

Profile Survey

**Static gaskets for flanges connections
within pipelines, apparatuses, valves and fittings.**

According to German pre-standard DIN 2505 - January 1986 - the following is valid

$$F_{DV} = p \cdot d_D \cdot k_0 \cdot K_D \text{ [N];}$$

d_D [mm] mean diameter of gasket

b_D [mm] width of the gasket; p [N/mm²] internal pressure

k_0 [mm] characteristic value of initial load F_{DV}

strength resistance: K_D [N/mm²] for metal

$k_0 \cdot K_D$ [N/mm] for soft materials and combinations of soft material with metal

$$F_{DB} = p \cdot \pi \cdot d_D \cdot k_1 \cdot S \text{ [N];}$$

k_1 [mm] characteristic value of sealing operating load

F_{DB} ; As a rule, the safety factor of $S = 1.2$ applies

The bolt load must be exceed F_{DV} respectively $F_{DB} + \text{hydraulic} + \text{outer loads}$. The change of strength occurring at elevated temperatures must be taken into account.

$$10 \text{ bar} = 1 \text{ N/mm}^2 = 0.10 \text{ kp/mm}^2.$$

The values k_0 , $k_0 \cdot K_D$ and k_1 in this leaflet comply with DIN 2505, respectively AD-B7. Surface pressure limits can be found in the book „The Optimization of Static Gaskets“ H. J. Tückmantel.

Annotation about surface roughness.

1. The given values of surface roughness in our leaflets are to be understood as *recommended* maximum surface roughness. Finer surface roughnesses are preferable especially when low leakages are requested. Larger surface roughness can be tolerated, especially for graphite and PTFE.
2. For all gaskets made from soft materials or combinations of soft material and metal (not for metal jacketed gaskets), a surface roughness, corresponding to a contact surface „Form C“ according to DIN-standard, or stock-finish according to ANSI-standard, is allowable. Depending upon the softness of the gasket surface, the material will be embedded more or less deeply into the tool marks of the flanges. When using metal/soft material gaskets e.g. CONVEX-gaskets with layers of PTFE or graphite, this may lead to lower leakage due to a locally increased surface pressure.
3. Only for metal gaskets should the indicated roughness grades be met. In the event that the upper limit is exceeded, a significant deterioration occurs. A short fall of the lower limit is allowable but does not show an appreciable improvement.

It is easy to understand that the indication of the surface roughness only does not give complete information, because in addition the form of the roughness must be taken into account. A stock-finish fabricated surface manufactured with a „roundnosed tool“ has with the same R_z -value a more favourable sealing quality than a sealing surface fabricated with a conical nosed tool.

Flat-ring gaskets

page 2-5

Flat-ring gaskets of metal

Flat-ring gaskets of soft material

Rubber-steel gaskets

Corrugated gaskets

page 2

Wekas gaskets with fabric jacket

Spiral wound gaskets SPIROFLEX

page 3

Grooved gaskets with covering layer

CONVEX gaskets with covering layer

page 4

Metal Jacketed gaskets

PTFE enveloped gaskets

page 5

Special shaped metal gaskets

page 6-7

Circular shaped gaskets

Ring-joint gaskets RTJ

Lens gaskets

page 6

Solid Metal Convex gaskets

Diamond shaped gaskets

Grooved gaskets without layers

H-gaskets

page 7

Weld ring gaskets

page 8

Gaskets for self-sealing cover plates and closures

page 9

Double-cone gaskets, radial sealing

Delta gaskets, radial sealing

Cover plate gaskets, axial sealing (material

graphite)

page 9

Gaskets in the off-load (KNS)

Double sealing system with intermediate

exhausting KHS/KNS

Special gaskets


page 10

kempOchen
the right choice!

Flat-ring gaskets

Flat-ring gaskets of metal

		Al	Ag	Cu	Ni	Iron	CrMo- steel	CrNi- steel
K_D	N/mm ²	100	150	200	300	350	450	500
R_z^*	μm	2.5	12.5	6.3	3.2	3.2	3.2	1.6

Profile	Cross-Section	Material	k_0 [mm]	k_1 [mm]
A1		Metal	b_D	b_D+5

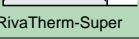
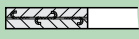
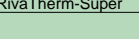
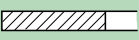

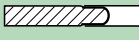
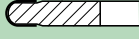
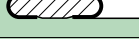
Flat-ring gaskets of soft material

As a rule, thin gaskets are preferred to thick ones. Gaskets are usually 1.5, 2, or 3 mm thick. Thin gaskets require better flange surfaces and better evenness than thicker ones.

To ensure sealing of the porous edges, gaskets **profile F1** are rimmed on the inside with a thin metallic strip.

Profile F5 is bordered by an outer metallic strip. This is not a reinforcing outer ring (e.g. in the sense of TRD452) but a cross section sealing through outer pressure as it occurs with self sealing manhole covers.

Profile F7 has an outer and inner rim.

Profile	Cross-Section	Material	$k_0 \cdot K_D$ [N/mm]	k_1 [mm]	R_z^* [μm]
A1		Graphite with metal Reinforced	$10 b_D$	$1.1 b_D$	50 to 160
		Graphite with tanged metal Reinforced	$20 b_D$	$1.3 b_D$	
		FA ¹⁾	$200 \sqrt{\frac{b_D}{h_D}}$	$1.3 b_D$	
	Soft Material		PTFE	$25 b_D$	
		Rubber	$2 b_D$	$0.5 b_D$	
F1					
F5		FA ¹⁾ with 1.4541	$245 \sqrt{\frac{b_D}{h_D}}$	$1.4 b_D$	25 to 160
F7					

*Recommended maximum peak-to-valley height for flange surfaces
¹⁾ fibre sheet with binder, asbestos free




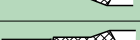

RivaTherm-Super with high chemical and thermal resistance up to 550 °C. RivaTherm-Super RS2E2 for gaseous and liquid oxygen service with BAM certification up to 130 bar 200 °C, and for general gas and water service.

RivaTherm-Super with tanged metal reinforcement RS2K110 of same chemical and thermal resistance as RivaTherm-Super, also for gaseous and liquid oxygen service with BAM certification up to 130 bar 200°C, and for general gas and water service with DVGW certification record number DIN DVGW90.01e079. Flat-ring gaskets of asbestos free fibre sheets (FA) with binder, rubber, rubber-cork, compressed mineral fibre sheets or graphite are available.

Rubber-steel gaskets

Profile WG, advantages to rubber gaskets with fabric insert: higher pressure resistance, easier to install as these gaskets are rigid. **Profile WG2** is further development with rigid self sealing lips in addition. Advantageous in applications with plastic or plastic glass reinforced flanges and glass lined flanges. The **type WS** is self-sealing by lips of Perbunan, EPDM or Viton. The sealing rubber ring can be replaced, the reinforcing ring can be reused. For surface pressures higher than 10 N/mm² it is recommended **profile WL** be used, because the sealing part is in the off-load.

Profile WL2 consists of a sealing rubber lip similar to that used for profile WL, in combination with an elastic steel supporting ring. In the region of the supporting ring, the rubber sealing part has a rippled inner surface adapted to the corrugated supporting ring. Therefore, a pull out of the rubber lip in the event of decrease of the liquid column, or in case of static vacuum is impossible.

Profile	Cross-Section	Material	$k_0 \cdot K_D$ [N/mm]	k_1 [mm]	R_z^* [μm]
WG		Rubber	$2 b_D$	$0.5 b_D$	50 to 160
WG2		Rubber	$2 b_D$	$0.5 b_D$	
WS		Rubber	$< 2 b_D$	$< 0.5 b_D$	
		PTFE	$15 b_D$	$1.0 b_D$	
WL		Rubber	off-load		
		PTFE	off-load		
WL2		Rubber	off-load		

*Recommended maximum peak-to-valley height for flange surfaces

Corrugated gaskets

Profile W1 requires a high surface finish and evenness of flanges. **Profile W1A** with covering layers of graphite or PTFE. **Profile W3** with cord layers, dry or graphited. **Profile W5** „Rival“ metal gasket is additionally impregnated with mastic and wrapped in protective paper. **Profile W7** with inner rim of heat resistant steel for high temperatures applications. An asbestos free ceramic cord is used as ribbon layers. **Profile WZ3** with cord layers from ceramic cord or mineral fibre cord and sealing zone from PTFE or graphite, outstandingly gastight.

Profile W2A respectively **W12A** is a dimensionally stable gasket, for example for hot air piping with enormous adaptability. **Profile W1A** for oxygen service up to 130 bar 200°C (BAM confirmation) with low necessary initial load, therefore usable for cooler fitting.

Profile W11A, W12A, W13A and WZ13 with bare centring ring of gasket to locate it at the bolt holes.

Upon request, all profiles can be supplied with welded straps for easier assembling. All profiles can also be supplied as frame gaskets.

Profile	Cross-Section	Material	$k_0 \cdot K_D$ [N/mm]	k_1 [mm]	R_z^* [μ m]
W1		Metal	200 b_D	$b_D/2+5$	6.3 to 12.5
W1A		Covering layers: Graphite or PTFE	15 b_D	1.0 b_D	25 to 160
W11A					
W2A					
W12A					
W3		Supporting Metals: Al	30 b_D	0.6 b_D	50 to 160
W13		Cu, Ms Steel	35 b_D 45 b_D	0.7 b_D 1.0 b_D	
W5		Inlayer: Mineral Fibre			
W7					
WZ3		Supporting Metals: Al Cu, Ms Steel	25 b_D 30 b_D 35 b_D	0.5 b_D 0.65 b_D 0.8 b_D	50 to 160
WZ13		Inlayer: Mineral Fibre Zone: Graphite, PTFE			

* Recommended maximum peak-to-valley height for flange surfaces.

Wekas gaskets with fabric jacket

This gasket owes its high stability to its 3 mm thick inner steel ring. Easy mounting, even for large diameters. The steel ring of **profile WAS** is braided with a PTFE hose, and the **profile WAG** is wrapped with a mineral fibre fabric cloth. **Profile WAS•F1** and **WAG•F1** are additionally rimmed with heat resistant steel for temperatures above 500 °C. Additionally with metal jacket **profile WA•F8** can be supplied. **Profile WAWAF** in asbestos free design with corrugated ring on both sides of the solid steel core and wrapped with ceramic or mineral fibre fabric.

Profile GRAPA made of braided expanded graphite wrapped with stainless steel foil.

Profile	Cross-Section	Material	$k_0 \cdot K_D$ [N/mm]	k_1 [mm]	R_z^* [μ m]
WAS WAG		Steel, Mineral Fibre Fabric	45 b_D	1.0 b_D	50 to 160
WAS F1 WAG F1					
WA F8		dito Cu-jacket	60 b_D	1.6 b_D	25 to 50
WAWAF		Steel, Mineral Fibre Fabric	45 b_D	1.0 b_D	50 to 160
GRAPA		Graphite Stainless Steel	25 b_D	1.0 b_D	

* Recommended maximum peak-to-valley height for flange surfaces

Spiral wound gaskets SPIROFLEX

Spiral wound gaskets are recognised sealing elements for refineries, chemical plants, water treatment installations and general pipe line construction.

Strips of e.g. chrome steel, chrome nickel steel, chrome nickel silicium steel, monel, nickel or titanium are available.

Filler of graphite, PTFE, mineral fibre or FA¹⁾ can be supplied. Nominal gasket thickness: 2.5, 3.0, 3.5 mm for flanges with tongue and groove, as well as for spigot and recess, otherwise 4.5 mm up to \varnothing 1200, 5.5 up to \varnothing 1800 and 6.5 mm up to \varnothing 3000 mm.

Spiral wound gasket **profile SpZ1, SpZ2, SpZ1J and SpZ2J** with sealing zone of PTFE (DVGW record number G90e006) for gas and water service or **profile SpV1, SpV2, SpV1J and SpV2J** with graphite for oxygen service up to 250 bar 350 °C (**BAM certificate**).

We also manufacture spiral wound gaskets for the apparatus and valve industry. Gaskets in ovals, e.g. manhole or boiler-hand-hole gaskets, also with inner and/or outer ring are available.

Gasket for heat exchangers are equipped with metal jacketed ribs for pass partitions according to **profile F8**. Grooved ribs with layers of PTFE or graphite are also possible.

With our spiral wound gasket profile **SpV2J • RTJ** and **SpZ2 • RTJ**, it is possible to seal RTJ-flanges in cases where, for example, a RTJ-gasket is not available or in case the grooves are damaged. Also for economic reasons, this change may be advantageous. The design of the profile SpV2J • RTJ and SpZ2 • RTJ are such that the sealing face of the gasket is placed between the ID of the flange, and that of the groove. The gaskets are centred by a 3 mm thick outer ring. The use of these gaskets is possible for flanges larger than 2 1/2" nominal diameter.

Spiroflex gaskets **SpFS1, SpFS1J and SpFS2J** in "fire safe design" with inner filler PTFE and outer filler graphite for working temperatures up to 280°C and low leakage rate usable for applications with "fire safe requirements".

Profile	Cross-Section	Material	$k_0 \cdot K_D$ [N/mm]	k_1 [mm]	R_z^* [μ m]
SpV1		Steel, Cr-steel	50 b_D	1.3 b_D	12.5 to 25
SpV2		CrNi-steel	55 b_D	1.4 b_D	
SpV2J		Monel	55 b_D	1.4 b_D	
SpV2J RTJ		Titanium	55 b_D	1.4 b_D	
SpZ1J		CrNi-steel FA ¹⁾ , PTFE or Graphite	40 b_D	1.2 b_D	25 to 50
SpZ2J					
SpZ2 • RTJ					
SpZ1SJ					
SpFS1J					

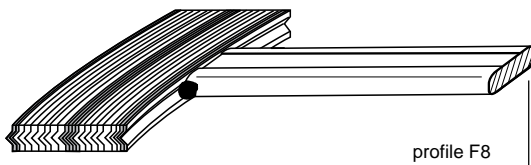
* Recommended maximum peak-to-valley height for flange surfaces

¹⁾ fibre sheet with binder, asbestos free

Flat-ring gaskets

Profile Code:	Single notched	Single notched with Zone	Double notched	Double notched with zone
	SpV	SpZ	SpVV	SpZV
1 normal	SpV 1*	SpZ 1	SpVV 1	SpZV 1
2 with outer ring	SpV 2*	SpZ 2	SpVV 2	SpZV 2
1J with inner ring	SpV 1J	SpZ 1J*	SpVV 1J	SpZV 1J
2J with inner and outer ring	SpV 2J*	SpZ 2J*	SpVV 2J	SpZV 2J
1S with loop	SpV 1S	SpZ 1S		
1SJ with loop and inner ring	SpV 1SJ	SpZ 1SJ*		

* Only these profiles are shown in cross-Section



profile F8

Grooved gaskets with covering layer

Grooved metal gaskets are mainly used with layers of soft or plastic materials on both faces. Due to the layers, the design values approach those of solid flat ring gaskets made of the layer material. The material of the grooved metal itself determines the stability of the gasket. **Profile B9A** with centring ring. **Profile B15A** with centring ring of thin metal plate, advantageous for applications involving considerable temperature differences between ID and OD. The **profiles B27A, B29A and B25A** reduce edge pressure by means of a convex groove depth. Advantageous for higher temperatures and higher flange rotation.

Grooved ring for flange connection with two groove flanges according to **profile E7A or E27A**.

Profile	Cross-Section	Layer Material	$k_0 \cdot K_D$ [N/mm]	k_1 [mm]	R_z^* [μm]
B7A		Graphite	15 b _D	1.0 b _D	25 to 50
B9A					
B15A		PTFE	15 b _D	1.0 b _D	50 to 100
E7A		FA ¹⁾	50 b _D	1.0 b _D	25 to 50
B27A		Al	70 b _D	1.0 b _D	12.5 to 25
B29A					
B25A					
E27A		Silver	100 b _D	1.0 b _D	12.5 to 25

¹⁾ fibre sheet with binder, asbestos free

* Recommended maximum peak-to-valley height for flange surfaces

CONVEX gaskets with covering layer

The soft layer are easily and safely mounted on the convex metal supporting part with an adhesive virtually free from chlorides. No grooves which might become filled up with adhesive exist. The profile section is not diminished by multiple grooves as usual practice for grooved gaskets. The layers are in contact with the entire convex surface throughout. Adherence between layers and metal core is more secure even with sensitive materials than with grooved gaskets (here adherence on ridges hold the layers in position). The backing edges formed on the metal supporting part protect the sealing surface from damage in the course of handling and mounting.

Profile B45A with centring ring mounted in an outer groove whereby stress is minimized recommended in cases of great temperature difference or of vibration.

Profile	Cross-Section	Layer Material	$k_0 \cdot K_D$ [N/mm]	k_1 [mm]	R_z^* [μm]
B 45A		Graphite	15 b _D	1.0 b _D	25 to 50
		PTFE	15 b _D	1.0 b _D	50 to 100
B 47A		FA ¹⁾	30 b _D	1.0 b _D	25 to 50
		Al	50 b _D	1.0 b _D	12.5 to 25
		Silver	100 b _D	1.0 b _D	12.5 to 25

¹⁾ fibre sheet with binder, asbestos free

* Recommended maximum peak-to-valley height for flange surfaces

Metal Jacketed gaskets

for engines, exhaust equipment, chemical industry and apparatus construction.

Jacket material: aluminium, copper, brass, nickel, monel, soft iron, chrome-steel, chrome-nickel-steel etc.

Inlayer: mineral fibre, FA¹⁾, graphite or filler of several steel plates (profile F3L). Profile F8 for apparatus design



Gaskets with ribs are sometimes required to be seamless, but then the gasket has only one outside border. Border radii $r \sim 10$ mm.



Gaskets with ribs attached by welding are more favourable from the technical point of view because they have two continuous borders sealing towards the outside; this embodiment allows tube plate with smaller border radii $r \sim 3$ mm.

Profile F17 as per profile F8, but with centring ring.

Profile	Cross-Section	Jacket Material	$k_0 \cdot K_D$ [N/mm]	k_1 [mm]	R_z^* [μm]
F2		Aluminium	50 b_D	1.4 b_D	25 to 50
F3					
F4					
F6		Copper	60 b_D	1.6 b_D	12.5 to 25
F6A		Brass	60 b_D	1.6 b_D	12.5 to 25
F8		Nickel	70 b_D	1.8 b_D	6.3 to 12.5
F10/2		Steel	70 b_D	1.8 b_D	6.3 to 12.5
F10		Chrome-Nickel Steel	100 b_D	2.0 b_D	2.5 to 6.3
F12					
F17					
FW3		Steel	60 b_D	1.6 b_D	12.5 to 25
F3L		Steel	300 b_D	1.6 b_D	6.3 to 12.5

¹⁾ fibre sheet with binder, asbestos free

* Recommended maximum peak-to-valley height for flange surfaces

PTFE enveloped gaskets

They are indispensable in the chemical industry and in construction of chemical apparatus and piping.

Profile PF2: As a rule, the filler consists of graphite, FA¹⁾ or rubber (also with fabric reinforcement).

Profile PW3: The insert consists of a corrugated ring with cord rope, as per profile W3.

Profile PW4: The insert consists of a corrugated ring as per profile W1 with graphite, RivaTherm-Super or FA¹⁾ layers on both sides.

Profile PW5: As per profile PW4 but with increasing thickness (2 mm as minimum) of the PTFE envelope at inner gasket diameter to reduce the leakage rate (for increasing diffusion tightness).

Profile PWA2: As per profile PW4 but in addition with steel plate on the corrugated ring on both faces for increasing recovery.

The profiles **PF18, PF19 and PF20** have a cut envelope, and therefore they are cheaper than gaskets with machined envelope (as per profiles **PF21, PF22 and PF23**). For level, flat, metal, ceramic or glass, sealing surfaces, **profile PF27** has advantages. The insert consists of a grooved gasket as per profile B27.

For **profile PF25**, respectively **PF29**, the inserted grooved gasket is complete with centring ring.

Profile	Cross-Section	Material of Insertion	$k_0 \cdot K_D$ [N/mm]	k_1 [mm]	R_z^* [μm]
PF 2		Soft Material	25 b_D	1.1 b_D	25 to 160
PW 3		Corrugated Ring with Cord Rope	30 b_D	1.0 b_D	50 to 160
PW 4		Corrugated Ring with Soft Material Layers	25 b_D	1.1 b_D	25 to 160
PWA 2		Corrugated Ring Steel Plates Soft Material			
PF 18		Soft Material			
PF 19					
PF 20					
PF 21					
PF 22					
PF 23					
PF 27			Metal	25 b_D	1.1 b_D
PF 29					

* Recommended maximum peak-to-valley height for flange surfaces

Special shaped metal gaskets

Circular shaped gaskets

These gaskets are used in the gas and vacuum engineering fields. The material is subjected to plastic deformation. Good results have been obtained with rings of aluminium, copper, silver or soft-annealed nickel.

Profile	Cross-Section	Touching	k_0 [mm]	k_1 [mm]	R_z^* [μ m]
A10		one-sided	1.5	6.0	2.5 to 6.3
		two-sided	2.0	6.0	

* Recommended maximum peak-to-valley height for flange surfaces



Ring-joint gaskets RTJ

These gaskets are standardized per ASME B16.20 and API 6A. New sizes will continuing be added to the table of standard dimensions, see our leaflet "Ring-joint gaskets" (We are authorized to mark our products with the API quality emblem).

Profile A13 also with convex shaped sealing surface as per **profile AR13**. The advantages of this RTJ gasket design are explained in detail in the essay "Wissenswertes über Ring-Joint-Dichtungen".

It is also possible to manufacture RTJ-rings as blind gaskets as per **profiles A11S, A13S**, etc. or as blind spectacle gasket as per **profiles A11BS, A13BS** etc.

The use of a protector sealing ring as per **profile F22** helps to avoid vortices and deposits. In case of smaller widths, the protector U-shape is symmetrical, in case of larger widths the U-shaped protector have a centring device on one side.

The limits of application of oval and octogonal ring-joint gaskets in relation to material, diameter, pressure, and temperature, may be obtained from the publication "The Optimization of Static Gaskets" of Hans Joachim Tückmantel, published by Kempchen, Oberhausen, first edition 1991.

In case of damaged grooves, we are able to supply soft-iron compensating-liners as per **profiles AK11, AK12, AK13 and AK14**. For calculation purposes please contact our gasketing consultants. We calculate bolt loads and torques for difficult and complex flange connections at competitive rates.

Profile	Cross-Section	Ring Type	k_0 [mm]	k_1 [mm]	R_z^* [μ m]	
A11		R oval	2.0	6.0	1.6 to 6.3	
A11S		R oval				
A11Bs		R oval				
A12		BX symmetrical				
A13		R octogonal				
A13S		R octogonal				
A13BS		R octogonal				
AR13		R convex-octogonal				
A14		RX asymmetrical				
F22		AK13				
AK11						
AK12						
		AK14				

Lens gaskets

These gaskets are reliable in high-pressure applications. Lens blind discs are manufactured as blind gaskets **profile A5S** or as spectacle blind gasket **profile A5BS**. In order to connect component parts with different radial expansion, bellow rings as per **profile A9** are used. Advantageous for high pressure and temperature.

Profile	Cross-Section	Description	k_0 [mm]	k_1 [mm]	R_z^* [μ m]
A4		Half-lens	2.0	6.0	2.5 to 6.3
A5		Lens			
A5S		Blind lens			
A5BS		Spectacle blind lens			
A9		Bellow lens			

* Recommended maximum peak-to-valley height for flange surfaces

Solid Metal Convex gaskets

In application, they may be of the same material as the flanges. Galvanized coatings of silver, nickel, copper or tin are advantageous.

Profile H7 has a contact radius R, which is fitted to the prevailing surface pressure. **Profile H9** is equipped with a centring ring. With a design adaptation, gaskets as per profile H7 and H9 will act as self sealing, and create increased reliability. For calculation purposes please contact our gasketing consultants and ask for **GCS (Gasket-Calculation-Service)**.

Profile	Cross-Section	Material	k ₀ [mm]	k ₁ [mm]	R _Z * [μm]
A7		Metal	2.0	6.0	2.5 to 6.3
H7		Metal	see text		
H9		Metal	see text		

* Recommended maximum peak-to-valley height for flange surfaces

H-gaskets

This gasket consists of a supporting steel ring with recesses for the sealing rings, of pentagonal cross-section. Material for sealing rings: copper, silver, gold and PTFE for recess widths of 3.2, 4.0 or 4.8 of supporting ring. **Profile H5-D** with two sealing rings for higher bolt load. Also with intermediate exhaust (between the two sealing rings) - exhaust bore in the flange or in the gasket possible - in case of nuclear installation, or dangerous substances. Available also with centring ring e.g. **profile H9-2** etc. Ask for design details and assistance.

Profile	Cross-Section	Material	k ₀ [mm]	k ₁ [mm]	R _Z * [μm]
H5-2 H5-2,5 H5-3		Al,Ag,Cu	3.2 4.0 4.8	8.0 9.0 10.0	Cu: 6.3 to 16
H5-D2 H5-D2,5 H5-D3		Al,Ag,Cu	6.4 8.0 9.7	11.0 13.0 15.0	Al,Ag: 16 to 50

* Recommended maximum peak-to-valley height for flange surfaces

Diamond shaped gaskets

Profile B2, usable for flanged connections up to PN 630 in compressed air pipe-lines. The material of the gasket should have a lower hardness value than the materials of the flanges.

Profile	Cross-Section	Material	k ₀ [mm]	k ₁ [mm]	R _Z * [μm]
B2		Metal	1,0	5,0	6,3 to 12,5
B3					

* Recommended maximum peak-to-valley height for flange surfaces

Grooved gaskets without layers

Profiles B7, B9 etc. should be made of soft metals such as aluminium, copper or soft-iron in order to avoid damage of the flange surfaces. (Grooved gaskets with covering layers are preferred to avoid creeping.)

Profile	Cross-Section	Material	k ₀ [mm]	k ₁ [mm]	R _Z * [μm]
B7		Metal	0.5 √ Z	9+0.2 Z	6.3 to 12.5
B9					
B15					
E7					

(Z = number of teeth)
(k₀-value per Z ≥ 4)

* Recommended maximum peak-to-valley height for flange surface

Weld ring gaskets

Weld ring gaskets

Membrane weld ring gaskets as per **profile A21** are welded on the inside and outside diameter of both rings. M-flanges according to DIN 2526 (with beveled face) are usually required. Total thickness of the gasket $2 \cdot 4 = 8$ mm.

Weld ring gaskets as per **profile A22** with welding seams on the outside. Total thickness of the gasket $2 \cdot 15 = 30$ mm.

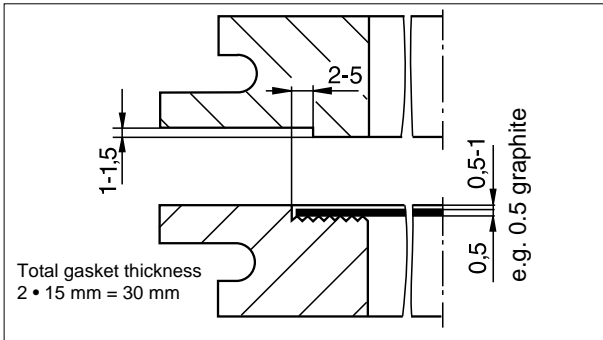
Weld ring gaskets with hollow lip as per **profile A23** are capable - similar to the lens bellow ring A9 - to work under radial expansions as result of different thickness of flanges during the heating up procedure. Total thickness of gasket $2 \cdot 15 = 30$ mm.

Weld ring gaskets as per **profiles A22K, A23K and A24K** have a turned grooved profile with a layer of 0.5 mm thick-soft material for the static test. Weld ring gaskets as per profiles **A22N, A23N, and A24N** have a groove for the installation of a spiral wound gasket.

(Attention: $k_0 \neq 0$ and $k_1 \neq 0$).

The advantage of the weld ring gasket **profile A24** lies in its great ability to absorb movement. It is mainly used on heat exchangers to cope with different radial expansions, for instance of bonnet flange and tube plate.

Design as per profiles A22KVR, A23KVR, and A24KVR.



Profile A25 same design as per profile A24 but with total gasket thickness $2 \cdot 20 = 40$ mm so that external welding is possible.

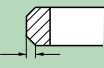
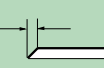
Profile	Cross-Section	Material	k_0 [mm]	k_1 [mm]	R_z^* [μm]
A21		Steel	0	0	25 to 50
A22					
A23					
A24					
A24K		Steel	Values see grooved gaskets		
A24KVR					
A24N		Steel	Values see spiral wound gaskets		
A24R		Steel	Values see Grooved Gaskets		
A24H		Steel	Values see Solid Metal Convex Gaskets		25 to 50
A25		Steel	0	0	

* Recommended maximum peak-to-valley height for flange surfaces

Double-cone gaskets, radial sealing

We manufacture double-cone gaskets as per **profile A16** up to Ø 3200 mm. Sealing foils as per **profile A19** are available in any size. Sealing foils with diameters larger than Ø 2000 mm are welded. The thickness tolerance of the welding seam in comparison to the foil thickness amounts to +0.1 mm respectively -0.05 mm.


Also with convex sealing surface as per profile AR16. Sealing behaviour comparable with gaskets as per profile H7 and H9.

Profile	Cross-Section	Material	k_0 [mm]	k_1 [mm]	R_z^* [µm]
A16		Steel	-	-	6.3 to 12.5
A19		Al, Ag, Cu, Ni	b_0	b_0+5	

* Recommended maximum peak-to-valley height for flange surfaces









Delta gaskets, radial sealing

Approved gaskets for high pressure apparatus for example for high pressure urea-synthesis.

Profile	Cross-Section	Material	k_0 [mm]	k_1 [mm]	R_z^* [µm]
A15		Steel	-	-	1.6 to 6.3

* Recommended maximum peak-to-valley height for flange surfaces

Cover plate gaskets, axial sealing (material graphite)

Construction and Material of the Gasket		Profile Series									R_z^* [µm]
Graphite Ring Made of chemical pur graphite "RivaTherm"	factor K	P70	P71	P71K	P71KL	P74	P74K	P75	P75K	P76KZ	12.5 to 25
		N/mm ²	100	110	90	70	80	70	80	-	
Graphite Ring Made of chemical pur graphite "RivaTherm" with lamellae	factor K	P80	P81	P81K	-	P84	P84K	P85	P85K	P86	12.5 to 25
		N/mm ²	120	130	-	80	90	80	90	-	

1) Gaskets with a height larger than 50 mm will be manufacture in two parts. For this finish the caps in the middle of the gasket are not necessary. The required finish must be specified. Material of caps: stainless steel 1.4541 other materials on request.

* Recommended maximum peak-to-valley height for flange surfaces

Gaskets in the off-load (KNS)

Double sealing system with intermediate exhausting KHS/KNS

Gaskets in the off-load (KNS)

The spiral wound gasket **SpZNG** is manufactured for the installation in a groove with flange to flange contact. The occurrence of a gap is not allowable during all operating conditions.

For temperatures up to 280°C we recommend the material combination graphite/PTFE because of the outstanding sealing characteristics. For temperatures up to 350 °C it is possible to use the graphite full-filled type SpVNG. For applications with temperatures higher than 350 °C, gasket should be used in the main load, and not in the off-load. Rubber-steel gaskets, as per profile WL and WL2, work in the same way, and therefore exceptionally reliable. With these types, the rubber lip is in the off-load.

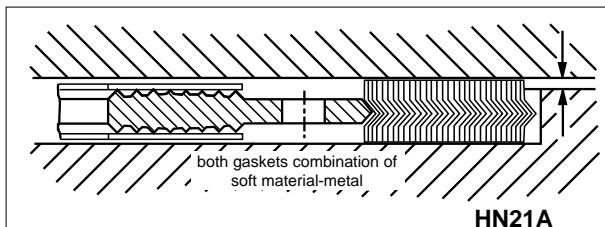
Profile	Cross-Section	Material	$k_0 \cdot K_D$ [N/mm]	k_1 [mm]	R_z^* [µm]
SpZ NG		1.4541 < 280 °C = Graphite/PTFE	70 b _D	1.4 b _D	12.5 to 25
SpZV NG		> 280 °C = Graphite			
SpZJ NG		> 350 °C = not advised			
SpZVJ NG					

* Recommended maximum peak-to-valley height for flange surfaces

Double sealing system with intermediate exhausting KHS/KNS

For special applications in valve, apparatus construction for nuclear power plants, or in the chemical industry, sealing systems with intermediate exhausting are essential.

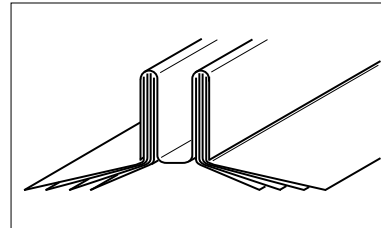
Only the combination of one gasket in the main-load and the other in the off-load represents an improved design. For the sealing ring in the main load, a gasket with a great spring strength is used e.g. grooved type. For the sealing ring in the off-load, a gasket with a low spring strength e.g. spiral wound type is used. Operation field of these gaskets: nuclear technology, phosgen plants, ammonia tanks etc.



Special gaskets

Special gaskets

The **affle seal profile T4** for sealing of longitudinal baffles is used in heat exchangers with high effectiveness in all metal finishes. As a rule, this gasket is manufactured of material 1.4571. For installation, bolt are not required. Therefore drilling of holes and the usual mounting procedure do not apply.



Kempchen splatter protection strips prevent accidents which may occur in case of escape of a dangerous medium. Everywhere where pipes are connected by bolted flanged joints, there is the danger that medium escapes in case of leakage. We supply splatter protection strips of stainless steel 1.4541 (ASTM 321) or of weather-resistant plastics.

Kempchen fire safe gaskets permit the operation of plants, pipes and equipment which have to fulfil the fire safe requirements according to BS 6755. Ask our gasketing consultants for further information.

Kempchen centring bolts, made of brass allow the absolute concentric installation of gaskets. A lot of work will be saved because belated corrections which are a risk to the gasket do not apply.

All information and technical descriptions contained in this brochure correspond to our state of knowledge at the time of the printing. They are intended as information about our products and their various applications. Therefore, we will only guarantee certain attributes described in the brochure or the suitability for actual intended purposes according to a written express warranty in the actual individual case. Any industrial proprietary rights must be observed. Orders will only be accepted and completed under our standard terms and conditions, which we will make available on request.

kempchen & Co. GmbH
 Alleestr.4 • D-46049 Oberhausen
 Tel.: ++49 208 8482-0 • Fax ++49 208 8482-285
 E-mail: info@kempchen.de
 URL: www.kempchen.de

kempchen
the right choice!

Gaskets • Packings • Expansion Joints • Rubber and Plastic Parts

007e/12980052