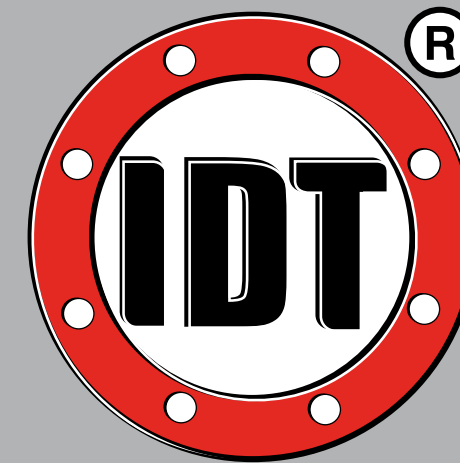


cutting-edge sealing technology



IDT Industrie- und Dichtungstechnik GmbH

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# **IDT** Industrie- und Dichtungstechnik GmbH

## General information

All information in this technical information reflects today's state of the art and is designed to inform about our products and their scope. They are not designed to guarantee certain product properties and their suitability for certain uses and do not constitute any liability on our part.

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# Contents

01	Company profile	• History and structure of IDT	4
02	Non-metallic gaskets	<ul style="list-style-type: none"> <li>• UNISEAL® aramid fibre sheets and gaskets</li> <li>• SIGRAFLEX®-graphite flat gasket, -graphite foil, -sheets, -tapes and -rings</li> <li>• PTFE-flat gaskets</li> <li>• Flat gaskets made from ePTFE</li> <li>• Elastomers</li> </ul>	6 8 14 18 20
03	Semi-metallic gaskets	<ul style="list-style-type: none"> <li>• Kammprofile gaskets</li> <li>• Spiral-wound gaskets</li> <li>• Corrugated metallic gaskets</li> <li>• PTFE (TFM™) Envelope gaskets</li> <li>• Rubber-steel gaskets</li> </ul>	22 26 30 33 36
04	Metallic gaskets	<ul style="list-style-type: none"> <li>• Ring-Type-Joint gaskets</li> <li>• Lens gaskets</li> <li>• Insert rings</li> </ul>	38 39 39
05	Manhole gasket	<ul style="list-style-type: none"> <li>• Oval handhole, head and manhole gaskets for boilers with TÜV approval</li> <li>• Manhole protection ring</li> </ul>	40 42
06	Stuffing box packing	<ul style="list-style-type: none"> <li>• PTFE packings</li> <li>• Graphite and carbon packings</li> <li>• special packings</li> <li>• TA-Luft packing sets</li> </ul>	44 46 47 48
07	Gaskets for high temperature applications	<ul style="list-style-type: none"> <li>• Mica gaskets</li> </ul>	50
08	Fabric gaskets and pipe expansion joints	<ul style="list-style-type: none"> <li>• Cristallo and Ceramic fabric gaskets</li> <li>• Fabric pipe expansion joints</li> </ul>	52 53
09	PTFE semi-finished products and parts	<ul style="list-style-type: none"> <li>• Semi-finished PTFE products, pressed and moulded parts turned from standard and special materials</li> </ul>	55
10	Service and maintenance products	<ul style="list-style-type: none"> <li>• Gasket cutting machines, circular sheers, packings cutter, packings puller, flange spreader, „Sure-cut“ hand packings cutter</li> <li>• PTFE thread seals and maintenance products</li> </ul>	56 60
11	Technical information	<ul style="list-style-type: none"> <li>• Dimension tables</li> <li>• Approvals</li> <li>• Assembly instruction</li> </ul>	62 76 78
12	Service	<ul style="list-style-type: none"> <li>• Service</li> <li>• Stuffing box packing selection form</li> <li>• Gasket selection form</li> </ul>	80 81 82

# Company profile

IDT group develops, manufactures and distributes high quality sealing products for use in apparatus, vessels, pipelines, fittings and pumps. Our main customers are chemical and petro-chemical companies, refineries, power stations and plant engineering companies.



## History

- 1924 Beginning the Production of automotive gaskets in Annaberg, Saxony-Anhalt
- 1946 Established Wilhelm Tripp KG in Ottobrunn near Munich, Bavaria
- 1984 Established a development, sales and marketing company, mainly for asbestos-free sealing elements in Essen, Westfalia
- 1991 The production facility is acquired by the newly established IDT Industrie und Dichtungstechnik Werk Kupfering GmbH in Annaberg
- 1994 Official opening of the new building in the industrial park at Annaberg
- 1995 Certification of IDT acc. to DIN ISO 9001
- 1998 Wilhelm Tripp GmbH, our long-standing partner, is acquired
- 1999 New production halls in Annaberg and Essen represent considerable expansion in range of services
- 2001 Setup of a high-capacity PTFE production
- 2003 IDT wins environmental award in the USA with one of its high quality gasket systems
- 2005 IDT enters joint venture in China
- 2006 Annaberg-Buchholz's municipal economy award presented to IDT
- 2007 Construction and opening of a new modern administration building in Essen
- 2008 First break of ground for the new construction of two modern production and storage halls in combination with the purchase of new systems engineering for the Annaberg-Buchholz location
- 2009 Commissioning of new production and storage halls (amongst others installation of a high performance spiral-wound gasket fabrication)

## Quality control

- In-house development and quality control department
- Modern measuring and test equipment
- Test Regis for gaskets and packing glands available for new developments and fabrication



## Machines and equipment

Our company has its own modern factory equipped with standard and special machinery for manufacturing high quality sealing products.

- Presses with up to 800 Mp pressing force
- Bridge-type die-cutting machines
- Swing-arm presses
- Circular shears
- Rolling and profiling machines
- Welding machines using various techniques (also plasma welding)
- CNC turning and milling machines, guillotine and rotary shears for metal band and strip cutting
- Special machines for gasket production – CNC water jet cutter quality assurance
- Laser cutting system

## Our Customers

Some of our customers are:

- The chemical and petrochemical industries
- Refineries
- Chemical and power plant construction companies
- General machinery manufacturing companies, electrical engineering and transformer construction
- Power plants
- The automotive industry and the Deutsche Bahn (German Rail)



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## Driving directions

The driving directions can be found under [www.idt-dichtungen.de](http://www.idt-dichtungen.de).



# UNISEAL® aramid fibre sheets and gaskets

## Description

UNISEAL® is a cost-effective asbestos-free “universal” -flat gasket material with a range of outstanding properties. It contains aramid fibres and temperature-resistant an-organic fillers in a high-strength and homogeneous connection with chemical-resistant elastomers using a calander process.

## Properties

- easy to dismantle even after temperature load
- all-purpose use for average chemical require as well as medium to high component rigidity
- temperature range from - 50 °C to approx. + 150 °C (up to 200°C possible after consultation with the manufacturer)
- Sealing of combustion engines, gearboxes, compressors, apparatuses, pressure vessels, pipes, auxiliary equipments, valves, pumps, liquid gas and refrigeration plants, hydraulic aggregates as well as bolted connections of any kind with a small ring area (radiators, gas and warm water equipment)
- very good media resistance against mineral and synthetic oils and greases, alcohol, fuels, solvents, cooling agents, liquid gases and antifreeze agents, saline solutions, weak acids and bases (resistance table for UNISEAL® upon request)
- can be used for drinking water and food industry applications as well as for sealing high purity products such as varnish raw materials and vitamins
- asbestos-free, no health hazard, colour neutral
- FDA - compliant

## Applications

- versatile, cost-efficient flat gaskets for pipe flanges, apparatus and container flanges (DIN EN 1514-1, DIN 2690, ASME/ANSI, special dimensions), for machine construction applications (engine construction, compressors, hydraulic plants etc.), auxiliary equipments and many more
- no special requirements on flange sealing surfaces - flange form C as per DIN 2526 is sufficient
- suitable for drinking water applications and for use with gas
- with inner eyelet suitable for increased demands on cleanliness
- for TA-Luft applications
- wide range of uses, since good resistance against a diverse media and operating fluids



## Product range

### - Sheet formats (standard)

UNISEAL® 3400 / UNISEAL® 3700-Trafomatic

Dimensions: 1500 x 1500 mm

Thicknesses: 0.3; 0.5; 0.75 ;1.0; 1.5; 2.0; 3.0; 4.0 and 5.0 mm

### - Flat gaskets DIN EN 1514-1

- standard dimensions see measurement table as of page 62
- gaskets with special dimensions (e.g. as per ANSI, special dimensions, nominal diameter > 400 mm or Ø > sheet formats - put together from segments) upon request

## Order example




UNISEAL® flat gaskets WS 3400 with inner eyelet, nominal diameter 50 and nominal pressure 40, dimensions 61 x 107 mm:

UNISEAL flat gasket WS 3400-IB, DN 50, PN 40

## Packaging

- carton with 40 pieces each up to DN 200
- carton with 20 pieces each up to DN 300
- individually packed or 5 pieces each as of DN 350

## Flat gaskets in UNISEAL® 3400/3700

UNISEAL® 3400	UNISEAL® 3400-IB	UNISEAL® 3700
		
<ul style="list-style-type: none"> <li>• complies with TA-Luft 2002 (VDI 2440/2200) leakage requirements</li> <li>• high pressure resistance</li> <li>• high blow-out security with inner eyelet (for UNISEAL® 3400-IB)</li> <li>• high tensile, compression and shear strength</li> <li>• very high gas proofness</li> <li>• scratch resistant, robust surface</li> <li>• good handling, easy to dismantle</li> <li>• resistant against a range of chemicals</li> <li>• no health hazard</li> <li>• FDA compliant</li> </ul>		<ul style="list-style-type: none"> <li>• good sealing properties with simultaneously good adaptability</li> <li>• high tensile, compression and shear strength</li> <li>• scratch resistant, robust surface</li> <li>• good handling, easy to dismantle</li> <li>• resistant against a range of chemicals</li> <li>• no health hazard</li> </ul>

## Operating limits

### Operating pressure:

max. 70 bar <sup>1)</sup>	max. 100 bar <sup>1)</sup>	max. 50 bar <sup>1)</sup>
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### Operating temperature:

-50 °C to 200 °C <sup>2)</sup>	-50 °C to 200 °C <sup>2)</sup>	-50 °C to 200 °C <sup>2)</sup>
--------------------------------	--------------------------------	--------------------------------

<sup>1)</sup> Max. temperature and max. pressure must not be permitted to occur simultaneously. They depend on the medium and installation conditions (please consult with the manufacturer)

<sup>2)</sup> Please consult with the manufacturer regarding temperatures above 150°C.

## Gasket characteristics DIN 28090 (Thickness = 2 mm)

$\sigma_{VU\ 0,1}$ : 29 N/mm <sup>2</sup>	$\sigma_{VU\ 0,1}$ : 42 N/mm <sup>2</sup>	$\sigma_{VU\ 0,1}$ : 34 N/mm <sup>2</sup>
$\sigma_{VU\ 0,01}$ : 43 N/mm <sup>2</sup>	$\sigma_{VU\ 0,01}$ : 56 N/mm <sup>2</sup>	$\sigma_{VU\ 0,01}$ : 50 N/mm <sup>2</sup>
$\sigma_{VO\ 20^\circ C}$ : 230 N/mm <sup>2</sup>	$\sigma_{VO\ 20^\circ C}$ : 230 N/mm <sup>2</sup>	$\sigma_{VO\ 20^\circ C}$ : 250 N/mm <sup>2</sup>
$\sigma_{BO\ 150^\circ C}$ : 100 N/mm <sup>2</sup>	$\sigma_{BO\ 200^\circ C}$ : 100 N/mm <sup>2</sup>	$\sigma_{BO\ 150^\circ C}$ : 50 N/mm <sup>2</sup>
$m_{DIN\ 2505}$ : 2,0	$m_{DIN\ 2505}$ : 2,0	$m_{DIN\ 2505}$ : 2,2

For gasket characteristics as per EN 13555 please refer to Gasket Database FH Münster under [www.gasketdata.org](http://www.gasketdata.org)

## Approvals

	• Blowout safety as per UVV 61 Gase/AD-B7 (VdTÜV)	• DIN-DVGW (DIN 3535-6)
• BAM approval for oxygen (80 °C/100 bar )		
• DIN-DVGW (DIN 3535-6)		
• FDA compliant		
• Fire Safe Test as per BS 6755-2, HTB and VP 401		
• KTW test certificate and W 270		
• TA-Luft 2002 (VDI 2440/2200)		

## Dimensions and profiles

as per DIN EN 1514-1 and other established dimension standards as well as special dimensions, please refer to measurement tables for flat gaskets as of page 62

# SIGRAFLEX®

- graphite gaskets
- graphite foil
- sealing sheets
- tapes and rings

## Description

Graphite flat gasket ranges WS 3865 (die-cut gaskets without eyelet), WS 3865-IB, WS 3885-HB / -DB (with stainless steel eyelet) and WS 3870-IB (PTFE-coated with inner eyelet) expand the application areas of the established SIGRAFLEX®-flat gasket range considerably. The increased requirements for tightness (TA-Luft) is dealt with by maintaining good properties for handling during storage / transport, assembly and dismantling, operational safety, service life and efficiency.

Various regulations from professional organisations as well as TA-Luft requirements (VDI 2440/2200) are complied with, other approvals such as use in oxygen, fire-safe, ethylene-oxide amongst others are also available. A gasket concept was realised which works without any changes to the established flange systems. Furthermore, new application areas were developed for which so far only spiral wound gaskets or kammprofile gaskets would have been suitable.

The use of SIGRAFLEX® UNIVERSALPRO / HOCHDRUCKPRO guarantees the high quality standard from one of the leading graphite manufactures in addition to the known technical advantages.

## Properties

- outstanding temperature resistance, constant temperature: -200 °C to approx. +550 °C (please consult with the manufacturer regarding temperatures above 450°C)
- very good media resistance, especially against corrosive materials and chemicals (resistance table for SIGRAFLEX® upon request)
- low steady diffusion rate even at high temperatures
- tightness remains intact for over 30 minutes in the event of fire in the vicinity (fire-safe-test).
- no aging or brittleness not even at high temperatures
- high compressibility and good adaptability across a wide temperature range, hence also good tightness in old plants.
- good temperature change adaptability, good cross slide stability
- no health hazard, can be disposed at domestic refuse dumps or incinerated
- very good handling during transport, assembly and dismantling; scratch resistant



## Applications

- ideal for high tightness requirements (TA-Luft) due to high gas and liquid tightness
- can be used for very high operating pressures while full utilisation of bolt load is recommended
- no special requirements on flange sealing surface - flange form C as per DIN EN 1092 is sufficient (see installation recommendations)
- high quality reinforced gasket in terms of UVV, high operational safety
- used especially for pipes and containers
- for chemical and petro-chemical industries, power plants as well as in heat carrier oil and heating plants and many more

## Product range/Models

### - foil/sheet/tape

- SIGRAFLEX®-foil / sealing sheet
- SIGRAFLEX®-tape
- SIGRAFLEX®-foil pressed into rings (see page 46)




### - high quality flat gasket systems

- flat gaskets as per DIN EN 1514-1 from
    - SIGRAFLEX®-UNIVERSAL (WS 3862);
    - SIGRAFLEX®-UNIVERSALPRO (WS 3865)
    - SIGRAFLEX®-HOCHDRUCK (WS 3885)
    - SIGRAFLEX®-HOCHDRUCKPRO (WS 3888)
    - SIGRAFLEX®-MF (WS 3870)
- with and without inner, outer or double eyelets

- PTFE envelope gaskets with insert from SIGRAFLEX® Email (Page 33)
- Kammprofile gaskets with graphite layers from SIGRAFLEX® Folie (Page 22)
- Spiral-wound gaskets with graphite filler from SIGRAFLEX®-foil (Page 26)



## SIGRAFLEX® foil / sheet

SIGRAFLEX® Foil	SIGRAFLEX® Sheet UNIVERSAL / UNIVERSALPRO	SIGRAFLEX® Sheet HOCHDRUCK / HOCHDRUCKPRO
		
Foil made from flexible, anisotropic layers of expanded graphite	Reinforced sealing sheet made from impregnated graphite with a perforated steel insert	Graphite sealing sheet for highest demands as adhesive-free connection with stainless steel foils

## Areas of use

<ul style="list-style-type: none"> <li>• -250 °C to approx. +550 °C <sup>1)</sup></li> <li>• high corrosive media (chemical, petro-chemical, power plants)</li> <li>• Layer for corrugated metallic gaskets and kammprofile gaskets</li> <li>• soft material for spiral-wound gaskets</li> </ul>	<ul style="list-style-type: none"> <li>• pipes and containers for chemical industry, petro-chemical industry and thermal power plants</li> <li>• medium to high admissible surface pressure,</li> <li>• operating pressure max. 100 bar,</li> <li>• constant temperature up to max 550 °C <sup>1)</sup></li> <li>• complies with TA-Luft (UNIVERSALPRO)</li> </ul>	<ul style="list-style-type: none"> <li>• pipes and containers for chemical industries and thermal power plants; nuclear plants; heat carrier oil and heating plants</li> <li>• high admissible surface pressure, operating pressure</li> <li>• max. 250 bar, constant temperature up to max. 550 °C <sup>1)</sup></li> <li>• complies with TA-Luft (HOCHDRUCKPRO)</li> </ul>
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## Properties / Application

<ul style="list-style-type: none"> <li>• outstanding temperature resistance, constant temperature: - 250 °C to approx. 550 °C <sup>1)</sup></li> <li>• very good media resistance, especially against corrosive materials and chemicals (SIGRAFLEX® resistance table upon request)</li> <li>• low steady diffusion rate even at high temperatures</li> <li>• The tightness remains intact for over 30 minutes in the event of fire in the vicinity (fire-safe-test).</li> <li>• no ageing or brittleness, not even at high temperatures</li> <li>• good temperature change adaptability, good cross slide stability</li> </ul>	<ul style="list-style-type: none"> <li>• can be used for very high operating pressures, while full utilisation of bolt load is recommended</li> <li>• high compressibility and good adaptability across a wide temperature range, hence also good tightness in old plants</li> <li>• no health hazard, can be disposed at domestic refuse dump or be incinerated</li> <li>• very good handling during transport, assembly and dismantling, scratch inured</li> <li>• mechanically solid due to eyelet or pre-compressed centring ring (HB)</li> </ul>	<ul style="list-style-type: none"> <li>• no special requirements on flange sealing surface - flange form C as per DIN EN 1092 is sufficient (see installation recommendations)</li> <li>• high quality reinforced gasket in terms of UVV <sup>2)</sup>, high operational safety</li> <li>• used specifically for pipes and containers in chemical and petro-chemical industry applications, power stations as well as in heat carrier oil and heating plants</li> <li>• UNIVERSALPRO/HOCHDRUCKPRO preferred for high tightness requirements (TA-Luft)</li> </ul>
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## Standard dimensions

thickness mm	width mm	density g/cm <sup>2</sup>	width x length mm	thickness mm	width x length mm	thickness mm
0.20	500	1.2	1500 x 1500	1.0	1500 x 1500	1.0
0.25	500/1000	1.0	1500 x 1500	1.5	1500 x 1500	1.5
0.35	500/1000	1.0	1500 x 1500	2.0	1500 x 1500	2.0
0.38	500/1000	1.1	1500 x 1500	3.0	1500 x 1500	3.0
0.50	500/1000	0.7	1000 x 1000	1.0	1000 x 1000	1.0
0.50	500/1000	1.0	1000 x 1000	1.5	1000 x 1000	1.5
0.75	500/1000	1.0	1000 x 1000	2.0	1000 x 1000	2.0
0.80	500/1000	1.0	1000 x 1000	3.0	1000 x 1000	3.0

<sup>1)</sup> depending on installation and operation conditions (please consult with the manufacturer regarding temperatures above 450°C)

<sup>2)</sup> UVV: German Accident Prevention Provision (Unfallverhütungsvorschrift)

## Graphite flat gaskets in SIGRAFLEX® UNIVERSALPRO & SELECT

UNIVERSALPRO (WS 3865, FD01)	UNIVERSALPRO with inner eyelet (WS 3865-IB, FD10)	SELECT with inner eyelet (WS 3830-IB, FD10)
		
<ul style="list-style-type: none"> <li>base material: SIGRAFLEX® UNIVERSALPRO, impregnated, with perforated steel insert made from 0.1 mm stainless steel 316L</li> <li>standard thickness 2.0 mm</li> <li>complies with TA-Luft, blow-out safety</li> <li>high stability, robust, good handling</li> </ul>	<ul style="list-style-type: none"> <li>base material: SIGRAFLEX® UNIVERSALPRO, impregnated, with perforated steel insert made from 0.1 mm stainless steel 316L</li> <li>inner eyelet made from stainless steel 1.4571</li> <li>standard thickness 2.0 mm</li> <li>complies with TA-Luft, blow-out safety</li> <li>high stability, robust, good handling</li> <li>good gas tightness, no product contamination</li> </ul>	<ul style="list-style-type: none"> <li>adhesive-free composite construction made from graphite and stainless steel foils; impregnated; modified inner eyelet made from stainless steel 1.4571</li> <li>standard thickness 2.0 mm</li> <li>complies with TA-Luft, blow-out safety</li> <li>for flange dimensions as per DIN EN 1514-1 and DIN EN 12560-1</li> </ul>

## Operating limits

### Operating pressure:

max. 100 bar	max. 160 bar	max. 100 bar
--------------	--------------	--------------

### Operating temperature:

-250 °C to +550 °C <sup>1)</sup>	-200 °C to +550 °C <sup>1)</sup>	-250 °C to +550 °C <sup>1)</sup>
----------------------------------	----------------------------------	----------------------------------

<sup>1)</sup> please consult with the manufacturer regarding temperatures above 450°C

## Gasket characteristics DIN 28090 (Thickness = 2 mm)

$\sigma_{VU0,1}$ : 17 N/mm <sup>2</sup>	$\sigma_{VU0,1}$ : 19 N/mm <sup>2</sup>	$\sigma_{VU0,1}$ : 17 N/mm <sup>2</sup> (PN40)
$\sigma_{VO}$ : 160 N/mm <sup>2</sup>	$\sigma_{VO}$ : 200 N/mm <sup>2</sup>	$\sigma_{VU0,1}$ : 10 N/mm <sup>2</sup> (PN10)
$\sigma_{BO\ 300^\circ C}$ : 140 N/mm <sup>2</sup>	$\sigma_{BO\ 300^\circ C}$ : 110 N/mm <sup>2</sup>	$\sigma_{VO}$ : 160 N/mm <sup>2</sup>
$m_{DIN\ 2505}$ : 1.3	$m_{DIN\ 2505}$ : 1.3	$\sigma_{BO\ 300^\circ C}$ : 140 N/mm <sup>2</sup>
		$m_{DIN\ 2505}$ : 1,3

For gasket characteristics as per EN 13555 please refer to Gasket Database FH Münster under [www.gasketdata.org](http://www.gasketdata.org)


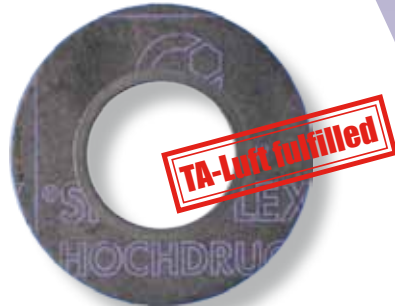
## Approvals

• Blowout safety (TÜV tested at 2.5 x nominal pressure)	• Blowout safety (TÜV tested at 2.5x nominal pressure)	• Blowout safety (TÜV tested at 2.5x nominal pressure)
• BAM approval for gaseous oxygen (225°C / 130 bar) and liquid oxygen	• BAM approval for gaseous oxygen (225°C / 130 bar) and liquid oxygen	• BAM approval for gaseous oxygen (250°C / 130 bar) and liquid oxygen
• DVGW	• DVGW	• DVGW
• TA-Luft 2002 (VDI 2440/2200)	• Fire Safe Test as per API 607	• Fire Safe Test as per API 607
	• TA-Luft 2002 (VDI 2440/2200)	• TA-Luft 2002 (VDI 2440/2200)

## Dimensions and profiles

as per DIN EN 1514-1 and other established dimension standards as well as special dimensions, please refer to measurement tables for flat gaskets as of page 62

## Graphite flat gaskets in SIGRAFLEX® HOCHDRUCK

SIGRAFLEX® HOCHDRUCK (WS 3885, FD01)	SIGRAFLEX® HOCHDRUCK with inner eyelet (WS 3885-IB, FD10)
	
<ul style="list-style-type: none"> <li>base material: SIGRAFLEX® HOCHDRUCK, impregnated, with adhesive-free inserts made from 0.05 mm stainless steel foil 316L</li> <li>standard thickness 2.0 mm</li> <li>complies with TA-Luft, blow-out safety</li> <li>high stability, robust, good handling</li> <li>high operating pressure up to 250 bar</li> </ul>	<ul style="list-style-type: none"> <li>base material: SIGRAFLEX® HOCHDRUCK, impregnated, with adhesive-free insert made from 0.05 mm stainless steel foil 316L and eyelet made from stainless steel 1.4571</li> <li>standard thickness 2.0 mm</li> <li>complies with TA-Luft, blow-out safety</li> <li>high stability, robust, good handling</li> <li>good gas tightness, no product contamination</li> </ul>

## Operating limits

### Operating pressure:

max. 250 bar	max. 250 bar
--------------	--------------

### Operating temperature:

-250 °C to +550 °C <sup>1)</sup>	-200 °C to +550 °C <sup>1)</sup>
----------------------------------	----------------------------------

<sup>1)</sup> please consult with the manufacturer regarding temperatures above 450°C

## Gasket characteristics DIN 28090 (Thickness = 2 mm)

$\sigma_{VU0,1}$ :	18 N/mm <sup>2</sup>	$\sigma_{VU0,1}$ :	20 N/mm <sup>2</sup>
$\sigma_{VO}$ :	270 N/mm <sup>2</sup>	$\sigma_{VO}$ :	200 N/mm <sup>2</sup>
$\sigma_{BO\ 300^\circ\text{C}}$ :	210 N/mm <sup>2</sup>	$\sigma_{BO\ 300^\circ\text{C}}$ :	130 N/mm <sup>2</sup>
$m_{DIN\ 2505}$ :	1.3	$m_{DIN\ 2505}$ :	1.3

For gasket characteristics as per EN 13555 please refer to Gasket Database FH Münster under [www.gasketdata.org](http://www.gasketdata.org)



## Approvals

<ul style="list-style-type: none"> <li>Blowout safety (TÜV tested at 2.5x nominal pressure)</li> <li>BAM approval for gaseous oxygen (200°C / 130 bar) and liquid oxygen</li> <li>BAM approval for ethylene oxide and propylene oxide</li> <li>DVGW</li> <li>Fire Safe Test as per API 607</li> <li>German Lloyd</li> <li>TA-Luft 2002 (VDI 2440/2200) at 60 MPa (tongue and groove flanges)</li> </ul>	<ul style="list-style-type: none"> <li>Blowout safety (TÜV tested at 2.5 x nominal pressure)</li> <li>BAM approval for gaseous oxygen (200°C / 130 bar) and liquid oxygen</li> <li>BAM approval for ethylene oxide and propylene oxide</li> <li>DVGW</li> <li>Fire Safe Test as per British Standard BS 6755 Part 2</li> <li>TA-Luft 2002 (VDI 2440/2200)</li> </ul>
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## Dimensions and profiles

as per DIN EN 1514-1 and other established dimension standards as well as special dimensions, please refer to measurement tables for flat gaskets as of page 62

## Graphite flat gaskets in SIGRAFLEX® HOCHDRUCK

SIGRAFLEX® HOCHDRUCK with inner eyelet and pre-compressed centering ring (WS 3885-HB, FD11)	SIGRAFLEX® HOCHDRUCK with inner and outer eyelet (WS 3885-DB, FD30) / and centering ring (WS 3885-DB-ZR, FD33)
	
<ul style="list-style-type: none"> <li>base material: SIGRAFLEX® HOCHDRUCK, impregnated, with adhesive-free insert made from 0.05 mm stainless foil 316L and inner eyelet made from stainless steel 1.4571</li> <li>standard thickness 2.0 mm</li> <li>complies with TA-Luft, blow-out safety</li> <li>high stability, robust, good handling</li> <li>high operating pressures up to 250 bar, suitable for seals which have only low surface pressures at their disposal</li> <li>good gas tightness, no product contamination</li> </ul>	<ul style="list-style-type: none"> <li>base material: SIGRAFLEX® HOCHDRUCK, impregnated with adhesive-free inserts made from 0.05 mm stainless steelfoil 316L; inner and outer eyelet made from stainless steel 1.4571</li> <li>standard thickness 2.0 mm</li> <li>complies with TA-Luft, blow-out safety</li> <li>high stability, robust, good handling</li> <li>good gas tightness, no product contamination</li> <li>for use at high operating temperatures (600 °C)</li> <li>suitable for tongue and groove flanges (FD30) as well as flat face and raised face flanges (FD33)</li> </ul>

## Operating limits

### Operating pressure:

max. 250 bar	max. 160 bar
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### Operating temperature:

-200 °C to +550 °C <sup>1)</sup>	-200 °C to +600 °C <sup>1)</sup>
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<sup>1)</sup> please consult with the manufacturer regarding temperatures above 450°C

## Gasket characteristics DIN 28090 (Thickness = 2 mm)

$\sigma_{VU0,1}$ :	20 N/mm <sup>2</sup>	$\sigma_{VU0,1}$ :	50 N/mm <sup>2</sup>
$\sigma_{VO}$ :	200 N/mm <sup>2</sup>	$\sigma_{VO}$ :	250 N/mm <sup>2</sup>
$\sigma_{BO\ 150^\circ C}$ :	180 N/mm <sup>2</sup>		
$\sigma_{BO\ 300^\circ C}$ :	130 N/mm <sup>2</sup>	$\sigma_{BO\ 300^\circ C}$ :	200 N/mm <sup>2</sup>
$m_{DIN\ 2505}$ :	1,3	$m_{DIN\ 2505}$ :	1,3



## Approvals

<ul style="list-style-type: none"> <li>Blowout safety (TÜV tested at 2.5 x nominal pressure)</li> </ul>	<ul style="list-style-type: none"> <li>BAM approval for gaseous oxygen (200°C / 130 bar) and liquid oxygen</li> </ul>
<ul style="list-style-type: none"> <li>BAM approval for gaseous oxygen (200°C / 130 bar) and liquid oxygen</li> </ul>	<ul style="list-style-type: none"> <li>BAM approval for ethylene oxide and propylene oxides</li> </ul>
<ul style="list-style-type: none"> <li>BAM approval for ethylene oxide and propylene oxide</li> </ul>	<ul style="list-style-type: none"> <li>DVGW</li> </ul>
<ul style="list-style-type: none"> <li>DVGW</li> </ul>	<ul style="list-style-type: none"> <li>Fire Safe Test as per BS 6755 Part 2</li> </ul>
<ul style="list-style-type: none"> <li>Fire Safe Test as per BS 6755 Part 2</li> </ul>	<ul style="list-style-type: none"> <li>TA-Luft 2002 (VDI 2440/2200)</li> </ul>
<ul style="list-style-type: none"> <li>TA-Luft 2002 (VDI 2440/2200)</li> </ul>	

## Dimensions and profiles

as per DIN EN 1514-1 and other established dimension standards as well as special dimensions, please refer to measurement tables for flat gaskets as of page 62

## Multilayer flat gaskets in SIGRAFLEX® MF

SIGRAFLEX® MF multilayer gasket from graphite, stainless steel and PTFE with inner eyelet (WS 3870-IB, FD10)	SIGRAFLEX® MF multilayer gasket from graphite, stainless steel and PTFE with inner and outer eyelet (WS 3870-DB, FD30)
	
<ul style="list-style-type: none"> <li>• Three-component flat gasket made from flexible graphite, stainless steel and PTFE for minimal leakage and maximum safety with high chemical resistance. The leakage requirements of TA-Luft 2002 (VDI 2440/2200) is met.</li> <li>• complies with highest requirements for keeping the operating medium clean</li> <li>• parts touching the media are FDA-conform</li> <li>• very good media resistance (depending on used inner eyelet material), especially against corrosive materials and chemicals</li> <li>• no adhesion to the flange sealing surface; low assembly cost</li> </ul>	<ul style="list-style-type: none"> <li>• Three-component flat gasket made from flexible graphite, stainless steel and PTFE for minimal leakage and maximal safety with high chemical resistance. The leakage requirements of TA-Luft 2002 (VDI 2440/2200) is met.</li> <li>• complies with highest requirements for keeping the operating medium clean</li> <li>• parts touching the media are FDA-conform</li> <li>• very good media resistance (depending on used inner eyelet material), especially against corrosive materials and chemicals</li> <li>• no adhesion to the flange sealing surface; low assembly cost</li> </ul>

## Operating limits

### Operating pressure:

max. 160 bar	max. 160 bar
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### Operating temperature:

-200 °C to +300 °C	-200 °C to +300 °C
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## Gasket characteristics DIN 28090 (Thickness = 2 mm)

$\sigma_{VU\ 0,1}$ :	10 N/mm <sup>2</sup>	$\sigma_{VU\ 0,1}$ :	10 N/mm <sup>2</sup>
$\sigma_{VO}$ :	220 N/mm <sup>2</sup>	$\sigma_{VO}$ :	220 N/mm <sup>2</sup>
$\sigma_{BO\ 300^{\circ}C}$ :	120 N/mm <sup>2</sup>	$\sigma_{BO\ 300^{\circ}C}$ :	120 N/mm <sup>2</sup>
$m_{DIN\ 2505}$ :	1.3	$m_{DIN\ 2505}$ :	1.3

For gasket characteristics as per EN 13555 please refer to Gasket Database FH Münster under [www.gasketdata.org](http://www.gasketdata.org)

## Approvals

• Blowout safety (TÜV tested at 2.5x nominal pressure)	• Blowout safety (TÜV tested at 2.5x nominal pressure)
• BAM approval for gaseous oxygen (200°C / 130 bar)	• BAM approval for gaseous oxygen (200°C / 130 bar) 1
• DVGW	• DVGW
• FDA compliant (parts in contact with product)	• FDA compliant (parts in contact with product)
• Fire Safe Test as per API 607 and BS 6755 Part 2	• Fire Safe Test as per API 607 and BS 6755 Part 2
• TA-Luft 2002 (VDI 2440/2200)	• TA-Luft 2002 (VDI 2440/2200)

## Dimensions and profiles

as per DIN EN 1514-1 and other established dimension standards as well as special dimensions, please refer to measurement tables for flat gaskets as of page 62



# PTFE flat gaskets

## Description

Flat gaskets made from Dyneon™ TFM™ are high quality gaskets which are mainly used in chemical and food industry applications.

Dyneon™ TFM™ is a chemically modified PTFE, which was developed for flat gasket applications amongst other uses.

The outstanding characteristics in comparison to non-modified PTFE are:

- drastically less deformation on load even at increased temperatures
- reduction of permeability of gases and vapours due to pore-reduced homogeneous structure
- anti-adhesive due to extremely smooth surface
- light and weather resistant, not brittleness, shock and impact proof

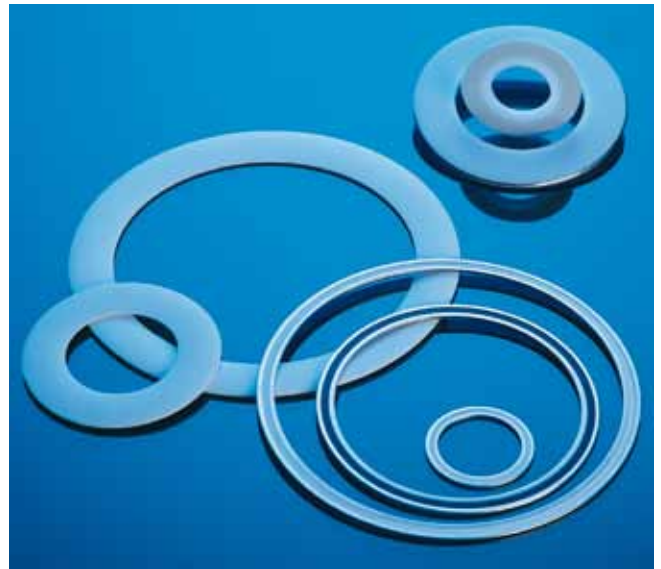
The stainless steel corrugated ring core and the diffusion barrier on the inner area of the gasket ((PW-I) as well as the design with double eyelet for tongue and groove flanges meet increased demands for tightness, operational safety, service life and efficiency. Complies with TA-Luft 2002 (VDI 2440/2200). FDA-compliant.

## Properties

- almost universal resistance against chemicals and solvents; filler, such as glass fibres etc. affect the chemical resistance (please consult manufacturer)
- excellent compressive stability at WS 7110 due to corrugated ring core with specially adjusted thickness of TFM™ envelope and the double eyelet
- massive, approx. 4 mm wide diffusion barrier at inner area for WS 7110/1.4571 (PW-I)
- higher admissible surface pressure with simultaneous form stability due to stainless steel double eyelet or corrugated ring core even at higher temperatures or operating pressures
- no product contamination

## Applications



- for high tightness requirements e.g. toxic gases
- WS 7110/1.4571 (PW-I) recommended for Oleum; resistant even against highly corrosive media e.g. saltpetre acid (for WS 7110-DB the chemical resistance is depending on the stainless steel eyelet)
- for pharmaceutical products, varnishes, paints, food, chemical industries, storage containers and tank trucks
- no special requirements on flange sealing surface - flange form B1 (EN 1092) is sufficient
- Bursting pressure at DN 100 > 100 bar (WS7110/1.4571)



## Models

- flat gaskets as per DIN EN 1514-1 with or without inner/outer/double eyelet made from
  - virginal PTFE TF 1620 (WS7010)
  - Dyneon™ TF 4105 with 25% glass fibre fraction
  - modified PTFE Dyneon™ TFM™ 1600 (WS 7110)
  - modified PTFE Dyneon™ TFM™ 4105 with 25% glass fibre fraction (WS 7115)
  - UNIFLUOR® 7550 (PTFE-base filled with micro glass balls)
  - UNIFLUOR® 7551 (PTFE-base filled with silica)
  - UNIFLUOR® 7553 (PTFE-base filled with barium sulphate)
- TFM™ envelope gasket WS 7110/3822: TFM™ envelope with aramid fibre (Centellen) insert
- TFM™ envelope gasket WS 7110/1.4571/3822: TFM™ envelope with stainless steel corrugated ring and aramid fibre (Centellen) insert
- TFM™ envelope gasket WS 7110/3825: TFM™ envelope with graphite (SIGRAFLEX®-Email) insert
- TFM™ envelope gasket WS 7110/1.4571/3825: TFM™ envelope with stainless steel corrugated ring and graphite (SIGRAFLEX®-Email) insert
- TFM™-Kammprofile gasket WS 7220/7115/7110 with kammprofile on either side

## PTFE flat gaskets in Dyneon™ TF

WS 7011 TF 1620	WS 7015 TF 4105
	
<ul style="list-style-type: none"> <li>made from pure virgin PTFE (Dyneon™ TF 1620)</li> <li>cost-efficient PTFE flat gasket for use with low mechanical stresses and low pressure-temperature-stresses</li> <li>has a high, almost universal chemical resistance; exceptions: e.g. fluoride, halogen-oxide, melted and dissolved alkali metals</li> <li>available as sheet and die-cut gasket as per DIN-EN 1514-1 and other established dimension standards as well as special dimensions</li> </ul>	<ul style="list-style-type: none"> <li>made from Dyneon™ TF 4105, compound from pure PTFE with a glass fibre fraction of 25%</li> <li>has a high chemical resistance for PTFE, while the limitations due to glass fibre fraction are marginal</li> <li>available as sheet and die-cut gasket as per DIN EN 1514-1 and other established dimension standards as well as in special dimensions</li> </ul>

## Operating limits

### Operating pressure:

max. 6 bar	max. 6 bar
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### Operating temperature:

max. 150 °C	max. 150 °C
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Max. temperature and max. pressure must not be permitted to occur simultaneously (please consult with the manufacturer)

## Gasket characteristics DIN 28090 (Thickness = 2 mm)

$\sigma_{vu}$ :	10 N/mm <sup>2</sup>	$\sigma_{vu}$ :	10 N/mm <sup>2</sup>
$\sigma_{v0}$ :	40 N/mm <sup>2</sup>	$\sigma_{v0}$ :	40 N/mm <sup>2</sup>
$\sigma_{B0\ 150^\circ C}$ :	25 N/mm <sup>2</sup>	$\sigma_{B0\ 150^\circ C}$ :	30 N/mm <sup>2</sup>
$m_{DIN\ 2505}$ :	1,1	$m_{DIN\ 2505}$ :	1,1

## Approvals

• FDA compliant	• FDA compliant
• TA-Luft 2002 (VDI 2440/2200)	• TA-Luft 2002 (VDI 2440/2200)


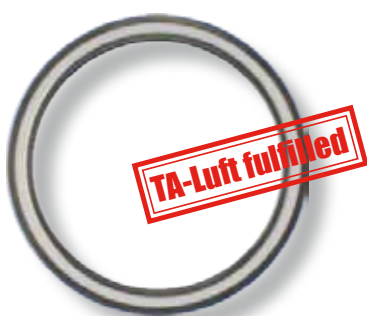

## Delivery form (sheet format)

• Thickness: 0.1; 0.3; 0.5; 0.8; 1.0; 1.5; 2.0; 3.0 mm	• Thickness: 0.3; 0.5; 0.75; 1.0; 1.5; 2.0; 3.0 mm
• Sheet size: 1500 mm x 1500 mm	• Sheet size: 1500 mm x 1500 mm
• other dimensions and thickness's available upon request	• other dimensions and thickness's available upon request

## Dimensions and profiles (Flat gaskets)

as per DIN EN 1514-1 and other established dimension standards as well as special dimensions, please refer to measurement tables for flat gaskets as of page 62

## PTFE flat gaskets in Dyneon™ TFM™

WS 7110 TFM™ 1600	WS 7110 DB TFM™ 1600	WS 7115 TFM™ 4105
		
<ul style="list-style-type: none"> <li>made from modified, cold flow reduced Dyneon™ TFM™ 1600 without fillers</li> <li>features a dense, homogeneous, almost pore-free polymer structure</li> <li>highest degree of chemical resistance due to the lack of fillers</li> </ul>	<ul style="list-style-type: none"> <li>Flat gasket made from modified, cold flow reduced Dyneon™ TFM™ 1600 with inner and outer eyelet were specifically developed for tongue and groove flanges, overhangs, recesses and other similar applications.</li> <li>Due to the double eyelet a chamber effect is created and therefore the material extrusion in the sealing gap and flowing of gasket is prevented.</li> </ul>	<ul style="list-style-type: none"> <li>made from modified, cold flow reduced Dyneon™ TFM™ 4105 with a glass fibre fraction of 25%.</li> <li>The modification and the glass fraction result in a reduced cold flow and an increased stability in comparison to normal PTFE. The chemical resistance is only limited marginally by the glass fraction.</li> </ul>

## Operating limits

### Operating pressure:

max. 16 bar	max. 40 bar	max. 16 bar
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### Operating temperature:

max. 150 °C	max. 200 °C	max. 150 °C
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Max. temperature and max. pressure must not be permitted to occur simultaneously (please consult with the manufacturer).

## Gasket characteristics DIN 28090 (Thickness = 2 mm)

$\sigma_{VU}$ : 10 N/mm <sup>2</sup>	$\sigma_{VU}$ : 23 N/mm <sup>2</sup>	$\sigma_{VU}$ : 13 N/mm <sup>2</sup>
$\sigma_{VO}$ : 50 N/mm <sup>2</sup>	$\sigma_{VO}$ : 117 N/mm <sup>2</sup>	$\sigma_{VO}$ : 50 N/mm <sup>2</sup>
$\sigma_{BO\ 150^\circ C}$ : 35 N/mm <sup>2</sup>	$\sigma_{BO\ 200^\circ C}$ : 40 N/mm <sup>2</sup>	$\sigma_{BO\ 150^\circ C}$ : 30 N/mm <sup>2</sup>
$m_{DIN\ 2505}$ : 1,1	$m_{DIN\ 2505}$ : 1,0	$m_{DIN\ 2505}$ : 1,1

## Approvals

• BAM approval for liquid oxygen	• BAM approval for gaseous oxygen (250 bar/300°C) and liquid oxygen	• BAM approval for gaseous oxygen (40 bar/125°C in tongue and groove flanges) and liquid oxygen
• FDA compliant	• FDA compliant	• FDA compliant
• TA-Luft 2002 (VDI 2440/2200)	• TA-Luft 2002 (VDI 2440/2200)	• TA-Luft 2002 (VDI 2440/2200)




## Delivery form (sheet format)

• Thickness: 0.3; 0.5; 0.75; 1.0; 1.5; 2.0; 3.0 mm	• Standard thickness 2 mm	• Thickness: 0.3; 0.5; 0.75; 1.0; 1.5; 2.0; 3.0 mm
• Sheet size: 1500 mm x 1500 mm		• Sheet size: 1500 mm x 1500 mm
• other dimensions and thickness's available upon request		• other dimensions and thickness's available upon request

## Dimensions and profiles (Flat gaskets)

as per DIN EN 1514-1 and other established dimension standards as well as special dimensions, please refer to measurement tables for flat gaskets as of page 62

## PTFE flat gaskets in UNIFLUOR® 7550 / 7551 / 7553

WS7550 blue	WS7551 fawn	WS7553 white
		
<ul style="list-style-type: none"> <li>• a high quality, biaxially oriented PTFE sealing material filled with hollow micro glass balls</li> <li>• high chemical resistance</li> <li>• excellent deformation properties</li> </ul>	<ul style="list-style-type: none"> <li>• a high quality, biaxially oriented PTFE sealing material reinforced with silica filler</li> <li>• high chemical resistance</li> <li>• excellent form deformation properties</li> </ul>	<ul style="list-style-type: none"> <li>• a high quality, biaxially oriented sealing material reinforced with barium sulphate filler</li> <li>• high chemical resistance</li> <li>• excellent deformation properties</li> </ul>

## Operating limits

### Operating pressure:

max. 60 bar	max. 80 bar	max. 80 bar
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### Operating temperature:

-200 °C to +260 °C	-200 °C to +260 °C	-200 °C to +260 °C
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Max. temperature and max. pressure must not be permitted to occur simultaneously (please consult with the manufacturer).

## Gasket characteristics DIN 28090 (Thickness = 2 mm)

$\sigma_{VU0,1}$ : 17 N/mm <sup>2</sup>	$\sigma_{VU}$ : 24 N/mm <sup>2</sup>	$\sigma_{VU}$ : 25 N/mm <sup>2</sup>
$\sigma_{V0}$ : 175 N/mm <sup>2</sup>	$\sigma_{V0}$ : 160 N/mm <sup>2</sup>	$\sigma_{V0}$ : 160 N/mm <sup>2</sup>
	$\sigma_{B0\ 150^{\circ}\text{C}}$ : 110 N/mm <sup>2</sup>	$\sigma_{B0\ 150^{\circ}\text{C}}$ : 95 N/mm <sup>2</sup>
$\sigma_{B0\ 200^{\circ}\text{C}}$ : 70 N/mm <sup>2</sup>	$\sigma_{B0\ 200^{\circ}\text{C}}$ : 90 N/mm <sup>2</sup>	$\sigma_{B0\ 200^{\circ}\text{C}}$ : 85 N/mm <sup>2</sup>
$m_{\text{DIN 2505}}$ : 1,2	$m_{\text{DIN 2505}}$ : 1,2	$m_{\text{DIN 2505}}$ : 1,2

## Approvals

• FDA compliant (FDA 21 CFR 177.1550)	• BAM approval for gaseous oxygen (150°C/60 bar) and liquid oxygen	• BAM approval for gaseous oxygen (200 °C/70 bar) and liquid oxygen
• German Lloyd	• BAM approval for ethylene oxide / propylene oxide	• FDA compliant
• TA-Luft 2002 (VDI 2440/2200)	• FDA compliant	• German Lloyd
	• German Lloyd	• TA-Luft 2002 (VDI 2440/2200)
	• TA-Luft 2002 (VDI 2440/2200)	

## Delivery form (sheet format)

• Thickness: 0.75; 1.0; 1.5; 2.0; 3.0 mm	• Thickness: 1.0; 1.5; 2.0; 3.0 mm	• Thickness: 1.0; 1.5; 2.0; 3.0 mm
• Sheet size: 1500 mm x 1500 mm	• Sheet size: 1500 mm x 1500 mm	• Sheet size: 1500 mm x 1500 mm
• other dimensions and thickness's available upon request	• other dimensions and thickness's available upon request	• other dimensions and thickness's available upon request

## Dimensions and profiles (Flat gaskets)

as per DIN EN 1514-1 and other established dimension standards as well as special dimensions, please refer to measurement tables for flat gaskets as of page 62

# Gaskets made from expanded PTFE (ePTFE)

## Description

### Fabrication

The outstanding properties of the material PTFE receive other positive characteristics due to a special manufacturing process which puts our sealing products at the top of expanded PTFE products.

The mono-directional manufacturing process gives the sealing material its characteristic, smooth, lengthwise oriented fibre structure.

The multi-directional manufacturing process gives the material the special resistance against cold flow and the dimensional stability even in critical areas of use due to the fibre orientation into several directions.

### Material

PTFE (Polytetrafluorethylen) is a versatile material for sealing technology due to its almost universal chemical resistance, the high temperature resistance and its anti-adhesive purposes.

### Chemical resistance

PTFE is resistant against almost all chemicals (acids, bases, solvent etc.) with only a few exceptions such as melted and dissolved alkali metals, halogen-oxides as well as primary fluorine at higher temperatures and pressures.

### Age resistant

ePTFE sealing materials do not age if used for approved areas of use.

### Temperature resistant

The ePTFE areas of use range from -240 °C to +270 °C, temporary up to +315 °C

### Physiological harmlessness

Pure PTFE is physiologically harmless at constant temperatures up to +260 °C according to BG no. 21. The requirements as per FDA21 are met.

## Gaskets made from ePTFE

### IDT-UNIFLUOR® Universal ePTFE sealing tape type 2740 (rectangular), 7747 (round)

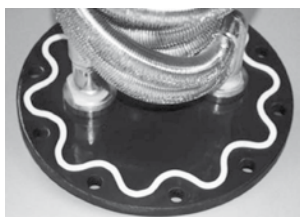
- Sealing tape or cord made from virginal, expanded PTFE for universal application
- rectangular self-adhesive, round without adhesive
- for high product purity also available without adhesive strip
- temperature range from -240 °C to +270 °C, temporary up to 315 °C
- BAM approved for oxygen-Tgb.-no. 4.1.332/94
- DVGW tested DIN-DVGW Reg.No.: DG-5127AQ1282
- TÜV certified – TÜV test no. AW6/3231-98



### IDT-UNIFLUOR® ePTFE sealing tape HighDensity-E type 7744

sealing tape made from higher density virginal expanded PTFE

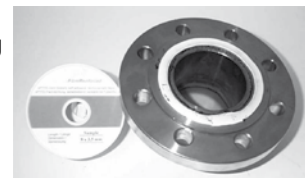
- for use with larger unevenness or for lower flange compression forces
- rectangular self-adhesive
- scarf joint at the overlap
- temperature range from -240 °C to +270 °C, temporary up to 315 °C
- TÜV-certified – TÜV test no. AW6/3231-98



### IDT-UNIFLUOR® ePTFE sealing tape with filler type 7778

sealing tape made from expanded PTFE with stabilising filler

- used for larger unevenness and temperature change
- rectangular self-adhesive
- temperature range from -240 °C to +270 °C, temporary up to 315 °C
- suitable for most media except highly alkaline materials





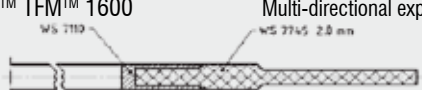
### IDT-UNIFLUOR® ePTFE sealing tape MultiTex®-FG type 7770

sealing tape made from virginal multi-directional expanded PTFE

- used for components sensitive to stress (e.g. enamel/plastic flange) as well as to seal steel flange securely
- temperature range from -240 °C to +270 °C, temporary up to 315 °C
- BAM approved for oxygen-BAM Tgb.-no. 11-431/2000





Flat gasket UNIFLUOR® 7745 (WS 7745, FD01)	Flat gasket UNIFLUOR® 7745-HB (WS 7745-HB, FD11)
	
<p>The gasket is made of extremely soft and adaptable multi-directional expanded ePTFE. The special manufacturing process provides this gasket with low setting behaviour and an extremely low flow (negligibly small increase in width under compression) even under high load. Its application is advantageous in sensitive sealing surfaces and in sealed connections sensitive to stress and with low flexural resistance (inspections glasses, enamel and plastic lines e.g.) where resistance to a variety of chemicals and suitability for use with foodstuffs is required.</p> <p>It is available as plate and die-cut gasket as per DIN EN 1514-1 and in other common dimensions as well as special-purpose dimensions.</p>	<p>Optimised PTFE flat gasket (IDT-WS 7745-HB) for use with stress sensitive flange connections (e.g. plastic flange) with extremely low leakage rates requirement, under very low surface load and high demands on product purity</p> <p><b>Range of applications</b></p> <ul style="list-style-type: none"> <li>flanges which are extremely sensitive to stress, especially those made from plastic for highest demands on tightness and purity</li> <li>pharmaceutical, food and chemical industry</li> </ul> <p><b>Construction</b></p> <ul style="list-style-type: none"> <li>basic body made from virginal PTFE (WS 7745) low density (0,7 g/cm³) with multi-directional fibre structure</li> <li>inner eyelet made from chemically modified, almost pore-free PTFE of high density (2,165 g/cm³) made from Dyneon™ TFM™ 1600 (WS 7110)</li> </ul> <p>Dyneon™ TFM™ 1600      Multi-directional expanded PTFE</p> 

## Operating limits

### Operating pressure:

max. 40 bar	max. 40 bar
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### Operating temperature:

-200 °C to 225 °C (short-term 250 °C)	max. 230 °C
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Max. temperature and max. pressure must not be permitted to occur simultaneously.

## Gasket characteristics DIN 28090

$\sigma_{VU\ 0,01}$ :	20 N/mm² (PN20)	$\sigma_{VU\ 0,01}$ :	1.1 N/mm²
$\sigma_{VU\ 0,01}$ :	25 N/mm² (PN40)	$\sigma_{VU\ 0,01}$ :	1.3 N/mm²
$\sigma_{V0}$ :	180 N/mm²		
$\sigma_{B0\ 200^\circ C}$ :	60 N/mm²		
$m_{DIN\ 2505}$ :	1.1		

## Approvals

• BAM approval for gaseous oxygen (160°C/40 bar) and liquid oxygen
• FDA compliant
• TA-Luft 2002 (VDI 2440/2200)

## Dimensions and profiles (Flat gaskets)

as per DIN EN 1514-1 and other established dimension standards as well as special dimensions, please refer to measurement tables for flat gaskets as of page 62

# Elastomers

## Description

Elastomers are form stable yet elastically deformable plastics. They can deform due to tensile or compression stresses and then gets back to their original, un-deformed state. Elastomers or rubber seals are almost the only seals to which the term recovery force applies.



## Scope of supply

- O-rings
- round cord rings
- flat gaskets
- rubber-steel gaskets
- lip ring
- profile cords

- milk bolted pipe joints
- tank truck couplings gaskets
- shaft seal
- moulded parts
- in a range of different dimensions and models

## Properties

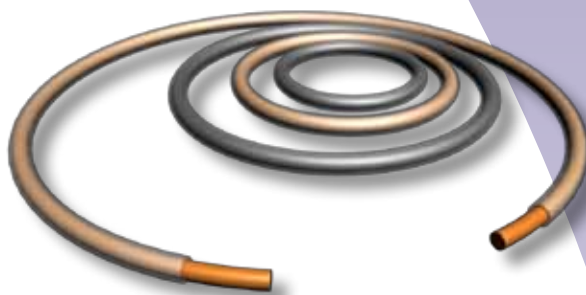
Abbrev. ISO 1629	chemical name	trade name	hardness range Shore A	temperature range	Properties/Application
ACM	acrylic rubber	NipolAR Europrene AR		-25 to 130° C	gaskets and profiles for automotive use, hoses
AEM	ethylene acrylic elastomer	Vamac		-40 to 150° C	good weather and ozone resistance
PUR / AU / EU	polyurethane rubber/ polyester urethane / polyether urethane	Vulkollan, Desmopan Elastollan, Urepan, Simputhan	60 to 98	-30 to 80° C	hydraulic seals, contact surfaces, rolls
CR	chloroprene elastomer	Neoprene, Baypren	30 to 90	-45 to 100° C	good flame resistance, good age resistance as well as chemical resistance
CSM	chlorosulfonated polyethylene	Hypalon	50 to 90	-20 to 120° C	resistant elastomers, UV, temperature and age resistant as well as tear-proof
ECO	epichlorohydrin	Hydrin, Herclor, Epich- lomer	35 to 90	-40 to 140° C	good petroleum resistance and good weather and ozone resistance
EPDM / EPR	ethylene propylene diene monomer rubber / ethylene propylene rubber	Nordel, DSM (Keltan) Dutral, Buna EP	25 to 90	-50 to 150° C	automotive, washing machines and kitchen appliances (steam resistant), construction industry
FFPM / FKM	perfluoro rubber	Perlast, Kalrez, Simriz Chemraz, Isolast Plasti- perflour	60 to 95	-15 to 230° C	electronics and semi-conductor industry, che- mical and petro-chemical industry, medical technology and pharmaceutical industry
FPM / FKM	fluoropolymer	Viton, Fluorel, Tecnoflon	50 to 95	-20 to 200° C	gaskets, molded parts and hoses, cable insulation
FVMQ / MQ / MVQ / VMQ	fluorosilicone rubber methyl groups on chain methyl and vinyl groups	Silopren, Silastik Silico- ne, Rhodorsil	20 to 80	-80 to 175° C -60 to 180° C -60 to 200° C	freezers, cookers, driers, windows and cabinet doors of planes, medical technical supplies, electrical insulators
IIR	isobutylene-isoprene copolymer	Polysarbutyl, Esso Butyl, Polysar Butyl	40 to 85	-40 to 130° C	lower gas permeability and good heat and age resistance
NBR / X-NBR / NEM (H-NBR)	nitrile-butadiene rubber / hydrogene butadiene	Perbunan N, Nitril, BunaN.Therban, Zetpol	40 to 95	-30 to 100° C -30 to 130° C -25 to 150° C	oil and fuel resistant gaskets, membranes and hoses
NR	natural rubber	Para	20 to 90	-60 to 80° C	car tyres, transport bands, belts, technical articles of any kind
SBR	styrene butadiene rubber	Buna SL, Solprene,	30 to 95	-50 to 100° C	mainly used co-polymer with NR for Dunatex, Krynnol, car tyres, sheet material and foam rubber sheets

## FEP sheathed O-rings with rubber elastic inner ring

### Description

The FEP sheathed O-ring consists of a rubber elastic inner ring (FPM or MVQ) and a FEP-sheathing (hexafluorpropylene), which covers the O-ring seamlessly.

FEP-sheathed O-rings are used – similar to the use of PTFE-rings – wherever the chemical resistance of a normal elastomers O-ring is no longer sufficient yet a certain elasticity is still required. The required elasticity is provided by the inner ring and the chemical resistance is achieved by the seamless FEP sheathing.



### Advantages

- very good chemical resistance against most liquids and chemicals
- temperature range for use from about - 60 °C to + 200 °C (depending on inner ring material)
- no contamination of food, pharmaceutical or medical products
- physiologically harmless, can be sterilized
- sufficient elastic properties
- FEP-O-rings can be fully exchanged for standard-O-ring seals.
- there is no need to change the groove dimensions. The FEP-sheath is relative thin-walled.
- FEP-sheathed O-rings are less flexible than elastomers O-rings. They are not as ductile and have less elasticity or a higher permanent deformation.
- split grooves are recommended for the installation of FEP-sheathed O-rings in order to avoid an impermissible deformation.

### Applications

FEP-sheathed O-rings are ideally suited for the chemical industry, petro-chemical industry, medical technology, food industry, water and sewage technology and similar industry sectors. A typical use of FEP-sheathed O-rings is the sealing of valve spindles and as a secondary sealing element for slow actuator and rotation movements.

# Kammprofile gaskets

## Description

Kammprofile gaskets are ideally suited to securely sealing media in extreme operating conditions (temperatures up to 550 °C, pressure up to 400 bar). They combine the specific properties of soft material gaskets (great alignment onto the flange sealing surface) and metal gaskets (high stability and rupture strength).

Basic body profile, thickness and material of either side of the seal are adjusted to each other in such a way that the seal material is extremely tight opposing the media diffusion with high resistance yet the collar tip remains tightly overlapped even at the highest level of compression and excluding the risk of metallic flange contact.

The collar tip overlap of approx. 0.2 mm is guaranteed in the compressed state, which makes flange roughness average values are securely controlled and the diffusion cross-section is small.

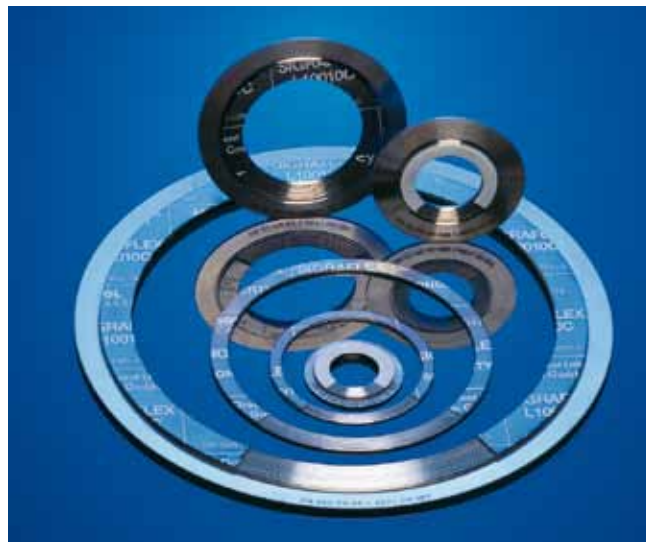
A small diffusion cross-section and very high seal material density when compressed result in very low leakage rates. Kammprofile gaskets comply with the increased requirements especially those imposed by TA-Luft 2002 (VDI 2440/2200).

This gasket can be adapted for use with a wide range of media and operational conditions due to the choice of material components and construction variations.

An overview of the possible gasket profiles is available from the manufacturer upon request.

## Properties/Applications

- excellent temperature resistance, continuous operating temperature: -200 °C to approx. + 550 °C
- very high operating pressures (400 bar)
- full utilisation of bolt load is recommended
- very good media resistance, especially against corrosive materials and chemicals
- high operational safety
- very low leakage rates for gases and liquids, complies with high tightness requirements (TA-Luft 2002)
- no aging or brittleness not even at high temperatures
- no health hazard
- very good handling during transport, assembly and dismantling, mechanically stable
- no over-compression with standard tensioning devices
- labelling of every gaskets on the centring ring
- use of low chloride graphite seals (chloride content < 25ppm) and adhesives (chloride content < 12 ppm) makes the gaskets suitable for use even between equipment parts made from austenitic materials.
- kammprofile gaskets stood the test in the chemical and petro-chemical industry, in conventional and nuclear power stations, for steam generation and apparatus engineering, especially where high temperatures and pressures have to be controlled securely.
- Due to the low minimum surface compression and relatively small sealing surfaces with comparatively,



kammprofile gaskets need only a low bolt loads for tightening.

## Materials

### Core

standard material 1.4571, other materials as e.g. 1.4541, 1.7335, 1.4828 available upon request

### Layers

- SIGRAFLEX®-Foil (WS 3800, WS 3805, APX)
- Dyneon™ TFM™ 1600 (WS 7110)
- unsintered PTFE (WS 7739)

WS 7110 is a chemically modified PTFE, which has the following properties in comparison to un-modified PTFE:

- drastically less deformation on load even at increased temperatures
- reduction of permeability of gases and vapours due to pore-reduced homogeneous structure
- anti-adhesive due to extremely smooth surface, not hygroscopic
- light and weather resistant, no brittleness, shock and impact proof

Other materials such as silver are available upon request.

The selection of sealing materials depends on their chemical resistance and the operating temperature and for this we are happy to assist you. Dyneon™ TFM™ 1600 should not be used above 250 °C. Graphite is not resistant against oxidizing media

## Basic designs

**KD20:** kammprofile on either side of the core, kammprofile pitch 1.0 mm; with cranked centring ring and predetermined breaking point, for flanges with flat face and raised face.

**KD30:** kammprofile on either side of the core, kammprofile pitch 1.0 mm; with loose centring ring for flanges with flat face and raised face.

**KD01/ER10:** kammprofile on either side of the core, kammprofile pitch 1.0 mm; for tongue/groove flanges or groove/groove flanges.

The following design variations are possible within the listed basic designs:

- kammprofile pitch 1.5 mm
- additional inner eyelet **KD03**
- PTFE envelope instead of layer **KD13**
- PTFE layer adhesive-free **KD09**
- convex shaped core design **KD24**
- special profiles for core of small thickness

## Dimensions

see page 72

## Labelling (Standard)

- manufacturer
- nominal size
- pressure range
- core material 1.4571
- layer material graphite



## Ordering example

Kammprofile gaskets nominal width 50, nominal pressure 40, dimensions 65 x 87 x 107x4 (core thickness) mm, core material 1.4571 with graphite seal on either side for flange with flat face and raised face as per DIN or EN:

Kammprofile gasket DN 50, PN 40, design KD10,  
company standard WN-1-06, 1.4571/Graphite

## Packaging

- individual packaging, up to DN 350 on skin board with protective layer
- for larger nominal width on carton or enveloped in foam

## Installation instructions

- store gaskets in a dry place, avoid damage during transport and installation
- flange surfaces have to be clean, dry and grease-free
- insert gaskets centrally and align the flange plane-parallel
- apply defined bolt tightening torque with torque wrench
- tighten the bolts in at least 3 steps crosswise to ensure an even compression distribution (e.g. first step 30% of intended final tightening torque, then with about 60% and 100%); check bolts frequently and tighten if necessary until all reached the intended final tightening torque

**Attention:** The maximum permissible bolt tension (usually 70 – 80% of yield point at low temperature) can be used at full capacity in most DIN-pipe flange connections for the described kammprofile gaskets.

We are happy to assist you for the ideal alignment of the seal connection and to establish the relevant calculations!

## Safety instructions/ fire performance

If Dyneon™ TFM™ is overheated (above 400 °C) a harmful decomposition product is created mainly as hydrofluoric acid. Therefore, relevant safety measures have to be adhered to.

Dyneon™ TFM™ is flame resistant. After the limiting-oxygen-index-test, the LOI-value is 95 (i.e. the material will only start burning in an atmosphere which contains more than 95% oxygen).



### Kammprofile gasket with machined centering ring and pre-determined breaking point (IDT style: KD20)



The two-sided kammprofile stainless steel core (standard: WS 1.4571/ kammprofile pitch 1mm) is covered on either side with soft layer, mainly graphite or PTFE.  
The gasket has a machined centering ring with predetermined breaking point to ensure that the flange screws are centered and to prevent fatigue failure in the sealing area.

### Kammprofile gasket with loose centering ring (IDT style: KD30)



The two-sided kammprofile stainless steel core (standard: WS 1.4571/ kammprofile pitch 1mm) is covered on either side with soft layer, mainly graphite or PTFE.  
The gasket has a loose centering ring to ensure that the flange screws are centered and to prevent fatigue failure in the sealing area.

## Construction

<p>Core material 1.4571; other materials are available on request Standard thickness: 4 mm</p> <p>Soft layer materials: - Graphite (s = 0.5 mm / 0.8 mm) - PTFE (s = 0.5 mm)</p> <p>Pre-determined breaking position</p> <p>Designed as per DIN EN 1514-6 (Type IR) DIN EN 12560-6 (Type IR)</p>	<p>Core material 1.4571; other materials are available on request Standard thickness: 4 mm</p> <p>Soft layer materials: - Graphite (s = 0.5 mm / 0.8 mm) - PTFE (s = 0.5 mm)</p> <p>Loose centering ring</p> <p>Designed as per DIN EN 1514-6 (Type LR) DIN EN 12560-6 (Type LR)</p>
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## Operating limits

### Operating pressure:

max. 400 bar	max. 400 bar
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### Operating temperature:

Graphite	PTFE	Graphite	PTFE
-200 °C to 550°C <sup>1)</sup>	-200 °C to 250 °C	-200 °C to 550°C <sup>1)</sup>	-200 °C to 250 °C

<sup>1)</sup> please consult the manufacturer regarding temperatures above 450°C

## Gasket characteristics DIN 28090

Graphite		PTFE		Graphite		PTFE	
$\sigma_{VU\ 0,1}$ :	15 N/mm <sup>2</sup>	$\sigma_{VU\ 0,1}$ :	15 N/mm <sup>2</sup>	$\sigma_{VU\ 0,1}$ :	15 N/mm <sup>2</sup>	$\sigma_{VU\ 0,1}$ :	15 N/mm <sup>2</sup>
$\sigma_{VO}$ :	500 N/mm <sup>2</sup>	$\sigma_{VO}$ :	500 N/mm <sup>2</sup>	$\sigma_{VO}$ :	500 N/mm <sup>2</sup>	$\sigma_{VO}$ :	500 N/mm <sup>2</sup>
$\sigma_{BO\ 300^\circ C}$ :	500 N/mm <sup>2</sup>	$\sigma_{BO\ 200^\circ C}$ :	450 N/mm <sup>2</sup>	$\sigma_{BO\ 300^\circ C}$ :	500 N/mm <sup>2</sup>	$\sigma_{BO\ 200^\circ C}$ :	450 N/mm <sup>2</sup>
$m_{DIN\ 2505}$ :	1.1	$m_{DIN\ 2505}$ :	1.1	$m_{DIN\ 2505}$ :	1.1	$m_{DIN\ 2505}$ :	1.1

For gasket characteristics as per EN 13555 please refer to gasket database FH Münster under [www.gasketdata.org](http://www.gasketdata.org)

## Approvals

• Blow-out safety Hot Blow-Out Test as per ASTM draft HOB T1 (Graphite)	• Blow-out safety Hot Blow-Out Test as per ASTM draft HOB T1 (Graphite)
• BAM approval for gaseous oxygen (70°C/100 bar) and liquid oxygen (PTFE)	• BAM approval for gaseous oxygen (70°C/100 bar) and liquid oxygen (PTFE)
• BAM approval for gaseous oxygen (200°C/130 bar) and liquid oxygen (Graphite)	• BAM approval for gaseous oxygen (200°C/130 bar) and liquid oxygen (Graphite)
• Fire Safe test as per API 607/DIN ISO 10497 (Graphite)	• Fire Safe test as per API 607/DIN ISO 10497 (Graphite)
• TA-Luft 2002 (VDI 2440/2200)	• TA-Luft 2002 (VDI 2440/2200)

### Kammprofile gasket for use in tongue and groove flanges (IDT style: KD01)



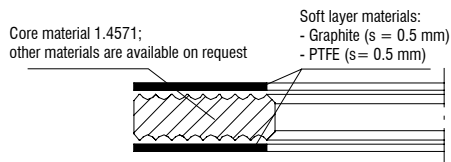
The two-sided kammprofile stainless core (standard: WS 1.4571, kammprofile pitch 1mm) is covered on either side with soft layer, mainly graphite or PTFE.  
The gasket can be fabricated in a small thickness, which enables the use also for tongue and groove flanges even for standard groove depths.

### Kammprofile gasket with convex-shaped basic body (IDT style: KD24)

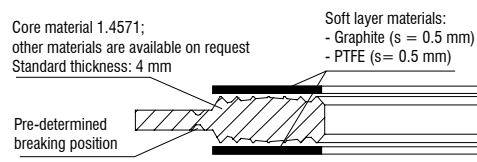


The two-sided kammprofile, convex-shaped stainless core (standard: WS 1.4571, kammprofile pitch 1mm) is covered on either side with soft layer, mainly graphite or PTFE.  
The gasket has a machined centering ring with predetermined breaking point to ensure that the flange screws are centered and to prevent fatigue failure in the sealing area.

## Construction



Designed as per DIN EN 1514-6 (Type NR)  
DIN EN 12560-6 (Type NR)  
Can be supplied from 2 mm overall thickness



Also available with a loose centering ring

## Operating limits

### Operating pressure:

max. 400 bar

max. 400 bar

### Operating temperature:

Graphite	PTFE	Graphite	PTFE
-200 °C to 550°C <sup>1)</sup>	-200 °C to 250 °C	-200 °C to 550°C <sup>1)</sup>	-200 °C to 250 °C

<sup>1)</sup> please consult the manufacturer regarding temperatures above 450°C

## Gasket characteristics DIN 28090

Graphite		PTFE		Graphite		PTFE	
$\sigma_{VU\ 0,1}$ :	15 N/mm <sup>2</sup>	$\sigma_{VU\ 0,1}$ :	15 N/mm <sup>2</sup>	$\sigma_{VU\ 0,1}$ :	15 N/mm <sup>2</sup>	$\sigma_{VU\ 0,1}$ :	15 N/mm <sup>2</sup>
$\sigma_{VO}$ :	500 N/mm <sup>2</sup>	$\sigma_{VO}$ :	500 N/mm <sup>2</sup>	$\sigma_{VO}$ :	500 N/mm <sup>2</sup>	$\sigma_{VO}$ :	500 N/mm <sup>2</sup>
$\sigma_{BO\ 300^\circ C}$ :	500 N/mm <sup>2</sup>	$\sigma_{BO\ 200^\circ C}$ :	450 N/mm <sup>2</sup>	$\sigma_{BO\ 300^\circ C}$ :	500 N/mm <sup>2</sup>	$\sigma_{BO\ 200^\circ C}$ :	450 N/mm <sup>2</sup>
$m_{DIN\ 2505}$ :	1.1	$m_{DIN\ 2505}$ :	1.1	$m_{DIN\ 2505}$ :	1.1	$m_{DIN\ 2505}$ :	1.1

## Approvals

• Blow-out safety Hot Blow-Out Test as per ASTM draft HOB T1 (Graphite)	• Blow-out safety Hot Blow-Out Test as per ASTM draft HOB T1 (Graphite)
• BAM approval for gaseous oxygen (70°C/100 bar) and liquid oxygen (PTFE)	• BAM approval for gaseous oxygen (70°C/100 bar) and liquid oxygen (PTFE)
• BAM approval for gaseous oxygen (200°C/130 bar) and liquid oxygen (Graphite)	• BAM approval for gaseous oxygen (200°C/130 bar) and liquid oxygen (Graphite)
• Fire Safe test as per API 607/DIN ISO 10497 (Graphite)	• Fire Safe test as per API 607/DIN ISO 10497 (Graphite)
• TA-Luft 2002 (VDI 2440/2200)	• TA-Luft 2002 (VDI 2440/2200)

# Spiral-wound gaskets

## Description

Due to their special construction spiral-wound gaskets have been proved to be one of most used gaskets especially high operating pressure and critical applications.

In addition to the high temperature limit (550 °C/graphite) and pressure limit (320 bar), the elastic recovery is also very notable. The component expansion differences lead in combination with creep and setting processes to seal gap changes which occur due to the change in temperature and pressure during starting up and cooling down. The spiral wound gasket is able to balance this difference out due to its design, ensuring a secure seal even under these conditions.

The actual sealing area consists of a spiral wound, small, profiled metal band. Some overlapping soft material tape (graphite, PTFE, mica) is wound across the width of the metal tape between the individual windings except for the start and final winding. The metal windings are spot-welded at the start and end. The sealing spiral has chamber support or centring rings either on the inside or outside depending on the use. It has a very low leakage rate due to the ideal construction and fabrication and complies with increased requirements, especially for TA-Luft 2002 (VDI 2440/2200)

The spiral wound gasket fully bottle-bore model can sustain a high surface compression. This gasket can be adapted for use with a wide range of media and operational conditions due to the choice of material components and construction variations.

## Properties/Applications

- good elastic recovery properties (control of starting up and cooling down processes)
- excellent temperature resistance, permanent temperature range: - 200 °C to approx. + 550 °C
- very high pressure limit (320 bar)
- good media resistance
- high operational safety
- very low leakage rates for gases and liquids, complies with leakage requirements of TA-Luft 2002 (VDI 2440/2200)
- no ageing or brittleness not even at high temperatures
- no health hazard; can be disposed of at domestic refuse dump
- very good handling during transport, assembly and dismantling, mechanically stable
- labelling of every gasket on the centring ring
- use of low chloride filler materials makes the gaskets suitable for use even between equipment parts made from austenitic materials.
- spiral wound gaskets are used successfully for chemical plants, power stations, water treatment, in pipe and appliance constructions, refineries – in short in all areas dominated by critical operating conditions.



## Materials

The material is coded and identified by colour on the outer ring.

### Spiral, Inner ring:

Material	Colour code	
1.4301 (304)	yellow	
1.4404 (316L)	dark green	
1.4571 (316Ti)	light green	
1.4541 (321)	turquoise	
1.0033	silver	
2.4360 (Monel 400)	orange	
2.4816 (Inconel 600)	gold	
3.7025 (Titan)	purple	
Hastelloy C	fawn	

### Sealing part

Graphite	grey	
PTFE	white	

### Outer ring

Carbon-steel zinc coated or powder coated, 1.4571; 1.4541 or similar.

The selection of sealing materials depends on their chemical resistance and the operating temperature, for which we are happy to assist you.

PTFE should not be used above 250°C . Graphite is not resistant against oxidizing media. Other materials available upon request.

## Basic design and dimensions

see as of page 66

Gasket thickness's: 3.2; 4.5; 4.9; 6.4 and 7.2 mm

## Labelling (standard)

Labeling on outer ring:

- manufacturer, nominal size, pressure range
- spiral and filler material
- colour coding



## Ordering example

Spiral wound gaskets nominal width 50, nominal pressure 40, dimensions 57 x 66 x 84 x 107 x 4,9 mm, spiral 1.4571, soft material graphite for flange with smooth sealing strip as per DIN EN 1514-2:

Spiral wound gasket DN 50, PN 40, thickness 4,9, style SD10, DIN EN 1514-2. 1.4571/graphite

## Packaging (standard)

- up to DN 100 / 4" in shrink film with 25 pieces each
- up to DN 250 / 10" in shrink film with 10 pieces each
- up to DN 600 / 24" bundled with 5 pieces each
- individual packaging on cardboard

## Installation recommendations

- store gaskets in a dry place, avoid damage during transport and installation
- flange sealing surfaces have to be clean, dry and grease-free
- insert gaskets centrally and align the flange plane-parallel
- apply defined bolt tightening torque with torque wrench
- tighten the bolts in at least 3 steps crosswise to ensure an even compression distribution (e.g. first step 30% of intended final tightening torque, then with about 60% and 100%).
- check bolts frequently and tighten if necessary until all reached the intended final tightening torque

## Safety instructions/ fire performance

If Dyneon™ TFM™ is overheated (above 400 °C) a harmful decomposition product is created mainly as hydrofluoric acid. Applicable safety measures have to be adhered to (see "Instructions for the safe handling of hydrofluoric plastics" - Association of Plastics Manufacturers).

Dyneon™ TFM™ is flame resistant. After the limiting-oxygen-index-test, the LOI-value is 95 (i.e. the material will only start burning in an atmosphere which contains more than 95% oxygen)..

**Spiral-wound gasket** with graphite or PTFE filler without inner and outer ring (IDT style: SD01)

The spiral-wound gasket comprises a spiral-wound, beaded metal strip (standard: 1.4541/ASTM 321; other materials are also available). A soft filler (graphite or PTFE) is placed between the metal strip, jutting out on both sides of it.

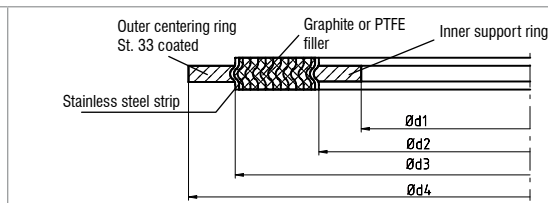
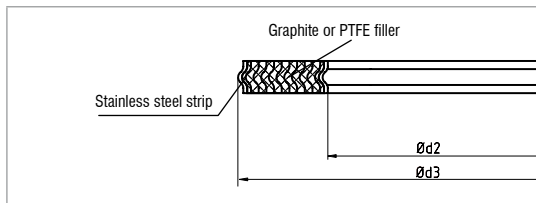
The gasket can be used in tongue and groove flanges (dimensions as per DIN 2691, EN 1514-1 Type TG and special-purpose dimensions). Spiral-wound gaskets are used mainly in high-pressure environments and in critical operating conditions.

**Spiral-wound gasket** mit Graphit- oder PTFE mit Innen- und Außenring (IDT style: SD10)

The spiral-wound gasket comprises a spiral-wound, beaded metal strip (standard: 1.4541/ASTM 321; other materials are also available). A soft filler (graphite or PTFE) is placed between the metal strip, jutting out on both sides of it. The outer and inner rings stabilize the spiral winding, whereby the outer ring also takes on the centering on the flange bolts.

The gasket can be used in flat face and raised face flanges, mostly for critical applications and under extreme conditions. One main area of application is the petro-chemical industry. Dimensions as per DIN EN 1514-2 Type C/O, DIN EN 12560-2 Type C/O, ASME B16.20 and special-purpose dimensions..

## Construction



## Operating limits

### Operating pressure:

max. 160 bar	max. 320 bar
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### Operating temperature:

Graphite	PTFE	Graphite	PTFE
-200 °C to 550 °C <sup>1)</sup>	-200 °C to 250 °C	-200 °C to 550 °C	-200 °C to 250 °C

<sup>1)</sup> please consult the manufacturer regarding temperatures above 450°C

## Gasket characteristics DIN 28090

Graphite		PTFE		Graphite		PTFE	
$\sigma_{VU,0,1}$ :	50 N/mm <sup>2</sup>	$\sigma_{VU,0,1}$ :	45 N/mm <sup>2</sup>	$\sigma_{VU,0,1}$ :	30 N/mm <sup>2</sup>	$\sigma_{VU,0,1}$ :	45 N/mm <sup>2</sup>
$\sigma_{VO}$ :	150 N/mm <sup>2</sup>	$\sigma_{VO}$ :	150 N/mm <sup>2</sup>	$\sigma_{VO}$ :	300 N/mm <sup>2</sup>	$\sigma_{VO}$ :	300 N/mm <sup>2</sup>
$\sigma_{BO,300^\circ C}$ :	120 N/mm <sup>2</sup>	$\sigma_{BO,200^\circ C}$ :	130 N/mm <sup>2</sup>	$\sigma_{BO,300^\circ C}$ :	220 N/mm <sup>2</sup>	$\sigma_{BO,200^\circ C}$ :	240 N/mm <sup>2</sup>
$m_{DIN\ 2505}$ :	1.4	$m_{DIN\ 2505}$ :	1.2	$m_{DIN\ 2505}$ :	1.4	$m_{DIN\ 2505}$ :	1.2

## Approvals

• BAM approval for gaseous oxygen (200°C/130 bar) and liquid oxygen (graphite)	• Blowout safety as per Hot Blowout Test/ASTM Draft (HOB T1) (Graphite)
• BAM approval for ethylene oxide/propylene oxide (graphite)	• BAM approval for gaseous oxygen (200°C/130 bar) and liquid oxygen (Graphite)
• FDA compliant (PTFE)	• BAM approval for ethylene oxide/propylene oxide (Graphite)
• TA-Luft 2002 (VDI 2440/2200)	• FDA compliant (PTFE)
	• Fire Safe Test as per API 607 / DIN ISO 10497 (Graphite)
	• TA-Luft 2002 (VDI 2440/2200)



**Spiral-wound gasket with graphite or PTFE filler and outer ring (IDT style: SD20)****Spiral-wound gasket with graphite or PTFE filler and inner ring (IDT style: SD30)**

The spiral-wound gasket comprises a spiral-wound, beaded metal strip (Standard: 1.4541/ASTM 321; other materials are also available). A soft filler (graphite or PTFE) is placed between the metal strip, jutting out on both sides of it. The outer support ring stabilizes the spiral winding and takes on the centering on the flange bolts.

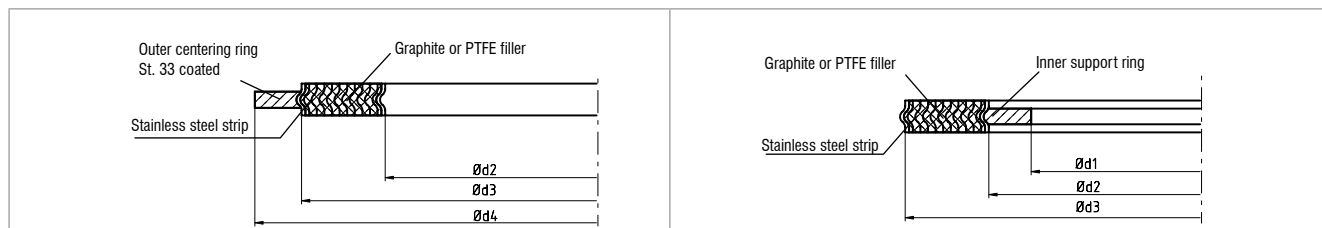
The gasket can be used in flat face and raised face flanges, mostly for problematic applications and under extreme conditions. One main area of application is the petro-chemical industry.

Dimensions as per DIN EN 1514-2 Form C/O, DIN EN 12560-2 Form C/O, ASME B16.20 and special-purpose dimensions.

The spiral-wound gasket comprises a spiral-wound, beaded metal strip (Standard: 1.4541/ASTM 321; other materials are also available). A soft filler (graphite or PTFE) is placed between the metal strip, jutting out on both sides of it. The inner ring provides increased radial stability.

The gasket can be used in male and female faced flanged in the petro-chemical industry as well as in critical applications as well as in high pressure environments.

## Construction



## Operating limits

### Operating pressure:

max. 320 bar	max. 320 bar
--------------	--------------

### Operating temperature:

Graphite	PTFE	Graphite	PTFE
-200 °C to 550 °C <sup>1)</sup>	-200 °C to 250 °C	-200 °C to 550 °C <sup>1)</sup>	-200 °C to 250 °C

<sup>1)</sup> please consult the manufacturer regarding temperatures above 450°C

## Gasket characteristics DIN 28090

Graphite		PTFE		Graphite		PTFE	
$\sigma_{VU}$ :	50 N/mm <sup>2</sup>	$\sigma_{VU}$ :	45 N/mm <sup>2</sup>	$\sigma_{VU}$ :	50 N/mm <sup>2</sup>	$\sigma_{VU}$ :	45 N/mm <sup>2</sup>
$\sigma_{VO}$ :	150 N/mm <sup>2</sup>	$\sigma_{VO}$ :	150 N/mm <sup>2</sup>	$\sigma_{VO}$ :	300 N/mm <sup>2</sup>	$\sigma_{VO}$ :	300 N/mm <sup>2</sup>
$\sigma_{BO\ 300^\circ C}$ :	120 N/mm <sup>2</sup>	$\sigma_{BO\ 200^\circ C}$ :	130 N/mm <sup>2</sup>	$\sigma_{BO\ 300^\circ C}$ :	220 N/mm <sup>2</sup>	$\sigma_{BO\ 200^\circ C}$ :	240 N/mm <sup>2</sup>
$m_{DIN\ 2505}$ :	1.4	$m_{DIN\ 2505}$ :	1.2	$m_{DIN\ 2505}$ :	1.4	$m_{DIN\ 2505}$ :	1.2

## Approvals

• BAM approval for gaseous oxygen (200°C/130 bar) and liquid oxygen (Graphite)	• BAM approval for gaseous oxygen (200°C/130 bar) and liquid oxygen (Graphite)
• BAM approval for ethylene oxide/propylene oxide (Graphite)	• BAM approval for ethylene oxide/propylene oxide (Graphite)
• FDA compliant (PTFE)	• FDA compliant (PTFE)
• Fire Safe Test as per API 607 (Graphite)	• TA-Luft 2002 (VDI 2440/2200)
• TA-Luft 2002 (VDI 2440/2200)	

# Corrugated metallic gaskets

## Description

The gasket consists of a corrugated stainless steel core with graphite (SIGRAFLEX®) layer (WD10) on either side. The core profile as well as thickness and density of layer are coordinated in such a way that a wave crest overlap of 0,1 to 0,2 mm is guaranteed in restraint condition during standard compression resulting in very small diffusion cross-section. The soft material is also very highly compressed in this areas.

In addition to these tasks, the optimised corrugated ring also increases the blow-out safety, improves the stability and handling of the gasket. Waves of the flange sealing surface are therefore compensated perfectly.

The gasket is already extremely tight already for low surface pressures ( $\sigma_{VU 0,01} = 22 \text{ MPa}$ ).

The gasket can be fabricated in various forms: circular ring, oval, elongated oval and frame. Transport and handling limit the maximum dimensions (approx. 5000 mm).

Bars (min. 8 mm wide), holding collar and bolt holes can be provided.

Special welding techniques guarantee a high weld quality grade for large gaskets and prevent the corrosion susceptibility for stainless steel core. Gaskets with small dimension consist of one piece.

The corrugated ring can be coated completely (WD10) or partially (WD12) with graphite.

The construction with inner eyelet (WD20) excludes influencing the operating medium with the graphite layer.

## Properties

- high quality gasket in the sense of TA-Luft
- excellent gas and liquid tightness already for low surface compression
- high temperature (450 °C) and pressure limit (160 bar)
- very good adjustment and elastic recovery properties
- no interference with the operating medium by the gasket (WD20)
- blow-out safe
- flange form C as per DIN 2526 is sufficient
- can be re-tightened
- The media resistance can be expanded by choosing different eyelet materials.



## Applications

- flexible or contorted flange which have to seal at low surface compression
- fluctuating temperature and pressure loads
- vacuum
- WD20 is an alternative to using spiral wound gaskets and has the following advantages:
  - considerably lower required surface compression
  - no specific requirement on the flange sealing surfaces; form C as per DIN 2526 is sufficient
  - no media interference

## Materials

### Core

Standard material 1.4571

### Layer

- SIGRAFLEX® Foil (WS 3800, 3805, APX)
- Dyneon™ TFM™ 1600 (WS 7110)
- Mica
- Other materials (e.g. ePTFE) upon request

## Ordering example

Corrugated metallic gasket nominal width 50, nominal pressure 40, dimensions 61 x 109 x 3.1 mm core material 1.4571 with graphite layer on either side for flat face flange as per DIN or DIN EN 1514-4:

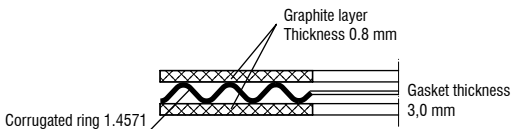
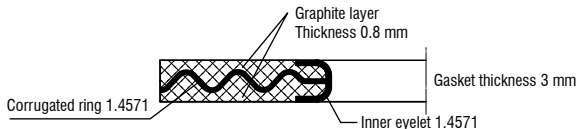
Corrugated metallic gasket DN 50, PN 40, Style WD10, 1.4571/Graphite

## Basic design and Dimensions

see page 71

Corrugated metallic gasket with two-sided graphite layer (IDT style: WD10)	Corrugated metallic gasket with two-sided graphite layer and inner eyelet (IDT style: WD20)
	
<p>The gasket comprises a corrugated metal core in stainless steel (1.4571) with a graphite foil layer on either side. The corrugated ring provides high compression on the soft material on the corrugated crests, low cross-sectional diffusion increased blowout safety as well as improved stability and handling.</p> <p>This sealing system features high tightness even at low surface contact pressure, high adaptability and resilience properties.</p> <p>The gasket can be used in flat face, raised face and male and female face flanges, for equipment with larger dimensions and in special-purpose flanged connections.</p>	<p>The gasket comprises a corrugated metal core in stainless steel (1.4571) with a graphite foil layer on either side. The corrugated ring provides high compression on the soft material on the corrugated crests, low cross-sectional diffusion increased blowout safety as well as improved stability and handling.</p> <p>This sealing system features high tightness even at low surface contact pressure, high adaptability and resilience properties. The inner ring effects a further reduction on diffusion and prevents the graphite layers from impacting the operating medium.</p> <p>The gasket can be used in flat face, raised face and male and female face flanges, for equipment with larger dimensions and in special-purpose flanged connections.</p>

## Construction

 <p>Graphite layer Thickness 0.8 mm</p> <p>Corrugated ring 1.4571</p> <p>Gasket thickness 3.0 mm</p> <p>Other thicknesses and other material combinations are available on request Dimensions as per DIN EN 1514-4 DIN EN 12560-4 Other standard dimensions and special-purpose dimensions on request</p>	 <p>Graphite layer Thickness 0.8 mm</p> <p>Corrugated ring 1.4571</p> <p>Inner eyelet 1.4571</p> <p>Gasket thickness 3 mm</p> <p>Other thicknesses and other material combinations are available on request Dimensions as per DIN EN 1514-4 DIN EN 12560-4 Other standard dimensions and special-purpose dimensions on request</p>
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## Operating limits

### Operating pressure:

max. 160 bar	max. 160 bar
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### Operating temperature:

-200 °C to 550 °C <sup>1)</sup>	-200 °C to 550 °C <sup>1)</sup>
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<sup>1)</sup> please consult the manufacturer regarding temperatures above 450°C

## Gasket characteristics DIN 28090 (thickness = 3 mm)

$\sigma_{VU\ 0,01}$ :	22 N/mm <sup>2</sup> ( $\sigma_{VU\ 0,1}$ : 12 N/mm <sup>2</sup> )	$\sigma_{VU\ 0,01}$ :	22 N/mm <sup>2</sup>
$\sigma_{VO}$ :	200 N/mm <sup>2</sup>	$\sigma_{VO}$ :	230 N/mm <sup>2</sup>
$\sigma_{BO\ 300^{\circ}C}$ :	200 N/mm <sup>2</sup>	$\sigma_{BO\ 300^{\circ}C}$ :	230 N/mm <sup>2</sup>
$m_{DIN\ 2505}$ :	1.1	$m_{DIN\ 2505}$ :	1.1

Gasket characteristics as per EN 13555 please refer to Gasket Database FH Münster under [www.gasketdata.org](http://www.gasketdata.org)

## Approvals

• Blowout safety Hot Blowout Test as per ASTM draft HOBT1	• BAM approval for gaseous oxygen (200°C/130 bar) and liquid oxygen
• BAM approval for gaseous oxygen (200°C/130 bar) and liquid oxygen	• BAM approval for ethylene oxide/propylene oxide
• BAM approval for ethylene oxide/propylene oxide	• Fire Safe Test as per API 607 / DIN ISO 10497
• Fire Safe Test as per API 607 / DIN ISO 10497	• TA-Luft 2002 (VDI 2440/2200)
• TA-Luft 2002 (VDI 2440/2200)	

## Corrugated metallic gasket with two-sided partial graphite layer (IDT style: WD12)



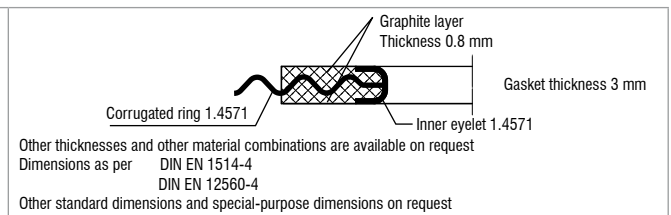
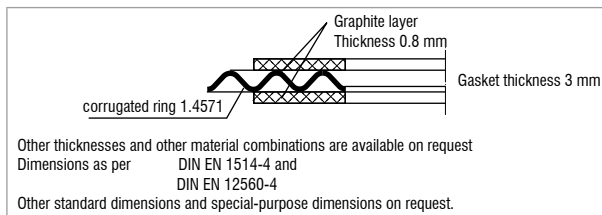
The gasket comprises a corrugated metal core in stainless steel (1.4571) with a partial graphite foil layer on either side. The sealing system is based on our IDT style WD 10 and features excellent sealing properties. The partial covering reduces the sealing face and thus increases the specific surface contact pressure. This design should be given preference over the IDT style WD10 where bolting force is low and in seals with larger sealing widths.

## Corrugated metallic gasket with two-sided partial graphite layer and inner eyelet (IDT style: WD24)



The gasket comprises a corrugated metal core in stainless steel (1.4571) with a graphite foil layer on either sides. The corrugated ring provides high compression on the soft material on the corrugated crests, low cross-sectional diffusion increased blowout safety as well as improved stability and handling. This sealing system features high leak-tightness even at low surface contact pressure, high adaptability and resilience properties. The inner ring effects a further reduction ion diffusion and prevents the graphite layers from impacting the operating medium. The gasket can be used in flat face, raised face and male and female face flanges, for equipment with larger dimensions and in special-purpose flanged connections

## Construction



## Operating limits

### Operating pressure:

max. 160 bar

max. 160 bar

### Operating temperature:

-200 °C to 550 °C <sup>1)</sup>

-200 °C to 550 °C <sup>1)</sup>

<sup>1)</sup> please consult the manufacturer regarding temperatures above 450°C

## Gasket characteristics DIN 28090 (thickness = 3 mm)

$\sigma_{VU\ 0,01}$ :	22 N/mm <sup>2</sup> ( $\sigma_{VU\ 0,1}$ : 12 N/mm <sup>2</sup> )	$\sigma_{VU\ 0,01}$ :	22 N/mm <sup>2</sup>
$\sigma_{VO}$ :	200 N/mm <sup>2</sup>	$\sigma_{VO}$ :	230 N/mm <sup>2</sup>
$\sigma_{BO\ 300^{\circ}C}$ :	200 N/mm <sup>2</sup>	$\sigma_{BO\ 300^{\circ}C}$ :	230 N/mm <sup>2</sup>
$m_{DIN\ 2505}$ :	1.1	$m_{DIN\ 2505}$ :	1.1

## Approvals

• Blowout safety Hot Blowout Test as per ASTM draft HOBT1	• BAM approval for gaseous oxygen (200°C/130 bar) and liquid oxygen
• BAM approval for gaseous oxygen (200°C/130 bar) and liquid oxygen	• BAM approval for ethylene oxide/propylene oxide
• BAM approval for ethylene oxide/propylene oxide	• Fire Safe Test as per API 607 / DIN ISO 10497
• Fire Safe Test as per API 607 / DIN ISO 10497	• TA-Luft 2002 (VDI 2440/2200)
• TA-Luft 2002 (VDI 2440/2200)	

# PTFE envelope gasket

## Description

The PTFE envelope gaskets are used for many applications. The different applications depend on the construction (different cores possible).

PTFE envelope gaskets are mainly used for enamel flanges but also for plastic pipes, rubber or steel flanges. The seal system PW-I (PTFE envelope gasket made from Dyneon™ TFM™ 1600 with diffusion barrier and corrugated ring 1.457 as insert) was developed specifically for the steel flange area.

The PTFE envelope gaskets with graphite insert (SIGRAFLEX® Email) or fibre insert (ED10 and ED30) have proven themselves especially with enamel flange connections. The actual seal function is carried out by the PTFE envelope made from Dyneon™ TFM™ 1600, a modified PTFE within the molecule chain with outstanding sealing properties. A diffusion barrier (3 or 4 mm) prevents media diffusion through the sealing cross-section.

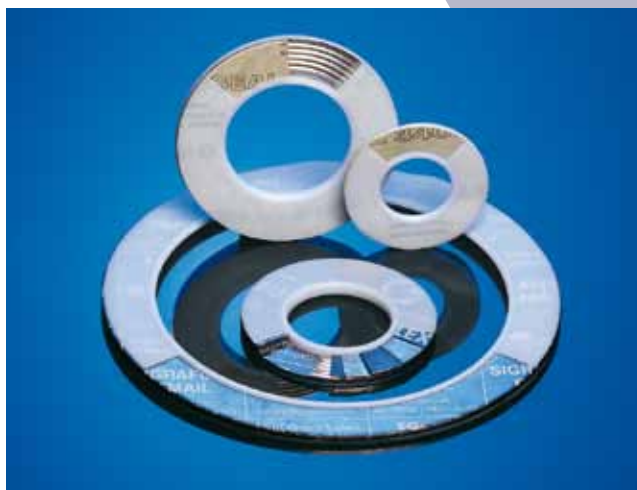
Leading enamel flange manufacturers recommend the profile ED10 for nominal widths up to DN 200 and the profile ED30 for beyond that.

## Properties

- outstanding media resistance (especially for highly corrosive media)
- no ageing or brittleness (SIGRAFLEX® Email insert)
- very low minimum surface pressure (SIGRAFLEX® Email insert)
- very good adaptability
- very good handling (transport, assembly and dismantling)
- no product contamination
- good adjustment and elastic recovery properties
- good long-term properties (SIGRAFLEX® Email insert)

## Applications

- preferred for low leakage rates for gases and liquids
- for high pressure-temperature combinations
- for high flange unevenness
- for seal connections with low surface compression
- for plastic, enamel or rubber flanges
- for highly corrosive media
- for high requirements for cleanliness
- for FDA applications
- for flanges sensitive to tension and flexibility



## Models

### PW-I (ED01)

PTFE (TFM™) envelope gasket (thickness 3,5 mm) with inner diffusion barrier (width 4 mm) and stainless steel corrugated ring (1.4571)

### ED10 / Graphite (WS 3825)

PTFE (TFM™) envelope gasket (thickness 4 mm) with inner diffusion barrier (width 3 mm) and graphite insert (SIGRAFLEX® Email, 3mm)

### ED10 / Aramid fibre (WS 3822)

PTFE (TFM™) envelope gasket (thickness 4 mm) with inner diffusion barrier (width 4 mm) and aramid fibre insert (3mm)

### ED30 / Graphite (WS 3825)

PTFE (TFM™) envelope gasket (thickness 6,5 mm) with inner diffusion barrier (width 3 mm) and corrugated ring and two graphite insert (SIGRAFLEX® Email, 2 mm)

### ED30 / Aramid fibre (WS 3822)

PTFE (TFM™) envelope gasket (thickness 6.5 mm) with inner diffusion barrier (width 3 mm), corrugated ring and two aramid fibre insert

## Ordering example

flat gasket made from Dyneon™ TFM™ 1600 (WS 7110) with stainless steel corrugated ring insert and inner diffusion barrier (PW-I) nominal width 65 and nominal pressure 40, dimensions 77 x 127 mm:

PTFE (TFM) envelope gasket ED01 PW-I WS 7110/1.4571, DN 65, PN 40

## Basic design and Dimensions

see page 70



## PTFE envelope gasket (PW-I) with stainless steel corrugated ring and inner diffusion barrier PW-I (IDT Style: ED01)



The PTFE envelope is made of modified Dyneon™ TFM™ 1600 and incorporates an inner diffusion barrier. The stainless steel corrugated ring is made of standard 1.4571 steel. Other materials are available. The seal is preferably suitable for use in steel flanged connections and permits high pressure/temperature combinations.

## PTFE envelope gasket with inner diffusion barrier and graphite (SIGRAFLEX® Email) or aramid fibre insert (IDT Style: ED10)

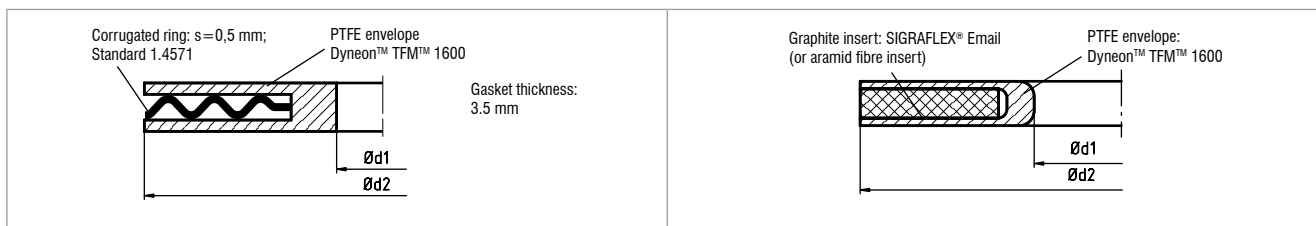


The PTFE envelope is made from Dyneon™ TFM™ 1600 and has an inner diffusion barrier (3 mm wide). The insert is made from graphite (SIGRAFLEX® Email in 3 mm thickness). Leading enamel flange manufacturers recommend this gasket up to a nominal width DN 200, beyond that the IDT style ED30 with a thickness of 6.5 mm.

The gasket system requires a low assembly surface compressing, is almost universally chemical resistant and not subject to aging or brittleness. The gasket is ideally suited for use with highly corrosive media, high requirements for cleanliness, FDA applications as well for flanges sensitive to tension and flexibility.

As insert aramid fibre in 3 mm thickness is used as well.

## Construction



## Operating limits

### Operating pressure:

max. 40 bar	max. 20 bar
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### Operating temperature:

	Graphite insert	Aramid fibre insert
-200 °C to +200 °C (short-term 230 °C)	-200 °C to +200 °C (short-term 230 °C)	-50 °C to 150 °C

Max. pressure (40 bar) and max. temperature (200°C) are permitted to occur simultaneously.

Max. temperature and max. pressure must not be permitted to occur simultaneously.

## Gasket characteristics DIN 28090

		Graphite insert	Aramid fibre insert
$\sigma_{VU\ 0,01}$	12 N/mm <sup>2</sup>	$\sigma_{VU}$ : 8 N/mm <sup>2</sup>	$\sigma_{VU}$ : 12 N/mm <sup>2</sup>
$\sigma_{VO\ 20^\circ C}$	90 N/mm <sup>2</sup>	$\sigma_{VO}$ : 60 N/mm <sup>2</sup>	$\sigma_{VO}$ : 90 N/mm <sup>2</sup>
$\sigma_{BO\ 150^\circ C}$	60 N/mm <sup>2</sup>	$\sigma_{BO\ 150^\circ C}$ : 30 N/mm <sup>2</sup>	$\sigma_{BO\ 150^\circ C}$ : 60 N/mm <sup>2</sup>
$m_{DIN\ 2505}$	1.0	$m_{DIN\ 2505}$ : 1.1	$m_{DIN\ 2505}$ : 1.1

## Approvals

• Blowout safety as per TÜV report AW6 / 0580-07	• FDA compliant (parts in contact with product)
• FDA compliant	• TA-Luft 2002 (VDI 2440/2200)
• TA-Luft 2002 (VDI 2440/2200)	

### PTFE envelope gasket mit with inner diffusion barrier, corrugated ring and two graphite inserts (IDT Style: ED30)



The PTFE envelope is made of modified Dyneon™ TFM™ 1600 and incorporates an inner diffusion barrier (3 mm wide), a corrugated ring (1.4571) and two graphite inserts in SIGRAFLEX® Email (each 2 mm thick). The seal features high resilience and is recommended by leading enamel flange manufacturers from DN 250 upwards; it is however available in all nominal widths.

The sealing system requires a low minimum seating stress on installation; it is resistant to most chemicals, it neither ages nor becomes brittle. The gasket is particularly suitable for use in environments with highly corrosive media, where a high degree of product purity is required, for FDA applications and in flanges sensitive to tension and bending.

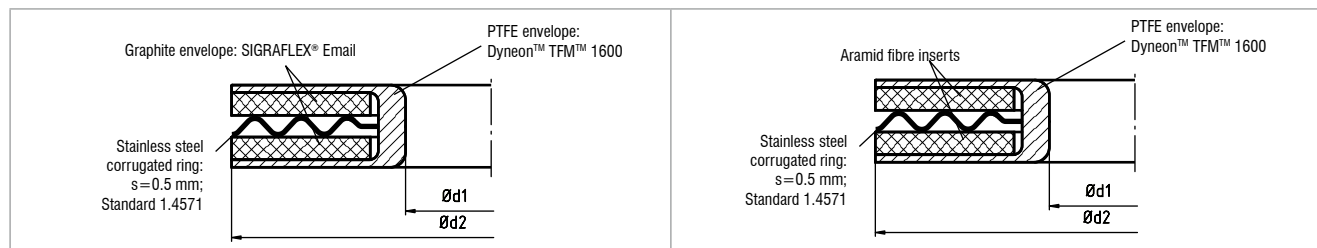
### PTFE envelope gasket with inner diffusion barrier, corrugated ring and two aramid fibre inserts (IDT Style: ED30)



The PTFE envelope is made of modified Dyneon™ TFM™ 1600 and incorporates an inner diffusion barrier (3 mm wide), a corrugated ring (1.4571) and two aramid fibre inserts in (each 2 mm thick).

The seal is preferably suitable for use in the enamel sector, where aggressive chemical media are present, where a high degree of product purity is required and in FDA applications.

## Construction



## Operating limits

### Operating pressure:

max. 40 bar

max. 20 bar

### Operating temperature:

-200 °C to +200 °C (short-term 230 °C)

-50 °C to 150 °C

Max. temperature and max. pressure must not be permitted to occur simultaneously.

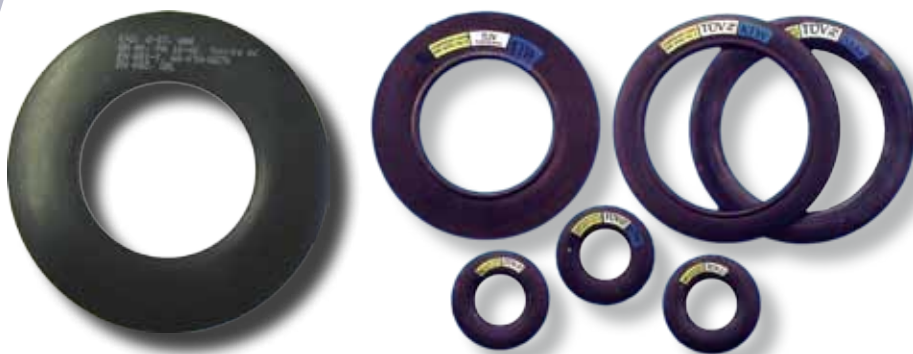
## Gasket characteristics DIN 28090 (thickness = 6,5 mm)

$\sigma_{VU}$ :	8 N/mm <sup>2</sup>	$\sigma_{VU}$ :	12 N/mm <sup>2</sup>
$\sigma_{VO}$ :	60 N/mm <sup>2</sup>	$\sigma_{VO}$ :	60 N/mm <sup>2</sup>
$\sigma_{BO\ 150^{\circ}C}$ :	55 N/mm <sup>2</sup>	$\sigma_{BO\ 150^{\circ}C}$ :	55 N/mm <sup>2</sup>
$m_{DIN\ 2505}$ :	1.1	$m_{DIN\ 2505}$ :	1.1

## Approvals

- |   |   |
|---|---|
| • Blowout safety as per TÜV report AW6/0580-97  | • FDA compliant (parts in contact with product) |
| • FDA compliant (parts in contact with product) | • TA-Luft 2002 (VDI 2440/2200)                  |
| • Fire Safe test as per API 607 / DIN ISO 10497 |   |
| • TA-Luft 2002 (VDI 2440/2200)                  |   |

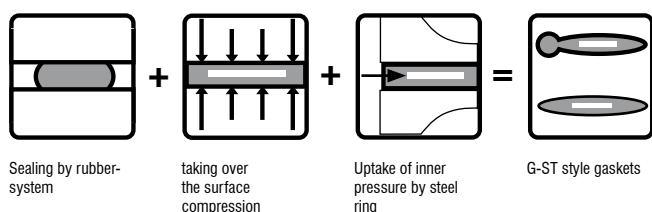
# Rubber-steel gaskets



## Description

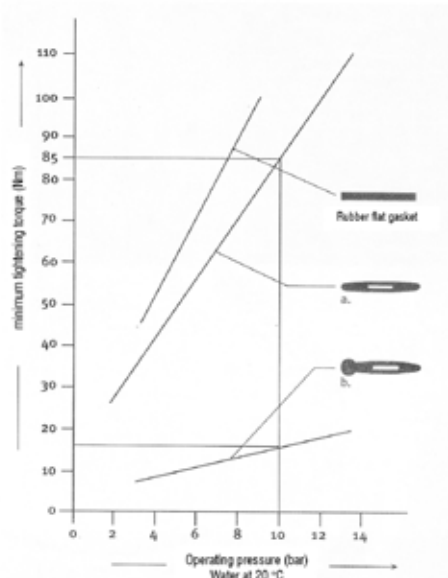
Rubber-steel gaskets were developed from simple rubber flat seals. The use of the steel core increases the blow-out safety and stability. This ensures also good handling of the seal even in large nominal widths.

Rubber-steel gaskets are suitable for water, water steam, gas, air, acids, bases, hydrocarbon etc (depending on their polymer type), while operating temperatures are limited up to 200 °C. The use of rubber-steel gaskets is recommended especially for applications where only little surface compression is available.



## Properties

- high tightness already under low surface compression
- secure tightness for weakly designed systems
- great compensation ability in case of angular deviation



## Materials

- **Elastomers:** NBR; EPDM; CSM; FPM; NR; CR; IIR (see page 20)
- **Steel core:** S235 JR /St 37 (Standard)  
stainless steel (optional)

## Applications

- Pipe construction gas / water
- Plastic pipes
- enamel apparatus flange
- rubber flange

## Delivery form

G-ST gaskets can be delivered in various models and dimension, depending on the relevant application e.g. for steel pipes, plastic pipes, rubberised pipes, force shunts application or as open core for all free dimensions (as of 200 mm).

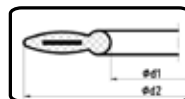
Standard dimensions for steel pipes as per DIN EN 1514-1 or ASME-B16.21

In dimensions suitable for VDI vessel flange (DN 500 - DN 800)

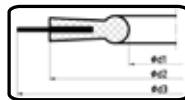
In dimensions suitable for pipes made from PVC according to DIN 8063 part 4 and plastic loose flange connection as per DIN 16962 part 12, part 4 (PP) and DIN 16963 part 11, part 4 (PE) as well as from PVDF



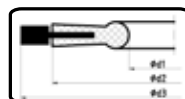
GS01 flange gasket





GS10 style flange gasket



GS20 for free dimensional gaskets with open stainless steel insert



GS30 for steel flange connections with contact arrangement

Rubber-steel gasket G-ST (IDT style: GS01)	Rubber-steel gasket G-ST-P/S (IDT style: GS10)
	
<p>The gasket comprises a rubber convex-shaped body with an inner steel ring at the centre. The rubber jacketing is firmly vulcanized to the steel insert to provide a stable connection which will withstand high stress loads. The steel insert also increase safe blow-out and stability of the sealing system. The crowned form generates partial increase in the surface contact pressure.</p> <p>The gasket requires low bolting force/surface contact pressure and can be used in low-load design flanges with low bending strength (even plastic flanges).</p>	<p>The convex-shaped basic body is additionally fitted with an O-ring to serve as a static sealing element. Surface faults and angle deviations in flanges can thus be more easily compensated. The rubber jacketing is firmly vulcanized to the steel insert to provide a stable connection which will withstand high stress loads. The steel insert also increase safe blow-out and stability of the sealing system.</p> <p>The gasket requires low bolting force/surface contact pressure and can be used in low-load design flanges with low bending strength (even plastic flanges).</p>

## Construction

GS 01 	GS 10 
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## Operating limits

### Operating pressure:

max. 25 bar	max. 25 bar
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### Operating temperature:

NBR: -25 °C to 70 °C	NBR: -25 °C to 70 °C
EPDM: -30 °C to 120 °C	EPDM: -30 °C to 120 °C
CSM: -20 °C to 120 °C	FPM: -20 °C to 200 °C
FPM: -20 °C to 200 °C	

## Gasket characteristics DIN 28090

$\sigma_{VU}$ / NBR: EPDM; FPM; NR : 2 N/mm <sup>2</sup>	$\sigma_{VU}$ / NBR: EPDM; FPM; NR : 2 N/mm <sup>2</sup>
$\sigma_{VO 20^\circ C}$ / NBR; EPDM; NR : 15 N/mm <sup>2</sup>	$\sigma_{VO 20^\circ C}$ / NBR; EPDM; NR : 15 N/mm <sup>2</sup>
$\sigma_{VO 20^\circ C}$ / FPM : 9 N/mm <sup>2</sup>	$\sigma_{VO 20^\circ C}$ / FPM : 9 N/mm <sup>2</sup>
$\sigma_{BO 150^\circ C}$ / FPM : 5 N/mm <sup>2</sup>	$\sigma_{BO 150^\circ C}$ / FPM : 5 N/mm <sup>2</sup>

## Approvals

• DVGW (NBR)	• DVGW (NBR)
• FDA (EPDM/NBR)	• FDA (EPDM/NBR)
• KTW (NBR/EPDM)	• KTW (NBR/EPDM)
• TA-Luft 2002 (VDI 2440/2200) (NBR/EPDM/FPM)	• TA-Luft 2002 (VDI 2440/2200) (NBR/EPDM/FPM/CSM/CR/IIR)

## Ring-Joint (RTJ) gaskets

Ring-Joint (RTJ) gaskets are fully metallic, turned gaskets. They are mainly used for applications with high pressures and temperatures. Typical applications are within refineries and petro-chemical industry.

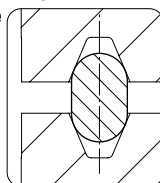
They are manufactured under consideration of the norms ASME B16.20 (DIN EN 12560-5) and API 6A for flanges as per API 6B and ASME / ANSI B16.5 as well as ASME / ANSI B 16.47.

### Gasket types/designs

There are two base types of RTJ gaskets: oval and octagonal. These standard models are used up to 6250 lbs (430 bar) according to ASME/ANSI B 16.5 or 5000 lbs (344 bar) according to API 6A.

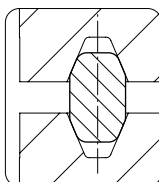
#### Style Oval RJ01

The oval model is the oldest version of RTJ gasket. It was originally developed for flanges which are no longer used today. The oval form can be used just like the octagonal version in flange connections with RTJ-groove (flank angle 23°) as per above mentioned norm. The spherical surface of the seal is pressed against the cone-shaped surface of the flange when the flange is adjusted, which creates a linear contact between flange and seal. The metal ring is further deformed with increasing assembly strength and the contact surface is widened. The size of the sealing surface is dependant on the applied assembly strength. The oval type is used preferably for low bolt loads and differing radial expansions/misalignment



#### Style Octagonal RJ10

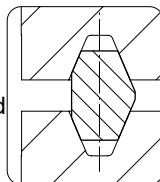
The octagonal model is used like the oval form in flange systems as per above-mentioned norm. Different to the oval form, a surface laminar load is created at the contact surface between seal and flange right from the start. The seal surface size depends on the assembly strength. The octagonal type is usually the preferred model.



#### BX and RZ model

The **RX type** is an optimised model of the type R-octagonal. It fits into the same flange and can be exchanged without any problems. The type RX was optimised in such a way that an increase of inner pressure increases the surface compression and the type RX hence has better sealing properties.

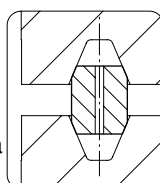
The **type BS** is also a model optimised for pressure. It can, however, not be exchanged with other types. It was specifically developed for the API 6BX flange and is used up to a operating pressure of 20,000 lbs (1378 bar) as per API 6A.



### Gasket materials/surface composition

The flange and seal require a smooth surface.

The surface finish for the contact surfaces of the types R and RX should not exceed 1,6 Ra or 6,4 Rz.



The type BX requires a surface finish of max. 0,8 Ra or 3,2 Rz. All sealing surfaces of the flanges or seals should have no scratches or other damage.

The material choice is very important since RTJ gaskets can be used for extreme operating conditions. Media resistance is an important factor in addition to pressure and temperature.

In order to prevent damage to the flange, the hardness of the RTJ ring should always be softer than the flange material. The maximal hardness value are specified for the different materials as per ASME B 16.20/API 6A.

Standard materials:

Material	Material-number	AISI/ASTM	Identification
X5CrNiMo17-12-2	1.4401	316	S316
X6CrNiNb18-10	1.4550	347	S347
X6CrNiMoTi17-12-2	1.4571	316Ti	S316Ti
X2CrNiMo17-12-2	1.4404	316L	S316L
12CrMo195	1.7362	A182	F5
Soft iron	1.1003	Soft-Iron	D

Further materials available upon request

### Order example

Seal as per EN 12560-5, oval form (IDT-profile: RJ01), with ring number R.36 made from X2CrNiMo17-12-2 (1.4404):

IDT Ring-Joint gasket RJ01 R.36 / WS 1.4404

### Dimensions

See as of page 74



## Lens gaskets

Lens gaskets are also referred to as sealing lenses or high pressure lenses and are like RTJ gasket: fully metallic, turned sealing elements.

Lens gaskets are used like RTJ gaskets for high pressure areas and are mainly used for pipes.

The bored sealing surface of the flange forms together a cone segment with an open angle of  $140^\circ$ . Here the spherical zone of the lens connects with the cone-shaped surfaces of the flange. Lens gaskets are non-sensitive to overload. An increase in load increases the sealing surface. The surface compression therefore only increases disproportionately.

Lens gaskets can usually be reused several times, since only the surface of the lens gasket is deformed in the elastic area.

### Dimensions

The manufacture of lens gaskets is carried out in consideration of DIN 2696. There are two dimensional series for lens gaskets determined corresponding to the two series of pipe connection dimensions.

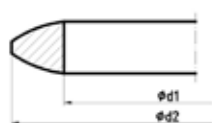
- Row 1 for flanges as per DIN EN 1092-1, DIN 2627, DIN 2628, DIN 2629 or DIN 2638 in ranges from DN 10 to DN 200 and PN 63 to PN 400.
- Row 2 for flanges as per DIN 2636, DIN 2637, DIN 2638, DIN 2628 or DIN 2629 for ranges from DN 10 to DN 200 and PN 64 to PN 320

### IDT style

- **LD01** standard lens gasket as per DIN 2696
- **LD10** standard blind lens

### Delivery

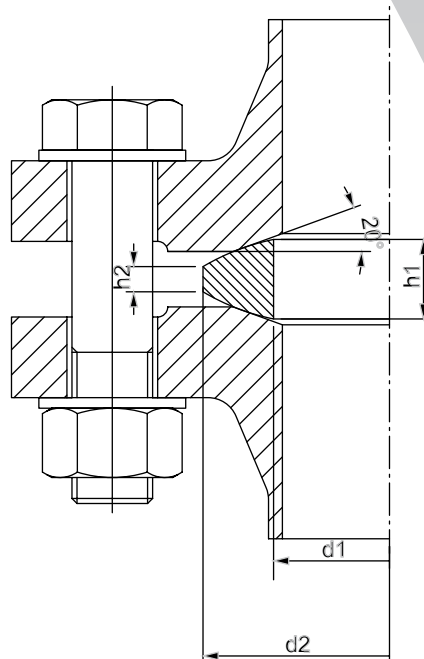
The lens gaskets are packed in such a way that mechanical and corrosive damages to the sealing surfaces are impossible during transport.



IDT Profil: LD01



IDT Profil: LD10



### Identification/Order example

The lens gasket from row 1, IDT profile LD01, DN 50 PN 160 from material 1.4571:

IDT lens gasket LD01 DIN 2696 series 1 DN 50 PN 160 1.4571

### Gasket materials/surface composition

Short name	Material number	Standard
C22.8	1.0460	DIN 17243
P245GH	1.0352	DIN EN 10222-2
X6CrNiMoTi17-12-2	1.4571	DIN EN 10088-1
X6CrNiTi18-10	1.4541	DIN EN 10088-1

Further materials available upon request

A surface finish of  $R_z 6,3$  in radial direction is required for the sealing surfaces. Surfaces have to be free grooves and scratches.

## Insert rings

Insert rings are full metallic, turned ring which comply with DIN 2512. They are mainly used together with two soft material gaskets in groove/groove flange connections.

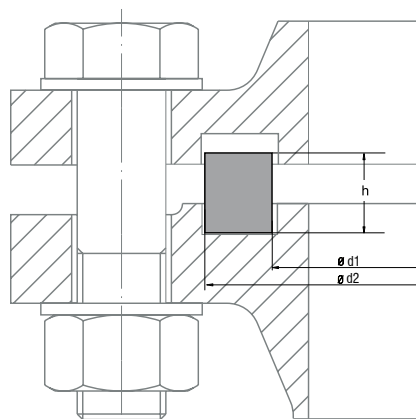
### IDT style

The standard model is a simple smooth ring (IDT profile ER01). Insert rings are often serrated at the sealing surfaces in order to increase the sealing properties (IDT profile ER10). A specifically practical solution is to use insert rings which are serrated on either side and have a graphite foil seal seat. These rings comply with a complete serrated profile gasket and the standard two soft material gaskets are redundant.

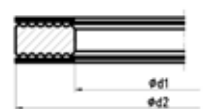
### Identification/Order example

Insert ring IDT profile ER01 for groove flange from DN100 out of C-steel:

IDT-insert ring ER01 DIN 2512 DN 100 C-steel



IDT style: ER01



IDT style: ER10

# Oval handhole, head and manhole gaskets for boilers with TÜV-approval

## Description

Asbestos-free soft material gaskets were developed and implemented by different manufacturers due to Germany banning asbestos materials for sealing systems in boilers.

Unfortunately some of these constructions may lead to dangerous accidents which is due to the seal being pressed out of its seat.

This caused the German authorities (VdTÜV und FDBR) to point out possible dangers and to develop the requirements "Information Sheet 100" for oval handhole, head and manhole gaskets in boilers.

This information sheet includes the requirements for clamp systems and gaskets, the test conditions and the labelling of the gasket.

The tests are carried out by VdTÜV. In the event of a positive test result a component label is issued which has to be used on the parts-tested gasket. Only TÜV-approved gaskets may be used after notification and transitional period.

## Properties

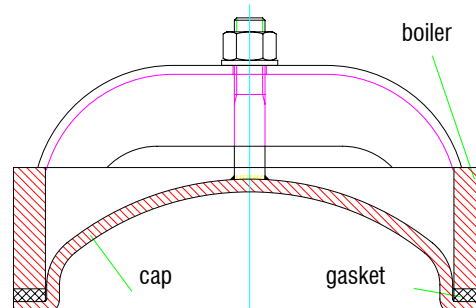
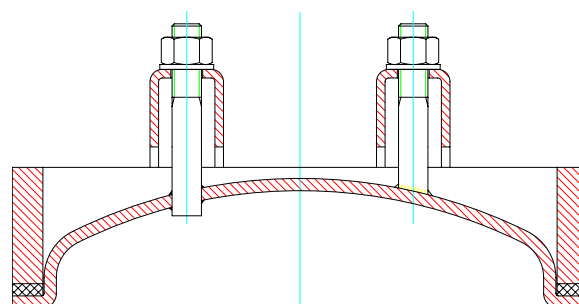
IDT has developed the shown gasket model (cross-section on following page) with the aims listed below and received TÜV-test certificate as per VdTÜV-information sheet "Gaskets 100", TRD 401, annex 1, test class "d". The gaskets have the following characteristics:

- blow-out safety (shaft ring, flange)
- reduced leakage
- high compensation capability (shaft ring)
- prevention of graphite abrasion due to operating medium (flange)
- easy handling
- high age and chemical resistance
- no expiry date
- no hardening under temperature

## Design

The choice of the relevant and most effective design variation is carried out according to the condition of the load system.

Boilers with oval barrier system are equipped with inner cap, which is tightened using the nut across bolts and brackets and work self-sealing at inner overpressure.



## Approvals

The IDT-gaskets comply with the test requirements of the VdTÜV-information sheet "gaskets 100", TRD 401, annex 1, test class "d".

All designs have the following TÜV-certificate:

- permissible operating overpressure  $p = 40$  bar
- permissible operating temperature  $T = 250$  °C
- permissible cold water test overpressure  $p = 88$  bar

## Delivery form

Each gasket is delivered with a detailed installation and assembly instructions which includes amongst other the following information:

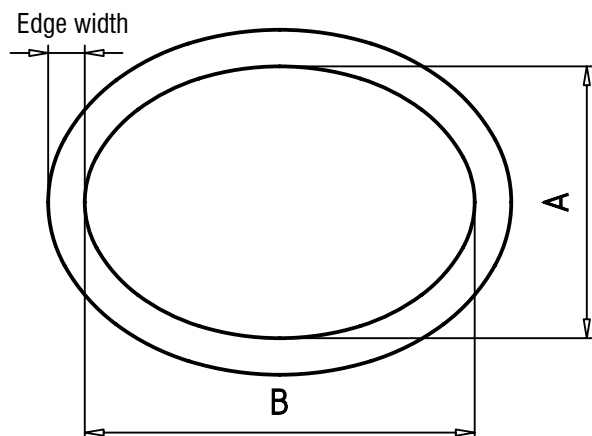
- requirements on the load system
- requirements on the gasket
- assembly, disassembly of gasket
- bolt tightening torque

### Standard-dimensions:

Dimension of inner oval (AxB) X edge width of gasket x thickness (depending on model 3 mm, 4 mm, 5 mm or 8 mm)

80 x 120 x 15 x thickness	220 x 320 x 25 x thickness
100 x 150 x 15 x thickness	300 x 400 x 25 x thickness
120 x 160 x 15 x thickness	320 x 420 x 25 x thickness

Further dimensions upon request.



**IDT Style FD01**  
WS 3860 2 x 2 mm



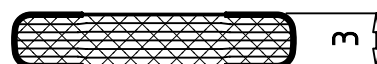
**IDT Style FD01**  
WS 3885



**IDT Style FD20**  
WS 3885;  
outer eyelet 1.4571, 0,15 mm



**IDT Style FD30**  
WS 3885;  
double eyelet 1.4571, 0,15 mm



**IDT Style WD10**  
corrugated ring 1.4571;  
layer WS 3860, 2 x 2 mm



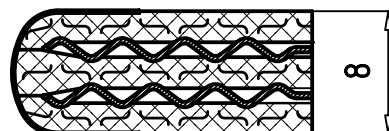
**IDT Style WD30**  
corrugated ring 1.4571;  
layer WS 3860, 2 x 2 mm;  
outer eyelet 1.4571, 0,15 mm



**IDT Style WD40**  
corrugated ring 1.4571;  
layer WS 3860, 2 x 2 mm;  
double eyelet 1.4571, 0,15 mm



**IDT Style WD39**  
2 x corrugated ring 1.4571;  
layer WS 3860, 3 x 2 mm;  
out eyelet 1.4571, 0,15 mm



# IDT-MultiTex-DK ePTFE gasket Manhole gasket made from ePTFE with steel core



## Description

IDT-MultiTex-SDR safety sealing rings made from multi directional oriented ePTFE with stainless steel core are adapted to the high user requirements in terms of tightness and safety within handhole, head and manhole covers of boilers.

They are the first and currently only multi directional oriented ePTFE sealing tapes with TRD401 / VdTÜV-information sheet Gaskets 100 approval.

The multi-directional oriented fibre structure and the unique construction of the MultiTex-security sealing rings with stainless steel core ensure durable sealing and operating safety.

The high adaptability during installation guarantees and unusual cold water tightness.

The previously high installation effort when using rubber seals to achieve correct cold water test is therefore redundant.

## Properties

### Material

The MultiText material consists of pure, virginal PTFE in multi-directional fibre structure

### Chemical resistance

pH 0 to 14

resistant against all media with exception of dissolved and melted alkali metals as well as elemental fluoride at  $T > 150^{\circ}\text{C}$  and  $p > 40\text{bar}$

### Age resistant

There is no ageing if used in approved applications

### Temperature resistant

approved up to  $225^{\circ}\text{C}$

### Pressure resistance

approved up to 25 bar operating pressure  
cold water testing overpressure 55 bar

### Physiological harmlessness/ approved for use with food

physiologically harmless in constant temperature use up to  $225^{\circ}\text{C}$

The requirements as per FDA21 CFR 177.1550 (PTFE) and FDA21 CFR 177.105 (adhesive) were met.

## Test and certificates

parts tested in accordance with VdTÜV-leaflet „Dichtung 100“ and TRD 401 appendix 1; permitted for use in test class „c“

Component identification **ring**:

TÜV. D.06 – 009.c

Component identification **band**:

TÜV. D.06 – 008.c

## Delivery forms / dimensions

**Ring**: Delivery is in form of ready, oval sealing ring as per dimensions below.

80X120X15X8

100X150X15X8

120X160X15X8

220X320X25X8

300X400X25X8

320X420X25X8

other dimension upon request

**Type**: Delivery as piece goods with one-side self-adhesive assembly aid, on spindles with 10 m, 25 m or 50 m, other lengths upon request.

For caps with:

– Sealing surface width 15 mm: Art. Nr. 611030 15X3 mm

– Sealing surface width 25 mm: Art. Nr. 612440 24 X 3 mm

# Manhole protection and sealing rings for enamelled steel boiler

## Properties

- seals and protects manhole, funnel and sampling openings of enamelled containers from damage to the sealing surfaces and inside of the sleeve
- prevents expensive repairs or re-enamelling of the overall boiler
- saves the use of expensive enamelled steel spacer rings
- and the need to replace seals frequently
- current findings indicate a long service life even during
- rough operating modes during batch operation as well as frequent opening and closing
- no product contamination
- conductive (conduction of electrostatic charges)
- base body made from conductive Dyneon™ TF

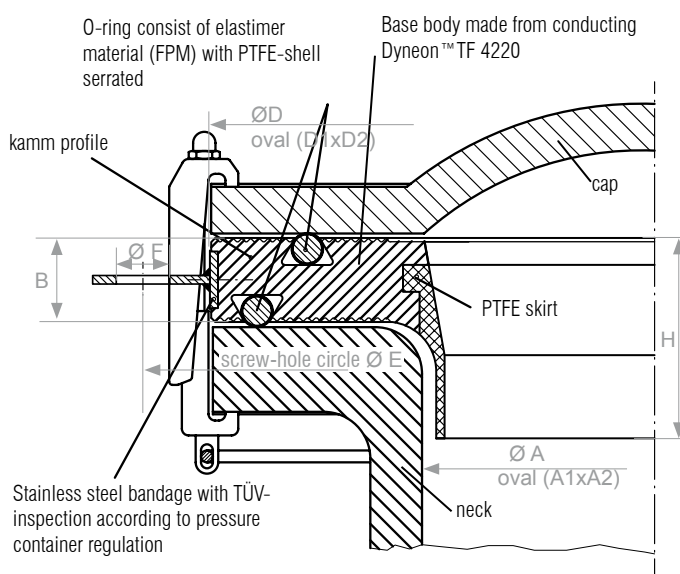
## Applications

- operating pressure max. 10 bar,
- operating temperature approx. 200 °C
- flange sensitive to stress
- aggressive and toxic media in gaseous and liquid condition
- pharmaceutical and chemical industry
- batch operation (change in temperature and pressure)

## Dimension sheet manhole protective ring

Nominal width DN	Ø A	oval A1x A2	B	Ø D	oval D1xD2	Ø E	Ø F	H	delivery time	max. operating pressure [bar]	max. operating temp. [°C]	Design and TÜV-approval of bandage
500	495		45	610		650	14	90	6 weeks	10	200	x
600	595		45	710		750	14	90	6 weeks	10	200	x
350x450		345x445	40		435x535		14	90	6 weeks	6	200	x

If you require any other dimensions to those mentioned above, then please fill in dimension sheet and send it to us. Since the component is subject to the pressure container regulation, please check if you want us to carry out the design and TÜV-approval of the stainless steel bandage.





## Stuffing box packings

### Description

Gland packings are cost-efficient sealing solutions for pumps, stirring devices and as spindle sealant in control and adjustment valves.

Gland packings are made with braiding machines from yarns using different braiding techniques, depending on dimensions and packing type.

Used materials consist of organic fibres such as:

- Aramid
- PTFE
- Ramie
- Novoloid
- Panox
- Polyacrylics

or inorganic fibres such as:

- glass
- aluminium silicate
- carbon













as well as pure graphite foils and PTFE compounds.

Additionally, the packings can be made with lubricants, fillers and binders depending on the item and its application.

### Installation information

- only use packings to fit the relevant gland
- remove old packing residue, clean gland thoroughly
- Gap between shaft and housing or collar < 0,22.  
Extrusion tight packings or backing rings have to be used for bigger gaps.

### Braid types

		4-diagonal braid – trapeze cross-section	<ul style="list-style-type: none"> <li>• low frictional heat</li> <li>• ideal spread out of force</li> <li>• little abrasion on packing and shaft</li> </ul>
		2-diagonal braid - plait (Zopf)	<ul style="list-style-type: none"> <li>• large surface</li> <li>• good elasticity</li> </ul>
		3-diagonal braid	<ul style="list-style-type: none"> <li>• good cross-section stability</li> <li>• dense braid structure</li> </ul>
		4-diagonal braid	<ul style="list-style-type: none"> <li>• very dense braid structure</li> <li>• smooth surface</li> <li>• high cross section stability</li> </ul>
		concentric, simple or multiple plaited around core	<ul style="list-style-type: none"> <li>• dense surface</li> </ul>
		pressed rings from pure graphite foil	<ul style="list-style-type: none"> <li>• high cross-section density</li> <li>• very high pressure, temperature and chemical resistance</li> </ul>



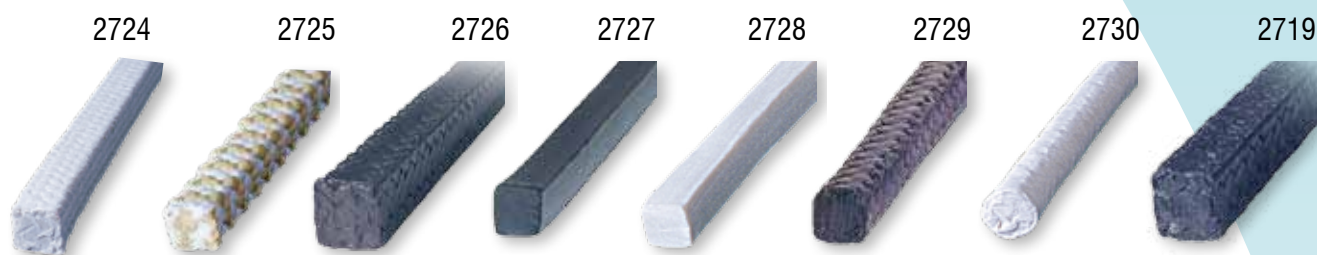
- Packings which are too thick may not be brought down to size by hitting them.
- Surfaces without grooves or signs of rust
- tools for disassembly and assembly see as of page 57

### Delivery form

- Sold by the meter in boxes with approx.

1 kg:	3 - 7 mm sg.	2 kg:	8 - 11 mm sg.
3,5 kg:	12 - 14 mm sg.	5 kg:	15 - 19 mm sg.
10 kg:	ab 20 mm sg.		

- Ready-to-install, compression-molded packing rings as per specified dimensions



## PTFE packing

	2724	2725	2726	2727	2728	2729	2730	2719
<b>Properties</b>								
fibre material	PTFE	PTFE	PTFE- Graphite	PTFE- Extrud.	PTFE- Extrud.	PTFE- Graphite	PTFE	PTFE- Graphite
additions	PTFE	PTFE		Graphite				
lubricating agent (* = silicone free)	no	yes*	no	yes*	yes*	yes	no	yes*
density approx.. (g/cm <sup>3</sup> )	1.7	1.7	1.4	1.9	1.9	1.6	1.4	1.6
<b>Range of applications</b>								
temperature min. (°C)	-200	-100	-200	-100	-100	-100	-200	-100
temperature max. (°C)	+290	+280	+280	+250	+250	+280	+280	+280
pH	0-14	0-14	0-14	0-14	0-14	0-14	0-14	0-14
pressure								
p (bar) rotary pumps		10		5	5	25		25
p (bar) piston pumps	500		500			(250)		(250)
p (bar) valves	500		500				100	(100)
speed (m/s)	2	10	3	10	10	25 (2)	2	25 (2)
<b>Applications</b>								
Paints, dyes (silicone-free)	•	•	•	x	x	x	•	•
Abrasive and sticky media	x	x	x	x	x	x	x	x
Water, industrial water, seawater	•	•	•	•	•	•	•	•
Hot water, boiler feed water, condensates	•	x	•	•	•	•	•	•
Vapors, sour gases, nitrogen	•	•	•	•	•	•	•	•
Oxygen	•	x	x	x	x	x	x	x
Mineral oils, animal fats	•	•	•	•	•	•	•	•
Heat transfer oils, synthetic oils	•	•	•	•	•	•	•	•
Diluted alkali, saline solutions	•	•	•	•	•	•	•	•
Concentrated alkali	•	•	•	•	•	○	•	•
Inorganic acids diluted, saline solutions	•	•	•	•	•	•	•	•
Inorganic acids, concentrated	•	•	•	•	•	•	•	•
Solvents, other organic compounds	•	•	•	•	•	•	•	•
<b>Approvals</b>								
Approvals	BAM FDA (2724F)	FDA	BAM FMFA					FMFA

• = suitable; ○ = limitedly suitable; x = unsuitable



## Graphite and carbon packing

	1395	1372	1380/90	1385	1377	1375
<b>Properties</b>						
fibre material	pure graphite foil	pure graphite foil	pure graphite foil	graphite	carbon	carbon
additions				Graphit	Graphit	Graphit
lubricating agent (*=silicone free)	no	no	no	no	no	yes*
density approx.. (g/cm³)	1.6	1.2	1.2 - 1.8	1.0	1.0	1.2
<b>Range of applications</b>						
temperature min. (°C)	-60	-60	-200	-60	-60	-60
temperature max. (°C)	+550	+500	+550	+500	+400	+400
Steam (°C)	+600	+550	+600	+550	+500	+500
pH	0-14	0-14	0-14	2-12	2-12	0-14
pressure						
p (bar) rotary pumps						20
p (bar) piston pumps						
p (bar) valves	500	300	300	150	150	
speed (m/s)	2	2	2	2	2	25
<b>Applications</b>						
Paints, dyes (silicone-free)	○	○	○	○	○	○
Abrasive and sticky media	x	x	x	x	x	x
Water, industrial water, seawater	●	●	●	●	●	●
Hot water, boiler feed water, condensates	●	●	●	●	●	○
Vapors, sour gases, nitrogen	●	●	●	○	○	●
Oxygen	x	x	●	x	x	x
Mineral oils, animal fats	●	●	●	●	●	●
Heat transfer oils, synthetic oils	●	●	●	●	●	●
Diluted alkali, saline solutions	●	●	●	○	○	○
Concentrated alkali	○	○	●	x	x	x
Inorganic acids diluted, saline solutions	●	●	●	○	○	○
Inorganic acids, concentrated	○	○	○	x	x	x
Solvents, other organic compounds	○	○	●	○	○	○
<b>Approvals</b>						
Approvals			BAM DVGW KTW			

● = suitable; ○ = limitedly suitable; x = unsuitable



## Special packing

	2224	2225	2226	2229	2722	2750	2755	2760	2785	1783	1724/1725
<b>Properties</b>											
fibre material	PTFE-Aramid	PTFE-Aramid	PTFE-Aramid	PTFE-Aramid	Aramid	Aramid	Ramie	Panox	Novo-loid	Poly-acryl	PTFE
additions	PTFE	PTFE	PTFE	PTFE	PTFE	PTFE	PTFE	PTFE/Graphite	PTFE	PTFE	PTFE
lubricating agent (*=silicone free)	yes	yes	yes	yes	yes	yes*	yes*	yes*	yes*	yes*	no/yes*
density approx.. (g/cm <sup>3</sup> )	1.6	1.5	1.5	1.6	1.4	1.4	1.4	1.4	1.4	1.5	1.7
<b>Range of applications</b>											
temperature min. (°C)	-100	-100	-100	-100	-100	-100	-50	-50	-50	-50	-100
temperature max. (°C)	+280	+280	+280	+280	+280	+250	+140	+200	+250	+140	+280
pH	1-13	1-13	1-13	1-13	1-13	1-13	5-14	4-10	1-14	1-13	0-14
pressure											
p (bar) rotary pumps		20		25	25	25	20	20	20	50	20
p (bar) piston pumps	500		500	(100)	(100)	(100)	(100)			50	
p (bar) valves	100		100							50	
speed (m/s)	2	15	3	25 (5)	20 (1.5)	20 (2)	10 (2)	25	15	25	25
<b>Applications</b>											
Paints, dyes (silicone-free)	x	x	x	x	x	•	○	○	•	○	•
Abrasive and sticky media	•	•	•	•	•	•	○	x	○	x	x
Water, industrial water, seawater	•	•	•	•	•	•	•	•	•	•	•
Hot water, boiler feed water, condensates	•	○	•	•	•	•	x	•	•	○	•
Vapors, sour gases, nitrogen	○	○	•	•	○	x	x	○	•	○	•
Oxygen	x	x	x	x	x	x	x	x	x	x	•
Mineral oils, animal fats	•	•	•	•	•	•	•	•	•	•	•
Heat transfer oils, synthetic oils	○	○	○	○	○	○	•	○	•	○	•
Diluted alkali, saline solutions	•	•	•	•	•	•	•	○	•	○	•
Concentrated alkali	x	x	x	x	x	x	x	x	•	x	•
Inorganic acids diluted, saline solutions	•	•	•	•	•	•	x	○	•	○	•
Inorganic acids, concentrated	x	x	○	○	x	x	x	x	x	x	•
Solvents, other organic compounds	○	○	○	○	○	○	○	○	•	○	•

• = suitable; ○ = limitedly suitable; x = unsuitable

## UNIGRAF® TA-Luft packing set Type 1374



This gland packing is made of braided, patented multi-purpose graphite fiber to provide excellent cross-sectional density in temperature cycles and extremely low leakage rates. The packing set features low gap extrusion, low cold flow tendency and very low friction coefficients.

## UNIFLUOR® TA-Luft packing set Type 2724F



This gland packing is made of highly expanded, white PTFE filament yarn to provide excellent cross-sectional density in temperature cycles and extremely low leakage rates. The packing set features low gap extrusion, low cold flow tendency and very low friction coefficients..

## Technical properties

Temperature:	-200 + 400 °C <sup>1)</sup>	Temperature:	-200 + 280°C
pH:	0 -14	pH:	0 - 14
V <sub>g</sub> :	2 m/s	V <sub>g</sub> :	2 m/s
Pressure:	max. 300 bar	Pressure	max. 250 bar
TA-Luft:	40 bar	TA-Luft:	40 bar

<sup>1)</sup> Please consult with the manufacturer concerning temperatures above 300°C.

## Range of applications

The preferred application is in standard and control valves in the chemical and petro-chemical industry, and in process engineering and refineries.

The preferred application is in standard and control valves in the chemical and petro-chemical industry, in process engineering and refineries.

## Advantages

- simple assembly
- cost advantages through standard dimensions
- suitable for use in new and re-worked valves

- simple assembly
- cost advantages through standard dimensions
- suitable for use in new and re-worked valves
- high savings potential

## TA-Luft certificate / VDI guideline 2440

The packing set was tested without disk springs at 400°C, 40 bar and 1000 spindle movements..

The packing set was tested without disk springs at 250°C, 40 bar and 2500 spindle movements.

## Applications / Chemical resistance

Resistant to most chemicals solvents, lyes, acids, alcohols, water, oils etc.  
Exceptions: dissolved or molten alkali metals, elementary fluorine, halogens (e.g. moist chlorine), chlorine trifluoride, oxidizing acids and other substances with an oxidizing effect (cf. chemical resistance of expanded graphite foil)

Resistant to most chemicals solvents, lyes, acids, alcohols, water, oils etc.  
Exceptions: dissolved or molten alkali metals, elementary fluorine, halogens at higher temperatures, chlorine trifluoride and fluorinated hydrocarbon (possible swelling)

## Forms of delivery

Ready-to-install compression-molded packing rings as per specified dimensions, delivered as a complete packing set

Complete packing sets of ready-to-install, die-moulded, customized gland packings.



## UNIFLUOR® TA-Luft valve packing set Type 2724FS



UNIFLUOR® 2724FS is a universal PTFE sealing set which complies with VDI regulations 2440/2200 without spring load due to its special combination.

## Technische Properties

Temperatur:	-200 + 280°C
pH:	0 - 14
V <sub>g</sub> :	2 m/s
Druck:	max. 250 bar

## Applications

The sealing set is suitable for new or backfitting of existing valves used in chemical and petro-chemical industry, process technology and refineries.

## Approvals

### TA-Luft 2002 (VDI 2440/2200)

The packing set was tested without spring load at 200°C, 40 bar and 5000 spindle movements.

## Chemical resistance

Resistant against a range of chemicals such as solvents, bases, acids, alcohols, water, oils etc. With the exception of dissolved or melted alkali metal, elemental fluoride, halogen at higher temperatures, chlortrifluoride and fluorised hydrocarbon (poss. swelling)

## Delivery form

Ready to install, compression-moulded packing set as per dimensions

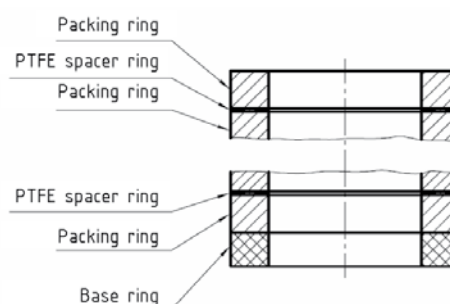
## Assembly and commissioning information for TA-Luft packing sets type 2724FS to achieve leakage rates as per TA-Luft requirements

Valves are amongst the most common components in plant construction. The gland packing which is used to seal the spindle bushing through the valve housing guarantees a high operating safety.

That's why specific requirements and care are needed for packing in gland spaces, spindle, gaps and packing dimensions.

Remove old packing residue, clean gland thoroughly. Grooves, dirt and potential rust on shaft, spindle and housing have to be cleaned – polish if necessary.

### Installation regulation: see drawing



The packing set is pretensioned with 50 Mpa, the collar plates screws have to be loosened again in order to create the stress equalisation in the packing.

The spindle has to be checked for flexibility and then the operating stress of 30 MPa has to be applied. Tighten after temperature exposure. The gap between shaft and housing or collar plate has to be checked thoroughly. We recommend the calculation formula  $0.015 \times \text{spindle diameter}$  (example: diam. 30 mm, gap 0.45 mm).

If the gap widths and operating pressures are higher then a metallic base ring with 0.1 mm gap measurement. The recommended surface roughness of the spindle and housing is  $R_a = 1 \mu\text{m}$ .

For control valves a hardness of 40 HRC applies. Almost all old valves can be retrofitted according to TA-Luft if carefully overhauled.

## Spindle and housing dimensions

Nominal dimension deviations should not be more than 1 % of the spindle diameter and 0.5 % of the borehole diameter. For overhauled valves, gate valves and appliances with spindle and housing dimensions which significantly deviate from the nominal dimensions then a sufficient pre-sealing of the packing set is required in order to adjust the rings to the gland and spindle.

# Mica flat gaskets



## Description

The mica flat gasket program consists of IDT-profiles WD10, WD12, WD20 as well as FD30 and complements the established IDT-flat gasket range and is especially suited for high temperature ranges.

The used mica paper consists mainly of aluminosilicates (layer silicates), impregnated with temperature resistant binders. Heat resistant steel is used in form of shafts, flanges and tanged steel for reinforcements.

The application areas for these gaskets are mainly hot gas and incineration plants, exhaust fumes of combustion engines and similar areas of use where high temperatures and comparatively low pressures dominate. The gaskets are suitable for the use in standard flange systems. The handling for installation and disassembly, storage and transport is uncomplicated.

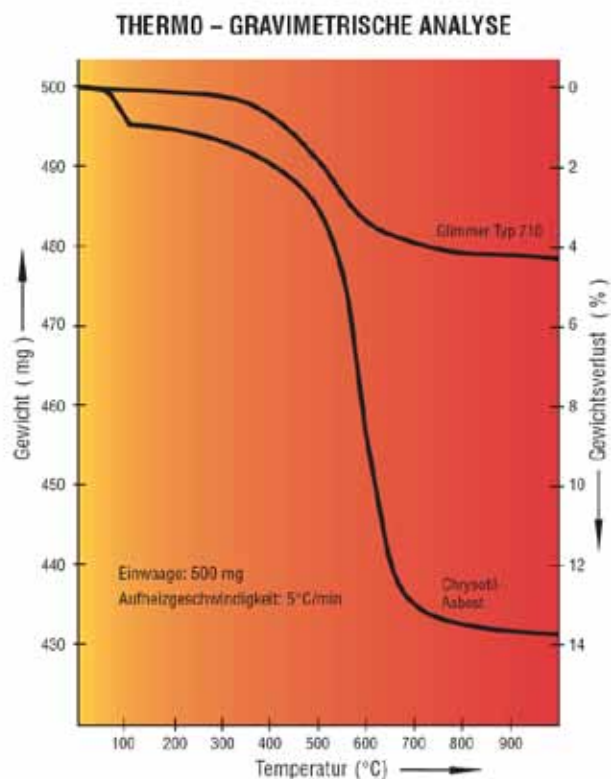
The media resistance of mica as well as of the metallic reinforcement and flange elements have to be considered for the use of the mica gasket with aggressive substances.

The very low loss of mass of the mica material in the high temperature ranges can be demonstrated well using thermogravimetry.

## Properties/Applications

- excellent heat resistance
- constant temperature up to 800°C. Short term temperature up to 900°C.
- inflammable
- diverse media resistance (depending on used metal)
- full utilisation of potential bolt loads recommended
- high compressibility and good adaptability; also suitable for old plants
- high pressure resistance
- asbestos-free no health hazard; can be disposed of at domestic refuse dump
- very good handling for storage and transport
- mechanically stable due to metal reinforcements
- no special requirements on flange gasket bearing surface  
- flange form C as per DIN 2526 is sufficient

- high quality reinforced gasket in terms of UVV (blow-out safety)
- Use for hot gas / waste gas application during thermal processes Combustion plants and motors as well as for similar problem cases



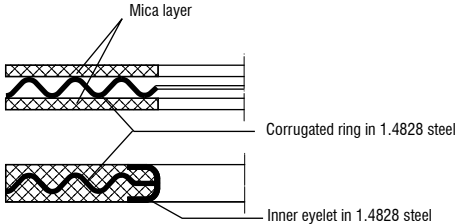
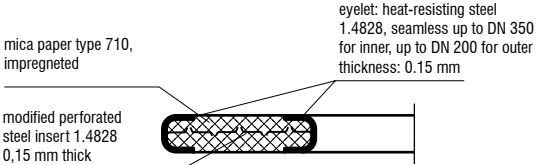
## Order example

Mica flat gaskets corrugated metallic ring insert and inner eyelet, nominal width 50 and nominal pressure 40, dimensions 61 x 107 mm:

IDT flat gasket - WD20 WS 3650, DN 50, PN 40

<b>WS 3650 mica corrugated metallic gasket</b> for flat face and raised face flanges WS 3650/-IB (IDT Style: WD10 und WD20)	<b>WS 3662 mica flat gasket</b> with inner and outer eyelet for tongue and groove flanges WS 3662-DB (IDT Style: FD30)
	
<p>The basic body consists of a corrugated metallic ring (heat resistant steel 1.4828) in the thickness of 0,5 mm which is plated with mica on either side (profile WD10). Additionally the sealing system can be fitted with an inner eyelet made from 1.4828 (profile WD20). Also only partial surface plating is possible according to our profiles WD 12 and WD 22.</p> <p>The main application area is for high temperatures and relatively low pressures, e.g. hot combustion exhaust gases in exhaust-air plants..</p>	<p>The gasket consists of mica foils which are reinforced in the center with perforated steel made from 1.4828 (0,15 mm thick). Additionally the seals have an inner and outer eyelet (also 1.4828). This increases the stability of the gasket and improves handling.</p> <p>This gasket is used in high temperature areas up to 900 °C, mainly for hot gases (e.g.: combustion plants)</p>

## Aufbau

<div> <div>WD 10</div> <div>WD 20</div>  </div>	<div> <div>FD30</div>  </div>
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## Operating limits

### Operating pressure:

max. 5 bar <sup>1)</sup>	max. 5 bar <sup>1)</sup>
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<sup>1)</sup> please consult with the manufacturer at higher operating pressure.

### Operating temperature:

up to 800 °C (short-term 900 °C)	up to 800 °C (short-term 900 °C)
----------------------------------	----------------------------------

## Gasket characteristics

$\sigma_{VU}$ : 30 N/mm <sup>2</sup>	$\sigma_{VU}$ : 50 N/mm <sup>2</sup>
$\sigma_{VO}$ : 200 N/mm <sup>2</sup>	$\sigma_{VO}$ : 240 N/mm <sup>2</sup>
$\sigma_{BO\ 300^{\circ}C}$ : 150 N/mm <sup>2</sup>	$\sigma_{BO\ 300^{\circ}C}$ : 165 N/mm <sup>2</sup>
$m_{DIN\ 2505}$ : 1.6	$m_{DIN\ 2505}$ : 1.6

# Fabric gaskets

## Thermotop-Fabric gaskets

### Material data

Thermotop fabric seals consist of textured modified glass fibre products without organic base fibres. Extremely good sealing properties are achieved with special elastomers bonds and outer high temperature coating.

- very flexible
- good resilience
- wear resistant
- non-sensitive to humidity
- resistant against vapours, oils, most bases and acids
- high gas tightness
- constant temperature 550 °C, in protective gas 900 °C

## Cristallo-Fabric gaskets

### Material data

Cristallo fabric seals consist of textured modified glass fibre products without organic base fibres. Specific properties are achieved with chrome steel wire reinforcement, elastomers bond and high temperature coating:

- very flexible, good resilience, wear resistant, non-sensitive to vapours, oils, bases and most acids
- high gas tightness
- constant temperature 500 °C, in protective gas 600 °C

## Ceramic-Fabric gaskets

### Material data

IDT-Ceramic products contain aluminium silicate fibre components with chrome steel wire reinforcements. A specific elastomers bond and an outer high temperature coating result in good sealing properties. Ceramic products have a share of about 15 % to 20 % of organic base fibres.

- very flexible
- good resilience
- wear resistant
- resistant against vapours, oils, grease, most bases and acids
- high gas tightness
- constant temperature 600 °C, protective gas 900 °C

## Application areas for fabric gaskets

Mainly used as static seal in protective gas hardening machines, boilers, coal pulverisers, flue gas canals, exhausters etc.

## Delivery forms for fabric gaskets

Piece goods, ready to install rings and frames, special form pieces, round, rectangular, flag and special profiles

## Fabric gaskets with diffusion barrier for industrial furnaces

- minimises gas and heat loss
- minimises the strain on the furnace environment

## Fabric band

woven, with solid edges, available in Cristallo, Thermotop and Ceramic quality

thicknesses: 3 and 5 mm rolls, at 25 m

widths: 20, 30, 40, 50, 60, 80 and 100 mm

other dimensions available upon request

Additional treatments: PTFE-impregnation (max. 290 °C) or graphitisation (constant temperature 450 °C)



Cristallo-Fabric gaskets



Thermotop® Fabric gaskets



Cristallo-Band



Ceramic-Fabric gaskets



# Fabric expansion joints

We manufacture and distribute high quality fabric expansion joints in cooperation with our partner GFG Kompensator mbH.

## Definition

GFG expansion joints are components for pipe, plant and appliance construction which are able to absorb movement while simultaneously carry out a sealing function due to their material condition and form

## Advantages

- highest flexibility and therefore utmost flexibility at small installation height (pipe distance)
- resilience or adjustment forces go against zero or are negligibly small for calculations.
- an ideal and individual adjustment to the relevant operating conditions is possible due to the possible combinations of most driver' materials.
- even large dimensions can be manufactured cost-efficiently.
- drastically smaller transport costs even for large dimension due to corresponding interfolding
- easy assembly, most of the time by customer's own staff

## Applications

GFG expansion joints can be used in

- power stations (boiler area, DeNOx, R.E.A., gas turbine plants, nuclear power station)
- waste incineration
- dust removal and filter plants
- cement industry
- steel industry
- drying technology
- chemical industry
- conveyor technology
- ventilator construction
- ventilation technology
- shipping technology and many more

## Material groups

It is possible to develop ideal problem solutions both from a technical as well as a financial point of view due the use of different material and the relevant material combinations. Problems usually occur due to mechanical, chemical and thermal influences.

The design itself is always determined by the following material groups and the related tasks

### • Insulating material

This prevents thermal but also mechanical damage to the actual sealing foil when used in relevant thickness and quality. Used are fabrics made from glass, silicate, ceramic.

### • Sealing foil

The sealing foil is the actual sealing element and the centre piece of the expansion joint. That is why it should be embedded between two fibre layers in most cases. Foils made from all types of elastomers, PTFE or stainless steel are used

### • Base fabric

They are on the outer layer and are responsible for pressure resistance and form stability and are usually coated. Used are fabrics made from polyester, aramid, glass or silicate.

### • Coating

A coating made from the different elastomers protects the base fabric, supports the form and is the actual sealing element for the expansion joint for simpler components. Used are e.g. neoprenes, EPDM, hypalone, silicone, viton or PTFE.



Ventilator construction



Cement industry / flue gas recirculation



Cement industry / flue gas



Expansion joint for ship diesel motors with cooled flanges



Flange expansion joint with integrated insulation for a steel plant



## Models

### • Tubular expansion joint

Fitted directly to the pipe

This is the simplest form of a fabric expansion joint, is, however, only suitable for round or oval cross-sections. Fitting strips have to be used for angular cross-section and the channel walls have to spot drilled. For under-pressure please note that the expansion joint bellows will drag inwards and reduces the flow cross-sectional area, therefore it is advised to use support rings. The max. temperature is around + 350 °C since the fixing point assumes the media temperature. Fitting using multi-part tubular clamps for sizes of approx. 700 – 800 mm diameter. For larger diameter it is recommended to use a flange fitting due to the better tightness.

### • Tubular expansion joint

Fitting on expanded mounting flange (if necessary with pre-insulation)

This type can cover all cross-section forms and sizes. Corners should, however, be fitted with corresponding radii. No spot drilling of pipe necessary even for angular cross-section. Possible use without pre-insulation up to 400 – 500 °C, with pre-insulation up to 600 – 700 °C due to the great temperature reduction in the fitting area. Temperatures up to approx. 1000 °C manageable for corresponding construction measures such interior bricking etc.

### • Flange expansion joint

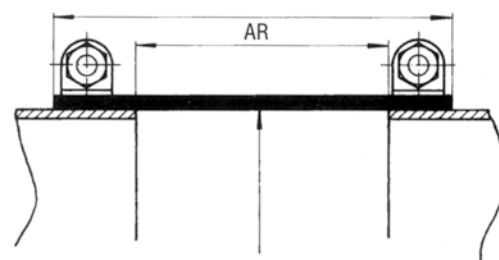
This type is used for large dimensions possibly for already existing pipe flanges, for higher pressures and great requirements for tightness. An operating temperature of about 450 - 500 °C should not be exceeded due to the bad head radiation in the fitting area. The expansion joint can be fitted further outwards (away from the media flow) due to the use of a larger flange and be protected by additional insulation or installed insulation. This enables a temperature increase to approx. 600 - 650 °C.

## Movement absorption

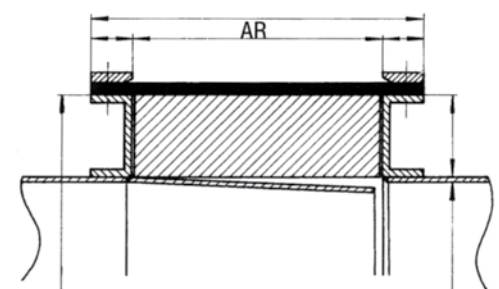
The possible movement absorption depends on the model of the middle part (AR). The following models are distinguished in general:

Middle part	axial approx.	lateral approx.
straight	- 0.25 x AR	± 0.1 x AR
curved	- 0.3 x AR	± 0.15 x AR
with folds	- 0.5 x AR	± 0.3 x AR

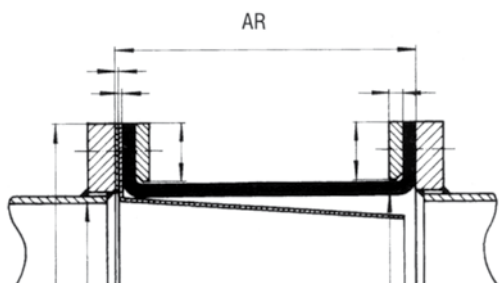
## Graphical representation of the models



Tubular expansion joint fitted directly to the pipe



Tubular expansion joint fastened on extended mounting flange



Flange expansion joint



DeNOx equipment



Tube-compensator for a low-fired calcination equipments



multilayer compensator as sucking support for an industrial ventilator

# PTFE-semi-finished products and turned form parts

The production of PTFE-form parts as per drawing or customer sample is carried out on modern CMC-machines (e.g. jet cutting, NC-turning etc.). The semi-finished products are also manufactured in our factory.

Please contact our sales department or application technology department for further information

## PTFE-semi-finished products

Rods and pipes (pressed or extruded), plates (pressed), foils (peeled), etc.

## turned form parts

Bushings, switching valve inserts, bearing shells, sealing, sealing set, scrapers, shells, spherical seat, seating ring, bellows, scraper protective rings, collars, spacers, sleeves, O-rings, flat gaskets, form seals etc.

## Standard materials

Materials	Material overview	IDT-Code
PTFE virginal		WS 7010
PTFE pure white, virginal	Dyneon™ TF 1620	WS 7011
PTFE 30 % glass, blue	Compound VX - 1	WS 7013
PTFE 25% glass	Dyneon™ TF 4105	WS 7015
PTFE 40 % glass	Dyneon™ TF 4108	WS 7018
PTFE 25 % E-carbon	Dyneon™ TF 4215	WS 7025
PTFE modified	Dyneon™ TFM™ 1600	WS 7110
PTFE 25% glass, modified	Dyneon™ TFM™ 4105	WS 7115
PTFE 2 % main pigment, modified	Dyneon™ TFM™ 6220	WS 7220
PTFE 2 % main pigment, modified	Dyneon™ TFM™ 6221	WS 7221 (FDA)

## Special-purpose materials

PTFE 2 % main pigment	Dyneon™ TF 4220	WS 7020
PTFE 60% bronze	Dyneon™ TF 4406	WS 7045
PTFE 15 % graphite	Dyneon™ TF 4303	WS 7030

weitere Dyneon™-Werkstoffe und Sondercompounds auf Anfrage

## Sondermaterialien

PVDF		WS 7550
PCTFE		WS 7555
RCH1000		WS 7560
DELIN		WS 7570
PERTINAX		WS 7573
POLYAMID		WS 7575
PDM		WS 7576
PA 6		WS 7577
PA 6, 30% glass		WS 7578
PLEXIGLAS		WS 7580
PTFE unsintered		WS 7739
PTFE precompressed		WS 7742
PTFE Soft		WS 7745

further special-purpose materials available upon request



## Gasket cutting machine ( Item no. 9300 WP)

### Applications

Suitable to cut almost all flat gasket materials, e.g. graphite with metal cores, aramid fibre plates also with expanded metal core, leather, PVC, PTFE, rubber, plastics, cork.

### Forms

round and oval rings as well as frames and strips

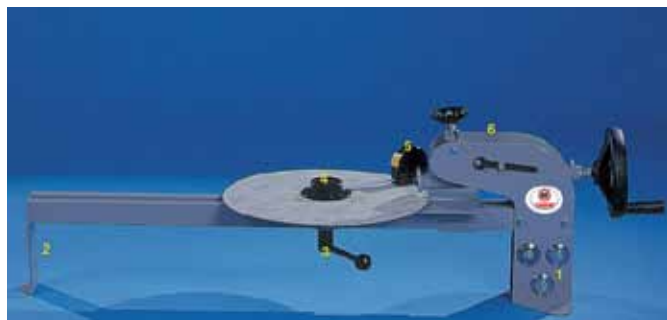
### Operating range

from 80 to 1250 mm in diameter and from 0,5 to 9,0 mm thickness

cutting accurate to measurement up to approx. 1 mm

### Spare parts

Item number	Products
Item no. 9301 WP	Replacement blade, "N" normal standard
Item no. 9302 WP	Electric drive for ring cutter
Item no. 9303 WP	Replacement blade, "G" – graphite, tanged steel
Item no. 9305 WP	Replacement blade, "U + M" Uniseal-metal
Item no. 9306 WP	Cutting base made from UNISEAL® 3400 350 mm 0.3 mm thick
Item no. 9307 WP	Hollow punch 22 mm diameter
Item no. 9308 WP	Measuring device, completely installed with measuring tape
Item no. 9309 WP	Centring and fixing device
Item no. 9311 WP	bolt lever
Item no. 9312 WP	spherical insert, complete with metal housing
Item no. 9313 WP	hand wheel, top with lobed wheel ring
Item no. 9314 WP	crank, spoke hand wheel with handle
Item no. 9316 WP	flat wrench, SW 10





## Circular cutter (Item no. 9315 WP / 9310 WP)

Easy to use, hard metal blade cuts sealing materials up to 12 mm thickness.

### Operating range

Item no. 9315 WP Senior:	Item no. 9310 WP Junior:
From centre: 30 – 500 mm diameter	From centre: 30 – 270 mm diameter
From corner hole: up to 1000 mm diameter	From corner hole: up to 500 mm diameter

### Spare parts

Item number	Products
Item no. 9320 WP	replacement blade
Item no. 9321 WP	blade holder (without blade)
Item no. 9322 WP	PVC-plate (senior)
Item no. 9323 WP	PVC-plate (junior)
Item no. 9324 WP	beam short, with scale and track
Item no. 9325 WP	beam long, with scale and track
Item no. 9326 WP	centre mandrel with knurled screw
Item no. 9327 WP	plexiglas slider with red mark
Item no. 9328 WP	split bushing M14, with 8 mm hole
Item no. 9329 WP	hole punch 14 mm, hardened



## Packing cutter (Item No. 9348 WP)

Cutting device made from aluminium to fabricate packing rings  
easy to use

### Operating range

Ring inner diameter 2 to 110 mm (up to 250 with extension)  
packing thickness 1 to 25 mm

### Accessories

Extension from 110 to 250 mm inner diameter

### Spare parts

Item number	Products
Item no. 9341 WP	Runner, completely installed
Item no. 9342 WP	Adjusting screw
Item no. 9343 WP	Block A, fitted
Item no. 9344 WP	Block B, fitted
Item no. 9345 WP	Lever nut, fitting to Block B
Item no. 9346 WP	Cutting base made from fibre
Item no. 9347 WP	Blade, super hard, anti-rust



## Packing extractor (Item no. 9351 WP - 9354 WP)

Handy, flexible special-purpose tool for removing packing - even in stuffing boxes which are difficult to access and when increased tensile force is required to remove packing from the seal.

### Delivery form

Size 1	Item no. 9351 WP	6 mm diameter, 200 mm long
Size 2	Item no. 9352 WP	8 mm diameter, 270 mm long
Size 3	Item no. 9353 WP	10 mm diameter, 365 mm long
Size 4	Item no. 9354 WP	14 mm diameter, 425 mm long

### Replacement tips with thread

Size 1	Item no. 9366 WP	6 mm ø
Size 2	Item no. 9367 WP	8 mm ø
Size 3	Item no. 9368 WP	10 mm ø

### Replacement tips with cork screw thread

Size 1	Item no. 9361 WP	6 mm ø
Size 2	Item no. 9362 WP	8 mm ø
Size 3	Item no. 9363 WP	10 mm ø
Size 4	Item no. 9364 WP	14 mm ø



## Sure-cut hand packing cutter

### method of operation

This will cut packing with a perfect 45° (diagonal) or 90° (straight) cut by adjusting the guides. Just push the locking head upwards to adjust the guides until they engage into the 45° or 90° holes. Press the blade using the handle DOWNWARDS, do NOT adjust the cutting angle when the blade is open!

It will cut all „soft“ packing types in flexible graphite, PTFE, gPDFE, acryl, ramie, polyamide etc. but it is not suitable for pure aramid packing! Also cuts O-ring material, rubber and silicone profiles etc.

### Sure-cut accessories set:

The set of accessories comprises a 2- step hand sharpener and a replacement blade with a central pin.

The Sure-Cut accessories set allows you to keep your packing hand cutter sharp and always in top condition. The 2-step sharpener is fitted with a pre-set ceramic sharpening element. The coarse side removes nicks and/or irregularities from the blade, the fine side sharpens the blade again.



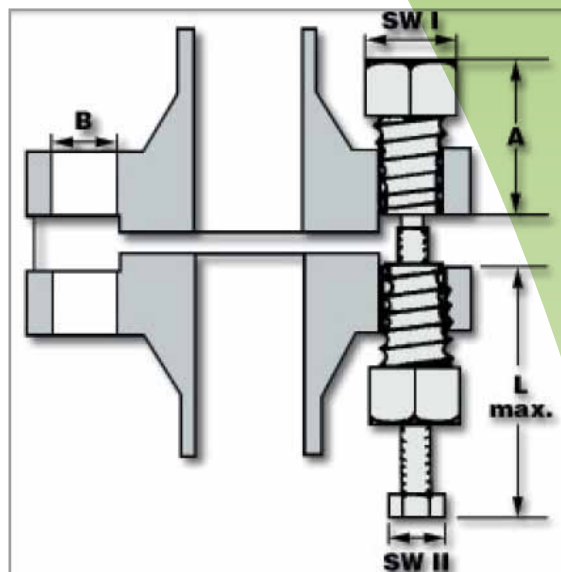


## Flange expander (Item no. 9370 WP)

The procedure is quite simple: After removing the two opposite connecting screws from the flange connection, the flange expanders are turned into the two holes. Then the rest of the connecting screws are removed as far as required or loosened and the flange connection can then be opened using the bolts in the flange expander.

Additional safety is provided by inserting a rigid spacer between the flange rims. The sealing ring can be replaced. The flange can be opened wide using this system in order to check the sealing area without causing any damage as is often the case when using wedges.

Not only seals but gauges, line blinds and similar items can be removed easily. The table below shows the fields of application for DIN flanges. The flange expander can naturally also be used for other flanges. We recommend working with at least two flange expander as in principle each flange connection should be expanded parallel










### Delivery form

SW I	22	27	32	36	41	46	50	55	60	65
SW II	13	17	22	24	17	30	30	32	32	32

### For DIN-flanges

SW I	A (mm)	B (mm ø)	DIN 2632 PN 10	DIN 2633 PN 16	DIN 2634 PN 25	DIN 2635 PN 40	DIN 2636 PN 64	DIN 2637 PN 100	DIN 2638 PN 160	L max. (mm)	SW II
22	34	14	10-25	10-25	10-25	10-25	10-15	10-15	10-15	90	13
27	47	18	32-125	32-125	32-80	32-80	25	25	25	107	17
32	50	23	150-350	150-200	100	100	32-80	32-40	40	119	22
36	56	27	400-500	250-300	125-200	125-150	100	50-80	50-80	140	24
41	64	30	600	400	250-300	175-200	125	100	100	152	27
46	73	33		500	350	250-300	150-175	125-175	125-150	213	30
50	73	36		600	400-500	350	200-300	200	175-200	213	30
55	73	39			600	400	350	250		239	32
60	77	42				500	400	300	250-300	239	32
65	77	48						350		275	32

Item no.	1001	1002	1000	1006	1009	1014
Produkte	PTFE-paste L	PTFE-paste M	PTFE-thread tape Tape-HD	PTFE-thread tape	High temperature parting compound without heavy metals, anti-seize, nickel-free	Assembly and disassembly lubricant, anti-seize
						
Material data	paste on the basis of different PTFE types, water soluble oil and thickening agent		PTFE-thread tapes of high density made from pure, virgin, unsintered PTFE mass per unit area: min. 100 g/m <sup>2</sup> class GRp	PTFE-thread tapes made from pure, virgin, unsintered PTFE mass per unit area: min. 60 g/m <sup>2</sup> Class FRp	aluminium, magnesium silicate fluoride graphite, synthetic oil and thickener	product on petroleum basis with finely dispensed graphite flakes and metal particles the main parts are copper and aluminium
Properties	elastic PTFE-particles are transformed into a thin, homogeneous layer by the mechanical pressure of the thread flanks.  the easy to use thread seal prevents jamming and protects against corrosion.		not hardening, age resistant, extremely expandable and flexible, good adaptability onto the threads, easy assembly and disassembly		high temperature and pressure resistant high performance lubricant with solid matter fraction, good chemical resistance, excellent corrosion protection for chemical and thermic influences	heat resistant lubricant and parting compound, prevents corrosion and jamming; reduces friction values especially for bolt connections bolt connections fresh water and salt water resistant
Use	temperature range: -240 °C to +260 °C Chemical resistance (pH): 0-14 pneumatic and hydraulic systems, oil pressure pipes, cooling systems etc. Lubricating paste		areas of use as per DIN EN 751-3: – gas installation (city gas, natural gas, liquefied gas): 5 bar/ -20 °C to 125 °C – hot water: 7 bar/ up to 125 °C – nominal width area (thread as per ISO 7-1): – class GRp DN ≤ 10 1) – class FRp 10 < DN ≤ 50  1) PTFE-tapes of class FRp can also be used for other nominal widths if the number of thread turns is ≥ 7,5 cm <sup>-1</sup> .		- 40 °C to + 1500 °C  lubrication of nuts, bolts, jacks, ropes, cog wheels, rolls, compressors, dampers, valves and presses, especially suited for high temperatures, heavy loads, in chemical and petro-chemical industry; re-cutting of damaged threads	- 180 °C to + 1100 °C  lubricants, rust protection and parting compound in the chemical industry, automotive industry, mining, steel and machine production; lubricates and protects during extreme temperature changes protects threads and fittings against damage, makes assembly easier
	Bolt connections with fine threads: – water (sanitary), – steam/food/chemicals – Oxygen (liquid)	Bolt connections made from V2A-steel: – water (sanitary), – steam/food/chemicals				
Tests	BAM approval for oxygen (60 °C / 40 bar)		BAM approval for gaseous oxygen (100 °C / 25 bar) and DVGW approved	BAM approval for oxygen gaseous (60 °C / 25 bar) and DVGW approved		
Delivery form	tubes at 220 g tubes at 100 g		rolls at 10 m, 12,7 (1/2") x 0,1 mm; Box with 12 cans	rolls at 12 m, 12 x 0,1 mm; VPE at 10 rolls, box with 200 rolls	brush-in-cap can at 300 g Box with 12 cans	spray can (aerosol) at 400 ml Box with 10 cans

Item no.	1008	1012	1015	1016	1010	1011
<b>Products</b>	FIN-Lub, synthetic multi-purpose lubricant with PTFE	Chain bearing lubricant; creep oil with white lubricants	Teflon-cover; PTFE lubricant and parting compound	Silicone-lubricant lubricants and parting compounds for plastics, rubber and metal	Cold zinc coating, long-term rust protection for iron and steel	Fast acting rust remover, active rust remover with humidity protection
						
<b>Material data</b>	combination of synthetic high performance oils, penetration oils, PTFE and corrosion protection agents	mineral oil with selected white solid lubricants	fine-particled PTFE with dispersing aid	silicone oil without solvents	highly pure reactive zinc metal with specifically stabilising additives and epoxy resins dispersed in solvents	Dissolving of corrosion protection and water repellent additives in mineral oil, does not contain solid particles like MoS2 or graphite
<b>Properties</b>	excellent long-term lubricant with boundary additives, rust protective and water repellent, even in extreme conditions strong adhesive lubricant film with corrosion protection and good creep properties, does not change rubber components even during longer contact, does not age and does not resinify.	clean, self-creeping lubricants, especially effective for oscillating movements; displaces and undercuts humidity; protects against corrosion; removes rust, dampens noise	dry, grease-free surface lubricant and parting compound; water and chemical resistant; abrasion resistant durable dries fast; several coats possible - let previous coat dry first	non-toxic, water repellent lubricant and parting compound does not turn resinous	air-drying, metallic, visco-plastic coating; salt water resistant; anti-corrosion durable	fast acting rust remover with lubricating effect; which undercuts and displaces humidity protects against oxidation and rust; excellent penetration capability; does not affect rubber or plastic non toxic.
<b>Use</b>	-30 °C to +170 °C  Lubrication all kinds, i.g. hinges, screw-joints, bars, bearings, chains, locks, weapons etc. corrosion protection for bolts, screws etc. installation help for i.g. fine fit in hydraulic, clean fit-up spray for o-rings.	-30 °C to +80 °C  Lubrication of levers, joints, chains and other mechanisms especially for oscillating movements, reduces friction loss and function loss; prevent fitting rust; removes burned and seized up bolt connections	-30 °C to +265 °C  non-staining, grease-free lubricant for metals, plastics, wood, leather, rubber, glass etc. non-staining grease-free parting compound, prevents sticking in forms, containers etc.	150 °C to 200 °C  universal lubricant especially for areas where mineral oil containing lubricants may not be used, ideal for bearing and drives made from pure or reinforced plastics; durable parting compound for deforming of rubber and plastic parts, prevent sticking of rubber seals (car doors) in all weather conditions; good insulation and anti-oxidisation agent; prevents creep flows in electrical units; water repellent care product for work gloves and shoes etc.	up to + 400 °C  Priming or thick coating in corrosion repair protection (welding work) on bodywork, undercarriages, exhaust systems, storage tanks, iron frames, machined parts, buildings, water vehicles, shipyards etc. apply evenly on grease- and rust-free base.	up to + 50 °C  Makes seized up and burned bolt connections and other mechanisms operable, removes dirt, protects against corrosion, prevents contact faults which are caused by humidity, reduces squeaking from locks (cylinder lock), hinges, bike chains etc.
<b>Delivery form</b>	spray can (aerosol) at 500 ml Box with 10 cans canister with 10l	spray can (aerosol) at 500 ml Box with 10 cans canister with 10l	spray can (aerosol) at 400 ml Box with 12 cans	spray can (aerosol) at 400 ml Box with 12 cans	spray can (aerosol) at 400 ml Box with 12 cans	spray can (aerosol) at 400 ml Box with 10 cans, Canister with 10 l

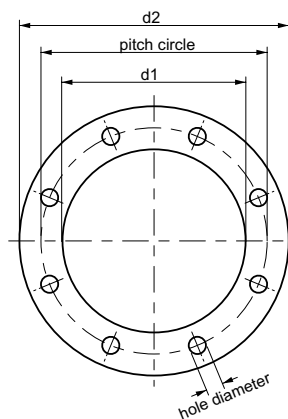
## Gasket dimensions

### Flat gaskets dimensions for:

- flanges with flat face and raised face (IBC)
- male-female flanges (SR)
- tongue and groove flanges (TG)
- flanges with screw holes (FF)

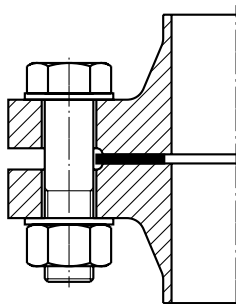


Type IBC, SR, TG

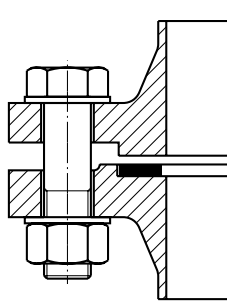


Form FF

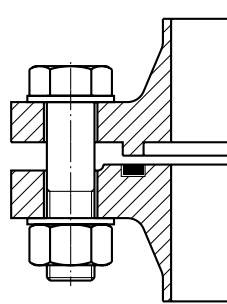
### Flange / gasket types:



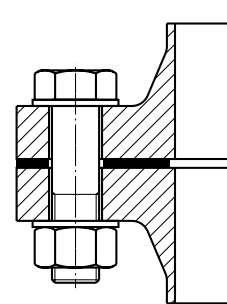
Type IBC  
flat face and raised face



Type SR  
male-female



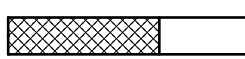
Type TG  
tongue and groove



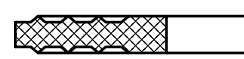
Type FF  
with screw holes

### Profile examples:

FD01 (without eyelet)



FD04 (without eyelet)



FD10 (with inner eyelet)



FD11 (with inner eyelet)



FD30 (with double eyelet)



FD33 (with double eyelet)



## Flat gaskets dimensions as per company standard 41-19, 41-20 and 41-21 according to DIN EN 1514-1

dimension in mm <sup>1)</sup>

flanges types		IBC								SR <sup>2)</sup>	TG <sup>2)</sup>	
nominal pressure		PN 2,5	PN 6	PN 10	PN 16	PN 25	PN 40	PN 63 <sup>5)</sup>		PN 10-40 (160)		
DN	d1 (mm)	d2 (mm)						d1 <sup>6)</sup> (mm)	d2 (mm)	d2 (mm)	d1 (mm)	d2 (mm)
10	18	39		46				18	56	34	24	34
15	22	44		51				21	61	39	29	39
20	27	54		61				25	72	50	36	50
25	34	64		71				30	82	57	43	57
32	43	76		82				41	88	65	51	65
40	49	86		92				47	103	75	61	75
50	61	96		107				59	113	87	73	87
60 <sup>4)</sup>	72	106		117				68	123	-	-	-
65	77	116		127				73	138	109	95	109
80 <sup>3)</sup>	92	132		142				86	148	120	106	120
100	115	152		162		168		110	174	149	129	149
125	141	182		192		194		135	210	175	155	175
150	169	207		218		224		163	247	203	183	203
200	220	262		273		284	290	210	309	259	239	259
250	273	317		328		340	352	264	364	312	292	312
300	324	373		378	384	400	417	314	424	363	343	363
350	356	423		438	444	457	474	360	486	421	395	421
400	407	473		489	495	514	546	415	543	473	447	473
450	458	528		539	555	564	571	-	-	523	497	523
500	508	578		594	617	624	628	-	-	575	549	575
600	610	679		695	734	731	747	-	-	675	649	675
700	712	784		810	804	833	-	-	-	777	751	777
800	813	890		917	911	942	-	-	-	882	856	882
900	915	990		1017	1011	1042	-	-	-	987	961	987
1000	1016	1090		1124	1128	1154	-	-	-	1092	1062	1092
1100	1120	-	-	1231	1228	1254	-	-	-	1292	1262	1292
1200	1220	1290	1307	1341	1342	1364	-	-	-	1492	1462	1492
1400	1420	1490	1524	1548	1542	1578	-	-	-	1692	1662	1692
1500 <sup>4)</sup>	1520	-	-	1658	1654	1688	-	-	-	1892	1862	1892
1600	1620	1700	1724	1772	1764	1798	-	-	-	2092	2062	2092
1800	1820	1900	1931	1972	1964	2000	-	-	-	-	-	-
2000	2020	2100	2138	2182	2168	2230	-	-	-	-	-	-
2200	2220	2307	2348	2384	-	-	-	-	-	-	-	-
2400	2420	2507	2558	2594	-	-	-	-	-	-	-	-
2600	2620	2707	2762	2794	-	-	-	-	-	-	-	-
2800	2820	2924	2972	3014	-	-	-	-	-	-	-	-
3000	3020	3124	3172	3228	-	-	-	-	-	-	-	-
3200	3220	3324	3382	-	-	-	-	-	-	-	-	-
3400	3420	3524	3592	-	-	-	-	-	-	-	-	-
3600	3620	3734	3804	-	-	-	-	-	-	-	-	-
3800	3820	3931	-	-	-	-	-	-	-	-	-	-
4000	4020	4131	-	-	-	-	-	-	-	-	-	-

<sup>1)</sup> tolerances as per DIN ISO 2768 tolerance class V<sup>3)</sup> inner diameter deviating (89 mm) from EN 1514-1<sup>5)</sup> PN 63 DN 175 = 185 mm X 277 mm<sup>2)</sup> dimension TG / SR > DN 1000 as per EN 1092<sup>4)</sup> only for cast iron flanges<sup>6)</sup> inner diameter only for PN 63 IBC



## Flat gaskets dimensions type FF as per company standard 41-22 according to DIN EN 1514-1

dimension in mm <sup>3)</sup>

DN	d1 (mm)	PN 2,5 / PN 6				PN 10				PN 16				PN 25				PN 40			
		d2 (mm)	screw holes		pitch circle Ø (mm)	d2 (mm)	screw holes		pitch circle Ø (mm)	d2 (mm)	screw holes		pitch circle Ø (mm)	d2 (mm)	screw holes		pitch circle Ø (mm)	d2 (mm)	screw holes		pitch circle Ø (mm)
			n	Ø (mm)			n	Ø (mm)			n	Ø (mm)			n	Ø (mm)			n	Ø (mm)	
10	18	75	4	11	50	90	4	14	60	90	4	14	60	90	4	14	60	90	4	14	60
15	22	80	4	11	55	95	4	14	65	95	4	14	65	95	4	14	65	95	4	14	65
20	27	90	4	11	65	105	4	14	75	105	4	14	75	105	4	14	75	105	4	14	75
25	34	100	4	11	75	115	4	14	85	115	4	14	85	115	4	14	85	115	4	14	85
32	43	120	4	14	90	140	4	18	100	140	4	18	100	140	4	18	100	140	4	18	100
40	49	130	4	14	100	150	4	18	110	150	4	18	110	150	4	18	110	150	4	18	110
50	61	140	4	14	110	165	4	18	125	165	4	18	125	165	4	18	125	165	4	18	125
60	72	150	4	14	120	175	8	18	135	175	8	18	135	175	8	18	135	175	8	18	135
65	77	160	4	14	130	185	8	18	145	185	8	18	145	185	8	18	145	185	8	18	145
80 <sup>1)</sup>	92	190	4	18	150	200	8	18	160	200	8	18	160	200	8	18	160	200	8	18	160
100	115	210	4	18	170	220	8	18	180	220	8	18	180	235	8	22	190	235	8	22	190
125	141	240	8	18	200	250	8	18	210	250	8	18	210	270	8	26	220	270	8	26	220
150	169	265	8	18	225	285	8	22	240	285	8	22	240	300	8	26	250	300	8	26	250
200	220	320	8	18	280	340	8	22	295	340	12	22	295	360	12	26	310	375	12	30	320
250	273	375	12	18	335	395	12	22	350	405	12	26	355	425	12	30	370	450	12	33	385
300	324	440	12	22	395	445	12	22	400	460	12	26	410	485	16	30	430	515	16	33	450
350	356	490	12	22	445	505	16	22	460	520	16	26	470	555	16	33	490	580	16	36	510
400	407	540	16	22	495	565	16	26	515	580	16	30	525	620	16	36	550	660	16	39	585
450	458	595	16	22	550	615	20	26	565	640	20	30	585	670	20	36	600	685	20	39	610
500	508	645	20	22	600	670	20	26	620	715	20	33	650	730	20	36	660	755	20	42	670
600	610	755	20	26	705	780	20	30	725	840	20	36	770	845	20	39	770	890	20	48	795
700	712	-	-	-	-	895	24	30	840	910	24	36	840	960	24	42	875	-	-	-	-
800	813	-	-	-	-	1015	24	33	950	1025	24	39	950	1085	24	48	990	-	-	-	-
900	915	-	-	-	-	1115	28	33	1050	1125	28	39	1050	1185	28	48	1090	-	-	-	-
1000	1016	-	-	-	-	1230	28	36	1160	1255	28	42	1170	1320	28	56	1210	-	-	-	-
1100	1120	-	-	-	-	1340	32	39	1270	1355	32	42	1270	1420	32	56	1310	-	-	-	-
1200	1220	-	-	-	-	1455	32	39	1380	1485	32	48	1390	1530	32	56	1420	-	-	-	-
1400	1420	-	-	-	-	1675	36	42	1590	1685	36	48	1590	1755	36	62	1640	-	-	-	-
1500 <sup>2)</sup>	1520	-	-	-	-	1785	36	42	1700	1820	36	56	1710	1865	36	62	1750	-	-	-	-
1600	1620	-	-	-	-	1915	40	48	1820	1930	40	56	1820	1975	40	62	1860	-	-	-	-
1800	1820	-	-	-	-	2115	44	48	2020	2130	44	56	2020	2195	44	70	2070	-	-	-	-
2000	2020	-	-	-	-	2325	48	48	2230	2345	48	62	2230	2425	48	70	2300	-	-	-	-

<sup>1)</sup> inner diameter deviating (89 mm) from the DIN EN 1514-1

<sup>2)</sup> only for cast iron flanges

<sup>3)</sup> tolerances as per DIN ISO 2768 tolerance class V

## Flat gaskets dimensions as per company standard 41016 as per DIN EN 12560-1 and ASME B16.21

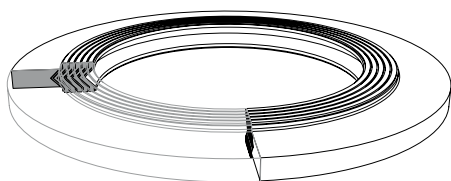
dimension in mm <sup>1)</sup>

nominal width		d1 (mm)	type IBC				type FF					type SR	type TG	
DN	NPS (inch)		Class 150	Class 300	Class 600	Class 900	d2 (mm)	screw holes			LK Class 150 (mm)	Class 300-900	Class 300-900	
			d2 (mm)					n	Ø (mm)	Ø (inch)		d2 (mm)	d1 (mm)	d2 (mm)
15	1/2	22	47.5	54.0		63.5	89.0	4	15.9	5/8	60.3	35.0	25.5	35.0
20	3/4	27	57.0	66.5		69.5	98.0	4	15.9	5/8	69.8	43.0	33.5	43.0
25	1	34	66.5	73.0		79.0	108.0	4	15.9	5/8	79.4	51.0	38.0	51.0
32	1 1/4	43	76.0	82.5		89.0	117.0	4	15.9	5/8	88.9	64.0	47.5	64.0
40	1 1/2	49	85.5	95.0		98.0	127.0	4	15.9	5/8	98.4	73.0	54.0	73.0
50	2	61	104.5	111.0		142.5	152.0	4	19.0	3/4	120.6	92.0	73.0	92.0
65	2 1/2	73	124.0	130.0		165.0	178.0	4	19.0	3/4	139.7	105.0	85.5	105.0
80	3	89	136.5	149.0		168.0	190.0	4	19.0	3/4	152.4	127.0	108.0	127.0
100	4	115	174.5	181.0	193.5	206.0	229.0	8	19.0	3/4	190.5	157.0	132.0	157.0
125	5	141	196.5	216.0	241.0	247.5	254.0	8	22.2	7/8	215.9	186.0	160.5	186.0
150	6	169	222.0	251.0	266.5	289.0	279.0	8	22.2	7/8	241.3	216.0	190.5	216.0
200	8	220	279.0	308.0	320.5	358.5	343.0	8	22.2	7/8	298.4	270.0	238.0	270.0
250	10	273	339.5	362.0	400.0	435.0	406.0	12	25.4	1	362.0	324.0	286.0	324.0
300	12	324	409.5	422.0	457.0	498.5	483.0	12	25.4	1	431.8	381.0	343.0	381.0
350	14	356	450.5	485.5	492.0	520.5	533.0	12	28.6	1 1/8	476.2	413.0	374.5	413.0
400	16	407	514.0	539.5	565.0	574.5	597.0	16	28.6	1 1/8	539.8	470.0	425.5	470.0
450	18	458	549.0	597.0	612.5	638.0	635.0	16	31.8	1 1/4	577.8	533.0	498.0	533.0
500	20	508	606.5	654.0	682.5	698.5	698.0	20	31.8	1 1/4	635.0	584.0	533.5	584.0
600	24	610	717.5	774.5	790.5	838.0	813.0	20	34.9	1 3/8	749.3	692.0	641.5	692.0

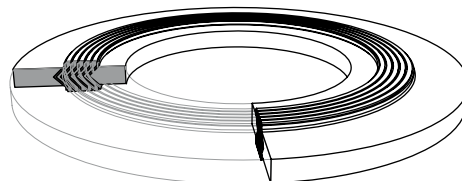
<sup>1)</sup> tolerances as per DIN ISO 2768 tolerance class V

## Spiral-wound gaskets dimensions

Formen as per DIN EN 1514-2



Form C/O, gasket with centering ring



Form C/I, gasket with centering ring and inner ring

Material identification for spiral and inner ring for circumference of outer ring:

### ■ Spiral, Inner ring:

material	colour code	
1.4301 (304)	yellow	
1.4404 (316L)	dark green	
1.4571 (316Ti)	light green	
1.4541 (321)	turquoise	
1.0033	silver	
2.4360 (Monel 400)	orange	
2.4816 (Inconel 600)	gold	
3.7025 (Titan)	purple	
Hastelloy C	fawn	

### ■ Sealing part

Graphite	grey	
PTFE	white	

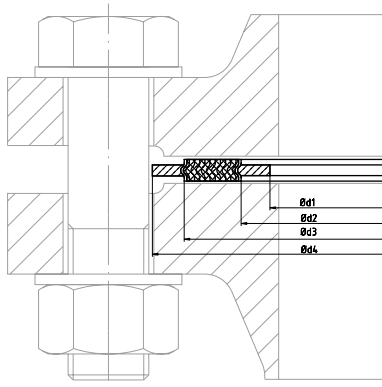
### ■ outer ring

C-steel zinc coated or powder coated, 1.4571; 1.4541 or similar.

Style as per IDT company standard:

<b>SD01:</b> without inner and centring ring	<b>SD10:</b> with inner and centring ring (corresponds to Form C/I)	<b>SD20:</b> without inner ring (corresponds to Form C/O)	<b>SD30:</b> with inner ring

## Spiral-wound gaskets dimensions SD10/SD20 as per company standard 41-14 according to DIN EN 1514-2



Ø d1 inner diameter of inner ring (only SD10)

Ø d2 inner diameter of sealing element

Ø d3 inner diameter of outer ring

Ø d4 inner diameter of outer ring

dimension in mm <sup>1)</sup>

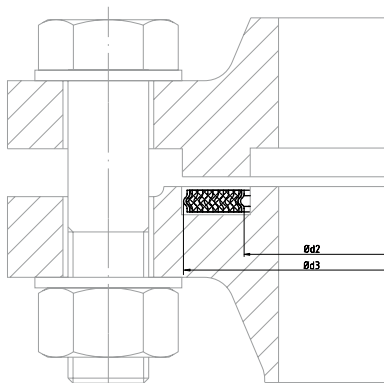
DN	d1 (mm)	d2 (mm)	d3 (mm)		d4 (mm)								
	PN 10-320	PN 10-320	PN 10-40	PN 63-320	PN 10	PN 16	PN 25	PN 40	PN 63	PN 100	PN 160	PN 250	PN 320
10	18	24	34		46				56			67	
15	23	29	39		51				61			72	
20	28	34	46	-	61				-			77	-
25	35	41	53		71				82			83	92
32	43	49	61	-	82				-			100	-
40	50	56	68		92				103			109	119
50	61	70	86		107				113	119		124	134
65	77	86	102	106	127				137	143		153	170
80	90	99	115	119	142				148	154		170	190
100	115	127	143	147	162		168		174	180		202	229
125	140	152	172	176	192		194		210	217		242	274
150	167	179	199	203	217		224		247	257		284	311
200	216	228	248	252	272		284	290	309	324		358	398
250	267	279	303	307	327	328	340	352	364	391	388	442	488
300	318	330	354	358	377	383	400	417	424	458		538	-
350	360	376	400	404	437	443	457	474	486	512	-	-	-
400	410	422	450	456	488	495	514	546	543	572	-	-	-
500	510	522	550	556	593	617	624	628	657	704	-	-	-
600	610	622	650	656	695	734	731	747	764	813	-	-	-
700	710	722	756	762	810	804	833	852	879	950	-	-	-
800	810	830	864	870	917	911	942	974	988	-	-	-	-
900	910	930	964	970	1017	1011	1042	1084	1108	-	-	-	-
1000	1010	1030	1074	1080	1124	1128	1154	1194	1220	-	-	-	-
1200	1210	1230	1280	-	1324	1342	1364	1398	1452	-	-	-	-
1400	1420	1450	1510	-	1548	1542	1578	1618	-	-	-	-	-
1600	1630	1660	1720	-	1772	1764	1798	1830	-	-	-	-	-
1800	1830	1860	1920	-	1972	1964	2000	-	-	-	-	-	-
2000	2020	2050	2120	-	2182	2168	2230	-	-	-	-	-	-
2200	2230	2260	2330	-	2384	2378	-	-	-	-	-	-	-
2400	2430	2460	2530	-	2594	-	-	-	-	-	-	-	-
2600	2630	2660	2730	-	2794	-	-	-	-	-	-	-	-
2800	2830	2860	2930	-	3014	-	-	-	-	-	-	-	-
3000	3030	3060	3130	-	3228	-	-	-	-	-	-	-	-

<sup>1)</sup> tolerances as per WN 41 - 14

## Spiral-wound gaskets dimensions SD01/SD30 for tongue/groove and male-female flanges as per company standard 41-14 according to DIN EN 1514-2

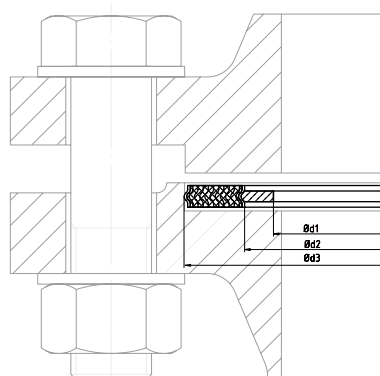
### SD01

without inner and centring ring for tongue/groove flange



### SD30

with inner ring for male/female flanges



dimension in mm <sup>1)</sup>

SD01		
DN	d2 (mm)	d3 (mm)
	PN 10-160	
10	24	34
15	29	39
20	36	50
25	43	57
32	51	65
40	61	75
50	73	87
65	95	109
80	106	120
100	129	149
125	155	175
150	183	203
200	239	259
250	292	312
300	343	363
350	395	421
400	449	473
500	549	575
600	649	675
700	751	777
800	856	882
900	961	987
1000	1062	1092

SD30			
DN	d1 (mm)	d2 (mm)	d3 (mm)
	PN 10-100		
10	18	24	34
15	23	29	39
20	28	36	50
25	35	43	57
32	43	51	65
40	50	61	75
50	61	73	87
65	77	95	109
80	90	106	120
100	115	129	149
125	140	155	175
150	167	183	203
200	216	239	259
250	267	292	312
300	318	343	363
350	360	395	421
400	410	449	473
500	510	549	575
600	610	649	675
700	710	751	777
800	810	856	882
900	910	961	987
1000	1010	1062	1092

<sup>1)</sup> tolerances:

size (mm)	< 600	600 - 800	800 - 1600
d1, d2	± 0,4	± 0,8	± 1,2
d3	± 0,8	± 1,6	± 1,6



# Spiral-wound gaskets dimensions in steel flange as per company standard WN 41-17 according to DIN EN 12560-2 for flanges as per ASME B16.5

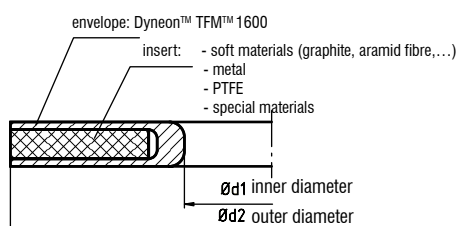
dimension in mm <sup>1)</sup>

Nominal width		d1 (mm)					d2 (mm)					d3 (mm)		d4 (mm)						
		Class					Class					Class		Class						
DN	NPS (inch)	150-300	600	900	1500	2500	150-300	600	900	1500	2500	150-600	900-2500	150	300	600	900	1500	2500	
15	1/2	14.3					19.1					31.8		47.8	54.1		63.5		69.9	
20	3/4	20.7					25.4					39.6		57.2	66.8		69.9		76.2	
25	1	27.0					31.8					47.8		66.8	73.2		79.5		85.9	
32	1 1/4	38.1		33.4			47.8		39.6			60.5		76.2	82.6		88.9		104.9	
40	1 1/2	44.5		41.3			54.1		47.8			69.9		85.9	95.3		98.6		117.6	
50	2	55.6		52.4			69.9		58.7			85.9		104.9	111.3		143.0		146.1	
65	2 1/2	66.7		63.5			82.6		69.9			98.6		124.0	130.3		165.1		168.4	
80	3	81.0		81.0			101.6		95.3		92.2		120.7		136.7	149.4		168.4	174.8	196.9
100	4	106.4					127.0		120.7		117.6		149.4		174.8	181.1	193.8	206.5	209.6	235.0
125	5	131.8					155.7		147.6		143.0		177.8		196.9	215.9	241.3	247.7	254.0	279.4
150	6	157.2					182.6		174.8		171.5		209.6		222.3	251.0	266.7	289.1	282.7	317.5
200	8	215.9	209.6	196.9			233.4	225.6	222.3	215.9		263.7	257.3	279.4	308.1	320.8	358.9	352.6	387.5	
250	10	268.3	260.4	246.1			287.3	274.6	276.4	266.7	270.0	317.5	311.2	339.9	362.0	400.1	435.1	435.1	476.3	
300	12	317.5		292.1			339.9	327.2	323.9	323.9	317.5	374.7	368.3	409.7	422.4	457.2	498.6	520.7	549.4	
350	14	349.3		320.8		-	371.6	362.0	355.6	362.0	-	406.4	400.1	450.9	485.9	492.3	520.7	577.9	-	
400	16	400.0		374.7		-	422.4	412.8		406.4		-	463.6	457.2	514.4	539.8	565.2	574.8	641.4	-
450	18	449.3		425.5		-	474.7	469.9	463.6		-	527.1	520.2	549.4	596.9	612.9	638.3	704.9	-	
500	20	500.0		482.6	476.3	-	525.5	520.7		514.4		-	577.9	571.5	606.6	654.1	682.8	698.5	755.7	-
600	24	603.3		590.6	577.9	-	628.7			616.0		-	685.8	679.5	717.6	774.7	790.7	838.2	901.7	-

<sup>1)</sup> tolerances as per WN 41-17

## PTFE envelope gaskets dimensions for steel flanges

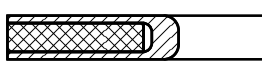
### Designs and profiles



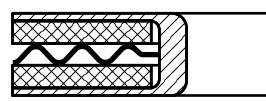
**ED01 (PW-I):** with corrugated metallic ring



**ED10 <sup>1)</sup>:** with soft material insert such as graphite, aramid fibre. etc.



**ED30 <sup>1)</sup>:** with corrugated metallic ring and two soft material inserts



### PTFE envelope gaskets dimensions for steel flanges as per company standard 43-02 according to DIN EN 1514-3 <sup>1)</sup>

dimension in mm <sup>2)</sup>

DN	d1 (mm)	d2 (mm)					
		PN 6	PN 10	PN 16	PN 25	PN 40	PN 63
10	18	39		46			56
15	22	44		51			61
20	27	54		61			72
25	34	64		71			82
32	43	76		82			88
40	49	86		92			103
50	61	96		107			113
65	77	116		127			138
80	89	132		142			148
100	115	152	162		168		174
125	141	182	192		194		210
150	169	207	218		224		247
200	220	262	273		284	290	309
250	273	317	328	329	340	352	364
300	324	373	378	384	400	417	424
350	356	423	438	444	457	474	486
400	407	473	489	495	514	546	543
450	458	528	539	555	564	571	-
500	508	578	594	617	624	628	-
600	610	679	695	734	731	747	-

### PTFE envelope gaskets dimensions for steel flanges as per company standard according to DIN EN 12560-3 <sup>1)</sup>

dimension in mm <sup>2)</sup>

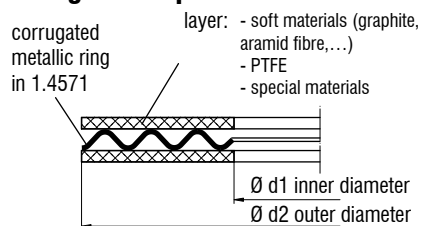
Nennweite		d1 (mm)	d2 (mm)	
DN	NPS (inch)		Class 150	Class 300
15	1/2	22	47.5	54.0
20	3/4	27	57.0	66.5
25	1	34	66.5	73.0
32	1 1/4	43	76.0	82.5
40	1 1/2	49	85.5	95.0
50	2	61	104.5	111.0
65	2 1/2	73	124.0	130.0
80	3	89	136.5	149.0
100	4	115	174.5	181.0
125	5	141	196.5	216.0
150	6	169	222.0	251.0
200	8	220	279.0	308.0
250	10	273	339.5	362.0
300	12	324	409.5	422.0
350	14	356	450.5	485.5
400	16	407	514.0	539.5
450	18	458	549.0	597.0
500	20	508	606.5	654.0
600	24	610	717.5	774.5

<sup>1)</sup> please contact manufacturer for measuring tables for enamel flanges

<sup>2)</sup> tolerances according to DIN ISO 2768 tolerance class V

## Corrugated metallic gaskets dimensions

### Designs and profiles



**WD20:** corrugated metallic gasket with inner eyelet



**WD12:** corrugated metallic gasket with partial layer



**WD10:** corrugated metallic gasket with full graphite layer



**WD24:** corrugated metallic gasket with partial layer and inner eyelet

### Corrugated metallic gaskets dimensions as per company standard 41-32 according to DIN EN 1514-4

dimension in mm <sup>1)</sup>

DN	d1 (mm)	d2 (mm)					
		PN 10	PN 16	PN 25	PN 40	PN 63	PN 100
10	18			48		58	
15	22			53		63	
20	27			63		74	
25	34			73		84	
32	43			84		90	
40	49			94		105	
50	61			109		115	121
65	77			129		140	146
80	89			144		150	156
100	115	164		170		176	183
125	141	194		196		213	220
150	169	220		226		250	260
200	220	275		286	293	312	327
250	273	330		343	355	367	394
300	324	380	386	403	420	427	461
350	356	440	446	460	477	489	515
400	407	491	498	517	549	546	575
450	458	541	558	567	574	-	-
500	508	596	620	627	631	660	708
600	610	698	737	734	750	768	819
700	712	813	807	836	-	883	956
800	813	920	914	945	-	994	-
900	915	1020	1014	1045	-	1114	-

### Corrugated metallic gaskets dimensions as per company standard according to DIN EN 12560-4

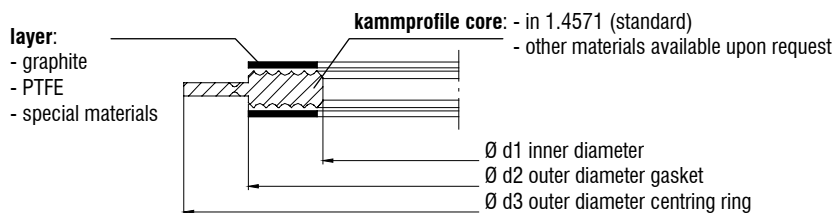
dimension in mm <sup>1)</sup>

DN	NPS (inch)	d1 (mm)	d2 (mm)					
			Class 150	Class 300	Class 600	Class 900	Class 1500	Class 2500
15	1/2	22	47.6	54.0		63.5		69.9
20	3/4	27	57.2	66.7		69.9		76.2
25	1	34	66.7	73.0		79.4		85.7
32	1 1/4	43	76.2	82.6		88.9		104.8
40	1 1/2	49	85.7	95.3		98.4		117.5
50	2	61	104.8	111.1		142.9		146.1
65	2 1/2	73	123.8	130.2		165.1		168.3
80	3	89	136.5	149.2		168.3	174.6	196.9
100	4	115	174.6	181.0	193.7	206.4	209.6	235.0
125	5	141	196.9	215.9	241.3	247.7	254.0	279.4
150	6	169	222.3	250.8	266.7	288.9	282.6	317.5
200	8	220	279.4	308.0	320.7	358.8	352.4	387.4
250	10	273	339.7	362.0	400.1	435.0	435.0	476.3
300	12	324	409.6	422.3	457.2	498.5	520.7	549.3
350	14	356	450.9	485.8	492.1	520.7	577.9	-
400	16	407	514.4	539.8	565.2	574.7	641.4	-
450	18	458	549.3	596.9	612.8	638.2	704.9	-
500	20	508	606.4	654.1	682.6	698.5	755.7	-
600	24	610	717.6	774.7	790.6	838.2	901.7	-

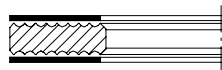
<sup>1)</sup> tolerances as per DIN ISO 2768 tolerance class V

# Kammprofile gaskets dimensions

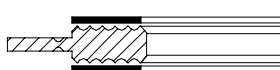
## Designs and profiles



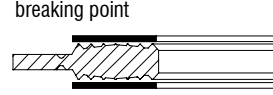
**KD01:** Kammprofile without centring edge for tongue and groove



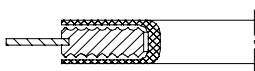
**KD20:** Kammprofile with cranked centring ring and predetermined breaking point



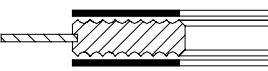
**KD24:** kammprofile with convex-shaped basic body, machined centring ring and pre-determined breaking point



**KD33:** kammprofile with lose centering ring and PTFE envelope



**KD30:** Kammprofile with lose centering ring, thickness 1.5 mm



## Kammprofile gaskets dimensions as per company standard 43-04 according to DIN EN 1514-6

dimension in mm <sup>1)</sup>

DN	d1 (mm)	d2 (mm)			d3 (mm)									
		PN 10/40	PN 64/160	PN 250/400	PN 10	PN 16	PN 25	PN 40	PN 64	PN 100	PN 160	PN 250	PN 320	PN 400
10	22	36			46				56			67		
15	26	42			51				61			72		-
20	31	47			61				-	-	-	-	-	-
25	36	52			71				82			83	92	104
32	46	62	66		82				-	-	-	-	-	-
40	53	69	73		92				103			109	119	135
50	65	81	87		107				113	119		124	134	150
65	81	100	103		127				137	143		153	170	192
80	95	115	121		142				148	154		170	190	207
100	118	138	146		162		168		174	180		202	229	256
125	142	162	178		192		194		210	217		242	274	301
150	170	190	212		217		224		247	257		284	311	348
175	195	215		245	247		254	265	277	287	284	316	358	402
200	220	240	248	280	272		284	290	309	324		358	398	442
250	270	290	300	340	327	328	340	352	364	391	388	442	488	-
300	320	340	356	400	377	383	400	417	424	458		536	-	-
350	375	395	415	-	437	443	457	474	486	512	-	-	-	-
400	426	450	474	-	489	495	514	546	543	572	-	-	-	-
450	480	506	-	-	539	555	-	571	-	-	-	-	-	-
500	530	560	588	-	594	617	624	628	657	704	-	-	-	-
600	630	664	700	-	695	734	731	747	764	813	-	-	-	-
700	730	770	812	-	810	804	833	852	879	950	-	-	-	-
800	830	876	886	-	917	911	942	974	988	-	-	-	-	-
900	930	982	994	-	1017	1011	1042	1084	1108	-	-	-	-	-
1000	1040	1098	1110	-	1124	1128	1154	1194	1220	-	-	-	-	-
1200	1250	1320	1334	-	1341	1342	1364	1398	1452	-	-	-	-	-
1400	1440	1522	-	-	1548	1542	1578	1618	-	-	-	-	-	-
1600	1650	1742	-	-	1772	1764	1798	1830	-	-	-	-	-	-
1800	1850	1914	-	-	1972	1964	2000	-	-	-	-	-	-	-
2000	2050	2120	-	-	2182	2168	2230	-	-	-	-	-	-	-
2200	2250	2328	-	-	2384	2378	-	-	-	-	-	-	-	-
2400	2460	2512	-	-	2594	-	-	-	-	-	-	-	-	-
2600	2670	2728	-	-	2794	-	-	-	-	-	-	-	-	-
2800	2890	2952	-	-	3014	-	-	-	-	-	-	-	-	-
3000	3100	3166	-	-	3228	-	-	-	-	-	-	-	-	-

<sup>1)</sup> tolerances as per DIN EN 1514-6

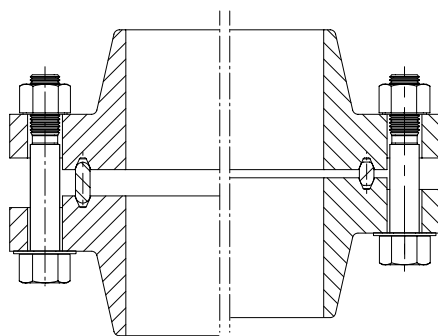
**Kammprofile gaskets dimensions as per company standard 43-04 according to DIN EN 12560-6**dimension in mm <sup>1)</sup>

NPS (inch)	d1 (mm)	d2 (mm)	d3 (mm)						
			Class 150	Class 300	Class 400	Class 600	Class 900	Class 1500	Class 2500
1/2	23.0	33.3	44.4		50.8		60.3		66.7
3/4	28.6	39.7	53.9		63.5		66.7		73.0
1	36.5	47.6	63.5		69.8		76.2		82.5
1 1/4	44.4	60.3	73.0		79.4		85.7		101.6
1 1/2	52.4	69.8	82.5		92.1		95.2		114.3
2	69.8	88.9	101.6		108.0		139.7		142.8
2 1/2	82.5	101.6	120.6		127.0		161.9		165.1
3	98.4	123.8	133.4		146.1		165.1	171.5	193.7
3 1/2	111.1	136.5	158.8	161.9	158.7		-	-	-
4	123.8	154.0	171.5	177.8	174.6	190.5	203.2	206.4	231.7
5	150.8	182.6	193.7	212.7	209.5	238.1	244.5	250.8	276.2
6	177.8	221.7	219.1	247.7	244.5	263.5	285.8	279.4	314.3
8	228.6	266.7	276.2	304.8	301.6	317.5	355.6	349.3	384.1
10	282.6	320.7	336.5	358.8	355.6	396.9	431.8	431.8	473.0
12	339.7	377.8	406.4	419.1	415.9	454.0	495.3	517.1	546.1
14	371.5	409.6	447.7	482.6	479.4	488.9	517.5	574.7	-
16	422.3	466.7	511.2	536.6	533.4	561.9	571.5	638.1	-
18	479.4	530.2	546.1	593.7	590.5	609.6	635.0	701.7	-
20	530.2	581.0	603.2	650.9	644.5	679.5	695.3	752.4	-
22	581.0	631.8	657.2	701.7	698.5	730.3	-	-	-
24	631.8	682.6	714.4	771.5	765.2	787.4	835.0	898.5	-

<sup>1)</sup> tolerances as per DIN EN 12560-6

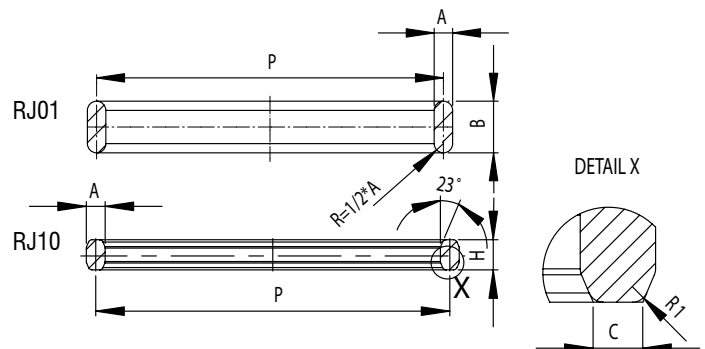


## Ring-Joint gaskets (RTJ) dimensions



a) oval form  
(IDT style: RJ01)

b) octagonal form  
(IDT style: RJ10)



### Ring-Joint gaskets (RTJ) dimensions according to ASME/ANSI B16.5 and DIN EN 12560-5

Class-level of flanges					Ring-number	average flank dia- meter of ring, P	ring width, A	ring height		edge length of octagonal ring, C
150	300 and 600	900	1500	2500				oval, B	octago- nal, H	
nominal width DN mm (inch)						mm	mm	mm	mm	mm
-	15 (1/2)	-	-	-	<b>R.11</b>	34,13	6,35	11,11	9,53	4,32
-	-	15 (1/2)	15 (1/2)	-	<b>R.12</b>	39,69	7,94	14,29	12,70	5,23
-	20 (3/4)	-	-	15 (1/2)	<b>R.13</b>	42,86	7,94	14,29	12,70	5,23
-	-	20 (3/4)	20 (3/4)	-	<b>R.14</b>	44,45	7,94	14,29	12,70	5,23
25 (1)	-	-	-	-	<b>R.15</b>	47,63	7,94	14,29	12,70	5,23
-	25 (1)	25 (1)	25 (1)	20 (3/4)	<b>R.16</b>	50,80	7,94	14,29	12,70	5,23
32(1.1/4)	-	-	-	-	<b>R.17</b>	57,15	7,94	14,29	12,70	5,23
-	32(1.1/4)	32(1.1/4)	32(1.1/4)	25 (1)	<b>R.18</b>	60,33	7,94	14,29	12,70	5,23
40(1.1/2)	-	-	-	-	<b>R.19</b>	65,09	7,94	14,29	12,70	5,23
-	40(1.1/2)	40(1.1/2)	40(1.1/2)	-	<b>R.20</b>	68,26	7,94	14,29	12,70	5,23
-	-	-	-	32(1.1/4)	<b>R.21</b>	72,23	11,11	17,46	15,88	7,75
50 (2)	-	-	-	-	<b>R.22</b>	82,55	7,94	14,29	12,70	5,23
-	50 (2)	-	-	40(1.1/2)	<b>R.23</b>	82,55	11,11	17,46	15,88	7,75
-	-	50 (2)	50 (2)	-	<b>R.24</b>	95,25	11,11	17,46	15,88	7,75
65(2.1/2)	-	-	-	-	<b>R.25</b>	101,60	7,94	14,29	12,70	5,23
-	65(2.1/2)	-	-	50 (2)	<b>R.26</b>	101,60	11,11	17,46	15,88	7,75
-	-	65(2.1/2)	65(2.1/2)	-	<b>R.27</b>	107,95	11,11	17,46	15,88	7,75
-	-	-	-	65(2.1/2)	<b>R.28</b>	111,13	12,70	19,05	17,46	8,66
80 (3)	-	-	-	-	<b>R.29</b>	114,30	7,94	14,29	12,70	5,23
-	80 (3)	-	-	-	<b>R.30</b>	117,48	11,11	17,46	15,88	7,75
-	80 (3)	80 (3)	-	-	<b>R.31</b>	123,83	11,11	17,46	15,88	7,75
-	-	-	-	80 (3)	<b>R.32</b>	127,00	12,70	19,05	17,46	8,66
-	-	-	80 (3)	-	<b>R.35</b>	136,53	11,11	17,46	15,88	7,75
100 (4)	-	-	-	-	<b>R.36</b>	149,23	7,94	14,29	12,70	5,23
-	100 (4)	100 (4)	-	-	<b>R.37</b>	149,23	11,11	17,46	15,88	7,75
-	-	-	-	100 (4)	<b>R.38</b>	157,16	15,88	22,23	20,64	10,49
-	-	-	100 (4)	-	<b>R.39</b>	161,93	11,11	17,46	15,88	7,75

**Ring-Joint gaskets (RTJ) dimensions according to ASME/ANSI B16.5 and DIN EN 12560-5**

Class-level of flanges					Ring-number	average flank diameter of ring, P	ring width, A	ring height		edge length of octagonal ring, C
150	300 and 600	900	1500	2500				oval, B	octagonal, H	
nominal width DN mm (inch)						mm	mm	mm	mm	mm
125 (5)	-	-	-	-	<b>R.40</b>	171,45	7,94	14,29	12,70	5,23
-	125 (5)	125 (5)	-	-	<b>R.41</b>	180,98	11,11	17,46	15,88	7,75
-	-	-	-	125 (5)	<b>R.42</b>	190,50	19,05	25,40	23,81	12,32
150 (6)	-	-	-	-	<b>R.43</b>	193,68	7,94	14,29	12,70	5,23
-	-	-	125 (5)	-	<b>R.44</b>	193,68	11,11	17,46	15,88	7,75
-	150 (6)	150 (6)	-	-	<b>R.45</b>	211,14	11,11	17,46	15,88	7,75
-	-	-	150 (6)	-	<b>R.46</b>	211,14	12,70	19,05	17,46	8,66
-	-	-	-	150 (6)	<b>R.47</b>	228,60	19,05	25,40	23,81	12,32
200 (8)	-	-	-	-	<b>R.48</b>	247,65	7,94	14,29	12,70	5,23
-	200 (8)	200 (8)	-	-	<b>R.49</b>	269,88	11,11	17,46	15,88	7,75
-	-	-	200 (8)	-	<b>R.50</b>	269,88	15,88	22,23	20,64	10,49
-	-	-	-	200 (8)	<b>R.51</b>	279,40	22,23	28,58	26,99	14,81
250 (10)	-	-	-	-	<b>R.52</b>	304,80	7,94	14,29	12,70	5,23
-	250 (10)	250 (10)	-	-	<b>R.53</b>	323,85	11,11	17,46	15,88	7,75
-	-	-	250 (10)	-	<b>R.54</b>	323,85	15,88	22,23	20,64	10,49
-	-	-	-	250 (10)	<b>R.55</b>	342,90	28,58	36,51	34,93	19,81
300 (12)	-	-	-	-	<b>R.56</b>	381,00	7,94	14,29	12,70	5,23
-	300 (12)	300 (12)	-	-	<b>R.57</b>	381,00	11,11	17,46	15,88	7,75
-	-	-	300 (12)	-	<b>R.58</b>	381,00	22,23	28,58	26,99	14,81
350 (14)	-	-	-	-	<b>R.59</b>	396,88	7,94	14,29	12,70	5,23
-	-	-	-	300 (12)	<b>R.60</b>	406,40	21,75	39,69	38,10	22,33
-	350 (14)	-	-	-	<b>R.61</b>	419,10	11,11	17,46	15,88	7,75
-	-	350 (14)	-	-	<b>R.62</b>	419,10	15,88	22,23	20,64	10,49
-	-	-	350 (14)	-	<b>R.63</b>	419,10	25,40	33,34	31,75	17,30
400 (16)	-	-	-	-	<b>R.64</b>	454,03	7,94	14,29	12,70	5,23
-	400 (16)	-	-	-	<b>R.65</b>	469,90	11,11	17,46	15,88	7,75
-	-	400 (16)	-	-	<b>R.66</b>	469,90	15,88	22,23	20,64	10,49
-	-	-	400 (16)	-	<b>R.67</b>	469,90	28,58	36,51	34,93	19,81
450 (18)	-	-	-	-	<b>R.68</b>	517,53	7,94	14,29	12,70	5,23
-	450 (18)	-	-	-	<b>R.69</b>	533,40	11,11	17,46	15,88	7,75
-	-	450 (18)	-	-	<b>R.70</b>	533,40	19,05	25,40	23,81	12,32
-	-	-	450 (18)	-	<b>R.71</b>	533,40	28,58	36,51	34,93	19,81
500 (20)	-	-	-	-	<b>R.72</b>	558,80	7,94	14,29	12,70	5,23
-	500 (20)	-	-	-	<b>R.73</b>	584,20	12,70	19,05	17,46	8,66
-	-	500 (20)	-	-	<b>R.74</b>	584,20	19,05	25,40	23,81	12,32
-	-	-	500 (20)	-	<b>R.75</b>	584,20	31,75	39,69	38,10	22,33
600 (24)	-	-	-	-	<b>R.76</b>	673,10	7,94	14,29	12,70	5,23
-	600 (24)	-	-	-	<b>R.77</b>	692,15	15,88	22,23	20,64	10,49
-	-	600 (24)	-	-	<b>R.78</b>	692,15	25,40	33,34	31,75	17,30
-	-	-	600 (24)	-	<b>R.79</b>	692,15	34,93	44,45	41,28	24,82

**Limiting deviation**

Abbrev.	Name	Limiting deviation	Abbrev.	Name	Limiting deviation
P	average flank diameter of ring	±0,18 mm	C	Edge length of octagonal ring	±0,20 mm
A	ring width	±0,20 mm		angle 23 °	± 0,5 °
B and H	ring height	±0,40 mm	R1	ring radius	± 0,40 mm

## Approvals

IDT-code	product	TA-Luft <sup>4)</sup> VDI 2440 /2200	BAM <sup>1)</sup> oxygen	DVGW <sup>2)</sup>	KTW <sup>3)</sup> TZW	Fire Safe	FDA	Blow-out safety	others
WS 3400	UNISEAL® 3400	x	X 80 °C/100 bar	x	x	x	x		SVGW; ÖVGW; HTB; VP 401
WS 3400-IB	UNISEAL® 3400 with inner eyelet	x	X 80 °C / 100 bar	x	x		x	x	
WS 3700	UNISEAL® 3700 (Trafo- matic)			x					
WS 3800	SIGRAFLEX® Folie		X 200 °C / 130 bar and liquid oxygen	x	x				
WS 3850	SIGRAFLEX® STANDARD		X 200 °C / 130 bar and liquid oxygen	x	x				
WS 3840	SIGRAFLEX® ECONOMY		X 200 °C / 130 bar and liquid oxygen	x					
WS 3830-IB	SIGRAFLEX® SELECT with inner eyelet 1.4571	x	X 250 °C / 130 bar and liquid oxygen	x		x		x	
WS 3862	SIGRAFLEX® UNIVERSAL		X 200 °C / 130 bar and liquid oxygen	x				x	ethylene oxide/propylene oxide on ships US Coast- Guard; BAM ethylene oxide/ propylene oxide; German Lloyd
WS 3862-IB	SIGRAFLEX® UNIVERSAL with inner eyelet		X 200 °C / 130 bar and liquid oxygen	x		x		x	
WS 3865	SIGRAFLEX® UNIVERSAL PRO	x	X 200 °C / 130 bar and liquid oxygen	x				x	
WS 3865-IB	SIGRAFLEX® UNIVERSAL PRO with inner eyelet	x	X 200 °C / 130 bar and liquid oxygen	x		x		x	
WS 3870-IB	SIGRAFLEX® MF with inner eyelet 1.4571	x	X 200 °C / 130 bar	x		x	x	x	
WS 3885	SIGRAFLEX® HOCHDRUCK	X (f. Nut and Feder)	X 200 °C / 130 bar and liquid oxygen	x		x		x	ethylene oxide/propylene oxide on ships US Coast- Guard; BAM ethylene oxide/ propylene oxide; German Lloyd, TRD 401
WS 3885-IB	SIGRAFLEX® HOCHDRUCK with inner eyelet	X (mod. Bördel)	X 200 °C / 130 bar and liquid oxygen	x		x		x	TDR 401 with outer eyelet
WS 3885-HB	SIGRAFLEX® HOCHDRUCK with inner eyelet and CR	x	X 200 °C / 130 bar and liquid oxygen	x		x		x	TRD 401
WS 3885-DB	SIGRAFLEX® HOCHDRUCK with double eyelet	x	X 200 °C / 130 bar and liquid oxygen	x		x			
WS 3888	SIGRAFLEX® HOCHDRUCK PRO	x	X 200 °C / 130 bar and liquid oxygen	x		x		x	
WS 3888-IB	SIGRAFLEX® HOCHDRUCK PRO with inner eyelet	x	X 200 °C / 130 bar and liquid oxygen	x		x		x	
WS 7110	Dyneon™ TFM™ 1600	x	X nur liquid oxygen				x		
WS 7110-IB	Dyneon™ TFM™ 1600 with inner eyelet 1.4571	x	X nur liquid oxygen				x für PTFE		
WS 7110-DB	Dyneon™ TFM™ 1600 with double eyelet in 1.4571	x	X 250 °C / 130 bar and liquid oxygen				x für PTFE		
WS 7115	Dyneon™ TFM™ 4105	x	X liquid oxygen and Nut/Feder 125 °C / 40 bar				x		

<sup>1)</sup> BAM: Federal German Institute for Materials Research and Testing

<sup>2)</sup> DVGW: German Technical and Scientific Association for Gas and Water

<sup>3)</sup> KTW: Federal German Ministry of Health recommendations for maximum levels of plastics in drinking water

<sup>4)</sup> TA-Luft: German Technical Instructions on Air Quality Control

IDT-code	product	TA-Luft VDI 2440 /2200	BAM oxygen	DVGW	KTW TZW	Fire Safe	FDA	Blow-out safety	others
WS 7550	UNIFLUOR® 7500 (PTFE with micro glass ball)	x					x		German Lloyd
WS 7551	UNIFLUOR® 7511 (PTFE with silica)	x	X 150 °C / 60 bar and liquid oxygen				x		BAM Ethylene oxide/ propylene oxide
WS 7553	Unifluor 7533 (PTFE with barium sulphate)	x	X 200 °C / 70 bar and liquid oxygen				x		German Lloyd
WS 7745	ePTFE saeling sheet	x	X 160 °C / 40 bar and liquid oxygen				x	x	voluntary TÜV-test
WS 7110 / 1.4571	Dyneon™ TFM™ 1600 with corrugated metallic ring 1.4571 (PW-I)	x					X for PTFE envelope	x	
WS 7110 / 3822	PTFE envelope gasket ED10	x					X for PTFE envelope		
WS 7110 / 3822 / 1.4571	PTFE envelope gasket ED30	x					X for PTFE envelope		
WS 7110 / 3825	PTFE envelope gasket ED10	x					X for PTFE envelope		
WS 7110 / 3825 / 1.4571	PTFE envelope gasket ED30	x				x	X for PTFE envelope	x	
WS 2740	ePTFE sealing tape	x	X 90 °C / 100 bar and liquid oxygen	x			x		voluntary TÜV-test
WS 7744	ePTFE sealing tape High Density Form E	x					x		voluntary TÜV-test
WS 7770	ePTFE sealing tape FG	x	X 160 °C / 40 bar and liquid oxygen				x	x	voluntary TÜV-test
KD01; KD10; KD20; KD30	Kammprofile gaskets graphite layer 0.8 mm	x	X 200 °C / 130 bar and liquid oxygen			X KD10, 20, 30		x	
KD01; KD06; KD10; KD20; KD30	Kammprofile gaskets graphite layer 0.5 mm	x	X 200 °C / 130 bar and liquid oxygen			X KD10, 20, 30		x	
KD24	Kammprofile gaskets graphite layer 0.5 mm; 1.5 mm pitch	x	X 200 °C / 130 bar and liquid oxygen			x		x	
KD01; KD10; KD20; KD30	Kammprofile gaskets 0.5 mm layer Dyneon™ TFM™ 1600 glued	x	X 70 °C / 100 bar						
SD10	spiral-wound gasket SD10 graphite	x	X 200 °C / 130 bar and liquid oxygen			x		x	BAM ethylene oxide/ propylene oxide
SD20	spiral-wound gasket SD20 Graphit	x	X 200 °C / 130 bar and liquid oxygen			x			BAM ethylene oxide/ propylene oxide
WD10	corrugated metallic gas-ket 1.4571 / WS3800 (3.0 mm)	x	X 200 °C / 130 bar and liquid oxygen			x		x	BAM ethylene oxide/ propylene oxide
WD20	corrugated metallic gas-ket 1.4571 / WS 3800 (3.0 mm) with inner eyelet	x	X 200 °C / 130 bar and liquid oxygen			x			BAM ethylene oxide/ propylene oxide
GS10	rubber-steel gasket NBR DUO	x		x	x		x		
GS01; GS10	rubber-steel gasket EPDM	x			x		x		

## Assembly instruction

### 1. Cleaning sealing surfaces

The sealing surfaces and screws, washers and their surface areas have to be cleaned after disassembly of the old, used seal.

A wire brush with stainless steel or better brass bristles is ideal to remove seal residue or to clean the sealing surface. Always brush in circular movements in direction of the grooves for circular sealing surfaces/seals, for rectangular flanges brush longitudinal direction, to prevent that potentially created grooves never run radially. You can also use brass scrapers or similar. The contact surface of the tool should be softer than the flange surface (mostly steel) to prevent unnecessary damage.

### 2. Checks before installation

The sealing surfaces and other for the functioning important components have to be checked and prepared before installation.

#### 2.1. Fasteners(screws, nuts, washers)

Screws should be smooth-running, no corrosion, no damaged threads, ridges, crack and no other damaged spots.

The screws, but also the underside of the screw heads, the nuts and washers (all load bearing surfaces) have to be lubricated before installation. Companies and installation crews often have their specific company standards and regulations.

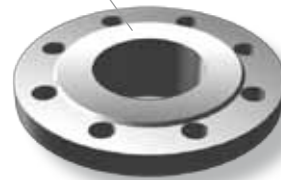
#### 2.2. Flange

The sealing surfaces have to be free from dirt and corrosion, without damage (scratches, cavities, distortion, holes), grease free, sufficiently smooth and aligned in parallel. Grooves which run radially are especially damaging. Damaged parts have to be exchanged or (if applicable with metal pastes as per manufacturer recommendation) to be repaired.

#### 2.3. Gasket

The seal has to be clean, dry and without damage. Measurements, seats, composition and sealing type have to be checked before installation.

1. Cleaning of sealing surfaces



2.1 Check fasteners before installation



2.2 Check flange before installation



2.3 Check gasket before installation





### 3. Assembly for round flange connections

The seal has to be inserted centered without mechanical stress. If necessary, use an assembly aid, like e.g. a flange expander.

The correct fit of the seal has to be checked again. If the assembly conditions are difficult, then a controlled use of a little spray adhesive onto the sealing surface for fixing may be useful.

Do not apply sealing or parting pastes or similar on sealing faces!

The screws have to be tightened with a torque wrench or other tools for controlled tightening in at least 3 steps with 30%, 60% and finally 100% of recommended bolt tightening torque cross-wise.

There might be a need for additional steps with 100% if there is a large number of screws and very compressible sealing materials.

To prevent that individual screws are missed out by accident it is recommended to mark each screw after tightening (e.g. with chalk).

Check tightening torque after these „cross-wise“ steps once more in clock-wise direction and tighten if necessary until all screws have reached the full tightening torque.

The screws should be greased or lubricated.

The diagram at the end below shows the torquing schema



### 4. Assembly for angular seal connection / special forms

The same basic principles apply as for round flange connections, however, the bolt tightening sequence may be different.

The torquing schema depends on the flange form. We are happy to develop the torque schema for your specific application scenario.

### 5. Re-tightening the gasket

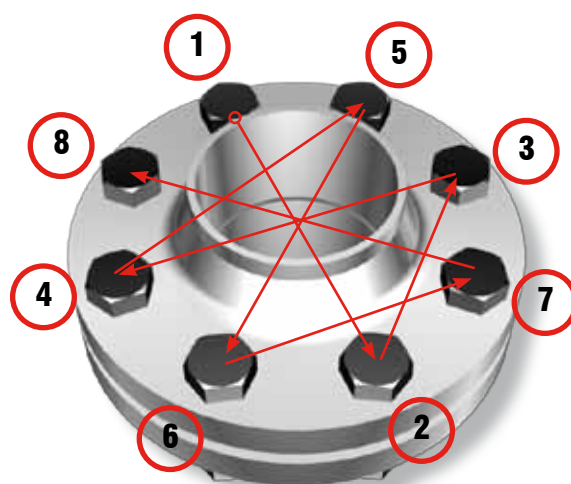
A re-tightening of IDT-flat gaskets is usually not required.

A re-tightening may be useful, if e.g. a longer period of time passed between assembly and commissioning. A re-tightening of some PTFE-variations can be beneficial and may even be an absolute requirement. If you are re-tightening, then please only in cold condition.

Elastomer bound aramid seals should not be re-tightened once they were hot.

### 6. Others

Many companies (chemical, power station and other) have their own assembly instructions. They have to be considered independently of this recommendation.



# Service

We are able to assist our customers to guarantee a continuous faultfree operation of their plants due to our cost-efficient service features and provision of seals and sealing materials

- central stock keeping of standard items at plant in Essen
- E-Commerce (CC-Chemplorer)
- stock keeping directly at customer
- 24-hours delivery stand-by of IDT-gaskets, 7 days a week (IDT-service international delivery upon request)
- internet online shop
- container provision with gaskets and staff on customer request during shut-downs
- training on site at customer
- seal calculations and recommendations
- determination gaskets characteristics in our modern test laboratory (e.g. according to DIN 28090, EN 13555, VDI 2440/2200)



## Form for stuffing box packing selection

We require the answers to the questions on this form in order to determine the right seal type for you. Please indicate norms, operating conditions and the application area for the seal, e.g. for valve, pump, boiler closure or similar. We are able to determine the right seal for your requirements from our broad range.

Valid technical norm: \_\_\_\_\_

### Valve

1. Name of valve, manufacturer, year of manufacture: \_\_\_\_\_

2. Outer diameter of spindle (mm): \_\_\_\_\_

3. Inner diameter of stuffing box (mm): \_\_\_\_\_

4. Depth of stuffing box (mm): \_\_\_\_\_

5. Operating medium: \_\_\_\_\_

6. Operating temperature max. (°C): \_\_\_\_\_

7. Operating pressure max. (bar): \_\_\_\_\_

8. Condition of spindle and stuffing box surfaces: \_\_\_\_\_

9. Gap measurements: \_\_\_\_\_

### Pump

1. Name of pump, manufacturer, year of manufacture: \_\_\_\_\_

2. Number of revolutions pump shaft (U/min): \_\_\_\_\_

3. Outer diameter of pump shaft (mm): \_\_\_\_\_

4. Inner diameter of stuffing box (mm): \_\_\_\_\_

5. Depth of stuffing box (mm): \_\_\_\_\_

6. Operating medium: \_\_\_\_\_

7. Operating temperature max (°C): \_\_\_\_\_

8. Operating pressure max (bar): \_\_\_\_\_

9. Condition of spindle (wearing shell)  
and stuffing box surfaces: \_\_\_\_\_

Furthermore the customer can also give other data, e.g. special requirements for food industry use, pharmaceutical applications etc.

We can help you faster and more efficiently if you provide a drawing or sketch of the relevant plant.

### Sender

Title, first name, name	Position
Company	Department
Street	Post code, city, country
Telephone	Fax
E-Mail	Homepage

## Form for gasket selection

We require the answers to the questions on this form in order to determine the right gasket type for you. Please indicate norms, operating conditions and the application area for the seal, e.g. for flange, valve, pump, boiler closure or similar. We are able to determine the right seal for your requirements from our broad range.

Valid technical norm: \_\_\_\_\_

### gasket application

1. Maximum pressure (bar)

2. Temperature (°C):

3. Medium:

### Flange

4. Type of flange / flange form:

5. Flange material:

6. Waviness:

### Dimension of gasket

7. Inner diameter (mm):

8. Outer diameter (mm):

9. Thickness (mm):

### Tightening bolts

10. Bolt size:

11. Number:

12. Bolt material:

13. Others:

Fixed-pitch bolt

☐

tension bolt

☐

new equipment

☐

old equipment

☐

Please fill in and tick as applicable.

We can help you faster and more efficiently if you provide a drawing or sketch of the relevant plant.

### Sender

Title, first name, name

Position

Company

Department

Street

Post code, city, country

Telephone

Fax

E-Mail

Homepage

