyl acetate	6
Ethyl alcohol	6
Ethyl benzene	6
Ethyl chloride	6
Ethylene	8.2
Ethylene chloride	6
Ethylene glycol	6
Ethylene oxide	8.2

F	
Faecal matter	9.1
Fatty acids	1.1; 1.2
Fatty alcohol	6
Ferric sulphate, aqueous	5
Fixing bath	2.1
Fluorine, dry	8.3
Fluorobenzene	6
Fluorosilicic acid	1.1; 1.2
Formaldehyde	6
Formic acid	1.1; 1.2
Freon types	6
Frigen types	6
Furnace gas, dry	8.2; 8.3

G	
Gas oil	3.1
Gelatine	5
Glaubers salt, aqueous (sodium sulphate)	5
Glue, aqueous	5
Glycerine	6
Glycol	6
Greases	3.1
Groundnut oil	3.1
Group H, HL, H-LP	3.1; 3.2

H	
Heat transfer oil	3.2
Heating oil	3.1
Heptane	6
Hexane	6
Hydraulic fluids/ mineral oil based	3.1
Hydraulic fluids/ phosphate ester based	3.2
Hydrobromic acid	1.1; 1.2
Hydrochloric acid	1.1; 1.3
Hydrocyanic acid	1.1; 1.2
Hydrogen chloride gas	8.3
Hydrogen peroxide	5

I	
Iodine, tincture	6
Iodine-potassium iodide, aqueous	5
Iron nitrate	1.1
Iron-III-Chloride, aquous	5
Isobutanol alcohol	6
Isobutyl ketone	6
Isooctane	6
Isopropanol	6
Isopropyl acetate	6
Isopropyl ether	6

L	
Lactic acid	1.1
Lauryl alcohol	6
Lead acetate, aqueous	5
Lithium chloride	5

M	
Magnesium chloride	5
Magnesium hydroxide	2.1; 2.2
Magnesium sulphate	5
Maleic acid	1.1; 1.2
Maleic anhydride	1.2
Methacrylic acid methyl ester	6
Methane	8.2
Methanol	6
Methyl ethylketone (MEK)	6
Methyl glycol acetate	6
Methyl isobutyl ketone	6
Methylene chloride	6
Milk of lime	2.1; 2.2
Mineral oil	3.1
Monobromobenzene	6
Monochloracetic acid	1.2; 1.3
Monochloracetic acid	1.2; 1.3

N	
Naphta	6
Naphtaline	6
Natural gas	8.2
Nickel sulphate	5
Nitric acid	1.2; 1.3
Nitrobenzene	6

O	
Oleum	1.3
Oxalic acid	1.1; 1.2
Oxygen, gaseous	8.4

P	
P3® alkali	2.1; 2.2
Palmitic acid	1.1
Paper pulp	5
Paraffin	3.1
Paraffin oil	3.1
Pentane	6
Perchlorethylene	6
Perchloric acid	1.2; 1.3
Petrol	3.1
Petroleum	3.1
Petroleum ether	6
Phenol, aqueous	1.1; 1.2
Phosphoric acid	1.1; 1.2
Phthalic acid	1.1; 1.2
Phthalic anhydride	1.1; 1.2
Pine needle oil	3.1
Potassium acetate, aqueous	5
Potassium bromide, aqueous	5
Potassium carbonate, aqueous	2.1
Potassium chlorate, aqueous	5.2
Potassium chloride, aqueous	5
Potassium cyanide, aqueous	5
Potassium hydroxide	2.1; 2.2
Potassium nitrate, aqueous	5
Potassium silicate, aqueous	5
Propane	8.2
Propanol	6
Propyl acetate	6
Propylene glycol	6

R	
River acids, concentrated	1.2; 1.3

S	
Salicylic acid	1.1; 1.2
Sea water	9.1
Sea/lake water (salt water)	9.1
Silicone oil	3.2
Silver nitrate, aqueous	5
Soap solution	5
Sodium carbonate	2.1
Sodium chloride	5
Sodium cyanide	5
Sodium hypochlorite	1.1; 1.2
Sodium nitrite	5
Sodium phosphate	5
Sodium silicate	5
Sodium sulphate	5
Sodium sulphide	5
Sodium sulphite	5; 1.1
Sodium thiosulphate	5
Soluble sodium	5
Steam	7
Steam up to 180 °C	7.1
Steam up to 280 °C	7.2
Steam up to 600 °C	7.3
Stearic acid	1.1
Sulphite alkali	2.1; 2.2
Sulphur dioxide	8.3
Sulphuric acid	2.1; 2.2

T	
Tallow	3.1
Tannic acid	1.1; 1.2
Tannin	1.1
Tar	3.1
Tartaric acid	1.1; 1.2
Tetrahydrofurane	6
Toluene	6
Town gas	8.2
Tributyl phosphate	1.2; 1.3
Trichloracetic acid	1.2; 1.3
Trichlorethylene	6
Triethanolamine	4
Turpentine	6

U	
Urea, aqueous	5

V	
Vinyl acetate	6
Vinyl chloride, aqueous	4

W	
Waste water	9.1
Water, boiler feed water	9.2
Water, cold	9.1
Water, sea water	9.1
Water, up to 100°	9.1
Wood pulp	5

X	
Xylene	6

Z	
Zinc chloride	1.1
Zinc sulphate	1.1

STANDARDISATION PROPOSALS

These proposals are guidelines only.
For further advice please contact our Technical Department

Type of industry	Media	Pumps, Agitators etc.									Valves					
		Arochem S 6216	Arolan II 6215	Kombilon 6742	Ramilon 4586	Unichem 6313	Uniflex 6588	Unistat 6303	Unival 6323	Univerdit 7000	Alchem 6375	Arostat 6204	Carbosteam 6550	Grafiflex 6501	G-Spezial 6560	G-Spezial S 6565
Breweries	Mash				■			■								
	Wort				■			■								
	Water				■			■								
	Beer				■			■								
	Brine				■			■								
	Washing solution				■			■								
	Ammonia				■			■								
	Steam								■			■	■	■	■	■
Chemical industry in general	Alkalis	■	■	■		■	■	■	■		■					
	Inorganic acids			■		■		■	■		■					
	Organic acids	■	■	■		■	■	■	■		■					
	Crystalline media									■	■					
	Hardening media									■	■					
	Halogens			■		■	■		■	■	■					
	Solvents: aliphatic				■			■			■					
	Arom. and chlorinated				■			■			■					
	Alcohols	■	■		■		■	■			■					
	Esters	■	■		■		■	■			■					
	Ketones	■	■		■		■	■			■					
	Oils and greases	■	■		■		■	■			■					
	Water (incl. waste)	■	■		■		■	■			■					
	Steam												■	■	■	■
Paint industry	Greasing oils				■						■					
	Solvents				■						■					
	Dispersion paints				■						■					
	Synthetic resin paints				■					■	■					
Power stations	Boiler feed water			■					■			■				
	Condensate	■	■		■		■					■				
	Cooling water	■	■		■		■					■				
	River water	■	■		■		■					■				
	Steam												■	■	■	■

■ type of packing

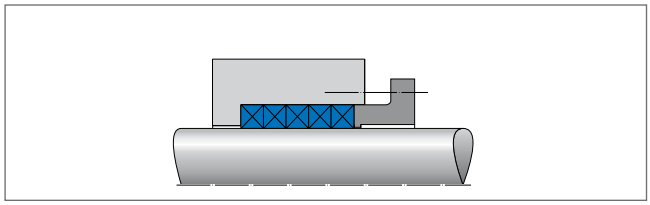
Type of industry	Media	Pumps, Agitators etc.									Valves					
		Arochem S 6216	Arolan II 6215	Kombilon 6742	Ramilon 4586	Unichem 6313	Uniflex 6588	Unistat 6303	Unival 6323	Univerdit 7000	Alchem 6375	Arostat 6204	Carbosteam 6550	Grafiflex 6501	G-Spezial 6560	G-Spezial S 6565
Paper industry	Fibrous water				■		■					■				
	Pulp				■		■					■				
	Drum water				■		■					■				
	Condensed water				■		■					■				
	Screening water				■		■					■				
	Waste water				■		■					■				
	Liquors	■	■									■				
	Steam												■	■	■	■
Refineries	Crude oil	■	■								■	■				
	Aliphatic hydrocarbons	■	■				■				■	■				
	Aromatic hydrocarbons	■	■				■				■	■				
	Chlorinated hydrocarbons	■	■				■				■	■				
	Bitumen	■	■	■		■	■		■		■	■				
	Heat transfer oils											■				
	Steam												■	■	■	■
	Organic acids			■		■	■		■							
	Inorganic acids			■		■	■		■		■	■				
	Chlorine			■		■	■		■		■					
	Caustics			■		■	■	■	■		■	■				
Pulp industry	Boiler liquids: pH 1–3			■		■	■	■	■		■	■				
	Boiler liquids: pH 13–14			■		■		■	■							
	Chlorine dioxide			■		■		■	■							
	Sulfite water			■		■		■	■							
	Hypochlorite			■		■		■	■							
	Hydrochloric acid			■		■		■	■							
	Fibre suspension						■			■						
	Steam									■			■	■	■	■
Cement industry	Muds				■		■			■		■				
	Water				■							■				
Sugar industry	Water (with sand)				■					■		■				
	Juice				■					■		■				
	Lime milk				■					■		■				
	Skimming froth				■					■		■				
	Sugar juice, molasses				■							■				
	Steam												■	■	■	■

■ type of packing

APPLICATION EXAMPLES

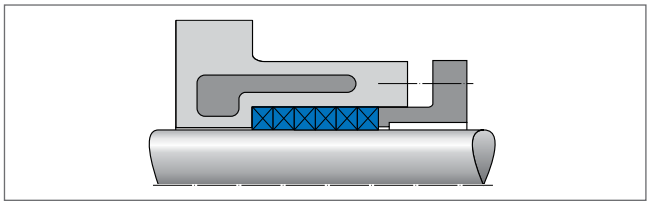
Here are various examples of basic packing applications

Basic design of a stuffing box



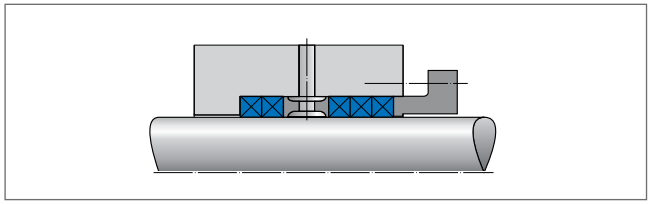
General application for valves, centrifugal and plunger pumps

Stuffing box with cooling manifold



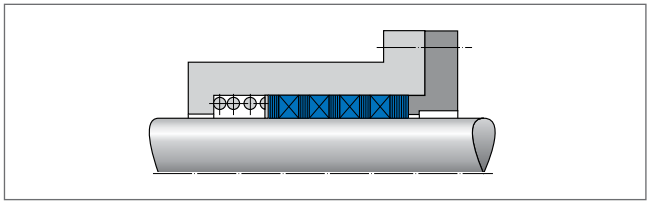
For shaft seals with media boiling point
below operating temperature

Stuffing box with lantern ring



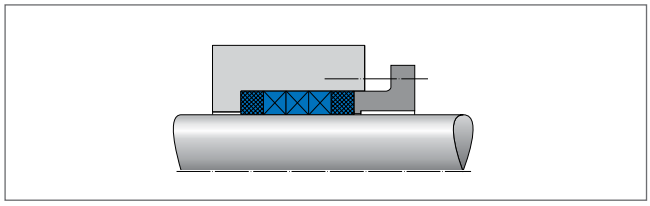
- For lubrication
- For sealing at high pressure (greater than pump pressure)
- For sealing at negative pressure (leakage suction)
- For cooling

Stuffing box with inside spring



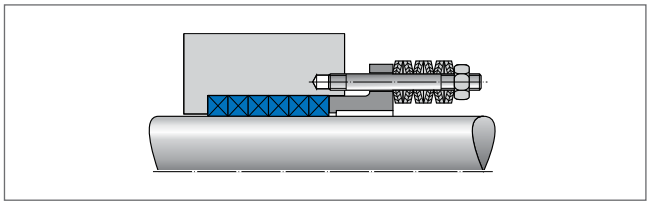
Predominantly on high-pressure plunger pumps
(Spring adjustment only to ensure a preliminary sealing)

Stuffing box with different types of packings



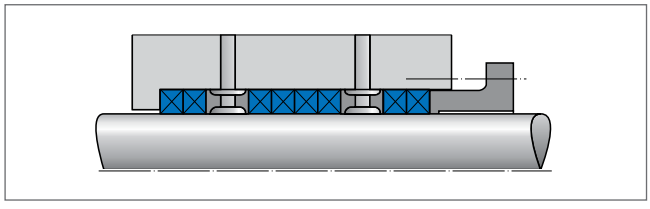
- For protection of a plastic type packing, braided packing is used as anti-extrusion ring
- Highly pre-compressed rings for bridging large extrusion gaps
- High-density spacer rings as replacement for metal guides

Stuffing box with outside spring



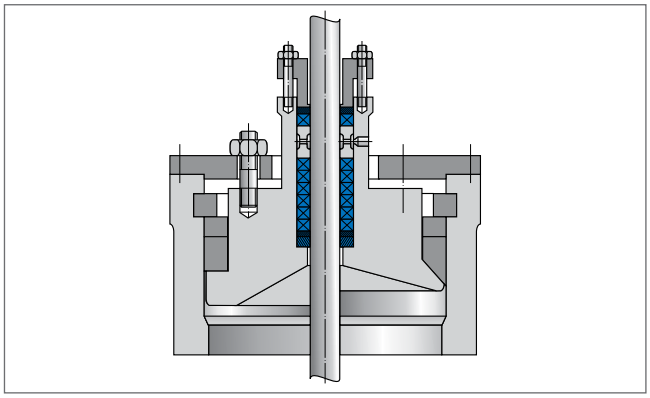
Maintenance-free sealing. Spring load must exceed
pressure of medium by ring surface area!

Stuffing box with two lantern rings



- First ring for high-pressure lubrication, second ring for suction
- Sealing with different media

Self-sealing end cover with highly compressed Grafiflex rings



Application e. g. Bredtschneider-Uhde system

INSTALLATION GUIDE

To pack a stuffing box either "cut to size" or use die-formed rings. Use the Merkel packing cutter for an exact length and form a ring around the shaft or spindle. If no tool is available simply wind the packing around a shaft or pipe of correct diameter and cut. A diagonal cut helps to produce a better sealing effect than a straight cut. When cutting packings that tend to fray, place adhesive tape over the area to be cut and then cut through the tape.
Install each ring into the stuffing box bore, ensuring the ends are placed together and first introduced followed by the rest of the ring. Also ensure the joints are placed 90° to each other. The packing should initially be tightly compressed so that it will mould and seat itself in the stuffing box. The gland nuts should then be loosened and retightened to a medium setting.

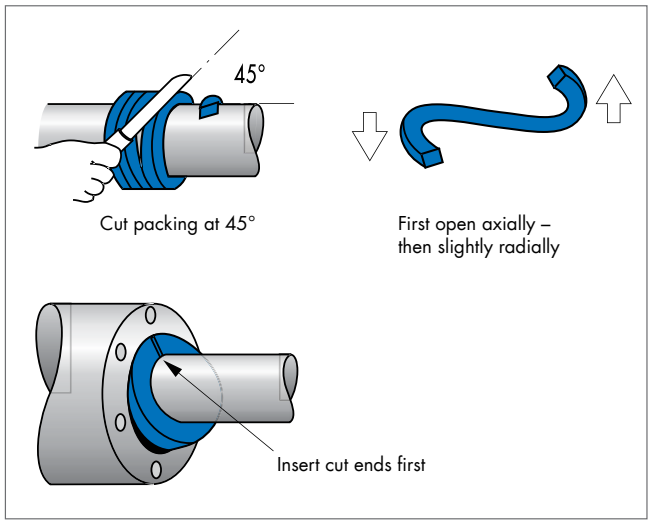
Precompression of packings
The correct pre-compression and operating compression of the gland is dependant on the type of packing and its application. The appropriate gland pressure can only be measured with a torque wrench or similar instrument.

Pump packings
Pump packings are applied with a gland pressure of 1.05 to 2.0 times the pressure of the medium. However, a minimum pressure of 0.5 to 1.5 N/mm² is necessary.

Valve packings
Valve packings are applied with a gland pressure of 2 to 5 times medium pressure and a minimum pressure of 5 N/mm². Please consult our technical advisory service for the correct values.

"Running in" new packings
Pump packings are particularly susceptible to damage through high temperature during the run-in period. Therefore it is important to pay special attention to the shaft temperature during the run-in phase. If the packing runs too hot the pump must be stopped. After a short cooling down period a regular drip should appear and the pump can then be restarted. It may be necessary to repeat this procedure several times until regular leakage appears.

Installing pre-formed rings
Pre-formed rings with exact dimensions should be handled with particular care in order to retain the advantages that these rings offer. If the rings have to be opened to fit onto the shaft then the ring ends should be opened axially only enough to fit the ring over the shaft. Bending the ring radially deforms the ring and makes installation more difficult.



Tolerances and surface finishes
The surface finish should not exceed the following values:
- Centrifugal pump shafts, plungers and spindles $R_a < 0.25$ µm
- Stuffing box bores $R_a < 2.5$ µm

These values are for general applications. For increased sealing effect and longer service life the R_a values should be reduced to $R_a < 0.1$ µm. The permissible eccentricity on centrifugal pumps should be less than 1/1000 of the shaft diameter. In the interest of reduced leakage the eccentricity must not exceed 1/100 of the packing width.

Gap width
The permissible extrusion gaps between shaft and gland are 2/100 of the packing section. If the gaps are larger or the packing in question is inclined to extrude, suitable anti-extrusion rings should be fitted. A copy of our detailed installation instructions is included with each delivery.

NON-STANDARD MERKEL PACKINGS

Merkel packing	Description	Pressure (MPa)			Speed (m/s)		Temperature (°C)	pH
		Rotary pumps	Plunger pumps	Valves	Rotary pumps	Plunger pumps		
	**Merkel Ramiflex 4510** Ramie fibre with special red grease impregnation	1.6	10		10	1	–10 … +120	6–9
	**Merkel Arolan 6210** Multi-filament aramid yarn with PTFE impregnation and lubricant	2.5	20		26	2	–50 … +280	1–13
	**Merkel Arochem II 6211** PTFE/Graphite compound yarn re-inforced with aramid corners		50			2	–50 … +280	1–13
	**Merkel Arochem 6212** PTFE yarn re-inforced with aramid corners	2.5	50		15	2	–50 … +280	1–13
	**Merkel Aroflex 6226** Staple aramid with mineral grease/ graphite impregnation	1.6			10		–10 … +150	2–13
	**Merkel Flexalon 6250** White synthetic yarn with PTFE impregantion and lubricant	2.5			25		–50 … +250	1–13
	**Merkel Univall II 6326** Graphite-impregnated PTFE yarn with silicon oil lubrication	2.5			15		–100 … +280	0–14

Merkel packing	Description	Pressure (MPa)			Speed (m/s)		Temperature (°C)	pH
		Rotary pumps	Plunger pumps	Valves	Rotary pumps	Plunger pumps		
	**Merkel Unival GFO® 6329** 100% GFO yarn	2.5			25		–100 … +280	0–14
	**Merkel Thermapack 6401** High quality silicic acid yarn			1			–50 … +1,100	5–9
	**Merkel GC Spezial 6567** Expanded flexible graphite fibres and carbon fibres	2.5		45	20		–30 … +400 +550 [1]	0–14
	**Merkel Grafolan HT 6570** Graphite yarn with special PTFE impregnation			30			–30 … +450 +550 [1]	0–14
	**Merkel G-Spezial AR 6562** Expanded graphite yarns with aramid re-inforced corners	4			25		–100 … +280	1–13
	**Merkel Carboflex 6587** Carbon yarn with special PTFE/ Graphite impregnation	2.5			25		–30 … +300	0–14
	**Merkel Carbosteam S 6555** Expanded graphite core with carbon yarn overbraid			30			–30 … +400 +550 [1]	0–14

1 steam

® GFO, Inconel

41 AE 013 1.0 5-14

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